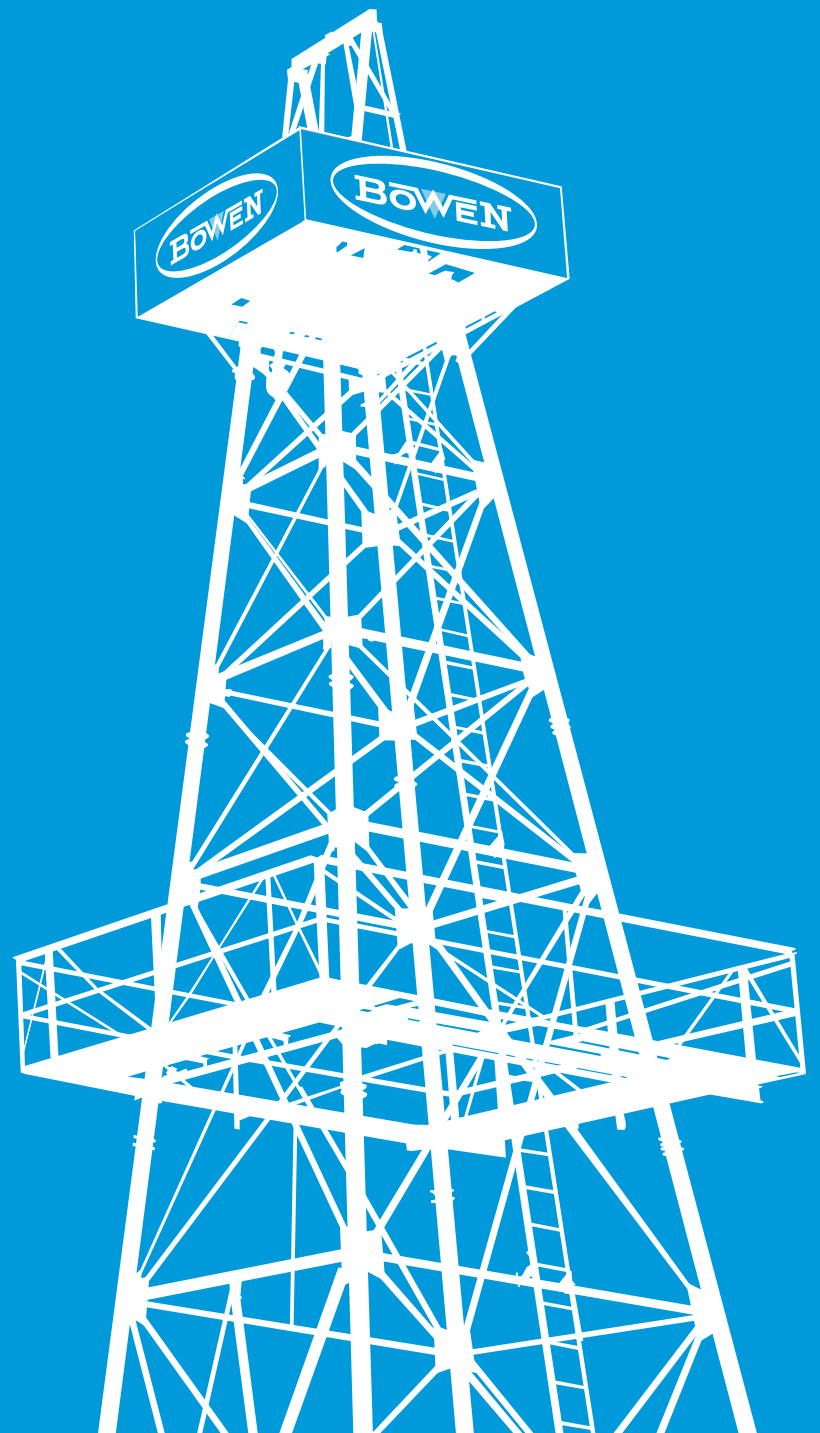


# Instruction Manuals

# **Bowen Fishing Tools**



**Bowen | NOV**

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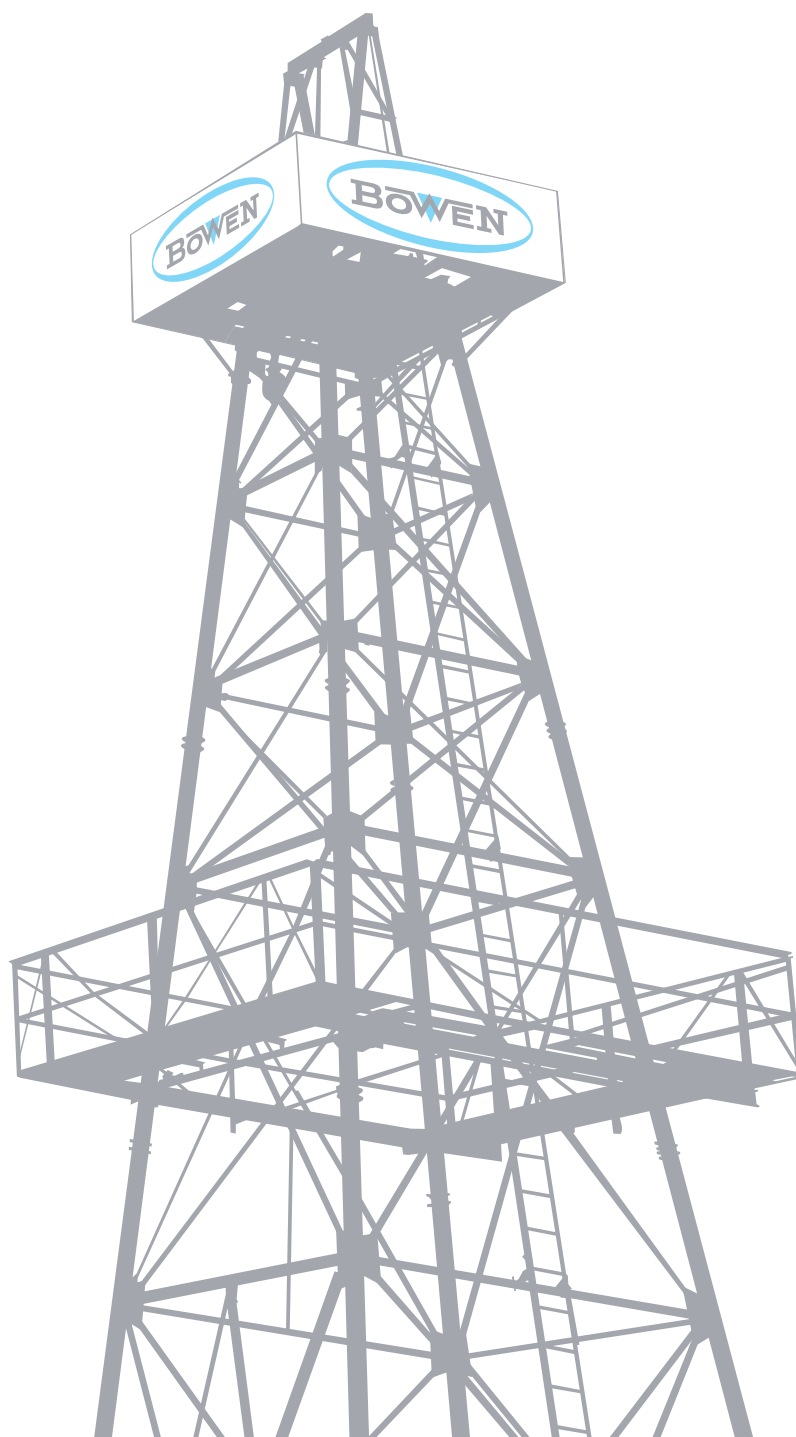
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\*Red indicates product manuals that are for reference only; product is not available for sale.

# Bowen Series 10 and 20 Sucker Rod Overshots

Instruction Manual 1010



# Bowen Series 10 and 20 Sucker Rod Overshots

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

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# Bowen Series 10 and 20 Sucker Rod Overshots

## General Description

Bowen™ sucker rod overshots are sturdy, compact units designed to engage sucker rods or other items used inside of tubing. Designed and developed upon the same principle as other *Bowen* overshots, they are the most effective means for the recovery of sucker rods.

## Use

Bowen Series 10 overshots recover non-hardened sucker rod boxes up to 2 in. OD inside of 2 7/8 in. tubing and up to 1 5/8 in. OD inside of 2 3/8 in. tubing. Basket grapples are recommended for fishing hardened and ground boxes.

Bowen Series 20 overshots are short catch sucker rod overshots which provide a means for engaging the exposed portion of a fish which is too short to be engaged with a conventional overshot.

Bowen sucker rod overshots fitted with top subs having tubing threads and oversized guides are ideally suited for engaging the fishing neck of wireline rope sockets and retrieving wireline tools such as gun perforators lost inside of casing.

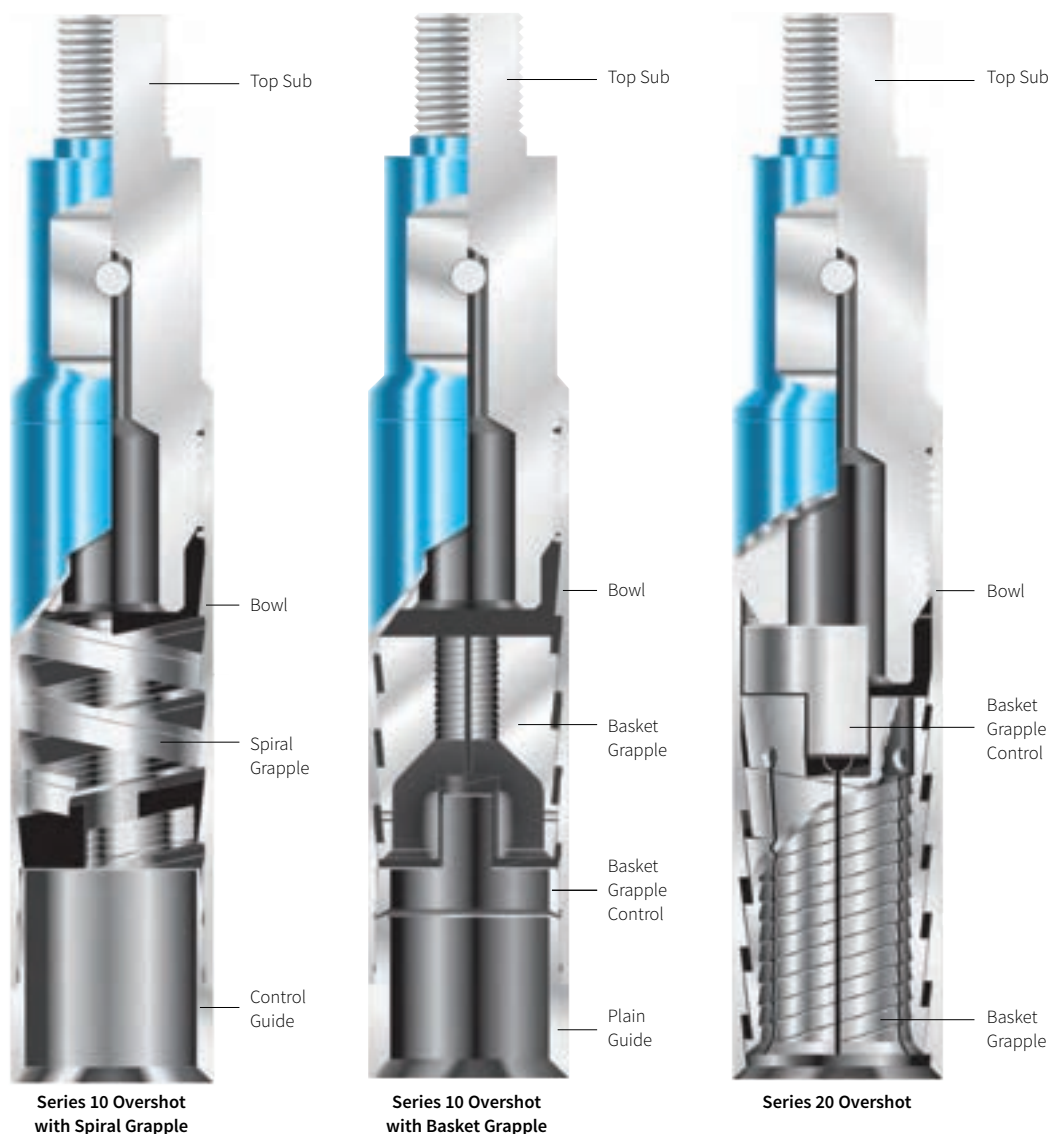
Bowen Series 10 and 20 overshots will effectively catch fish as much as 1/64 in. maximum undersize and 1/64 in. maximum oversize.

## Construction

A Bowen Series 10 sucker rod overshot consists of a top sub, a bowl, a spiral grapple and a control guide. When a basket grapple is used in a Series 10 assembly, a basket grapple control and a plain guide are required.

A Bowen Series 20 sucker rod overshot consists of a top sub, a bowl, a grapple control and a

basket grapple. It differs from a Series 10 in that the grapple control is at the top of the bowl above the basket grapple, placing the grapple at the lowermost position in the bowl.



# Bowen Series 10 and 20 Sucker Rod Overshots

## Operation

First, determine that the overshot is properly assembled, is dressed with the proper size grapple, and that all of its parts are in good working order. Refer to the specification table for a list of parts.

### To Engage and Pull the Fish

After reaching the top of the fish, slowly rotate the fishing string to the right and gradually lower the overshot over the fish; combined rotating and lowering is important.

Allow the right-hand torque to slack out of the fishing string and then pull on the fish by elevating the fishing string.

Note that when wireline is used for a fishing string, sinker bars should be used for weight to force the overshot down on the fish.

### To Release from the Fish

Using wireline eliminates the use of the standard releasing procedure due to the fact that the overshot cannot be rotated.

Bump down; then simultaneously rotate to the right and slowly elevate the fishing string until the overshot is clear of the fish. Combined rotating and elevating is important.

To release from a recovered fish, follow the same procedure while holding the fish below the overshot stationary.

## Precautions

Unless an upward strain is maintained, never rotate the fishing string to the left while the overshot is engaged with the fish. Always bump down with the full weight of the fishing string before starting the releasing operation.

## Explanation of Mechanism

After the overshot has reached the top of the fish, combined rotation and lowering results in the following:

1. The guide will direct the fish into the overshot.
2. The grapple will expand and the fish will pass into it to be halted by the pin section of the top sub or by a basket grapple stop.
3. The fish is now properly located in the overshot, and when upward pull is exerted, the grapple is contracted by the tapers of the bowl and the hold is secure.

When releasing, the sharp downward bump places the largest portion of the bowl tapers opposite the grapple and breaks the hold. Right-hand rotation expands the grapple and by maintaining right-hand rotation, the overshot may be withdrawn from the fish.

## Maintenance

Maintenance of the *Bowen* sucker rod overshot is simple, but important. After each use, disassemble, inspect, and repair the tool as needed, then reassemble.

## Disassembly

1. Clamp the bowl in a vise between the threaded ends. Break the threaded connections of the top sub and guide loose; remove the top sub and guide.

**Caution:** Use only sufficient gripping action in the vise to break connections; excessive force can distort or crack the bowl. Also, avoid leaving heavy

**tool marks on the bowl, which reduce the longevity of the bowl.**

2. Remove the grapple by unscrewing it from the bowl using right-hand rotation. Where the grapple is a basket type, the control must first be lifted out through the bottom in the Series 10 assembly and through the top in the Series 20.

Inspect all the parts before reassembling them, particularly the grapple. Grapples can be reused at the discretion of the operator. Because of various unknown downhole conditions, NOV recommends replacing used grapples after each run. Grease the parts as they are reassembled. To prevent rust or deterioration, either grease or paint the exterior.

# Bowen Series 10 and 20 Sucker Rod Overshots



Top Sub



Spiral Grapple



Bowl



Basket Grapple



Basket Grapple Control



Control Guide



Plain Guide

## Series 10 Disassembled



Top Sub



Bowl



Basket Grapple Control



Basket Grapple

## Series 20 Disassembled

# Bowen Series 10 and 20 Sucker Rod Overshots

## Specifications and Replacement Parts - Series 10 Sucker Rod Overshots

### Specifications

|                                    |                 |           |         |           |         |          |         |         |         |         |         |         |         |         |         |         |         |
|------------------------------------|-----------------|-----------|---------|-----------|---------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Maximum Catch Size (Spiral)</b> |                 | ¾ in.     | ¾ in.   | 1 in.     | 1 ¼ in. | 1 ¼ in.  | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ½ in. | 1 ½ in. | 1 ½ in. | 1 ½ in. | 1 ½ in. | 1 ½ in. | 1 ½ in. | 1 ½ in. |
| <b>Maximum Catch Size (Basket)</b> |                 | ¾ in.     | ¾ in.   | 1 ¾ in.   | ¾ in.   | 1 ¼ in.  | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. |
| <b>Overshot OD</b>                 |                 | 0.955 in. | 1 ¼ in. | 1.290 in. | 1 ¾ in. | 1.43 in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. |
| <b>Type</b>                        |                 | F.S.      | S.H.    | S.H.      | S.H.    | S.H.     | S.H.    | S.H.    | S.H.    | S.H.    | S.H.    | S.H.    | S.H.    | S.H.    | S.H.    | S.H.    | S.H.    |
| <b>Complete Assembly</b>           | <b>Part No.</b> | 29514     | 53476   | 55800     | 9790    | 17985    | 71344*  | 16490   | 26495** | 47501*  | 49624** | 13940   | 9990    | 9340    | 17040*  | 19265*  | 21625** |
|                                    | <b>Weight</b>   | 3 ¾ lbs   | 3 ¾ lbs | 4 lbs     | 4 lbs   | 4 lbs    | 4 lbs   | 4 lbs   | 4 lbs   | 4 lbs   | 4 lbs   | 4 lbs   | 4 ½ lbs | 5 lbs   | 4 ½ lbs | 5 ½ lbs | 5 lbs   |

### Replacement Parts

|                       |                 |         |         |         |         |         |         |         |         |         |         |         |       |       |         |         |         |
|-----------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|-------|---------|---------|---------|
| <b>Top Sub</b>        | <b>Part No.</b> | 29853   | 53477   | 55801   | 9791    | 17986   | 26496*  | 16491   | 26496   | 47502*  | 49625*  | 13941   | 9341  | 9341  | 17041*  | 17041*  | 17041*  |
|                       | <b>Weight</b>   | 2 ½ lbs | 2 ½ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 3 lbs | 3 lbs | 2 ½ lbs | 2 ½ lbs | 2 ½ lbs |
| <b>Bowl</b>           | <b>Part No.</b> | 29845   | 53478   | 55802   | 9792    | 17987   | 71345*  | 16492   | 26497** | 47503*  | 49626** | 13942   | 9991  | 9342  | 17042*  | 19266*  | 21626** |
|                       | <b>Weight</b>   | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 1 lb  | 1 lb  | 1 lb    | 1 lb    | 1 lb    |
| <b>Spiral Grapple</b> | <b>Part No.</b> | 29855   | 53479   | 55803   | 9793    | 17988   | 16493   | 16493   | 26498   | 13943   | 49627   | 13943   | 9992  | 9343  | 9343    | 9343    | 21627   |
|                       | <b>Weight</b>   | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb  | ¾ lb  | ¾ lb    | ¾ lb    | ¾ lb    |
| <b>Control Guide</b>  | <b>Part No.</b> | 29856   | 53482   | 55804   | 9796    | 17989   | 26500   | 16496   | 26500*  | 47505   | 49630*  | 13945   | 9993† | 9349  | 9349    | 19267*  | 19267*  |
|                       | <b>Weight</b>   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb  | ½ lb  | ½ lb    | ½ lb    | 1 lb    |

### Basket Parts

|                        |                 |       |       |       |      |       |       |       |        |       |       |       |      |         |         |         |         |
|------------------------|-----------------|-------|-------|-------|------|-------|-------|-------|--------|-------|-------|-------|------|---------|---------|---------|---------|
| <b>Basket Grapple</b>  | <b>Part No.</b> | 29855 | 53479 | 55803 | 9793 | 17988 | 16493 | 16493 | 26498  | 13943 | 49628 | 13943 | 9992 | 9343    | 9343    | 9343    | 21627   |
|                        | <b>Weight</b>   | ¾ lb  | ¾ lb  | ¾ lb  | ¾ lb | ¾ lb  | ¾ lb  | ¾ lb  | ¾ lb   | ¾ lb  | ¾ lb  | ¾ lb  | ¾ lb | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs |
| <b>Grapple Control</b> | <b>Part No.</b> | 29857 | 53480 | 55809 | 9794 | 18003 | 16494 | 16494 | 16494  | 13947 | 13947 | 13947 | 9993 | 9344    | 9344    | 9344    | 9344    |
|                        | <b>Weight</b>   | ¾ lb  | ¾ lb  | ¾ lb  | ¾ lb | ¾ lb  | ¾ lb  | ¾ lb  | ¾ lb   | ¾ lb  | ¾ lb  | ¾ lb  | ¾ lb | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    |
| <b>Plain Guide</b>     | <b>Part No.</b> | 29858 | 53481 | 55810 | 9795 | 18004 | 26499 | 16498 | 26499* | 47504 | 49629 | 13944 | 9994 | 9345    | 9345    | 19268*  | 19268*  |
|                        | <b>Weight</b>   | ½ lb  | ½ lb  | ½ lb  | ½ lb | ½ lb  | ½ lb  | ½ lb  | ½ lb   | ½ lb  | ½ lb  | ½ lb  | ¾ lb | 1 lb    | 1 lb    | 1 lb    | 1 lb    |



### Special Notes:

- (1) Grapples available in ¼ in. intervals
- (2) \* Left-hand threads
- (3) \*\* This is a left-hand tool
- (4) † Spiral control
- (5) FS (Full Strength) – Engineered to withstand all pulling and jarring strain.
- (6) SFS (Semi Full Strength) – Engineered to withstand all pulling strain.
- (7) SH (Slim Hole) – Engineered to withstand heavy pulling strain only.
- (8) Overshot ODs are nominal ODs. If the tool is to be run through a tight clearance, the actual tool OD should be checked.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection



### Recommended Spare Parts:

- Spiral:
- (1) 2 Grapples
  - (2) 1 Control Guide
- Basket:
- (1) 2 Grapples
  - (2) 1 Grapple Control



# Bowen Series 10 and 20 Sucker Rod Overshots

## Specifications and Replacement Parts - Series 10 Sucker Rod Overshots

### Specifications

|                                    |                 |            |           |           |             |             |             |             |           |             |             |            |             |             |           |           |
|------------------------------------|-----------------|------------|-----------|-----------|-------------|-------------|-------------|-------------|-----------|-------------|-------------|------------|-------------|-------------|-----------|-----------|
| <b>Maximum Catch Size (Spiral)</b> |                 | 1 5/16 in. | 1 1/2 in. | 1 3/4 in. | 1 7/8 in.   | 1 15/16 in. | 1 1/2 in.   | 1 13/16 in. | 1 1/2 in. | 1 11/16 in. | 1 13/16 in. | 1 1/2 in.  | 1 11/16 in. | 1 13/16 in. | 1 1/2 in. |           |
| <b>Maximum Catch Size (Basket)</b> |                 | 1 7/16 in. | 1 7/8 in. | 1 7/8 in. | 1 7/8 in.   | 1 7/8 in.   | 1 7/8 in.   | 1 7/8 in.   | 1 7/8 in. | 1 7/8 in.   | 1.660 in.   | 1.660 in.  | 1 3/4 in.   | 1 3/4 in.   | 1 3/4 in. |           |
| <b>Overshot OD</b>                 |                 | 2 5/16 in. | 2 5/8 in. | 2 5/8 in. | 1 27/32 in. | 1 27/32 in. | 1 27/32 in. | 2 1/16 in.  | 2 1/8 in. | 2 5/16 in.  | 2 5/16 in.  | 2 5/16 in. | 2 1/4 in.   | 2 1/4 in.   | 2 5/8 in. |           |
| <b>Type</b>                        |                 | F.S.       | F.S.      | F.S.      | S.H.        | S.H.        | S.H.        | S.H.        | S.H.      | F.S.        | S.F.S.      | F.S.       | S.H.        | S.H.        | S.H.      |           |
| <b>Complete Assembly</b>           | <b>Part No.</b> | 9880       | 17045*    | 19270*    | 49637**     | 49780*      | 36423       | 54178*      | 27765     | 60340**     | 11480       | 30308*     | 78928**     | 77733*      | 16070     | 21630**   |
|                                    | <b>Weight</b>   | 5 lbs      | 7 1/4 lbs | 7 1/4 lbs | 5 lbs       | 5 lbs       | 5 lbs       | 4 3/4 lbs   | 4 3/4 lbs | 6 1/2 lbs   | 4 3/4 lbs   | 4 7/8 lbs  | 6 lbs       | 6 lbs       | 4 3/4 lbs | 4 7/8 lbs |

### Replacement Parts

|                       |                 |        |           |           |           |           |           |           |           |           |           |           |         |        |           |           |
|-----------------------|-----------------|--------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|--------|-----------|-----------|
| <b>Top Sub</b>        | <b>Part No.</b> | 9341   | 17041*    | 17041*    | 49638*    | 49638*    | 36424     | 54179*    | 27766     | 30309*    | 11481     | 30309*    | 77734*  | 77734* | 16071     | 21631*    |
|                       | <b>Weight</b>   | 3 lbs  | 2 1/2 lbs | 2 1/2 lbs | 2 1/2 lbs | 2 1/2 lbs | 2 1/2 lbs | 2 3/4 lbs | 2 1/2 lbs | 3 lbs     | 2 1/2 lbs | 2 1/2 lbs | 3 lbs   | 3 lbs  | 2 1/2 lbs | 2 1/2 lbs |
| <b>Bowl</b>           | <b>Part No.</b> | 9881   | 17047*    | 19271*    | 49639**   | 49792*    | 36425     | 54180*    | 27767     | 60341**   | 11482     | 30310*    | 78929** | 77735* | 16072     | 21632**   |
|                       | <b>Weight</b>   | 1 lbs  | 3 3/4 lbs | 3 3/4 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 lbs     | 1 1/4 lbs | 2 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 2 lbs   | 2 lbs  | 1 1/4 lbs | 1 1/2 lbs |
| <b>Spiral Grapple</b> | <b>Part No.</b> | 9343   | 9343      | 9343      | 49640     | 36436     | 36436     | 54181     | 27768     | 60342     | 11483     | 11483     | 78930   | 16073  | 16073     | 21633     |
|                       | <b>Weight</b>   | 1/2 lb | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 3/8 lb    | 3/8 lb    | 1/2 lb  | 1/2 lb | 1/2 lb    | 3/8 lb    |
| <b>Control Guide</b>  | <b>Part No.</b> | 9883   | 9883      | 19272*    | 49642*    | 49642     | 36427     | 54184     | 27764     | 30311*    | 11484     | 30311*    | 77738*  | 77738  | 16076     | 21634*    |
|                       | <b>Weight</b>   | 1/2 lb | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb  | 1/2 lb | 1/2 lb    | 1/2 lb    |

### Basket Parts

|                        |                 |           |           |           |           |           |           |           |         |           |         |         |           |          |        |        |
|------------------------|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|-----------|---------|---------|-----------|----------|--------|--------|
| <b>Basket Grapple</b>  | <b>Part No.</b> | 9343      | 9343      | 9343      | 49640     | 36436     | 36436     | 54181     | 27768   | 60342     | 11483   | 11483   | 78930     | 16073    | 16073  | 21633  |
|                        | <b>Weight</b>   | 1 1/4 lbs | 1 1/4 lbs | 1 1/4 lbs | 1 1/4 lbs | 1 1/4 lbs | 1 1/4 lbs | 1 1/2 lbs | 7/8 lbs | 1 1/4 lbs | 7/8 lbs | 7/8 lbs | 1 1/4 lbs | 1 1/4 lb | 7/8 lb | 7/8 lb |
| <b>Grapple Control</b> | <b>Part No.</b> | 153338    | 153338    | 153338    | 36437     | 36437     | 36437     | 54182     | 27763   | 11485     | 11485   | 11485   | 16074     | 16074    | 16074  | 16074  |
|                        | <b>Weight</b>   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/4 lb    | 1/4 lb  | 1/4 lb    | 1/4 lb  | 1/4 lb  | 1/4 lb    | 1/4 lb   | 1/4 lb | 1/4 lb |
| <b>Plain Guide</b>     | <b>Part No.</b> | 9882      | 9882      | 19273*    | 49641     | 49641     | 36426     | 54183     | 27769   | 30312*    | 11486   | 30312*  | 77737*    | 77737*   | 16075  | 21636* |
|                        | <b>Weight</b>   | 1 lb      | 1 lb      | 1 lb      | 1 lb      | 1 lb      | 1 lb      | 1 lb      | 1/2 lb  | 1 lb      | 1/2 lb  | 1/2 lb  | 1 lb      | 1 lb     | 1/2 lb | 1/2 lb |



### Special Notes:

- (1) Grapples available in 1/16 in. intervals
- (2) \* Left-hand threads
- (3) \*\* This is a left-hand tool
- (4) † Spiral control
- (5) FS (Full Strength) – Engineered to withstand all pulling and jarring strain.
- (6) SFS (Semi Full Strength) – Engineered to withstand all pulling strain.
- (7) SH (Slim Hole) – Engineered to withstand heavy pulling strain only.
- (8) Overshot ODs are nominal ODs. If the tool is to be run through a tight clearance, the actual tool OD should be checked.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection



### Recommended Spare Parts:

- Spiral:
- (1) 2 Grapples
  - (2) 1 Control Guide
- Basket:
- (1) 2 Grapples
  - (2) 1 Grapple Control

# Bowen Series 10 and 20 Sucker Rod Overshots

## Specifications and Replacement Parts - Series 10 Sucker Rod Overshots

### Specifications

|                                    |                 |                    |                    |                    |                    |                    |                    |                    |                  |                  |                   |                   |                   |
|------------------------------------|-----------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|------------------|------------------|-------------------|-------------------|-------------------|
| <b>Maximum Catch Size (Spiral)</b> |                 | <b>2 in.</b>       | <b>2 in.</b>       | <b>2 in.</b>       | <b>2 in.</b>       | <b>2 in.</b>       | <b>2 in.</b>       | <b>2 in.</b>       | <b>2.33 in.</b>  | <b>2.33 in.</b>  | <b>2 3/8 in.</b>  | <b>2 3/8 in.</b>  | <b>2 3/8 in.</b>  |
| <b>Maximum Catch Size (Basket)</b> |                 | <b>1 13/16 in.</b> | <b>1 13/16 in.</b> | <b>1 13/16 in.</b> | <b>1 13/16 in.</b> | <b>1 13/16 in.</b> | <b>1 13/16 in.</b> | <b>1 13/16 in.</b> | <b>2.142 in.</b> | <b>2.142 in.</b> | <b>2 3/16 in.</b> | <b>2 3/16 in.</b> | <b>2 3/16 in.</b> |
| <b>Overshot OD</b>                 |                 | 2 5/16 in.         | 2 5/16 in.         | 2 5/16 in.         | 2 5/16 in.         | 2 7/8 in.          | 2 7/8 in.          | 2 7/8 in.          | 2 13/16 in.      | 2 13/16 in.      | 2 27/32 in.       | 2 27/32 in.       | 2 27/32 in.       |
| <b>Type</b>                        |                 | S.H.               | S.H.               | S.H.               | S.H.               | F.S.               | F.S.               | F.S.               | S.H.             | S.H.             | S.H.              | S.H.              | S.H.              |
| <b>Complete Assembly</b>           | <b>Part No.</b> | 9400               | 16985*             | 19280*             | 34492**            | 9530               | 17130*             | 77920              | 37315            | 44928*           | 17435*            | 17280*            | 15860             |
|                                    | <b>Weight</b>   | 6 lbs              | 5 7/8 lbs          | 6 lbs              | 6 lbs              | 6 3/8 lbs          | 6 3/8 lbs          | 6 3/8 lbs          | 6 lbs            | 6 lbs            | 6 1/8 lbs         | 6 1/8 lbs         | 6 3/8 lbs         |

### Replacement Parts

|                       |                 |           |           |           |           |           |           |           |           |           |           |           |           |
|-----------------------|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Top Sub</b>        | <b>Part No.</b> | 9401      | 16986*    | 16986*    | 16986*    | 9531      | 17131*    | 9531      | 37317     | 44930*    | 17281*    | 17281*    | 15863     |
|                       | <b>Weight</b>   | 3 1/8 lbs | 3 1/2 lbs | 3 1/2 lbs | 3 1/2 lbs | 3 3/4 lbs | 3 3/4 lbs | 3 1/2 lbs | 3 1/2 lbs | 3 1/2 lbs | 3 3/8 lbs | 3 3/8 lbs | 3 3/8 lbs |
| <b>Bowl</b>           | <b>Part No.</b> | 9402      | 16987*    | 19281*    | 34493**   | 9532      | 17132*    | 77921     | 37316     | 44929*    | 17436*    | 17282*    | 15861     |
|                       | <b>Weight</b>   | 1 1/2 lbs | 1 1/8 lbs | 1 1/8 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/4 lbs |
| <b>Spiral Grapple</b> | <b>Part No.</b> | 9403      | 9403      | 9403      | 34494     | 9403      | 9403      | 9403      | 37318     | 37318     | 9872      | 9872      | 9872      |
|                       | <b>Weight</b>   | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    |
| <b>Control Guide</b>  | <b>Part No.</b> | 9406      | 9406      | 19282*    | 19282*    | 9535      | 9535      | 9535      | 37319†    | 37319†    | 9873†     | 9873†     | 9873†     |
|                       | <b>Weight</b>   | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1 lb      | 1 lb      | 1 lb      | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1 lb      |

### Basket Parts

|                        |                 |        |        |        |        |        |        |        |        |        |        |        |        |
|------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Basket Grapple</b>  | <b>Part No.</b> | 9403   | 9403   | 9403   | 34494  | 9403   | 9403   | 9403   | 37318  | 37318  | 9872   | 9872   | 9872   |
|                        | <b>Weight</b>   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   |
| <b>Grapple Control</b> | <b>Part No.</b> | 9405   | 9405   | 9405   | 9405   | 9405   | 9405   | 9405   | 37319  | 37319  | 9873   | 9873   | 9873   |
|                        | <b>Weight</b>   | 1/8 lb | 1/8 lb | 1/8 lb | 1/4 lb | 1/8 lb | 1/8 lb | 1/8 lb | 1/8 lb | 1/8 lb | 1/4 lb | 1/4 lb | 1/4 lb |
| <b>Plain Guide</b>     | <b>Part No.</b> | 9404   | 9404   | 19283* | 19283* | 9533   | 9533   | 77922  | 37320  | 44931  | 17437  | 15862  | 15862  |
|                        | <b>Weight</b>   | 1/2 lb | 1/2 lb | 1 lbs  | 1/2 lb | 3 lbs  | 3 lbs  | 3 lbs  | 1/2 lb | 1/2 lb | 1/2 lb | 1/2 lb | 1/2 lb |



### Special Notes:

- (1) Grapples available in 1/16 in. intervals
- (2) \* Left-hand threads
- (3) \*\* This is a left-hand tool
- (4) † Spiral control
- (5) FS (Full Strength) – Engineered to withstand all pulling and jarring strain.
- (6) SFS (Semi Full Strength) – Engineered to withstand all pulling strain.
- (7) SH (Slim Hole) – Engineered to withstand heavy pulling strain only.
- (8) Overshot ODs are nominal ODs. If the tool is to be run through a tight clearance, the actual tool OD should be checked.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection



### Recommended Spare Parts:

- Spiral:
- (1) 2 Grapples
  - (2) 1 Control Guide
- Basket:
- (1) 2 Grapples
  - (2) 1 Grapple Control

# Bowen Series 10 and 20 Sucker Rod Overshots

## Specifications and Replacement Parts - Series 20 Short Catch Sucker Rod Overshots

### Specifications

| Maximum Catch – Basket Only |          | ½ in.   | 1 in.   | 1 ½ in. | 1 ¾ in. | 1 ½ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. |
|-----------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Overshot OD                 |          | 1 ¼ in. | 1 ¾ in. | 1 ½ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. | 1 ¾ in. |
| Complete Assembly           | Part No. | 17315   | 25780   | 28774   | 28760   | 18355   | 34601** | 21125   | 61737†  |
|                             | Weight   | 4 ¾ lbs | 4 ¾ lbs | 5 lbs   | 5 lbs   | 5 ½ lbs | 5 ½ lbs | 5 lbs   | 5 lbs   |

### Replacement Parts

|                 |          |       |       |         |         |         |         |       |         |
|-----------------|----------|-------|-------|---------|---------|---------|---------|-------|---------|
| Top Sub         | Part No. | 17316 | 25781 | 28775   | 28761   | 18356   | 34602*  | 18356 | 61912   |
|                 | Weight   | 3 lbs | 3 lbs | 3 ½ lbs | 3 ½ lbs | 3 ¾ lbs | 3 ¾ lbs | 3 lbs | 3 lbs   |
| Bowl            | Part No. | 17317 | 25752 | 28776   | 28762   | 18357   | 34603** | 21126 | 61738   |
|                 | Weight   | 1 lb  | 1 lb  | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 1 lb  | 1 ½ lbs |
| Basket Grapple  | Part No. | 17318 | 25783 | 28777   | 28763   | 18358   | 34604   | 18358 | 18358   |
|                 | Weight   | ¾ lb  | ¾ lb  | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb  | 1 lb    |
| Grapple Control | Part No. | 17319 | 25784 | 28778   | 28764   | 18359   | 18359   | 18359 | 18359   |
|                 | Weight   | ½ lb  | ½ lb  | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb  | ½ lb    |

### Accessories – Extra

|                |          |   |   |   |   |   |   |       |   |
|----------------|----------|---|---|---|---|---|---|-------|---|
| Oversize Guide | Part No. | — | — | — | — | — | — | 21127 | — |
|                | Weight   | — | — | — | — | — | — | —     | — |
| Pin (2 Req'd.) | Part No. | — | — | — | — | — | — | 14876 | — |
|                | Weight   | — | — | — | — | — | — | —     | — |



### Special Notes:

- (1) Grapples available in 1/16 in. intervals
- (2) \* Left-hand threads
- (3) \*\* This is a left-hand tool
- (4) † Spiral control
- (5) FS (Full Strength) – Engineered to withstand all pulling and jarring strain.
- (6) SFS (Semi Full Strength) – Engineered to withstand all pulling strain.
- (7) SH (Slim Hole) – Engineered to withstand heavy pulling strain only.
- (8) Overshot ODs are nominal ODs. If the tool is to be run through a tight clearance, the actual tool OD should be checked.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection



### Recommended Spare Parts:

- Spiral:
- (1) 2 Grapples for each size
  - (2) 1 Control

# Bowen Series 10 and 20 Sucker Rod Overshots

## Specifications and Replacement Parts - Series 20 Short Catch Sucker Rod Overshots

### Specifications

| Maximum Catch – Basket Only |          | 1 1/2 in.  | 1 1/2 in.  | 1 3/4 in.  | 1 3/4 in. | 1 7/8 in.  | 1 7/8 in.  | 2 in.      | 2 in.      | 2 1/8 in.  | 2 1/8 in.  | 2 1/4 in.  | 2 1/4 in.  |
|-----------------------------|----------|------------|------------|------------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
| Overshot OD                 |          | 1 7/32 in. | 1 7/32 in. | 2 1/16 in. | 2 1/4 in. | 2 5/16 in. | 2 5/16 in. | 2 7/32 in. | 2 7/8 in.  | 2 7/8 in.  | 3 1/8 in.  | 3 1/4 in.  | 3 3/8 in.  |
| Complete Assembly           | Part No. | 49643**    | 11555      | 38506††    | 47464     | 17438      | 30421*     | 18305      | 20170      | 56073      | 20645      | 22270      | 55236      |
|                             | Weight   | 4 7/8 lbs  | 4 7/8 lbs  | 8 1/8 lbs  | 7 3/8 lbs | 7 3/8 lbs  | 7 3/8 lbs  | 7 1/4 lbs  | 10 1/2 lbs | 10 1/4 lbs | 10 1/2 lbs | 10 1/2 lbs | 10 1/2 lbs |

### Replacement Parts

|                 |          |        |        |           |        |        |        |           |        |           |        |        |        |
|-----------------|----------|--------|--------|-----------|--------|--------|--------|-----------|--------|-----------|--------|--------|--------|
| Top Sub         | Part No. | 49638  | 9341   | 38507     | 16071  | 9401   | 16986* | 18306     | 20172  | 56074     | 20646  | 22271  | 55237  |
|                 | Weight   | 3 lbs  | 3 lbs  | 6 lbs     | 6 lbs  | 6 lbs  | 6 lbs  | 4 1/2 lbs | 7 lbs  | 6 3/4 lbs | 7 lbs  | 7 lbs  | 7 lbs  |
| Bowl            | Part No. | 49644  | 11556  | 38508     | 47465  | 17439  | 30422* | 18307     | 20171  | 56075     | 20647  | 22272  | 55238  |
|                 | Weight   | 1 lb   | 1 lb   | 3/8 lb    | 1/2 lb | 1/2 lb | 1/2 lb | 1/2 lb    | 2 lbs  | 2 lbs     | 2 lbs  | 2 lbs  | 2 lbs  |
| Basket Grapple  | Part No. | 49645  | 11557  | 38509     | 47466  | 17440  | 17440  | 18308     | 18308  | 56076     | 20648  | 22273  | 55239  |
|                 | Weight   | 3/4 lb | 3/4 lb | 1 3/8 lbs | 1 lb   | 1 lb   | 1 lb   | 1 lb      | 1 lb   | 1 lb      | 1 lb   | 1 lb   | 1 lb   |
| Grapple Control | Part No. | 49646  | 11558  | 38510     | 47467  | 17441  | 17441  | 18309     | 18309  | 56077     | 20649  | 22274  | 55240  |
|                 | Weight   | 1/8 lb | 1/8 lb | 1/8 lb    | 1/8 lb | 1/8 lb | 1/8 lb | 1/4 lb    | 1/4 lb | 1/4 lb    | 1/4 lb | 1/4 lb | 1/4 lb |

### Accessories – Extra

|                |          |   |   |   |   |       |       |   |       |   |       |       |       |
|----------------|----------|---|---|---|---|-------|-------|---|-------|---|-------|-------|-------|
| Oversize Guide | Part No. | — | — | — | — | 22276 | 22276 | — | 20173 | — | 20650 | 22275 | 55320 |
|                | Weight   | — | — | — | — | —     | —     | — | —     | — | —     | —     | —     |
| Pin (2 Req'd.) | Part No. | — | — | — | — | 14876 | 14876 | — | 20174 | — | 20651 | 20651 | 25498 |
|                | Weight   | — | — | — | — | —     | —     | — | —     | — | —     | —     | —     |



### Special Notes:

- (1) Grapples available in 1/16 in. intervals
- (2) \* Left-hand threads
- (3) \*\* This is a left-hand tool
- (4) † Spiral control
- (5) FS (Full Strength) – Engineered to withstand all pulling and jarring strain.
- (6) SFS (Semi Full Strength) – Engineered to withstand all pulling strain.
- (7) SH (Slim Hole) – Engineered to withstand heavy pulling strain only.
- (8) Overshot ODs are nominal ODs. If the tool is to be run through a tight clearance, the actual tool OD should be checked.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection



### Recommended Spare Parts:

- Spiral:
- (1) 2 Grapples for each size
  - (2) 1 Control

# Bowen Series 10 and 20 Sucker Rod Overshots

## Table of Calculated Strengths Bowen Series 10 Sucker Rod Overshots

| Complete Assembly Number | Bowl Number | OD          | Maximum Catch Size with Spiral Grapple | Maximum Catch Size with Basket Grapple | Load Capacity at Yield Points |  |                           |
|--------------------------|-------------|-------------|--|--|-------------------------------|--|---------------------------|
|                          |             |             |  |  | Spiral Grapple                | Basket Grapple   |                           |
|                          |             |             |  |  |                               | Catch Size   | Without Stop              |
| 9340                     | 9342        | 1 29/32 in. | 1 1/8 in.                              | 1 7/16 in.                             | 39,500 lbs                    | 1 7/16 in. down to, but not including 1 in.<br>1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 9400                     | 9402        | 2 23/64 in. | 2 in.                                  | 1 13/16 in.                            | 55,700 lbs                    | 1 13/16 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down | 40,100 lbs<br>25,400 lbs  |
| 9530                     | 9532        | 2 7/8 in.   | 2 in.                                  | 1 13/16 in.                            | 200,400 lbs                   | 1 13/16 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down | 144,400 lbs<br>91,300 lbs |
| 9880                     | 9881        | 2 5/16 in.  | 1 5/8 in.                              | 1 7/16 in.                             | 138,100 lbs                   | 1 7/16 in. down to, but not including 1 in.<br>1 in. down          | 93,900 lbs<br>59,400 lbs  |
| 9990                     | 9991        | 1 29/32 in. | 1 1/2 in.                              | 1 5/16 in.                             | 83,800 lbs                    | 1 5/16 in. down  | 38,200 lbs                |
| 11480                    | 11482       | 2 23/64 in. | 1 13/16 in.                            | 1.66 in.                               | 118,100 lbs                   | 1.660 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down   | 85,100 lbs<br>53,800 lbs  |
| 13940                    | 13942       | 1 29/32 in. | 1 1/2 in.                              | 1 5/16 in.                             | 39,500 lbs                    | 1 5/16 in. down to, but not including 1 in.<br>1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 15860                    | 15861       | 2 27/32 in. | 2 3/8 in.                              | 2 3/16 in.                             | 70,000 lbs                    | 2 3/16 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down  | 51,100 lbs<br>37,700 lbs  |
| 16070                    | 16072       | 2 17/64 in. | 1 13/16 in.                            | 1 3/4 in.                              | 55,700 lbs                    | 1 3/4 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down   | 40,100 lbs<br>25,400 lbs  |
| 16490                    | 16492       | 1 23/32 in. | 1 3/8 in.                              | 1 3/16 in.                             | 39,100 lbs                    | 1 3/16 in. down to, but not including 1 in.<br>1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 16985                    | 16987       | 2 23/64 in. | 2 in.                                  | 1 13/16 in.                            | 55,700 lbs                    | 1 13/16 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down | 40,100 lbs<br>25,400 lbs  |
| 17040                    | 17042       | 1 29/32 in. | 1 5/8 in.                              | 1 7/16 in.                             | 39,500 lbs                    | 1 7/16 in. down to, but not including 1 in.<br>1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 17045                    | 17047       | 2 5/16 in.  | 1 5/8 in.                              | 1 7/16 in.                             | 138,100 lbs                   | 1 7/16 in. down to, but not including 1 in.<br>1 in. down          | 93,900 lbs<br>59,400 lbs  |
| 17130                    | 17132       | 2 7/8 in.   | 2 in.                                  | 1 13/16 in.                            | 200,400 lbs                   | 1 13/16 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down | 144,400 lbs<br>91,300 lbs |
| 17280                    | 17282       | 2 27/32 in. | 2 3/8 in.                              | 2 3/16 in.                             | 70,000 lbs                    | 2 3/16 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down  | 51,100 lbs<br>37,700 lbs  |
| 17435                    | 17436       | 2 27/32 in. | 2 3/8 in.                              | 2 3/16 in.                             | 70,000 lbs                    | 2 3/16 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down  | 51,100 lbs<br>37,700 lbs  |
| 17985                    | 17987       | 1 7/16 in.  | 1 1/4 in.                              | 1 1/16 in.                             | 16,500 lbs                    | 1 1/16 in. down  | 11,500 lbs                |
| 19265                    | 19266       | 1 29/32 in. | 1 5/8 in.                              | 1 7/16 in.                             | 39,500 lbs                    | 1 7/16 in. down to, but not including 1 in.<br>1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 19270                    | 19271       | 2 5/16 in.  | 1 5/8 in.                              | 1 7/16 in.                             | 138,100 lbs                   | 1 7/16 in. down to, but not including 1 in.<br>1 in. down          | 93,900 lbs<br>59,400 lbs  |
| 19280                    | 19281       | 2 23/64 in. | 2 in.                                  | 1 13/16 in.                            | 55,700 lbs                    | 1 13/16 in. down to, but not including 1 1/8 in.<br>1 1/8 in. down | 40,100 lbs<br>25,400 lbs  |



### Special Notes:

All strengths listed are calculated theoretical yield points and are accurate within 20%. It should be noted however, that all strengths assume a straight, steady pull and full grapple engagement of a round fish. Anything less than full engagement or straight pulling will reduce the listed strength. This includes tong marks or other damage to the bowl surface.

Overshot ODs are nominal ODs. If the tool is to be run through a tight clearance, the actual tool OD should be checked.

# Bowen Series 10 and 20 Sucker Rod Overshots

## Table of Calculated Strengths Bowen Series 10 Sucker Rod Overshots

| Complete Assembly Number | Bowl Number | OD          | Maximum Catch Size with Spiral Grapple | Maximum Catch Size with Basket Grapple | Load Capacity at Yield Points |   |                           |
|--------------------------|-------------|-------------|--|--|-------------------------------|---|---------------------------|
|                          |             |             |  |  | Spiral Grapple                | Basket Grapple  |                           |
|                          |             |             |  |  |                               | Catch Size  | Without Stop              |
| 21625                    | 21626       | 1 29/32 in. | 1 1/8 in.                              | 1 7/16 in.                             | 39,500 lbs                    | 1 1/16 in. down to, but not including 1 in. 1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 21630                    | 21632       | 2 5/16 in.  | 1 13/16 in.                            | 1 3/4 in.                              | 68,100 lbs                    | 1 3/4 in. down to, but not including 1 1/2 in. 1 1/2 in. down   | 49,000 lbs<br>31,000 lbs  |
| 26495                    | 26497       | 1 27/32 in. | 1 3/8 in.                              | 1 3/16 in.                             | 39,100 lbs                    | 1 3/16 in. down to, but not including 1 in. 1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 27765                    | 27767       | 2 3/4 in.   | 1 13/16 in.                            | 1 1/2 in.                              | 55,700 lbs                    | 1 1/2 in. down to, but not including 1 in. 1 in. down           | 40,100 lbs<br>25,400 lbs  |
| 29514                    | 29854       | 0.955 in.   | 3/4 in.                                | 9/16 in.                               | 11,000 lbs                    | 9/16 in. down   | 8,500 lbs                 |
| 30308                    | 30310       | 2 21/64 in. | 1 13/16 in.                            | 1.660 in.                              | 118,100 lbs                   | 1.660 in. down to, but not including 1 1/2 in. 1 1/2 in. down   | 85,100 lbs<br>53,800 lbs  |
| 34492                    | 34493       | 2 21/64 in. | 2 in.                                  | 1 13/16 in.                            | 55,700 lbs                    | 1 13/16 in. down to, but not including 1 1/2 in. 1 1/2 in. down | 40,100 lbs<br>25,400 lbs  |
| 36423                    | 36425       | 1 27/32 in. | 1 3/16 in.                             | 1 3/8 in.                              | 39,500 lbs                    | 1 3/8 in. down to, but not including 1 in. 1 in. down           | 28,500 lbs<br>18,000 lbs  |
| 37315                    | 37316       | 2 13/16 in. | 2.33 in.                               | 2.142 in.                              | 73,300 lbs                    | 2.142 in. down to, but not including 1 1/2 in. 1 1/2 in. down   | 53,500 lbs<br>39,400 lbs  |
| 44928                    | 44929       | 2 13/16 in. | 2.33 in.                               | 2.142 in.                              | 73,300 lbs                    | 2.142 in. down to, but not including 1 1/2 in. 1 1/2 in. down   | 53,500 lbs<br>39,400 lbs  |
| 47501                    | 47503       | 1 29/32 in. | 1 1/2 in.                              | 1 3/16 in.                             | 39,500 lbs                    | 1 3/16 in. down to, but not including 1 in. 1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 49624                    | 49626       | 1 29/32 in. | 1 1/2 in.                              | 1 3/16 in.                             | 39,500 lbs                    | 1 3/16 in. down to, but not including 1 in. 1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 49637                    | 49639       | 1 27/32 in. | 1 3/16 in.                             | 1 3/8 in.                              | 39,500 lbs                    | 1 3/8 in. down to, but not including 1 in. 1 in. down           | 28,500 lbs<br>18,000 lbs  |
| 49780                    | 49782       | 1 27/32 in. | 1 3/16 in.                             | 1 3/8 in.                              | 39,500 lbs                    | 1 3/8 in. down to, but not including 1 in. 1 in. down           | 28,500 lbs<br>18,000 lbs  |
| 54178                    | 54180       | 2 3/4 in.   | 1 3/4 in.                              | 1 3/16 in.                             | 55,700 lbs                    | 1 3/16 in. down to, but not including 1 in. 1 in. down          | 40,100 lbs<br>25,400 lbs  |
| 55800                    | 55802       | 1.290 in.   | 1 in.                                  | 13/16 in.                              | 55,000 lbs                    | -   | -                         |
| 60340                    | 60341       | 2 21/64 in. | 1 13/16 in.                            | 1.660 in.                              | 118,100 lbs                   | 1.660 in. down to, but not including 1 1/2 in. 1 1/2 in. down   | 85,100 lbs<br>53,800 lbs  |
| 71344                    | 71345       | 1 27/32 in. | 1 3/8 in.                              | 1 3/16 in.                             | 39,100 lbs                    | 1 3/16 in. down to, but not including 1 in. 1 in. down          | 28,500 lbs<br>18,000 lbs  |
| 77733                    | 77735       | 2 17/64 in. | 1 13/16 in.                            | 1 3/4 in.                              | 55,700 lbs                    | 1 3/4 in. down to, but not including 1 1/2 in. 1 1/2 in. down   | 40,100 lbs<br>25,400 lbs  |
| 77920                    | 77921       | 2 7/8 in.   | 2 in.                                  | 1 13/16 in.                            | 200,400 lbs                   | 1 13/16 in. down to, but not including 1 1/2 in. 1 1/2 in. down | 144,400 lbs<br>91,300 lbs |
| 78928                    | 78929       | 2 17/64 in. | 1 13/16 in.                            | 1 3/4 in.                              | 55,700 lbs                    | 1 3/4 in. down to, but not including 1 1/2 in. 1 1/2 in. down   | 40,100 lbs<br>25,400 lbs  |



### Special Notes:

All strengths listed are calculated theoretical yield points and are accurate within 20%. It should be noted however, that all strengths assume a straight, steady pull and full grapple engagement of a round fish. Anything less than full engagement or straight pulling will reduce the listed strength. This includes tong marks or other damage to the bowl surface.

Overshot ODs are nominal ODs. If the tool is to be run through a tight clearance, the actual tool OD should be checked.

# Bowen Series 10 and 20 Sucker Rod Overshots

## Table of Calculated Strengths Bowen Series 20 Short Catch Sucker Rod Overshots

| Complete Assembly Number | Bowl Number | OD                                  | Maximum Catch Size                  | Load Capacity at Yield Point - Basket Grapple |
|--------------------------|-------------|-------------------------------------|-------------------------------------|---|
| 11555                    | 11556       | 1 <sup>29</sup> / <sub>32</sub> in. | 1 ½ in.                             | 41,000 lbs                                    |
| 17315                    | 17317       | 1 <sup>5</sup> / <sub>32</sub> in.  | 7/8 in.                             | 31,500 lbs                                    |
| 17438                    | 17439       | 2 <sup>5</sup> / <sub>16</sub> in.  | 1 <sup>13</sup> / <sub>16</sub> in. | 50,400 lbs                                    |
| 18305                    | 18307       | 2 <sup>29</sup> / <sub>32</sub> in. | 2 ½ in.                             | 102,300 lbs                                   |
| 18355                    | 18357       | 1 ¾ in.                             | 1 ¾ in.                             | 35,100 lbs                                    |
| 20170                    | 20171       | 2 7/8 in.                           | 2 ½ in.                             | 101,800 lbs                                   |
| 20645                    | 20647       | 3 ½ in.                             | 2 ¾ in.                             | 127,000 lbs                                   |
| 21125                    | 21126       | 1 <sup>27</sup> / <sub>32</sub> in. | 1 ¾ in.                             | 52,900 lbs                                    |
| 22270                    | 22272       | 3 ¼ in.                             | 2 ½ in.                             | 127,000 lbs                                   |
| 25780                    | 25782       | 1 <sup>13</sup> / <sub>32</sub> in. | 1 in.                               | 31,500 lbs                                    |
| 28760                    | 28762       | 1 ¾ in.                             | 1 ¼ in.                             | 42,200 lbs                                    |
| 28774                    | 28776       | 1 ½ in.                             | 1 ½ in.                             | 35,100 lbs                                    |
| 30421                    | 30422       | 2 <sup>5</sup> / <sub>16</sub> in.  | 1 <sup>13</sup> / <sub>16</sub> in. | 60,200 lbs                                    |
| 34601                    | 34603       | 1 ¾ in.                             | 1 ¾ in.                             | 40,900 lbs                                    |
| 38506                    | 38508       | 2 <sup>5</sup> / <sub>16</sub> in.  | 1 ¾ in.                             | 79,000 lbs                                    |
| 47464                    | 47465       | 2 ¼ in.                             | 1 ¾ in.                             | 50,298 lbs                                    |
| 49643                    | 49644       | 1 <sup>27</sup> / <sub>32</sub> in. | 1 <sup>15</sup> / <sub>32</sub> in. | 41,000 lbs                                    |
| 55236                    | 55238       | 3 ¾ in.                             | 2 ¾ in.                             | 126,000 lbs                                   |
| 56073                    | 56075       | 2 7/8 in.                           | 2 <sup>5</sup> / <sub>16</sub> in.  | 62,100 lbs                                    |
| 61737                    | 61738       | 1 <sup>15</sup> / <sub>16</sub> in. | 1 ¾ in.                             | 73,000 lbs                                    |



### Special Notes:

All strengths listed are calculated theoretical yield points and are accurate within 20%. It should be noted however, that all strengths assume a straight, steady pull and full grapple engagement of a round fish. Anything less than full engagement or straight pulling will reduce the listed strength. This includes tong marks or other damage to the bowl surface.

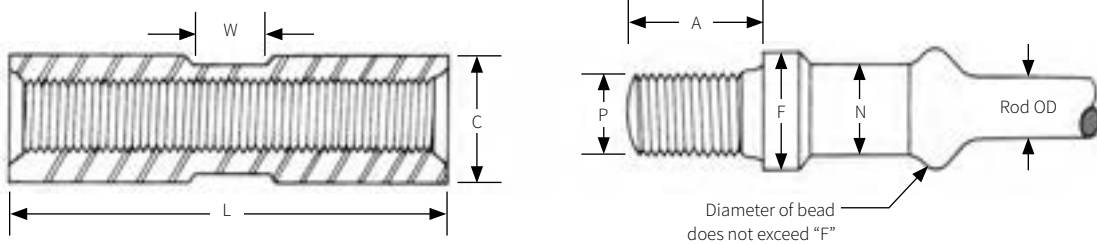
Overshot ODs are nominal ODs. If the tool is to be run through a tight clearance, the actual tool OD should be checked.

# Bowen Series 10 and 20 Sucker Rod Overshots

## Sucker Rod Dimensions and Table of Calculated Strengths

| Rod Size | "A" Length of Pin | "F" Outside Dia. of Shoulder | "N" Wrench Flat | "P" Outside Dia. of Pin | "C" Outside Dia. of Full Sized Coupling | "L" Minimum Length | "W" Coupling Wrench Flat Width | Thread  |        |
|----------|-------------------|------------------------------|-----------------|-------------------------|---|--------------------|--------------------------------|---------|--------|
| ½ in.    | 1 in.             | 1 in.                        | ¾ in.           | ¾ in.                   | 1 in.                                   | 2 ¾ in.            | ¾ in.                          | ¾ in.   | 10 thd |
| ⅝ in.    | 1 ½ in.           | 1 ½ in.                      | ¾ in.           | 1 ⅝ in.                 | 1 ½ in.                                 | 4 in.              | 1 ⅝ in.                        | 1 ⅝ in. | 10 thd |
| ¾ in.    | 1 ¾ in.           | 1 ½ in.                      | 1 in.           | 1 ⅝ in.                 | 1 ¾ in.                                 | 4 in.              | 1 ½ in.                        | 1 ⅝ in. | 10 thd |
| ⅞ in.    | 1 ¾ in.           | 1 ¾ in.                      | 1 in.           | 1 ¾ in.                 | 1 ⅞ in.                                 | 4 in.              | 1 ¾ in.                        | 1 ¾ in. | 10 thd |
| 1 in.    | 1 ¾ in.           | 2 in.                        | 1 ⅝ in.         | 1 ¾ in.                 | 2 ⅝ in. or 2 in.*                       | 4 in.              | 1 ¾ in.                        | 1 ¾ in. | 10 thd |
| 1 ⅛ in.  | 2 in.             | 2 ¼ in.                      | 1 ½ in.         | 1 ¾ in.                 | 2 ¾ in.                                 | 4 ½ in.            | 2 ½ in.                        | 1 ¾ in. | 10 thd |

\* Used when running 1 in. rods in 2 ⅝ in. tubing, 2 ¾ in. is standard.



## Sucker Rod Strength Table

| Rod Size  |          | ½ in.     | ⅝ in.     | ¾ in.     | ⅞ in.     | 1 in.     |
|---|----------|-----------|-----------|-----------|-----------|-----------|
| Rod Area  |          | 0.196 in. | 0.306 in. | 0.442 in. | 0.601 in. | 0.785 in. |
| Based on J and L Type 7<br>with ultimate tensile strength of 86,000 and yield of 70,000 psi   | Yield    | 16,000    | 21,400    | 30,900    | 42,100    | 55,000    |
|   | Ultimate | 20,000    | 26,300    | 38,000    | 51,700    | 67,500    |
|   | Torque*  | 70        | 140       | 171       | 381       | 570       |
| Based on J and L Type 2<br>with ultimate tensile strength of 100,000 and yield of 65,000 psi  | Yield    | —         | 19,900    | 28,700    | 39,100    | 51,000    |
|   | Ultimate | —         | 30,600    | 44,200    | 60,100    | 78,500    |
|   | Torque*  | 65        | 130       | 159       | 353       | 530       |
| Based on J and L Type 1<br>with ultimate tensile strength of 100,000 and yield of 65,000 psi  | Yield    | —         | 20,900    | 30,300    | 41,200    | 53,800    |
|   | Ultimate | —         | 30,600    | 44,200    | 60,100    | 78,500    |
|   | Torque*  | 68 ½      | 136       | 168       | 372       | 560       |
| Based on J and L Type 12<br>with ultimate tensile strength of 120,000 and yield of 96,000 psi | Yield    | —         | 29,400    | 42,300    | 57,700    | 75,300    |
|   | Ultimate | —         | 37,700    | 53,000    | 72,000    | 94,200    |
|   | Torque*  | 96        | 192       | 235       | 476       | 783       |

\* Torque based on rod OD @ yield.





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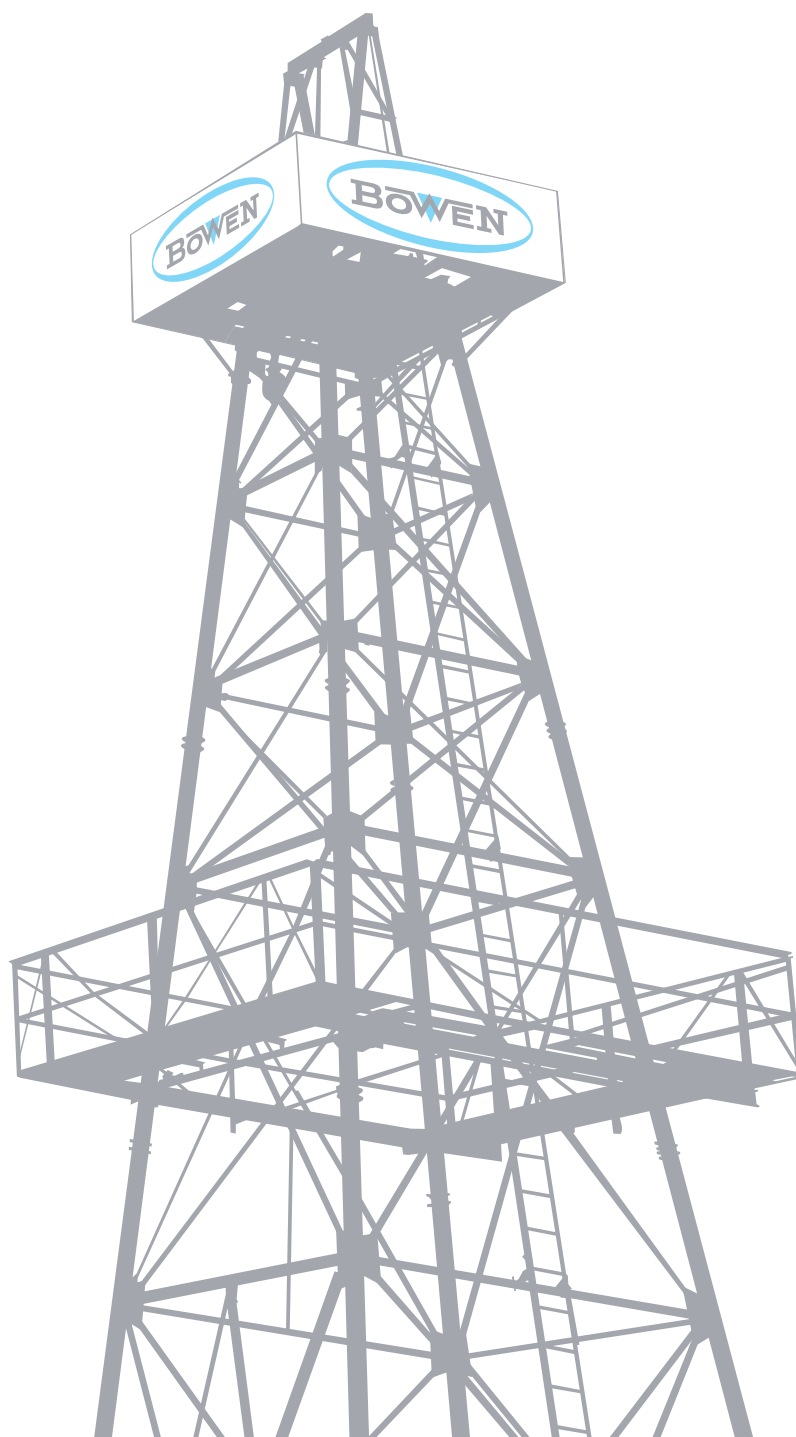
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# Bowen Series 70 Short Catch Overshots

Instruction Manual 1070



# Bowen Series 70 Short Catch Overshots

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Series 70 Short Catch Overshots

## General Description

Our Bowen™ Series 70 short catch overshoot is the most effective tool you can use to recover a fish whose exposed upper end is too short to be engaged with conventional catch overshots.

## Use

Each Bowen Series 70 short catch overshoot engages a specific maximum outside diameter. (See the specifications tables on pages 5 and 6). You may dress each overshoot to engage any smaller diameter by installing the appropriate size of basket grapple.

## Construction

A Series 70 short catch overshoot consists of a top sub, a bowl, a basket grapple control, and a basket grapple. The basket grapple inserts into the bowl from the top and the finger of the basket grapple control fits into the top of the basket grapple. The bowl allows the basket grapple to be located at its extreme lower end.

## Operation

First, determine that the overshoot is properly assembled, dressed with the proper size grapple, and that all of its parts are in good working order. Refer to the specification tables for the list of parts.

Make up the overshoot on the fishing string and run into the well.

## To Engage and Pull the Fish

As the overshoot reaches the top of the fish, slowly rotate the fishing string to the right and gradually lower the overshoot over the fish. Combined rotating and lowering is important.

Allow the right-hand torque to slack out of the fishing string and then pull on the fish by elevating the fishing string.

## To Release from the Fish

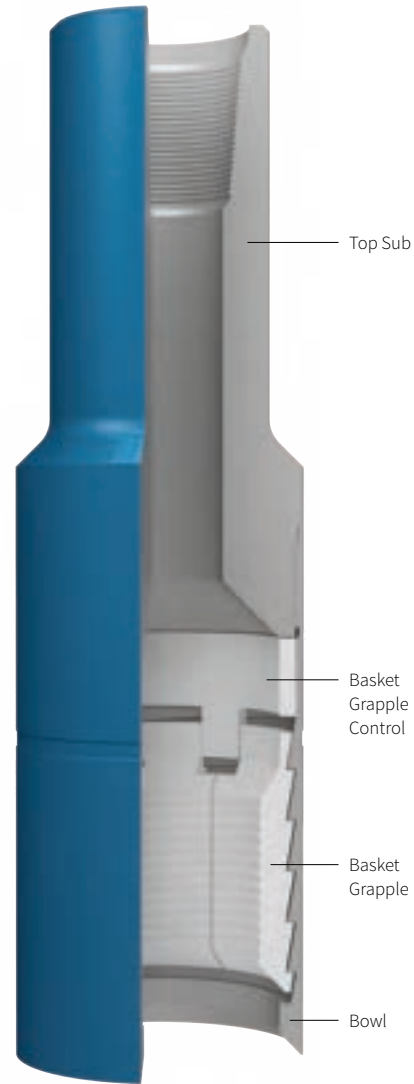
Bump down, then simultaneously rotate to the right and slowly elevate the fishing string until the overshoot is clear of the fish. Combined rotating and elevating is important.

To release from a recovered fish, follow the same procedure while holding the fish below the overshoot.

## Precautions

Unless you maintain an upward strain, never rotate the fishing string to the left while the overshoot is engaged with the fish.

Always bump down the full weight of the fishing string before starting releasing operations.



**Bowen Series 70  
Short Catch Overshoot**

# Bowen Series 70 Short Catch Overshots

## Explanation of Mechanism

After the overshot has reached the top of the fish, combined rotation and lowering results in the following:

1. The bottom of the bowl serves as a guide to direct the fish into the basket grapple.
2. The grapple expands and the fish passes into it to be halted by the lower end of the top sub.
3. The fish is now properly located in the overshot and when upward pull is exerted, the grapple is contracted by the tapers of the bowl and the hold is secure.

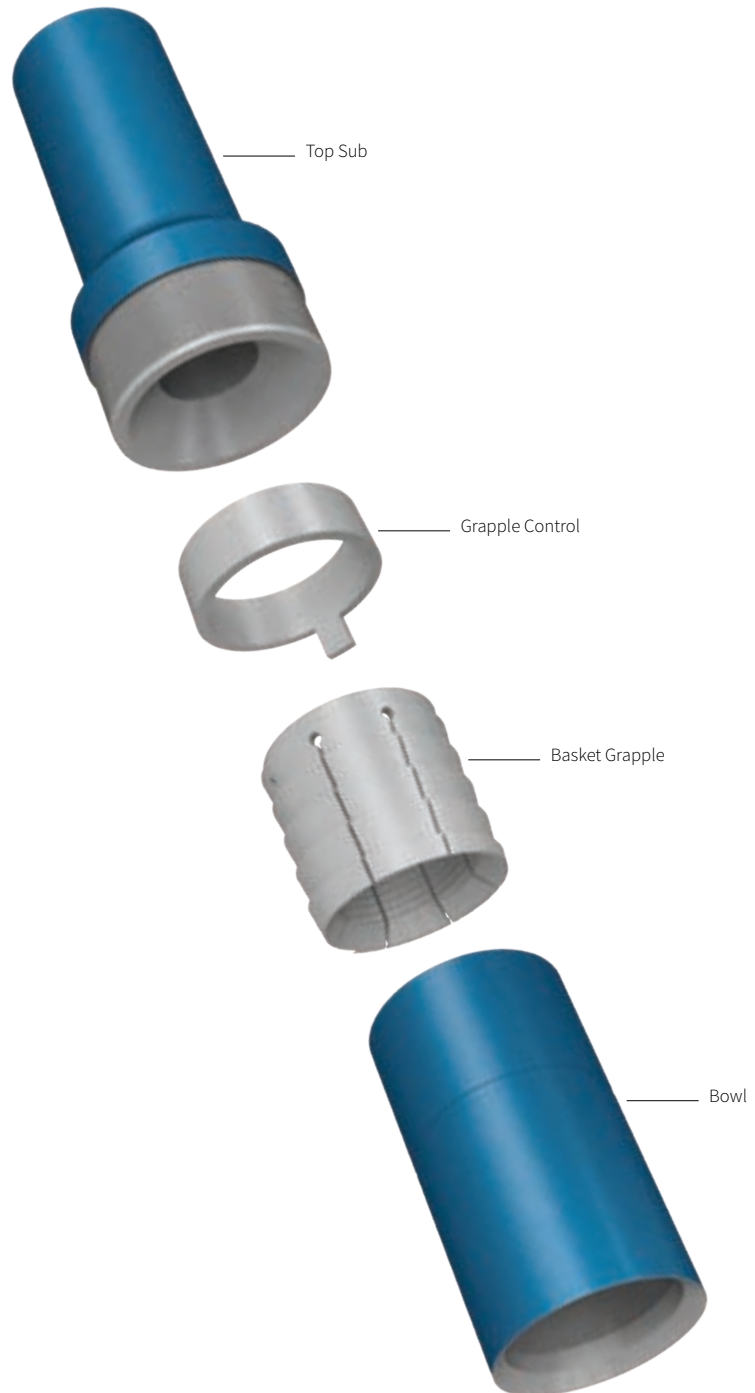
When releasing, the sharp downward bump breaks the freeze between bowl and grapple and places the largest portion of the bowl tapers opposite the largest portion of the grapple helix. Elevation of the fishing string and right-hand rotation of the overshot causes the left hand wickers in the grapple to feed the overshot (grapple) off the fish.

## Maintenance

To guard against failed runs and to prolong the life of the tool, disassemble, clean, and oil or lubricate all parts of the overshot before reassembling. Check grapple wickers for dullness and replace them if necessary.

**NOTE: NOV recommends that grapples are replaced after they have been used downhole.**

By referencing the illustrations, you will see that little instruction is needed to dismantle or assemble this tool. To prevent rust or deterioration, either paint or grease the exterior of the overshot.



# Bowen Series 70 Short Catch Overshots

## Bowen Series 70 Short Catch Overshot Specifications

|                            |                 |                |                |                |                |                |                |                |                |                |
|----------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Maximum Catch</b>       |                 | <b>1 ½ in.</b> | <b>2 ½ in.</b> | <b>2 ¾ in.</b> | <b>3 ¼ in.</b> | <b>3 ½ in.</b> | <b>3 ¾ in.</b> | <b>3 ¾ in.</b> | <b>3 ¾ in.</b> | <b>3 ¾ in.</b> |
| <b>Standard O.D.</b>       |                 | 2 ¾ in.        | 3 in.          | 3 ¼ in.        | 3 ½ in.        | 4 in.          | 4 ¼ in.        | 4 ¼ in.        | 4 ¾ in.        | 4 ¾ in.        |
| <b>Standard Connection</b> |                 | ¾ in.          | 2 ½ in.        | 2 ¾ in.        | 2 ¾ in.        | 2 ¾ in.        | 2 ¾ in.        | 2 ¾ in.        | 2 ¾ in.        | 2 ¾ in.        |
|                            | SR              |                | EUE            | API            | EUE            | REG            | EUE            | REG            | REG            | REG            |
|                            | PIN             |                |                | REG            |                |                |                |                |                |                |
| <b>Type</b>                |                 | SH             | SH             | SH             | SH             | SH             | FS             | SH             | SH             | SH             |
| <b>Complete Assembly</b>   | <b>Part No.</b> | 38506          | 17615          | 13535          | 63892          | 10434          | 11290          | 68550          | C-11023        | 10543          |
|                            | <b>Weight</b>   | 8 lbs          | 30 lbs         | 36 lbs         | 39 lbs         | 59 lbs         | 57 lbs         | 59 lbs         | 87 lbs         | 100 lbs        |

## Replacement Parts

|                               |                 |         |        |         |         |         |        |         |         |        |
|-------------------------------|-----------------|---------|--------|---------|---------|---------|--------|---------|---------|--------|
| <b>Top Sub</b>                | <b>Part No.</b> | 38507   | 17616  | 13536   | 63893   | 10435   | 11295  | 68551   | A-11024 | 10544  |
|                               | <b>Weight</b>   | 4 lbs   | 14 lbs | 15 lbs  | 16 lbs  | 20 lbs  | 23 lbs | 20 lbs  | 35 lbs  | 35 lbs |
| <b>Bowl</b>                   | <b>Part No.</b> | 38508   | 17617  | 13537   | 63894   | 10436   | 11291  | 68552   | B-11025 | 10545  |
|                               | <b>Weight</b>   | 2 lbs   | 11 lbs | 14 lbs  | 15 lbs  | 25 lbs  | 21 lbs | 25 lbs  | 33 lbs  | 54 lbs |
| <b>Basket Grapple</b>         | <b>Part No.</b> | 38509   | 17618  | 13538   | 63895   | 10437   | 11292  | 68553   | B-11026 | 10546  |
|                               | <b>Weight</b>   | 1 ½ lbs | 3 lbs  | 4 ½ lbs | 5 ½ lbs | 11 lbs  | 10 lbs | 11 lbs  | 15 lbs  | 8 lbs  |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | 38510   | 17619  | 13539   | 63896   | 10438   | 11294  | 68554   | A-11027 | 10547  |
|                               | <b>Weight</b>   | ½ lbs   | 1 lbs  | 2 ¼ lbs | 2 ½ lbs | 2 ¾ lbs | 3 lbs  | 2 ¾ lbs | 4 lbs   | 3 lbs  |

## Bowen Series 70 Short Catch Overshot Specifications

|                            |                 |                |                |                |              |              |              |              |              |              |
|----------------------------|-----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Maximum Catch</b>       |                 | <b>3 ¾ in.</b> | <b>3 ¾ in.</b> | <b>3 ¾ in.</b> | <b>4 in.</b> | <b>4 in.</b> | <b>4 in.</b> | <b>4 in.</b> | <b>5 in.</b> | <b>6 in.</b> |
| <b>Standard O.D.</b>       |                 | 5 ½ in.        | 4 ¾ in.        | 5 ½ in.        | 5 ¼ in.      | 5 ¾ in.      | 5 ¾ in.      | 6 in.        | 6 ¼ in.      | 7 ½ in.      |
| <b>Standard Connection</b> |                 | 3 ½ in.        | 3 ½ in.        | 3 ½ in.        | 3 ½ in.      | 3 ½ in.      | 3 ½ in.      | 4 ½ in.      | 4 ½ in.      | 4 ½ in.      |
|                            |                 | FH             | FH             | FH             | IF           | FH           | IF           | FH           | REG          | FH           |
| <b>Type</b>                |                 | FS             | SH             | FS             | FS           | FS           | SH           | FS           | SH           | FS           |
| <b>Complete Assembly</b>   | <b>Part No.</b> | 11297          | 12645          | 12785          | 53186        | 13065        | 10560        | 11303        | 14805        | 11630        |
|                            | <b>Weight</b>   | 87 lbs         | 59 lbs         | 123 lbs        | 87 lbs       | 116 lbs      | 129 lbs      | 153 lbs      | 158 lbs      | 165 lbs      |

## Replacement Parts

|                               |                 |        |         |         |        |        |         |        |        |         |
|-------------------------------|-----------------|--------|---------|---------|--------|--------|---------|--------|--------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | 11298  | 10544   | 12786   | 53187  | 13066  | 10561   | 11304  | 14806  | 11631   |
|                               | <b>Weight</b>   | 35 lbs | 35 lbs  | 58 lbs  | 35 lbs | 65 lbs | 55 lbs  | 80 lbs | 89 lbs | 91 lbs  |
| <b>Bowl</b>                   | <b>Part No.</b> | 11299  | 12646   | 12787   | 53188  | 13067  | 10562   | 11305  | 14807  | 11632   |
|                               | <b>Weight</b>   | 33 lbs | 13 lbs  | 41 lbs  | 33 lbs | 24 lbs | 49 lbs  | 39 lbs | 32 lbs | 34 lbs  |
| <b>Basket Grapple</b>         | <b>Part No.</b> | 11300  | 12647   | 12788   | 53189  | 13068  | 10563   | 11306  | 14808  | 11633   |
|                               | <b>Weight</b>   | 15 lbs | 6 lbs   | 19 lbs  | 15 lbs | 16 lbs | 21 lbs  | 19 lbs | 32 lbs | 34 lbs  |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | 11301  | 12648   | 12789   | 53190  | 13069  | 10564   | 11307  | 14809  | 11634   |
|                               | <b>Weight</b>   | 4 lbs  | 4 ½ lbs | 5 ¼ lbs | 4 lbs  | 5 lbs  | 3 ¾ lbs | 5 lbs  | 5 lbs  | 7 ½ lbs |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Top connection desired
  - (3) Size of fish to be caught
  - (4) OD, if other than standard



### Recommended Spare Parts:

- (1) 2 basket grapples for each catch size
- (2) 1 basket grapple control



### Special Notes:

- FS ..... Full Strength      Engineered to withstand all pulling, torsional, and jarring strain.  
 SH ..... Slim Hole            Engineered to withstand heavy pulling strain only.  
 SR ..... Sucker Rod  
 EUE ..... External Upset  
 API ..... American Petroleum Institute  
 REG ..... Regular

# Bowen Series 70 Short Catch Overshots

## Bowen Series 70 Short Catch Overshot Specifications

| Maximum Catch       | 6 ¼ in.   | 6 ¾ in. | 6 ½ in. | 7 in.   | 7 in.   | 7 ¾ in. | 8 in.   | 8 ¼ in. | 9 in.    |         |
|---------------------|-----------|---------|---------|---------|---------|---------|---------|---------|----------|---------|
| Standard OD         | 7 7/8 in. | 8 in.   | 8 ¼ in. | 8 ¾ in. | 8 ½ in. | 9 ¼ in. | 9 ¾ in. | 10 in.  | 11 ¼ in. |         |
| Standard Connection | 4 ½ in.   | 8 ¾ in. | 5 ½ in. | 8 ¾ in. | 4 ½ in. | 4 ½ in. | 6 ¾ in. | 8 ¾ in. | 7 ¾ in.  |         |
|                     | IF        | REG     | REG     | REG     | FH      | IF      | REG     | REG     | REG      |         |
| Type                | FS        | FS      | FS      | SH      | FS      | FS      | FS      | FS      | FS       |         |
| Complete Assembly   | Part No.  | 16975   | 46673   | 38939   | 151454  | 20050   | 25030   | 20060   | 46102    | 33878   |
|                     | Weight    | 230 lbs | 229 lbs | 245 lbs | 236 lbs | 243 lbs | 288 lbs | 356 lbs | 378 lbs  | 429 lbs |

## Replacement Parts

|                        |          |         |         |         |         |         |         |         |         |         |
|------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Top Sub                | Part No. | 16976   | 46674   | 38940   | 20051   | 20051   | 25031   | 20061   | 46679   | 38879   |
|                        | Weight   | 140 lbs | 145 lbs | 145 lbs | 148 lbs | 150 lbs | 200 lbs | 210 lbs | 224 lbs | 225 lbs |
| Bowl                   | Part No. | 16977   | 46675   | 38941   | 20052   | 20052   | 25032   | 20062   | 46680   | 33880   |
|                        | Weight   | 45 lbs  | 38 lbs  | 46 lbs  | 39 lbs  | 28 lbs  | 45 lbs  | 48 lbs  | 62 lbs  | 110 lbs |
| Basket Grapple         | Part No. | 16978   | 46676   | 38942   | 151455  | 20053   | 25033   | 20063   | 46681   | 33881   |
|                        | Weight   | 36 lbs  | 38 lbs  | 45 lbs  | 39 lbs  | 55 lbs  | 32 lbs  | 80 lbs  | 78 lbs  | 78 lbs  |
| Basket Grapple Control | Part No. | 16979   | 46677   | 38943   | 151456  | 20054   | 25034   | 20064   | 46682   | 33882   |
|                        | Weight   | 7 ½ lbs | 8 lbs   | 8 lbs   | 10 lbs  | 8 ½ lbs | 9 lbs   | 16 lbs  | 12 lbs  | 13 lbs  |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Top connection desired
  - (3) Size of fish to be caught
  - (4) OD, if other than standard



### Recommended Spare Parts:

- (1) 2 basket grapples for each catch size
- (2) 1 basket grapple control



### Special Notes:

- FS ..... Full Strength      Engineered to withstand all pulling, torsional, and jarring strain.  
 SH ..... Slim Hole            Engineered to withstand heavy pulling strain only.



# Bowen Series 70 Short Catch Overshots

## Bowen Series 70 Short Catch Overshot — Table of Calculated Strengths

| Complete Assembly No. | Bowl Number | O.D.        | Max. Catch Size | Load Capacity at Yield Point Basket Grapple |              | Maximum Recommended Makeup Torque |
|-----------------------|-------------|-------------|-----------------|---|--------------|-----------------------------------|
|                       |             |             |                 | Without Stop                                | With Stop    |                                   |
| 10434                 | 10436       | 4 1/16 in.  | 3 1/16 in.      | 697,300 lb                                  | 571,300 lb   | 5,250 ft lb                       |
| 10434                 | 10436       | 4 1/8 in.*  | 3 1/16 in.      | 212,700 lb                                  | 212,700 lb   | 2,700 ft lb                       |
| 10543                 | 10545       | 5 3/8 in.   | 3 23/32 in.     | 1,283,600 lb                                | 1,011,300 lb | 7,400 ft lb                       |
| 10543                 | 10545       | 4 1/16 in.* | 3 23/32 in.     | 197,600 lb                                  | 197,600 lb   | 2,900 ft lb                       |
| 10560                 | 10562       | 6 3/8 in.   | 4 3/4 in.       | 915,200 lb                                  | 693,600 lb   | 18,600 ft lb                      |
| 10560                 | 10562       | 5 7/8 in.*  | 4 3/4 in.       | 348,200 lb                                  | 306,200 lb   | 6,750 ft lb                       |
| C-11023               | B-11025     | 4 3/8 in.   | 3 3/8 in.       | 250,300 lb                                  | —            | 3,400 ft lb                       |
| 11290                 | 11291       | 4 3/8 in.   | 3 1/16 in.      | 398,100 lb                                  | 398,100 lb   | 5,650 ft lb                       |
| 11297                 | 11299       | 5 3/8 in.   | 3 23/32 in.     | 790,500 lb                                  | 635,700 lb   | 13,700 ft lb                      |
| 11303                 | 11305       | 6 3/8 in.   | 4 3/4 in.       | 720,600 lb                                  | 579,400 lb   | 19,800 ft lb                      |
| 11630                 | 11632       | 7 3/8 in.   | 6 in.           | 445,300 lb                                  | 358,000 lb   | 14,200 ft lb                      |
| 12645                 | 12646       | 4 3/4 in.   | 3 3/4 in.       | 267,100 lb                                  | 267,100 lb   | 3,950 ft lb                       |
| 12785                 | 12785       | 5 3/8 in.   | 3 3/4 in.       | 907,000 lb                                  | 729,300 lb   | 15,700 ft lb                      |
| 12785                 | 12787       | 5 1/2 in.*  | 3 3/4 in.       | 558,100 lb                                  | 504,500 lb   | 9,900 ft lb                       |
| 13065                 | 13067       | 5 23/32 in. | 4 1/4 in.       | 575,600 lb                                  | 467,400 lb   | 7,300 ft lb                       |
| 13535                 | 13537       | 3 3/4 in.   | 2 3/8 in.       | 239,800 lb                                  | 239,800 lb   | 2,700 ft lb                       |
| 14805                 | 14807       | 6 1/4 in.   | 5 1/4 in.       | 319,700 lb                                  | —            | 6,500 ft lb                       |
| 16975                 | 16977       | 7 3/8 in.   | 6 1/4 in.       | 445,700 lb                                  | 349,200 lb   | 13,200 ft lb                      |
| 17615                 | 17617       | 3 3/8 in.   | 2 1/2 in.       | 263,600 lb                                  | —            | 2,900 ft lb                       |
| 20050                 | 20052       | 8 1/2 in.   | 7 in.           | 373,700 lb                                  | 285,100 lb   | 12,400 ft lb                      |
| 20060                 | 20062       | 9 3/4 in.   | 8 in.           | 445,100 lb                                  | —            | 22,200 ft lb                      |
| 25030                 | 25032       | 9 1/4 in.   | 7 3/4 in.       | 391,700 lb                                  | —            | 16,800 ft lb                      |
| 33878                 | 33880       | 11 1/4 in.  | 9 in.           | 874,800 lb                                  | —            | 46,800 ft lb                      |
| 36239                 | 36241       | 15 in.      | 12 1/4 in.      | 934,800 lb                                  | —            | 120,000 ft lb                     |
| 38506                 | 38508       | 2 3/16 in.  | 1 3/8 in.       | 85,200 lb                                   | —            | 600 ft lb                         |
| 38939                 | 38941       | 8 1/2 in.   | 6 1/2 in.       | 445,100 lb                                  | —            | 17,100 ft lb                      |
| 46102                 | 46680       | 10 in.      | 8 1/4 in.       | 445,100 lb                                  | —            | 18,000 ft lb                      |
| 46673                 | 46675       | 8 in.       | 6 3/8 in.       | 445,700 lb                                  | —            | 14,700 ft lb                      |
| 53186                 | 53188       | 5 1/4 in.   | 4 1/8 in.       | 339,500 lb                                  | 339,500 lb   | 5,750 ft lb                       |
| 63892                 | 63894       | 3 13/16 in. | 3 1/16 in.      | 224,600 lb                                  | —            | 2,750 ft lb                       |
| 68550                 | 68552       | 4 1/8 in.   | 3 1/8 in.       | 254,700 lb                                  | —            | 1,900 ft lb                       |
| 151454                | 20052       | 8 3/8 in.   | 7 in.           | 226,400 lb                                  | —            | 6,150 ft lb                       |

\* Standard OD



### Note:

- 1) All strengths listed are calculated theoretical yield points and accurate within 20%. Note, however, that all strengths assume a straight, steady pull and full grapple engagement of a round fish. Anything less than full engagement or straight pulling will reduce the listed strength substantially. Tong marks and other surface damage to the bowl will also reduce the strength. Jarring may amplify the pull load by a factor of 3 to 10.
- 2) Maximum recommended makeup torque is at 50% of yield. No tong marks should be applied to the bowl. This is the maximum torque. Much less torque may be used depending upon the situation.

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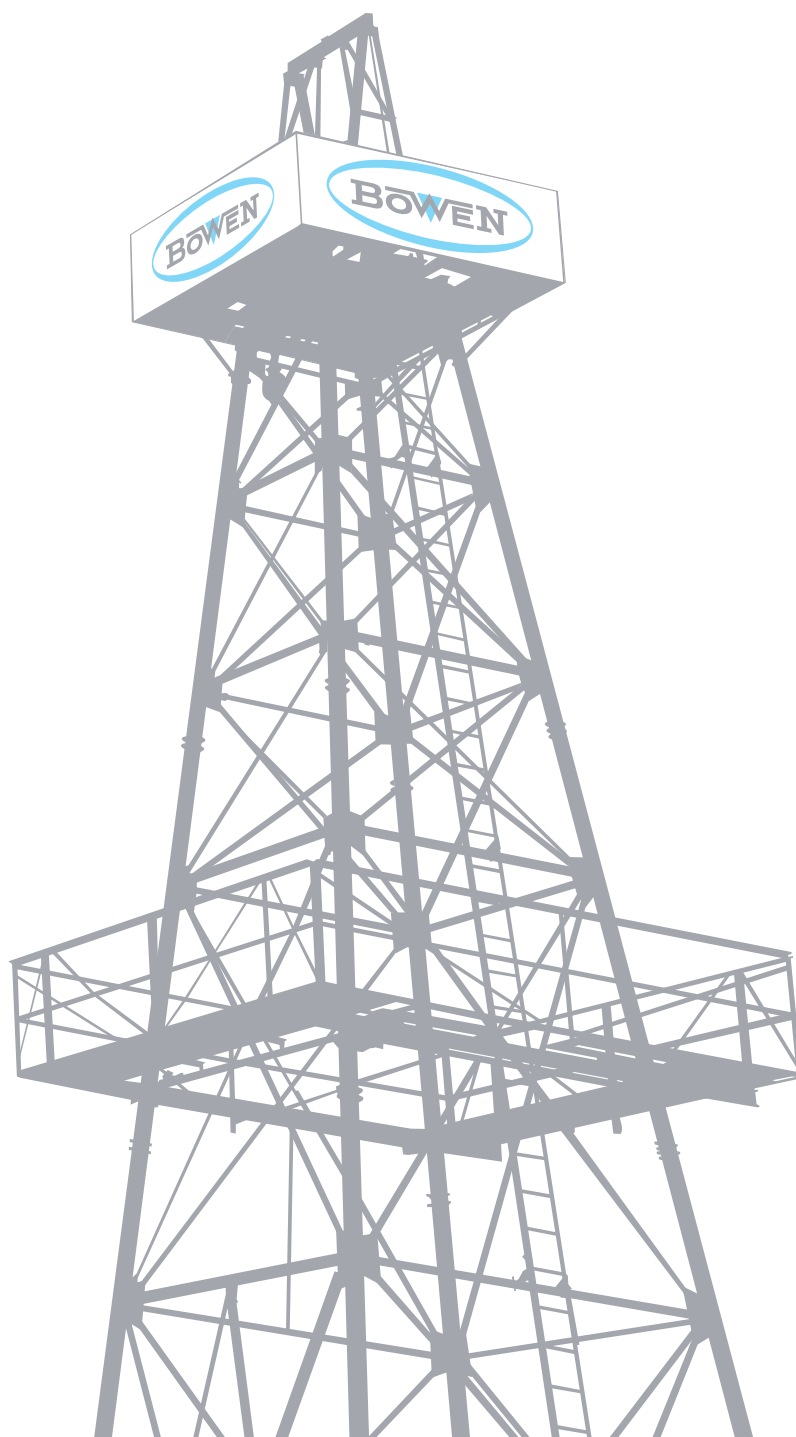
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# Bowen Series 150 Releasing and Circulating Overshots

Instruction Manual 1150

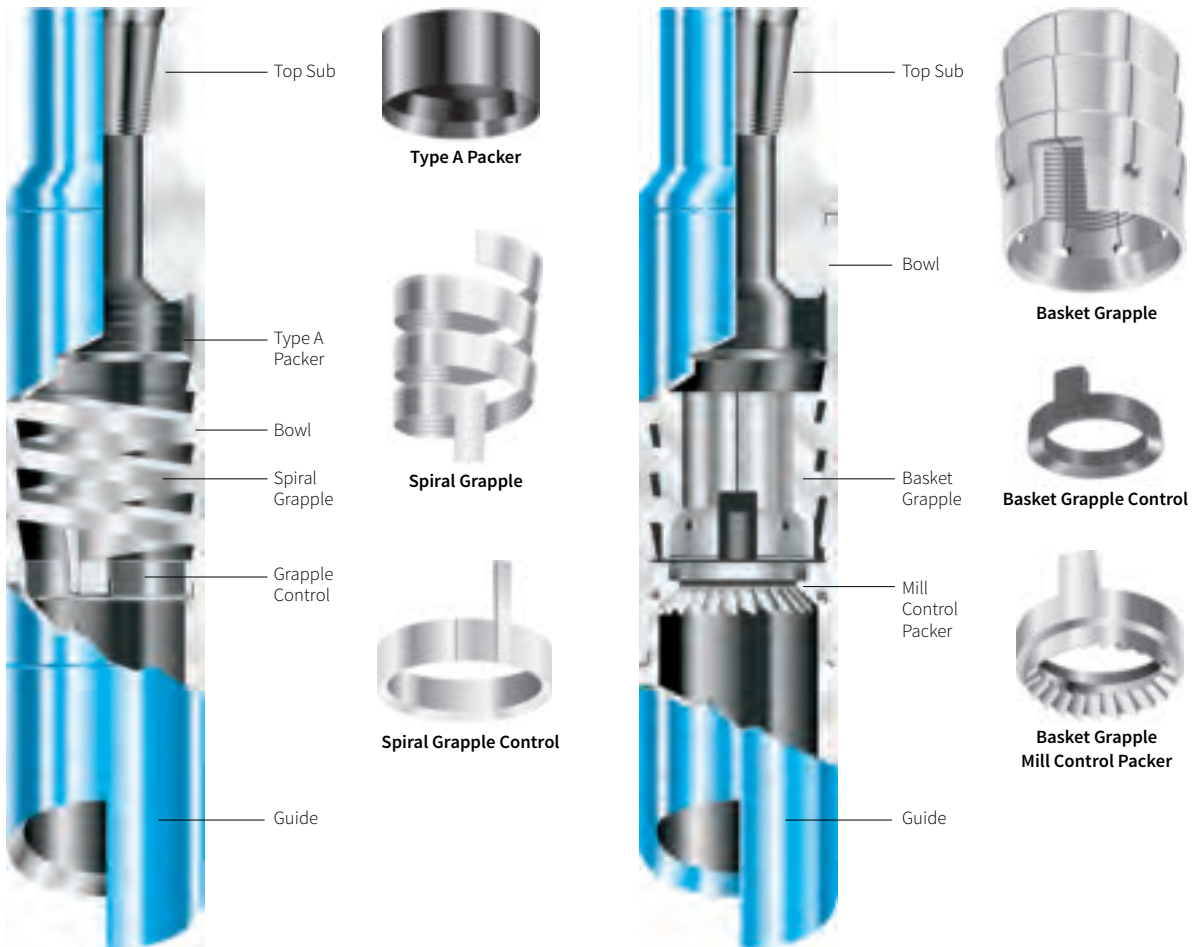


# Bowen Series 150 Overshots

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.



**Series 150 Releasing and Circulating Overshot Dressed with Spiral Grapple and Components**

**Series 150 Releasing and Circulating Overshot Dressed with Basket Grapple and Components**

## General Description

The Bowen™ Series 150 overshoot is the strongest external fishing tool available to externally engage, pack off, and pull a fish. An industry standard since the 1930s, the rugged, user-friendly tool withstands extremely heavy pulling, torsional and jarring strains without damage or distortion to either the tool or the fish.

Through the installation of proper under-size parts, the tool may be adapted to engage and pack off any smaller size.

All sizes of Bowen Series 150 releasing and circulating overshoots are available in full strength or slim hole types. Despite the extremely small outside diameters of full strength type overshoots, they can withstand the pulling, torsional and jarring strains, which can be exerted by modern machinery to release and retrieve a lost fish.

The slim hole type overshoots have reduced outside diameters. They perform pulling jobs in tight holes where no other external catch releasing fishing tool can be run.

# Bowen Series 150 Overshots

## Use

A Bowen Series 150 releasing and circulating overshot engages, packs off and retrieves twisted-off or lost tubing, drill pipe, coupling, tool joint, casing or other similar fish.

## Construction

The Bowen Series 150 releasing and circulating overshot consists of three outside parts: the top sub, bowl, and guide. The basic overshot may be dressed with either of two sets of internal parts, depending on whether the fish is near maximum catch size for the particular overshot.

If the fish diameter is near the maximum catch of the overshot, use spiral grapple control and Type-A packer.

When the fish diameter is considerably below maximum catch size (usually 1/2 in.), use the basket grapple and a mill control packer.

## Gripping and Releasing Mechanism

The bowl of the overshot has a helically tapered spiral section in its inside diameter. The gripping member (spiral grapple or basket grapple), fits into this section. When an upward pull is exerted against a fish, a compressive strain spreads evenly over a long section of the fish. No damage or distortion results to either the fish or the overshot. This design permits a far stronger tool with a smaller outside diameter than is possible with an overshot that employs a single tapered section which supports slips.

A spiral grapple is formed as a left-hand helix with a tapered exterior to conform with the helically tapered section in the bowl. Its interior is wickered for engagement with the fish.

A basket grapple is an expansible cylinder with a tapered exterior that conforms to the helically tapered section in the bowl. Its interior is wickered for engagement with the fish.

Three types of basket grapples are available to meet your needs for catching various types of fish:

The plain basket grapple is standard and will always be furnished unless you specify another type. It is wickered for its entire interior length. You may use it to catch any plain single diameter fish.

The basket grapple with long catch stop has an internal shoulder located at the upper end to stop the fish in the best catch position. It stops and catches an upset or box section of a tool joint with sufficient length left below the grapple to allow the joint or upset to be packed off with a basket mill control packer.

The basket grapple with short catch stop has a double set of wickers, of two different internal diameters. It stops and catches a coupling with a ruptured piece of pipe engaged in its upper end. The upper set of wickers will catch the ruptured pipe and act as a stop against the coupling, while the lower set of wickers will catch the coupling. The coupling will be stopped in the best position to be packed off by the mill control packer.

Grapple controls are of two types: spiral grapple controls are used with spiral grapples; mill control packers are used with basket grapples.

Grapple controls are used as a special key, to allow the grapple to move up and down during

operation while simultaneously transmitting full torque from the bowl to the grapple.

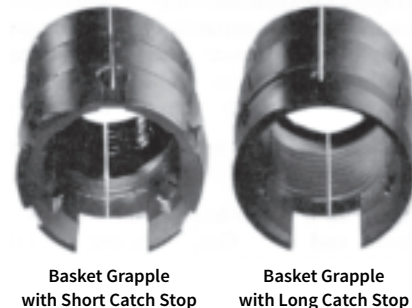
Spiral grapple controls and basket grapple controls are plain. Mill control packers include a pack-off. See pack-off mechanism for a complete explanation.

In operation, the overshot functions in the same manner, whether dressed with spiral grapple parts or basket grapple parts.

During the engagement operation, as the overshot is rotated to the right and lowered, the grapple will expand when the fish is engaged, allowing the fish to enter the grapple. After rotation has ceased and upward pull has been exerted, the grapple is contracted by the tapers in the bowl and its deep wickers grip the fish firmly.

During the releasing operation, a sharp downward bump places the larger portion of the bowl tapers opposite the grapple smaller tapered portion, breaking the hold. Thereafter, when the overshot is rotated to the right and slowly elevated, the wickers will screw the grapple off the fish, effectively releasing it.

Standard Bowen releasing and circulating overshots require right-hand rotation only, both during engagement and releasing operation. This feature eliminates the dangers that are present when it is necessary to rotate the string to the left.



## Pack-off Mechanism

The type of pack-off mechanism used depends on how the overshot is dressed, and your choice.

When the overshot is dressed with a spiral grapple, a Type-A packer is used. The Type-A packer is a sleeve type. The OD of the packer seats within the ID of the bowl. It has an internal lip which seals around the fish. Each Type-A packer packs off a specific size. A Type-A packer should be ordered for each catch size spiral grapple.

A mill control packer is used when the overshot is dressed with a basket grapple. The Type-R is most commonly used. The Type-R mill control packer is used when packing off is required. The unique double lip seal of the mill control packer provides a positive seal of the fish. The packer is self energized and is retained within the mill control by

a lower second sealing lip and requires no adhesive for retaining the packer. It has a replaceable inner seal and a replaceable outer seal. The inner seal and the outer seal may both be replaced in the field when required. Mill control packers remove small burrs and rough breaks only. Replacement inner and outer seals are listed on page 20. Also see the special high pressure pack-off accessories on page 19.



**Type A Packer**



Inner Seal



Mill Control Packer



Outer Seal

**Type R Mill Control Packer**

All mill control packers are manufactured to pack off a specific size. One should be ordered to match each size basket grapple. Mill control packers, when used, replace a plain basket control. The plain basket control is used with a basket grapple when no pack off of the fish is required.

Type-D packer assemblies are available to pack off tubing collars in tubing size Series 150 overshots. The Type-D packer assembly consists of a packer, a spring and an O-ring. It is assembled in the bowl above the grapple. Its upper end is sealed in a counterbore in the top sub, by the O-ring. In operation, its lower end stops the collar in proper catch position, while the integral molded seal enters and packs off the collar threads at the top of the collar. These packers are listed on page 16.

The Type-D collar packer may be used with a spiral grapple, in place of a Type-A packer, where the collar being fished is too short to allow effective catch and pack off length.



**Series 150 Overshot with Type D Packer in Packed Off Position**



**Type D Packer Assembly**

All packers (Type-A, Type-R, Type-D, High Pressure pack-offs) are rated from 3,000-5,000 psi depending upon the condition of the fish, wellbore temperatures, and fluids.

## Operation

First, determine that the overshot is properly assembled, is dressed with the proper size grapple, and that all its parts are in good working condition. Refer to specifications beginning on page 11.

If the fish is smaller than the maximum outside diameter that the overshot was designed to engage, install undersize parts.

If the hole size is so much greater than the fish size that it is possible for the overshot to pass alongside the fish, install either a wallhook guide or an oversize guide in place of the standard guide. (see page 18)

If the top of the fish is a heavily burred tool joint, replace the standard guide with the proper milling guide. See page 19.

If the fish has an unengageable upper end, install an extension between the top sub and bowl. See illustration on page 6.

Using the top sub, connect the overshot to the fishing string and run it in the hole.

## To Engage and Pull the Fish

Slowly rotate the fishing string to the right and gradually lower the overshot over the fish; combined rotating and lowering is important.

Allow the right-hand twist to slack out of the fishing string and then pull on the fish by elevating the fishing string.

If the fish does not come, turn on the circulating pumps and maintain an upward strain while circulation is forced through the fish.

## To Release from the Fish

Bump down; then simultaneously rotate to the right and slowly elevate the fishing string until the overshot is clear of the fish; combined rotating and elevating is important.

To release from a recovered fish, follow the same procedure while holding the fish below the overshot.

## Precautions

Unless an upward strain is maintained, never rotate the fishing string to the left while the overshot is engaged with the fish.

Always bump the full weight of the fishing string before starting releasing operations.

Always shut off the circulating pumps before lowering the overshot over the fish.

# Bowen Series 150 Overshots

## Function of the Overshot in Engaging the Fish

After the overshot has reached the top of the fish, combined rotation and lowering results in the following:

1. The guide will direct the fish into the overshot.
2. The grapple will expand and the fish will pass through it.
3. The fish will pass through the pack-off rubber and will be halted when it contacts the pin end of the top sub. In the case where an external upset section is being engaged by a basket grapple, the fish will be halted by the solid steel stop in the upper end of the basket grapple.
4. The fish is now properly located in the overshot and thereafter when upward pull is exerted, the grapple is contracted by the tapers in the bowl and the hold will be secure.
5. Likewise, once the fish is in this position, the circulation will seal the pack-off rubber around the fish and prevent fluid passage down the outside. Thus, by building up pressure with the pumps, the fluid can be forced down through the fish.

## Function of the Overshot when Releasing

The sharp downward bump places the largest portion of the bowl tapers opposite the grapple and breaks the hold. Right-hand rotation expands the grapple. Maintaining right-hand rotation allows you to withdraw the overshot from the fish.

## Function of the Grapple

The mechanical conditions which caused the grapple to expand and contract are:

1. The grapple is a left-hand helix.

2. The lower end of the grapple is anchored in the overshot bowl.
3. The inside diameter of the grapple is smaller than the outside diameter of the fish.

As the overshot rotates to the right and lowers over the fish, the drag of the fish against the grapple causes the grapple to expand sufficiently to allow the fish to enter.

As the overshot rotates to the right and withdraws from the fish, the drag of the fish against the grapple causes the grapple to rotate on the fish and expand sufficiently, allowing withdrawal of the overshot.

## Grapple Material Considerations

Standard grapple wickers are supplied at a hardness of approximately 52 - 58 HRC. It is recommended that there is a 10 point difference or more between the hardness of the fish that the grapple is intending to engage and catch. If the fish is of a hardness outside the range of a standard grapple, a Nitralloy grapple is recommended. This type of grapple is capable of achieving hardness values of 60+ HRC.

## Spiral Parts

The spiral grapple and Type-A packer catch sizes from maximum catch spiral grapple down to maximum catch-basket grapple, as specified in the specifications tables on pages 11 through 15 inclusively.

The spiral grapples and Type-A packer should be changed for each different size fish. They will effectively catch and pack off worn fish as much as  $\frac{3}{32}$  in. maximum undersize. The over-range of each grapple is approximately  $\frac{1}{32}$  in.

There are exceptions, particularly in the slim hole type overshots. Some of these will effectively catch undersize or oversize fish by no more than  $\frac{1}{16}$  in. maximum.

## Basket Parts

Basket parts are used to catch sizes from maximum catch basket grapple as specified in the specification tables of pages 11 through 15 inclusive, down to any smaller size.

Basket grapples and mill control packers should be changed for each size fish to be caught.

Where a plain basket control is used in place of a mill control packer, it does not need to be changed for use with undersize basket grapples.

Basket grapples will effectively catch fish worn as much as  $\frac{3}{32}$  in. maximum under-size. The over range of each grapple is approximately  $\frac{1}{32}$  in.

There are exceptions, particularly in the slim hole type overshots. Some of these will effectively catch undersize fish by no more than  $\frac{1}{16}$  in. maximum.



Type SS Top Sub  
(Short with Shoulder)

Type LS Top Sub  
(Elevator Type with Shoulder)

## Overshot Accessories

### Top Subs

Top subs are available for Bowen™ overshots in two types: SS, short sub with shoulder; and LS, elevator sub with shoulder. Type-SS top subs are furnished as part of the assembly unless otherwise specified

### Extension Subs

If the upper end of a fish is unengageable, an extension sub should be installed between the top sub and the bowl of the overshot. This will permit lowering of the overshot over the fish far enough to insure engagement and a perfect pack off in the fishing operation. Extension subs are listed on page 21.



Extension Sub



## Stop Rings

In some instances, such as trying to engage a coupling with a spiral grapple or with a standard basket grapple, there is risk that the coupling or upset move beyond the grapple (i.e. the grapple will pass over the engageable area). If this occurs, there is risk the grapple will not be releasable or damage may occur. To prevent this, we recommend the use of a stop that stop the fish within the grapple catch area. Stop ring part numbers are on page 22.

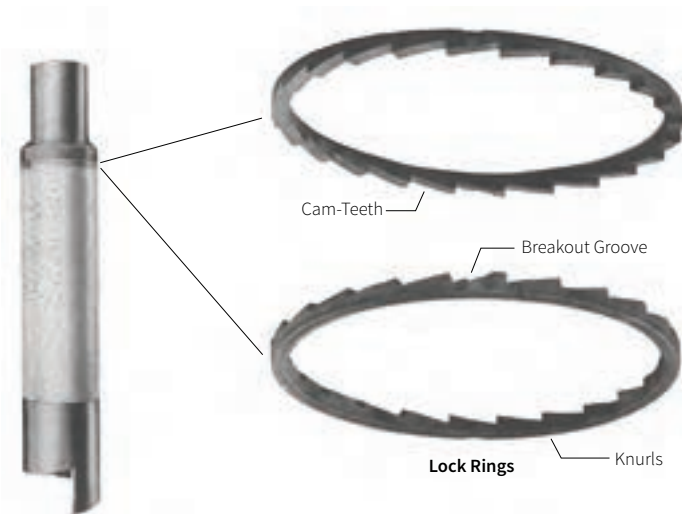


Stop Ring with Overshot and Coupling

## Lock Rings

Bowen™ lock rings are available as optional equipment to prevent the top sub and bowl of Bowen Series 150 releasing and circulating overshots from unthreading during backing-off operations. Use of Bowen lock rings eliminates the weakening practice of drilling and tapping the bowl to install a set screw for securing the bowl to the top sub. The rings also eliminate the weakening and hazardous practice of welding a steel strap across the bowl and sub joint to hold them in place. Using excessive torque when making-up these joints is also no longer necessary if the rings are used.

Bowen lock rings provide a positive and releasable means for locking straight-threaded shouldered joints so they will not back off.



## Construction

Bowen lock rings are used in pairs consisting of two identical rings. The rings have cam-teeth on one face, knurls on the other, and two breakout grooves on the edges. They are precision made from alloy steel, stress relieved, and heat treated.

## Assembly

One lock ring is inverted and placed on the other so the cam-teeth intermesh and the breakout grooves are aligned, and then they are placed on the top sub. The bowl is threaded on, and as the joint is made-up, the knurled faces opposite to the cam-teeth dig in and grip the shoulders. The pitch on the cam-teeth is greater than the thread pitch, so if reverse rotation is applied, the cam-teeth begin to ride up on each other. This produces a wedging action which effectively locks the top sub to the bowl.

The joints are properly made up when reverse torque has been applied and a slight separation in the cam-teeth shoulders is observed. Heavy make-up torque is not required.

When the overshot is dressed with a spiral grapple and Type-A packer, a spacer is required between the packer and top sub. Please refer to lock ring table on page 21. The purpose of the spacer is to fill the space produced by the extra standoff of the top sub when used with the lock rings. No spacer is required when the Type-A packer is not used.

## Disassembly

When unthreading is desired, a special Bowen lock ring breakout clamp is required. Slight right-hand torque may have to be applied for lining-up the ring breakout grooves to receive the clamp.

The breakout clamp consists of two keys that fit into the lock ring grooves, a lower key seat, and an extended pin flat link chain attached at one end to a bracket which has a guide for another (movable) key seat attached to a screw handle.

To position the breakout clamp, back up the screw handle as far as it will go. Put the other end of the chain through a hole in the lower key seat and place the keys in the ring grooves opposite each other. Pull the chain around the rings so that all slack is removed and slip the nearest pin into the pin slot on the bracket. The screw handle is then tightened, which forces the slightly tapered keys into the lock ring breakout grooves, holds the cam-teeth together, and permits the shoulders to back away from the knurled faces when the joint is broken.



# Bowen Series 150 Overshots

## Itcoloy Mill Extension

Itcoloy (sintered tungsten carbide) mill extensions mill away flared or jagged metal from the top of the fish so that the fish will pass easily into the overshot bowl. For ordinary work, they are installed between the bowl and the standard or oversize guide.

The Itcoloy mill extension is also used in the Bowen™ subsea sheared pipe retrieval method (see pages 8-9). In this case it is installed between the overshot bowl and the special guides. They may be ordered by giving the overshot number and specifying the Itcoloy mill extension type and fish size. Prices are available upon request.



Itcoloy Mill Extension

mill guides perform the same service on undersize tool joints and are also used when the top of the fish is an unusually jagged section of pipe. They may be ordered using the standard guide number and specifying Itcoloy mill guide, and fish size. More information on these guides can be found on page 19.



Oversize Guide



Type C Mill Guide

## Guides

If the hole size is so much greater than the fish size that it is possible for the overshot to pass alongside the fish, an oversize guide must be installed in place of the standard guide to ensure alignment of the fish with the overshot. These guides are listed on page 18.

Twist-offs in tool joints are not always immediately revealed at the surface and as a result drilling is not halted at once. In such cases, the top of the fish is often damaged. A mill guide must be installed on the overshot to trim the burr off the fish so that it can enter the overshot. Itcoloy

## Subsea Sheared Pipe Retrieval Method

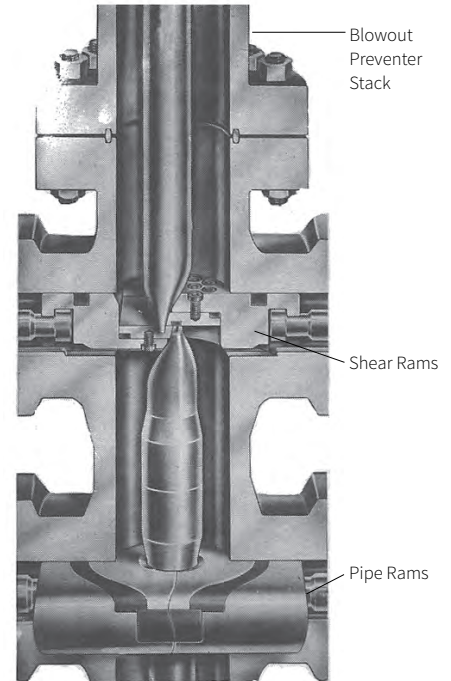
During operations from a floating rig, many hundreds of feet of drillstring often extend from the rig to the sea floor through the wellhead blowout preventer (BOP) stack and down into the well. During instances such as a blowout, a loss of anchor, a drifting rig, or a dangerous storm, it is sometimes necessary for the rig to hurriedly move from the well-site. This is done by temporarily severing the drill string inside the BOP and only tripping out the upper end.

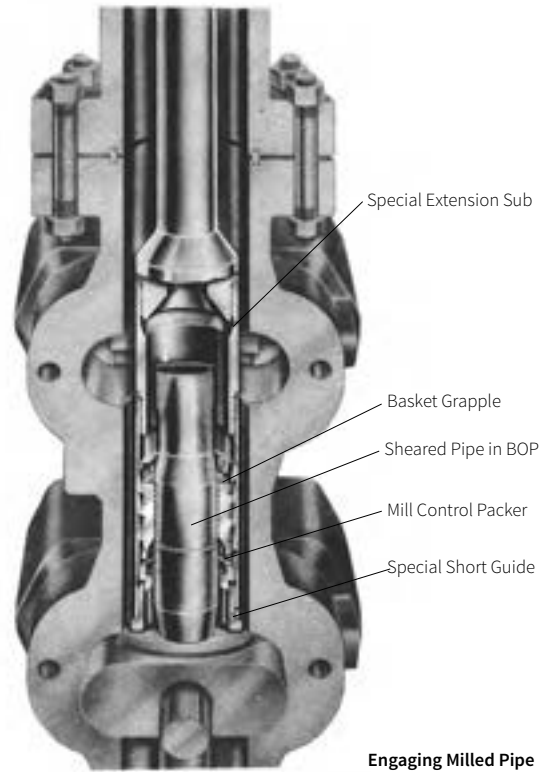
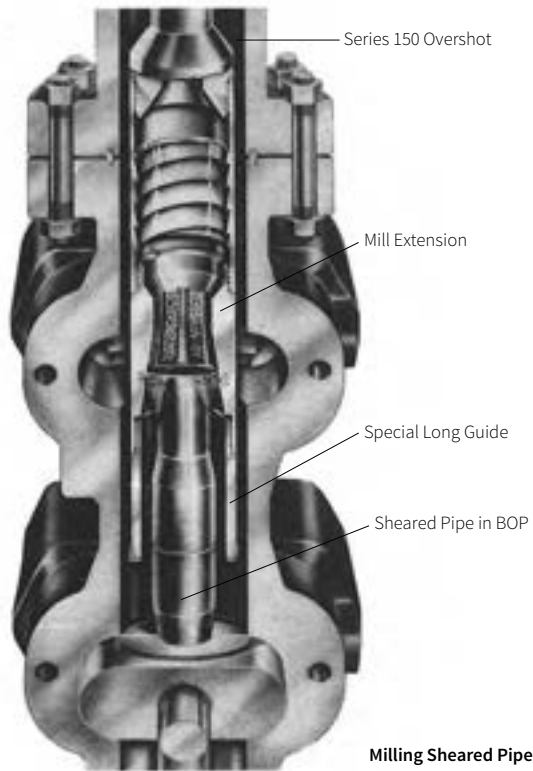
The BOP being used must have at least two sets of rams: lower pipe rams and shear rams above them. Before shearing, it is necessary to land the nearest tool joint on the pipe rams and close them to suspend and pack off the string. The shearing then produces flattened flare-ends with protruding ears.

When the rig returns, the string must be retrieved, the end brought to the surface and the sheared

piece removed. In the past, sheared pipe retrieval has been difficult, costly and time-consuming. Often large parts of the BOP stack must be brought to the surface to effect retrieval.

The Bowen method of sheared pipe retrieval can be achieved in a simple, time-saving and economical manner. It requires only two easy steps using the Series 150 circulating and releasing overshot equipped with a few special accessories.





## Step 1: Flare Mill-Down

Once the standard guide, grapple and packer have been removed from a Bowen™ overshoot, it is then dressed with a mill extension and special flat-bottom long guide and installed on the drill string. The mill extension has tapered milling ribs of Bowen Itcoloy facing on its ID. The overshoot is lowered into the BOP and over the end of the drill pipe, then rotated to mill down the flared ears of the sheared pipe. The end of the long guide is faced with soft metal so that if inadvertently it contacts the BOP pipe rams, it does not damage them. The guide is also of a length which prevents the mill extension from contacting and damaging the tool joint in the BOP. This is important because this joint OD is where engagement of the string will take place.

## Step 2: Engage and Pull

After the milling step is completed, the Bowen overshoot is brought back to the surface, dressed with a special flat-bottom short guide, extension sub and a basket grapple and mill control packer sized to engage the joint. The overshoot is lowered again and as it enters the BOP, the milled-down flare-end passes through the grapple and mill control packer, and is housed in the extension sub while the grapple engages and packs off the tool joint. A pull is exerted on the overshoot to make certain of engagement, then the BOP pipe rams are retracted and the string is raised to the rig floor where the severed joint is removed and replaced, allowing normal operations to resume.

Bowen sheared pipe retrieval overshoot assemblies are available for all sizes of drill pipe and BOPs. Prices will be quoted on request.

## How to Order

Specify:

- (1) Make and working bore size of BOP
- (2) The distance between the counter lines of the BOP pipe rams and shear rams
- (3) Drill pipe body OD and tool joint OD and length

# Bowen Series 150 Overshots

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## Assembly Lists

The lists of assemblies and accessories in this instruction manual have been reduced to the most popular overshots and parts worldwide. This helps you quickly find the information you require and allows you to easily send the electronic version of the file.

The Bowen Series 150 overshot product line consists of many different sizes and types of assemblies and items. A list of more than 225 of these is in Supplemental Instruction Manual 1150A. If a locally popular assembly is not listed in Manual 1150, it will most likely be listed in Manual 1150A. However, the supplemental manual is still not a complete list. There are additional assemblies not listed.

The standard Series 150 overshot is a right-hand operation tool with right-hand threads. But there are many special assemblies offered. Some of the specialty overshots offered include:

- Right-hand tools with left-hand threads
- Left-hand tools with left-hand threads
- Left-hand tools with right-hand threads (see chart on page 26)
- Tools for H<sub>2</sub>S service
- Tools for CO<sub>2</sub> service
- Tools for H<sub>2</sub>S and CO<sub>2</sub> service
- Very high strength tools
- Very thin wall tools
- Sizes ranging from 2<sup>5</sup>/<sub>16</sub> in. OD to above 42 in. OD.

NOV continues to design new assemblies, adding to a product line that has been around for almost a century.

**Note:** For LH conversion sheet please see page 26.

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |               |               |               |               |               |               |              |               |              |
|--|-----------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|---------------|--------------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | <b>2 in.</b>       | <b>2½ in.</b> | <b>2¾ in.</b> | <b>2½ in.</b> | <b>2½ in.</b> | <b>2½ in.</b> | <b>3¼ in.</b> | <b>3 in.</b> | <b>3¼ in.</b> | <b>3 in.</b> |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 1¾ in.             | 1¾            | 2 in.         | 2 in.         | 2 in.         | 2½ in.        | 2½ in.        | -            | 2½ in.        | 2½ in.       |
| <b>Overshot O.D. Nominal</b>                         |                 | 2¾ in.             | 2¾ in.        | 3 in.         | 3 in.         | 3 in.         | 3 in.         | 3 in.         | 3 in.        | 3 in.         | 3 in.        |
| <b>Overshot O.D. Actual*</b>                         |                 | 2¾ in.             | 2¾ in.        | -             | -             | -             | -             | -             | -            | -             | -            |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |               |               |               |               |               |               |              |               |              |
| <b>Type</b>  |                 | SH                 | SH            | XSH           | SH            | FS            | XSH           | SH            | XSH          | SH            | SH           |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | B8919              | C10199        | 9305          | C4623         | C5080         | 9270          | 37585         | 37585MAX     | C5101         | C1835        |
|  | <b>Weight</b>   | 13 lbs             | 28 lbs        | 42 lbs        | 46 lbs        | 55 lbs        | 51 lbs        | 50 lbs        | 50 lbs       | 60 lbs        | 56 lbs       |

\*Overshot O.D. Actual is listed when different than Overshot O.D. Nominal. Strengths are based upon the actual measured O.D. and standard material.

### Replacement Parts

|                               |                 |        |        |        |        |        |        |        |          |        |        |
|-------------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|----------|--------|--------|
| <b>Top Sub</b>                | <b>Part No.</b> | A8920  | A10200 | 9311   | A5083  | A5081  | 9276   | 37586  | 37586    | A5102  | A1842  |
|                               | <b>Weight</b>   | 7 lbs  | 13 lbs | 20 lbs | 22 lbs | 25 lbs | 26 lbs | 25 lbs | 25 lbs   | 30 lbs | 28 lbs |
| <b>Bowl</b>                   | <b>Part No.</b> | B8921  | B10201 | 9306   | B5088  | B5082  | 9271   | 37587  | 37587MAX | B5103  | B1836  |
|                               | <b>Weight</b>   | 2½ lbs | 6 lbs  | 9 lbs  | 10 lbs | 13 lbs | 11 lbs | 11 lbs | 11 lbs   | 14 lbs | 16 lbs |
| <b>Packer</b>                 | <b>Part No.</b> | 9407   | B10202 | 9309   | B5089  | B3395  | 8550   | 37588  | -        | B3594  | B1839  |
|                               | <b>Weight</b>   | ½ lbs  | ½ lbs  | ½ lbs  | ½ lbs  | ½ lbs  | ¼ lbs  | ¾ lbs  | -        | ¾ lbs  | ¾ lbs  |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | 9403   | B10204 | 9307   | B5091  | B5085  | 9272   | 37590  | 37590MAX | B3596  | B1837  |
|                               | <b>Weight</b>   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb   | 1½ lbs | 1¼ lbs | 1¼ lbs   | 1½ lbs | 1½ lbs |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | 9405   | A10205 | 9308   | A5092  | A5086  | 9273   | 37591  | 37591MAX | B3597  | A1838  |
|                               | <b>Weight</b>   | ½ lb   | ½ lb   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb     | ¾ lb   | 1 lb   |
| <b>Standard Guide</b>         | <b>Part No.</b> | 9404   | A10206 | 9312   | A5093  | A5087  | 9275   | 37592  | 37592MAX | A3598  | A1841  |
|                               | <b>Weight</b>   | 1½ lbs | 7 lbs  | 11 lbs | 12 lbs | 15 lbs | 11 lbs | 11 lbs | 11 lbs   | 13 lbs | 16 lbs |

### Basket Parts

|                               |                 |        |        |        |         |         |        |        |   |         |        |
|-------------------------------|-----------------|--------|--------|--------|---------|---------|--------|--------|---|---------|--------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | 9403   | B10204 | 9307   | B5091   | B5085   | 9272   | 37590  | - | B3596   | B1837  |
|                               | <b>Weight</b>   | 3 lbs  | 3½ lbs | 3¾ lbs | 3¾ lbs  | 3¾ lbs  | 5½ lbs | 6 lbs  | - | 7½ lbs  | 7½ lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | 9405   | 10205  | 9308   | A5092   | A5086   | 9273   | 37591  | - | B3597   | A1838  |
|                               | <b>Weight</b>   | 1½ lbs | 2 lbs  | 2¼ lbs | 2¼ lbs  | 2¼ lbs  | 2¼ lbs | 2½ lbs | - | 2½ lbs  | 3 lbs  |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | 9407M  | 10202R | 9309R  | B-5089R | B-3395R | 8550R  | 37588R | - | B-3594R | B1839R |
|                               | <b>Weight</b>   | 2 lbs  | 2½ lbs | 3 lbs  | 3 lbs   | 3 lbs   | 3 lbs  | 3¼ lbs | - | 3½ lbs  | 4 lbs  |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Special Notes:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.
- XFS (Extra Full Strength) ..... Engineered for extreme abuse.
- SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.
- SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.
- XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots

## Specifications

|  |                 |                    |        |        |        |           |        |        |        |         |         |         |
|--|-----------------|--------------------|--------|--------|--------|-----------|--------|--------|--------|---------|---------|---------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | 3½ in.             | 3 in.  | 3½ in. | 3¾ in. | 3¾ in.    | 3¾ in. | 3¾ in. | 4 in.  | 4¼ in.  | 4 in.   | 4 in.   |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 2½ in.             | 2 in.  | 2½ in. | 3 in.  | 3.220 in. | 3½ in. | 3¼ in. | 3 in.  | 3¼ in.  | 4 in.   | 4 in.   |
| <b>Overshot O.D. Nominal</b>                         |                 | 4½ in.             | 3 in.  | 4 in.  | 4½ in. | 4¾ in.    | 4 in.  | 4¾ in. | 4 in.  | 5 in.   | 5 in.   | 5 in.   |
| <b>Overshot O.D. Actual*</b>                         |                 | -                  | 3¾ in. | -      | -      | -         | -      | -      | -      | -       | -       | -       |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |        |        |        |           |        |        |        |         |         |         |
| <b>Type</b>  |                 | FS                 | XSH    | SH     | SH     | FS        | SH     | SFS    | SH     | FS      | SH      | FS      |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | 9105               | 21300  | C4619  | C5151  | 9109      | C5129  | 9120   | C5154  | 5896    | C4969   | 5698    |
|  | <b>Weight</b>   | 70 lbs             | 70 lbs | 72 lbs | 77 lbs | 83 lbs    | 82 lbs | 83 lbs | 95 lbs | 130 lbs | 120 lbs | 130 lbs |

\*Overshot O.D. Actual is listed when different than Overshot O.D. Nominal. Strengths are based upon the actual measured O.D. and standard material.

## Replacement Parts

|                               |                 |        |        |        |        |        |        |        |        |        |        |        |
|-------------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Top Sub</b>                | <b>Part No.</b> | 9106   | 21301  | A4620  | A5152  | 9110   | A5130  | 9110   | A5155  | 5897   | A4970  | 5699   |
|                               | <b>Weight</b>   | 33 lbs | 33 lbs | 36 lbs | 38 lbs | 40 lbs | 42 lbs | 40 lbs | 48 lbs | 61 lbs | 60 lbs | 65 lbs |
| <b>Bowl</b>                   | <b>Part No.</b> | 9107   | 21302  | B4621  | B5153  | 9111   | B5131  | 9121   | B5156  | 5898   | B4971  | 5700   |
|                               | <b>Weight</b>   | 18 lbs | 18 lbs | 18 lbs | 19 lbs | 21 lbs | 20 lbs | 21 lbs | 24 lbs | 34 lbs | 30 lbs | 33 lbs |
| <b>Packer</b>                 | <b>Part No.</b> | 809    | 21303  | 6515   | L6665  | 6665   | B5538  | 9122   | B5157  | 169    | L1140  | 1140   |
|                               | <b>Weight</b>   | ¾ in.  | ¾ in.  | ¾ in.  | ½ in.  | ½ in.  | ½ in.  | ½ in.  | ½ in.  | ¾ in.  | ¾ in.  | ¾ in.  |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | 1741   | 21305  | B3607  | B4339  | 6662   | B5133  | 9123   | B5159  | 165    | M1135  | 1135   |
|                               | <b>Weight</b>   | 1½ lbs | 1½ lbs | 1½ lbs | 1¾ lbs | 1¾ lbs | 1¾ lbs | 2 lbs  | 2 lbs  | 2½ lbs | 2¼ lbs | 2¼ lbs |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | 1747   | 21306  | B3608  | B4340  | 6674   | A5134  | 9124   | B5160  | 186    | M1137  | 1137   |
|                               | <b>Weight</b>   | 1 lbs  | 1 lbs  | 1½ lbs | 1¼ lbs | 1¼ lbs | 1¼ lbs | 1½ lbs | 1½ lbs | 2 lbs  | 1½ lbs | 1½ lbs |
| <b>Standard Guide</b>         | <b>Part No.</b> | 1746   | 21307  | A4622  | A4341  | 6667   | A5135  | 9125   | A5161  | 187    | M1138  | 1143   |
|                               | <b>Weight</b>   | 17 lbs | 17 lbs | 15 lbs | 16 lbs | 18 lbs | 16 lbs | 18 lbs | 19 lbs | 30 lbs | 25 lbs | 27 lbs |

## Basket Parts

|                               |                 |        |        |        |        |        |        |        |        |         |         |         |
|-------------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | 1741   | 21305  | B3607  | B4339  | 6662   | B5133  | 9123   | B5159  | 165     | M1135   | 1135    |
|                               | <b>Weight</b>   | 7½ lbs | 7½ lbs | 7½ lbs | 8¾ lbs | 8¾ lbs | 8¾ lbs | 8¾ lbs | 10 lbs | 12½ lbs | 11¼ lbs | 11¼ lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | 1747   | 21306  | B3608  | B4340  | 6674   | A5134  | 9124   | B5160  | 186     | M1137   | 1137    |
|                               | <b>Weight</b>   | 3 lbs  | 3 lbs  | 3¾ lbs | 3¾ lbs | 3¾ lbs | 3¾ lbs | 3¾ lbs | 4½ lbs | 6 lbs   | 4½ lbs  | 4½ lbs  |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | 809R   | 21303R | L7065R | L6665R | 6665R  | B5538R | 9122R  | B5157R | 169R    | 1140R   | 1140R   |
|                               | <b>Weight</b>   | 4 lbs  | 4 lbs  | 4½ lbs | 5 lbs  | 5 lbs  | 5 lbs  | 5 lbs  | 6 lbs  | 8 lbs   | 6 lbs   | 6 lbs   |



## How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



## Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



## Special Notes:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength)..... Engineered for extreme abuse.  
 SFS (Semi Full Strength)..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole)..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole)..... Engineered for pickup jobs only.

## Specifications

|  |                 |                                    |         |                                    |         |                                    |         |         |         |         |         |         |
|--|-----------------|------------------------------------|---------|------------------------------------|---------|------------------------------------|---------|---------|---------|---------|---------|---------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | 4¾ in.                             | 4¾ in.  | 5 in.                              | 5 in.   | 5 ½ in.                            | 5¼ in.  | 5¾ in.  | 5½ in.  | 6¼ in.  | 6¼ in.  | 6¼ in.  |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 4¼ in.                             | 4¼ in.  | 4½ in.                             | 4¾ in.  | 4¾ in.                             | 4¾ in.  | 4¾ in.  | 4¾ in.  | 5 in.   | 5½ in.  | 5½ in.  |
| <b>Overshot O.D.</b>                                 |                 | 5 in.                              | 5¼ in.  | 5 <sup>2</sup> / <sub>32</sub> in. | 6 in.   | 5¼ in.                             | 6 in.   | 6½ in.  | 6 in.   | 7 in.   | 7 in.   | 7 in.   |
| <b>Overshot O.D. Actual*</b>                         |                 | 5 <sup>2</sup> / <sub>32</sub> in. | -       | 5 <sup>2</sup> / <sub>32</sub> in. | -       | 5 <sup>2</sup> / <sub>32</sub> in. | -       | -       | -       | -       | -       | -       |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order                 |         |                                    |         |                                    |         |         |         |         |         |         |
| <b>Type</b>  |                 | SH                                 | FS      | SH                                 | SFS     | SH                                 | SH      | SH      | SH      | SH      | SFS     | FS      |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | C5168                              | 8975    | C5171                              | 7787    | C11823                             | 6655    | 4773    | 8625    | 9692    | 8741    | C2108   |
|  | <b>Weight</b>   | 133 lbs                            | 138 lbs | 140 lbs                            | 157 lbs | 160 lbs                            | 176 lbs | 182 lbs | 185 lbs | 216 lbs | 241 lbs | 261 lbs |

\*Overshot O.D. Actual is listed when different than Overshot O.D. Nominal. Strengths are based upon the actual measured O.D. and standard material.

## Replacement Parts

|                               |                 |         |         |         |         |         |         |         |         |         |         |         |
|-------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | A5169   | 8976    | A5172   | 7789    | A11824  | 6656    | 4774    | 8626    | 9693    | 8742    | B2106   |
|                               | <b>Weight</b>   | 62 lbs  | 64 lbs  | 65 lbs  | 69 lbs  | 69 lbs  | 78 lbs  | 79 lbs  | 78 lbs  | 87 lbs  | 99 lbs  | 105 lbs |
| <b>Bowl</b>                   | <b>Part No.</b> | B5170   | 8977    | B5173   | 7788    | B11825  | 4503    | 9205    | 8617    | 9694    | 1641    | B2109   |
|                               | <b>Weight</b>   | 32 lbs  | 33 lbs  | 34 lbs  | 40 lbs  | 33 lbs  | 52 lbs  | 53 lbs  | 54 lbs  | 62 lbs  | 69 lbs  | 76 lbs  |
| <b>Packer</b>                 | <b>Part No.</b> | B2199   | 6114    | L5950   | 5950    | B11826  | 4505    | 9209    | 8618    | 9689    | 1642    | L1680   |
|                               | <b>Weight</b>   | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | B2201   | 6112    | B4369   | 5942    | B11828  | 4498    | 9207    | 8619    | 9687    | 1644    | B2073   |
|                               | <b>Weight</b>   | 2 ½ lbs | 2 ¾ lbs | 2 ½ lbs | 2 ½ lbs | 2 ½ lbs | 3 lbs   | 3 lbs   | 4 lbs   | 5 lbs   | 5 ¼ lbs | 5 ¼ lbs |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | B2202   | 6113    | B4370   | 5944    | A11829  | 4499    | 9208    | 8620    | 9688    | 1645    | A2074   |
|                               | <b>Weight</b>   | 2 lbs   | 2 ¼ lbs | 2 lbs   | 2 ¼ lbs | 2 lbs   | 2 ½ lbs | 2 ½ lbs | 2 ½ lbs | 3 lbs   | 3 ¼ lbs | 3 ½ lbs |
| <b>Standard Guide</b>         | <b>Part No.</b> | B2203   | 6121    | B4371   | 5946    | A11830  | 4504    | 4775    | 8621    | 9691    | 5525    | A2075   |
|                               | <b>Weight</b>   | 33 lbs  | 34 lbs  | 34 lbs  | 42 lbs  | 33 lbs  | 39 lbs  | 43 lbs  | 54 lbs  | 58 lbs  | 63 lbs  | 69 lbs  |

## Basket Parts

|                               |                 |          |          |          |        |          |         |        |         |        |        |          |
|-------------------------------|-----------------|----------|----------|----------|--------|----------|---------|--------|---------|--------|--------|----------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | B2201    | 6112     | B4369    | 5942   | B11828   | 4498    | 9207   | 8619    | 9687   | 1644   | B-2073   |
|                               | <b>Weight</b>   | 12 ½ lbs | 13 ½ lbs | 12 ½ lbs | 14 lbs | 12 ½ lbs | 15 lbs  | 16 lbs | 20 lbs  | 25 lbs | 27 lbs | 28 ¾ lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | B2202    | 6113     | B4370    | 5944   | A11829   | 4499    | 9208   | 8620    | 9688   | 1645   | A2074    |
|                               | <b>Weight</b>   | 6 lbs    | 6 ½ lbs  | 6 lbs    | 7 lbs  | 6 lbs    | 7 ½ lbs | 8 lbs  | 7 ½ lbs | 9 lbs  | 10 lbs | 10 ½ lbs |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | B2199R   | 6114R    | L5950R   | 5950R  | 11826R   | 4505R   | L9209R | L8618R  | 9689R  | 1642R  | L1680R   |
|                               | <b>Weight</b>   | 8 lbs    | 8 lbs    | 8 lbs    | 9 lbs  | 8 lbs    | 10 lbs  | 10 lbs | 10 lbs  | 12 lbs | 13 lbs | 14 lbs   |



## How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



## Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



## Special Notes:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength)..... Engineered for extreme abuse.  
 SFS (Semi Full Strength)..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole)..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole)..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots

## Specifications

|  |                 |                    |         |         |         |         |         |         |         |         |         |         |
|--|-----------------|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | 6½ in.             | 6½ in.  | 6½ in.  | 6½ in.  | 6¾ in.  | 7 in.   | 7¼ in.  | 8 in.   | 8¾ in.  | 8½ in.  | 9 in.   |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 5½ in.             | 5¾ in.  | 6 in.   | 5½ in.  | 6 in.   | 6 in.   | 6 in.   | 7¼ in.  | 7¼ in.  | 7¼ in.  | 8¼ in.  |
| <b>Overshot O.D.</b>                                 |                 | 7 in.              | 8 in.   | 7¾ in.  | 8 in.   | 8 in.   | 8 in.   | 8 in.   | 9 in.   | 9 in.   | 10½ in. | 10½ in. |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |         |         |         |         |         |         |         |         |         |         |
| <b>Type</b>  |                 | SH                 | FS      | SH      | FS      | SH      | SH      | SH      | FS      | SH      | FS      | FS      |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | 9860               | C5342   | 4785    | C3032   | C5222   | 9217    | C5354   | 264     | 4834    | 8960    | C5321   |
|  | <b>Weight</b>   | 220 lbs            | 257 lbs | 235 lbs | 280 lbs | 243 lbs | 251 lbs | 260 lbs | 337 lbs | 314 lbs | 358 lbs | 401 lbs |

## Replacement Parts

|                               |                 |        |         |         |         |         |         |         |         |         |         |         |
|-------------------------------|-----------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | 9861   | A5343   | 9133    | A3033   | A5223   | 9218    | A5355   | 265     | 9063    | 8961    | A5322   |
|                               | <b>Weight</b>   | 87 lbs | 115 lbs | 100 lbs | 120 lbs | 102 lbs | 107 lbs | 114 lbs | 158 lbs | 153 lbs | 165 lbs | 178 lbs |
| <b>Bowl</b>                   | <b>Part No.</b> | 9862   | B3711   | 9134    | B3034   | B5224   | 9219    | B5356   | 266     | 9062    | 8962    | B5323   |
|                               | <b>Weight</b>   | 64 lbs | 60 lbs  | 67 lbs  | 78 lbs  | 69 lbs  | 69 lbs  | 71 lbs  | 84 lbs  | 77 lbs  | 87 lbs  | 97 lbs  |
| <b>Packer</b>                 | <b>Part No.</b> | 9865   | 2372    | 9136    | A1814   | B5225   | 9224    | B5357   | 235     | 9055    | 8956    | B5324   |
|                               | <b>Weight</b>   | 1½ lbs | 1½ lbs  | 1½ lbs  | 1½ lbs  | 1½ lbs  | 1¼ lbs  | 1¼ lbs  | 1½ lbs  | 1½ lbs  | 1½ lbs  | 2 lbs   |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | 9863   | B2374   | 9137    | N84     | B5227   | 9222    | B5359   | 238     | 9057    | 8957    | B5326   |
|                               | <b>Weight</b>   | 5½ lbs | 5¾ lbs  | 5½ lbs  | 6 lbs   | 5¾ lbs  | 5¾ lbs  | 6 lbs   | 7¾ lbs  | 6½ lbs  | 9 lbs   | 10 lbs  |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | 9864   | B2375   | 9138    | M-89    | A5228   | 9223    | B5360   | 239     | 9058    | 8958    | B5327   |
|                               | <b>Weight</b>   | 3½ lbs | 3½ lbs  | 3 lbs   | 3 lbs   | 3 lbs   | 3½ lbs  | 3 lbs   | 4 lbs   | 3½ lbs  | 4¾ lbs  | 5 lbs   |
| <b>Standard Guide</b>         | <b>Part No.</b> | 9867   | A2376   | 9139    | A1818   | A5229   | 9226    | A5361   | 240     | 9059    | 8959    | A5328   |
|                               | <b>Weight</b>   | 60 lbs | 71 lbs  | 60 lbs  | 72 lbs  | 62 lbs  | 62 lbs  | 64 lbs  | 81 lbs  | 70 lbs  | 90 lbs  | 108 lbs |

## Basket Parts

|                               |                 |        |         |         |        |         |         |        |         |        |         |        |
|-------------------------------|-----------------|--------|---------|---------|--------|---------|---------|--------|---------|--------|---------|--------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | 9863   | B2374   | 9137    | N84    | B5227   | 9222    | B5359  | 238     | 9057   | 8957    | B5326  |
|                               | <b>Weight</b>   | 25 lbs | 28¾ lbs | 26 lbs  | 30 lbs | 28¾ lbs | 28 lbs  | 30 lbs | 37½ lbs | 34 lbs | 45 lbs  | 50 lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | 9864   | B2375   | 9138    | M89    | A5228   | 9223    | B5360  | 239     | 9058   | 8958    | B5327  |
|                               | <b>Weight</b>   | 9½ lbs | 10½ lbs | 8½ lbs  | 9 lbs  | 9 lbs   | 10 lbs  | 9 lbs  | 12 lbs  | 11 lbs | 13¾ lbs | 15 lbs |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | 9865R  | L6635R  | 9136R   | A1814R | B5225R  | L9224R  | B5357R | 235R    | 9055R  | 8956R   | B5324R |
|                               | <b>Weight</b>   | 11 lbs | 14 lbs  | 11½ lbs | 12 lbs | 12 lbs  | 13½ lbs | 12 lbs | 16 lbs  | 15 lbs | 19 lbs  | 20 lbs |



## How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



## Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



## Special Notes:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength)..... Engineered for extreme abuse.  
 SFS (Semi Full Strength)..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole)..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole)..... Engineered for pickup jobs only.



## Specifications

|  |                 |                    |         |         |         |         |         |
|--|-----------------|--------------------|---------|---------|---------|---------|---------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | 9½ in.             | 10½ in. | 11¼ in. | 12 in.  | 14 in.  | 14¾ in. |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 8½ in.             | 9 in.   | 10½ in. | 11¼ in. | 13¼ in. | 14 in.  |
| <b>Overshot O.D.</b>                                 |                 | 11¼ in.            | 11¾ in. | 12¾ in. | 13¾ in. | 16 in.  | 16¾ in. |
| <b>Standard Box</b>                                  |                 | Per Customer Order |         |         |         |         |         |
| <b>Type</b>  |                 | FS                 | FS      | —       | —       | —       | —       |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | C12822             | 5329    | 15800   | 33006   | 68028   | 64553   |
|  | <b>Weight</b>   | 520 lbs            | 642 lbs | 948 lbs | 975 lbs | —       | —       |

## Replacement Parts

|                               |                 |         |         |         |         |       |        |
|-------------------------------|-----------------|---------|---------|---------|---------|-------|--------|
| <b>Top Sub</b>                | <b>Part No.</b> | A12823  | 5330    | 15801   | 33007   | 68029 | 64554  |
|                               | <b>Weight</b>   | 218 lbs | 375 lbs | 500 lbs | 500 lbs | —     | —      |
| <b>Bowl</b>                   | <b>Part No.</b> | B12824  | 5331    | 15802   | 33008   | 68030 | 64555  |
|                               | <b>Weight</b>   | 125 lbs | 115 lbs | 116 lbs | 115 lbs | —     | —      |
| <b>Packer</b>                 | <b>Part No.</b> | B12825  | 5332    | 15805   | 33011   | 68031 | 64556  |
|                               | <b>Weight</b>   | 2¼ lbs  | 2½ lbs  | 2¾ lbs  | 3 lbs   | —     | —      |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | B12827  | 5334    | 15803   | 33009   | 68033 | 64558  |
|                               | <b>Weight</b>   | 12 lbs  | 12 lbs  | 17 lbs  | 16 lbs  | —     | —      |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | B12828  | 5335    | 15804   | 33010   | 68034 | 64559  |
|                               | <b>Weight</b>   | 6 lbs   | 7 lbs   | 11 lbs  | 6 lbs   | —     | 25 lbs |
| <b>Standard Guide</b>         | <b>Part No.</b> | A12829  | 5336    | 15806   | 33012   | 68035 | 64560  |
|                               | <b>Weight</b>   | 130 lbs | 130 lbs | 200 lbs | 110 lbs | —     | —      |

## Basket Parts

|                               |                 |         |        |        |        |        |        |
|-------------------------------|-----------------|---------|--------|--------|--------|--------|--------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | B12827  | 5334   | 15803  | 33009  | 68033  | 64558  |
|                               | <b>Weight</b>   | 60 lbs  | 60 lbs | 80 lbs | 50 lbs | —      | —      |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | B12828  | 5335   | 15804  | 33010  | 68034  | 64559  |
|                               | <b>Weight</b>   | 17 lbs  | 21 lbs | 35 lbs | 16 lbs | —      | —      |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | B12825R | 5332R  | 15805R | 33011R | 68031R | 64556R |
|                               | <b>Weight</b>   | 21 lbs  | 28 lbs | 50 lbs | 60 lbs | —      | —      |



## How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



## Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 outer seals



## Special Notes:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots

## Bowen Type D Collar Packer Assemblies for Tubing Overshots

|                                  |                 |           |           |           |           |           |
|----------------------------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| <b>Use with Overshot No.</b>     |                 | 9305      | C4623     | C5080     | 9270      | C5101     |
| <b>Overshot Maximum Catch</b>    |                 | 2½ in.    | 2½ in.    | 2½ in.    | 2⅞ in.    | 3⅛ in.    |
| <b>Maximum Size to Pack-off:</b> |                 | 1.660 in. | 1.990 in. | 1.990 in. | 2¾ in. OD | 2¾ in. OD |
| <b>Tubing Collar O.D.</b>        |                 | EUE       | EUE       | EUE       | UPSET     | UPSET     |
| <b>Complete Assembly</b>         | <b>Part No.</b> | 39380     | 39382     | 39383     | 39384     | 24046     |
|                                  | <b>Weight</b>   | 2½ lbs    | 2½ lbs    | 2½ lbs    | 3⅜ lbs    | 3½ lbs    |

## Replacement Parts

|                      |                 |        |        |        |       |        |
|----------------------|-----------------|--------|--------|--------|-------|--------|
| <b>Packer Insert</b> | <b>Part No.</b> | 9309D  | B5089D | B3395D | 8550D | B3594D |
|                      | <b>Weight</b>   | 2½ lbs | 2¾ lbs | 2¾ lbs | 3 lbs | 3¼ lbs |
| <b>Spring</b>        | <b>Part No.</b> | 39412  | 26154  | 26154  | 8539  | 24044  |
|                      | <b>Weight</b>   | ½ lb   | ½ lb   | ½ lb   | ¾ lb  | ½ lb   |
| <b>O-Ring</b>        | <b>Part No.</b> | 30-3   | 30-4   | 30-4   | 30-6  | 30-10  |
|                      | <b>Weight</b>   | ½ lb   | ½ lb   | ½ lb   | ½ lb  | ½ lb   |

## Bowen Type D Collar Packer Assemblies for Tubing Overshots

|                                 |                 |           |           |           |           |  |
|---------------------------------|-----------------|-----------|-----------|-----------|-----------|--|
| <b>Use with Overshot No.</b>    |                 | 9105      | C4619     | 9109      | C5151     |  |
| <b>Overshot Maximum Catch</b>   |                 | 3½ in.    | 3½ in.    | 3¾ in.    | 3¾ in.    |  |
| <b>Maximum Size to Pack-off</b> |                 | 2¾ in. OD | 2¾ in. OD | 2¾ in. OD | 2¾ in. OD |  |
| <b>Tubing Collar</b>            |                 | EUE       | NON UPSET | EUE       | EUE       |  |
| <b>Complete Assembly</b>        | <b>Part No.</b> | 9095      | 39393     | 6653      | 6653      |  |
|                                 | <b>Weight</b>   | 4½ lbs    | 5¼ lbs    | 4½ lbs    | 4½ lbs    |  |

## Replacement Parts

|                      |                 |        |        |        |        |  |
|----------------------|-----------------|--------|--------|--------|--------|--|
| <b>Packer Insert</b> | <b>Part No.</b> | 809D   | L7065D | 6665D  | 6665D  |  |
|                      | <b>Weight</b>   | 4½ lbs | 5½ lbs | 4½ lbs | 4½ lbs |  |
| <b>Spring</b>        | <b>Part No.</b> | 808    | 4183   | 6654   | 6654   |  |
|                      | <b>Weight</b>   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   |  |
| <b>O-Ring</b>        | <b>Part No.</b> | 27-35  | 30-10  | 30-10  | 30-10  |  |
|                      | <b>Weight</b>   | ½ lb   | ½ lb   | ½ lb   | ½ lb   |  |



Type D  
Packer Assembly

## Bowen Type D Collar Packer Assemblies for Tubing Overshots

|   |                 |                |                |                |                |                |                |                      |                      |            |            |                      |
|---|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------------|----------------------|------------|------------|----------------------|
| <b>Use with Overshot No.</b>                  |                 | 5148           | C5129          | C4686          | C5139          | C5154          | C5142          | C5428                | C5425                | 9515       | 5896       | 5162                 |
| <b>Overshot Maximum Catch</b>                 |                 | 3 2½ in.       | 3 ¾ in.        | 3 ¾ in.        | 3 ¾ in.        | 4 in.          | 4 in.          | 4 ½ in.              | 4 ½ in.              | 4 ¼ in.    | 4 ¼ in.    | 4 ¼ in.              |
| <b>Maximum Size to Pack-off Tubing Collar</b> |                 | 2 ¾ in. OD EUE | 2 ¾ in. OD EUE | 2 ¾ in. OD EUE | 2 ¾ in. OD EUE | 2 ¾ in. OD EUE | 2 ¾ in. OD EUE | 2 ¾ in. OD EUE UPSET | 2 ¾ in. OD EUE UPSET | 3 ½ OD NON | 3 ½ OD NON | 3 ½ in. OD NON UPSET |
| <b>Complete Assembly</b>                      | <b>Part No.</b> | 39225          | 39397          | 39398          | 39399          | 39401          | 39402          | 39403                | 39404                | 9538       | 5895       | 35696                |
|   | <b>Weight</b>   | 4 ¾ lbs        | 4 ¾ lbs        | 7 ¼ lbs        | 8 ½ lbs        | 8 ¾ lbs        | 8 ¾ lbs        | 7 ¾ lbs              | 7 ¾ lbs              | 5 ¾ lbs    | 8 ½ lbs    | 8 ¾ lbs              |

## Replacement Parts

|                      |                 |         |         |       |         |        |        |        |       |         |       |       |
|----------------------|-----------------|---------|---------|-------|---------|--------|--------|--------|-------|---------|-------|-------|
| <b>Packer Insert</b> | <b>Part No.</b> | 3219D   | 5538D   | A811D | A1707D  | B5157D | B1506D | B4895D | 1867D | 856D    | 189D  | 4672D |
|                      | <b>Weight</b>   | 4 ¾ lbs | 4 ½ lbs | 7 lbs | 7 ¾ lbs | 8 lbs  | 8 lbs  | 7 lbs  | 7 lbs | 5 ½ lbs | 8 lbs | 8 lbs |
| <b>Spring</b>        | <b>Part No.</b> | 6654    | 6654    | 6654  | 914     | 914    | 914    | 914    | 914   | 914     | 6129  | 914   |
|                      | <b>Weight</b>   | ¼ lb    | ¼ lb    | ¼ lb  | ¾ lb    | ¾ lb   | ¾ lb   | ¾ lbs  | ¾ lb  | ¾ lb    | ½ lb  | ¾ lb  |
| <b>O-Ring</b>        | <b>Part No.</b> | 30-10   | 30-10   | 30-10 | 30-14   | 30-14  | 30-14  | 30-14  | 30-14 | 30-14   | 30-16 | 30-14 |
|                      | <b>Weight</b>   | ½ lb    | ½ lb    | ½ lb  | ½ lb    | ½ lb   | ½ lb   | ½ lb   | ½ lb  | ½ lb    | ½ lb  | ½ lb  |

## Bowen Type D Collar Packer Assemblies for Tubing Overshots

|   |                 |                |                |                |                |                |                    |                    |                    |                    |              |  |
|---|-----------------|----------------|----------------|----------------|----------------|----------------|--------------------|--------------------|--------------------|--------------------|--------------|--|
| <b>Use with Overshot No.</b>                  |                 | 8975           | C5165          | C4814          | 5737           | 5698           | C5168              | C4829              | C7096              | C7093              | 4825         |  |
| <b>Overshot Maximum Catch</b>                 |                 | 4 ½ in.        | 4 ½ in.        | 4 ½ in.        | 4 ¾ in.        | 4 ¾ in.        | 4 ¾ in.            | 4 ¾ in.            | 4 ¾ in.            | 4 ¾ in.            | 5 in.        |  |
| <b>Maximum Size to Pack-off Tubing Collar</b> |                 | 3 ½ in. OD EUE | 3 ½ in. OD EUE | 3 ½ in. OD EUE | 3 ½ in. OD EUE | 3 ½ in. OD EUE | 4 in. OD NON UPSET | 4 in. OD NON UPSET | 4 in. OD NON UPSET | 4 in. OD NON UPSET | 4 in. OD EUE |  |
| <b>Complete Assembly</b>                      | <b>Part No.</b> | 6104           | B13548         | 39405          | 39406          | 18661          | 39407              | 39408              | 39409              | 39410              | 39226        |  |
|   | <b>Weight</b>   | 7 ½ lbs        | 9 lbs          | 8 lbs          | 8 lbs          | 9 lbs          | 8 ½ lbs            | 8 ½ lbs            | 5 ½ lbs            | 12 ½ lbs           | 10 ½ lbs     |  |

## Replacement Parts

|                      |                 |       |         |          |         |         |        |        |        |        |        |      |
|----------------------|-----------------|-------|---------|----------|---------|---------|--------|--------|--------|--------|--------|------|
| <b>Packer Insert</b> | <b>Part No.</b> | 6114D | A2487D  | B2199-1D | 195D    | 1140D   | B2199D | B2362D | B6387D | B2455D | 4505D  |      |
|                      | <b>Weight</b>   | 7 lbs | 8 ½ lbs | 7 ½ lbs  | 7 ½ lbs | 8 ½ lbs | 8 lbs  | 8 lbs  | 10 lbs | 12 lbs | 10 lbs |      |
| <b>Spring</b>        | <b>Part No.</b> | 6129  | 6129    | 6129     | 6129    | 18662   | 6129   | 6129   | 39236  | 39236  | 39236  |      |
|                      | <b>Weight</b>   | ½ lb  | ½ lb    | ½ lb     | ½ lb    | ½ lb    | ½ lb   | ½ lb   | 1½ lb  | 1½ lb  | ½ lb   | ½ lb |
| <b>O-Ring</b>        | <b>Part No.</b> | 30-15 | 30-15   | 30-15    | 30-15   | 30-15   | 30-15  | 30-15  | 30-19  | 30-19  | 30-19  |      |
|                      | <b>Weight</b>   | ½ lb  | ½ lb    | ½ lb     | ½ lb    | ½ lb    | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   |      |



## How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Any desired spares, by name and part number



## Recommended Spare Part:

- (1) 3 O-Rings

Miscellaneous O-ring seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing sets, however, will always be furnished in sealed plastic bags.

# Bowen Series 150 Overshots

## Overshot Guides and Wallhook Guides

If the hole size is so much greater than the fish size that it is possible for the overshot to pass alongside the fish, an oversize guide or a wallhook guide must be installed to insure alignment of the fish with the overshot.

### Oversize Guides

| For Overshot Guides with Outside Diameter |         |         |
|---|---------|---------|
| Over                                      | To      | Weight  |
| —   | 4½ in.  | —       |
| 4½ in.                                    | 5 in.   | 23 lbs  |
| 5 in.                                     | 5½ in.  | 27 lbs  |
| 5½ in.                                    | 6 in.   | 30 lbs  |
| 6 in.                                     | 6½ in.  | 34 lbs  |
| 6½ in.                                    | 7 in.   | 49 lbs  |
| 7 in.                                     | 7½ in.  | 65 lbs  |
| 7½ in.                                    | 8 in.   | 75 lbs  |
| 8 in.                                     | 8½ in.  | 85 lbs  |
| 8½ in.                                    | 9 in.   | 87 lbs  |
| 9 in.                                     | 9½ in.  | 90 lbs  |
| 9½ in.                                    | 10 in.  | 110 lbs |
| 10 in.                                    | 10½ in. | 131 lbs |
| 10½ in.                                   | 11 in.  | 137 lbs |
| 11 in.                                    | 11½ in. | 143 lbs |
| 11½ in.                                   | 12 in.  | 159 lbs |
| 12 in.                                    | 12½ in. | 175 lbs |
| 12½ in.                                   | 13 in.  | 183 lbs |
| 13 in.                                    | 13½ in. | 190 lbs |
| 13½ in.                                   | 14 in.  | 197 lbs |
| 14 in.                                    | 14½ in. | 205 lbs |
| 14½ in.                                   | 15 in.  | 223 lbs |
| 15 in.                                    | 15½ in. | 242 lbs |
| 15½ in.                                   | 16 in.  | 250 lbs |
| 16 in.                                    | 16½ in. | 257 lbs |
| 16½ in.                                   | 17 in.  | 267 lbs |
| 17 in.                                    | 17½ in. | 278 lbs |
| 17½ in.                                   | 18 in.  | 300 lbs |
| 18 in.                                    | 18½ in. | 321 lbs |
| 18 ½ in.                                  | 19 in.  | 327 lbs |
| 19 in.                                    | 19½ in. | 334 lbs |
| 19½ in.                                   | 20 in.  | 344 lbs |
| 20 in.                                    | 20½ in. | 353 lbs |
| 20½ in.                                   | 21 in.  | 362 lbs |

### Wallhook Guides

| For Wallhook Guides with Length |                 |                 |                 |                 |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
| Over                            | Weight - 30 in. | Weight - 36 in. | Weight - 42 in. | Weight - 48 in. |
| 5 in. to 5½ in. O.D.            | 81 lbs          | 94 lbs          | 110 lbs         | —               |
| 5½ in. to 6 in. O.D.            | 87 lbs          | 102 lbs         | 117 lbs         | —               |
| 6 in. to 6½ in. O.D.            | 93 lbs          | 110 lbs         | 126 lbs         | —               |
| 6½ in. to 7 in. O.D.            | 100 lbs         | 117 lbs         | 134 lbs         | —               |
| 7 in. to 7½ in. O.D.            | 108 lbs         | 126 lbs         | 144 lbs         | —               |
| 7½ in. to 8 in. O.D.            | 115 lbs         | 135 lbs         | 155 lbs         | —               |
| 8 in. to 8½ in. O.D.            | 123 lbs         | 145 lbs         | 166 lbs         | 188 lbs         |
| 8½ in. to 9 in. O.D.            | 132 lbs         | 155 lbs         | 177 lbs         | 198 lbs         |
| 9 in. to 9½ in. O.D.            | —               | —               | 191 lbs         | 213 lbs         |
| 9½ in. to 10 in. O.D.           | —               | —               | 204 lbs         | 228 lbs         |
| 10 in. to 10½ in. O.D.          | —               | —               | 244 lbs         | 273 lbs         |
| 10½ in. to 11 in. O.D.          | —               | —               | 285 lbs         | 318 lbs         |
| 11 in. to 11½ in. O.D.          | —               | —               | 299 lbs         | 333 lbs         |
| 11½ in. to 12 in. O.D.          | —               | —               | 312 lbs         | 348 lbs         |
| 12 in. to 12½ in. O.D.          | —               | —               | 327 lbs         | 366 lbs         |
| 12½ in. to 13 in. O.D.          | —               | —               | 343 lbs         | 383 lbs         |
| 13 in. to 13½ in. O.D.          | —               | —               | 360 lbs         | 402 lbs         |
| 13½ in. to 14 in. O.D.          | —               | —               | 377 lbs         | 421 lbs         |
| 14 in. to 14½ in. O.D.          | —               | —               | 391 lbs         | 436 lbs         |
| 14½ in. to 15 in. O.D.          | —               | —               | 404 lbs         | 451 lbs         |
| 15 in. to 15½ in. O.D.          | —               | —               | 419 lbs         | 467 lbs         |
| 15½ in. to 16 in. O.D.          | —               | —               | 433 lbs         | 483 lbs         |
| 16 in. to 16½ in. O.D.          | —               | —               | 448 lbs         | 500 lbs         |
| 16½ in. to 17 in. O.D.          | —               | —               | 462 lbs         | 516 lbs         |
| 17 in. to 17½ in. O.D.          | —               | —               | 479 lbs         | 535 lbs         |
| 17½ in. to 18 in. O.D.          | —               | —               | 496 lbs         | 554 lbs         |



Oversize Guide



Wallhook Guide

## Bowen Overshot Accessories

### Milling Guides

In cases where the top of the fish is a badly burred tool joint or drill pipe, a milling guide should be installed on the overshoot to trim the burr of the fish so that it can enter the overshoot.



Type-C  
Itcoloy Mill  
Guide

### Type C Mill Guides

Carburized teeth or Itcoloy throughout the ID to mill the fish (pipe upset section or tool joint)

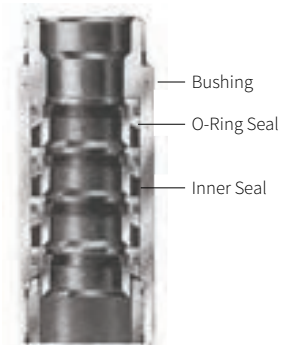
|                               |        |        |        |        |        |        |        |        |        |        |  |  |  |  |  |  |
|-------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|--|--|--|--|--|
| <b>Overshot O.D. Not Over</b> | 4¼ in. | 5½ in. | 6      | 7      | 7½ in. | 8      | 8½ in. | 9      | 9½ in. | 9¾ in. |  |  |  |  |  |  |
| <b>Mill Guide Est. Weight</b> | 22 lbs | 26 lbs | 36 lbs | 40 lbs | 44 lbs | 52 lbs | 54 lbs | 60 lbs | 65 lbs | 78 lbs |  |  |  |  |  |  |

### High Pressure Pack-off Assemblies

The high pressure pack-off assembly is a special assembly for use in areas of extreme pressure. It consists of a bushing and four packing elements. It is normally installed between the bowl and the guide of the overshoot.

### High Pressure Pack-off Assemblies for Series 150 Overshots

|                              |                 |        |                                    |                                    |        |        |         |
|------------------------------|-----------------|--------|------------------------------------|------------------------------------|--------|--------|---------|
| <b>Use with Overshot No.</b> |                 | 9105   | 9109                               | 5896                               | 8975   | 6655   | 8741    |
| <b>Overshot Catch Size</b>   |                 | 3½ in. | 3 <sup>7</sup> / <sub>16</sub> in. | 4¼ in.                             | 4¾ in. | 5¼ in. | 6¼ in.  |
| <b>Overshot O.D.</b>         |                 | 4½ in. | 4 <sup>1</sup> / <sub>16</sub> in. | 5 <sup>5</sup> / <sub>16</sub> in. | 5¾ in. | 6¾ in. | 7¾ in.  |
| <b>Complete Assembly</b>     | <b>Part No.</b> | 10255  | 10260                              | 10357                              | 10265  | 13595  | 21091   |
|                              | <b>Weight</b>   | 34 lbs | 41 lbs                             | 66 lbs                             | 65 lbs | 92 lbs | 121 lbs |



High Pressure  
Pack-off Assembly

### Replacement Parts

|   |                 |          |          |          |          |         |         |
|---|-----------------|----------|----------|----------|----------|---------|---------|
| <b>Bushing</b>                                  | <b>Part No.</b> | 10256    | 10261    | 10358    | 10266    | 13596   | 21092   |
|   | <b>Weight</b>   | 18 lbs   | 21 lbs   | 34 lbs   | 33 lbs   | 52 lbs  | 69 lbs  |
| <b>Packer<br/>(4 Req'd., includes O-ring)</b>   | <b>Part No.</b> | 809HP    | 6665HP   | 169HP    | 6114HP   | 4505HP  | 1642HP  |
|   | <b>Weight</b>   | 4 lbs    | 5 lbs    | 8 lbs    | 8 lbs    | 10 lbs  | 13 lbs  |
| <b>O-Ring Seal<br/>(4 Req'd., 1 per Packer)</b> | <b>Part No.</b> | 30-14    | 30-18    | 30-27    | 30-27    | 30-32   | 30-38   |
|   | <b>Weight</b>   | 1/100 lb | 1/100 lb | 1/100 lb | 1/100 lb | 1/50 lb | 1/50 lb |



### How to Order

- Specify:
- (1) Name and number of overshoot
  - (2) Size of fish to be caught



### Recommended Spare Parts:

- (1) 2 Sets of Packers (4 per Set)
- (2) 8 O-Rings

Miscellaneous O-ring seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing Sets, however, will always be furnished in sealed plastic bags.

# Bowen Series 150 Overshots

## Type R Replaceable Inner Seals for Control Packers

Listed in Order of Fish Size:

|                   |                 |        |        |        |        |        |        |        |        |        |        |  |  |
|-------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|--|
| <b>Fish Size</b>  |                 | 1½ in. | 2 in.  | 2½ in. | 2¾ in. | 2¾ in. | 2½ in. | 2¾ in. | 2¾ in. | 2¾ in. | 3 in.  |  |  |
| <b>Inner Seal</b> | <b>Part No.</b> | A10803 | A10804 | A10805 | A10806 | A10807 | A10808 | A10809 | A10810 | A10811 | A10812 |  |  |
|                   | <b>Weight</b>   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   |  |  |
| <b>Fish Size</b>  |                 | 3½ in. | 3½ in. | 3½ in. | 3½ in. | 3½ in. | 3¾ in. | 3¾ in. | 4 in.  | 4½ in. | 4¼ in. |  |  |
| <b>Inner Seal</b> | <b>Part No.</b> | A10813 | A10814 | A10815 | A10816 | A10817 | A10819 | A10820 | A10821 | A10822 | A10823 |  |  |
|                   | <b>Weight</b>   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   |  |  |
| <b>Fish Size</b>  |                 | 4½ in. | 4½ in. | 4½ in. | 4½ in. | 4½ in. | 5 in.  | 5 in.  | 5¼ in. | 5¾ in. | 5½ in. |  |  |
| <b>Inner Seal</b> | <b>Part No.</b> | A10824 | A10825 | A10826 | A10827 | A10828 | A10829 | A10830 | A10831 | A10832 | A10833 |  |  |
|                   | <b>Weight</b>   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   |  |  |
| <b>Fish Size</b>  |                 | 5½ in. | 5½ in. | 5½ in. | 6 in.  | 6 in.  | 6¼ in. | 6 in.  | 6½ in. | 6 in.  | 6¼ in. |  |  |
| <b>Inner Seal</b> | <b>Part No.</b> | A10834 | A10835 | A10836 | A10837 | A10838 | A10839 | A10840 | A10841 | A10842 | A10843 |  |  |
|                   | <b>Weight</b>   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   |  |  |
| <b>Fish Size</b>  |                 | 6½ in. | 7 in.  | 7½ in. | 7¼ in. | 7½ in. | 7½ in. | 7 in.  | 7¾ in. | 7 in.  | 8 in.  |  |  |
| <b>Inner Seal</b> | <b>Part No.</b> | A10844 | A10845 | A10846 | A10847 | A10848 | A10849 | A10850 | A10851 | A10852 | A10853 |  |  |
|                   | <b>Weight</b>   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   |  |  |
| <b>Fish Size</b>  |                 | 8½ in. | 8¼ in. | 8 in.  | 8½ in. | 8 in.  | 8¼ in. | 8 in.  | 9 in.  | 9 in.  | 9¼ in. |  |  |
| <b>Inner Seal</b> | <b>Part No.</b> | A10854 | A10855 | A10856 | A10857 | A10858 | A10859 | A10860 | A10861 | A10862 | A10863 |  |  |
|                   | <b>Weight</b>   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   | ¼ lb   |  |  |

## Inner Seals to Pass Upset and Pack-off Pipe

|                           |                 |         |           |           |            |            |        |        |        |            |            |        |        |
|---------------------------|-----------------|---------|-----------|-----------|------------|------------|--------|--------|--------|------------|------------|--------|--------|
| <b>Pack-off Pipe Size</b> |                 | 1¼ in.  | 1½ in.    | 2¼ in.    | 2¾ in.     | 2¾ in.     | 2¾ in. | 2¾ in. | 3 in.  | 3 in.      | 3 in.      | 4 in.  | 4 in.  |
| <b>Pass Upset Size</b>    |                 | 1 11/16 | 1.900 in. | 2.330 in. | 2 1/16 in. | 2 1/16 in. | 3 in.  | 3 in.  | 3 in.  | 3 1/16 in. | 3 1/16 in. | 5 in.  | 5 in.  |
| <b>Inner Seal</b>         | <b>Part No.</b> | A13366  | A13317    | A13285    | A11690     | A11690     | A11691 | A11692 | A11693 | A11693     | A11694     | A11695 | A11696 |



### How to Order

- Specify:
- (1) Fish size
  - (2) Inner seal part number



### Recommended Spare Parts:

- (1) 3 Inner seals



Inner Seal

## Type-R Replaceable Outer Seals for Mill Control Packers

Listed in Numerical Order of Mill Control Packer Part Numbers:

|                   |                 |       |        |        |       |           |        |        |         |         |        |        |        |        |
|-------------------|-----------------|-------|--------|--------|-------|-----------|--------|--------|---------|---------|--------|--------|--------|--------|
| <b>Packer No.</b> |                 | 169R  | 235R   | 809R   | 1140R | 1642R     | B2199R | B3395R | B3594R  | 4505R   | B5089R | B5157R | B2225R | B5324R |
| <b>Outer Seal</b> | <b>Part No.</b> | 30-22 | 27-72  | 30-11  | 30-25 | 30-37     | 30-26  | 30-8   | 30-12   | 30-30   | 30-7   | 30-20  | 30-39  | 30-47  |
| <b>Packer No.</b> |                 | 5332R | B5357R | B5538R | 5950R | L5950R    | 6114R  | 6665R  | L6665R  | L7065R  | 8550R  | 8956R  | 9055R  | 9122R  |
| <b>Outer Seal</b> | <b>Part No.</b> | 30-52 | 30-41  | 30-18  | 30-28 | 30-28     | 30-25  | 30-17  | 30-17   | 30-16   | 30-11  | 30-46  | 30-45  | 30-17  |
| <b>Packer No.</b> |                 | 9136R | 9209R  | L9224R | 9309R | 9407M     | 9689R  | 9865R  | B10202R | B12825R | 15805R |        |        |        |
| <b>Outer Seal</b> | <b>Part No.</b> | 30-38 | 30-30  | 30-39  | 30-6  | MS9021-32 | 30-36  | 30-37  | 30-5    | 30-49   | 27-78  |        |        |        |

NOTE: Use the Same Outer Seal for Type-R and Type-E Mill Control Packer



### How to Order

- Specify:
- (1) Fish size
  - (2) Inner seal part number
  - (3) Outer seal part number



### Recommended Spare Parts:

- (1) 3 Inner seals



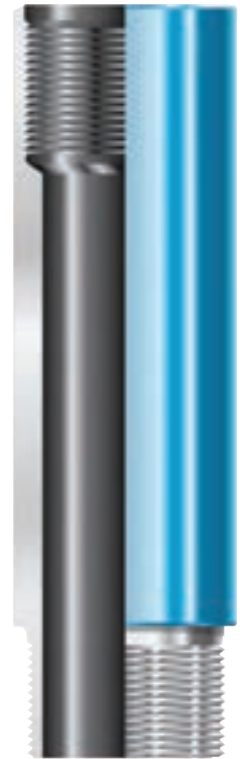
Outer Seal

## Extension Sub

If a twist-off has left a fish whose upper end is unengageable, an extension sub is installed between top sub and the bowl of the overshot. This will permit lowering of the overshot over the fish far enough to ensure a secure engagement and a perfect pack off.

## Extension Sub Specifications

| Sizes                  | O.D. of Extension Sub | Lengths |         |         |         |         |         |         |
|------------------------|-----------------------|---------|---------|---------|---------|---------|---------|---------|
|                        |                       | 24 in.  | 30 in.  | 36 in.  | 42 in.  | 48 in.  | 54 in.  | 60 in.  |
| 4 to 4½ in.            | Weight                | 53 lbs  | 64 lbs  | 75 lbs  | 86 lbs  | 97 lbs  | 108 lbs | 119 lbs |
| Over 4½ in. to 5 in.   | Weight                | 59 lbs  | 72 lbs  | 84 lbs  | 97 lbs  | 109 lbs | 122 lbs | 135 lbs |
| Over 5 in. to 5½ in.   | Weight                | 66 lbs  | 80 lbs  | 94 lbs  | 108 lbs | 122 lbs | 136 lbs | 150 lbs |
| Over 5½ in. to 6 in.   | Weight                | 73 lbs  | 88 lbs  | 103 lbs | 119 lbs | 134 lbs | 150 lbs | 166 lbs |
| Over 6 in. to 6½ in.   | Weight                | 90 lbs  | 109 lbs | 128 lbs | 147 lbs | 166 lbs | 185 lbs | 204 lbs |
| Over 6½ in. to 7 in.   | Weight                | 102 lbs | 124 lbs | 146 lbs | 168 lbs | 190 lbs | 212 lbs | 234 lbs |
| Over 7 in. to 7½ in.   | Weight                | 122 lbs | 148 lbs | 174 lbs | 200 lbs | 226 lbs | 252 lbs | 278 lbs |
| Over 7½ in. to 8 in.   | Weight                | 127 lbs | 154 lbs | 181 lbs | 209 lbs | 236 lbs | 263 lbs | 290 lbs |
| Over 8 in. to 8½ in.   | Weight                | 140 lbs | 170 lbs | 200 lbs | 230 lbs | 260 lbs | 290 lbs | 320 lbs |
| Over 8½ in. to 9 in.   | Weight                | 150 lbs | 182 lbs | 214 lbs | 246 lbs | 278 lbs | 310 lbs | 342 lbs |
| Over 9 in. to 9½ in.   | Weight                | 178 lbs | 212 lbs | 246 lbs | 280 lbs | 314 lbs | 348 lbs | 382 lbs |
| Over 9½ in. to 10 in.  | Weight                | 166 lbs | 202 lbs | 238 lbs | 274 lbs | 310 lbs | 346 lbs | 382 lbs |
| Over 10 in. to 10½ in. | Weight                | 176 lbs | 214 lbs | 252 lbs | 290 lbs | 328 lbs | 366 lbs | 404 lbs |
| Over 10½ in. to 11 in. | Weight                | 184 lbs | 224 lbs | 264 lbs | 304 lbs | 344 lbs | 384 lbs | 424 lbs |
| Over 11 in. to 11½ in. | Weight                | 207 lbs | 253 lbs | 298 lbs | 343 lbs | 388 lbs | 433 lbs | 478 lbs |
| Over 11½ in. to 12 in. | Weight                | 218 lbs | 266 lbs | 314 lbs | 362 lbs | 410 lbs | 458 lbs | 516 lbs |
| Over 12 in. to 12½ in. | Weight                | 230 lbs | 280 lbs | 330 lbs | 380 lbs | 430 lbs | 480 lbs | 530 lbs |
| Over 12½ in. to 13 in. | Weight                | 245 lbs | 300 lbs | 355 lbs | 410 lbs | 465 lbs | 520 lbs | 575 lbs |



Extension Sub



## How to Order

- Specify:
- (1) O.D. and Length of Sub
  - (2) Overshot O.D. and assembly number

## Lock Rings

Lock Rings prevent the top sub and bowl of a Bowen overshot from unthreading when reverse rotation, such as a backing-off, occurs. They provide a positive means of locking straight-threaded, shouldered joints without excessive torque or pins. Knurled surfaces on the rings dig into the shoulder when the joint is made-up. Cam teeth between the rings have pitches greater than the thread pitch, and these cams produce the locking action.

## Lock Ring Specifications

| Bowl No.                       | Size                   | Lock Ring No. | Spacer No.* |
|--------------------------------|------------------------|---------------|-------------|
| 8977                           | 4¾ in. x 5¾ in. O.D.   | 65280         | 65373       |
| B2109                          | 6¼ in. x 7¾ in. O.D.   | 65296         | 65376       |
| B5224                          | 6¾ in. x 7¾ in. O.D.   | 65302         | 65377       |
| 266                            | 8 in. x 9¾ in. O.D.    | 65179         | 65370       |
| B5323                          | 9 in. x 10¾ in. O.D.   | 65325         | 67744       |
| 5331                           | 10¾ in. x 11¾ in. O.D. | 65331         | 65381       |
| <b>Breakout Clamp Part No.</b> |                        | 65912         |             |

Specifications of Lock Rings for other than the Overshots listed will be furnished upon request.  
 \*Used with Type A Packers only (see page 6).



Lock Rings

# Bowen Series 150 Overshots

## Stop Rings

### Stop Ring Specifications

| Assembly  | Part No.    | B8919   | C10199    | 9305    | C4623  | C5080  | 9270    | 37585    | C5101  | C1835    | 9105   | 21300    | C4619  |
|-----------|-------------|---------|-----------|---------|--------|--------|---------|----------|--------|----------|--------|----------|--------|
| Stop Ring | Part No.    | 9407S * | B10202S * | 9309S * | B5089S | B3395S | 8550S * | 37588S * | B3594S | B1839S * | 809S   | 21303S * | 6515S  |
|           | Standard ID | -       | -         | -       | 1¾ in. | 1¾ in. | -       | -        | 1¾ in. | -        | 2½ in. | -        | 1½ in. |
|           | Weight      | -       | -         | -       | 3      | 2      | -       | -        | 4      | -        | 3      | -        | 9      |

### Stop Ring Specifications

| Assembly  | Part No.    | C5151  | 9109   | C5129  | 9120   | C5154  | 5896   | C4969  | 5698                                | C5168                               | 8975                                | C5171    |
|-----------|-------------|--------|--------|--------|--------|--------|--------|--------|-------------------------------------|-------------------------------------|-------------------------------------|----------|
| Stop Ring | Part No.    | L6665S | 6665S  | B5538S | 9122S  | B5157S | 169S   | L1140S | 1140S                               | B2199S                              | 6114S                               | L5950S * |
|           | Standard ID | 2½ in. | 2½ in. | 2½ in. | 1½ in. | 2½ in. | 2½ in. | 2½ in. | 2 <sup>11</sup> / <sub>16</sub> in. | 2 <sup>11</sup> / <sub>16</sub> in. | 2 <sup>11</sup> / <sub>16</sub> in. | -        |
|           | Weight      | 6      | 7      | 5      | 9      | 8      | 11     | 18     | 9                                   | 11                                  | 11                                  | -        |

\*Note: Requires a non-standard design that may be requested. Stop rings may also be requested for larger overshots assemblies but are generally not required due to the length of couplings used on larger casing sizes.

Stop Rings are interchangeable with left and right hand assemblies



Stop Ring with Overshot and Coupling



## Calculated Strengths for Series 150 Overshots

| Max. Catch Size w/<br>Spiral Grapple | Load Capacity at Yield Point |               |             | Part Numbers |         |          |        | Makeup Torque w/ Bowl* |               |
|--------------------------------------|------------------------------|---------------|-------------|--------------|---------|----------|--------|------------------------|---------------|
|                                      | Spiral Grapple               | Without Stop  | With Stop   | Assembly     | Top Sub | Bowl     | Guide  | Top Sub                | Guide         |
| 2 in.                                | 50,400 lbs                   | 36,300 lbs    | 28,900 lbs  | B8919        | A8920   | B8921    | 9404   | 600 ft-lbs             | 80 ft-lbs     |
| 2 1/8 in.                            | 101,600 lbs                  | 86,400 lbs    | 61,000 lbs  | C10199       | A10200  | B10201   | A10206 | 1,300 ft-lbs           | 200 ft-lbs    |
| 2 1/4 in.                            | 193,500 lbs                  | 173,200 lbs   | 118,000 lbs | 9305         | 9311    | 9306     | 9312   | 2,000 ft-lbs           | 400 ft-lbs    |
| 2 1/2 in.                            | 258,000 lbs                  | 213,300 lbs   | 163,500 lbs | C4623        | A5083   | B5088    | A5093  | 2,700 ft-lbs           | 700 ft-lbs    |
| 2 3/8 in.                            | 193,500 lbs                  | 157,400 lbs   | 78,700 lbs  | 9270         | 9276    | 9271     | 9275   | 2,500 ft-lbs           | 500 ft-lbs    |
| 2 1/2 in.                            | 346,200 lbs                  | 307,700 lbs   | 219,800 lbs | C5080        | A5081   | B5082    | A5087  | 2,700 ft-lbs           | 900 ft-lbs    |
| 3 1/16 in.                           | 217,700 lbs                  | 221,200 lbs   | 179,700 lbs | 37585        | 37586   | 37587    | 37592  | 2,600 ft-lbs           | 500 ft-lbs    |
| 3 1/8 in.                            | 235,000 lbs                  | N/A           | N/A         | 37585MAX     | 37586   | 37587MAX | 37592  | 2,900 ft-lbs           | 500 ft-lbs    |
| 3 3/8 in.                            | 102,500 lbs                  | 97,500 lbs    | 66,500 lbs  | 21300        | 21301   | 21302    | 21307  | 1,700 ft-lbs           | 400 ft-lbs    |
| 3 3/8 in.                            | 155,100 lbs                  | 144,200 lbs   | 98,000 lbs  | C1835        | A1842   | B1836    | A1841  | 2,400 ft-lbs           | 800 ft-lbs    |
| 3 3/16 in.                           | 265,400 lbs                  | 219,000 lbs   | 160,100 lbs | C5101        | A5102   | B5103    | A3598  | 6,200 ft-lbs           | 900 ft-lbs    |
| 3 3/8 in.                            | 310,200 lbs                  | 255,000 lbs   | 170,000 lbs | 9105         | 9106    | 9107     | 1746   | 3,500 ft-lbs           | 1,000 ft-lbs  |
| 3 1/2 in.                            | 267,400 lbs                  | 220,700 lbs   | 144,300 lbs | C4619        | A4620   | B4621    | A4622  | 4,400 ft-lbs           | 1,300 ft-lbs  |
| 3 21/32 in.                          | 276,400 lbs                  | 228,100 lbs   | 157,900 lbs | C5151        | A5152   | B5153    | A4341  | 5,500 ft-lbs           | 1,600 ft-lbs  |
| 3 3/4 in.                            | 270,600 lbs                  | 218,000 lbs   | 150,900 lbs | C5129        | B5130   | B5131    | A5135  | 5,700 ft-lbs           | 1,200 ft-lbs  |
| 3 23/32 in.                          | 332,000 lbs                  | 279,000 lbs   | 199,500 lbs | 9109         | 9110    | 9111     | 6667   | 3,400 ft-lbs           | 1,300 ft-lbs  |
| 3 3/4 in.                            | 261,300 lbs                  | 233,000 lbs   | 138,000 lbs | 9120         | 9110    | 9121     | 9125   | 3,400 ft-lbs           | 1,000 ft-lbs  |
| 4 in.                                | 385,000 lbs                  | 241,000 lbs   | 167,000 lbs | C5154        | A5155   | B5156    | A5161  | 6,200 ft-lbs           | 1,100 ft-lbs  |
| 4 1/8 in.                            | 297,000 lbs                  | 258,000 lbs   | 186,200 lbs | C4969        | A4970   | B4971    | M1138  | 7,800 ft-lbs           | 1,700 ft-lbs  |
| 4 1/4 in.                            | 526,600 lbs                  | 494,300 lbs   | 362,500 lbs | 5896         | 5897    | 5898     | 187    | 9,000 ft-lbs           | 2,600 ft-lbs  |
| 4 3/8 in.                            | 420,000 lbs                  | 378,500 lbs   | 273,000 lbs | 5698         | 5699    | 5700     | 1143   | 7,100 ft-lbs           | 1,700 ft-lbs  |
| 4 3/4 in.                            | 360,400 lbs                  | 308,400 lbs   | 234,500 lbs | C5168        | A5169   | B5170    | B2203  | 6,900 ft-lbs           | 1,900 ft-lbs  |
| 4 3/4 in.                            | 432,900 lbs                  | 411,600 lbs   | 303,275 lbs | 8975         | 8976    | 8977     | 6121   | 8,100 ft-lbs           | 1,600 ft-lbs  |
| 5 1/8 in.                            | 135,000 lbs                  | 115,000 lbs   | 71,500 lbs  | C11823       | A11824  | B11825   | A11830 | 5,500 ft-lbs           | 1,600 ft-lbs  |
| 5 in.                                | 323,500 lbs                  | 283,500 lbs   | 218,500 lbs | C5171        | A5172   | B5173    | B4371  | 8,200 ft-lbs           | 2,200 ft-lbs  |
| 5 in.                                | 468,000 lbs                  | 440,000 lbs   | 322,000 lbs | 7787         | 7789    | 7788     | 5946   | 9,000 ft-lbs           | 2,400 ft-lbs  |
| 5 1/4 in.                            | 403,000 lbs                  | 356,000 lbs   | 256,000 lbs | 6655         | 6656    | 4503     | 4504   | 10,400 ft-lbs          | 3,400 ft-lbs  |
| 5 3/8 in.                            | 385,500 lbs                  | 325,000 lbs   | 232,000 lbs | 4773         | 4774    | 9205     | 4775   | 8,400 ft-lbs           | 2,900 ft-lbs  |
| 5 in.                                | 637,000 lbs                  | 574,300 lbs   | 462,000 lbs | C4825        | B4826   | B4827    | L1074  | 14,900 ft-lbs          | 4,300 ft-lbs  |
| 5 1/2 in.                            | 386,000 lbs                  | 325,000 lbs   | 232,000 lbs | 8625         | 8626    | 8617     | 8621   | 9,500 ft-lbs           | 3,300 ft-lbs  |
| 6 1/4 in.                            | 450,400 lbs                  | 427,283 lbs   | 327,900 lbs | 9692         | 9693    | 9694     | 9691   | 13,500 ft-lbs          | 3,700 ft-lbs  |
| 6 1/4 in.                            | 502,100 lbs                  | 449,900 lbs   | 363,200 lbs | 8741         | 8742    | 1641     | 5525   | 16,000 ft-lbs          | 4,700 ft-lbs  |
| 6 1/2 in.                            | 418,200 lbs                  | 396,700 lbs   | 322,900 lbs | 9860         | 9861    | 9862     | 9867   | 12,100 ft-lbs          | 4,000 ft-lbs  |
| 6 3/8 in.                            | 422,000 lbs                  | 400,000 lbs   | 318,000 lbs | 4785         | 9133    | 9134     | 9139   | 13,200 ft-lbs          | 4,200 ft-lbs  |
| 6 3/4 in.                            | 586,800 lbs                  | 515,600 lbs   | 413,700 lbs | C2108        | B2106   | B2109    | A2072  | 31,100 ft-lbs          | 6,400 ft-lbs  |
| 7 in.                                | 453,000 lbs                  | 429,500 lbs   | 329,500 lbs | 9217         | 9218    | 9219     | 9226   | 17,300 ft-lbs          | 4,600 ft-lbs  |
| 6 1/2 in.                            | 586,500 lbs                  | 515,500 lbs   | 413,500 lbs | C5342        | A5343   | B3711    | A2376  | 22,900 ft-lbs          | 6,800 ft-lbs  |
| 6 3/4 in.                            | 531,900 lbs                  | 467,300 lbs   | 375,000 lbs | C5222        | A5223   | B5224    | A5229  | 11,300 ft-lbs          | 4,400 ft-lbs  |
| 6 3/4 in.                            | 637,500 lbs                  | 574,300 lbs   | 462,000 lbs | C3032        | A3033   | B3034    | A1818  | 18,200 ft-lbs          | 7,000 ft-lbs  |
| 7 1/4 in.                            | 430,000 lbs                  | 385,000 lbs   | 295,000 lbs | C5354        | A5355   | B5356    | A5361  | 14,500 ft-lbs          | 5,200 ft-lbs  |
| 7 1/4 in.                            | 586,900 lbs                  | 515,600 lbs   | 426,500 lbs | C5352        | A5353   | M1026    | M1029  | 30,000 ft-lbs          | 8,100 ft-lbs  |
| 8 3/8 in.                            | 447,500 lbs                  | 424,500 lbs   | 325,500 lbs | 4834         | 9063    | 9062     | 9059   | 20,300 ft-lbs          | 6,200 ft-lbs  |
| 8 in.                                | 602,700 lbs                  | 510,750 lbs   | 398,600 lbs | 264          | 265     | 266      | 240    | 26,400 ft-lbs          | 10,200 ft-lbs |
| 8 1/2 in.                            | 602,700 lbs                  | 492,000 lbs   | 391,000 lbs | 8960         | 8961    | 8962     | 8959   | 32,500 ft-lbs          | 10,200 ft-lbs |
| 9 in.                                | 586,800 lbs                  | 515,600 lbs   | 426,500 lbs | C5321        | A5322   | B5323    | A5328  | 37,200 ft-lbs          | 13,100 ft-lbs |
| 9 1/8 in.                            | 586,800 lbs                  | 515,600 lbs   | 413,700 lbs | C12822       | A12823  | B12824   | A12829 | 39,500 ft-lbs          | 15,700 ft-lbs |
| 10 1/8 in.                           | 616,000 lbs                  | 528,000 lbs   | 435,000 lbs | 5329         | 5330    | 5331     | 5336   | 52,200 ft-lbs          | 16,100 ft-lbs |
| 11 1/4 in.                           | 605,000 lbs                  | 562,250 lbs   | 444,000 lbs | 15800        | 15801   | 15802    | 15806  | 51,700 ft-lbs          | 16,100 ft-lbs |
| 11 1/8 in.                           | 1,022,314 lbs                | 745,564 lbs   | N/A         | 33006        | 33007   | 33008    | 33012  | 70,500 ft-lbs          | 17,600 ft-lbs |
| 14 in.                               | 1,164,000 lbs                | 1,175,000 lbs | N/A         | 68028        | 68029   | 68030    | 68035  | 111,200 ft-lbs         | 34,670 ft-lbs |
| 14 3/4 in.                           | 1,197,674 lbs                | 1,226,777 lbs | N/A         | 64553        | 64554   | 64555    | 64560  | 107,500 ft-lbs         | 26,670 ft-lbs |

NOTE: All strengths listed are calculated theoretical yield points and are accurate within 20%. It should be noted, however, that all strengths assume a straight, steady pull and full grapple engagement of a round fish. Anything less than full engagement or straight pulling will reduce the listed strength substantially. This includes tong marks or other damage to the bowl surface.

All strengths shown are at standard diameters. In a scenario where an overshot OD needs to be turned down to fit into a tight hole, please contact your local service representative so that NOV Engineering can assist with revised strengths. Strengths are based upon the actual measured O.D. and standard material. Contact your local service representative or wt-bowentools@nov.com for assistance with revised strengths.

# Bowen Series 150 Overshots

## Left-Hand Overshot Cross Reference Table

| Outside Diameter | Standard P/N | Left Hand Threads Only P/N | Completely Left Hand P/N |
|------------------|--------------|----------------------------|--------------------------|
| 2½ in.           | C10199       | 154669                     | 77749                    |
| 3 in.            | 9305         | -                          | 506206                   |
| 3¼ in.           | C5072        | -                          | 508144                   |
| 3½ in.           | C4623        | -                          | 157311                   |
| 3¾ in.           | C5080        | -                          | 155821                   |
| 3 in.            | 9270         | 19475                      | -                        |
| 3 in.            | C9237        | -                          | 74989                    |
| 3 in.            | N-9270       | 80863                      | 146120                   |
| 3 in.            | C1827        | -                          | C-13679                  |
| 3 in.            | 37585        | 152265                     | 151813, 149523           |
| 3 in.            | C1835        | 56703                      | -                        |
| 3 in.            | 21300        | -                          | 151667, 151820           |
| 3⅞ in.           | C5101        | 53420                      | 70365                    |
| 4 in.            | C4736        | 70567, 48894               | 54118                    |
| 4 in.            | C5104        | 74827                      | 145310                   |
| 4 in.            | 4390         | 78234                      | 151643                   |
| 4 in.            | 9105         | 30080                      | 74785                    |
| 4 in.            | C5098        | 53886                      | 47438                    |
| 4 in.            | C5126        | 48890                      | -                        |
| 4 in.            | C4619        | 151949                     | 154282                   |
| 4 in.            | C9773        | -                          | 156881                   |
| 4 in.            | 17201        | 36214                      | 152679                   |
| 4 in.            | C5123        | -                          | 77573                    |
| 4 in.            | C5151        | 56707                      | 46238                    |
| 4 in.            | C5129        | 64133                      | 149201                   |
| 4 in.            | 1255         | -                          | 505225                   |
| 4 in.            | 9109         | 60131                      | 51949                    |
| 4 in.            | 9120         | 148548                     | 152633                   |
| 4 in.            | C5139        | -                          | 152957                   |
| 4 in.            | C5154        | -                          | 51469                    |
| 4 in.            | 153578       | -                          | 155738                   |
| 4 in.            | C5154        | -                          | 51469 (CT)               |
| 5 in.            | C5148        | 53424                      | 73203                    |
| 5 in.            | C5428        | -                          | 47111                    |
| 5 in.            | C5162        | -                          | 151827, 149525           |
| 5 in.            | 9515         | -                          | 47439                    |
| 5 in.            | C5425        | 64743                      | 47440                    |
| 5 in.            | C4969        | 501186                     | 152639                   |
| 5 in.            | 5896         | 70426                      | 505213                   |
| 5 in.            | 5698         | 78345                      | -                        |
| 5 in.            | C5168        | 51985                      | 54046                    |
| 5 in.            | 8975         | 26350                      | 31764                    |
| 5 in.            | C7096        | -                          | 47112                    |
| 5 in.            | 79908        | 153299 (CT)                | -                        |
| 5 in.            | 4814         | 147699                     | -                        |

| Outside Diameter | Standard P/N | Left Hand Threads Only P/N | Completely Left Hand P/N |
|------------------|--------------|----------------------------|--------------------------|
| 5 in.            | C5171        | 151638                     | 70326                    |
| 5 in.            | C4829        | 52478                      | C-13720                  |
| 5 in.            | 7787         | 147721                     | 151631                   |
| 5 in.            | C7093        | -                          | 151834                   |
| 5 in.            | 6655         | -                          | 80700                    |
| 5 in.            | C4825        | 58288                      | 507942                   |
| 5 in.            | 8625         | -                          | 504919                   |
| 5 in.            | 8978         | -                          | 69917                    |
| 5 in.            | C5206        | C-14140                    | -                        |
| 5 in.            | 150980       | 153185(HP)                 | -                        |
| 5 in.            | 6150         | 150975                     | -                        |
| 5 in.            | 9692         | 54132                      | 54059                    |
| 5 in.            | 7572         | 54136                      | 54074                    |
| 5 in.            | 8741         | -                          | 39431                    |
| 5 in.            | 9860         | 36414                      | -                        |
| 5 in.            | 9163         | 77163                      | -                        |
| 5 in.            | C5204        | 48884                      | -                        |
| 5 in.            | 4785         | 49087                      | -                        |
| 5 in.            | C2108        | 48303                      | 47113                    |
| 5 in.            | 9678         | 59342                      | -                        |
| 5 in.            | 5222         | 14760                      | -                        |
| 5 in.            | C5222        | 62288                      | 54141                    |
| 5 in.            | C5222        | 152667 (CT)                | -                        |
| 5 in.            | C5342        | 50487                      | 47442                    |
| 5 in.            | 9217         | 36418, 149323              | 70221                    |
| 5 in.            | C3263        | -                          | 67323                    |
| 5 in.            | C5342        | 153310 (CT)                | -                        |
| 5 in.            | C3032        | -                          | 504868                   |
| 5 in.            | C3833        | 56709                      | -                        |
| 5 in.            | C5354        | -                          | 148518                   |
| 5 in.            | C5233        | -                          | 80137                    |
| 5 in.            | C1500        | 70521                      | -                        |
| 5 in.            | 264          | 54138                      | 54082                    |
| 5 in.            | C4179        | 64707                      | -                        |
| 5 in.            | 79951        | 152663 (CT)                | -                        |
| 5 in.            | C1230        | 68000                      | -                        |
| 5 in.            | 8960         | 20165                      | -                        |
| 5 in.            | C5321        | 56713                      | 506468                   |
| 5 in.            | C12822       | 77160                      | 72253                    |
| 5 in.            | C5313        | -                          | 80131                    |
| 5 in.            | 15250        | 64740                      | -                        |
| 5 in.            | 5329         | 79668                      | 79778                    |
| 5 in.            | 15800        | 59890                      | -                        |
| 5 in.            | 31653        | 77167                      | -                        |

\*CT - course thread. Items in this list may be legacy or obsolete and for reference only. Contact NOV for more information.

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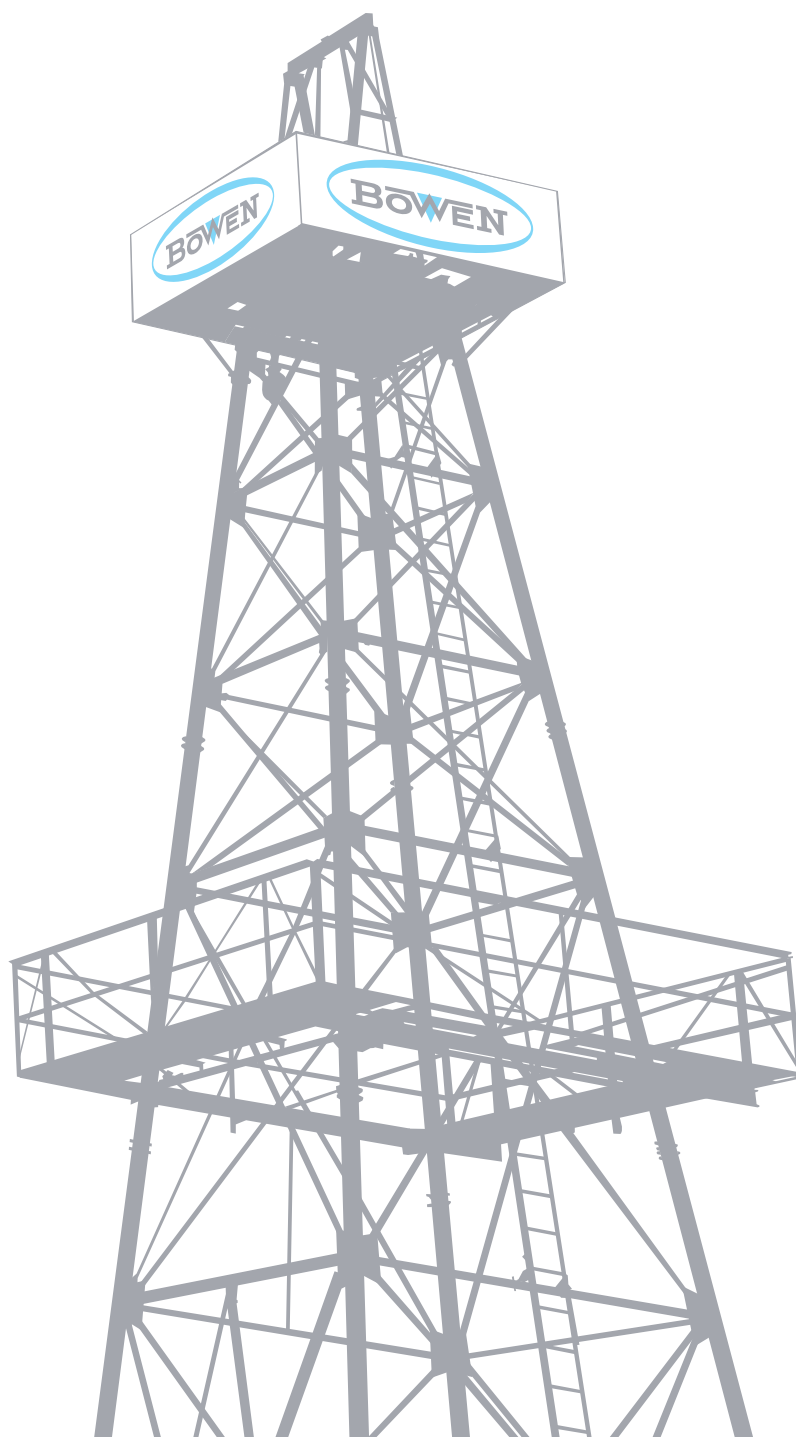
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# Bowen Series 150 Overshots Supplement

Instruction Manual 1150A



# Bowen Series 150 Overshots Supplement

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| Explanation.....                          | 2       |
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## Explanation

The lists of assemblies and accessories in Instruction Manual 1150 have been reduced to the most popular overshots and parts worldwide. This helps you quickly find the information you require and allows you to more easily transmit the electronic file.

The Bowen™ Series 150 overshot product line consists of many different sizes and types of assemblies and items. This instruction manual includes a list of more than 225 of these products. If a locally popular assembly is not listed in Manual 1150, it will probably be listed in Manual 1150A. However, this is still not a complete list. There are additional assemblies not listed.

The standard Series 150 overshot is a right-hand operation tool with right-hand threads, but there are many special types available. Some of the specialty overshots offered include:

- Right-Hand Tools with Left-Hand Threads
- Left-Hand Tools with Right Hand Threads
- Left-Hand Tools with Left Hand Threads
- Rated for H2S Service
- Rated for CO2 Service
- Rated for H2s and CO2 service
- Extreme High Strength
- Extreme Thin Wall
- Ranging in Size from 2-5/16" OD to above 42" OD

Even with all of the existing combinations, NOV continues to design new assemblies, enhancing a product line that has been around for almost a century.

The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.



# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |              |                |              |                |              |                |              |                |
|--|-----------------|--------------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | <b>2 ½ in.</b>     | <b>2 in.</b> | <b>2 ½ in.</b> | <b>2 in.</b> | <b>2 ½ in.</b> | <b>2 in.</b> | <b>2 ½ in.</b> | <b>2 in.</b> | <b>2 ½ in.</b> |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 1 ¾ in.            | 2 in.        | 1 ½ in.        | 1 ¾ in.      | 1 ½ in.        | 2 ½ in.      | 2 ¾ in.        | 2 ¾ in.      | 2 ¾ in.        |
| <b>Overshot O.D.</b>                                 |                 | 2 ½ in.            | 3 ½ in.      | 3 ¼ in.        | 3 ½ in.      | 4 ½ in.        | 3 in.        | 3 ¾ in.        | 4 in.        | 4 ½ in.        |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |              |                |              |                |              |                |              |                |
| <b>Type</b>  |                 | SH                 | XSH          | SH             | FS           | FS             | XSH          | SH             | FS           | FS             |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | 16395              | 9305         | C5072          | C4741        | 1443           | N9270        | C1827          | C4736        | 4390           |
|  | <b>Weight</b>   | 37 lbs             | 42 lbs       | 44 lbs         | 53 lbs       | 70 lbs         | 51 lbs       | 54 lbs         | 64 lbs       | 70 lbs         |

### Replacement Parts

|                               |                 |        |        |        |        |        |         |         |         |         |
|-------------------------------|-----------------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | 16396  | 9311   | A5073  | B4742  | 1445   | L9276   | A1834   | A4737   | 4391    |
|                               | <b>Weight</b>   | 18 lbs | 20 lbs | 21 lbs | 24 lbs | 33 lbs | 26 lbs  | 27 lbs  | 31 lbs  | 33 lbs  |
| <b>Bowl</b>                   | <b>Part No.</b> | 16397  | 9306   | B5074  | B4743  | 1446   | M9271   | B1828   | B4738   | 4392    |
|                               | <b>Weight</b>   | 8 lbs  | 9 lbs  | 10 lbs | 13 lbs | 18 lbs | 11 lbs  | 12 lbs  | 15 lbs  | 18 lbs  |
| <b>Packer</b>                 | <b>Part No.</b> | 16398  | 9309   | B5075  | L1453  | 1453   | M8550   | A1831   | L809RS  | 4398    |
|                               | <b>Weight</b>   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ¼ lb    | ¼ lb    | ¼ lb    | ¾ lb    |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | 16392  | 9307   | B5077  | B782   | 1448   | M9272   | A1829   | M805    | 805     |
|                               | <b>Weight</b>   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb   | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | 16393  | 9308   | A5078  | B783   | 1449   | L9273   | A1830   | M806    | 806     |
|                               | <b>Weight</b>   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb   | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    |
| <b>Standard Guide</b>         | <b>Part No.</b> | 16394  | 9312   | A5079  | A4745  | 1450   | L9275   | A1833   | A4740   | 4393    |
|                               | <b>Weight</b>   | 10 lbs | 11 lbs | 11 lbs | 14 lbs | 17 lbs | 11 lbs  | 12 lbs  | 16 lbs  | 17 lbs  |

### Basket Parts

|                               |                 |         |         |         |         |         |         |         |         |         |
|-------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | 16392   | 9307    | B5077   | B782    | 1448    | M9272   | A1829   | M805    | 805     |
|                               | <b>Weight</b>   | 3 ½ lbs | 3 ¾ lbs | 3 ¾ lbs | 3 ¾ lbs | 3 ¾ lbs | 5 ½ lbs | 5 ½ lbs | 5 ½ lbs | 5 ½ lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | 16393   | 9308    | A5078   | B783    | 1449    | L9273   | A1830   | M806    | 806     |
|                               | <b>Weight</b>   | 2 lbs   | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | 16398R  | 9309R   | B5075R  | L1453R  | 1453R   | 8550R   | A1831R  | L809RS  | 4398R   |
|                               | <b>Weight</b>   | 2 ½ lbs | 3 lbs   | 3 lbs   | 3 lbs   | 3 lbs   | 3 lbs   | 3 lbs   | 3 lbs   | 3 lbs   |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |                  |                  |                  |                  |                  |                  |                    |                |                    |
|--|-----------------|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------------|----------------|--------------------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | <b>3 1/16 in.</b>  | <b>3 1/8 in.</b> | <b>3 1/4 in.</b> | <b>3 1/2 in.</b> | <b>3 5/8 in.</b> | <b>3 3/4 in.</b> | <b>3 7/8 in.</b> | <b>3 15/16 in.</b> | <b>3 1 in.</b> | <b>3 1 1/8 in.</b> |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 2 1/32 in.         | 2 1/8 in.        | 2 1/4 in.        | 2 3/8 in.        | 2 1/2 in.        | 2 5/8 in.        | 2 3/4 in.        | 2 7/8 in.          | 2 15/16 in.    | 2 1/2 in.          |
| <b>Overshot O.D.</b>                                 |                 | 4 3/16 in.         | 4 in.            | 4 1/8 in.        | 4 1/4 in.        | 4 1/2 in.        | 4 5/8 in.        | 4 3/4 in.        | 4 7/8 in.          | 4 1/4 in.      | 4 3/8 in.          |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |                  |                  |                  |                  |                  |                  |                    |                |                    |
| <b>Type</b>  |                 | FS                 | SH               | FS               | FS               | FS               | SH               | FS               | FS                 | SH             | FS                 |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | C5098              | C5104            | 8220             | N9105            | C4822            | C5115            | 9630             | C5112              | C5126          | 9635               |
|  | <b>Weight</b>   | 72 lbs             | 62 lbs           | 70 lbs           | 70 lbs           | 76 lbs           | 65 lbs           | 82 lbs           | 82 lbs             | 82 lbs         | 67 lbs             |

### Replacement Parts

|                               |                 |           |           |           |           |           |           |           |           |           |           |
|-------------------------------|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Top Sub</b>                | <b>Part No.</b> | A5099     | A5105     | 8221      | L9106     | A4823     | A5116     | 9631      | A5113     | A5127     | 9636      |
|                               | <b>Weight</b>   | 33 lbs    | 31 lbs    | 33 lbs    | 33 lbs    | 35 lbs    | 32 lbs    | 38 lbs    | 38 lbs    | 33 lbs    | 36 lbs    |
| <b>Bowl</b>                   | <b>Part No.</b> | B5100     | B5106     | 8223      | M9107     | B4824     | B5117     | 9632      | B5114     | B5128     | 9637      |
|                               | <b>Weight</b>   | 18 lbs    | 15 lbs    | 18 lbs    | 18 lbs    | 19 lbs    | 16 lbs    | 21 lbs    | 21 lbs    | 17 lbs    | 20 lbs    |
| <b>Packer</b>                 | <b>Part No.</b> | L7090     | B5107     | 809       | L809      | L7090     | B5118     | 1517      | L1517     | B4625     | 4185      |
|                               | <b>Weight</b>   | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    | 3/8 lb    |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | B4403     | B5109     | 1741      | M1741     | B791      | B5120     | 1518      | B3205     | B4627     | 4195      |
|                               | <b>Weight</b>   | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | B4404     | A5110     | 1747      | L1747     | B792      | A5121     | 1520      | B3206     | B4628     | 4196      |
|                               | <b>Weight</b>   | 3/8 lb    | 1 lbs     | 1 lbs     | 1 lbs     | 1 lbs     | 1 lbs     | 1 1/8 lbs | 1 1/8 lbs | 1 1/8 lbs | 1 1/4 lbs |
| <b>Standard Guide</b>         | <b>Part No.</b> | A4405     | A5111     | 1746      | L1746     | A793      | A5122     | 1519      | A3207     | A4629     | 4197      |
|                               | <b>Weight</b>   | 18 lbs    | 13 lbs    | 17 lbs    | 17 lbs    | 19 lbs    | 14 lbs    | 20 lbs    | 20 lbs    | 14 lbs    | 20 lbs    |

### Basket Parts

|                               |                 |           |           |           |           |           |           |           |           |           |           |
|-------------------------------|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | B4403     | B5109     | 1741      | M1741     | B791      | B5120     | 1518      | B3205     | B4627     | 4195      |
|                               | <b>Weight</b>   | 7 1/2 lbs | 7 1/2 lbs | 7 1/2 lbs | 7 1/2 lbs | 7 1/2 lbs | 7 1/2 lbs | 7 1/2 lbs | 7 1/2 lbs | 7 1/2 lbs | 7 1/2 lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | B4404     | B5110     | 1747      | L1747     | B792      | A5121     | 1520      | B3206     | B4628     | 4196      |
|                               | <b>Weight</b>   | 2 3/8 lbs | 3 lbs     | 3 lbs     | 3 lbs     | 3 lbs     | 3 lbs     | 3 3/8 lbs | 3 3/8 lbs | 3 3/8 lbs | 3 3/4 lbs |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | L7090R    | B5107R    | 809R      | L809R     | L7090R    | B5118R    | 1517R     | L1517R    | B4625R    | 4185R     |
|                               | <b>Weight</b>   | 3 1/2 lbs | 4 lbs     | 4 lbs     | 4 lbs     | 4 lbs     | 4 lbs     | 4 1/2 lbs | 4 1/2 lbs | 4 1/2 lbs | 5 lbs     |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |                |                |                |                |                |                |                |                |                |                |
|--|-----------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | <b>3 ½ in.</b>     | <b>3 ½ in.</b> | <b>3 ½ in.</b> | <b>3 ½ in.</b> | <b>3 ½ in.</b> | <b>3 ½ in.</b> | <b>3 ½ in.</b> | <b>3 ½ in.</b> | <b>3 ½ in.</b> | <b>3 ½ in.</b> | <b>3 ½ in.</b> |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 2 ½ in.            | 2 ½ in.        | 2 ½ in.        | 3 in.          | 2 ½ in.        | 2 ½ in.        | 3 ½ in.        | 3 ½ in.        | 3 ½ in.        | 3 ½ in.        | 3 ½ in.        |
| <b>Overshot O.D.</b>                                 |                 | 4 ¾ in.            | 4 ½ in.        | 4 ½ in.        | 4 ¾ in.        | 4 ¾ in.        | 5 ½ in.        | 4 ½ in.        | 4 ½ in.        | 4 ¾ in.        | 4 ¾ in.        | 5 in.          |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |                |                |                |                |                |                |                |                |                |                |
| <b>Type</b>  |                 | FS                 | FS             | SH             | FS             | FS             | FS             | SH             | SH             | FS             | FS             | FS             |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | N9635              | C5123          | C3793          | 1255           | C4732          | C4561          | 17420          | 17201          | N9109          | 12275          | C5148          |
|  | <b>Weight</b>   | 77 lbs             | 86 lbs         | 86 lbs         | 90 lbs         | 99 lbs         | 118 lbs        | 77 lbs         | 77 lbs         | 83 lbs         | 83 lbs         | 107 lbs        |

### Replacement Parts

|                               |                 |         |         |         |         |         |         |         |         |         |         |         |
|-------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | L9636   | A5124   | A3794   | 1246    | A4733   | A4562   | 17421   | 17202   | L9110   | 12276   | A5149   |
|                               | <b>Weight</b>   | 36 lbs  | 40 lbs  | 40 lbs  | 42 lbs  | 45 lbs  | 48 lbs  | 30 lbs  | 30 lbs  | 40 lbs  | 40 lbs  | 49 lbs  |
| <b>Bowl</b>                   | <b>Part No.</b> | M9637   | B5125   | A3795   | 1248    | B4734   | B4563   | 17422   | 17203   | M9111   | 12277   | B5150   |
|                               | <b>Weight</b>   | 20 lbs  | 22 lbs  | 22 lbs  | 24 lbs  | 26 lbs  | 34 lbs  | 19 lbs  | 19 lbs  | 21 lbs  | 21 lbs  | 28 lbs  |
| <b>Packer</b>                 | <b>Part No.</b> | L4185   | L6515   | L6515   | 1253    | L168    | L168    | 17423   | L6665   | L6665   | 6665    | B3219   |
|                               | <b>Weight</b>   | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | M4195   | B3359   | B3607   | 1249    | M164    | M164    | 17425   | B4339   | L6662   | 6662    | B4410   |
|                               | <b>Weight</b>   | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 2 ¾ lbs | 2 ¾ lbs | 1 ¾ lbs | 1 ¾ lbs | 1 ¾ lbs | 1 ¾ lbs | 2 ¼ lbs |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | L4196   | B3360   | B3608   | 1250    | M185    | M185    | 17426   | B4340   | L6674   | 6674    | B4411   |
|                               | <b>Weight</b>   | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ½ lbs |
| <b>Standard Guide</b>         | <b>Part No.</b> | L4197   | A3361   | A3609   | 1252    | A4735   | A2176   | 17427   | 17204   | L6667   | 6667    | A4412   |
|                               | <b>Weight</b>   | 20 lbs  | 21 lbs  | 21 lbs  | 23 lbs  | 24 lbs  | 32 lbs  | 16 lbs  | 16 lbs  | 18 lbs  | 18 lbs  | 26 lbs  |

### Basket Parts

|                               |                 |         |         |         |         |          |          |         |         |         |         |          |
|-------------------------------|-----------------|---------|---------|---------|---------|----------|----------|---------|---------|---------|---------|----------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | M4195   | B3359   | B3607   | 1249    | M164     | M164     | 17425   | B4339   | L6662   | 6662    | B4410    |
|                               | <b>Weight</b>   | 7 ½ lbs | 7 ½ lbs | 7 ½ lbs | 7 ½ lbs | 11 ¾ lbs | 11 ¾ lbs | 8 ¾ lbs | 8 ¾ lbs | 8 ¾ lbs | 8 ¾ lbs | 11 ¼ lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | L4196   | B3360   | B3608   | 1250    | M185     | M185     | 17426   | B4340   | L6674   | 6674    | B4411    |
|                               | <b>Weight</b>   | 3 ¾ lbs | 3 ¾ lbs | 3 ¾ lbs | 3 ¾ lbs | 3 ¾ lbs  | 3 ¾ lbs  | 3 ¾ lbs | 3 ¾ lbs | 3 ¾ lbs | 3 ¾ lbs | 4 ½ lbs  |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | L4185R  | L6515R  | L6615R  | 1253R   | L168R    | L168R    | 17423R  | L6665R  | L6665R  | 6665R   | B3219R   |
|                               | <b>Weight</b>   | 5 lbs   | 5 lbs   | 5 lbs   | 5 lbs   | 5 lbs    | 5 lbs    | 5 lbs   | 5 lbs   | 5 lbs   | 5 lbs   | 6 lbs    |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |                |                |                    |                    |                    |                  |                  |                  |                  |              |
|--|-----------------|--------------------|----------------|----------------|--------------------|--------------------|--------------------|------------------|------------------|------------------|------------------|--------------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | <b>3 ¼ in.</b>     | <b>3 ½ in.</b> | <b>3 ¾ in.</b> | <b>3 11/16 in.</b> | <b>3 13/16 in.</b> | <b>3 15/16 in.</b> | <b>3 7/8 in.</b> | <b>3 7/8 in.</b> | <b>3 7/8 in.</b> | <b>3 7/8 in.</b> | <b>4 in.</b> |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 3 ¼ in.            | 3 ½ in.        | 3 ¾ in.        | 3 11/16 in.        | 3 13/16 in.        | 3 15/16 in.        | 3 7/8 in.        | 3 7/8 in.        | 3 7/8 in.        | 3 7/8 in.        | 3 7/8 in.    |
| <b>Overshot O.D.</b>                                 |                 | 4 1/16 in.         | 5 in.          | 5 1/8 in.      | 4 7/16 in.         | 4 1/2 in.          | 5 1/8 in.          | 4 3/4 in.        | 4 3/4 in.        | 5 3/16 in.       | 5 1/4 in.        | 4 7/8 in.    |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |                |                |                    |                    |                    |                  |                  |                  |                  |              |
| <b>Type</b>  |                 | SFS                | FS             | XFS            | SH                 | SH                 | FS                 | SH               | SH               | FS               | FS               | SH           |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | N9120              | 9725           | C4686          | C9773              | C9296              | C7497              | C6230            | C5139            | C5136            | 9515             | 5168         |
|  | <b>Weight</b>   | 83 lbs             | 107 lbs        | 113 lbs        | 80 lbs             | 86 lbs             | 115 lbs            | 82 lbs           | 90 lbs           | 118 lbs          | 120 lbs          | 95 lbs       |

### Replacement Parts

|                               |                 |         |         |         |         |         |         |         |         |         |         |         |
|-------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | L9110   | 9726    | A4687   | A9774   | A9297   | A7498   | A6231   | A5140   | A5137   | 9516    | 5155    |
|                               | <b>Weight</b>   | 40 lbs  | 49 lbs  | 53 lbs  | 38 lbs  | 44 lbs  | 54 lbs  | 24 lbs  | 46 lbs  | 56 lbs  | 57 lbs  | 48 lbs  |
| <b>Bowl</b>                   | <b>Part No.</b> | M9121   | 9727    | B4688   | B9775   | B9298   | B7499   | B6232   | B5141   | B5138   | 9517    | 5156    |
|                               | <b>Weight</b>   | 21 lbs  | 28 lbs  | 29 lbs  | 16 lbs  | 21 lbs  | 29 lbs  | 20 lbs  | 22 lbs  | 30 lbs  | 31 lbs  | 24 lbs  |
| <b>Packer</b>                 | <b>Part No.</b> | M9122   | 811     | A811    | L6163   | B9299   | B2196   | 60947   | A1707   | B972    | 856     | 5157    |
|                               | <b>Weight</b>   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | L9123   | 814     | B814    | B9777   | B9301   | B2192   | B6234   | B1709   | M859    | 859     | 5159    |
|                               | <b>Weight</b>   | 2 lbs   | 2 ¼ lbs | 2 ¼ lbs | 1 ¾ lbs | 1 ¾ lbs | 2 ¼ lbs | 1 ¾ lbs | 1 ¾ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 lbs   |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | L9124   | 815     | A815    | A9778   | A9302   | B2193   | A6235   | A1710   | L875    | 875     | 5160    |
|                               | <b>Weight</b>   | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ½ lbs | 1 ¼ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs |
| <b>Standard Guide</b>         | <b>Part No.</b> | L9125   | 816     | A816    | A9779   | A9309   | A7501   | A6236   | A1711   | L876    | 876     | 5169    |
|                               | <b>Weight</b>   | 18 lbs  | 26 lbs  | 27 lbs  | 15 lbs  | 17 lbs  | 27 lbs  | 6 lbs   | 18 lbs  | 28 lbs  | 28 lbs  | 19 lbs  |

### Basket Parts

|                               |                 |         |          |          |         |         |          |         |         |          |          |         |
|-------------------------------|-----------------|---------|----------|----------|---------|---------|----------|---------|---------|----------|----------|---------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | L9123   | 814      | B814     | B9777   | B9301   | B2192    | B6234   | B1709   | M859     | 859      | 5159    |
|                               | <b>Weight</b>   | 8 ¾ lbs | 11 ¼ lbs | 11 ¼ lbs | 8 ¾ lbs | 8 ¾ lbs | 11 ¼ lbs | 8 ¾ lbs | 8 ¾ lbs | 11 ¼ lbs | 11 ¼ lbs | 10 lbs  |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | L9124   | 815      | A815     | A9778   | A9302   | B2193    | A6235   | A1710   | L875     | 875      | 5160    |
|                               | <b>Weight</b>   | 3 ¾ lbs | 4 ½ lbs  | 4 ½ lbs  | 3 ¾ lbs | 3 ¾ lbs | 4 ½ lbs  | 3 ¾ lbs | 4 ½ lbs | 4 ½ lbs  | 4 ½ lbs  | 4 ½ lbs |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | L9122R  | 811R     | A811R    | L6163R  | B9299R  | B2196R   | A1707R  | A1707R  | B972R    | 856R     | 5157R   |
|                               | <b>Weight</b>   | 5 lbs   | 6 lbs    | 6 lbs    | 5 lbs   | 5 lbs   | 6 lbs    | 5 lbs   | 6 lbs   | 6 lbs    | 6 lbs    | 6 lbs   |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.
- XFS (Extra Full Strength) ..... Engineered for extreme abuse.
- SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.
- SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.
- XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |                |                |                |                |                |                |                |                |                |                |
|--|-----------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | <b>4 in.</b>       | <b>4 ½ in.</b> | <b>4 ¾ in.</b> | <b>4 ¾ in.</b> | <b>4 ¾ in.</b> | <b>4 ¾ in.</b> | <b>4 ½ in.</b> | <b>4 ½ in.</b> | <b>4 ½ in.</b> | <b>4 ¾ in.</b> | <b>4 ¾ in.</b> |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 3 ¾ in.            | 3 ¾ in.        | 3 ½ in.        | 3 ¾ in.        | 3 ¾ in.        | 3 ¾ in.        | 3 ¾ in.        | 3 ¾ in.        | 3 ¾ in.        | 4 ¾ in.        | 4 in.          |
| <b>Overshot O.D.</b>                                 |                 | 5 ¾ in.            | 5 in.          | 5 ¾ in.        | 5 ¾ in.        | 5 ¾ in.        | 5 ¾ in.        | 5 ¾ in.        | 5 ¾ in.        | 5 ¾ in.        | 5 ¾ in.        | 5 ¾ in.        |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |                |                |                |                |                |                |                |                |                |                |
| <b>Type</b>  |                 | FS                 | SH             | FS             | SH             | SH             | FS             | SH             | FS             | FS             | FS             | FS             |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | C5142              | C5428          | C5425          | C5162          | 4716           | C4819          | C5165          | C3796          | C4814          | M5698          | 5737           |
|  | <b>Weight</b>   | 124 lbs            | 101 lbs        | 130 lbs        | 105 lbs        | 118 lbs        | 131 lbs        | 113 lbs        | 130 lbs        | 142 lbs        | 130 lbs        | 150 lbs        |

### Replacement Parts

|                               |                 |         |         |         |         |         |         |         |         |         |         |         |
|-------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | A5143   | A5429   | A5426   | A5163   | 4718    | A4820   | A5166   | A3797   | A4815   | L5699   | 5738    |
|                               | <b>Weight</b>   | 59 lbs  | 51 lbs  | 62 lbs  | 53 lbs  | 55 lbs  | 62 lbs  | 56 lbs  | 65 lbs  | 68 lbs  | 65 lbs  | 70 lbs  |
| <b>Bowl</b>                   | <b>Part No.</b> | B5144   | B5430   | B5427   | B5164   | 4717    | B4821   | B5167   | B3798   | B4816   | M5700   | 5735    |
|                               | <b>Weight</b>   | 32 lbs  | 26 lbs  | 34 lbs  | 26 lbs  | 30 lbs  | 34 lbs  | 28 lbs  | 33 lbs  | 36 lbs  | 33 lbs  | 38 lbs  |
| <b>Packer</b>                 | <b>Part No.</b> | B1508   | B4895   | L1867   | B4672   | 4672    | L169    | B2487   | B2436   | B21991  | L1140   | 195     |
|                               | <b>Weight</b>   | ½ lb    | ½ lb    | ¾ lb    | ½ lb    | ½ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | B1505   | B4897   | B1997   | B4674   | 4674    | M165    | B2489   | B2489   | B1987   | M1135   | 196     |
|                               | <b>Weight</b>   | 2 ¼ lbs | 2 lbs   | 2 ¼ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ½ lbs | 2 ¼ lbs | 2 ¼ lbs | 2 ½ lbs | 2 ¼ lbs | 2 ¾ lbs |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | A1506   | B4898   | A1998   | B4675   | 4675    | L186    | B2490   | B2439   | B1988   | M1137   | 193     |
|                               | <b>Weight</b>   | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ¾ lbs | 1 ¾ lbs | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs   | 1 ½ lbs | 2 lbs   |
| <b>Standard Guide</b>         | <b>Part No.</b> | A1507   | B4899   | B1999   | A4676   | 4719    | L187    | B2491   | B3226   | B1989   | L1143   | 192     |
|                               | <b>Weight</b>   | 29      | 20      | 20      | 21      | 25      | 30      | 24      | 36      | 33      | 27      | 36      |

### Basket Parts

|                               |                 |          |         |          |          |          |          |          |          |          |          |          |
|-------------------------------|-----------------|----------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | B1505    | B4897   | B1997    | B4674    | 4674     | M165     | B2489    | B2489    | B1987    | M1135    | 196      |
|                               | <b>Weight</b>   | 11 ¼ lbs | 10      | 11 ¼ lbs | 11 ¼ lbs | 11 ¼ lbs | 12 ½ lbs | 11 ¼ lbs | 11 ¼ lbs | 12 ½ lbs | 11 ¼ lbs | 14 ¾ lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | A1506    | B4898   | A1998    | B4675    | 4675     | L186     | B2490    | B2439    | B1988    | M1137    | 193      |
|                               | <b>Weight</b>   | 4 ½ lbs  | 4 ½ lbs | 4 ½ lbs  | 5 ¼ lbs  | 5 ¼ lbs  | 6 lbs    | 6 lbs    | 6 lbs    | 6 lbs    | 4 ½ lbs  | 6 lbs    |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | A1508R   | B4895R  | L1867R   | B4672R   | 4672R    | L169R    | B2487R   | B2436R   | B2199-1R | L1140R   | 195R     |
|                               | <b>Weight</b>   | 6 lbs    | 6 lbs   | 6 lbs    | 7 lbs    | 7 lbs    | 8 lbs    | 8 lbs    | 8 lbs    | 8 lbs    | 6 lbs    | 8 lbs    |



### How to Order

- Specify:
- (1) Name and number of assembly or part
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  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
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# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|   |          |                    |           |            |            |           |           |           |            |            |           |           |
|---|----------|--------------------|-----------|------------|------------|-----------|-----------|-----------|------------|------------|-----------|-----------|
| Maximum Catch Size (Spiral)                   |          | 4 3/8 in.          | 4 1/2 in. | 4 3/4 in.  | 4 7/8 in.  | 4 7/8 in. | 4 7/8 in. | 4 7/8 in. | 4 7/8 in.  | 4 7/8 in.  | 5 in.     | 5 1/4 in. |
| Maximum Catch Size (Basket)                   |          | 4 in.              | 4 1/4 in. | 4 1/2 in.  | 4 3/4 in.  | 4 1/2 in. | 4 1/4 in. | 4 1/4 in. | 4 1/4 in.  | 4 1/4 in.  | 4 1/4 in. | 4 3/8 in. |
| Overshot O.D.                                 |          | 5 15/16 in.        | 5 3/4 in. | 6 1/16 in. | 6 1/16 in. | 5 3/4 in. | 6 in.     | 6 1/8 in. | 6 3/16 in. | 6 3/16 in. | 6 5/8 in. | 6 3/8 in. |
| Standard Box Connection                       |          | Per Customer Order |           |            |            |           |           |           |            |            |           |           |
| Type  |          | FS                 | FS        | FS         | FS         | SH        | FS        | FS        | FS         | FS         | FS        | SH        |
| Complete Assembly (Dressed with Spiral Parts) | Part No. | C4844              | N8975     | 8940       | C4829      | C7096     | 9026      | 912       | C7093      | 3061       | C4825     | 4770      |
|   | Weight   | 150 lbs            | 138 lbs   | 138 lbs    | 153 lbs    | 135 lbs   | 138 lbs   | 170 lbs   | 176 lbs    | 175 lbs    | 192 lbs   | 176 lbs   |

### Replacement Parts

|                        |          |           |           |           |           |           |           |           |        |           |           |           |
|------------------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|-----------|-----------|-----------|
| Top Sub                | Part No. | B4845     | L8976     | 8941      | A4830     | A7097     | 9027      | 908       | A7094  | 3062      | B4826     | 4771      |
|                        | Weight   | 70 lbs    | 64 lbs    | 65 lbs    | 71 lbs    | 64 lbs    | 65 lbs    | 70 lbs    | 75 lbs | 70 lbs    | 78 lbs    | 78 lbs    |
| Bowl                   | Part No. | B4846     | M8977     | 8942      | B4831     | B7098     | 9028      | 905       | B7095  | 3075      | B4827     | 9199      |
|                        | Weight   | 38 lbs    | 33 lbs    | 39 lbs    | 39 lbs    | 33 lbs    | 38 lbs    | 40 lbs    | 44 lbs | 40 lbs    | 53 lbs    | 52 lbs    |
| Packer                 | Part No. | L195      | L6114     | 2362      | B2362     | B6387     | 9020      | 1189      | B2455  | 1189      | L4505     | 9203      |
|                        | Weight   | 3/4 lb    | 3/4 lb    | 3/4 lb    | 3/4 lb    | 3/4 lb    | 3/4 lb    | 3/4 lb    | 3/4 lb | 3/4 lb    | 7/8 lb    | 3/4 lb    |
| Spiral Grapple         | Part No. | M196      | M6112     | 2364      | B2364     | B6389     | 9022      | 1182      | B2457  | 1182      | M1071     | 9201      |
|                        | Weight   | 2 7/8 lbs | 2 3/4 lbs | 2 3/4 lbs | 2 7/8 lbs | 2 1/2 lbs | 2 1/2 lbs | 2 1/2 lbs | 3 lbs  | 2 1/2 lbs | 3 lbs     | 3 lbs     |
| Spiral Grapple Control | Part No. | M193      | L6113     | 2365      | B2365     | A6390     | 9023      | 1187      | B2458  | 1187      | M1072     | 9202      |
|                        | Weight   | 2 lbs     | 2 1/4 lbs | 2 lbs     | 2 lbs     | 2 lbs     | 2 lbs     | 2 1/4 lbs | 2 lbs  | 2 1/4 lbs | 2 1/2 lbs | 2 1/2 lbs |
| Standard Guide         | Part No. | L192      | 6121      | 6355      | B2366     | A6391     | 9024      | 1186      | A2459  | 3077      | L1074     | 4772      |
|                        | Weight   | 36 lbs    | 34 lbs    | 35 lbs    | 37 lbs    | 33 lbs    | 34 lbs    | 42 lbs    | 51 lbs | 42 lbs    | 54 lbs    | 39 lbs    |

### Basket Parts

|                        |          |            |            |        |            |            |            |        |        |        |           |           |
|------------------------|----------|------------|------------|--------|------------|------------|------------|--------|--------|--------|-----------|-----------|
| Basket Grapple         | Part No. | M196       | M6112      | 2364   | B2364      | B6389      | 9022       | 1182   | B2457  | 1182   | M1071     | 9201      |
|                        | Weight   | 14 3/8 lbs | 13 1/2 lbs | 14 lbs | 14 3/8 lbs | 12 1/2 lbs | 12 1/2 lbs | 14 lbs | 15 lbs | 14 lbs | 15 lbs    | 15 lbs    |
| Basket Grapple Control | Part No. | M193       | L6113      | 2365   | B2365      | A6390      | 9023       | 1187   | B2458  | 1187   | M1072     | 9202      |
|                        | Weight   | 6 lbs      | 6 1/2 lbs  | 6 lbs  | 6 lbs      | 6 lbs      | 6 lbs      | 7 lbs  | 6 lbs  | 7 lbs  | 7 1/2 lbs | 7 1/2 lbs |
| Mill Control Packer    | Part No. | L195R      | L6114R     | 2362R  | B2362R     | B6387R     | 9020R      | 1189R  | B2455R | 1189R  | M4505RS   | 9203R     |
|                        | Weight   | 8 lbs      | 8 lbs      | 8 lbs  | 8 lbs      | 8 lbs      | 8 lbs      | 9 lbs  | 8 lbs  | 9 lbs  | 10 lbs    | 10 lbs    |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



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# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|   |          |                    |         |         |         |         |             |             |             |         |         |         |
|---|----------|--------------------|---------|---------|---------|---------|-------------|-------------|-------------|---------|---------|---------|
| Maximum Catch Size (Spiral)                   |          | 5 ¼ in.            | 5 ½ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in.     | 5 ¾ in.     | 5 ¾ in.     | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. |
| Maximum Catch Size (Basket)                   |          | 4 ¾ in.            | 4 ½ in. | 4 ¾ in. | 4 ¾ in. | 4 ¾ in. | 4 13/16 in. | 4 13/16 in. | 4 13/16 in. | 5 in.   | 5 ½ in. | 5 in.   |
| Overshot O.D.                                 |          | 6 ¾ in.            | 6 ¾ in. | 6 ¾ in. | 6 ¾ in. | 7 ½ in. | 6 11/16 in. | 6 11/16 in. | 7 ¼ in.     | 6 ¾ in. | 6 ¾ in. | 6 ¾ in. |
| Standard Box Connection                       |          | Per Customer Order |         |         |         |         |             |             |             |         |         |         |
| Type  |          | SH                 | FS      | SH      | SH      | FS      | SH          | FS          | FS          | XSH     | SH      | SH      |
| Complete Assembly (Dressed with Spiral Parts) | Part No. | N6655              | C5174   | 4776    | C5178   | C5176   | C5185       | 8943        | C3810       | 9038    | 8978    | C5193   |
|   | Weight   | 176 lbs            | 211 lbs | 185 lbs | 185 lbs | 225 lbs | 189 lbs     | 190 lbs     | 228 lbs     | 194 lbs | 203 lbs | 203 lbs |

### Replacement Parts

|                        |          |         |        |         |         |        |         |         |        |         |        |        |
|------------------------|----------|---------|--------|---------|---------|--------|---------|---------|--------|---------|--------|--------|
| Top Sub                | Part No. | L6656   | A5175  | 4777    | B4826   | A5177  | A5186   | 8944    | A3811  | 9039    | 8979   | A5194  |
|                        | Weight   | 78 lbs  | 85 lbs | 78 lbs  | 78 lbs  | 89 lbs | 79 lbs  | 80 lbs  | 92 lbs | 81 lbs  | 82 lbs | 82 lbs |
| Bowl                   | Part No. | M4503   | B4519  | 9211    | B5179   | B2791  | B5187   | 8945    | B3812  | 9040    | 8980   | B5195  |
|                        | Weight   | 52 lbs  | 60 lbs | 54 lbs  | 54 lbs  | 64 lbs | 55 lbs  | 60 lbs  | 65 lbs | 56 lbs  | 58 lbs | 58 lbs |
| Packer                 | Part No. | L4505   | B4520  | 9215    | B5180   | A756   | B5188   | 8947    | L113   | L9033   | 6697   | B3479  |
|                        | Weight   | ¾ lb    | 1 lb   | ¾ lb    | ¾ lb    | 1 lb   | ¾ lb    | ¾ lb    | 1 ¼ lb | 1 lb    | 1 lb   | 1 lb   |
| Spiral Grapple         | Part No. | M4498   | B4472  | 9213    | B5182   | B759   | B5190   | 103     | M103   | M9035   | 6699   | B3481  |
|                        | Weight   | 3 lbs   | 4 lbs  | 4 lbs   | 4 lbs   | 5 lbs  | 4 lbs   | 5 lbs   | 5 lbs  | 4 ½ lbs | 5 lbs  | 5 lbs  |
| Spiral Grapple Control | Part No. | L4499   | A4473  | 9214    | A5183   | B760   | B5191   | 129     | M129   | M9036   | 6700   | A3482  |
|                        | Weight   | 2 ½ lbs | 3 lbs  | 2 ½ lbs | 2 ½ lbs | 3 lbs  | 2 ½ lbs | 2 ½ lbs | 3 lbs  | 2 ½ lbs | 3 lbs  | 3 lbs  |
| Standard Guide         | Part No. | L4504   | A4474  | 4778    | A5184   | A761   | A5192   | 8946    | A3813  | 9037    | 6701   | A3483  |
|                        | Weight   | 39 lbs  | 58 lbs | 45 lbs  | 45 lbs  | 63 lbs | 47 lbs  | 48 lbs  | 61 lbs | 48 lbs  | 54 lbs | 54 lbs |

### Basket Parts

|                        |          |         |        |         |         |        |         |         |        |        |        |        |
|------------------------|----------|---------|--------|---------|---------|--------|---------|---------|--------|--------|--------|--------|
| Basket Grapple         | Part No. | M4498   | B4472  | 9213    | B5182   | B759   | B5190   | 103     | M103   | 9035   | 6699   | B3481  |
|                        | Weight   | 15 lbs  | 20 lbs | 20 lbs  | 20 lbs  | 25 lbs | 20 lbs  | 21 lbs  | 25 lbs | 21 lbs | 25 lbs | 25 lbs |
| Basket Grapple Control | Part No. | L4499   | A4473  | 9214    | B5183   | B760   | B5191   | 129     | M129   | 9036   | 6700   | A3482  |
|                        | Weight   | 7 ½ lbs | 9 lbs  | 7 ½ lbs | 7 ½ lbs | 9 lbs  | 7 ½ lbs | 7 ½ lbs | 9 lbs  | 8 lbs  | 9 lbs  | 9 lbs  |
| Mill Control Packer    | Part No. | L4505R  | B4520R | 9215R   | B5180R  | A756R  | B5188R  | 8947R   | L113R  | 9033R  | 6697R  | B3479R |
|                        | Weight   | 10 lbs  | 12 lbs | 10 lbs  | 10 lbs  | 12 lbs | 10 lbs  | 10 lbs  | 12 lbs | 11 lbs | 12 lbs | 12 lbs |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |                |                |              |              |              |              |              |                |                |                |
|--|-----------------|--------------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|----------------|----------------|----------------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | <b>5 ¾ in.</b>     | <b>5 ¾ in.</b> | <b>5 ¾ in.</b> | <b>6 in.</b> | <b>6 in.</b> | <b>6 in.</b> | <b>6 in.</b> | <b>6 in.</b> | <b>6 ½ in.</b> | <b>6 ½ in.</b> | <b>6 ½ in.</b> |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 5 in.              | 5 in.          | 5 in.          | 5 ½ in.      | 5 ¼ in.      | 5 ¼ in.      | 5 ¼ in.      | 5 ¼ in.      | 5 ½ in.        | 5 ¾ in.        | 5 ¾ in.        |
| <b>Overshot O.D.</b>                                 |                 | 7 ¾ in.            | 7 ¾ in.        | 7 ¾ in.        | 7 ¾ in.      | 7 ½ in.      | 7 ¾ in.      | 7 ¾ in.      | 7 ¾ in.      | 7 ¼ in.        | 7 ¾ in.        | 7 ¾ in.        |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |                |                |              |              |              |              |              |                |                |                |
| <b>Type</b>  |                 | FS                 | FS             | FS             | SH           | FS           | FS           | F.S.         | F.S.         | S.H.           | F.S.           | S.H.           |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | 6150               | D6150          | C4689          | C5196        | 9996         | 247          | C3364        | 7572         | C5206          | C5204          | 12567          |
|  | <b>Weight</b>   | 239 lbs            | 239 lbs        | 239 lbs        | 209 lbs      | 215 lbs      | 245 lbs      | 245 lbs      | 245 lbs      | 213 lbs        | 257 lbs        | 216 lbs        |

### Replacement Parts

|                               |                 |         |         |         |        |         |         |         |         |        |         |         |
|-------------------------------|-----------------|---------|---------|---------|--------|---------|---------|---------|---------|--------|---------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | 6151    | L6151   | A4690   | A5197  | 9997    | 248     | A3365   | 7573    | A5207  | A5205   | 7573    |
|                               | <b>Weight</b>   | 98 lbs  | 98 lbs  | 98 lbs  | 84 lbs | 90 lbs  | 95 lbs  | 95 lbs  | 95 lbs  | 86 lbs | 103 lbs | 87 lbs  |
| <b>Bowl</b>                   | <b>Part No.</b> | 6152    | M6152   | B3522   | B5198  | 9998    | 249     | B3366   | 7574    | B5208  | B4218   | 12568   |
|                               | <b>Weight</b>   | 69 lbs  | 69 lbs  | 69 lbs  | 60 lbs | 69 lbs  | 73 lbs  | 73 lbs  | 73 lbs  | 61 lbs | 75 lbs  | 62 lbs  |
| <b>Packer</b>                 | <b>Part No.</b> | 110     | L110    | L110    | B5199  | 223     | 223     | L223    | 223     | B5209  | L1642   | 9689    |
|                               | <b>Weight</b>   | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 lbs  | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 lbs  | 1 ½ lbs | 1 ½ lbs |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | 104     | M104    | M104    | B5201  | 220     | 220     | M220    | 220     | B5211  | B2063   | 9687    |
|                               | <b>Weight</b>   | 5 ½ lbs | 5 ½ lbs | 5 ½ lbs | 5 lbs  | 5 ½ lbs | 5 ½ lbs | 5 ½ lbs | 5 ½ lbs | 5 lbs  | 5 ½ lbs | 5 lbs   |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | 130     | L130    | L130    | A5202  | 219     | 219     | L219    | 219     | A5212  | B2064   | 9688    |
|                               | <b>Weight</b>   | 3 ½ lbs | 3 ½ lbs | 3 ½ lbs | 3 lbs  | 3 ½ lbs | 3 ½ lbs | 3 ¼ lbs | 3 ¼ lbs | 3 lbs  | 3 ½ lbs | 3 lbs   |
| <b>Standard Guide</b>         | <b>Part No.</b> | 120     | L120    | L120    | A5203  | 218     | 218     | L218    | 218     | A5213  | A2065   | 9691    |
|                               | <b>Weight</b>   | 61 lbs  | 61 lbs  | 61 lbs  | 56 lbs | 61 lbs  | 67 lbs  | 67 lbs  | 67 lbs  | 57 lbs | 68 lbs  | 58 lbs  |

### Basket Parts

|                               |                 |          |          |          |        |          |          |          |          |        |          |        |
|-------------------------------|-----------------|----------|----------|----------|--------|----------|----------|----------|----------|--------|----------|--------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | 104      | M104     | M104     | B5201  | 220      | 220      | M220     | 220      | B5211  | B2063    | 9687   |
|                               | <b>Weight</b>   | 27 ½ lbs | 27 ½ lbs | 27 ½ lbs | 25 lbs | 27 ½ lbs | 27 ½ lbs | 27 ½ lbs | 27 ½ lbs | 25 lbs | 27 ½ lbs | 25 lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | 130      | L130     | L130     | A5202  | 219      | 219      | L219     | 219      | A5212  | B2064    | 9688   |
|                               | <b>Weight</b>   | 10 ½ lbs | 10 ½ lbs | 10 ½ lbs | 9 lbs  | 10 ½ lbs | 9 ¾ lbs  | 9 ¾ lbs  | 9 ¾ lbs  | 9 lbs  | 10 ½ lbs | 9 lbs  |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | 110R     | L110R    | L110R    | B5199R | 223R     | 223R     | L223R    | 223R     | B5209R | L1642R   | 9689R  |
|                               | <b>Weight</b>   | 14 lbs   | 14 lbs   | 14 lbs   | 12 lbs | 14 lbs   | 13 lbs   | 13 lbs   | 13 lbs   | 12 lbs | 13 lbs   | 12 lbs |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.



# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |         |         |         |         |         |         |         |         |         |         |
|--|-----------------|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | 6 ¼ in.            | 6 ¼ in. | 6 ¼ in. | 6 ¼ in. | 6 ¼ in. | 6 ¼ in. | 6 ¼ in. | 6 ¼ in. | 6 ¼ in. | 6 ¼ in. | 6 ¼ in. |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 5 ½ in.            | 5 ½ in. | 5 ½ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 5 ½ in. | 5 ¾ in. |
| <b>Overshot O.D.</b>                                 |                 | 7 ¾ in.            | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |         |         |         |         |         |         |         |         |         |         |
| <b>Type</b>  |                 | SH                 | SH      | SH      | SFS     | SFS     | SFS     | FS      | FS      | FS      | FS      | FS      |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | 12565              | C4691   | N9692   | 1873    | 19090   | N8741   | 7791    | 9678    | 9983    | C8841   | D7791   |
|  | <b>Weight</b>   | 216 lbs            | 216 lbs | 216 lbs | 241 lbs | 241 lbs | 241 lbs | 261 lbs | 261 lbs | 261 lbs | 261 lbs | 261 lbs |

### Replacement Parts

|                               |                 |         |         |         |         |         |         |         |         |         |         |         |
|-------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | 118     | A4692   | L9693   | 118     | 19091   | L8742   | 7793    | 7922    | 118     | A8842   | L7793   |
|                               | <b>Weight</b>   | 87 lbs  | 87 lbs  | 87 lbs  | 99 lbs  | 99 lbs  | 99 lbs  | 105 lbs | 105 lbs | 105 lbs | 105 lbs | 105 lbs |
| <b>Bowl</b>                   | <b>Part No.</b> | 12566   | B4693   | M9694   | 1875    | 19092   | M1641   | 1657    | 9749    | 9984    | C2205   | M1657   |
|                               | <b>Weight</b>   | 62 lbs  | 62 lbs  | 62 lbs  | 69 lbs  | 69 lbs  | 69 lbs  | 76 lbs  | 76 lbs  | 76 lbs  | 76 lbs  | 76 lbs  |
| <b>Packer</b>                 | <b>Part No.</b> | 9689    | L1642   | L9689   | 1642    | 1642    | L1642   | 1680    | 1680    | 1680    | L1680   | L1680   |
|                               | <b>Weight</b>   | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | 9687    | B4694   | M9687   | 1644    | 1644    | M1644   | 1659    | 1659    | 1659    | B2073   | M1659   |
|                               | <b>Weight</b>   | 5 lbs   | 5 lbs   | 5 lbs   | 5 ¼ lbs | 5 ¼ lbs | 5 ¼ lbs | 5 ¾ lbs | 5 ¾ lbs | 5 ¾ lbs | 5 ¾ lbs | 5 ¾ lbs |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | 9688    | B4695   | L9688   | 1645    | 1645    | L1645   | 1660    | 1660    | 1660    | A2074   | L1660   |
|                               | <b>Weight</b>   | 3 lbs   | 3 lbs   | 3 lbs   | 3 ¼ lbs | 3 ¼ lbs | 3 ¼ lbs | 3 ½ lbs | 3 ½ lbs | 3 ½ lbs | 3 ½ lbs | 3 ½ lbs |
| <b>Standard Guide</b>         | <b>Part No.</b> | 9691    | A4696   | L9691   | 5525    | 5525    | L5525   | 1493    | 1493    | 1493    | A2075   | L1493   |
|                               | <b>Weight</b>   | 58 lbs  | 58 lbs  | 58 lbs  | 63 lbs  | 63 lbs  | 63 lbs  | 69 lbs  | 69 lbs  | 69 lbs  | 69 lbs  | 69 lbs  |

### Basket Parts

|                               |                 |        |        |        |        |        |        |          |          |          |          |          |
|-------------------------------|-----------------|--------|--------|--------|--------|--------|--------|----------|----------|----------|----------|----------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | 9687   | B4694  | M9687  | 1644   | 1644   | M1644  | 1659     | 1659     | 1659     | B2073    | M1659    |
|                               | <b>Weight</b>   | 25 lbs | 25 lbs | 25 lbs | 27 lbs | 27 lbs | 27 lbs | 28 ¾ lbs | 28 ¾ lbs | 28 ¾ lbs | 28 ¾ lbs | 28 ¾ lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | 9688   | B4695  | L9688  | 1645   | 1645   | L1645  | 1660     | 1660     | 1660     | A2074    | L1660    |
|                               | <b>Weight</b>   | 9 lbs  | 9 lbs  | 9 lbs  | 10 lbs | 10 lbs | 10 lbs | 10 ½ lbs | 10 ½ lbs | 10 ½ lbs | 10 ½ lbs | 10 ½ lbs |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | 9689R  | L1642R | L9689R | 1642R  | 1642   | L1642R | 1680R    | 1680     | 1680     | L1680R   | 1680R    |
|                               | <b>Weight</b>   | 12 lbs | 13 lbs | 12 lbs | 13 lbs | 13 lbs | 13 lbs | 14 lbs   | 14 lbs   | 14 lbs   | 14 lbs   | 14 lbs   |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|   |          |                    |         |         |         |         |         |         |         |         |         |         |
|---|----------|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Maximum Catch Size (Spiral)                   |          | 6 ½ in.            | 6 ½ in. | 6 ½ in. | 6 ½ in. | 6 ½ in. | 6 ½ in. | 6 ½ in. | 6 ½ in. | 6 ½ in. | 6 ½ in. | 6 ½ in. |
| Maximum Catch Size (Basket)                   |          | 5 ¾ in.            | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 6 in.   | 6 in.   | 5 ¾ in. |
| Overshot O.D.                                 |          | 7 ½ in.            | 7 ½ in. | 7 ½ in. | 7 ¾ in. | 7 ¾ in. | 8 ¼ in. | 8 ¼ in. | 8 ¼ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. |
| Standard Box Connection                       |          | Per Customer Order |         |         |         |         |         |         |         |         |         |         |
| Type  |          | SH                 | SH      | SH      | SFS     | SH      | FS      | FS      | FS      | SH      | SH      | SH      |
| Complete Assembly (Dressed with Spiral Parts) | Part No. | 9009               | M9009   | 9746    | 9163    | C5344   | 9677    | 2380    | 7796    | N4785   | B11322  | C5214   |
|   | Weight   | 211 lbs            | 211 lbs | 211 lbs | 232 lbs | 221 lbs | 250 lbs | 280 lbs | 280 lbs | 235 lbs | 235 lbs | 236 lbs |

### Replacement Parts

|                        |          |         |         |         |         |         |         |         |         |         |         |         |
|------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Top Sub                | Part No. | 9010    | L9010   | 7922    | 9165    | A5345   | 7922    | 2381    | 7798    | L9133   | A3365   | A5215   |
|                        | Weight   | 84 lbs  | 84 lbs  | 84 lbs  | 93 lbs  | 89 lbs  | 100 lbs | 120 lbs | 120 lbs | 100 lbs | 100 lbs | 101 lbs |
| Bowl                   | Part No. | 9011    | M9011   | 9747    | 9164    | B5346   | 9748    | 2382    | 7797    | M9134   | B11323  | B5216   |
|                        | Weight   | 63 lbs  | 63 lbs  | 63 lbs  | 68 lbs  | 64 lbs  | 70 lbs  | 80 lbs  | 80 lbs  | 67 lbs  | 67 lbs  | 67 lbs  |
| Packer                 | Part No. | 9005    | L9005   | 9005    | 5508    | B5347   | 9865    | 2372    | 2372    | L9136   | L9136   | B5217   |
|                        | Weight   | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs |
| Spiral Grapple         | Part No. | 9003    | M9003   | 9003    | 5503    | B5349   | 9863    | 5652    | 5652    | M9137   | M9137   | B5219   |
|                        | Weight   | 5 ¾ lbs | 5 lbs   | 5 lbs   | 5 lbs   | 5 lbs   | 5 ½ lbs | 5 ¾ lbs | 5 ¾ lbs | 5 ½ lbs | 5 ½ lbs | 5 ½ lbs |
| Spiral Grapple Control | Part No. | 9004    | L9004   | 9004    | 5504    | B5350   | 9864    | 5653    | 5653    | L9138   | L9138   | A5220   |
|                        | Weight   | 3 lbs   | 3 lbs   | 3 lbs   | 3 lbs   | 3 lbs   | 3 ½ lbs | 3 ½ lbs | 3 ½ lbs | 3 lbs   | 3 lbs   | 3 lbs   |
| Standard Guide         | Part No. | 9007    | L9007   | 9007    | 5506    | A5351   | 9867    | 5655    | 5655    | L9139   | L9139   | A5221   |
|                        | Weight   | 58 lbs  | 58 lbs  | 58 lbs  | 62 lbs  | 59 lbs  | 60 lbs  | 80 lbs  | 80 lbs  | 60 lbs  | 60 lbs  | 60 lbs  |

### Basket Parts

|                        |          |        |        |        |        |        |         |        |        |          |          |          |
|------------------------|----------|--------|--------|--------|--------|--------|---------|--------|--------|----------|----------|----------|
| Basket Grapple         | Part No. | 9003   | M9003  | 9003   | 5503   | B5349  | 9863    | 5652   | 5652   | M9137    | M9137    | B5219    |
|                        | Weight   | 25 lbs | 25 lbs | 25 lbs | 25 lbs | 25 lbs | 25 lbs  | 30 lbs | 30 lbs | 26 lbs   | 26 lbs   | 27 ½ lbs |
| Basket Grapple Control | Part No. | 9004   | L9004  | 9004   | 5504   | B5350  | 9864    | 5653   | 5653   | L9138    | L9138    | A5220    |
|                        | Weight   | 9 lbs  | 9 lbs  | 9 lbs  | 9 lbs  | 9 lbs  | 9 ½ lbs | 12 lbs | 12 lbs | 8 ½ lbs  | 8 ½ lbs  | 9 lbs    |
| Mill Control Packer    | Part No. | 9005R  | L9005R | 9005R  | 5508R  | B5347R | 9865R   | 2372R  | 2372R  | L9136R   | L9136R   | B5217R   |
|                        | Weight   | 12 lbs | 12 lbs | 12 lbs | 12 lbs | 12 lbs | 11 lbs  | 14 lbs | 14 lbs | 11 ½ lbs | 11 ½ lbs | 12 lbs   |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
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- Mill Control Packer:
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- SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.
- XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|   |          |                    |         |         |         |         |         |         |         |         |         |         |
|---|----------|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Maximum Catch Size (Spiral)                   |          | 6 ½ in.            | 6 ½ in. | 6 ¾ in. | 6 ¾ in. | 6 ¾ in. | 6 ¾ in. | 6 ¾ in. | 7 in.   | 7 in.   | 7 in.   | 7 in.   |
| Maximum Catch Size (Basket)                   |          | 5 ½ in.            | 5 ½ in. | 6 ½ in. | 6 in.   | 6 in.   | 6 ¼ in. | 6 ¼ in. | 6 ¾ in. | 6 ¼ in. | 6 ¾ in. | 6 ¼ in. |
| Overshot O.D.                                 |          | 8 ½ in.            | 8 ½ in. | 7 ¾ in. | 8 ¾ in. | 8 ¾ in. | 8 in.   | 8 in.   | 8 ½ in. | 8 ½ in. | 8 ¾ in. | 8 ¾ in. |
| Standard Box Connection                       |          | Per Customer Order |         |         |         |         |         |         |         |         |         |         |
| Type  |          | SFS                | SFS     | SH      | FS      | FS      | SH      | SH      | SH      | SH      | SH      | FS      |
| Complete Assembly (Dressed with Spiral Parts) | Part No. | 9339               | M9339   | 16500   | 275     | C3833   | 8995    | N8995   | 9815    | C3263   | 17028   | 6140    |
|   | Weight   | 270 lbs            | 270 lbs | 243 lbs | 284 lbs | 284 lbs | 245 lbs | 245 lbs | 251 lbs | 253 lbs | 260 lbs | 297 lbs |

### Replacement Parts

|                        |          |         |         |         |         |         |         |         |         |         |         |         |
|------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Top Sub                | Part No. | 9338    | L9338   | 16501   | 276     | A-3834  | 8996    | L-8996  | 9816    | A-3033  | 276     | 6141    |
|                        | Weight   | 115 lbs | 115 lbs | 102 lbs | 120 lbs | 120 lbs | 103 lbs | 103 lbs | 107 lbs | 107 lbs | 115 lbs | 130 lbs |
| Bowl                   | Part No. | 9337    | M9337   | 16502   | 277     | B3816   | 8997    | M8997   | 9817    | B3264   | 17209   | 6142    |
|                        | Weight   | 75 lbs  | 75 lbs  | 69 lbs  | 79 lbs  | 79 lbs  | 68 lbs  | 68 lbs  | 69 lbs  | 70 lbs  | 79 lbs  | 80 lbs  |
| Packer                 | Part No. | 1634    | L1634   | B5225   | 207     | L207    | 8985    | L8985   | 9224    | L6310   | 9224    | 111     |
|                        | Weight   | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ½ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ¾ lbs |
| Spiral Grapple         | Part No. | 84      | M84     | B5227   | 209     | M209    | 8987    | M8987   | 9222    | B3267   | 9222    | 105     |
|                        | Weight   | 6 lbs   | 6 lbs   | 5 ¾ lbs | 6 ½ lbs | 6 ½ lbs | 5 ¾ lbs | 5 ¾ lbs | 5 ¾ lbs | 5 ¾ lbs | 5 ¾ lbs | 6 lbs   |
| Spiral Grapple Control | Part No. | 89      | L89     | B5228   | 208     | L208    | 8988    | M8988   | 9223    | B3268   | 9223    | 131     |
|                        | Weight   | 3 lbs   | 3 lbs   | 3 lbs   | 4 lbs   | 4 lbs   | 3 ½ lbs | 3 ½ lbs | 1 ¼ lbs | 3 ½ lbs | 3 ½ lbs | 4 lbs   |
| Standard Guide         | Part No. | 4174    | L4174   | 16503   | 205     | L205    | 8989    | L8989   | 9226    | A3269   | 9226    | 121     |
|                        | Weight   | 69 lbs  | 69 lbs  | 62 lbs  | 73 lbs  | 73 lbs  | 62 lbs  | 62 lbs  | 62 lbs  | 62 lbs  | 63 lbs  | 75 lbs  |

### Basket Parts

|                        |          |        |        |          |          |          |          |          |          |          |          |        |
|------------------------|----------|--------|--------|----------|----------|----------|----------|----------|----------|----------|----------|--------|
| Basket Grapple         | Part No. | 84     | M84    | B5227    | 209      | M209     | 8987     | M8987    | 9222     | B3267    | 9222     | 105    |
|                        | Weight   | 30 lbs | 30 lbs | 28 ¾ lbs | 30 ¾ lbs | 30 ¾ lbs | 28 ¾ lbs | 28 ¾ lbs | 28 lbs   | 28 ¾ lbs | 28 lbs   | 30 lbs |
| Basket Grapple Control | Part No. | 89     | L89    | B5228    | 208      | L208     | 8988     | M8988    | 9223     | B3268    | 9223     | 131    |
|                        | Weight   | 9 lbs  | 9 lbs  | 9 lbs    | 12 lbs   | 12 lbs   | 10 ½ lbs | 10 ½ lbs | 10 lbs   | 10 ½ lbs | 10 lbs   | 12 lbs |
| Mill Control Packer    | Part No. | 1634R  | L1634R | B5225R   | 207R     | L207R    | 8985R    | L8985R   | 9224R    | L6310R   | 9224R    | 111R   |
|                        | Weight   | 12 lbs | 12 lbs | 12 lbs   | 16 lbs   | 16 lbs   | 14 lbs   | 14 lbs   | 13 ½ lbs | 14 lbs   | 13 ½ lbs | 16 lbs |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

| Maximum Catch Size (Spiral)                   |          | 7 in.              | 7 in.   | 7 ½ in. | 7 ½ in. | 7 ½ in. | 7 ½ in. | 7 ½ in. | 7 ½ in. | 7 ½ in. | 7 ½ in. | 7 ½ in. |
|---|----------|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Maximum Catch Size (Basket)                   |          | 6 ¼ in.            | 6 ¼ in. | 6 ½ in. | 6 ¾ in. | 6 ½ in. | 6 ½ in. | 6 ¾ in. | 6 ¾ in. | 6 ¾ in. | 6 ¾ in. | 6 ¾ in. |
| Overshot O.D.                                 |          | 8 ¾ in.            | 8 ¾ in. | 8 ¾ in. | 8 ¾ in. | 8 ¾ in. | 8 ½ in. | 8 ½ in. | 9 in.   | 8 ¾ in. | 8 ¾ in. | 9 ¼ in. |
| Standard Box Connection                       |          | Per Customer Order |         |         |         |         |         |         |         |         |         |         |
| Type  |          | FS                 | FS      | SH      | FS      | FS      | SH      | SH      | FS      | SH      | SH      | SFS     |
| Complete Assembly (Dressed with Spiral Parts) | Part No. | 7800               | C4817   | 9570    | 7805    | C5352   | 4793    | C5233   | C5230   | 12692   | C7101   | 9290    |
|   | Weight   | 297 lbs            | 297 lbs | 260 lbs | 301 lbs | 301 lbs | 262 lbs | 265 lbs | 306 lbs | 260 lbs | 263 lbs | 275 lbs |

### Replacement Parts

|                        |          |         |         |         |         |         |         |         |         |         |         |         |
|------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Top Sub                | Part No. | 7802    | B4818   | 9544    | 7807    | A5353   | 4794    | A5234   | A5231   | 12693   | A7102   | 9296    |
|                        | Weight   | 130 lbs | 130 lbs | 111 lbs | 132 lbs | 132 lbs | 117 lbs | 118 lbs | 135 lbs | 118 lbs | 121 lbs | 124 lbs |
| Bowl                   | Part No. | 7801    | B3819   | 9571    | 7806    | M10261  | 9233    | B5235   | B5232   | 12694   | B7103   | 9291    |
|                        | Weight   | 80 lbs  | 80 lbs  | 72 lbs  | 80 lbs  | 80 lbs  | 70 lbs  | 71 lbs  | 81 lbs  | 70 lbs  | 71 lbs  | 72 lbs  |
| Packer                 | Part No. | 111     | L111    | 9231    | 1025    | L1025   | 9237    | B5236   | B4154   | 12695   | B7104   | 9298    |
|                        | Weight   | 1 ¾ lbs | 1 ¾ lbs | 1 ¼ lbs | 1 ½ lbs | 1 ½ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ½ lbs | 1 ¼ lbs | 1 ¼ lbs | 1 ½ lbs |
| Spiral Grapple         | Part No. | 105     | N105    | 9229    | 1027    | M1027   | 9235    | B5238   | C4156   | 12697   | B7106   | 9292    |
|                        | Weight   | 6 lbs   | 6 lbs   | 5 ¾ lbs | 6 ½ lbs | 6 ½ lbs | 5 ½ lbs | 6 lbs   | 7 lbs   | 5 ½ lbs | 6 lbs   | 6 lbs   |
| Spiral Grapple Control | Part No. | 131     | M131    | 9230    | 1031    | M1031   | 9236    | B5239   | B4157   | 12698   | A7107   | 9293    |
|                        | Weight   | 4 lbs   | 4 lbs   | 3 ½ lbs | 4 lbs   | 4 lbs   | 3 ½ lbs | 3 ½ lbs | 4 lbs   | 3 ½ lbs | 3 ½ lbs | 3 ½ lbs |
| Standard Guide         | Part No. | 121     | M121    | 4792    | 1029    | M1029   | 4795    | A5240   | A4158   | 12699   | A7108   | 9295    |
|                        | Weight   | 75 lbs  | 75 lbs  | 64 lbs  | 77 lbs  | 77 lbs  | 64 lbs  | 65 lbs  | 77 lbs  | 64 lbs  | 66 lbs  | 67 lbs  |

### Basket Parts

|                        |          |        |        |        |          |          |          |          |        |          |          |          |
|------------------------|----------|--------|--------|--------|----------|----------|----------|----------|--------|----------|----------|----------|
| Basket Grapple         | Part No. | 105    | N105   | 9229   | 1027     | M1027    | 9235     | B5238    | C4156  | 12697    | B7106    | 9292     |
|                        | Weight   | 30 lbs | 30 lbs | 28 lbs | 32 ½ lbs | 32 ½ lbs | 28 ½ lbs | 30 lbs   | 35 lbs | 30 lbs   | 30 lbs   | 30 lbs   |
| Basket Grapple Control | Part No. | 131    | M131   | 9230   | 1031     | M1031    | 9236     | B5239    | B4157  | 12698    | A7107    | 9293     |
|                        | Weight   | 12 lbs | 12 lbs | 10 lbs | 12 lbs   | 12 lbs   | 10 lbs   | 10 ½ lbs | 12 lbs | 10 ½ lbs | 10 ½ lbs | 10 ½ lbs |
| Mill Control Packer    | Part No. | 111R   | L111R  | 9231R  | 1025R    | L1025R   | 9237R    | B5236R   | B4154R | 12695R   | B7104R   | 9298R    |
|                        | Weight   | 16 lbs | 16 lbs | 14 lbs | 16       | 16 lbs   | 13 ½ lbs | 14 lbs   | 16 lbs | 14 lbs   | 14 lbs   | 14 lbs   |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |         |         |         |         |         |         |         |         |         |         |
|--|-----------------|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | 7 ½ in.            | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 6 ¾ in.            | 6 ¾ in. | 7 in.   | 6 ¾ in. | 7 ¼ in. | 7 ¼ in. | 7 in.   | 7 in.   | 7 in.   | 7 in.   | 7 ¼ in. |
| <b>Overshot O.D.</b>                                 |                 | 9 ½ in.            | 8 ¾ in. | 8 ¾ in. | 9 ¼ in. | 8 ¾ in. | 8 ¾ in. | 8 ¾ in. | 9 ¾ in. | 9 ¾ in. | 9 ¾ in. | 9 in.   |
| <b>Standard Box Connection</b>                       |                 | Per Customer Prder |         |         |         |         |         |         |         |         |         |         |
| <b>Type</b>  |                 | FS                 | SH      | SH      | FS      | SH      | SH      | SH      | FS      | FS      | FS      | SH      |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | C7099              | 4796    | C5249   | C5241   | 9850    | 5257    | C5257   | 1665    | 7810    | C1500   | 4816    |
|  | <b>Weight</b>   | 314 lbs            | 271 lbs | 275 lbs | 319 lbs | 278 lbs | 275 lbs | 281 lbs | 328 lbs | 328 lbs | 328 lbs | 289 lbs |

### Replacement Parts

|                               |                 |         |         |         |         |         |         |         |         |         |         |         |
|-------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Top Sub</b>                | <b>Part No.</b> | A7100   | 4797    | A5250   | A5242   | 9851    | 5258    | A5258   | 1666    | 7812    | B1502   | 4835    |
|                               | <b>Weight</b>   | 140 lbs | 124 lbs | 124 lbs | 145 lbs | 128 lbs | 128 lbs | 128 lbs | 152 lbs | 152 lbs | 152 lbs | 133 lbs |
| <b>Bowl</b>                   | <b>Part No.</b> | B4516   | 9239    | B5251   | B5243   | 9852    | 5259    | B5259   | 1283    | 7811    | B1501   | 9245    |
|                               | <b>Weight</b>   | 81 lbs  | 71 lbs  | 72 lbs  | 82 lbs  | 73 lbs  | 73 lbs  | 73 lbs  | 83 lbs  | 83 lbs  | 83 lbs  | 76 lbs  |
| <b>Packer</b>                 | <b>Part No.</b> | L98     | 9243    | B5252   | B5244   | 9855    | 5260    | B5260   | 98      | 98      | L-98    | 9250    |
|                               | <b>Weight</b>   | 2 lbs   | 1 ½ lbs | 1 ½ lbs | 1 ¾ lbs | 4 ½ lbs | 4 ½ lbs | 4 ½ lbs | 1 ¾ lbs | 1 ¾ lbs | 1 ¾ lbs | 2 lbs   |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | B3454   | 9241    | B5254   | B5246   | 9853    | 5262    | B5262   | 85      | 85      | N85     | 9248    |
|                               | <b>Weight</b>   | 7 lbs   | 5 ½ lbs | 6 lbs   | 7 lbs   | 6 lbs   | 6 lbs   | 6 lbs   | 7 lbs   | 7 lbs   | 7 lbs   | 7 lbs   |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | B3455   | 9242    | B5255   | B5247   | 9854    | 5263    | A5263   | 100     | 100     | M100    | 9249    |
|                               | <b>Weight</b>   | 4 lbs   | 3 ½ lbs | 3 ½ lbs | 4 lbs   | 3 ½ lbs | 3 ½ lbs | 3 ½ lbs | 4 lbs   | 4 lbs   | 4 lbs   | 4 lbs   |
| <b>Standard Guide</b>         | <b>Part No.</b> | A3456   | 4798    | A5256   | A5248   | 9857    | 5264    | A5264   | 88      | 88      | M88     | 4836    |
|                               | <b>Weight</b>   | 79 lbs  | 65 lbs  | 67 lbs  | 79 lbs  | 66 lbs  | 68 lbs  | 68 lbs  | 80 lbs  | 80 lbs  | 80 lbs  | 69 lbs  |

### Basket Parts

|                               |                 |        |        |          |        |        |        |          |        |        |        |        |
|-------------------------------|-----------------|--------|--------|----------|--------|--------|--------|----------|--------|--------|--------|--------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | B3454  | 9241   | B5254    | B5246  | 9853   | 5262   | B5262    | 85     | 85     | N85    | 9248   |
|                               | <b>Weight</b>   | 35 lbs | 29 lbs | 30 lbs   | 35 lbs | 29 lbs | 30 lbs | 30 lbs   | 35 lbs | 35 lbs | 35 lbs | 35 lbs |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | B3455  | 9242   | B5255    | B5247  | 9854   | 5263   | A5263    | 100    | 100    | M100   | 9249   |
|                               | <b>Weight</b>   | 12 lbs | 10 lbs | 10 ½ lbs | 12 lbs | 10 lbs | 10 lbs | 10 ½ lbs | 12 lbs | 12 lbs | 12 lbs | 12 lbs |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | M98RS  | 9243R  | B5252R   | B5244R | 9855R  | 5260R  | B5260R   | 98R    | 98R    | L98R   | 9250R  |
|                               | <b>Weight</b>   | 16 lbs | 14 lbs | 14 lbs   | 16 lbs | 14 lbs | 14 lbs | 14 lbs   | 16 lbs | 16 lbs | 16 lbs | 16 lbs |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

|  |                 |                    |              |              |                |                |                |                |                |                |                |                |
|--|-----------------|--------------------|--------------|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Maximum Catch Size (Spiral)</b>                   |                 | <b>8 in.</b>       | <b>8 in.</b> | <b>8 in.</b> | <b>8 ½ in.</b> | <b>8 ½ in.</b> | <b>8 ½ in.</b> | <b>8 ½ in.</b> | <b>8 ½ in.</b> | <b>8 ½ in.</b> | <b>8 ½ in.</b> | <b>8 ½ in.</b> |
| <b>Maximum Catch Size (Basket)</b>                   |                 | 7 ¾ in.            | 7 ¼ in.      | 7 ¼ in.      | 7 ½ in.        | 7 ½ in.        | 7 ¾ in.        | 7 ¾ in.        | 8 in.          | 7 ¾ in.        | 7 ¾ in.        | 8 in.          |
| <b>Overshot O.D.</b>                                 |                 | 9 ½ in.            | 9 ½ in.      | 9 ½ in.      | 10 ½ in.       | 9 ½ in.        | 10 ½ in.       | 10 ½ in.       | 9 ¾ in.        | 10 ¼ in.       | 11 in.         | 10 ½ in.       |
| <b>Standard Box Connection</b>                       |                 | Per Customer Order |              |              |                |                |                |                |                |                |                |                |
| <b>Type</b>  |                 | SH                 | FS           | FS           | FS             | SH             | FS             | FS             | XSH            | SH             | FS             | FS             |
| <b>Complete Assembly (Dressed with Spiral Parts)</b> | <b>Part No.</b> | C5265              | N264         | C4179        | C1230          | C5284          | M8960          | C5281          | 4837           | C5297          | C5292          | 8963           |
|  | <b>Weight</b>   | 294 lbs            | 337 lbs      | 337 lbs      | 351 lbs        | 325 lbs        | 358 lbs        | 358 lbs        | 325 lbs        | 369 lbs        | 456 lbs        | 390 lbs        |

### Replacement Parts

|                               |                 |         |         |         |         |         |         |         |         |         |         |          |
|-------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| <b>Top Sub</b>                | <b>Part No.</b> | A5266   | L265    | B4180   | B1235   | A5285   | L8961   | A5282   | 4838    | A5298   | A5293   | 8964     |
|                               | <b>Weight</b>   | 137 lbs | 158 lbs | 158 lbs | 162 lbs | 159 lbs | 165 lbs | 165 lbs | 159 lbs | 168 lbs | 182 lbs | 174 lbs  |
| <b>Bowl</b>                   | <b>Part No.</b> | B5267   | M266    | B2716   | B1231   | B5286   | M8962   | B5283   | 9098    | B5299   | B5294   | 8965     |
|                               | <b>Weight</b>   | 75 lbs  | 84 lbs  | 84 lbs  | 86 lbs  | 78 lbs  | 87 lbs  | 87 lbs  | 78 lbs  | 88 lbs  | 118 lbs | 94 lbs   |
| <b>Packer</b>                 | <b>Part No.</b> | B5268   | L235    | M235    | L1060   | B5287   | L8956   | L1060   | 9103    | B5300   | A1966   | 1966     |
|                               | <b>Weight</b>   | 1 ½ in. | 1 ½ in. | 1 ½ in. | 1 ½ lbs | 1 ½ in. | 1 ½ lbs | 1 ½ lbs | 1 ½ in. | 1 ¾ lbs | 2 ½ lbs | 1 ¾ lbs  |
| <b>Spiral Grapple</b>         | <b>Part No.</b> | B5270   | M238    | M238    | C1232   | B5289   | M8957   | B4430   | 9101    | B5302   | B1962   | 8966     |
|                               | <b>Weight</b>   | 6 ½ lbs | 7 ¾ lbs | 7 ¾ lbs | 8 ½ in. | 7 ½ in. | 9 lbs   | 9 lbs   | 7 ½ in. | 10 lbs  | 12 lbs  | 10 ½ in. |
| <b>Spiral Grapple Control</b> | <b>Part No.</b> | B5271   | M239    | M239    | B1233   | A5290   | L8958   | A4431   | 9102    | B5303   | B1963   | 8967     |
|                               | <b>Weight</b>   | 3 ½ in. | 4 lbs   | 4 lbs   | 4 ¾ lbs | 4 lbs   | 4 ¾ lbs | 4 ¾ lbs | 4 lbs   | 5 lbs   | 6 lbs   | 5 ½ in.  |
| <b>Standard Guide</b>         | <b>Part No.</b> | A5272   | M240    | M240    | B1236   | A5291   | L8959   | B4432   | 4839    | A5304   | A5296   | 8968     |
|                               | <b>Weight</b>   | 70 lbs  | 81 lbs  | 81 lbs  | 87 lbs  | 74 lbs  | 90 lbs  | 90 lbs  | 74 lbs  | 96 lbs  | 135 lbs | 103 lbs  |

### Basket Parts

|                               |                 |          |          |          |          |          |          |          |          |        |        |          |
|-------------------------------|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|--------|--------|----------|
| <b>Basket Grapple</b>         | <b>Part No.</b> | B5270    | M238     | M238     | C1232    | B5289    | M8957    | B4430    | 9101     | B5302  | B1962  | 8966     |
|                               | <b>Weight</b>   | 32 ½ in. | 37 ¾ lbs | 37 ¾ lbs | 42 ½ in. | 37 ½ in. | 45 lbs   | 45 lbs   | 37 ½ in. | 50 lbs | 60 lbs | 52 lbs   |
| <b>Basket Grapple Control</b> | <b>Part No.</b> | B5271    | M239     | M239     | B1233    | B5290    | L8958    | A4431    | 9102     | B5303  | B1963  | 8967     |
|                               | <b>Weight</b>   | 10 ½ in. | 12 lbs   | 12 lbs   | 13 ¼ lbs | 12 lbs   | 13 ¼ lbs | 13 ¼ lbs | 12 lbs   | 15 lbs | 18 lbs | 15 ½ in. |
| <b>Mill Control Packer</b>    | <b>Part No.</b> | B5268R   | L235R    | L235R    | L1060R   | B5287R   | L8956R   | L1060R   | 9103R    | B5300R | A1966R | 1966R    |
|                               | <b>Weight</b>   | 14 lbs   | 16 lbs   | 16 lbs   | 19 lbs   | 16 lbs   | 19 lbs   | 19 lbs   | 16 lbs   | 20 lbs | 24 lbs | 21 lbs   |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

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 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
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# Bowen Series 150 Overshots Supplement

## Specifications and Replacement Parts

### Specifications

| Maximum Catch Size (Spiral)                   |          | 8 7/8 in.          | 8 7/8 in.  | 9 in.      | 9 in.      | 9 1/2 in.  | 10 in.     | 10 1/2 in. | 10 1/2 in. | 16 3/4 in. |
|---|----------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Maximum Catch Size (Basket)                   |          | 8 7/8 in.          | 8 7/8 in.  | 8 1/4 in.  | 8 in.      | 8 3/4 in.  | 9 1/4 in.  | 9 3/8 in.  | 9 1/2 in.  | 16 in.     |
| Overshot O.D.                                 |          | 10 1/2 in.         | 11 1/4 in. | 10 3/8 in. | 11 3/8 in. | 11 3/4 in. | 11 7/8 in. | 11 3/4 in. | 12 1/2 in. | 20 3/4 in. |
| Standard Box Connection                       |          | Per Customer Order |            |            |            |            |            |            |            |            |
| Type  |          | FS                 | FS         | FS         | FS         | FS         | FS         | FS         | XFS        |            |
| Complete Assembly (Dressed with Spiral Parts) | Part No. | C5305              | C1870      | 5321       | C5313      | 15250      | 8969       | C5329      | C1880      | 31653      |
|   | Weight   | 386 lbs            | 386 lbs    | 401 lbs    | 533 lbs    | 530 lbs    | 670 lbs    | 642 lbs    | 847 lbs    | —          |

### Replacement Parts

| Top Sub                | Part No. | A5306     | B1877     | 5322    | A5314      | 15251      | 8970      | A5330     | B1885     | 31654   |
|------------------------|----------|-----------|-----------|---------|------------|------------|-----------|-----------|-----------|---------|
|                        | Weight   | 173 lbs   | 173 lbs   | 178 lbs | 223 lbs    | 220 lbs    | 388 lbs   | 375 lbs   | 460 lbs   | 500 lbs |
| Bowl                   | Part No. | B5307     | B1871     | 5323    | B5315      | 15252      | 8971      | B5331     | B1881     | 31655   |
|                        | Weight   | 93 lbs    | 93 lbs    | 97 lbs  | 134 lbs    | 130 lbs    | 122 lbs   | 115 lbs   | 180 lbs   | 570 lbs |
| Packer                 | Part No. | B5308     | A1966     | 5324    | B5316      | 15255      | 1969      | B5332     | A1969     | 31656   |
|                        | Weight   | 1 3/4 in. | 1 3/4 in. | 2 lbs   | 2 1/4 lbs  | 2 1/4 lbs  | 2 1/2 in. | 2 1/2 in. | 2 3/8 lbs | 32 lbs  |
| Spiral Grapple         | Part No. | B5310     | B1874     | 5326    | B5318      | 15253      | 8972      | B5334     | B1971     | 31658   |
|                        | Weight   | 10 lbs    | 10 lbs    | 10 lbs  | 12 1/2 in. | 12 1/2 in. | 12 lbs    | 12 lbs    | 15 lbs    | 125 lbs |
| Spiral Grapple Control | Part No. | B5311     | B1875     | 5327    | B5319      | 15254      | 8973      | A5335     | B1972     | 31659   |
|                        | Weight   | 5 lbs     | 5 lbs     | 5 lbs   | 6 lbs      | 6 lbs      | 7 lbs     | 7 lbs     | 10 lbs    | —       |
| Standard Guide         | Part No. | A5312     | B1876     | 5328    | A5320      | 15257      | 8974      | A5336     | B1973     | 31660   |
|                        | Weight   | 102 lbs   | 102 lbs   | 108 lbs | 154 lbs    | 150 lbs    | 138 lbs   | 130 lbs   | 178 lbs   | 170 lbs |

### Basket Parts

|                        |          |        |        |        |            |        |        |        |        |         |
|------------------------|----------|--------|--------|--------|------------|--------|--------|--------|--------|---------|
| Basket Grapple         | Part No. | B5310  | B1874  | 5326   | B5318      | 15253  | 8972   | B5334  | B1971  | 31658   |
|                        | Weight   | 50 lbs | 50 lbs | 50 lbs | 62 1/2 in. | 62 lbs | 60 lbs | 60 lbs | 75 lbs | 250 lbs |
| Basket Grapple Control | Part No. | B5311  | B1875  | 5327   | B5319      | 15254  | 8973   | A5335  | B1972  | 31659   |
|                        | Weight   | 15 lbs | 15 lbs | 15 lbs | 18 lbs     | 17 lbs | 21 lbs | 21 lbs | 30 lbs | 25 lbs  |
| Mill Control Packer    | Part No. | B5308R | A1966R | 5324R  | B5316R     | 15255R | 1969R  | B5332R | A1969R | 31656R  |
|                        | Weight   | 20 lbs | 24 lbs | 20 lbs | 24 lbs     | 21 lbs | 28 lbs | 28 lbs | 40 lbs | 32 lbs  |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.  
 XFS (Extra Full Strength) ..... Engineered for extreme abuse.  
 SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.  
 SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.  
 XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.

# Bowen Series 150 Overshots Supplement

## Bowen Series Course Thread (CT) 150 Overshots Specifications and Replacement Parts

### Specifications

|                                    |                 |                    |                  |                  |              |              |              |              |                   |
|------------------------------------|-----------------|--------------------|------------------|------------------|--------------|--------------|--------------|--------------|-------------------|
| <b>Maximum Catch Size (Spiral)</b> |                 | <b>3 1/8 in.</b>   | <b>3 1/2 in.</b> | <b>3 3/4 in.</b> | <b>4 in.</b> | <b>6 in.</b> | <b>7 in.</b> | <b>8 in.</b> | <b>10 1/2 in.</b> |
| <b>Maximum Catch Size (Basket)</b> |                 | 2 1/8 in.          | 2.702 in.        | 3.220 in.        | 4 1/4 in.    | 5 3/8 in.    | 6 3/8 in.    | 7 1/4 in.    | 9 3/8 in.         |
| <b>Overshot O.D.</b>               |                 | 3 3/4 in.          | 4 1/8 in.        | 4 1/2 in.        | 5 3/4 in.    | 7 3/8 in.    | 8 1/8 in.    | 9 3/8 in.    | 11 3/4 in.        |
| <b>Standard Box Connection</b>     |                 | Per Customer Order |                  |                  |              |              |              |              |                   |
| <b>Type</b>                        |                 | CT                 | CT               | CT               | CT           | CT           | CT           | CT           | CT                |
| <b>Complete Assembly</b>           | <b>Part No.</b> | 80602              | 79957            | 79937            | 79908        | 79946        | 79942        | 79951        | 80252             |

### Replacement Parts

|                        |                 |        |       |       |       |       |       |       |       |
|------------------------|-----------------|--------|-------|-------|-------|-------|-------|-------|-------|
| <b>Top Sub</b>         | <b>Part No.</b> | 80603  | 79958 | 79938 | 79909 | 79947 | 79943 | 79952 | 80253 |
| <b>Bowl</b>            | <b>Part No.</b> | 80604  | 79959 | 79939 | 79910 | 79948 | 79944 | 79953 | 80254 |
| <b>P.O. Rubber</b>     | <b>Part No.</b> | 37588* | 809   | 6665  | 6114  | 9689  | 9224  | 235   | 5332  |
| <b>P.O. Seat Ring</b>  | <b>Part No.</b> | 37589  | 1748  | 43496 | 6120  | 9690  | 9225  | 241   | 5333  |
| <b>Grapple</b>         | <b>Part No.</b> | 37590  | 1741  | 6662  | 6112  | 9687  | 9222  | 238   | 5334  |
| <b>Grapple Control</b> | <b>Part No.</b> | 37591  | 1747  | 6674  | 6113  | 9688  | 9223  | 239   | 5335  |
| <b>Guide</b>           | <b>Part No.</b> | 80605  | 79960 | 79940 | 79911 | 79949 | 79945 | 79954 | 80255 |
| <b>Packer</b>          | <b>Part No.</b> | —      | —     | —     | —     | 9689  | 9224  | —     | —     |
| <b>Basket Grapple</b>  | <b>Part No.</b> | —      | —     | —     | —     | —     | 9222  | —     | —     |

### Optional

|                                     |                 |         |       |        |         |       |        |         |            |
|-------------------------------------|-----------------|---------|-------|--------|---------|-------|--------|---------|------------|
| <b>Lock Ring Set</b>                | <b>Part No.</b> | 67480   | 67484 | 67504  | 65280   | 67617 | 67695  | 65179   | 65331      |
| <b>Spacer</b>                       | <b>Part No.</b> | 67481   | 67485 | 67505  | 65373   | 67652 | 67696  | A-5335  | B-1972     |
| <b>Lock Ring Breakout Tool</b>      | <b>Part No.</b> | 65912   | 65912 | 65912  | 65912   | 65912 | 65912  | 65912   | 65912      |
| <b>High Pressure Pack-off Ass'y</b> | <b>Part No.</b> | 70857   | 10255 | 10260  | 10265   | —     | 61204  | 65321   | 65333      |
| <b>Small Spacer Seal</b>            | <b>Part No.</b> | 568-40  | 30-14 | 30-18  | 6230-27 | —     | 30-42  | 6230-46 | PRP568-275 |
| <b>Large Spacer Seal</b>            | <b>Part No.</b> | 568-42  | —     | —      | —       | —     | —      | —       | —          |
| <b>Packer</b>                       | <b>Part No.</b> | 37588HP | 809HP | 6665HP | 6114HP  | —     | 9224HP | 235HP   | 5332HP     |
| <b>Pack-off Adapter</b>             | <b>Part No.</b> | 70858   | —     | —      | —       | —     | —      | —       | —          |
| <b>Spacer</b>                       | <b>Part No.</b> | 70859   | —     | —      | —       | 67652 | —      | 65381** | —          |
| <b>Bushing</b>                      | <b>Part No.</b> | —       | 10256 | 10261  | 10266   | —     | 61205  | 65322   | 65334      |
| <b>Mill Extension</b>               | <b>Part No.</b> | —       | —     | —      | 79912   | —     | —      | 79955   | 80256      |

\*For Type D Packer use No. 3594-D

\*\*Use with Type A Packer



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of fish to be caught
  - (3) Top connection
  - (4) OD, if other than standard



### Recommended Spare Parts:

- Spiral:
- (1) 3 Packers
  - (2) 2 Grapples for each size
  - (3) 1 Control
- Basket:
- (1) 2 Grapples
  - (2) Mill Control Packers for each size
- Mill Control Packer:
- (1) 3 Inner and 3 Outer Seals



### Abbreviations:

- FS (Full Strength) ..... Engineered to withstand all pulling, torsional, and jarring strain.
- XFS (Extra Full Strength) ..... Engineered for extreme abuse.
- SFS (Semi Full Strength) ..... Engineered for special hole conditions commensurate with maximum strength.
- SH (Slim Hole) ..... Engineered to withstand heavy pulling strain only.
- XSH (Extra Slim Hole) ..... Engineered for pickup jobs only.



# Bowen Series 150 Overshots Supplement

## Overshot Accessories

Two types of top subs are available for Bowen Overshots: SS, short sub with shoulder; and LS, elevator sub with shoulder. Type-SS top subs are furnished as part of the assembly, unless otherwise specified.

### 150 Series Overshot Type LS Top Subs

|                              |           |         |          |          |         |          |          |          |          |          |          |          |         |         |
|------------------------------|-----------|---------|----------|----------|---------|----------|----------|----------|----------|----------|----------|----------|---------|---------|
| <b>Complete Assembly No.</b> | 9305      | C5072   | C4741    | C4623    | C5080   | 9270     | C1827    | C4736    | C5101    | C5098    | C5104    | 9105     | C4822   | C5115   |
| <b>O.D. of Overshot</b>      | 3 ½ in.   | 3 ¼ in. | 3 ½ in.  | 3 ¾ in.  | 3 ¾ in. | 3 ¾ in.  | 3 ¾ in.  | 4 in.    | 3 ½ in.  | 4 ¾ in.  | 4 in.    | 4 ½ in.  | 4 ¼ in. | 4 ½ in. |
| <b>Part No.</b>              | 9311LS    | A5073G  | A4742G   | A5083G   | A5081G  | 9276LS   | A1834G   | A4737G   | A5102G   | A5099G   | A5105G   | 9106LS   | A4823G  | A5116G  |
| <b>Weight</b>                | 78 lbs    | 81 lbs  | 84 lbs   | 83 lbs   | 86 lbs  | 86 lbs   | 84 lbs   | 88 lbs   | 87 lbs   | 90 lbs   | 87 lbs   | 88 lbs   | 90 lbs  | 107     |
| <b>Length</b>                | 46 in.    | 46 in.  | 46 in.   | 46 in.   | 46 in.  | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.  | 46 in.  |
| <b>Complete Assembly No.</b> | No. C5112 | C5126   | 9635     | C5123    | C4619   | C4732    | C5151    | 9109     | C5148    | C5129    | 9120     | C4686    | C9296   | C7497   |
| <b>O.D. of Overshot</b>      | 4 ¾ in.   | 4 ¼ in. | 4 ¾ in.  | 4 ½ in.  | 4 ¾ in. | 4 ½ in.  | 4 ¾ in.  | 4 ½ in.  | 5 in.    | 4 ¾ in.  | 4 ½ in.  | 5 ½ in.  | 4 ½ in. | 5 ½ in. |
| <b>Part No.</b>              | A5113G    | A5127G  | 9636LS   | A5124G   | A4620G  | A4733G   | A5152G   | 9110LS   | A5149G   | A5130G   | 9110LS   | A4687G   | A9297G  | A7498G  |
| <b>Weight</b>                | 112 lbs   | 109 lbs | 111 lbs  | 114 lbs  | 111 lbs | 116 lbs  | 113 lbs  | 116 lbs  | 118 lbs  | 115 lbs  | 117 lbs  | 120 lbs  | 114 lbs | 120 lbs |
| <b>Length</b>                | 46 in.    | 46 in.  | 46 in.   | 46 in.   | 46 in.  | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.  | 46 in.  |
| <b>Complete Assembly No.</b> | C5139     | C5136   | 9515     | C5154    | C5142   | C5428    | C5425    | C5162    | C4819    | 5896     | C5165    | C4814    | C4969   | 5698    |
| <b>O.D. of Overshot</b>      | 4 ¾ in.   | 5 ¾ in. | 5 ¼ in.  | 4 ¾ in.  | 5 ¾ in. | 5 in.    | 5 ¾ in.  | 5 ½ in.  | 5 ¾ in.  | 5 ¾ in.  | 5 ¾ in.  | 5 ¾ in.  | 5 ½ in. | 5 ¾ in. |
| <b>Part No.</b>              | A5140G    | A5137G  | 9516LS   | A5155G   | A5143G  | A5249G   | A5426G   | A5163G   | A4820G   | 5897LS   | A5166G   | B4815G   | A4970G  | 5699LS  |
| <b>Weight</b>                | 117 lbs   | 122 lbs | 124 lbs  | 119 lbs  | 124 lbs | 121 lbs  | 126 lbs  | 170 lbs  | 175 lbs  | 175 lbs  | 175 lbs  | 180 lbs  | 180 lbs | 182 lbs |
| <b>Length</b>                | 46 in.    | 46 in.  | 46 in.   | 46 in.   | 46 in.  | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.  | 46 in.  |
| <b>Complete Assembly No.</b> | C4844     | 5737    | C5168    | 8975     | C4829   | C7096    | C7093    | C5171    | 7787     | C4825    | 6655     | C5174    | 4773    | 8625    |
| <b>O.D. of Overshot</b>      | 5 ½ in.   | 5 ½ in. | 5 ¾ in.  | 5 ¾ in.  | 6 ½ in. | 5 ¾ in.  | 6 ¾ in.  | 5 ¾ in.  | 6 ¾ in.  | 6 ¾ in.  | 6 ¾ in.  | 6 ¾ in.  | 6 ½ in. | 5 ¾ in. |
| <b>Part No.</b>              | B4845G    | 5738LS  | A5169G   | 8976LS   | A4830G  | A7097G   | A7094G   | A5172G   | 7789LS   | A4826G   | 6656LS   | A5175G   | 4774LS  | 8628LS  |
| <b>Weight</b>                | 185 lbs   | 185 lbs | 185 lbs  | 180 lbs  | 190 lbs | 180 lbs  | 190 lbs  | 190 lbs  | 190 lbs  | 195 lbs  | 195 lbs  | 200 lbs  | 215 lbs | 220 lbs |
| <b>Length</b>                | 46 in.    | 46 in.  | 46 in.   | 46 in.   | 46 in.  | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.   | 46 in.  | 46 in.  |
| <b>Complete Assembly No.</b> | C5178     | C5176   | C5185    | B3810    | 9038    | C5193    | 8978     | C4689    | 6150     | C5196    | C3364    | 7572     | C5206   | C5204   |
| <b>O.D. of Overshot</b>      | 6 ¾ in.   | 7 ½ in. | 6 ½ in.  | 7 ¼ in.  | 6 ¾ in. | 6 ¾ in.  | 6 ¾ in.  | 7 ¾ in.  | 7 ¾ in.  | 7 ¾ in.  | 7 ¾ in.  | 7 ¾ in.  | 7 ¾ in. | 7 ¾ in. |
| <b>Part No.</b>              | A4826G    | A5177G  | A5186G   | B3811G   | 9039LS  | A5194G   | 8979LS   | A4690G   | 6151LS   | A5197G   | A3365G   | 7573LS   | A5207G  | A5205G  |
| <b>Weight</b>                | 220 lbs   | 230 lbs | 235 lbs  | 235 lbs  | 225 lbs | 230 lbs  | 230 lbs  | 240 lbs  | 240 lbs  | 235 lbs  | 245 lbs  | 245 lbs  | 240 lbs | 250 lbs |
| <b>Length</b>                | 48 in.    | 48 in.  | 48 in.   | 48 in.   | 48 in.  | 48 in.   | 48 in.   | 48 in.   | 48 in.   | 48 in.   | 48 in.   | 48 in.   | 48 in.  | 48 in.  |
| <b>Complete Assembly No.</b> | C4691     | 9692    | 8741     | C2108    | 7791    | 9009     | 9163     | C5344    | 9860     | C5342    | C5214    | 4785     | 9339    | C3032   |
| <b>O.D. of Overshot</b>      | 7 ¾ in.   | 7 ¾ in. | 7 ¾ in.  | 7 ¾ in.  | 7 ¾ in. | 7 ½ in.  | 7 ¾ in.  | 7 ¾ in.  | 7 ¾ in.  | 8 ¾ in.  | 7 ¾ in.  | 7 ¾ in.  | 8 ¾ in. | 8 ¾ in. |
| <b>Part No.</b>              | A4692G    | 9693LS  | 8742LS   | B2106G   | 7793LS  | 9010LS   | 9165LS   | A5345G   | 9861LS   | A5343G   | A5215G   | 9133LS   | 9338LS  | A3033G  |
| <b>Weight</b>                | 245 lbs   | 245 lbs | 245 lbs  | 255 lbs  | 255 lbs | 240 lbs  | 250 lbs  | 250 lbs  | 250 lbs  | 260 lbs  | 255 lbs  | 255 lbs  | 260 lbs | 265 lbs |
| <b>Length</b>                | 48 in.    | 48 in.  | 48 in.   | 48 in.   | 48 in.  | 48 in.   | 48 in.   | 48 in.   | 48 in.   | 48 in.   | 48 in.   | 48 in.   | 48 in.  | 48 in.  |
| <b>Complete Assembly No.</b> | C5222     | 275     | C3833    | 8995     | C3263   | 9217     | C4817    | 7800     | 9570     | C5354    | C5352    | 4793     | C5233   | C5230   |
| <b>O.D. of Overshot</b>      | 7 ¾ in.   | 8 ¾ in. | 8 ¾ in.  | 8 in.    | 8 ½ in. | 8 ½ in.  | 8 ¾ in.  | 8 ¾ in.  | 8 ¾ in.  | 8 ¾ in.  | 8 ¾ in.  | 8 ½ in.  | 8 ½ in. | 9 in.   |
| <b>Part No.</b>              | A5223G    | 276LS   | A3834G   | 8996LS   | A3033G  | 9218LS   | B4818G   | 7802LS   | 9544LS   | A5355G   | A5353G   | 4794LS   | A5234G  | A5231G  |
| <b>Weight</b>                | 410 lbs   | 420 lbs | 420 lbs  | 410 lbs  | 415 lbs | 415 lbs  | 425 lbs  | 425 lbs  | 420 lbs  | 420 lbs  | 430 lbs  | 425 lbs  | 425 lbs | 435 lbs |
| <b>Length</b>                | 50 in.    | 50 in.  | 50 in.   | 50 in.   | 50 in.  | 50 in.   | 50 in.   | 50 in.   | 50 in.   | 50 in.   | 50 in.   | 50 in.   | 50 in.  | 50 in.  |
| <b>Complete Assembly No.</b> | C7101     | C7099   | 4796     | C5249    | C5241   | C5257    | 9850     | C1500    | 1665     | 4816     | C5265    | 264      | C4179   | 4834    |
| <b>O.D. of Overshot</b>      | 8 ¾ in.   | 9 ½ in. | 8 ¾ in.  | 8 ¾ in.  | 9 ¼ in. | 8 ¾ in.  | 8 ¾ in.  | 9 ¾ in.  | 9 ¾ in.  | 9 in.    | 9 ¾ in.  | 9 ¾ in.  | 9 ¾ in. | 9 ½ in. |
| <b>Part No.</b>              | A7102G    | A7100G  | 4797LS   | A2550G   | A5242G  | A5258G   | 9851LS   | B1502G   | 1666LS   | 4835LS   | A5266G   | 265LS    | B4180G  | 9063LS  |
| <b>Weight</b>                | 430 lbs   | 437 lbs | 430 lbs  | 430 lbs  | 440 lbs | 640 lbs  | 640 lbs  | 650 lbs  | 650 lbs  | 640 lbs  | 645 lbs  | 655 lbs  | 655 lbs | 650 lbs |
| <b>Length</b>                | 54 in.    | 54 in.  | 50 in.   | 50 in.   | 50 in.  | 54 in.   | 54 in.   | 54 in.   | 54 in.   | 54 in.   | 54 in.   | 54 in.   | 54 in.  | 54 in.  |
| <b>Complete Assembly No.</b> | C1230     | C5284   | 8960     | C5297    | C5292   | 8963     | C5305    | C5321    | 8969     | C5329    | C1880    | 15800    | —       | —       |
| <b>O.D. of Overshot</b>      | 10 in.    | 9 ¾ in. | 10 ½ in. | 10 ¼ in. | 11 in.  | 10 ½ in. | 10 ½ in. | 10 ¾ in. | 11 ¾ in. | 11 ¾ in. | 12 ½ in. | 12 ¾ in. | —       | —       |
| <b>Part No.</b>              | B1235G    | A5285G  | 8961LS   | A5298G   | A5293G  | 8964LS   | A5306G   | A5322G   | 8970LS   | A5330G   | B1885G   | 15801LS  | —       | —       |
| <b>Weight</b>                | 660 lbs   | 655 lbs | 665 lbs  | 670 lbs  | 700 lbs | 675 lbs  | 680 lbs  | 680 lbs  | 900 lbs  | 895 lbs  | 925 lbs  | 975 lbs  | —       | —       |
| <b>Length</b>                | 54 in.    | 54 in.  | 54 in.   | 54 in.   | 54 in.  | 54 in.   | 54 in.   | 54 in.   | 54 in.   | 54 in.   | 54 in.   | 54 in.   | —       | —       |

# Bowen Series 150 Overshots Supplement

## Bowen Type D Collar Packer Assemblies for Tubing Overshots

|                                  |                 |           |           |           |           |              |              |              |              |              |              |
|----------------------------------|-----------------|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Use with Overshot No.</b>     |                 | 9305      | C4741     | C4623     | C5080     | 9270         | C4736        | C9237        | C5101        | C5104        | C4822        |
| <b>Overshot Maximum Catch</b>    |                 | 2 3/8 in. | 2 3/8 in. | 2 1/2 in. | 2 1/2 in. | 2 7/8 in.    | 2 7/8 in.    | 3 in.        | 3 1/16 in.   | 3 1/8 in.    | 3 1/8 in.    |
| <b>Maximum Size to Pack-off:</b> |                 | 1.660 in. | 1.660 in. | 1.990 in. | 1.990 in. | 2 3/8 in. OD | 2 3/8 in. OD | 2 3/8 in. OD | 2 3/8 in. OD | 2 3/8 in. OD | 2 3/8 in. OD |
| <b>Tubing</b>                    |                 | O.D.      | O.D.      | O.D.      | O.D.      | NON          | NON          | NON          | E.U.E.       | E.U.E.       | E.U.E.       |
| <b>Collar</b>                    |                 | E.U.E.    | E.U.E.    | E.U.E.    | E.U.E.    | UPSET        | UPSET        | UPSET        | —            | —            | —            |
| <b>Complete Assembly</b>         | <b>Part No.</b> | 39380     | 39381     | 39382     | 39383     | 39384        | 39385        | 47390        | 24046        | 39388        | 39390        |
|                                  | <b>Weight</b>   | 2 1/8 lbs | 2 1/8 lbs | 2 7/8 lbs | 2 7/8 lbs | 3 3/16 lbs   | 3 3/8 lbs    | 5 1/4 lbs    | 3 3/8 lbs    | 4 3/8 lbs    | 4 3/8 lbs    |

## Replacement Parts

|                      |                 |           |           |           |           |         |           |         |           |           |           |
|----------------------|-----------------|-----------|-----------|-----------|-----------|---------|-----------|---------|-----------|-----------|-----------|
| <b>Packer Insert</b> | <b>Part No.</b> | 9309D     | 1453D     | B5089D    | B3395D    | 8550D   | L809D     | B9240D  | B3594D    | B5107D    | 7090D     |
|                      | <b>Weight</b>   | 2 1/2 lbs | 2 1/2 lbs | 2 3/4 lbs | 2 3/4 lbs | 3 lbs   | 3 1/2 lbs | 5 lbs   | 3 1/4 lbs | 4 1/2 lbs | 4 1/2 lbs |
| <b>Spring</b>        | <b>Part No.</b> | 39412     | 39412     | 26154     | 26154     | 8539    | 8539      | 47391   | 24044     | 24044     | 24044     |
|                      | <b>Weight</b>   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 3/16 lb | 1/8 lb    | 1/4 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb    |
| <b>O-Ring</b>        | <b>Part No.</b> | 30-3      | 30-3      | 30-4      | 30-4      | 30-6    | 30-6      | 27-35   | 30-10     | 27-35     | 27-35     |
|                      | <b>Weight</b>   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb | 1/32 lb   | 1/32 lb | 1/32 lb   | 1/32 lb   | 1/32 lb   |

## Bowen Type D Collar Packer Assemblies for Tubing Overshots

|                                 |                 |              |              |              |              |              |              |              |              |              |              |
|---------------------------------|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Use with Overshot No.</b>    |                 | 9105         | C5112        | 5115         | C5126        | C5123        | 9635         | C4619        | C4732        | 9109         | C5151        |
| <b>Overshot Maximum Catch</b>   |                 | 3 1/8 in.    | 3 1/4 in.    | 3 1/4 in.    | 3 3/8 in.    | 3 3/8 in.    | 3 3/8 in.    | 3 1/2 in.    | 3 1/2 in.    | 3 21/32 in.  | 3 21/32 in.  |
| <b>Maximum Size to Pack-off</b> |                 | 2 3/8 OD in. | 2 3/8 OD in. | 2 3/8 OD in. | 2 3/8 OD in. | 2 3/8 OD in. | 2 7/8 OD in. | 2 7/8 OD in. | 2 7/8 OD in. | 2 7/8 OD in. | 2 7/8 OD in. |
| <b>Tubing</b>                   |                 | E.U.E.       | E.U.E.       | E.U.E.       | E.U.E.       | E.U.E.       | NON          | NON          | NON          | E.U.E.       | E.U.E.       |
| <b>Collar</b>                   |                 | —            | —            | —            | UPSET        | UPSET        | UPSET        | —            | —            | —            | —            |
| <b>Complete Assembly</b>        | <b>Part No.</b> | 9095         | 39391        | 39224        | 39392        | 39347        | 9639         | 39393        | 39394        | 6653         | 6653         |
|                                 | <b>Weight</b>   | 4 3/8 lbs    | 6 lbs        | 4 1/4 lbs    | 5 3/8 lbs    | 5 3/4 lbs    | 4 3/8 lbs    | 5 3/4 lbs    | 4 1/4 lbs    | 4 3/8 lbs    | 4 3/8 lbs    |

## Replacement Parts

|                      |                 |           |           |         |           |           |           |           |         |           |           |
|----------------------|-----------------|-----------|-----------|---------|-----------|-----------|-----------|-----------|---------|-----------|-----------|
| <b>Packer Insert</b> | <b>Part No.</b> | 809D      | 1517D     | B5118D  | B4625D    | 6515D     | 4185D     | 7065D     | 168D    | 6665D     | 6665D     |
|                      | <b>Weight</b>   | 4 3/8 lbs | 5 3/4 lbs | 4 lbs   | 5 1/2 lbs | 5 1/2 lbs | 4 1/8 lbs | 5 1/2 lbs | 4 lbs   | 4 3/8 lbs | 4 3/8 lbs |
| <b>Spring</b>        | <b>Part No.</b> | 808       | 39194     | 39194   | 24044     | 808       | 4183      | 4183      | 4183    | 6654      | 6654      |
|                      | <b>Weight</b>   | 1/4 lb    | 1/4 lb    | 1/4 lb  | 1/8 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb  | 1/4 lb    | 1/4 lb    |
| <b>O-Ring</b>        | <b>Part No.</b> | 27-35     | 30-9      | 30-9    | 27-35     | 27-35     | 30-10     | 30-10     | 30-10   | 30-10     | 30-10     |
|                      | <b>Weight</b>   | 1/32 lb   | 1/32 lb   | 1/32 lb | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb | 1/32 lb   | 1/32 lb   |



Type D Packer Assembly



## How to Order

- Specify:
- (1) Name and number of overshot
  - (2) Size of fish to be caught
  - (3) Any desired spares, by name and part number



## Recommended Spare Parts:

- (1) 3 O-Rings

Miscellaneous O-Ring Seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing Sets, however, will always be furnished in sealed plastic bags.

# Bowen Series 150 Overshots Supplement

## Bowen Type D Collar Packer Assemblies for Tubing Overshots

|                                  |                 |              |              |              |              |              |              |              |              |              |              |   |
|----------------------------------|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---|
| <b>Use with Overshot No.</b>     |                 | 5148         | C5129        | C4686        | C5139        | C5154        | C5142        | C5428        | C5425        | 9515         | 5896         | — |
| <b>Overshot Maximum Catch</b>    |                 | 3 3/32 in.   | 3 3/4 in.    | 3 3/4 in.    | 3 7/8 in.    | 4 in.        | 4 in.        | 4 1/8 in.    | 4 1/8 in.    | 4 1/4 in.    | 4 1/4 in.    | — |
| <b>Maximum Size to Pack-off:</b> |                 | 2 7/8 in. OD | 2 7/8 in. OD | 2 7/8 in. OD | 2 7/8 in. OD | 2 7/8 in. OD | 2 7/8 in. OD | 2 7/8 in. OD | 2 7/8 in. OD | 3 1/2 in. OD | 3 1/2 in. OD | — |
| <b>Tubing</b>                    |                 | E.U.E.       | E.U.E.       | E.U.E.       | E.U.E.       | E.U.E.       | E.U.E.       | E.U.E.       | E.U.E.       | NON          | NON          | — |
| <b>Collar</b>                    |                 | —            | —            | —            | —            | —            | —            | UPSET        | UPSET        | —            | —            | — |
| <b>Complete Assembly</b>         | <b>Part No.</b> | 39225        | 39397        | 39398        | 39399        | 39401        | 39402        | 39403        | 39404        | 9538         | 5895         | — |
|                                  | <b>Weight</b>   | 4 3/8 lbs    | 4 3/4 lbs    | 7 1/4 lbs    | 8 1/8 lbs    | 8 3/8 lbs    | 8 3/8 lbs    | 7 3/8 lbs    | 7 3/8 lbs    | 5 3/8 lbs    | 8 1/2 lbs    | — |

## Replacement Parts

|                      |                 |           |           |         |           |         |         |         |         |           |         |   |
|----------------------|-----------------|-----------|-----------|---------|-----------|---------|---------|---------|---------|-----------|---------|---|
| <b>Packer Insert</b> | <b>Part No.</b> | 3219D     | 5538D     | A811D   | A1707D    | B5157D  | B1506D  | B4895D  | 1867D   | 856D      | 189D    | — |
|                      | <b>Weight</b>   | 4 3/8 lbs | 4 1/2 lbs | 7 lbs   | 7 3/4 lbs | 8 lbs   | 8 lbs   | 7 lbs   | 7 lbs   | 5 1/2 lbs | 8 lbs   | — |
| <b>Spring</b>        | <b>Part No.</b> | 6654      | 6654      | 6654    | 914       | 914     | 914     | 914     | 914     | 914       | 6129    | — |
|                      | <b>Weight</b>   | 1/4 lb    | 1/4 lb    | 1/4 lb  | 3/8 lb    | 3/8 lb  | 3/8 lb  | 3/8 lb  | 3/8 lb  | 3/8 lb    | 1/2 lb  | — |
| <b>O-Ring</b>        | <b>Part No.</b> | 30-10     | 30-10     | 30-10   | 30-14     | 30-14   | 30-14   | 30-14   | 30-14   | 30-14     | 30-16   | — |
|                      | <b>Weight</b>   | 1/32 lb   | 1/32 lb   | 1/32 lb | 1/32 lb   | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb   | 1/32 lb | — |

## Bowen Type D Collar Packer Assemblies for Tubing Overshots

|                                 |                 |              |              |              |              |              |              |           |           |           |            |            |
|---------------------------------|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------|-----------|-----------|------------|------------|
| <b>Use with Overshot No.</b>    |                 | 5162         | 8975         | C5165        | C4814        | 5737         | 5698         | C5168     | C4829     | C7096     | C7093      | 4825       |
| <b>Overshot Maximum Catch</b>   |                 | 4 1/4 in.    | 4 1/2 in.    | 4 1/2 in.    | 4 1/2 in.    | 4 3/8 in.    | 4 3/8 in.    | 4 3/4 in. | 4 3/4 in. | 4 7/8 in. | 4 7/8 in.  | 5 in.      |
| <b>Maximum Size to Pack-off</b> |                 | 3 1/2 in. OD | 3 1/2 in. OD | 3 1/2 in. OD | 3 1/2 in. OD | 3 1/2 in. OD | 3 1/2 in. OD | 4 in. OD  | 4 in. OD  | 4 in. OD  | 4 in. OD   | 4 in. OD   |
| <b>Tubing</b>                   |                 | NON          | E.U.E.       | E.U.E.       | E.U.E.       | E.U.E.       | E.U.E.       | NON       | NON       | NON       | NON        | E.U.E.     |
| <b>Collar</b>                   |                 | UPSET        | —            | —            | —            | —            | —            | UPSET     | UPSET     | UPSET     | UPSET      | —          |
| <b>Complete Assembly</b>        | <b>Part No.</b> | 35696        | 6104         | B-13548      | 39405        | 39406        | 18661        | 39407     | 39408     | 39409     | 39410      | 39226      |
|                                 | <b>Weight</b>   | 8 3/8 lbs    | 7 1/2 lbs    | 9 lbs        | 8 lbs        | 8 lbs        | 9 lbs        | 8 1/2 lbs | 8 1/2 lbs | 5 1/2 lbs | 12 1/2 lbs | 10 1/2 lbs |

## Replacement Parts

|                      |                 |         |         |           |           |           |           |         |         |         |         |          |
|----------------------|-----------------|---------|---------|-----------|-----------|-----------|-----------|---------|---------|---------|---------|----------|
| <b>Packer Insert</b> | <b>Part No.</b> | 4672D   | 6114D   | A2487D    | B2199-1D  | 195D      | 1140D     | B2199D  | B2362D  | B6387D  | B2455D  | 4505D    |
|                      | <b>Weight</b>   | 8 lbs   | 7 lbs   | 8 1/2 lbs | 7 1/2 lbs | 7 1/2 lbs | 8 1/2 lbs | 8 lbs   | 8 lbs   | 10 lbs  | 12 lbs  | 10 lbs   |
| <b>Spring</b>        | <b>Part No.</b> | 914     | 6129    | 6129      | 6129      | 6129      | 18662     | 6129    | 6129    | 39236   | 39236   | 39236    |
|                      | <b>Weight</b>   | 3/8 lb  | 1/2 lb  | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb    | 1/2 lb  | 1/2 lb  | 1/2 lb  | 1/2 lb  | 1/2 lbs  |
| <b>O-Ring</b>        | <b>Part No.</b> | 30-14   | 30-15   | 30-15     | 30-15     | 30-15     | 30-15     | 30-15   | 30-15   | 30-19   | 30-19   | 30-19    |
|                      | <b>Weight</b>   | 1/32 lb | 1/32 lb | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lbs |



Type D Packer Assembly



## How to Order

- Specify:
- (1) Name and number of overshot
  - (2) Size of fish to be caught
  - (3) Any desired spares, by name and part number



## Recommended Spare Parts:

- (1) 3 O-Rings

Miscellaneous O-Ring Seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing Sets, however, will always be furnished in sealed plastic bags.

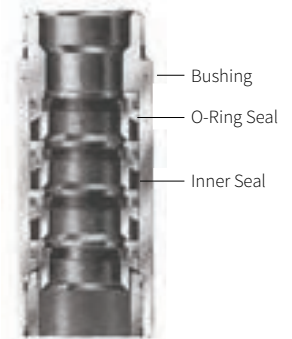
# Bowen Series 150 Overshots Supplement

## High Pressure Pack-off Assemblies

The high pressure pack-off assembly is a special assembly for use in areas of extreme pressure. It consists of a bushing and four packing elements. It is normally installed between the bowl and the guide of the overshoot.

### High Pressure Pack-off Assemblies for Series 150 Overshots

| Use with Overshot No. | 9105      | 9109        | 5896       | 8975      | 6655      | 8741      | 9163      | 9163      |         |
|-----------------------|-----------|-------------|------------|-----------|-----------|-----------|-----------|-----------|---------|
| Overshot Catch Size   | 3 1/8 in. | 3 21/32 in. | 4 1/4 in.  | 4 3/4 in. | 5 1/4 in. | 6 1/4 in. | 6 3/8 in. | 6 3/8 in. |         |
| Overshot O.D.         | 4 1/8 in. | 4 11/16 in. | 5 5/16 in. | 5 3/4 in. | 6 3/8 in. | 7 7/8 in. | 7 3/4 in. | 7 3/4 in. |         |
| Complete Assembly     | Part No.  | 10255       | 10260      | 10357     | 10265     | 13595     | 21091     | *22118    | 13770   |
|                       | Weight    | 34 lbs      | 41 lbs     | 66 lbs    | 65 lbs    | 92 lbs    | 121 lbs   | 116 lbs   | 116 lbs |



High Pressure Pack-off Assembly

### Replacement Parts

|                                      |          |           |           |           |           |          |          |          |          |
|--------------------------------------|----------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|
| Bushing                              | Part No. | 10256     | 10261     | 10358     | 10266     | 13596    | 21092    | 22119    | 13771    |
|                                      | Weight   | 18 lbs    | 21 lbs    | 34 lbs    | 33 lbs    | 52 lbs   | 9 lbs    | 68 lbs   | 68 lbs   |
| Packer (Includes O-Ring) (4 Req'd.)  | Part No. | 809HP     | 6665HP    | 169HP     | 6114HP    | 4505HP   | 1642HP   | 223HP    | 5508HP   |
|                                      | Weight   | 4 lbs     | 5 lbs     | 8 lbs     | 8 lbs     | 10 lbs   | 13 lbs   | 12 lbs   | 12 lbs   |
| O-Ring Seal (4 Req'd., 1 per Packer) | Part No. | 30-14     | 30-18     | 30-27     | 30-27     | 30-32    | 30-38    | 30-38    | 30-39    |
|                                      | Weight   | 1/100 lbs | 1/100 lbs | 1/100 lbs | 1/100 lbs | 1/50 lbs | 1/50 lbs | 1/50 lbs | 1/50 lbs |

\* This assembly is installed between Top Sub and Bowl. All others are installed between Bowl and Guide.



### How to Order

- Specify:
- (1) Name and number of overshoot
  - (2) Size of fish to be caught



### Recommended Spare Parts:

- (1) 2 Sets of Packers (4 per Set)
- (2) 8 O-Rings

Miscellaneous O-Ring Seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing Sets, however, will always be furnished in sealed plastic bags.

# Bowen Series 150 Overshots Supplement

## Type R Replaceable Outer Seals for Mill Control Packers. Listed in Numerical Order of Mill Control Packer Part Numbers:

|                   |                 |       |        |         |        |         |        |          |        |        |        |        |           |        |
|-------------------|-----------------|-------|--------|---------|--------|---------|--------|----------|--------|--------|--------|--------|-----------|--------|
| <b>Packer No.</b> |                 | —     | 98R    | 98RS    | 110R   | 111R    | 113R   | 168R     | 169R   | 195R   | 207R   | 223R   | 235R      | A756R  |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 30-43  | 30-42   | 27-62  | 27-68   | 30-33  | 30-18    | 30-22  | 27-52  | 30-39  | 27-64  | 27-72     | 30-32  |
| <b>Packer No.</b> |                 | —     | 809R   | L809R   | 811R   | A811R   | 856R   | B972R    | 1025R  | 1060R  | 1140R  | 1189R  | 1253R     | 1453R  |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 30-11  | 30-11   | 30-18  | 30-18   | 30-19  | 30-19    | 30-41  | 30-46  | 30-25  | 30-28  | 30-17     | 30-6   |
| <b>Packer No.</b> |                 | —     | L1453R | A1508R  | 1517R  | L1517R  | 1634R  | 1642R    | 1680R  | A1707R | A1814R | A1831R | A1867R    | 1966R  |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 30-6   | 30-24   | 30-14  | 30-14   | 30-38  | 30-37    | 27-65  | 30-19  | 30-38  | 30-11  | 30-21     | 27-74  |
| <b>Packer No.</b> |                 | —     | A1966R | 1969R   | A1969R | A2196R  | B2199R | B2199-1R | 2362R  | 2372R  | B2436R | B2455R | B2487R    | L3064R |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 27-74  | 27-74   | 27-76  | 30-19   | 30-26  | 30-24    | 30-26  | 30-38  | 30-24  | 30-27  | 30-24     | 30-24  |
| <b>Packer No.</b> |                 | —     | B3219R | B3395R  | B3479R | B3594R  | B4154R | 4185R    | 4398R  | 4505R  | 4505RS | B4520R | B4625R    | 4672R  |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 30-17  | 30-8    | 30-34  | 30-12   | 30-41  | 30-19    | 30-11  | 30-30  | 30-28  | 30-30  | 30-15     | 30-22  |
| <b>Packer No.</b> |                 | —     | B4672R | B4895R  | B5075R | B5089R  | B5107R | B5118R   | 5157R  | B5157R | B5180R | B5188R | B5199R    | B5209R |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 30-22  | 30-20   | 30-6   | 30-7    | 30-12  | 30-14    | 30-20  | 30-20  | 30-32  | 30-33  | 30-36     | 30-37  |
| <b>Packer No.</b> |                 | —     | B5217R | B5225R  | B5236R | B5244R  | B5252R | 5260R    | B5260R | B5268R | B5287R | B5300R | B5308R    | B5316R |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 30-39  | 30-39   | 30-42  | 30-43   | 30-43  | 30-43    | 30-43  | 30-44  | 30-44  | 30-47  | 30-48     | 27-64  |
| <b>Packer No.</b> |                 | —     | 5324R  | B5324R  | 5332R  | B5347R  | B5357R | 5508R    | B5538R | 5950R  | L5950R | 6114R  | L6163R    | 6310R  |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 30-48  | 30-47   | 30-52  | 30-38   | 30-41  | 30-38    | 30-18  | 30-28  | 30-28  | 30-25  | 30-18     | 30-40  |
| <b>Packer No.</b> |                 | —     | B6364R | B6387R  | 6515R  | B6635R  | 6665R  | L6665R   | 6697R  | L7065R | L7090R | B7104R | 8550R     | 8618R  |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 30-46  | 30-27   | 30-15  | 27-66   | 30-17  | 30-17    | 30-33  | 30-16  | 30-13  | 30-42  | 30-11     | 30-31  |
| <b>Packer No.</b> |                 | —     | 8947R  | 8956R   | 8985R  | 9005R   | 9020R  | 9033R    | 9055R  | 9103R  | 9122R  | 9136R  | 9203R     | 9209R  |
| <b>Outer Seal</b> | <b>Part No.</b> | —     | 30-30  | 30-46   | 30-39  | 30-37   | 30-27  | 30-33    | 30-45  | 30-46  | 30-17  | 30-38  | 30-32     | 30-30  |
| <b>Packer No.</b> |                 | 9215R | 9224R  | L9224R  | 9231R  | 9237R   | B9240R | 9243R    | 9250R  | 9298R  | B9299R | 9309R  | 9407M     | 9689R  |
| <b>Outer Seal</b> | <b>Part No.</b> | 30-32 | 30-39  | 30-39   | 30-40  | 30-41   | 30-12  | 30-41    | 30-43  | 30-42  | 30-19  | 30-6   | MS9021-32 | 30-36  |
| <b>Packer No.</b> |                 | 9855R | 9865R  | B10202R | 10368R | B11826R | 12695R | B12825R  | 15255R | 15805R | 16398R | 17423R | 21303R    | 26260R |
| <b>Outer Seal</b> | <b>Part No.</b> | 30-42 | 30-37  | 30-5    | 30-1   | 30-29   | 30-42  | 30-49    | 30-50  | 27-78  | 30-4   | 30-17  | 30-15     | 30-51  |

## Type R Replaceable Inner Seals for Control Packers

Listed in Order of Fish Size:

|                   |                 |         |         |         |         |         |         |         |         |         |         |
|-------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Fish Size</b>  |                 | 1 ½ in. | 2 in.   | 2 ½ in. | 2 ¾ in. | 2 ¾ in. | 2 ¾ in. | 2 ¾ in. | 2 ¾ in. | 2 ¾ in. | 3 in.   |
| <b>Inner Seal</b> | <b>Part No.</b> | A10803  | A10804  | A10805  | A10806  | A10807  | A10808  | A10809  | A10810  | A10811  | A10812  |
|                   | <b>Weight</b>   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ¼ lb    |
| <b>Fish Size</b>  |                 | 3 ½ in. | 3 ¾ in. | 3 ¾ in. | 3 ¾ in. | 3 ¾ in. | 3 ¾ in. | 3 ¾ in. | 4 in.   | 4 ½ in. | 4 ½ in. |
| <b>Inner Seal</b> | <b>Part No.</b> | A10813  | A10814  | A10815  | A10816  | A10817  | A10819  | A10820  | A10821  | A10822  | A10823  |
|                   | <b>Weight</b>   | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Fish Size</b>  |                 | 4 ¾ in. | 4 ½ in. | 4 ¾ in. | 4 ¾ in. | 4 ¾ in. | 5 in.   | 5 ½ in. | 5 ¼ in. | 5 ¾ in. | 5 ½ in. |
| <b>Inner Seal</b> | <b>Part No.</b> | A10824  | A10825  | A10826  | A10827  | A10828  | A10829  | A10830  | A10831  | A10832  | A10833  |
|                   | <b>Weight</b>   | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Fish Size</b>  |                 | 5 ¾ in. | 5 ¾ in. | 5 ¾ in. | 6 in.   | 6 ½ in. | 6 ½ in. | 6 ¾ in. | 6 ½ in. | 6 ¾ in. | 6 ¾ in. |
| <b>Inner Seal</b> | <b>Part No.</b> | A10834  | A10835  | A10836  | A10837  | A10838  | A10839  | A10840  | A10841  | A10842  | A10843  |
|                   | <b>Weight</b>   | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Fish Size</b>  |                 | 6 ¾ in. | 7 in.   | 7 ½ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 7 ¾ in. | 8 in.   |
| <b>Inner Seal</b> | <b>Part No.</b> | A10844  | A10845  | A10846  | A10847  | A10848  | A10849  | A10850  | A10851  | A10852  | A10853  |
|                   | <b>Weight</b>   | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Fish Size</b>  |                 | 8 ½ in. | 8 ¾ in. | 8 ¾ in. | 8 ¾ in. | 8 ¾ in. | 8 ¾ in. | 8 ¾ in. | 9 in.   | 9 ½ in. | 9 ½ in. |
| <b>Inner Seal</b> | <b>Part No.</b> | A10854  | A10855  | A10856  | A10857  | A10858  | A10859  | A10860  | A10861  | A10862  | A10863  |
|                   | <b>Weight</b>   | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |

## Inner Seals to Pass Upset and Pack-off Pipe

|                           |                 |         |           |           |         |         |         |         |         |         |         |         |         |
|---------------------------|-----------------|---------|-----------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Pack-off Pipe Size</b> |                 | 1 ¼ in. | 1 ½ in.   | 2 ¼ in.   | 2 ¾ in. | 2 ¾ in. | 2 ¾ in. | 2 ¾ in. | 3 ½ in. | 3 ½ in. | 3 ½ in. | 4 ½ in. | 4 ½ in. |
| <b>Pass Upset Size</b>    |                 | 1 ¾ in. | 1.900 in. | 2.330 in. | 2 ½ in. | 2 ½ in. | 2 ½ in. | 2 ½ in. | 3 ¼ in. | 3 ¼ in. | 3 ¼ in. | 5 in.   | 5 ½ in. |
| <b>Inner Seal</b>         | <b>Part No.</b> | A13366  | A13317    | A13285    | A11690  | A11690  | A11691  | A11692  | A11693  | A11693  | A11694  | A11695  | A11696  |

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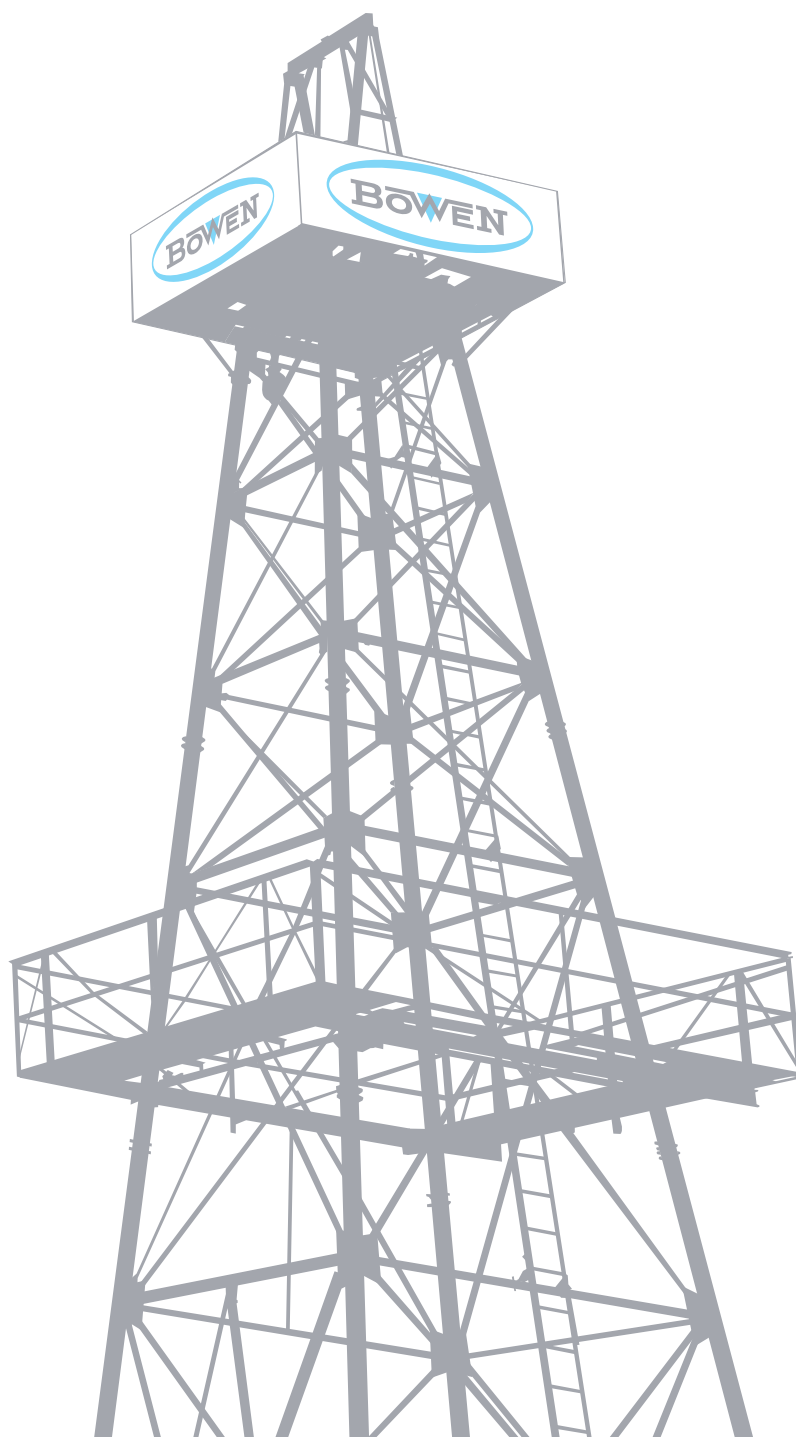
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# Bowen Wide Catch Overshot

Instruction Manual 1600







# Bowen Wide Catch Overshot

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Wide Catch Overshot

## 1. General Description

The Wide Catch overshot offers an extended range that's up to four times greater than any other overshot on the market. It is the most effective tool available to externally engage, pack-off, and pull a fish that has been significantly worn. This rugged tool has the ability to interchange the bottom guide with the full range of existing components used with the standard *Bowen™* Series 150 overshot.

In service, the Wide Catch overshot takes a positive grip over a large area of fish and is capable of withstanding heavy pulling, torsional, and jarring strains without causing damage to the tools or the fish. The Wide Catch overshot will allow you to reduce your grapple inventory, decrease your number of trips, and increase your success in fishing, reducing your overall intervention costs.

In addition to the large catch range, the Wide Catch overshot has the ability to seal across very large extrusion gaps at either standard or high pressure and provide full circulation through the fish, should it be required.

Coarse threads at the connection between the top sub and bowl allow for quick assembly while maximizing the torsional and tensile strength.

A seal is created between the connections of the top sub, extension sub, and bowl, which prevents the connection from washing out should the overshot be required to be flowed through for a long period of time. In order to lock the top sub/extension sub to the bowl from backing off during operation, set screws have become standard and will gall the threads should the connection break free.

## 2. Use

The Wide Catch overshot engages, packs off and retrieves twisted-off, stuck or lost tubing, drill pipe, casing coupling, tool joint, casing or other similar fish.

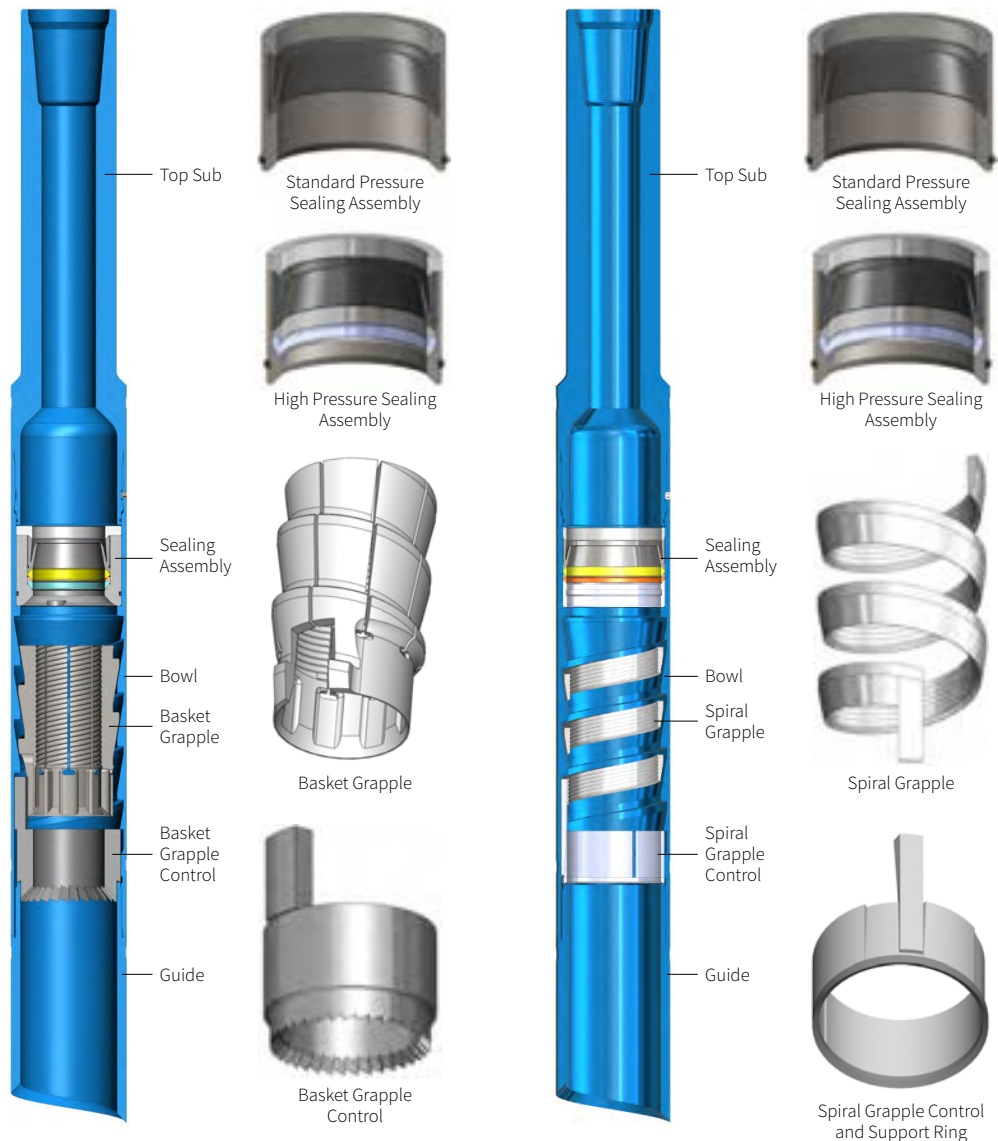
## 3. Construction

The standard Wide Catch overshot is composed of three external parts: the top sub, bowl, and guide. You may dress the basic overshot with either of two sets of internal grapple parts, depending

on whether the fish to be caught is near maximum catch size for the particular overshot. You may also assemble the overshot with optional extension subs.

If the fish diameter is near the maximum catch of the overshot, use a spiral grapple, spiral grapple control, and support ring. If the fish diameter is considerably below the maximum catch size (usually ½ in. or more), use a basket grapple and mill control or optional plain control.

The overshot may also be dressed with either of two sets of sealing assemblies depending on the amount of pressure the packers may be subjected to when attempting to circulate fluid. If the operating pressure is low, use the standard pressure assembly consisting of the housing, packer, retainer and O-ring. If you desire a higher operating pressure, use the high pressure assembly consisting of a non-extrusion ring, solid ring, C-ring, housing, packer, retainer, and O-ring.



# Bowen Wide Catch Overshot

## 4. Gripping and Releasing Mechanism

The bowl of the overshot has a helically tapered spiral section in its ID. The grapple is threaded into this section of the bowl, as it has a helically tapered spiral on its OD that directly matches the ID of the bowl. When an upward pull is exerted against a fish, an expansion strain spreads evenly over a long section of the fish. The design permits a far stronger tool with a smaller outside diameter than is possible with an overshot that employs a single tapered section which supports slips.

The spiral grapple is formed as a left-hand helix with a tapered exterior to conform with the helically tapered section in the ID of the bowl. A basket grapple is an expandible cylinder with a tapered exterior to conform to the helically tapered section in the bowl. Both have wickered interiors for engagement with the fish.

Grapple controls are used as a special key to allow the grapple to move up and down during operation while simultaneously transmitting full torque from the grapple to the bowl.

There are two types of grapple controls: spiral grapple controls are used with spiral grapples; mill controls are used with basket grapples. (Optional plain basket grapple controls are available upon request.)

Spiral grapple controls are plain, while basket mill controls have hardened teeth on the bottom to allow a light milling operation in order to dress the top of the fish.

During the engagement operation, as the overshot rotates to the right and lowers, the grapple will expand

when the fish is engaged, allowing the fish to enter the grapple. With rotation ceased and upward pull exerted, the grapple contracts by the tapers in the bowl and the wickers grip the fish firmly.

During the releasing operation, a sharp downward bump places the larger portion of the bowl tapers opposite the grapple smaller tapered portion, breaking the hold. Thereafter, when the overshot rotates to the right and slowly elevates, the wickers will unscrew the grapple off the fish, effectively releasing.

The fact that that the Wide Catch overshot requires right-hand rotation only during both the engaging and releasing operations is extremely important. This feature eliminates the dangers that are present when it is necessary to rotate the string to the left.

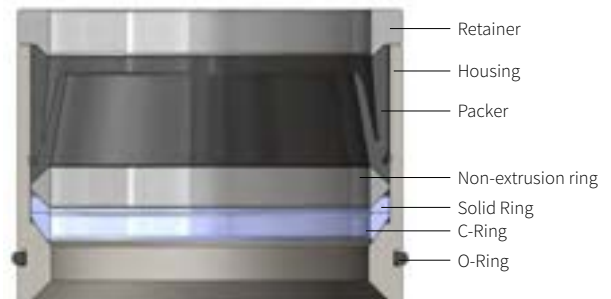
## 5. Pack-off Mechanism

The type of pack-off used depends on the amount of pressure on the fish when attempting to pump fluid. If you would like the overshot to seal off with only a minimal pressure applied, use a standard pressure assembly. If your fishing operation requires a high sealing pressure, use the high pressure assembly.

The packer used in the Wide Catch overshot, while similar to a standard Series 150 Type A packer, seals across a large extrusion gap. It includes an outer lip that seals against the ID of the bowl and an inner lip that seals around the OD of the fish. Because each seal packs off a specific size of fish, the cross section of the seal does not change as the nominal size diameter for a specific overshot decreases. As the fish size decreases, the seal housing reduces accordingly.



Standard Pressure Sealing Assembly



High Pressure Sealing Assembly

# Bowen Wide Catch Overshot

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## 6. Special Features

You may be concerned that fishing in high profile areas could cause the connection between the top sub and bowl to loosen during engaging and releasing, causing the tool to back off. The Series 150 overshot addresses this concern with a set of lock rings that requires a substantial amount of torque before the connection can be broken. While this is still an option for the Wide Catch overshot, many in the field have requested a more permanent solution. Therefore, the top sub to bowl connection has three equally spaced set screws that are inserted through the threads. In the event that the torque is great enough to break the connection, the threads will be galled by the set screws, preventing the connection from backing off. This feature is included on all bowls, top subs, and extension subs.

Due to the inclusion of the set screw ports on the box connections, with added circulation, the pin connection has been fitted to include an O-ring. This will protect the ports if you do not require the use of set screws and will protect the ports from potential washout. These features are highlighted in the figure.

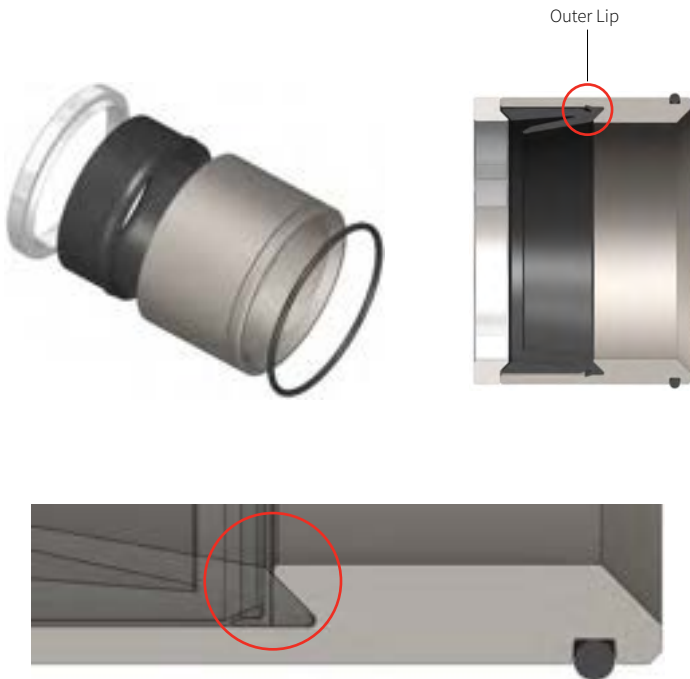


# Bowen Wide Catch Overshot

## 7. Assembly

### Seal Assembly – Standard Pressure

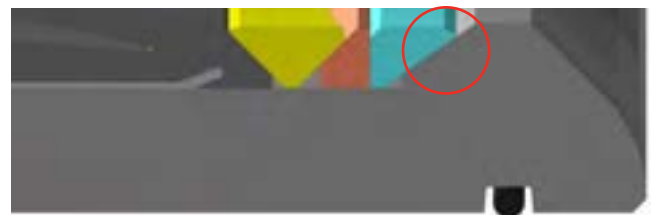
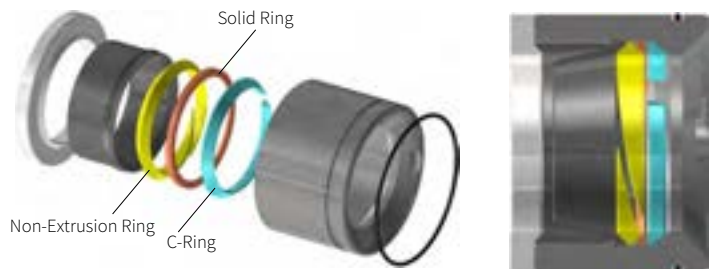
- For all sizes other than maximum spiral size (e.g., 5¾ in. tool with max spiral grapple size 4¾ in.), a housing is used for the seal assembly. The housings for these sizes are restricted by an insert that holds the seal in place. The seal bore for these sizes are the ID of the bowl.
- Each seal assembly contains an O-ring which is installed into the groove on the OD of the housing.
- **The standard pressure housing has an integral lip that the seal will rest in, seen below.**
- The seal is installed with the small outer lip first into the housing opposite the O-ring groove side. The profile of the seal fits under the machined groove in the housing, which retains the seal.
- The retainer fits against the back of the seal and the face of the housing.
- Both the retainer and the O-ring are interchangeable between the standard and high pressure sealing assemblies.



Standard Pressure Housing Includes Integral Lip For Seal

### Seal Assembly – High Pressure

- For all sizes other than maximum spiral size (e.g., 5¾ in. tool with max spiral grapple size 4¾ in.), a housing is used for the seal assembly. The housings for these sizes are restricted by an insert that holds the seal in place. The seal bore for these sizes are the ID of the bowl.
- Each seal assembly contains an O-ring which is installed into the groove on the OD of the housing
- **The high pressure housing does NOT have an integral lip that the seal will rest in, seen below. The seal is held in place by the non-extrusion ring.**
- Install the cut C-ring first so that the angle mates with the machined angle inside of the housing.
- Install the solid ring so the larger flat face mates with the face of the C-ring.
- Install the non-extrusion ring, which will mate to the back of the solid ring.
- Install the seal with the small outer lip first into the housing, opposite the O-ring groove side on the housing, with the profile fitting under the angled face of the non-extrusion ring.
- The retainer then fits against the back of the seal and the face of the housing.
- Both the retainer and the O-ring are interchangeable between the standard and high pressure sealing assemblies.



High Pressure Assembly Housing DOES NOT Include the Lip For Seal

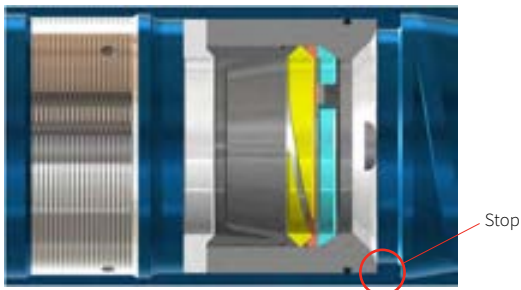
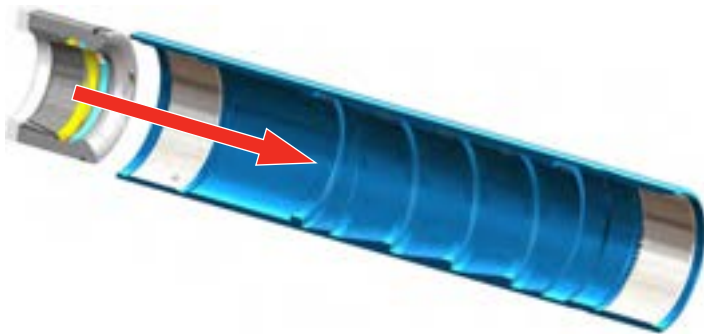
# Bowen Wide Catch Overshot

## Installation of the Seal Assembly Into Bowl

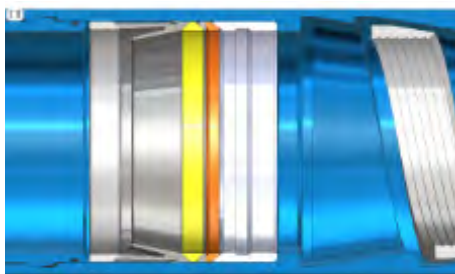
- Before inserting the sealing assembly, be sure to secure the bowl in a vice as a certain amount of force may be required to install the sealing assembly.

**NOTE:** Because of the thin wall section of the bowl, it is best to use the vice over the helical section of the bowl. Placing the vice over the threads or seal area can warp the bowl under excessive force.

- Upon applying a thin layer of grease to the O-ring, the housing slides into the top of the bowl, O-ring side first.
- Press the housing in using a rubber mallet and brass rod or similar tool until it comes into contact with the stop inside the bowl. Take care not to damage any of the internal components of the housing.



Sealing Assembly Shouldered Against Stop in Bowl



Sealing Assembly Shown for Max Catch Application

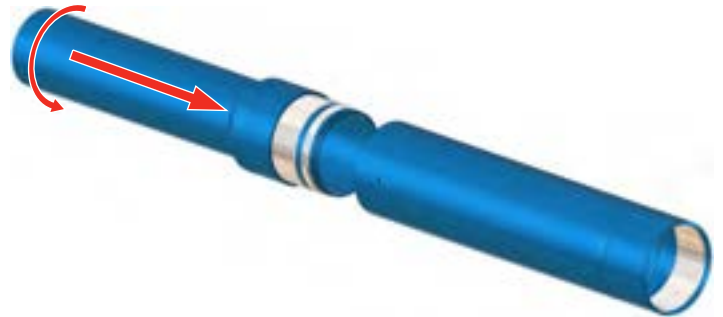
## Installation of the O-ring on Top Sub/Extension Sub Pin Connection

- The O-ring for the top sub is installed into the groove on the end of the pin connection. A light coating of oil may be used for ease of installation. This O-ring is also used on the pin connection of any extension subs where high circulation is a possibility.



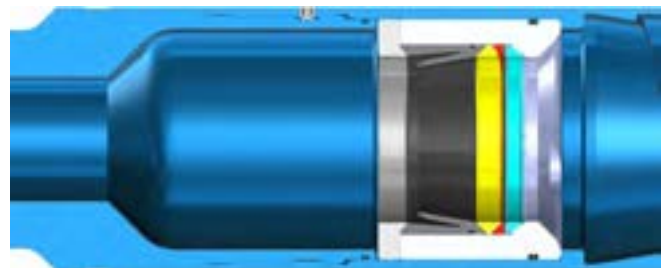
## Top Sub/Bowl

- Install the top sub after the sealing assembly. Use right-hand rotation unless otherwise noted.
- Take care to make sure that the retainer ring does not fall over once installed, as this can prevent the top sub from being made up. If this is a concern, place a small amount of grease between the retainer and housing. This will temporarily hold the retainer to the housing and prevent it from falling out of place.
- Once the top sub shoulders up to the bowl, apply the appropriate makeup torque. This value can be found on page 21.



Right-Hand Rotation Required for Top Sub

- Once installed, the top sub will shoulder against the bowl and retain all of the sealing components in place.

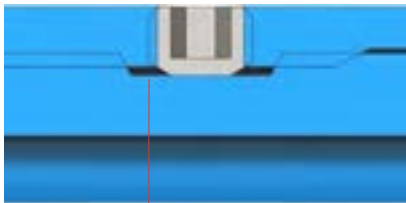
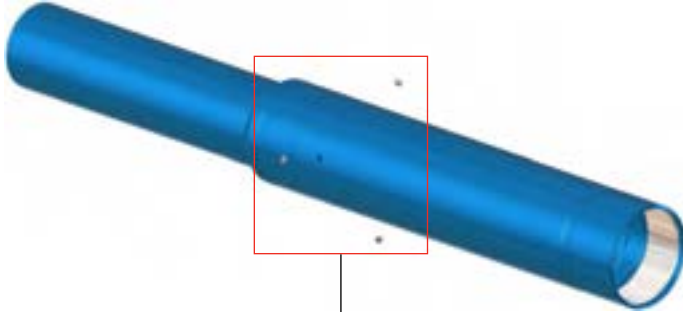


Section View Seal Assembly Retained Between Bowl and Top Sub

# Bowen Wide Catch Overshot

## Installation of Set Screws

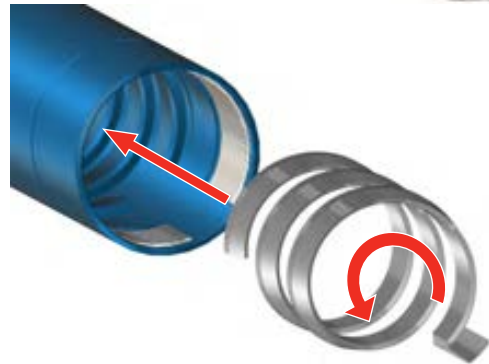
- Install three set screws through the threaded ports on the bowl/extension sub box connection. These screws are to be installed until they bottom out against the groove that is machined in the top sub.



Groove on Top Sub/Extension Sub Pin Thread

## Grapple Installation

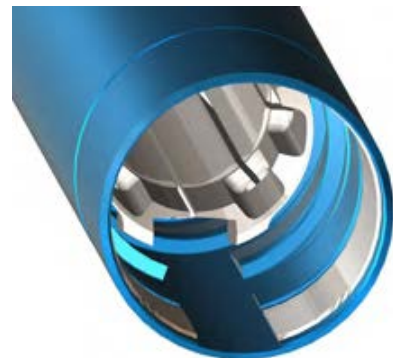
- Before grapple installation, move the assembly so that the jaws of the vice are positioned on the fishing neck of the top sub. Putting the bowl in the vice may warp it slightly if you tighten the vice too much.
- Install the grapple from the bottom end of the bowl.
- Unless otherwise noted, install both grapples by rotating them to the left.



Each standard grapple is assembled with left-hand rotation from the bottom of the bowl

## Basket Grapple

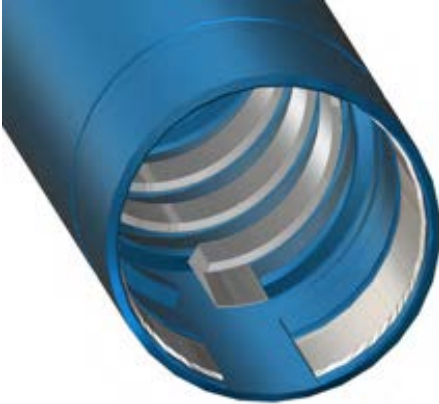
- Rotate the grapple in the bowl until the slot in the grapple and bowl line up together.
- The grapple is in the right location when the full helix section on the grapple has shouldered against the helix in the bowl where the machined slot has ended.



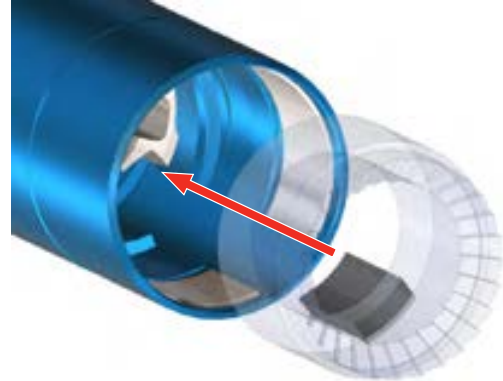
# Bowen Wide Catch Overshot

## Spiral Grapple

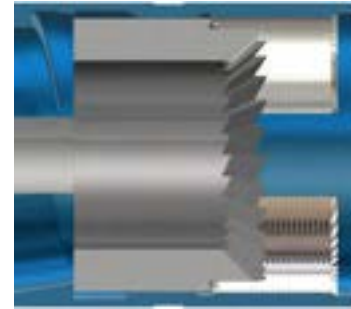
- The grapple rotates in the bowl until the tang on the grapple is inserted into the slot in the bowl.
- The grapple is in the correct position when the end of the grapple has shouldered against the portion of the bowl without the machined slot.
- Assembly of the grapple is complete when the tang is pushed to the right, as seen in the picture below.



- The finger will fit into the grapple slot, but there should not be interference between the face of the control and the bottom of the grapple.



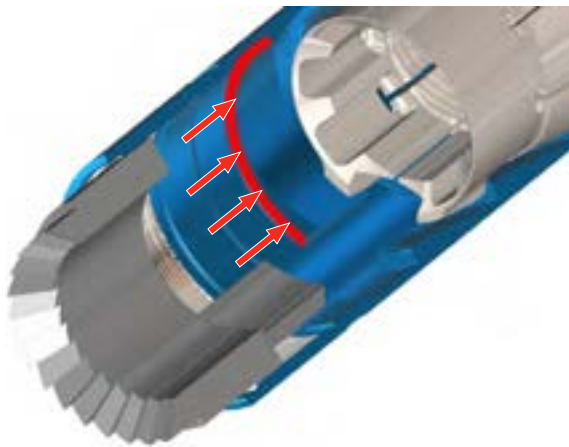
- When the control has been installed correctly, the major OD of the control will not cover the threads. However, the teeth will cover a small portion of the threads.



## Control Installation

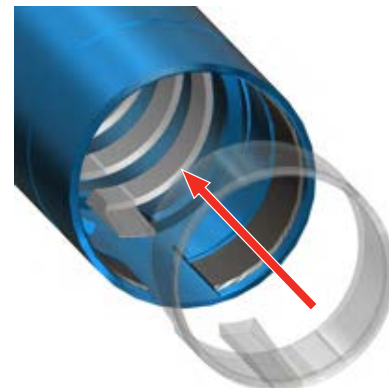
### Basket Grapple Control

- The control is oriented so that the protruding finger is inserted first.
- The control finger will follow the bowl slot until it bottoms out against the portion of the bowl where the helix starts. This can be seen on the highlighted portion of the bowl.



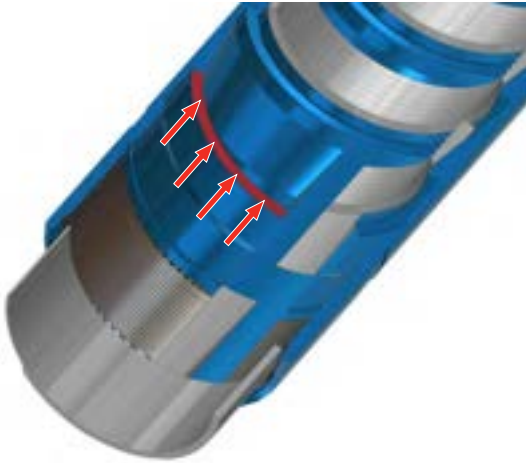
### Spiral Grapple Control and Support Ring

- The spiral grapple control is oriented so that the protruding finger is inserted first.
- The finger will follow the bowl slot until it bottoms out against the portion of the bowl where the helix starts.
- As seen in the picture below, the finger on the control will lay to the left of the grapple tang.
- Take care to make sure the tang of the grapple is held in place between the bowl and the control.





# Bowen Wide Catch Overshot

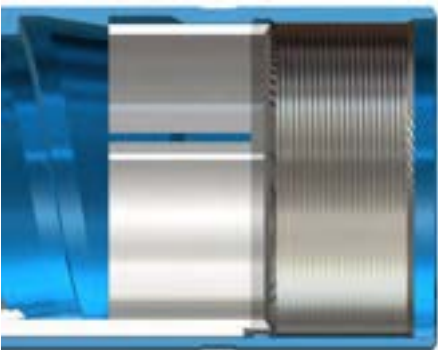
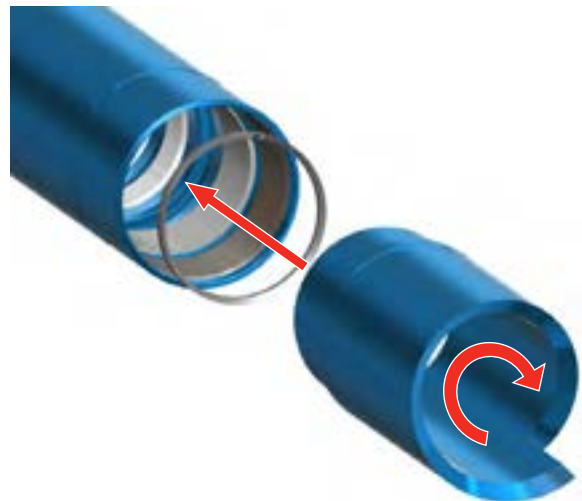


## Guide Installation

- The guide is installed once all internal components have been installed.
- Unless otherwise noted, install the guide with right-hand rotation.
- Once the guide shoulders up to the bowl, apply the appropriate makeup torque. This value can be found on page 21.

**NOTE:** When assembling with a spiral grapple control and support ring, because the ring may shift when the guide is being installed, a small amount of grease may be placed between the support ring and the control. This will stick the support ring to the control and prevent it from falling out of place.

- The flat face of the support ring will shoulder against the bottom flat face of the control.
- A small amount of grease may be placed between the support ring and the control to temporarily hold the support ring to the control and prevent it from falling out of place.
- When the control and support ring have been installed correctly, the major OD of the ring will not cover the threads.



# Bowen Wide Catch Overshot

- As shown in the pictures below, the guide will fit against the control and hold it in place against the bowl.



## 8. Operation

### Preliminary Checklist

- First, determine that the overshot is properly assembled, is dressed with the proper size grapple, and that all parts are in good working condition.
- If the fish is smaller than the maximum OD that the overshot was designed to engage, install undersize parts.
- If the hole size is so much greater than the fish size that it is possible for the overshot to pass alongside the fish, install an appropriate wallhook guide or an oversize guide in place of the standard guide. (Note: wallhook guides are typically used only with Lebus knuckle joints.)
- If the top of the fish is a heavily burred tool joint, replace the standard guide with the proper milling guide, type A or C.
- If the fish has an unmanageable upper end, install an extension between the top sub and the bowl.
- Using the top sub, connect the overshot to the fishing string and run it in the hole.

### To Engage and Pull the Fish

As the top of the fish is reached, slowly rotate the fishing string to the right and gradually lower the overshot over the fish; combined rotation and lowering is important. Rotating the overshot will allow the grapple to easily centralize the fish and minimize the load required for engagement.

Once the overshot is over the fish, allow the right-hand rotation to slack out of the fishing string and then pull on the fish by elevating the fishing string.

If the fish does not come out, turn on the circulating pumps and maintain an upward strain while circulation is forced through the fish.

**NOTE: If jarring operations are required, start with minimal jarring force and gradually increase as required to free the fish. Take care to avoid further damage or tensile failure of the fish itself.**

### To Release From the Fish

Bump down, then simultaneously rotate to the right and slowly elevate the fishing string until the overshot is clear of the fish; combined rotating and elevating is important.

To release from a recovered fish, follow the same procedure while holding the fish below the overshot.

**NOTE: With the conventional Bowen™ Series 150 overshot, when you were unable to release through the standard method of bumping down and rotating to the right, oilfield convention was to disassemble the guide, remove the control, and remove the grapple with the fish still engaged. This procedure is not always possible with the Wide Catch overshot, as the increased catch range does not allow for easy passage of the grapple past the guide threads while still engaged with a fish.**

### Precautions

- Rotation of the fishing string to the left while the fish is engaged in the overshot is not recommended and should be avoided. Doing so may loosen the connections at the top sub or the bowl.
- Should it be necessary to rotate to the left, maintain an upward

# Bowen Wide Catch Overshot

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strain on the overshot at all times. Without an upward strain, the overshot may lose its ability to bump down to release the fish.

- Always bump the full weight of the fishing string before starting releasing operations.
- Always shut off the circulation pumps before lowering the overshot over the fish.
- Once the fish enters the seal assembly and adequate pressure has been applied, the overshot may be released as noted previously. However, take care not to re-engage the fish once it has disengaged; a second engagement may damage the seal and/or the non-extrusion ring assembly. If a second engagement is necessary, bring the tool to the surface and inspect it for any possible issues before attempting a second run.

## Function of the Overshot when Engaging the Fish

After the overshot has reached the top of the fish, combined rotation and lowering results in the following:

1. The guide will direct the fish into the overshot.
2. The control will centralize the fish to align with the grapple.
3. The grapple will expand and the fish will pass through it.
4. The fish will pass through the sealing assembly and will halt when it contacts the shoulder in the top sub pin end.
  - a. In the case where an external upset section is engaged by a basket grapple with a long catch

stop, the fish will halt by the solid steel stop in the upper end of the basket grapple.

- b. Should a separate stop be required, make a stop by using a piece of bar stock that fits into the seal housing bore. This may also be done by using a smaller sized seal housing than the grapple size would require.

5. The fish is now properly located in the overshot and thereafter when an upwards pull is exerted, the grapple contracts by the tapers in the bowl and the hold will be secure.

6. Likewise, once the fish is in this position, the circulation will seal the seal assembly around the fish and prevent fluid passage around the outside of the fish. Thus, by increasing pressure with the pumps, the fluid can be forced down through the fish.

## Function of the Overshot when Releasing

The sharp downward bump places the largest portion of the bowl tapers opposite the grapple and breaks the hold. Right-hand rotation expands the grapple, and by maintaining right-hand rotation, you may withdraw the overshot by slowly lifting upward while continually rotating to the right.

## Function of the Spiral Grapple

The mechanical conditions which cause the spiral grapple to expand and contract are as follows:

1. The spiral grapple is a left-hand helix.
2. The lower end of the spiral

grapple is anchored in the overshot bowl.

3. The ID of the spiral grapple is smaller than the OD of the fish.

As the overshot rotates to the right and lowers over the fish, the drag of the fish against the spiral grapple causes it to unwind and expand sufficiently to allow the fish to enter.

As the overshot rotates to the right and withdraws from the fish, the drag of the fish against the spiral grapple causes it to unwind and expand sufficiently to allow the overshot to be withdrawn. The wickers that are machined with a left-hand lead allow the grapple to effectively unscrew itself from the fish.

## Function of the Basket Grapple

The mechanical conditions which cause the basket grapple to expand and contract are as follows:

1. The basket grapple is machined with a left-hand helix.
2. The lower end of the basket grapple is anchored in the overshot bowl.
3. The inside diameter of the basket grapple is smaller than the outside diameter of the fish.
4. The bottom end of the basket grapple acts as a C-ring.

As the overshot lowers over the fish, the fish pushes against the bottom C-ring of the basket grapple and causes it to expand sufficiently to allow the fish to enter.

As the overshot rotates to the right and withdraws from the fish, the wickers that are machined with a left-hand lead allow the basket grapple to effectively unscrew itself from the fish.

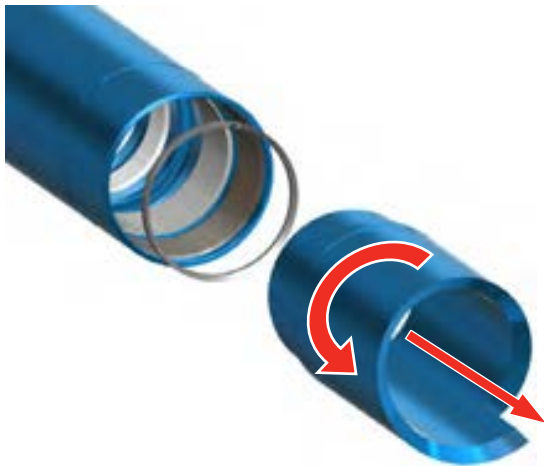
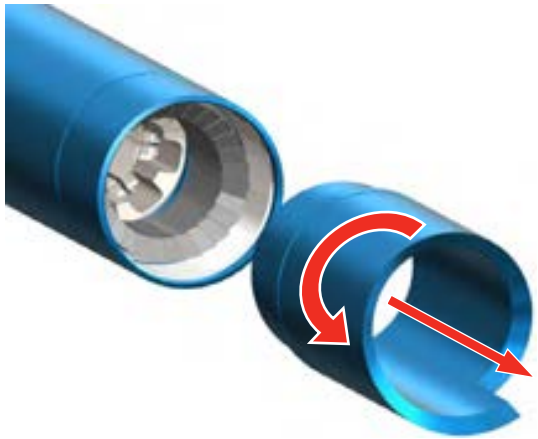
# Bowen Wide Catch Overshot

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## 9. Disassembly

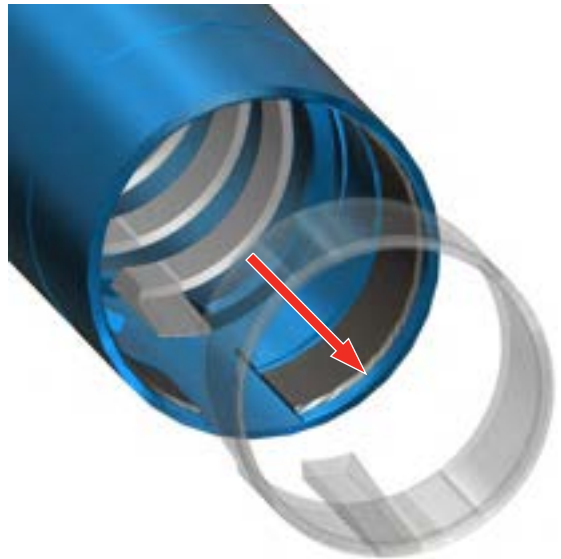
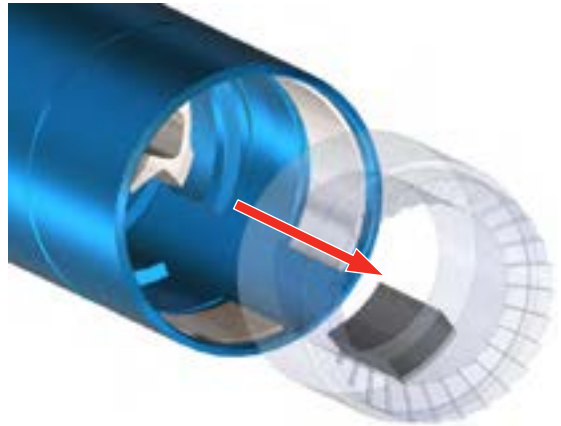
### Guide Disassembly

- Clamp the vice onto the bowl OD across the threads at the top sub connection.
- Remove the guide by applying left-hand rotation. If you applied torque to install the guide, a pipe wrench may be required to loosen the guide.



### Control Removal

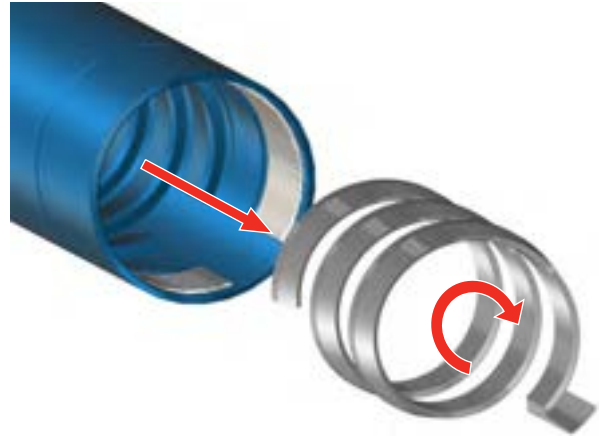
- Remove the control from the bowl after the guide has been removed.



# Bowen Wide Catch Overshot

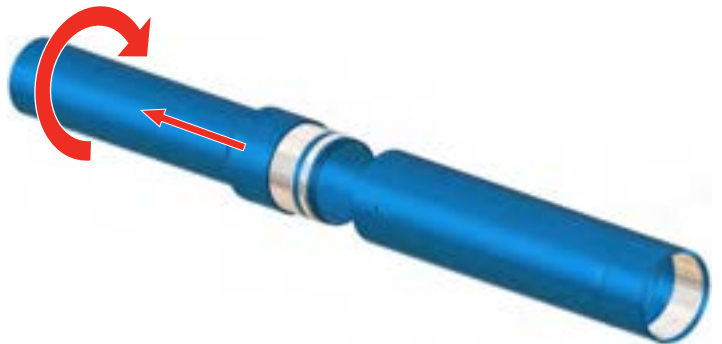
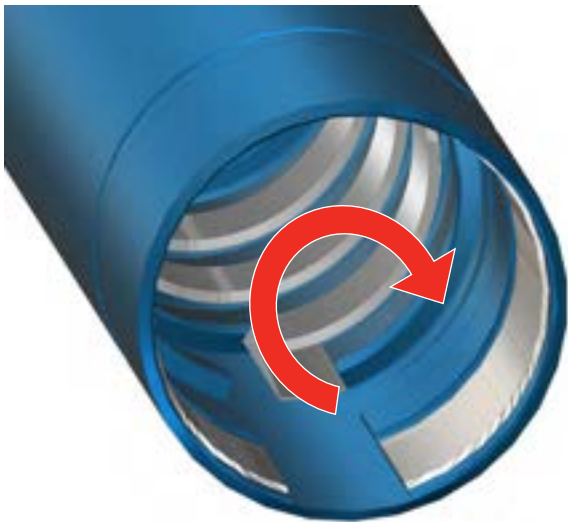
## Grapple Removal

- Remove the grapple from the bowl using right-hand rotation.



## Top Sub Removal

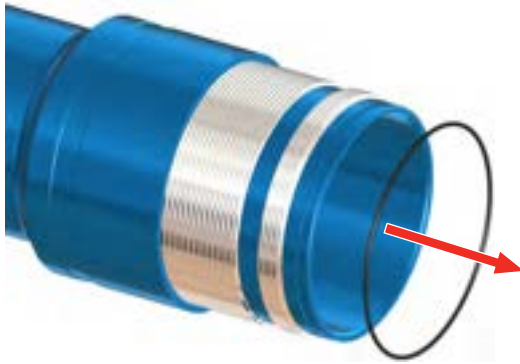
- Remove the set screws before removing the top sub. Failure to do so can result in galled threads and can prevent the top sub from being removed.
- As the bowl and top sub have been torqued together, take care when removing the top sub. Unless otherwise noted, the top sub is removed with left-hand rotation.



# Bowen Wide Catch Overshot

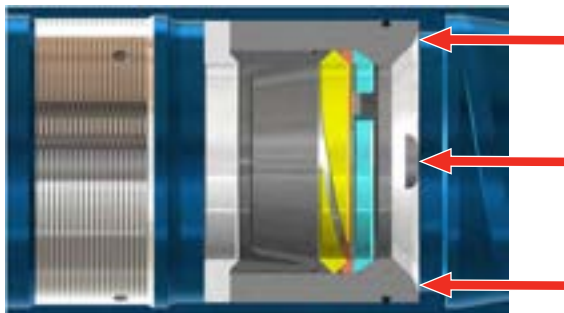
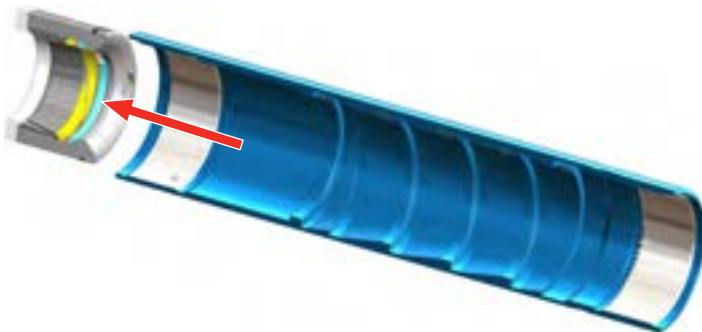
## Top Sub/Extension Sub O-ring Removal

- Remove the O-ring of the pin thread of the top sub/extension sub using a pick or other tool to pry it out of the groove.



## Seal Assembly Removal

- The O-ring groove on the OD of the sealing assembly housing increases the standard squeeze. As a result, you may have to push the housing out from the bottom of the bowl. Small groove shoulders on the housing will aid you in pushing the housing out from the bowl. A rod or similar tool can be used on these faces to push the housing out, if necessary.



## 10. Parts

### Spiral Parts

Spiral grapples can catch sizes that range from the maximum catch spiral grapple down to maximum catch basket grapple, as listed in the specifications tables.

These spiral grapples and seal assemblies should be changed for each different size fish. They will effectively catch and pack off worn fish that are significantly under the nominal size. The over-range of each grapple is approximately  $\frac{1}{32}$  in.

### Basket Parts

Basket parts can catch sizes that range from the maximum catch basket grapple, as listed in the specification table, down to any smaller size.

Basket grapples, sealing assemblies, and mill controls should be changed for each size fish to be caught. An optional plain control can be used in place of a mill control if it is deemed unnecessary to dress the top of the fish.

Basket grapples and sealing assemblies effectively catch and pack off worn fish that are significantly under the nominal size. The over-range of each grapple is approximately  $\frac{1}{32}$  in.

### Sealing Assemblies

All sealing is done above the grapple with the use of a sealing assembly. The assemblies are specific to each catch size but are independent of whether the grapple is a spiral or basket.

Note: once an assembly has been run downhole, it is recommended that the packer (non-extrusion ring, solid ring, C-ring, and O-ring when applicable) be replaced.

Unless there is noticeable damage, the housing and retainer may be reused multiple times.

### Extension Subs

If a twist-off has left the upper end of a fish difficult to engage, install an extension sub between the top sub and the bowl of the overshot. This will permit lowering of the overshot over the fish far enough to ensure proper engagement and optimize pack off during the fishing operation.

### Guides/ Mill Extensions/ Miscellaneous Bottom Accessories

If the hole size is much greater than the fish size, making it possible for the overshot to pass alongside the fish, install an oversized guide or a wallhook guide in place of the standard guide to ensure alignment of the fish with the overshot.

(Note: wallhook guides are typically used only with knuckle joints.)

The bottom connection is a modified version of the standard Series 150 overshot, such that any existing guides, extensions, and shoes for the same size overshot are interchangeable.

# Bowen Wide Catch Overshot

## 11. Specifications and Replacement Parts

### Specifications

| Maximum Catch Size (Spiral) |          | 3 2½ in.       | 4 ¾ in.        | 6 ½ in.        | 7 in.          | 8 in.          | 10 ½ in.        |
|-----------------------------|----------|----------------|----------------|----------------|----------------|----------------|-----------------|
| Maximum Catch Size (Basket) |          | 3 ⅙ in.        | 4 ⅞ in.        | 5 ⅞ in.        | 6 ¼ in.        | 7 ¼ in.        | 9 in.           |
| Overshot OD                 |          | 4 1⅙ in.       | 5 ¾ in.        | 7 ⅞ in.        | 8 ⅙ in.        | 9 ⅙ in.        | 11 ¾ in.        |
| Standard Box Connection     |          | 2 ¾ in. IF Box | 3 ½ in. IF Box | 3 ½ in. IF Box | 4 ½ in. IF Box | 4 ½ in. IF Box | 6 ¾ in. REG Box |
| Complete Assembly           | Part No. | 506586         | 506366         | 507460         | 506458         | 506585         | 507331          |

### Replacement Parts

|                                  |          |             |             |             |             |             |             |
|----------------------------------|----------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Top Sub</b>                   | Part No. | 506493      | 506148      | 507405      | 506249      | 506292      | 507192      |
|                                  | Weight   | 45 lbs      | 72 lbs      | 79 lbs      | 152 lbs     | 158 lbs     | 283 lbs     |
| <b>Bowl</b>                      | Part No. | 506491      | 506149      | 507409      | 506250      | 506296      | 507228      |
|                                  | Weight   | 25 lbs      | 29 lbs      | 40 lbs      | 60 lbs      | 66 lbs      | 141 lbs     |
| <b>Spiral Grapple</b>            | Part No. | 506494      | 505565      | 507457      | 506251      | 506297      | 507195      |
|                                  | Weight   | 5 lbs       | 6 lbs       | 9 lbs       | 8 lbs       | 23 lbs      | 23 lbs      |
| <b>Spiral Grapple Control</b>    | Part No. | 506504      | 505567      | 507443      | 506253      | 506298      | 507230      |
|                                  | Weight   | 1 lbs       | 2 lbs       | 3 lbs       | 4 lbs       | 5 lbs       | 10 lbs      |
| <b>Support Ring</b>              | Part No. | 506661      | 506662      | 507456      | 506659      | 506660      | 507456      |
|                                  | Weight   | 0.1 lbs     | 0.1 lbs     | 0.5 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     |
| <b>SP Seal Housing</b>           | Part No. | See page 18 | 505578      | 507411      | See page 19 | See page 20 | -           |
|                                  | Weight   | 7 lbs       | 14 lbs      | 15 lbs      | 22 lbs      | 25 lbs      | -           |
| <b>Retainer</b>                  | Part No. | 506478      | 505576      | 507429      | 505981      | 506348      | 506887      |
|                                  | Weight   | 1 lbs       | 1 lbs       | 0.44 lbs    | 2 lbs       | 5 lbs       | 4 lbs       |
| <b>Packer</b>                    | Part No. | See page 18 | See page 18 | 507464      | See page 19 | See page 20 | See page 20 |
|                                  | Weight   | 0.25 lbs    | 0.25 lbs    | 0.28 lbs    | 0.25 lbs    | 0.25 lbs    | 0.5 lbs     |
| <b>O-Ring (Housing)</b>          | Part No. | See page 18 | See page 18 | See page 19 | See page 19 | See page 20 | See page 20 |
|                                  | Weight   | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     |
| <b>O-Ring (Top Sub/ Ext Sub)</b> | Part No. | 568154      | 568158      | 568166      | 568168      | 568172      | 568275      |
|                                  | Weight   | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     |
| <b>Set Screws (Qty. 3)</b>       | Part No. | 506187/005  | 506187/005  | 507415/005  | 506187/005  | 506187/005  | 506187/005  |
|                                  | Weight   | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     | 0.1 lbs     |
| <b>Standard Guide</b>            | Part No. | 6667        | 6121        | 507424      | 9226        | A5272       | 5336        |
|                                  | Weight   | 13 lbs      | 23 lbs      | 38 lbs      | 40 lbs      | 45 lbs      | 88 lbs      |

### Basket Grapple Parts

|                            |          |        |        |   |        |        |        |
|----------------------------|----------|--------|--------|---|--------|--------|--------|
| <b>Basket Grapple</b>      | Part No. | 506494 | 505565 | - | 506251 | 506297 | 507195 |
|                            | Weight   | 15 lbs | 24 lbs | - | 35 lbs | 35 lbs | 57 lbs |
| <b>Basket Mill Control</b> | Part No. | 506502 | 505568 | - | 506252 | 506299 | 507292 |
|                            | Weight   | 5 lbs  | 5 lbs  | - | 20 lbs | 20 lbs | 29 lbs |

### High Pressure Sealing Assembly

|                           |          |             |             |   |             |             |          |
|---------------------------|----------|-------------|-------------|---|-------------|-------------|----------|
| <b>HP Seal Housing</b>    | Part No. | See page 18 | 505903      | - | See page 19 | See page 20 | 506883   |
|                           | Weight   | 5 lbs       | 14 lbs      | - | 22 lbs      | 25 lbs      | 4 lbs    |
| <b>Retainer</b>           | Part No. | 506478      | 505576      | - | 505981      | 506348      | 506887   |
|                           | Weight   | 1 lbs       | 1 lbs       | - | 2 lbs       | 3 lbs       | 4 lbs    |
| <b>Seals</b>              | Part No. | See page 18 | See page 18 | - | See page 19 | See page 20 | 506888   |
|                           | Weight   | 0.25 lbs    | 0.25 lbs    | - | 0.25 lbs    | 0.25 lbs    | 0.5 lbs  |
| <b>Non-Extrusion Ring</b> | Part No. | See page 18 | 505904      | - | See page 19 | See page 20 | 506886   |
|                           | Weight   | 0.25 lbs    | 0.25 lbs    | - | 0.25 lbs    | 0.25 lbs    | 1.5 lbs  |
| <b>Solid Ring</b>         | Part No. | See page 18 | 505905      | - | See page 19 | See page 20 | 506885   |
|                           | Weight   | 0.1 lbs     | 0.1 lbs     | - | 0.1 lbs     | 0.1 lbs     | 0.86 lbs |
| <b>C-Ring</b>             | Part No. | See page 18 | 505906      | - | See page 19 | See page 20 | 506884   |
|                           | Weight   | 0.1 lbs     | 0.1 lbs     | - | 0.1 lbs     | 0.1 lbs     | 1 lbs    |

# Bowen Wide Catch Overshot

## 4 1/16 in. Bowen™ WCOS Seal Kits - Assembly # 506586

|                         |                  |                  |                  |                   |                  |                   |                  |                    |
|-------------------------|------------------|------------------|------------------|-------------------|------------------|-------------------|------------------|--------------------|
| <b>Grapple Size</b>     | <b>2 3/8 in.</b> | <b>2 3/4 in.</b> | <b>2 7/8 in.</b> | <b>3 1/16 in.</b> | <b>3 1/8 in.</b> | <b>3 3/16 in.</b> | <b>3 1/2 in.</b> | <b>3 23/32 in.</b> |
| <b>Catch Range</b>      | 2.406 in.        | 2.650 in.        | 2.906 in.        | 3.094 in.         | 3.156 in.        | 3.406 in.         | 3.531 in.        | 3.687 in.          |
| <b>(Reference Only)</b> | 2.156 in.        | 2.400 in.        | 2.656 in.        | 2.844 in.         | 2.906 in.        | 3.156 in.         | 3.281 in.        | 3.437 in.          |

### Standard Pressure

|                                       |            |            |            |            |            |            |            |            |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Complete Standard Pressure Kit</b> | 507273/011 | 507273/010 | 507273/009 | 507273/008 | 507273/007 | 507273/006 | 507273/012 | 507273/005 |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|

### Standard Pressure Kit Components

|                           |            |            |            |            |            |            |            |            |
|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>SP Housing</b>         | 506481/011 | 506481/010 | 506481/009 | 506481/008 | 506481/007 | 506481/006 | 506482/005 | 506481/005 |
| <b>Retainer</b>           | 506478/012 | 506478/011 | 506478/010 | 506478/009 | 506478/008 | 506478/007 | 506478/006 | 506478/005 |
| <b>Packer</b>             | 506479/011 | 506479/010 | 506479/009 | 506479/008 | 506479/007 | 506479/006 | 506480/005 | 506479/005 |
| <b>O-Ring (Housing)**</b> | 568154/020 | 568154/020 | 568154/020 | 568154/020 | 568154/020 | 568154/020 | 568154/020 | N/A        |

### High Pressure

|                                   |            |            |            |            |            |            |            |            |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Complete High Pressure Kit</b> | 507269/011 | 507269/010 | 507269/009 | 507269/008 | 507269/007 | 507269/006 | 507269/012 | 507269/005 |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|

### High Pressure Kit Components

|                           |            |            |            |            |            |            |            |            |
|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>HP Housing</b>         | 506483/011 | 506483/010 | 506483/009 | 506483/008 | 506483/007 | 506483/006 | 506484/005 | 506483/005 |
| <b>Retainer</b>           | 506478/012 | 506478/011 | 506478/010 | 506478/009 | 506478/008 | 506478/007 | 506478/006 | 506478/005 |
| <b>Packer</b>             | 506479/011 | 506479/010 | 506479/009 | 506479/008 | 506479/007 | 506479/006 | 506480/005 | 506479/005 |
| <b>O-Ring (Housing)**</b> | 568154/020 | 568154/020 | 568154/020 | 568154/020 | 568154/020 | 568154/020 | 568154/020 | N/A        |
| <b>Solid Backup Ring</b>  | 506487/011 | 506487/010 | 506487/009 | 506487/008 | 506487/007 | 506487/006 | 506488/005 | 506487/005 |
| <b>Non-Extrusion Ring</b> | 506489/011 | 506489/010 | 506489/009 | 506489/008 | 506489/007 | 506489/006 | 506490/005 | 506489/005 |
| <b>C-Ring</b>             | 506485/011 | 506485/010 | 506485/009 | 506485/008 | 506485/007 | 506485/006 | 506486/005 | 506485/005 |

\*\*Note - These Parts Can Be Used In Multiple Catch Ranges.

## 5 3/4 in. Bowen™ WCOS Seal Kits - Assembly # 506366

|                         |                  |                  |                  |                   |                  |                   |              |                  |
|-------------------------|------------------|------------------|------------------|-------------------|------------------|-------------------|--------------|------------------|
| <b>Grapple Size</b>     | <b>2 3/8 in.</b> | <b>2 3/4 in.</b> | <b>2 7/8 in.</b> | <b>3 1/16 in.</b> | <b>3 1/8 in.</b> | <b>3 3/16 in.</b> | <b>4 in.</b> | <b>4 1/8 in.</b> |
| <b>Catch Range</b>      | 2.406 in.        | 2.656 in.        | 2.906 in.        | 3.219 in.         | 3.531 in.        | 3.781 in.         | 4.031 in.    | 4.156 in.        |
| <b>(Reference Only)</b> | 2.094 in.        | 2.344 in.        | 2.594 in.        | 2.906 in.         | 3.219 in.        | 3.469 in.         | 3.719 in.    | 3.843 in.        |

### Standard Pressure

|                                       |            |            |            |            |            |            |            |            |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Complete Standard Pressure Kit</b> | 507272/009 | 507272/022 | 507272/018 | 507272/021 | 507272/011 | 507272/014 | 507272/012 | 507272/010 |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|

### Standard Pressure Kit Components

|                           |            |            |            |            |            |            |            |            |
|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>SP Housing</b>         | 505578/007 | 505578/022 | 505578/008 | 505578/021 | 505578/013 | 505578/015 | 505578/012 | 505578/011 |
| <b>Retainer</b>           | 505576/007 | 505576/022 | 505576/008 | 505576/021 | 505576/012 | 505576/015 | 505576/013 | 505576/011 |
| <b>Packer</b>             | 505537/006 | 505537/019 | 505537/015 | 505537/018 | 505537/008 | 505537/011 | 505537/009 | 505537/007 |
| <b>O-Ring (Housing)**</b> | 568249/020 | 568249/020 | 568249/020 | 568249/020 | 568249/020 | 568249/020 | 568249/020 | 568249/020 |

### High Pressure

|                                   |            |            |            |            |            |            |            |            |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Complete High Pressure Kit</b> | 507268/009 | 507268/022 | 507268/018 | 507268/021 | 507268/011 | 507268/014 | 507268/012 | 507268/010 |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|

### High Pressure Kit Components

|                           |            |            |            |            |            |            |            |            |
|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>HP Housing</b>         | 505903/005 | 505903/009 | 505903/006 | 505903/010 | 505903/007 | 505903/011 | 505903/012 | 505903/013 |
| <b>Retainer</b>           | 505576/007 | 505576/022 | 505576/008 | 505576/021 | 505576/012 | 505576/015 | 505576/013 | 505576/011 |
| <b>Packer</b>             | 505537/006 | 505537/019 | 505537/015 | 505537/018 | 505537/008 | 505537/011 | 505537/009 | 505537/011 |
| <b>O-Ring (Housing)**</b> | 568249/020 | 568249/020 | 568249/020 | 568249/020 | 568249/020 | 568249/020 | 568249/020 | 568249/020 |
| <b>Solid Backup Ring</b>  | 505905/005 | 505905/013 | 505905/006 | 505905/014 | 505905/007 | 505905/011 | 505905/010 | 505905/015 |
| <b>Non-Extrusion Ring</b> | 505904/005 | 505904/013 | 505904/006 | 505904/014 | 505904/007 | 505904/011 | 505904/010 | 505904/015 |
| <b>C-Ring</b>             | 505906/005 | 505906/013 | 505906/006 | 505906/014 | 505906/007 | 505906/011 | 505906/010 | 505906/015 |

|                         |                  |                   |                  |                  |
|-------------------------|------------------|-------------------|------------------|------------------|
| <b>Grapple Size</b>     | <b>4 1/4 in.</b> | <b>4 7/16 in.</b> | <b>4 1/2 in.</b> | <b>4 3/4 in.</b> |
| <b>Catch Range</b>      | 4.281 in.        | 4.468 in.         | 4.531 in.        | 4.781 in.        |
| <b>(Reference Only)</b> | 3.969 in.        | 4.156 in.         | 4.219 in.        | 4.469 in.        |

### Standard Pressure

|                                       |            |            |            |            |
|---------------------------------------|------------|------------|------------|------------|
| <b>Complete Standard Pressure Kit</b> | 507272/008 | 507272/006 | 507272/007 | 507272/005 |
|---------------------------------------|------------|------------|------------|------------|

### Standard Pressure Kit Components

|                           |            |            |            |            |
|---------------------------|------------|------------|------------|------------|
| <b>SP Housing</b>         | 505578/006 | 505578/009 | 505578/010 | 505578/005 |
| <b>Retainer</b>           | 505576/006 | 505576/009 | 505576/010 | 505576/005 |
| <b>Packer</b>             | 505537/005 | 505536/006 | 505536/007 | 505536/005 |
| <b>O-Ring (Housing)**</b> | 568249/020 | 568249/020 | 568249/020 | N/A        |

### High Pressure

|                                   |            |            |            |            |
|-----------------------------------|------------|------------|------------|------------|
| <b>Complete High Pressure Kit</b> | 507268/008 | 507268/006 | 507268/007 | 507268/005 |
|-----------------------------------|------------|------------|------------|------------|

### High Pressure Kit Components

|                           |            |            |            |            |
|---------------------------|------------|------------|------------|------------|
| <b>HP Housing</b>         | 505903/014 | 505903/015 | 505903/016 | 505903/017 |
| <b>Retainer</b>           | 505576/006 | 505576/009 | 505576/010 | 505576/005 |
| <b>Packer</b>             | 505537/005 | 505536/006 | 505536/007 | 505536/005 |
| <b>O-Ring (Housing)**</b> | 568249/020 | 568249/020 | 568249/020 | N/A        |
| <b>Solid Backup Ring</b>  | 505905/008 | 505905/016 | 505905/017 | 505905/018 |
| <b>Non-Extrusion Ring</b> | 505904/008 | 505904/016 | 505904/017 | 505904/018 |
| <b>C-Ring</b>             | 505906/008 | 505906/016 | 505906/017 | 505906/018 |

\*\*Note - These parts can be used in multiple catch ranges.



# Bowen Wide Catch Overshot

## 7 3/8 in. Bowen™ WCOS Seal Kits - Assembly # 507460

|                         |                   |                  |                    |                  |
|-------------------------|-------------------|------------------|--------------------|------------------|
| <b>Grapple Size</b>     | <b>5 5/16 in.</b> | <b>6 1/2 in.</b> | <b>6 21/64 in.</b> | <b>6 1/2 in.</b> |
| <b>Catch Range</b>      | 6.015 in.         | 6.188 in.        | 6.359 in.          | 6.531 in.        |
| <b>(Reference Only)</b> | 5.828 in.         | 6.000 in.        | 6.172 in.          | 6.344 in.        |

### Standard Pressure

|                                       |            |            |            |            |
|---------------------------------------|------------|------------|------------|------------|
| <b>Complete Standard Pressure Kit</b> | 507442/008 | 507442/007 | 507442/006 | 507442/005 |
|---------------------------------------|------------|------------|------------|------------|

### Standard Pressure Kit Components

|                           |            |            |            |            |
|---------------------------|------------|------------|------------|------------|
| <b>SP Housing</b>         | 507411/008 | 507411/007 | 507411/006 | 507411/005 |
| <b>Retainer</b>           | 507429/008 | 507429/007 | 507429/006 | 507429/005 |
| <b>Packer</b>             | 507464/008 | 507464/007 | 507464/006 | 507464/005 |
| <b>O-Ring (Housing)**</b> | 568166/020 | 568166/020 | 568166/020 | N/A        |

\*\*Note - These Parts Can Be Used In Multiple Catch Ranges.

## 8 1/8 in. Bowen™ WCOS Seal Kits - Assembly # 506458

|                         |                  |                  |                  |              |                  |                  |                  |                  |
|-------------------------|------------------|------------------|------------------|--------------|------------------|------------------|------------------|------------------|
| <b>Grapple Size</b>     | <b>4 3/8 in.</b> | <b>4 1/2 in.</b> | <b>4 3/4 in.</b> | <b>5 in.</b> | <b>5 1/4 in.</b> | <b>5 1/2 in.</b> | <b>5 3/4 in.</b> | <b>5 7/8 in.</b> |
| <b>Catch Range</b>      | 4.406 in.        | 4.531 in.        | 4.781 in.        | 5.031 in.    | 5.281 in.        | 5.531 in.        | 5.781 in.        | 5.906 in.        |
| <b>(Reference Only)</b> | 4.094 in.        | 4.219 in.        | 4.469 in.        | 4.719 in.    | 4.969 in.        | 5.219 in.        | 5.469 in.        | 5.594 in.        |

### Standard Pressure

|                                       |            |            |            |            |            |            |            |            |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Complete Standard Pressure Kit</b> | 507271/015 | 507271/032 | 507271/010 | 507271/009 | 507271/014 | 507271/013 | 507271/033 | 507271/012 |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|

### Standard Pressure Kit Components

|                           |            |            |            |            |            |            |            |            |
|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>SP Housing</b>         | 505980/021 | 505980/005 | 505980/017 | 505980/014 | 505980/020 | 505980/019 | 505980/006 | 505980/018 |
| <b>Retainer</b>           | 505981/022 | 505981/006 | 505981/017 | 505981/014 | 505981/021 | 505981/020 | 505981/008 | 505981/019 |
| <b>Packer</b>             | 505979/025 | 505979/007 | 505979/013 | 505979/010 | 505979/024 | 505979/023 | 505979/026 | 505979/022 |
| <b>O-Ring (Housing)**</b> | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 |

### High Pressure

|                                   |            |            |            |            |            |            |            |            |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Complete High Pressure Kit</b> | 507267/015 | 507267/031 | 507267/010 | 507267/009 | 507267/014 | 507267/013 | 507267/032 | 507267/012 |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|

### High Pressure Kit Components

|                           |            |            |            |            |            |            |            |            |
|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>HP Housing</b>         | 506003/021 | 506003/010 | 506003/009 | 506003/008 | 506003/020 | 506003/019 | 506003/011 | 506003/008 |
| <b>Retainer</b>           | 505981/022 | 505981/006 | 505981/017 | 505981/014 | 505981/021 | 505981/020 | 505981/008 | 505981/019 |
| <b>Packer</b>             | 505979/025 | 505979/007 | 505979/013 | 505979/010 | 505979/024 | 505979/023 | 505979/026 | 505979/022 |
| <b>O-Ring (Housing)**</b> | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 |
| <b>Solid Backup Ring</b>  | 506005/021 | 506005/015 | 506005/009 | 506005/009 | 506005/020 | 506005/019 | 506005/022 | 506005/018 |
| <b>Non-Extrusion Ring</b> | 506004/021 | 506004/015 | 506004/009 | 506004/008 | 506004/020 | 506004/019 | 506004/022 | 506004/018 |
| <b>C-Ring</b>             | 506006/021 | 506006/015 | 506006/009 | 506006/008 | 506006/020 | 506006/019 | 506006/022 | 506006/018 |

|                         |              |                  |                  |                  |                  |              |
|-------------------------|--------------|------------------|------------------|------------------|------------------|--------------|
| <b>Grapple Size</b>     | <b>6 in.</b> | <b>6 1/4 in.</b> | <b>6 3/8 in.</b> | <b>6 1/2 in.</b> | <b>6 3/4 in.</b> | <b>7 in.</b> |
| <b>Catch Range</b>      | 6.031 in.    | 6.281 in.        | 6.406 in.        | 6.531 in.        | 6.781 in.        | 7.031 in.    |
| <b>(Reference Only)</b> | 5.719 in.    | 5.969 in.        | 6.094 in.        | 6.219 in.        | 6.469 in.        | 6.719 in.    |

### Standard Pressure

|                                       |            |            |            |            |            |            |
|---------------------------------------|------------|------------|------------|------------|------------|------------|
| <b>Complete Standard Pressure Kit</b> | 507271/031 | 507271/008 | 507271/011 | 507271/007 | 507271/006 | 507271/005 |
|---------------------------------------|------------|------------|------------|------------|------------|------------|

### Standard Pressure Kit Components

|                           |            |            |            |            |            |            |
|---------------------------|------------|------------|------------|------------|------------|------------|
| <b>SP Housing</b>         | 505980/007 | 505980/010 | 505980/016 | 505980/009 | 506342/005 | 506342/006 |
| <b>Retainer</b>           | 505981/011 | 505981/010 | 505981/016 | 505981/009 | 505981/007 | 505981/005 |
| <b>Packer</b>             | 505979/011 | 505979/006 | 505979/014 | 505979/005 | 505979/021 | 505978/005 |
| <b>O-Ring (Housing)**</b> | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 | N/A        |

### High Pressure

|                                   |            |            |            |            |            |            |
|-----------------------------------|------------|------------|------------|------------|------------|------------|
| <b>Complete High Pressure Kit</b> | 507267/033 | 507267/008 | 507267/011 | 507267/007 | 507267/006 | 507267/005 |
|-----------------------------------|------------|------------|------------|------------|------------|------------|

### High Pressure Kit Components

|                           |            |            |            |            |            |            |
|---------------------------|------------|------------|------------|------------|------------|------------|
| <b>HP Housing</b>         | 506003/012 | 506003/007 | 506003/006 | 506003/005 | 506326/005 | 506326/006 |
| <b>Retainer</b>           | 505981/011 | 505981/010 | 505981/016 | 505981/009 | 505981/007 | 505981/005 |
| <b>Packer</b>             | 505979/011 | 505979/006 | 505979/014 | 505979/005 | 505978/007 | 505978/005 |
| <b>O-Ring (Housing)**</b> | 568262/020 | 568262/020 | 568262/020 | 568262/020 | 568262/020 | N/A        |
| <b>Solid Backup Ring</b>  | 506005/016 | 506005/007 | 506005/006 | 506005/005 | 506328/005 | 506328/006 |
| <b>Non-Extrusion Ring</b> | 506004/016 | 506004/007 | 506004/006 | 506004/005 | 506327/005 | 506327/006 |
| <b>C-Ring</b>             | 506006/016 | 506006/007 | 506006/006 | 506006/005 | 506329/005 | 506329/006 |

\*\*Note - These parts can be used in multiple catch ranges.

# Bowen Wide Catch Overshot

## 9 1/8 in. Bowen™ WCOS Seal Kits - Assembly # 506585

| Grapple Size     | 6 3/4 in. | 6 1/2 in. | 6 3/4 in. | 7 in.     | 7 1/4 in. | 7 1/2 in. | 7 3/4 in. | 8 in.     |
|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Catch Range      | 6.406 in. | 6.531 in. | 6.781 in. | 7.031 in. | 7.281 in. | 7.531 in. | 7.781 in. | 8.031 in. |
| (Reference Only) | 6.094 in. | 6.219 in. | 6.469 in. | 6.719 in. | 6.969 in. | 7.219 in. | 7.469 in. | 7.719 in. |

### Standard Pressure

|                                |            |            |            |            |            |            |            |            |
|--------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Complete Standard Pressure Kit | 507270/011 | 507270/007 | 507270/006 | 507270/005 | 507270/035 | 507270/034 | 507270/032 | 507270/031 |
|--------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|

### Standard Pressure Kit Components

|                    |            |            |            |            |            |            |            |            |
|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| SP Housing         | 506350/011 | 506350/010 | 506350/009 | 506350/008 | 506350/006 | 506350/005 | 506349/006 | 506349/005 |
| Retainer           | 506348/013 | 506348/012 | 506348/011 | 506348/010 | 506348/008 | 506348/007 | 506348/006 | 506348/005 |
| Packer             | 505979/014 | 505979/005 | 505979/021 | 505979/020 | 505979/019 | 505979/018 | 505978/008 | 505978/009 |
| O-Ring (Housing)** | 568266/020 | 568266/020 | 568266/020 | 568266/020 | 568266/020 | 568266/020 | 568266/020 | N/A        |

### High Pressure

|                            |            |            |            |            |            |            |            |            |
|----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Complete High Pressure Kit | 507266/011 | 507266/007 | 507266/006 | 507266/005 | 507266/035 | 507266/034 | 507266/032 | 507266/031 |
|----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|

### High Pressure Kit Components

|                    |            |            |            |            |            |            |            |            |
|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| HP Housing         | 506352/011 | 506352/010 | 506352/009 | 506352/008 | 506352/006 | 506352/005 | 506351/006 | 506351/005 |
| Retainer           | 506348/013 | 506348/012 | 506348/011 | 506348/010 | 506348/008 | 506348/007 | 506348/006 | 506348/005 |
| Packer             | 505979/014 | 505979/005 | 505979/021 | 505979/020 | 505979/019 | 505979/018 | 505978/008 | 505978/009 |
| O-Ring (Housing)** | 568266/020 | 568266/020 | 568266/020 | 568266/020 | 568266/020 | 568266/020 | 568266/020 | N/A        |
| Solid Backup Ring  | 506005/006 | 506005/005 | 506005/014 | 506005/013 | 506005/011 | 506005/010 | 506328/008 | 506328/007 |
| Non-Extrusion Ring | 506004/006 | 506004/005 | 506004/014 | 506004/013 | 506004/011 | 506004/010 | 506327/008 | 506327/007 |
| C-Ring             | 506006/006 | 506006/005 | 506006/014 | 506006/013 | 506006/011 | 506006/010 | 506329/008 | 506329/007 |

\*\*Note - These Parts Can Be Used In Multiple Catch Ranges.

## 11 3/4 in. Bowen™ WCOS Seal Kits - Assembly # 507331

| Grapple Size     | 4-7/8 in. | 5-1/4 in. | 5-23/32 in. | 6-3/16 in. | 6-1/4 in. | 6-21/32 in. | 7-1/8 in. | 7-19/32 in. |
|------------------|-----------|-----------|-------------|------------|-----------|-------------|-----------|-------------|
| Catch Range      | 4.906 in. | 5.281 in. | 5.750 in.   | 6.219 in.  | 6.281 in. | 6.688 in.   | 7.156 in. | 7.625 in.   |
| (Reference Only) | 4.406 in. | 4.781 in. | 5.250 in.   | 5.719 in.  | 5.781 in. | 6.188 in.   | 6.656 in. | 7.125 in.   |

### High Pressure Components

|                            |            |            |            |            |            |            |            |            |
|----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Complete High Pressure Kit | 507255/017 | 507255/019 | 507255/015 | 507255/018 | 507255/013 | 507255/012 | 507255/020 | 507255/016 |
|----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|

### High Pressure Kit Components

|                    |            |            |            |            |            |            |            |            |
|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| HP Housing         | 506883/017 | 506883/019 | 506883/015 | 506883/018 | 506883/013 | 506883/012 | 506883/020 | 506883/016 |
| Retainer           | 506887/017 | 506887/019 | 506887/015 | 506887/018 | 506887/013 | 506887/012 | 506887/020 | 506887/016 |
| Packer             | 506888/017 | 506888/019 | 506888/015 | 506888/018 | 506888/013 | 506888/012 | 506888/020 | 506888/016 |
| O-Ring (Housing)** | 568275/020 | 568275/020 | 568275/020 | 568275/020 | 568275/020 | 568275/020 | 568275/020 | 568275/020 |
| Solid Backup Ring  | 506885/017 | 506885/019 | 506885/015 | 506885/018 | 506885/013 | 506885/012 | 506885/020 | 506885/016 |
| Non-Extrusion Ring | 506886/017 | 506886/019 | 506886/015 | 506886/018 | 506886/013 | 506886/012 | 506886/020 | 506886/016 |
| C-Ring             | 506884/017 | 506884/019 | 506884/015 | 506884/018 | 506884/013 | 506884/012 | 506884/020 | 506884/016 |

| Grapple Size     | 7 3/4 in. | 8 1/16 in. | 8 17/32 in. | 9 in.     | 9 3/16 in. | 9 21/32 in. | 10 1/8 in. |
|------------------|-----------|------------|-------------|-----------|------------|-------------|------------|
| Catch Range      | 7.781 in. | 8.093 in.  | 8.562 in.   | 9.031 in. | 9.219 in.  | 9.688 in.   | 10.156 in. |
| (Reference Only) | 7.281 in. | 7.593 in.  | 8.062 in.   | 8.531 in. | 8.719 in.  | 9.188 in.   | 9.656 in.  |

### High Pressure

|                            |            |            |            |            |            |            |            |
|----------------------------|------------|------------|------------|------------|------------|------------|------------|
| Complete High Pressure Kit | 507255/011 | 507255/014 | 507255/010 | 507255/008 | 507255/007 | 507255/006 | 507255/005 |
|----------------------------|------------|------------|------------|------------|------------|------------|------------|

### High Pressure Kit Components

|                    |            |            |            |            |            |            |            |
|--------------------|------------|------------|------------|------------|------------|------------|------------|
| HP Housing         | 506883/011 | 506883/014 | 506883/010 | 506883/008 | 506883/007 | 506883/006 | 506883/005 |
| Retainer           | 506887/011 | 506887/014 | 506887/010 | 506887/008 | 506887/007 | 506887/006 | 506887/005 |
| Packer             | 506888/011 | 506888/014 | 506888/010 | 506888/008 | 506888/007 | 506888/006 | 506888/005 |
| O-Ring (Housing)** | 568275/020 | 568275/020 | 568275/020 | 568275/020 | 568275/020 | 568275/020 | N/A        |
| Solid Backup Ring  | 506885/011 | 506885/014 | 506885/010 | 506885/008 | 506885/007 | 506885/006 | 506885/005 |
| Non-Extrusion Ring | 506886/011 | 506886/014 | 506886/010 | 506886/008 | 506886/007 | 506886/006 | 506886/005 |
| C-Ring             | 506884/011 | 506884/014 | 506884/010 | 506884/008 | 506884/007 | 506884/006 | 506884/005 |

\*\*Note - These parts can be used in multiple catch ranges.

# Bowen Wide Catch Overshot

## Tool Data

### Calculated Strengths for the Wide Catch Overshot

| Bowl No. | Max Catch Size w/ Spiral Grapple     | OD                                   | Load Capacity at Yield Point |                          | Bowl Burst Pressure | Max Seal Operating Pressure    |                                     |
|----------|--------------------------------------|--------------------------------------|------------------------------|--------------------------|---------------------|--------------------------------|-------------------------------------|
|          |                                      |                                      | Spiral Grapple               | Basket Grapple           |                     | Standard Assembly <sup>2</sup> | High Pressure Assembly <sup>3</sup> |
| 506491   | 3 2 <sup>1</sup> / <sub>32</sub> in. | 4 1 <sup>1</sup> / <sub>16</sub> in. | 332,100 lbs <sup>1</sup>     | 290,900 lbs <sup>1</sup> | 17,800 psi          | 3,500 psi                      | 10,000 psi                          |
| 506149   | 4 3 <sup>1</sup> / <sub>4</sub> in.  | 5 3 <sup>1</sup> / <sub>4</sub> in.  | 407,100 lbs <sup>1</sup>     | 407,100 lbs <sup>1</sup> | 8,000 psi           | 2,500 psi                      | 6,500 psi                           |
| 507409   | 6 1 <sup>1</sup> / <sub>2</sub> in.  | 7 3 <sup>1</sup> / <sub>8</sub> in.  | 435,200 lbs <sup>1</sup>     | 435,200 lbs <sup>1</sup> | 9,200 psi           | 3,500 psi                      | -                                   |
| 506250   | 7 in.                                | 8 1 <sup>1</sup> / <sub>8</sub> in.  | 548,900 lbs <sup>1</sup>     | 512,300 lbs <sup>1</sup> | 10,200 psi          | 2,200 psi                      | 8,000 psi                           |
| 506296   | 8 in.                                | 9 1 <sup>1</sup> / <sub>8</sub> in.  | 548,900 lbs <sup>1</sup>     | 512,300 lbs <sup>1</sup> | 9,000 psi           | 2,200 psi                      | 7,200 psi                           |
| 506942   | 10 1 <sup>1</sup> / <sub>8</sub> in. | 11 3 <sup>1</sup> / <sub>4</sub> in. | 969,000 lbs <sup>1</sup>     | 950,200 lbs <sup>1</sup> | 8,200 psi           | -                              | 6,600 psi                           |

### Calculated Strengths for the Wide Catch Overshot - Reduced OD Specifications

| Bowl No. | Max Catch Size w/ Spiral Grapple     | OD  | Load Capacity at Yield Point |                          | Bowl Burst Pressure | Max Seal Operating Pressure    |                                     |
|----------|--------------------------------------|---|------------------------------|--------------------------|---------------------|--------------------------------|-------------------------------------|
|          |                                      |   | Spiral Grapple               | Basket Grapple           |                     | Standard Assembly <sup>2</sup> | High Pressure Assembly <sup>3</sup> |
| 506491   | 3 2 <sup>1</sup> / <sub>32</sub> in. | 4 1 <sup>1</sup> / <sub>16</sub> in. to 4 3 <sup>1</sup> / <sub>8</sub> | 300,400 lbs <sup>1</sup>     | 263,200 lbs <sup>1</sup> | 16,000 psi          | 3,400 psi                      | 9,900 psi                           |

### Connection Torque Requirements

| OD                                   | Part Numbers |        |        | Makeup Torque w/ Bowl      |                            |
|--------------------------------------|--------------|--------|--------|----------------------------|----------------------------|
|                                      | Top Sub      | Bowl   | Guide  | Top Sub                    | Guide                      |
| 4 1 <sup>1</sup> / <sub>16</sub> in. | 506493       | 506491 | 6667   | 5,200 ft-lbs <sup>4</sup>  | 1,100 ft-lbs <sup>4</sup>  |
| 5 3 <sup>1</sup> / <sub>4</sub> in.  | 506148       | 506149 | 6121   | 8,000 ft-lbs <sup>4</sup>  | 1,400 ft-lbs <sup>4</sup>  |
| 7 3 <sup>1</sup> / <sub>8</sub> in.  | 507405       | 507409 | 507424 | 13,800 ft-lbs <sup>4</sup> | 4,400 ft-lbs <sup>4</sup>  |
| 8 1 <sup>1</sup> / <sub>8</sub> in.  | 506249       | 506250 | 9226   | 17,800 ft-lbs <sup>4</sup> | 4,200 ft-lbs <sup>4</sup>  |
| 9 1 <sup>1</sup> / <sub>8</sub> in.  | 506292       | 506296 | A5272  | 22,600 ft-lbs <sup>4</sup> | 6,000 ft-lbs <sup>4</sup>  |
| 11 3 <sup>1</sup> / <sub>4</sub> in. | 507192       | 506942 | 5336   | 39,600 ft-lbs <sup>4</sup> | 15,100 ft-lbs <sup>4</sup> |

# Bowen Wide Catch Overshot

## Connection Torque Requirements - Reduced OD Specifications

| OD in Inches   | Part Numbers |        |       | Makeup Torque w/ Bowl (ft-lbs) <sup>4</sup> |       |       |
|--|--------------|--------|-------|---|-------|-------|
|  | Top Sub      | Bowl   | Guide | Top Sub                                     | Guide | Guide |
| 4 1 <sup>1</sup> / <sub>16</sub> in. to 4 3 <sup>1</sup> / <sub>16</sub> in. | 506493       | 506491 | 6667  | 5,000                                       | 1,100 | 6667  |

<sup>1</sup> All load capacities listed are calculated theoretical yield points and are considered accurate to within 20%. Note, however, that all strengths assume straight, steady pull and full grapple engagement of a round fish. Anything less than full engagement or straight pulling will reduce the listed strengths substantially. This includes tong marks or other damage to the bowl surface. The above strengths are calculated with a zero pressure differential across the bowl. Should a positive pressure differential occur, there can be a substantial decrease in the allowable pull load due to a pump open effect occurring over the fish. The pressure differential multiplied by the respective top fish area will yield the amount that the operator needs to account for and pull load capacity should be adjusted accordingly. See below for an example:

### Example:

- For bowl 506149 (5<sup>3</sup>/<sub>4</sub> in. Wide Catch overshot) the load capacity is 407,100 lbs.
- Assuming that the fish diameter is 2<sup>7</sup>/<sub>8</sub> in. and an estimated pressure differential of 1000 psi is present, the decrease in load applied is:

$$\begin{aligned} \text{Standard Load Capacity (L}_s\text{)} &= 407,100 \text{ lbs} \\ \text{Fish Diameter (D)} &= 2.875 \text{ in} \\ \text{Pressure Differential (P)} &= 1000 \text{ psi} \\ \pi &= 3.14 \\ \text{Area of Fish (A)} &= \left(\frac{\pi * D^2}{4}\right) = \left(\frac{3.14 * 2.875^2}{4}\right) = 6.49 \text{ in}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of fish(A)*Pressure Differential (P)} &= \text{Decrease in Load Capacity(L}_d\text{)} \\ 6.49 * 1000 &= 6490 \text{ lbs} \end{aligned}$$

$$\begin{aligned} \text{Standard Load Capacity (L}_s\text{)} - \text{Decrease in Load Capacity (L}_d\text{)} &= \text{Max Allowable Load Capacity (L}_m\text{)} \\ 407100 - 6490 &= 400,610 \text{ lbs} \end{aligned}$$

<sup>2</sup> Standard pressure: The seal operating pressures listed above are for a fish of nominal diameter. As the fish OD decreases, the seal operating pressure reduces. Pressure ratings are given for ambient temperature. As the temperature increases, the ability to maintain a seal diminishes.

<sup>3</sup> High pressure: The seal operating pressures listed above are for a fish of nominal diameter. The high pressure assemblies were tested to 250°F and above the published pressure rating. The current limitation is the bowl. Any attempt to maintain a pressure over the published value will increase your risk of bursting the bowl.

<sup>4</sup> The above torque values are the maximum recommended and set at 50% of the calculated theoretical yield torque. Maximum torque is not required for all fishing jobs and lower torque values will reduce wear and tear to the threads. Torque should be applied evenly to the OD so as to not collapse the OD.



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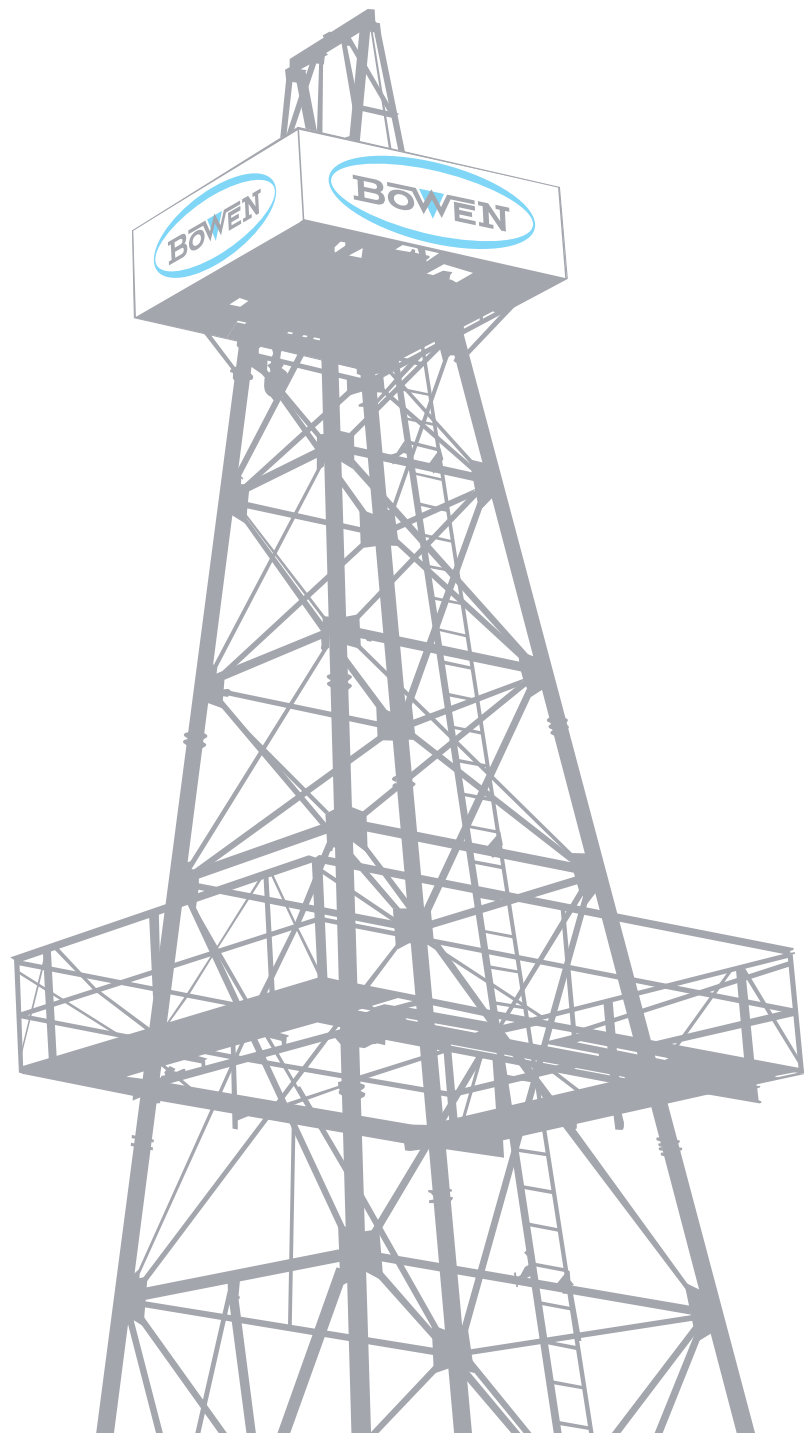
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# Bowen Full Circle Releasing Spears

Instruction Manual 2100



**Bowen | NOV**

# Bowen Full Circle Releasing Spears

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# Bowen Full Circle Releasing Spears

## General Description

The Bowen™ full circle releasing spear is a patented fishing spear that ensures positive internal engagement over a long section of a fish. The design of the full circle slips and the effect of the tapers of the body upon the slips cause the expansion strain to be distributed evenly over a long vertical section and virtually over the entire inner circumference of a fish, permitting tremendous pulling and jarring strains with no danger of distorting the fish.

## Use

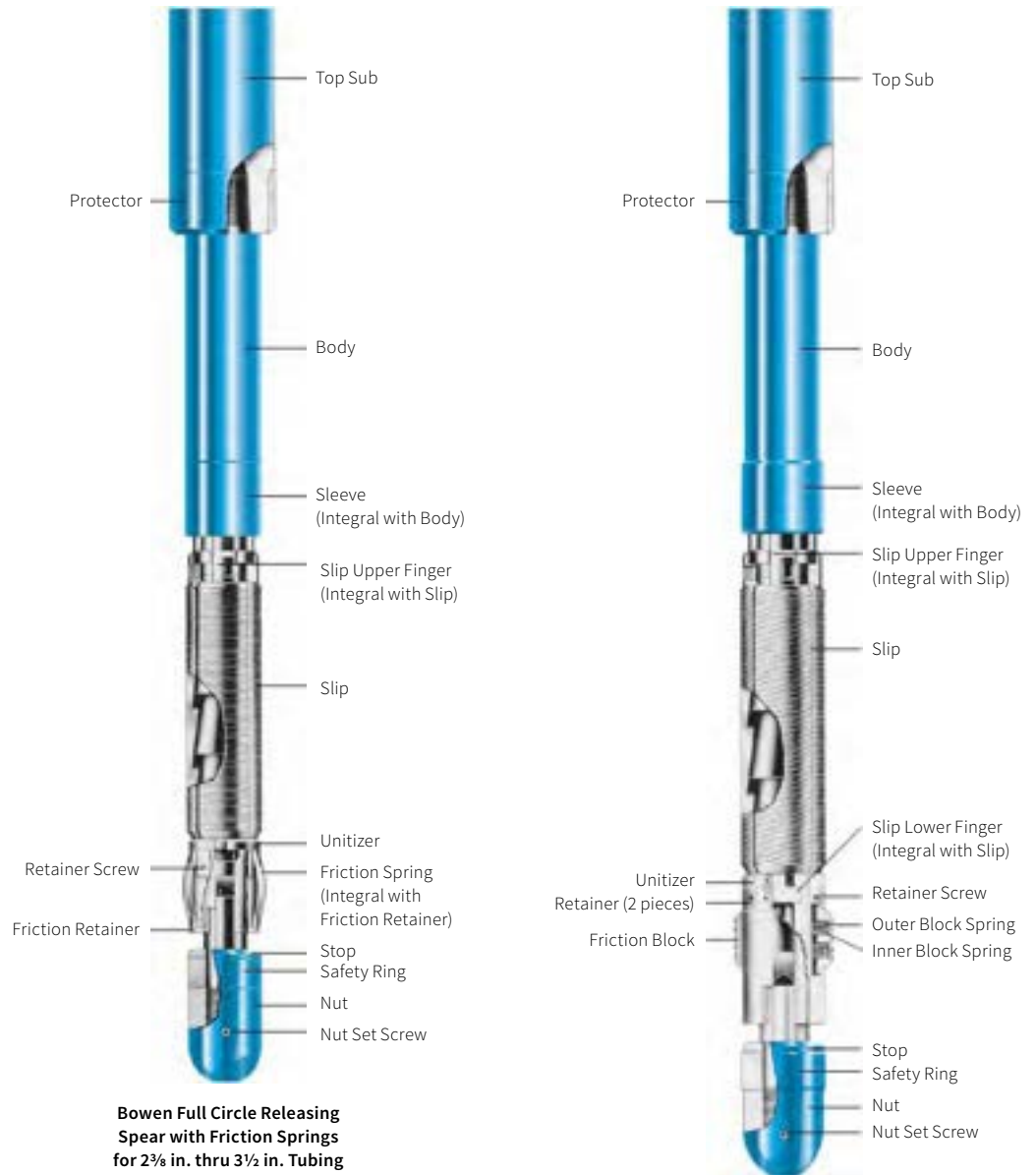
The Bowen full circle releasing spear internally engages and retrieves all sizes of tubing, drill pipe and casing. It may be used in conjunction with internal cutters to perform cut and pull operations, if desired.

## Construction

Construction of the Bowen full circle releasing spear varies slightly with size. The tubing and drill pipe size spear for all tubing and drill pipe through 3½ in. nominal, 4 in. O.D. tubing, use a friction spring assembly for a friction grip mechanism. All tubing and drill pipe size spears above 3½ in. nominal tubing and all casing size full circle spears use friction block assemblies for a friction grip mechanism.

All full circle spears for tubing and drill pipe are composed of a top sub, protector (when a skirt and guide are not used), body, slips, friction spring assembly or friction block assembly, stop, safety ring, nut, and nut set screw.

The friction block assembly includes a unitizer, retainer (2 pieces), friction blocks, retainer screws, outer block springs, and inner block springs.



# Bowen Full Circle Releasing Spears

The friction spring assembly includes a unitizer, a friction retainer, friction springs (which are integral with the friction retainer), and friction retainer screws.

The top sub serves as a stop and has a suitable thread at the bottom for the option of using a skirt and guide. If a skirt and guide are not used, a thread protector will be provided.

The body has a series of large tapers on its outside diameter which match similar tapers on the inside diameters of the slips. The purpose of these tapers is to cause the slips to expand and contact the fish during operation. Lugs near the upper end of the body maintain the upper ends of the slips in position. The unitizer fits around the lower end of the body, keeping the lower ends of the slips in position. The unitizer is kept in position by the stop, safety ring (or safety ring pack-off), and nut at the lower end of the body.

The retainer holds the friction blocks on all assemblies for 3½ in. nominal tubing and above, including all casing sizes. Friction retainers for 3½ in. tubing and smaller have integral friction springs.

The full circle slips (3 or more depending on size of the spear) are designed to permit easy entry into or withdrawal from the fish. When retracted, the slips form almost a completely full diameter. As a result of this design, the full circle slips present from 30% to 450% more slip engagement than most other spears on the market. This reduces the tendency to distort or rupture the fish to an absolute minimum.

The purpose of the safety ring is to prevent the spear from entering

any fish whose inside diameter is too small to allow entrance of the retracted slips. The nut guides the spear into the fish.

## Operation

Determine first that the Bowen™ full circle releasing spear is the proper size for the fish to be caught, is properly assembled, and is in good working condition. Refer to both the specification table and to the range sheet. Note especially the slip size and the safety ring (or safety ring pack-off) size.

Connect the spear to the fishing string. Set the spear in its retracted position by ascertaining that the slip fingers are engaged with the lugs on the body and with the lugs on the unitizer. In this position the full circle slips are pressed inward and will not engage the pipe as the spear is run in.

### To Engage and Pull the Fish

Lower the fishing string slowly until the spear has entered the fish to the desired depth.

Rotate the fishing string at least one-sixth (1/6) of a turn to the left and then pull on the fish by elevating the fishing string.

### To Release from the Fish

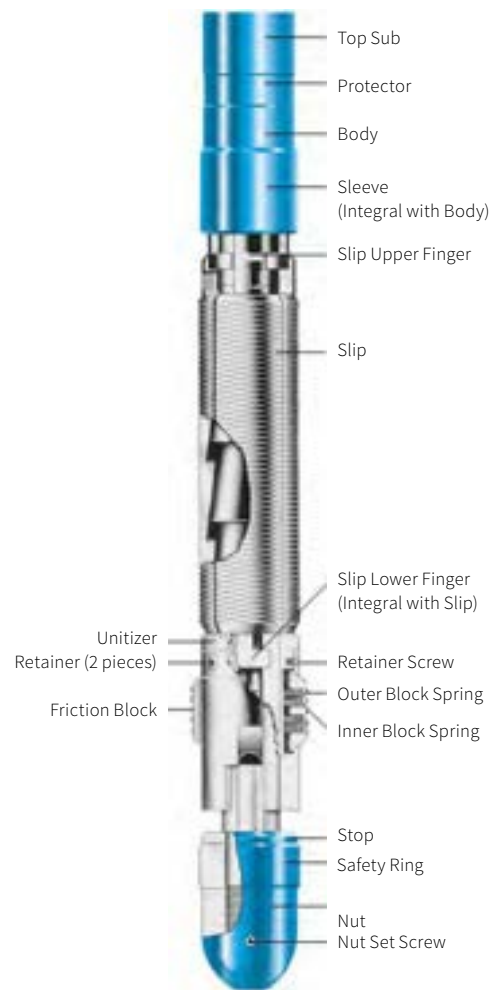
Bump down the full weight of the fishing string, then rotate the fishing string at least one-sixth (1/6) of a turn\* to the right and elevate the fishing string until it is clear of the fish.

If the spear will not pull from the fish, bump down; then simultaneously rotate to the right and slowly elevate the fishing string until the spear is clear of the fish. Combined rotation and elevation are important.

### \*Note:

In deep or crooked holes, it may be necessary to rotate more than one-sixth (1/6) of a turn. Additional rotation will not hinder the operation of the spear.

(To operate left-hand spears, observe the above instructions, except rotate to the right to engage and to the left to release from the fish.)



**Bowen Full Circle Releasing Spear for Casing**

# Bowen Full Circle Releasing Spears

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## Operation with Accessories

### Safety Ring Pack-off

In order to circulate through the fish, install the proper safety ring pack-off in place of the safety ring. (See range sheets on pages 12-13.)

After the spear has entered and engaged the fish, start the circulation pumps while maintaining a heavy upward pull on the fish. The fluid passing through the spear backs up against the packer, causing a positive seal on the inside of the fish. This will add lifting power to the pulling force exerted on the fishing string while simultaneously starting a breakdown of the sediment or formation between the fish and the walls of the wellbore, freeing the fish.

### Mill Type Nut

If the top of the fish is distorted or plugged in any manner that would prevent easy entry into the fish, install a mill type nut in place of the standard bullnose nut.

When the top of the fish is reached, rotate slowly to the right and slowly lower the spear into the fish to the desired depth.

### Side Hill Type Nut

If the top of the fish is badly out of line with the wellbore or is imbedded in the sidewall, install a side hill type nut in place of the standard bullnose nut.

When the top of the fish is reached, the fishing string must be lowered, elevated, rotated a portion of a turn and lowered again repeatedly until the leading edge of the side hill type nut encounters the section of the top of the fish that overlaps the wellbore and directs the spear into the fish.

### Sub Type Nut

If it is desired to run other tools below the spear, such as an internal cutter, install a sub type nut in place of the standard bullnose nut.

### Extensions

Drill pipe and tubing size spears: If the fish has an unengageable upper end, install as many extensions between the top sub and the body of the spear as are required to penetrate the fish to the necessary depth. Standard extensions are 36 in. long and are bored for fluid circulation.

### Skirts and Guides

Drill pipe and tubing size spears: If the hole size is so much greater than the fish size that it is possible for the spear to pass alongside the fish, install a proper size skirt on the top sub in place of the cap and, if necessary, install the proper oversize guide on the bottom of the skirt.

### Stop Subs

Stop subs may be installed anywhere above the spear for the purpose of limiting the extent of penetration of the spear into the fish. Stop subs are also useful in locating the top of the fish and in bumping down against the fish.

## Precautions

In deep or crooked holes, it is necessary to rotate the fishing string more than one-sixth ( $\frac{1}{6}$ ) of a turn in order to set or to release the spear. Additional rotation does not hurt the operation of the spear.

When handling the fish and rotating to the right or left, it is important to always maintain a heavy upward strain on the fishing string.

Always bump down the full weight of the fishing string before starting releasing operations.

## Explanation of Mechanism

### Function of the Spear During Engaging Operations

After the spear has reached the top of the fish, slow lowering of the fishing string results in the following:

1. The nut will direct the spear into the fish.
2. The proper safety ring or safety ring pack-off will prevent the spear from entering any fish whose inside diameter is smaller than the outside diameter of the slips in their retracted position.
3. The friction springs or friction blocks will contact the inner wall of the fish and hold the unitizer, friction retainer, and slips stationary until the shoulders at the ends of the tapers on the downwardly traveling body contact the shoulders at the ends of the tapers of the slips and push the assembly into the fish to the desired depth.
4. The slips are now in their uppermost position relative to the body. Thereafter, when the fishing string is rotated to the left, the slips are held stationary by the friction springs or friction blocks until the lugs on the upper end of the body are disengaged from the slots in the upper fingers of the slips. At the same time, the keys on stop are simultaneously disengaged from the recesses in the unitizer.

5. Then, when the fishing string is elevated, the slips are held stationary by the friction springs or friction blocks and the tapers on the upwardly traveling body expand the slips into tight full circle engagement with the fish.

### Function of the Spear During Releasing Operations

1. When the fishing string is bumped down, the slips are held stationary by the friction springs or friction blocks and the body travels downwardly until the lugs on the upper end of the body are opposite the slots in the upper fingers of the slips and the recesses in the unitizer are opposite the tops of the keys on the stop.
2. Next, when the fishing string is rotated to the right, the slips are held stationary by the friction springs or friction blocks until the lugs on the body locate themselves within the slots in the upper fingers of the slips. At the same time, the keys on the stop will locate themselves within the recesses of the unitizer.
3. The spear can now be pulled up or down the fish because when in this position the slips cannot be expanded into the fish by the tapers on the body.
4. As a secondary releasing mechanism, left-hand wickers are cut on the full circle slips and the lugs on the body and the keys on the stop will force the slips to rotate with the spear. After bumping down to break the hold, combined right-hand rotation and slow elevation of the fishing string unscrews the spear from the fish.

# Bowen Full Circle Releasing Spears

## Explanation of Safety Rings and Safety Ring Pack-offs

The outside diameter of the proper safety ring or safety ring pack-off is slightly larger than the outside diameter of the slips in their retracted state. This will prevent the spear from entering any fish whose inside diameter is smaller than the outside diameter of the slips in their retracted state. This ensures the spear's ability to release from any fish that it has penetrated. Safety rings and safety ring pack-offs should, therefore, be selected carefully in accordance with the range sheet on pages 12 and 13 in order to obtain this important safety feature.

The packing elements in safety ring pack-offs are molded rubber rings bonded permanently in the steel bodies. The design of the rubber ring is such that circulation pressure will expand its lip into a leak-proof fit against the inner walls of the fish.

## Maintenance

To guard against misruns and to prolong the life of the tool, the spear should be thoroughly serviced after use.

1. Disassemble the spear.
  - a. Unscrew the retainer screws and slide the friction retainer down the unitizer.
  - b. Lift the slips off the body.
  - c. Release the set screws in the nut and unscrew the nut from the body.
  - d. Slide off the safety ring (or safety ring pack-off), the stop and the unitizer.
2. Cleanse and carefully check all the parts.

- a. Replace worn or damaged parts.
  - b. A damaged sleeve must be machined off the body and a new one welded on.
  - c. A rubber portion of the safety ring pack-off can be replaced at the factory.
  - d. When the slip fingers need replacement, they may be installed by any field welding shop using the body and the unitizer to ensure proper location of the fingers.
3. Oil or grease all parts.
  4. Reassemble in reverse order. Before sliding the friction retainer on the unitizer, make sure that the lower fingers of the slips are engaged in the unitizer.
  5. To prevent rust, either grease or paint the exterior of the tool, with the exception of the rubber portion of the safety ring pack-off.

## Accessories

### Safety Ring Pack-off

The safety ring pack-off is installed in place of the safety ring to pack off the fish. Packing elements are molded rubber rings bonded permanently in the steel bodies. The design of the rubber ring is such that circulation pressure will expand its lip into a leak-proof fit against the inner walls of the fish.



Safety Ring Pack-off

### Mill Type Nut

The mill type nut is used in place of the standard bullnose nut to mill away the distorted end of a fish to ensure entrance of the spear into the fish. It is also effective for drilling out a sand-plugged fish.

### Side Hill Type Nut

The side hill type nut is used in place of the standard bullnose nut to align the spear with a fish that is imbedded in the sidewall of a hole.

### Sub Type Nut

The sub type nut is used in place of the standard bullnose nut to provide the connection required to utilize other tools below the spear such as internal cutters.



Mill Type Nut



Side Hill Type Nut



Sub Type Nut

### Extensions

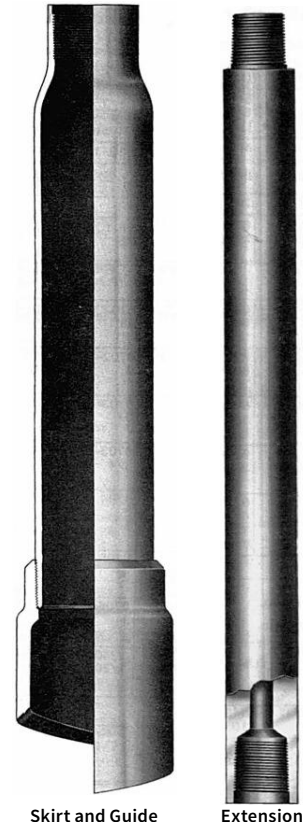
An extension may be installed between the top sub and the body (on drill pipe and tubing size spears only) so that the spear may be adapted to penetrate into a fish to the desired depth.

### Skirts and Guides

When the hole size is so much greater than the fish size that it is possible for the spear to pass alongside of the fish, install a skirt on the top sub in place of the cap (on drill pipe and tubing size spears only); then install a guide on the bottom of the skirt. Oversize guides are available for all hole sizes. See page 11.

### Stop Subs

Stop subs are useful in spear operations to locate the top of the fish, to control the penetration into the fish, and to bump against the fish. Stop subs may be installed anywhere above the spear without affecting the operating mechanism.



Skirt and Guide

Extension

# Bowen Full Circle Releasing Spears

## Specifications and Replacement Parts

### Specifications for Drill Pipe and Tubing Spears

| Nominal Size                            | 2½ in. D.P.                | 2½ in. Tbg.                         | 2½ in. D.P.                | 2½ in. Tbg.                        | 3½ in. D.P.                        | 3½ in. Tbg.                         | 4 in. D.P.                         | 4 in. Tbg.                         | 4½ in. D.P.                         | 5½ in. D.P.               |         |
|---|----------------------------|-------------------------------------|----------------------------|------------------------------------|------------------------------------|-------------------------------------|------------------------------------|------------------------------------|-------------------------------------|---------------------------|---------|
| <b>Recommended Catching Range</b>       | 2½ in. D.P.<br>All Weights | 2½ in. Tbg.<br>All Weights          | 2½ in. D.P.<br>All Weights | 2½ in. Tbg.<br>All Weights         | 3½ in. D.P.<br>All Weights         | 3½ in. Tbg.<br>All Weights          | 4 in. D.P.<br>All Weights          | 4 in. Tbg.<br>All Weights          | 4½ in. D.P.<br>or Tbg.              | 5½ in. and<br>5½ in. D.P. |         |
| <b>O.D. Smallest Slips Retracted</b>    | 1½ in.                     | 1 <sup>29</sup> / <sub>32</sub> in. | 2 in.                      | 2 <sup>5</sup> / <sub>16</sub> in. | 2 <sup>7</sup> / <sub>16</sub> in. | 2 <sup>13</sup> / <sub>16</sub> in. | 3 <sup>3</sup> / <sub>32</sub> in. | 3 <sup>3</sup> / <sub>16</sub> in. | 3 <sup>15</sup> / <sub>32</sub> in. | 4½ in.                    |         |
| <b>Expansion Slips Over Safety Ring</b> | 1½ in.                     | 1½ in.                              | ¾ in.                      | ¾ in.                              | 1 <sup>3</sup> / <sub>32</sub> in. | 1 <sup>3</sup> / <sub>32</sub> in.  | 1½ in.                             | 1½ in.                             | ½ in.                               | ¾ in.                     |         |
| <b>Slip Engagement Area</b>             | 55 Sq. in.                 | 59 Sq. in.                          | 74 Sq. in.                 | 87 Sq. in.                         | 95 Sq. in.                         | 115 Sq. in.                         | 126 Sq. in.                        | 135 Sq. in.                        | 178 Sq. in.                         | 265 Sq. in.               |         |
| <b>Complete Assembly</b>                | <b>Part No.</b>            | 6175                                | 6693                       | 6246                               | 6684                               | 7640                                | 6701                               | 7648                               | 6710                                | 6715                      | 6723    |
|   | <b>Weight</b>              | 32 lbs                              | 40 lbs                     | 55 lbs                             | 60 lbs                             | 71 lbs                              | 92 lbs                             | 107 lbs                            | 127 lbs                             | 180 lbs                   | 270 lbs |

### Replacement Parts for Drill Pipe and Tubing Spears

| Top Sub (including Protector)                           | Part No.          | 6176  | 5858               | 6247               | 5774               | 6263               | 6702               | 6676                                  | 5839   | 6270   | 6277    |
|---|-------------------|---|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------------------------|--------|--------|---------|
|   | <b>Weight</b>     | 20 lbs  | 20 lbs             | 27 lbs             | 19 lbs             | 28 lbs             | 28 lbs             | 50 lbs                                | 35 lbs | 52 lbs | 80 lbs  |
| <b>Protector</b>  | <b>Part No.</b>   | 6176-1  | 5858-1             | 6247-1             | 5774-1             | 6263-1             | 6702-1             | 6676-1                                | 5839-1 | 6270-1 | 6277-1  |
|   | <b>Weight</b>     | 1 lb  | 1 lb               | 4 lbs              | 1 lb               | 2½ lbs             | 2 lbs              | 3½ lbs                                | 2 lbs  | 3½ lbs | 5½ lbs  |
| <b>Body</b>   | <b>Part No.</b>   | 6177  | 6694               | 6248               | 6685               | 7641               | 6703               | 7649                                  | 6711   | 6716   | 6724    |
|   | <b>Weight</b>     | 12 lbs  | 15 lbs             | 19 lbs             | 21 lbs             | 27 lbs             | 31 lbs             | 36 lbs                                | 43 lbs | 60 lbs | 100 lbs |
| <b>Sleeve (Integral w/Body)</b>                         | <b>Part No.</b>   | 6177-1  | 6694-1             | 6248-1             | 6685-1             | 7641-1             | 6703-1             | 7649-1                                | 6711-1 | 6716-1 | 6724-1  |
|   | <b>Weight</b>     | ¼ lb  | ¼ lb               | ½ lb               | ½ lb               | ¾ lb               | ¾ lb               | ¾ lb                                  | 1 lb   | 1¼ lbs | 3 lb    |
| <b>Slip (including Fingers)</b>                         | <b>Part No.</b>   | 6178  | 6695               | 6249               | 6686               | 7642               | 6704               | 7650                                  | 6712   | 6717   | 6725    |
|   | <b>No. Req'd.</b> | 3   | 3                  | 3                  | 3                  | 3                  | 3                  | 3                                     | 3      | 3      | 4       |
|   | <b>Weight</b>     | 1 lbs   | 1¼ lbs             | 1¾ lbs             | 1½ lbs             | 2½ lbs             | 5 lbs              | 6 lbs                                 | 7 lbs  | 9 lbs  | 12 lbs  |
| <b>Unitizer</b>   | <b>Part No.</b>   | 6179  | 6696               | 6250               | 6687               | 7643               | 6705               | See Optional Accessories<br>on Page 6 |        |        |         |
|   | <b>Weight</b>     | 1 lb  | 1¼ lbs             | 1¾ lbs             | 2 lbs              | 3 lbs              | 4 lbs              |                                       |        |        |         |
| <b>Friction Retainer (including Springs)</b>            | <b>Part No.</b>   | 6546F   | 6697F              | 6542F              | 6688F              | 7644F              | 6706F              |                                       |        |        |         |
|   | <b>Weight</b>     | ½ lb  | ½ lb               | ¾ lb               | ¾ lb               | 1 lb               | 1 lb               |                                       |        |        |         |
| <b>Friction Retainer Screws (4 Req'd.)</b>              | <b>Part No.</b>   | 6423  | 6623               | 6423               | 6423               | 6423               | 23508              |                                       |        |        |         |
|   | <b>Weight</b>     | ¼ <sup>00</sup> lb  | ¼ <sup>00</sup> lb | ¼ <sup>00</sup> lb | ¼ <sup>00</sup> lb | ¼ <sup>00</sup> lb | ¼ <sup>00</sup> lb |                                       |        |        |         |
| <b>Friction Block Assembly (Includes the Following)</b> | <b>Part No.</b>   | 2½ in. Drill Pipe To 3½ in. Tubing Spears<br>Do Not Use Friction Block Assembly |                    |                    |                    | 14391              | 14901              | 14937                                 | 14838  |        |         |
|   | <b>Weight</b>     |   |                    |                    |                    | 9 lbs              | 9 lbs              | 10 lbs                                | 10 lbs |        |         |
| <b>Unitizer</b>   | <b>Part No.</b>   |   |                    |                    |                    | 14932              | 14902              | 14938                                 | 14839  |        |         |
|   | <b>Weight</b>     |   |                    |                    |                    | 6 lbs              | 6 lbs              | 7 lbs                                 | 7 lbs  |        |         |
| <b>Retainer (2 Pieces)</b>                              | <b>Part No.</b>   |   |                    |                    |                    | 14933              | 14903              | 14939                                 | 14841  |        |         |
|   | <b>Weight</b>     |   |                    |                    |                    | 1 lb               | 1 lb               | 1½ lbs                                | 1½ lbs |        |         |
| <b>Friction Block</b>                                   | <b>Part No.</b>   |   |                    |                    |                    | 14934              | 14904              | 14940                                 | 14840  |        |         |
|   | <b>No. Req'd.</b> |   |                    |                    |                    | 2                  | 2                  | 2                                     | 4      |        |         |
|   | <b>Weight</b>     |   |                    |                    |                    | ½ lb               | ½ lb               | ½ lb                                  | ½ lb   |        |         |
| <b>Retainer Screw</b>                                   | <b>Part No.</b>   |   |                    |                    |                    | 15964              | 23108              | 15964                                 | 25214  |        |         |
|   | <b>No. Req'd.</b> |   |                    |                    |                    | 4                  | 4                  | 4                                     | 4      |        |         |
|   | <b>Weight</b>     |   |                    |                    |                    | ⅜ lb               | ⅜ lb               | ⅜ lb                                  | ⅜ lb   |        |         |
| <b>Outer Block Spring</b>                               | <b>Part No.</b>   |   |                    |                    |                    | 14935              | 14919              | 14919                                 | 14842  |        |         |
|   | <b>No. Req'd.</b> |   |                    |                    |                    | 4                  | 4                  | 4                                     | 8      |        |         |
|   | <b>Weight</b>     |   |                    |                    |                    | ¾ lb               | ¾ lb               | ¾ lb                                  | ¾ lb   |        |         |
| <b>Inner Block Spring</b>                               | <b>Part No.</b>   |   |                    |                    |                    | 14936              | 14920              | 14920                                 | 14837  |        |         |
|   | <b>No. Req'd.</b> |   |                    |                    |                    | 4                  | 4                  | 4                                     | 8      |        |         |
|   | <b>Weight</b>     |   |                    |                    |                    | ¼ lb               | ¼ lb               | ¼ lb                                  | ¼ lb   |        |         |

# Bowen Full Circle Releasing Spears

## Specifications and Replacement Parts

### Specifications for Drill Pipe and Tubing Spears

| Nominal Size             |                 | 2 ½ in. D.P. | 2 ½ in. Tbg. | 2 ¾ in. D.P. | 2 ¾ in. Tbg. | 3 ½ in. D.P. | 3 ½ in. Tbg. | 4 in. D.P. | 4 in. Tbg. | 4 ½ in. D.P. | 5 ½ in. D.P. |
|--------------------------|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|------------|--------------|--------------|
| <b>Complete Assembly</b> | <b>Part No.</b> | 6175         | 6693         | 6246         | 6684         | 7640         | 6701         | 7648       | 6710       | 6715         | 6723         |

### Replacement Parts for Drill Pipe and Tubing Spears

|                             |                 |       |         |         |         |         |         |       |         |         |        |
|-----------------------------|-----------------|-------|---------|---------|---------|---------|---------|-------|---------|---------|--------|
| <b>Stop</b>                 | <b>Part No.</b> | 7638  | 6961    | 7639    | 7452    | 7645    | 7647    | 7653  | 7654    | 7655    | 7454   |
|                             | <b>Weight</b>   | ½ lb  | ½ lb    | ¾ lb    | ¾ lb    | 1 lb    | 1 ½ lbs | 2 lbs | 2 ½ lbs | 3 lbs   | 4 lbs  |
| <b>Safety Ring</b>          | <b>Part No.</b> | 6547  | 6545    | 6543    | 6424    | 6541    | 6707    | 6681  | 6539    | 6720    | 6485   |
|                             | <b>Weight</b>   | ¾ lb  | ¾ lb    | 1 ½ lbs | 1 ¾ lbs | 2 lbs   | 2 ½ lbs | 3 lbs | 3 ½ lbs | 4 ½ lbs | 7 lbs  |
| <b>Nut</b>                  | <b>Part No.</b> | 6180  | 5864    | 6251    | 6345    | 6267    | 6708    | 6682  | 5729    | 6721    | 6483   |
|                             | <b>Weight</b>   | 2 lbs | 2 ½ lbs | 3 lbs   | 4 lbs   | 4 ½ lbs | 5 ½ lbs | 7 lbs | 9 lbs   | 12 lbs  | 28 lbs |
| <b>Nut Screw (2 Req'd.)</b> | <b>Part No.</b> | 23330 | 23330   | 17762   | 17762   | 17762   | 23358   | 23345 | 23366   | 23368   | 23379  |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of top connection
  - (3) Size and weight of pipe to be caught



### Recommended Spare Parts:

- (1) 2 sets slips for each size to be caught
- (2) 1 unitizer (or 2 friction block assemblies)
- (3) 2 friction retainers (or 2 friction block assemblies)
- (4) 1 stop
- (5) 1 safety ring for each size of slips

### Accessories for Drill Pipe and Tubing Spears

|                                |                 |             |             |             |             |             |             |             |             |             |             |
|--------------------------------|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Safety Ring Pack-off</b>    | <b>Part No.</b> | 6181        | 6174        | 6252        | 5779        | 6268        | 6709        | 6683        | 5730        | 6722        | 6484        |
|                                | <b>Weight</b>   | ¾ lb        | ¾ lb        | 1 lb        | 1 ¼ lbs     | 1 ½ lbs     | 1 ¾ lbs     | 2 ½ lbs     | 2 ¾ lbs     | 3 ½ lbs     | 6 lbs       |
| <b>Extension (3 feet long)</b> | <b>Part No.</b> | 6176 - 6177 | 5858 - 6694 | 6247 - 6248 | 5774 - 6685 | 6263 - 6264 | 6702 - 6703 | 6676 - 7649 | 5839 - 6711 | 6270 - 6716 | 6277 - 6724 |
|                                | <b>Weight</b>   | 22 lbs      | 26 lbs      | 29 lbs      | 40 lbs      | 46 lbs      | 60 lbs      | 70 lbs      | 75 lbs      | 85 lbs      | 130 lbs     |
| <b>Mill Type Nut</b>           | <b>Part No.</b> | 6180A       | 5864A       | 6251A       | 6345A       | 6267A       | 6708A       | 6682A       | 5729A       | 6721A       | 6483A       |
|                                | <b>Weight</b>   | 1 ¾ lbs     | 2 lbs       | 2 ½ lbs     | 3 ¼ lbs     | 3 ¾ lbs     | 4 ½ lbs     | 6 lbs       | 8 lbs       | 11 lbs      | 26 lbs      |
| <b>Sub Type Nut</b>            | <b>Part No.</b> | 6180B       | 5864B       | 6251B       | 6345B       | 6267B       | 6708B       | 6682B       | 5729B       | 6721B       | 6483B       |
|                                | <b>Weight</b>   | 2 ½ lbs     | 3 lbs       | 3 ½ lbs     | 4 ¾ lbs     | 5 ½ lbs     | 6 ½ lbs     | 9 lbs       | 11 lbs      | 14 ½ lbs    | 31 lbs      |
| <b>Side Hill Type Nut</b>      | <b>Part No.</b> | 6180C       | 5864C       | 6251C       | 6345C       | 6267C       | 6708C       | 6682C       | 5729C       | 6721C       | 6483C       |
|                                | <b>Weight</b>   | 2 lbs       | 2 ½ lbs     | 3 lbs       | 4 lbs       | 4 ¾ lbs     | 5 ½ lbs     | 8 lbs       | 9 ½ lbs     | 13 lbs      | 29 lbs      |



### How to Order

- Specify:
- (1) Size and type of required connection
  - (2) Weight or weights of pipe to be retrieved



### Recommended Spare Parts:

- (1) 3 safety rings for each size of slips

### Optional Accessories

|  |                 |   |   |   |   |   |   |         |         |         |         |
|--|-----------------|---|---|---|---|---|---|---------|---------|---------|---------|
| <b>Unitizer</b>  | <b>Part No.</b> | — | — | — | — | — | — | 7651    | 6713    | 6718    | 6726    |
|  | <b>Weight</b>   | — | — | — | — | — | — | 5 ½ lbs | 7 lbs   | 8 ½ lbs | 11 lbs  |
| <b>Friction Retainer</b>                                   | <b>Part No.</b> | — | — | — | — | — | — | 7652F   | 6714F   | 6719F   | 6727F   |
|  | <b>Weight</b>   | — | — | — | — | — | — | 2 lbs   | 2 ½ lbs | 3 lbs   | 4 ½ lbs |
| <b>Friction Retainer Screws (4 Req'd.) (incl. Springs)</b> | <b>Part No.</b> | — | — | — | — | — | — | 7646    | 7646    | 7646    | 6373-1  |
|  | <b>Weight</b>   | — | — | — | — | — | — | ½ lb    | ½ lb    | ½ lb    | ½ lb    |



### Recommended Spare Parts:

- (1) Unitizer
- (2) Friction retainer

# Bowen Full Circle Releasing Spears

## Specifications and Replacement Parts

### Specifications for Casing Spears

| Nominal Catch Size                                  | 4½ in.                                  | 5 in.                | 5½ in.                | 6 in.                | 6½ in.                | 7 in.                | 7½ in.                | 8 in.                          | 9 in.                           | 10 in.                | 11 in.                            | 13 in.                            |          |
|---|---|----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|--------------------------------|---------------------------------|-----------------------|-----------------------------------|-----------------------------------|----------|
| <b>Recommended Catching Range (for all weights)</b> | 4½ in.,<br>4¾ in., 5 in.<br>All Weights | 5 in.<br>All Weights | 5½ in.<br>All Weights | 6 in.<br>All Weights | 6½ in.<br>All Weights | 7 in.<br>All Weights | 7½ in.<br>All Weights | 8 in.,<br>9 in.<br>All Weights | 9 in.,<br>10 in.<br>All Weights | 10 in.<br>All Weights | 11¾ in.,<br>12 in.<br>All Weights | 13 in.,<br>13¾ in.<br>All Weights |          |
| <b>Expansion Slips Over Safety Ring</b>             | ½ in.                                   | ½ in.                | ¾ in.                 | ¾ in.                | ¾ in.                 | ¾ in.                | ¾ in.                 | 1½ in.                         | ¾ in.                           | 1¾ in.                | 1¾ in.                            | 1¾ in.                            |          |
| <b>O.D. Smallest Slips Retracted</b>                | 3¾ in.                                  | 4 in.                | 4½ in.                | 5 in.                | 5½ in.                | 5¾ in.               | 6 in.                 | 7 in.                          | 8 in.                           | 9 in.                 | 10 in.                            | 12 in.                            |          |
| <b>Slip Engagement Area</b>                         | 210 Sq. in.                             | 217 Sq. in.          | 265 Sq. in.           | 315 Sq. in.          | 350 Sq. in.           | 365 Sq. in.          | 430 Sq. in.           | 485 Sq. in.                    | 580 Sq. in.                     | 690 Sq. in.           | 785 Sq. in.                       | 890 Sq. in.                       |          |
| <b>Complete Assembly</b>                            | <b>Part No.</b>                         | 10536                | 9337                  | 9342                 | 9347                  | 9796                 | 9352                  | 10608                          | 6318                            | 10473                 | 6067                              | 6073                              | 6081     |
|   | <b>Weight</b>                           | 132 lbs              | 169 lbs               | 226 lbs              | 283 lbs               | 358 lbs              | 398 lbs               | 502 lbs                        | 652 lbs                         | 833 lbs               | 1240 lbs                          | 1552 lbs                          | 2017 lbs |

### Replacement Parts

|   |                   |         |         |         |         |         |         |         |         |         |         |         |          |
|---|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| <b>Body</b>   | <b>Part No.</b>   | 10537   | 9338    | 9343    | 9348    | 9797    | 9353    | 10609   | 6319    | 10474   | 6068    | 6074    | 6082     |
|   | <b>Weight</b>     | 71 lbs  | 86 lbs  | 110 lbs | 146 lbs | 189 lbs | 205 lbs | 258 lbs | 323 lbs | 432 lbs | 670 lbs | 840 lbs | 1100 lbs |
| <b>Sleeve Integral with Body</b>                        | <b>Part No.</b>   | 10537-1 | 9338-1  | 9343-1  | 9348-1  | 9797-1  | 9353-1  | 10609-1 | 6319-1  | 10474-1 | 6068-1  | 6074-1  | 6082-1   |
|   | <b>Weight</b>     | 2¼ lbs  | 2½ lbs  | 3 lbs   | 4 lbs   | 5 lbs   | 6 lbs   | 8 lbs   | 12 lbs  | 15 lbs  | 20 lbs  | 25 lbs  | 32 lbs   |
| <b>Slip (including Fingers)</b>                         | <b>Part No.</b>   | 10538   | 9339    | 9344    | 9349    | 9798    | 9354    | 10610   | 6320    | 10475   | 6069    | 6075    | 6083     |
|   | <b>Weight</b>     | 10 lbs  | 11 lbs  | 12 lbs  | 14 lbs  | 17 lbs  | 20 lbs  | 24 lbs  | 29 lbs  | 36 lbs  | 44 lbs  | 55 lbs  | 72 lbs   |
|   | <b>No. Req'd.</b> | 3       | 3       | 4       | 4       | 4       | 4       | 4       | 4       | 4       | 6       | 6       | 6        |
| <b>Friction Block Assembly (includes the following)</b> | <b>Part No.</b>   | 14923   | 14943   | 14949   | 14950   | 14956   | 14958   | 14964   | 14970   | 14976   | 14981   | 14986   | 14991    |
|   | <b>Weight</b>     | 12 lbs  | 13½ lbs | 17½ lbs | 23 lbs  | 31 lbs  | 40½ lbs | 50 lbs  | 60½ lbs | 71 lbs  | 86 lbs  | 92½ lbs | 138 lbs  |
| <b>Unitizer</b>   | <b>Part No.</b>   | 14924   | 14944   | 14962   | 14951   | 14957   | 14959   | 14965   | 14971   | 14977   | 14982   | 14987   | 14992    |
|   | <b>Weight</b>     | 8 lbs   | 9 lbs   | 11 lbs  | 14 lbs  | 18 lbs  | 23 lbs  | 30 lbs  | 38 lbs  | 48 lbs  | 60 lbs  | 74 lbs  | 89 lbs   |
| <b>Retainer (2 Pieces)</b>                              | <b>Part No.</b>   | 14925   | 14945   | 14841   | 14952   | 14834   | 14960   | 14966   | 14972   | 14978   | 14983   | 14988   | 14993    |
|   | <b>Weight</b>     | 3/4 lbs | 1 lbs   | 1 lbs   | 1½ lbs  | 2 lbs   | 2½ lbs  | 3 lbs   | 3½ lbs  | 4 lbs   | 5 lbs   | 5½ lbs  | 6 lbs    |
| <b>Friction Block</b>                                   | <b>Part No.</b>   | 14927   | 14946   | 14840   | 14953   | 14835   | 14961   | 14967   | 14973   | 14979   | 14984   | 14989   | 14994    |
|   | <b>Weight</b>     | 1 ¼ lbs | 1 lbs   | 1 lbs   | 1 ½ lbs | 2 lbs   | 2½ lbs  | 3 lbs   | 3½ lbs  | 4 lbs   | 4 ½ lbs | 5 lbs   | 6 lbs    |
|   | <b>No. Req'd.</b> | 2       | 2       | 4       | 4       | 4       | 4       | 4       | 4       | 4       | 4       | 6       | 6        |
| <b>Retainer Screw</b>                                   | <b>Part No.</b>   | 15964   | 25214   | 25214   | 23126   | 23108   | 23108   | 23109   | 25221   | 25221   | 25221   | 25221   | 25221    |
|   | <b>Weight</b>     | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb     |
|   | <b>No. Req'd.</b> | 2       | 4       | 4       | 4       | 8       | 4       | 4       | 4       | 4       | 4       | 6       | 6        |
| <b>Outer Block Spring</b>                               | <b>Part No.</b>   | 14926   | 14919   | 14842   | 14842   | 14836   | 14836   | 14836   | 14836   | 17694   | 17694   | 14990   | 14996    |
|   | <b>Weight</b>     | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ½ lb    | ½ lb    | ½ lb    | ¾ lb     |
|   | <b>No. Req'd.</b> | 2       | 6       | 4       | 4       | 8       | 8       | 8       | 8       | 12      | 12      | 18      | 18       |
| <b>Block Spring Inner</b>                               | <b>Part No.</b>   | 16589   | 14920   | 14837   | 14837   | 14837   | 14837   | 14837   | 14837   | 11816   | 11816   | 11816   | 11816    |
|   | <b>Weight</b>     | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¾ lb    | ¾ lb    | ¾ lb    | ¾ lb     |
|   | <b>No. Req'd.</b> | 2       | 6       | 4       | 4       | 8       | 8       | 8       | 8       | 12      | 12      | 18      | 18       |
| <b>Stop</b>   | <b>Part No.</b>   | A-7603  | A-7580  | A-7454  | 7597    | B-6965  | 7609    | 7626    | 7494    | 7531    | 7627    | 7628    | 7629     |
|   | <b>Weight</b>     | 2¼ lbs  | 3 lbs   | 4 lbs   | 5 lbs   | 7 lbs   | 9 lbs   | 11 lbs  | 14 lbs  | 18 lbs  | 23 lbs  | 29 lbs  | 36 lbs   |
| <b>Safety Ring</b>                                      | <b>Part No.</b>   | 6733    | 7581    | 6485    | 6520    | 6488    | 6522    | 6524    | 6528    | 6531    | 6533    | 6535    | 6537     |
|   | <b>Weight</b>     | 5 lbs   | 6 lbs   | 7 lbs   | 8½ lbs  | 11 lbs  | 12 lbs  | 16 lbs  | 25 lbs  | 32 lbs  | 45 lbs  | 56 lbs  | 73 lbs   |
| <b>Nut</b>  | <b>Part No.</b>   | 6376    | 7582    | 6483    | 6040    | 6108    | 6046    | 6054    | 6321    | 6062    | 6071    | 6079    | 6087     |
|   | <b>Weight</b>     | 17 lbs  | 21 lbs  | 28 lbs  | 33 lbs  | 42 lbs  | 46 lbs  | 57 lbs  | 86 lbs  | 107 lbs | 134 lbs | 168 lbs | 216 lbs  |
| <b>Nut Set Screw</b>                                    | <b>Part No.</b>   | 23368   | 23368   | 23379   | 23379   | 23379   | 23379   | 23386   | 23386   | 23386   | 41056   | 41056   | 41056    |
|   | <b>Weight</b>     | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs   | 2 lbs    |



### How to Order

- Specify:
- (1) Name and number of assembly or parts
  - (2) Size and type of required connection
  - (3) Size and weight of pipe to be retrieved



### Recommended Spare Parts:

- (1) 2 sets slips for each size to be caught
- (2) 2 friction block assemblies
- (3) 1 Stop
- (4) 1 Safety ring for each size of slips

# Bowen Full Circle Releasing Spears

## Specifications and Replacement Parts

### Specifications for Drill Pipe and Tubing Spears

| Nominal Size      |          | 4½ in. | 5 in. | 5½ in. | 6 in. | 6½ in. | 7 in. | 7½ in. | 8 in. | 9 in. | 10 in. | 11 in. | 13 in. |
|-------------------|----------|--------|-------|--------|-------|--------|-------|--------|-------|-------|--------|--------|--------|
| Complete Assembly | Part No. | 10536  | 9337  | 9342   | 9347  | 9796   | 9352  | 10608  | 6318  | 10473 | 6067   | 6073   | 6081   |

### Accessories

|                      |          |        |        |        |        |        |        |        |        |         |         |         |         |
|----------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| Safety Ring Pack-off | Part No. | 6734   | 7583   | 6484   | 6041   | 6487   | 6047   | 6055   | 6529   | 6063    | 6072    | 6080    | 6088    |
|                      | Weight   | 4 lbs  | 5 lbs  | 6 lbs  | 7 lbs  | 9 lbs  | 10 lbs | 12 lbs | 17 lbs | 23 lbs  | 35 lbs  | 44 lbs  | 59 lbs  |
| Mill Type Nut        | Part No. | 6376A  | 7582A  | 6483A  | 6040A  | 6108A  | 6046A  | 6054A  | 6321A  | 6062A   | 6071A   | 6079A   | 6087A   |
|                      | Weight   | 16 lbs | 20 lbs | 26 lbs | 30 lbs | 39 lbs | 43 lbs | 53 lbs | 81 lbs | 102 lbs | 128 lbs | 160 lbs | 205 lbs |
| Sub Type Nut         | Part No. | 6376B  | 7582B  | 6483B  | 6040B  | 6108B  | 6046B  | 6054B  | 6321B  | 6062B   | 6071B   | 6079B   | 6087B   |
|                      | Weight   | 19 lbs | 24 lbs | 31 lbs | 36 lbs | 46 lbs | 51 lbs | 63 lbs | 94 lbs | 118 lbs | 148 lbs | 185 lbs | 238 lbs |
| Side Hill Type Nut   | Part No. | 6376C  | 7582C  | 6483C  | 6040C  | 6108C  | 6046C  | 6054C  | 6321C  | 6062C   | 6071C   | 6079C   | 6087C   |
|                      | Weight   | 18 lbs | 23 lbs | 28 lbs | 33 lbs | 42 lbs | 47 lbs | 58 lbs | 88 lbs | 110 lbs | 138 lbs | 172 lbs | 221 lbs |

### Optional Accessories

|                                     |          |        |        |        |        |        |        |        |        |        |        |        |        |
|-------------------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Unitizer                            | Part No. | 10539  | 9340   | 9345   | 9350   | 9799   | 9355   | 10611  | 7493   | 10476  | 6070   | 6078   | 6086   |
|                                     | Weight   | 8 lbs  | 9 lbs  | 11 lbs | 14 lbs | 18 lbs | 23 lbs | 30 lbs | 38 lbs | 48 lbs | 60 lbs | 74 lbs | 89 lbs |
| Friction Retainer (Incl. Springs)   | Part No. | 10540  | 9341   | 9346   | 9351   | 9800   | 9356   | 10612  | 7495 F | 10477  | 6532F  | 6534   | 6536F  |
|                                     | Weight   | 3 lbs  | 3¼ lbs | 4½ lbs | 6 lbs  | 7½ lbs | 9 lbs  | 12 lbs | 15 lbs | 20 lbs | 24 lbs | 30 lbs | 39 lbs |
| Friction Retainer Screws (2 Req'd.) | Part No. | 6373-1 | 6373-1 | 6373-1 | 7596   | 6964   | 6964   | 7496   | 7496   | 7496   | 7496   | 7496   | 7496   |
|                                     | Weight   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   | ½ lb   |



### How to Order

- Specify:
- (1) Name and number of assembly or parts
  - (2) Size and type of required connection
  - (3) Size and weight of pipe to be retrieved



### Recommended Spare Parts:

- (1) 2 sets slips for each size to be caught
- (2) 2 friction block assemblies
- (2) 1 stop
- (4) 1 safety ring for each size of slips



# Bowen Full Circle Releasing Spears

## Specifications and Replacement Parts

### Skirts for All Types of Spears

| Size      |          | 2½ in. | 2⅞ in. | 3½ in. | 4 in.  | 4½ in. | 5½ in. | 6½ in. |
|-----------|----------|--------|--------|--------|--------|--------|--------|--------|
| 4 in. OD  | Part No. | 4644   | 4646   | —      | —      | —      | —      | —      |
|           | Weight   | 17 lbs | 17 lbs | —      | —      | —      | —      | —      |
| 4½ in.    | Part No. | 4645   | 4647   | 4649   | 19446  | —      | —      | —      |
|           | Weight   | 19 lbs | 19 lbs | 27 lbs | 27 lbs | —      | —      | —      |
| 5 in. OD  | Part No. | —      | 4648   | 4650   | 19447  | —      | —      | —      |
|           | Weight   | —      | 24 lbs | 30 lbs | 30 lbs | —      | —      | —      |
| 5½ in. OD | Part No. | —      | 4778   | 4651   | 19448  | 4652   | —      | —      |
|           | Weight   | —      | 32 lbs | 34 lbs | 34 lbs | 41 lbs | —      | —      |
| 6 in. OD  | Part No. | —      | —      | 19441  | 19449  | 19454  | —      | —      |
|           | Weight   | —      | —      | 46 lbs | 46 lbs | 48 lbs | —      | —      |
| 6½ in. OD | Part No. | —      | —      | 5495   | 19450  | 4653   | 4655   | —      |
|           | Weight   | —      | —      | 58 lbs | 58 lbs | 58 lbs | 66 lbs | —      |
| 7 in. OD  | Part No. | —      | —      | 5494   | 19451  | 4654   | 5497   | —      |
|           | Weight   | —      | —      | 64 lbs | 64 lbs | 64 lbs | 64 lbs | —      |
| 7½ in. OD | Part No. | —      | —      | 4772   | 19452  | 4864   | 4656   | 4658   |
|           | Weight   | —      | —      | 78 lbs | 78 lbs | 78 lbs | 78 lbs | 78 lbs |
| 8½ in. OD | Part No. | —      | —      | 4773   | 19453  | 5496   | 4657   | 4659   |
|           | Weight   | —      | —      | 87 lbs | 87 lbs | 87 lbs | 87 lbs | 87 lbs |
| 9 in. OD  | Part No. | —      | —      | —      | —      | —      | 4792   | 4660   |
|           | Weight   | —      | —      | —      | —      | —      | 93 lbs | 93 lbs |
| 9½ in. OD | Part No. | —      | —      | —      | —      | —      | —      | 4661   |
|           | Weight   | —      | —      | —      | —      | —      | —      | 98 lbs |



### How to Order

Specify:

- (1) Number of assembly
- (2) Assembly number and size of taper tap or spear to be used with skirt
- (3) Outside diameter of skirt

### Skirt Guides for All Types of Spears

| Skirt O.D.               |          | 4 in.  | 4½ in. | 5 in.  | 5½ in. | 6 in.  | 6½ in. | 7 in.  | 7½ in. | 8½ in. | 9 in.  | 9½ in. |
|--------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Over 5 in. to 6 5 in. OD | Part No. | 4662   | 4663   | 4664   | —      | —      | —      | —      | —      | —      | —      | —      |
|                          | Weight   | 27 lbs | 30 lbs | 34 lbs | —      | —      | —      | —      | —      | —      | —      | —      |
| Over 6 in. to 7 in. OD   | Part No. | 4662   | 4663   | 4664   | 4665   | —      | —      | —      | —      | —      | —      | —      |
|                          | Weight   | 34 lbs | 38 lbs | 42 lbs | 49 lbs | —      | —      | —      | —      | —      | —      | —      |
| Over 7 in. to 8 in. OD   | Part No. | —      | 4663   | 4664   | 4665   | 4685   | —      | —      | —      | —      | —      | —      |
|                          | Weight   | —      | 48 lbs | 53 lbs | 55 lbs | 58 lbs | —      | —      | —      | —      | —      | —      |
| Over 8 in. to 9 in. OD   | Part No. | —      | 4663   | 4664   | 4665   | 4685   | 4299   | 3824   | —      | —      | —      | —      |
|                          | Weight   | —      | 53 lbs | 58 lbs | 60 lbs | 62 lbs | 64 lbs | 65 lbs | —      | —      | —      | —      |
| Over 9 in. to 10 in. OD  | Part No. | —      | —      | —      | 4665   | 4685   | 4299   | 3824   | 4666   | —      | —      | —      |
|                          | Weight   | —      | —      | —      | 65 lbs | 67 lbs | 70 lbs | 72 lbs | 74 lbs | —      | —      | —      |
| Over 10 in. to 11 in. OD | Part No. | —      | —      | —      | 4665   | 4685   | 4299   | 3824   | 4666   | 4295   | —      | —      |
|                          | Weight   | —      | —      | —      | 70 lbs | 76 lbs | 79 lbs | 82 lbs | 82 lbs | 84 lbs | —      | —      |
| Over 11 in. to 12 in. OD | Part No. | —      | —      | —      | —      | —      | 4299   | 3824   | 4666   | 4295   | 4667   | 4668   |
|                          | Weight   | —      | —      | —      | —      | —      | 79 lbs | 82 lbs | 84 lbs | 87 lbs | 89 lbs | 91 lbs |
| Over 12 in. to 13 in. OD | Part No. | —      | —      | —      | —      | —      | —      | 3824   | 4666   | 4295   | 4667   | 4668   |
|                          | Weight   | —      | —      | —      | —      | —      | —      | 87 lbs | 89 lbs | 91 lbs | 93 lbs | 95 lbs |

# Bowen Full Circle Releasing Spears

## Range Sheets

### Range Sheet for Drill Pipe and Tubing

| For Fish Size             |                                | Use Spear           |          | Use Slip       |          | Use Friction Block |          | Use Safety Ring Or Safety Ring Packoff |             |               |
|---------------------------|--------------------------------|---------------------|----------|----------------|----------|--------------------|----------|--|-------------|---------------|
| Drill Pipe or Tubing Size | Weight                         | Nominal Casing Size | Part No. | Size (Stamped) | Part No. | Size (Stamped)     | Part No. | Size (Stamped)                         | SR Part No. | SRPO Part No. |
| 2 3/8 in. DP              | 6.65 lbs                       | 2 3/8 in. DP        | 6175     | 1 13/16 in.    | 6178     | —                  | —        | 1 11/16 in.                            | 6547        | 6181          |
| 2 3/8 in. DP              | 4.80 lbs                       | 2 3/8 in. DP        | 6175     | 2 in.          | 6178     | —                  | —        | 1 7/8 in.                              | 6547        | 6181          |
| 2 3/8 in. Tubing          | 4.7 lbs, 4.6 lbs, and 4.0 lbs  | 2 3/8 in. Tubing    | 6693     | 2 1/2 in.      | 6695     | —                  | —        | 1 29/32 in.                            | 6545        | 6174          |
| 2 7/8 in. DP              | 10.40 lbs                      | 2 7/8 in. DP        | 6246     | 2 5/8 in.      | C6249    | —                  | —        | 2 in.                                  | 6543        | 6252          |
| 2 7/8 in. DP              | 8.35 lbs                       | 2 7/8 in. DP        | 6246     | 2 11/32 in.    | C6249    | —                  | —        | 2 3/16 in.                             | 6543        | 6252          |
| 2 7/8 in. DP              | 6.45 lbs                       | 2 7/8 in. DP        | 6246     | 2 1/2 in.      | C6249    | —                  | —        | 2 11/32 in.                            | 6543        | 6252          |
| 2 7/8 in. Tubing          | 8.7 lbs                        | 2 7/8 in. Tubing    | 6246     | 2 1/4 in.      | C6249    | —                  | —        | 2 7/8 in.                              | 6543        | 6252          |
| 2 7/8 in. Tubing          | 8.7 lbs                        | 2 7/8 in. Tubing    | 6684     | 2 1/4 in.      | 6686     | —                  | —        | 2 7/8 in.                              | 6424        | 5779          |
| 2 7/8 in. Tubing          | 6.50 lbs and 6.40 lbs          | 2 7/8 in. Tubing    | 6684     | 2 7/16 in.     | 6686     | —                  | —        | 2 7/16 in.                             | 6424        | 5779          |
| 3 1/2 in. DP              | 15.5 lbs                       | 3 1/2 in. DP        | 7640     | 2 5/8 in.      | 7642     | —                  | —        | 2 7/16 in.                             | 6541        | 6268          |
| 3 1/2 in. DP              | 13.3 lbs                       | 3 1/2 in. DP        | 7640     | 2 29/32 in.    | 7642     | —                  | —        | 2 19/32 in.                            | 6541        | 6268          |
| 3 1/2 in. DP              | 11.2 lbs                       | 3 1/2 in. DP        | 7640     | 2 15/16 in.    | 7642     | —                  | —        | 2 3/4 in.                              | 6541        | 6268          |
| 3 1/2 in. DP              | 8.5 lbs                        | 3 1/2 in. DP        | 7640     | 3 3/32 in.     | 7642     | —                  | —        | 2 29/32 in.                            | 6541        | 6268          |
| 3 1/2 in. Tubing          | 10.2 lbs, 9.3 lbs, and 9.2 lbs | 3 1/2 in. Tubing    | 6701     | 2 31/32 in.    | 6704     | —                  | —        | 2 13/16 in.                            | 6707        | 6709          |
| 3 1/2 in. Tubing          | 7.70 lbs                       | 3 1/2 in. Tubing    | 6701     | 3 1/8 in.      | 6704     | —                  | —        | 2 15/16 in.                            | 6707        | 6709          |
| 4 in. DP                  | 15.7 lbs                       | 4 in. DP            | 7648     | 3 3/32 in.     | 7650     | —                  | 14934    | 3 3/32 in.                             | 6681        | 6683          |
| 4 in. DP                  | 14.00 lbs                      | 4 in. DP            | 7648     | 3 11/32 in.    | 7650     | —                  | —        | 3 3/32 in.                             | 6681        | 6683          |
| 4 in. Tubing              | 11.0 lbs                       | 4 in. Tubing        | 6710     | 3 1/2 in.      | 6712     | 3 1/4 in.          | 14904    | 3 5/16 in.                             | 6539        | 5730          |
| 4 in. Tubing              | 9.5 lbs                        | 4 in. Tubing        | 6710     | 3 19/32 in.    | 6712     | —                  | —        | 3 13/32 in.                            | 6539        | 5730          |
| 4 1/2 in. DP              | 20 lbs                         | 4 1/2 in. DP        | 6715     | 3 11/16 in.    | 6717     | 3 5/8 in.          | 14940    | 3 15/32 in.                            | 6720        | 6722          |
| 4 1/2 in. DP              | 18.1 lbs and 16.6 lbs          | 4 1/2 in. DP        | 6715     | 3 7/8 in.      | 6717     | —                  | —        | 3 21/32 in.                            | 6720        | 6722          |
| 4 1/2 in. DP              | 13.75 lbs and 12.75 lbs        | 4 1/2 in. DP        | 6715     | 4 1/32 in.     | 6717     | —                  | —        | 3 13/16 in.                            | 6720        | 6722          |
| 5 1/2 in. DP              | 24.7 lbs and 21.9 lbs          | 5 1/2 in. DP        | 6723     | 4 3/4 in.      | 6725     | 4 3/4 in.          | 14840    | 4 1/2 in.                              | 6485        | 6484          |
| 5 1/4 in. DP              | 25.25 lbs                      | 5 1/2 in. DP        | 6723     | 4 3/4 in.      | 6725     | 4 3/4 in.          | 14840    | 4 1/2 in.                              | 6485        | 6484          |
| 5 1/4 in. DP              | 22.2 lbs                       | 5 1/2 in. DP        | 6723     | 4 7/8 in.      | 6725     | —                  | —        | 4 5/8 in.                              | 6485        | 6484          |
| 5 1/4 in. DP              | 19.0 lbs                       | 5 1/2 in. DP        | 6723     | 5 1/16 in.     | 6725     | —                  | —        | 4 3/16 in.                             | 6485        | 6484          |

**NOTE:**

The spears for drill pipe listed above will pass through API, Reed, Spang, Hughes, and Hydril I.F. tool joints and through internal upset section on Spang double-seal external upset drill pipe.

**NOTES:** Caution.

- 1) 6684 dressed for 2 7/8 in. 8.7 lb. will not go in completely. The top sub is 2 5/16 in. and will not go into tubing.
- 2) 6246 dressed for 2 7/8 in. 8.7 lb. will not go in completely. The top sub is 3 5/8 in. O.D. and will not go in completely.

# Bowen Full Circle Releasing Spears

## Range Sheets

### Range Sheet for Casing

| For Fish Size |   | Use Spear           |          | Use Slip       |          | Use Friction Block |           | Use Safety Ring Or Safety Ring Packoff |             |               |
|---------------|---|---------------------|----------|----------------|----------|--------------------|-----------|--|-------------|---------------|
| Casing Size   | Weight  | Nominal Casing Size | Part No. | Size (Stamped) | Part No. | Size (Stamped)     | Part No.  | Size (Stamped)                         | SR Part No. | SRPO Part No. |
| 4½ in.        | 13.5 lbs and 11.6 lbs                                 | 4½ in.              | 10536    | 4 in.          | 10538    | 14927              | 4½ in.    | 3²⁄₃₂ in.                              | 6733        | 6734          |
| 4½ in.        | 9.5 lbs   | 4½ in.              | 10536    | 4³⁄₃₂ in.      | 10538    | —                  | —         | 3¹⁄₁₆ in.                              | 6733        | 6734          |
| 4¾ in.        | 16.0 lbs  | 4½ in.              | 10536    | 4³⁄₃₂ in.      | 10538    | 14927              | 4½ in.    | 3¹⁄₁₆ in.                              | 6733        | 6734          |
| 5 in.         | 21.0 lbs  | 5 in.               | 9337     | 4³⁄₃₂ in.      | 9339     | 14946              | 4¾ in.    | 4 in.                                  | 7581        | 7583          |
| 5 in.         | 18.0 lbs and 17.7 lbs                                 | 5 in.               | 9337     | 4¹¹⁄₃₂ in.     | 9339     | —                  | —         | 4⅞ in.                                 | 7581        | 7583          |
| 5 in.*        | 15.0 lbs  | 5 in.               | 9337     | 4¹⁹⁄₃₂ in.     | 9339     | —                  | —         | 4¾ in.                                 | 7581        | 7583          |
| 5 in.         | 13.0 lbs and 11.5 lbs                                 | 5 in.               | 9337     | 4¹⁹⁄₃₂ in.     | 9339     | —                  | —         | 4¾ in.                                 | 7581        | 7583          |
| 5½ in.        | 23.0 lbs  | 5½ in.              | 9342     | 4¾ in.         | 9344     | 14840              | 4¾ in.    | 4½ in.                                 | 6485        | 6484          |
| 5½ in.        | 20.0 lbs and 17.0 lbs                                 | 5½ in.              | 9342     | 4⅞ in.         | 9344     | —                  | —         | 4⅞ in.                                 | 6485        | 6484          |
| 5½ in.        | 15.5 lbs, 14.0 lbs, and 13.0 lbs                      | 5½ in.              | 9342     | 5¹⁄₁₆ in.      | 9344     | —                  | —         | 4¹³⁄₁₆ in.                             | 6485        | 6484          |
| 5¾ in †       | 22.5 lbs and 19.5 lbs                                 | 5½ in.              | 9342     | 5¹⁄₁₆ in.      | 9344     | 14840              | 5¹⁄₁₆ in. | 4 ¾ in.                                | 6485        | 6484          |
| 5¾ in †       | 17.0 lbs and 14.0 lbs                                 | 5½ in.              | 9342     | 5¹⁄₁₆ in.      | 9344     | —                  | —         | 5¹⁄₁₆ in.                              | 6485        | 6484          |
| 6 in.         | 23.0 lbs  | 6 in.               | 9347     | 5¹⁄₁₆ in.      | 9349     | 14953              | 4¾ in.    | 5¹⁄₁₆ in.                              | 6520        | 6041          |
| 6 in.         | 20.0 lbs and 18.0 lbs                                 | 6 in.               | 9347     | 5¹⁄₁₆ in.      | 9349     | —                  | —         | 5¹⁄₁₆ in.                              | 6520        | 6041          |
| 6 in.         | 16.0 lbs and 15.0 lbs                                 | 6 in.               | 9347     | 5¹⁹⁄₃₂ in.     | 9349     | —                  | —         | 5¹³⁄₃₂ in.                             | 6520        | 6041          |
| 6¾ in.        | 32.0 lbs, 29.0 lbs, and 28.0 lbs                      | 6¾ in.              | 9796     | 5¾ in.         | 9798     | 14835              | 5¾ in.    | 5½ in.                                 | 6488        | 6487          |
| 6¾ in.        | 26.8 lbs, 26.0 lbs, 24.0 lbs, and 22.0 lbs            | 6¾ in.              | 9796     | 5¹⁹⁄₃₂ in.     | 9798     | —                  | —         | 5¹¹⁄₁₆ in.                             | 6488        | 6487          |
| 6¾ in.        | 20.0 lbs and 17.0 lbs                                 | 6¾ in.              | 9796     | 6⅞ in.         | 9798     | 14835              | 6⅞ in.    | 5⅞ in.                                 | 6488        | 6487          |
| 7 in.         | 40.0 lbs  | 6¾ in.              | 9796     | 5¹⁹⁄₃₂ in.     | 9798     | 14835              | 6⅞ in.    | 5¹¹⁄₁₆ in.                             | 6488        | 6487          |
| 7 in.         | 38.0 lbs and 35.0 lbs                                 | 7 in.               | 9352     | 6 in.          | 9354     | 14961              | 5¾ in.    | 5¾ in.                                 | 6522        | 6047          |
| 7 in.         | 32.0 lbs, 30.0 lbs, 29.0 lbs, and 28.0 lbs            | 7 in.               | 9352     | 6³⁄₁₆ in.      | 9354     | —                  | —         | 5¹⁹⁄₁₆ in.                             | 6522        | 6047          |
| 7 in.         | 26.0 lbs, 24.0 lbs, 23.0 lbs, and 22.0 lbs            | 7 in.               | 9352     | 6⅞ in.         | 9354     | —                  | —         | 6⅞ in.                                 | 6522        | 6047          |
| 7 in.         | 20.0 lbs and 17.0 lbs                                 | 7 in.               | 9352     | 6¹¹⁄₃₂ in.     | 9354     | —                  | —         | 6⁹⁄₃₂ in.                              | 6522        | 6047          |
| 7¾ in.        | 39.0 lbs and 33.7 lbs                                 | 7¾ in.              | 10608    | 6¹¹⁄₁₆ in.     | 10610    | 14967              | 6¾ in.    | 6⅞ in.                                 | 6524        | 6055          |
| 7¾ in.        | 29.7 lbs and 26.4 lbs                                 | 7¾ in.              | 10608    | 6¹⁹⁄₁₆ in.     | 10610    | —                  | —         | 6¹¹⁄₁₆ in.                             | 6524        | 6055          |
| 7¾ in.        | 24.0 lbs and 20.0 lbs                                 | 7¾ in.              | 10608    | 7³⁄₃₂ in.      | 10610    | —                  | —         | 6²¹⁄₃₂ in.                             | 6524        | 6055          |
| 8 in.         | 26.0 lbs  | 7¾ in.              | 10608    | 7¹⁄₁₆ in.      | 10610    | 14967              | 6¾ in.    | 7³⁄₁₆ in.                              | 6524        | 6055          |
| 8½ in.        | 39.5 lbs and 35.5 lbs                                 | 7¾ in.              | 10608    | 7¼ in.         | 10610    | 14967              | 6¾ in.    | 7 in.                                  | 6524        | 6055          |
| 8½ in.        | 32.0 lbs and 28.0 lbs                                 | 7¾ in.              | 10608    | 7¹⁄₁₆ in.      | 10610    | —                  | —         | 7³⁄₁₆ in.                              | 6524        | 6055          |
| 8¾ in.        | 49.0 lbs and 44.0 lbs                                 | 8¾ in.              | 6318     | 7¹⁹⁄₁₆ in.     | 6320     | 14973              | 7¾ in.    | 7¼ in.                                 | 6528        | 6529          |
| 8¾ in.        | 43.0 lbs, 40.0 lbs, 38.0 lbs, and 36.0 lbs            | 8¾ in.              | 6318     | 7¹³⁄₁₆ in.     | 6320     | —                  | —         | 7½ in.                                 | 6528        | 6529          |
| 8¾ in.*       | 32.0 lbs, 28.0 lbs and 24 lbs                         | 8¾ in.              | 6318     | 8¹⁄₁₆ in.      | 6320     | —                  | —         | 7¾ in.                                 | 6528        | 6529          |
| 9 in.         | 55 lbs  | 8¾ in.              | 6318     | 7¹³⁄₁₆ in.     | 6320     | 14973              | 7¾ in.    | 7½ in.                                 | 6528        | 6529          |
| 9 in.         | 45 lbs  | 8¾ in.              | 6318     | 8¹⁄₁₆ in.      | 6320     | —                  | —         | 7¾ in.                                 | 6528        | 6529          |
| 9 in.         | 40.0 lbs, 38.0 lbs, and 34.0 lbs                      | 8¾ in.              | 6318     | 8¹⁄₁₆ in.      | 6320     | —                  | —         | 8 in.                                  | 6528        | 6529          |
| 9¾ in.        | 58.0 lbs, 53.5 lbs, and 47.0 lbs                      | 9¾ in.              | 10473    | 8½ in.         | 10475    | 14979              | 8¾ in.    | 8³⁄₁₆ in.                              | 6531        | 6063          |
| 9¾ in.        | 43.5 lbs, 40.0 lbs, and 36.0 lbs                      | 9¾ in.              | 10473    | 8¹³⁄₁₆ in.     | 10475    | —                  | —         | 8½ in.                                 | 6531        | 6063          |
| 9¾ in.        | 32.3 lbs and 29.3 lbs                                 | 9¾ in.              | 10473    | 9 in.          | 10475    | —                  | —         | 8¹¹⁄₁₆ in.                             | 6531        | 6063          |
| 10 in.        | 33.0 lbs  | 9¾ in.              | 10473    | 9¾ in.         | 10475    | 14979              | 8¾ in.    | 9¹⁄₁₆ in.                              | 6531        | 6063          |
| 10¼ in.       | 55.5 lbs, 54.0 lbs, 51.0 lbs, and 48.0 lbs            | 10¼ in.             | 6067     | 9¹³⁄₁₆ in.     | 6069     | 14984              | 10 in.    | 9½ in.                                 | 6533        | 6072          |
| 10¼ in.       | 45.5 lbs, 45.0 lbs, 40.5 lbs, 40.0 lbs, and 32.75 lbs | 10¼ in.             | 6067     | 10¹⁄₁₆ in.     | 6069     | —                  | —         | 9¾ in.                                 | 6533        | 6072          |
| 11¼ in.       | 60.0 lbs and 54.0 lbs                                 | 11¼ in.             | 6073     | 10⅞ in.        | 6075     | 14989              | —         | 10⁹⁄₁₆ in.                             | 6535        | 6080          |
| 11¼ in.       | 47.0 lbs, 42.0 lbs, and 38.0 lbs                      | 11¼ in.             | 6073     | 11⅞ in.        | 6075     | —                  | —         | 10¹³⁄₁₆ in.                            | 6535        | 6080          |
| 12 in.        | 40.0 lbs  | 11¼ in.             | 6073     | 11⅞ in.        | 6075     | 14989              | —         | 11¹⁄₁₆ in.                             | 6535        | 6080          |
| 13 in.        | 54.0 lbs, 50.0 lbs, 45.0 lbs, and 40 lbs              | 13 in.              | 6081     | 12¾ in.        | 6083     | 14994              | 12¼ in.   | 12 in.                                 | 6537        | 6088          |
| 13¾ in.       | 83.0 lbs, 72.0 lbs, 68.0 lbs, and 61.0 lbs            | 13 in.              | 6081     | 12¾ in.        | 6083     | 14994              | 12¼ in.   | 12 in.                                 | 6537        | 6088          |
| 13¾ in.       | 54.4 lbs and 48.0 lbs                                 | 13 in.              | 6081     | 12¾ in.        | 6083     | —                  | —         | 12¼ in.                                | 6537        | 6088          |
| 16 in.        | 84.0 lbs, 75.0 lbs, 65.0 lbs, and 55.0 lbs            | 13¾ in.             | 6081     | 15³⁄₁₆ in.     | 6083     | 14994              | 15 in.    | 14¹³⁄₁₆ in.                            | 6537        | 6088          |

NOTE:  
 \* If spear must pass through joint on 5 in. -15.0 lb Spang Extreme Line Casing or through joint on 8¾ in. - 32 lb Spang Extreme Line Casing, use next smaller size slip and safety ring, or safety ring pack-off.  
 † Requires oversize friction retainer, Part No. 9346-F0.

# Bowen Full Circle Releasing Spears

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## Strength Chart

### Full Circle Releasing Spear Strength Chart

| Complete Assembly No. | Slip No. | Yield Strength of Body | Complete Assembly No. | Slip No. | Yield Strength of Body |
|-----------------------|----------|------------------------|-----------------------|----------|------------------------|
| 6067                  | 6069     | 3,300,000 lbs          | 6723                  | 6725     | 628,000 lbs            |
| 6073                  | 6075     | 4,300,000 lbs          | 7640                  | 7642     | 172,000 lbs            |
| 6081                  | 6083     | 5,961,000 lbs          | 7648                  | 7650     | 296,000 lbs            |
| 6175                  | 6178     | 56,400 lbs             | 9337                  | 9339     | 454,000 lbs            |
| 6246                  | 6249     | 110,400 lbs            | 9342                  | 9344     | 628,000 lbs            |
| 6318                  | 6320     | 1,761,000 lbs          | 9347                  | 9349     | 945,000 lbs            |
| 6684                  | 6686     | 134,000 lbs            | 9352                  | 9354     | 1,228,000 lbs          |
| 6693                  | 6695     | 71,500 lbs             | 9796                  | 9798     | 1,060,000 lbs          |
| 6701                  | 6704     | 224,000 lbs            | 10473                 | 10475    | 2,324,000 lbs          |
| 6710                  | 6712     | 275,000 lbs            | 10536                 | 10538    | 376,000 lbs            |
| 6715                  | 6717     | 318,000 lbs            | 10608                 | 10610    | 1,414,000 lbs          |

**NOTE:**

All listed strengths are theoretical calculations based upon the yield strength of the material and are accurate within 20%. They refer to the tensile strength of the body and do not relate to the strength of the fish being engaged. Thin walled or old corroded pipe may allow the grapple to expand to the point where it can jump the mandrel spirals. Jarring may amplify the pull load by a factor of 3 to 10.



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# ITCO TYPE RELEASING SPEARS

Instruction Manual 2300



Itco Type Releasing Spears

# Itco Type Releasing Spears

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*The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.*

*Twentieth Printing, September 2005*



### General Description

The **Bowen Itco Type Releasing Spear** is a superior fishing spear which is designed to assure positive internal engagement with the fish. It is ruggedly built to withstand severe jarring and pulling strains. It engages the fish over a large area without damage to, or distortion of the fish. The simple design eliminates any small parts which could become lost or damaged in the hole. If the fish cannot be pulled, the spear may easily be released and disengaged.

### Use

The Bowen Itco Type releasing Spear is used to internally engage and to retrieve all sizes of tubing, drill pipe and casing. It may be used in conjunction with cutters, spear pack-offs and other tools, where this is desirable.

### Construction

The Bowen Itco Type Releasing Spear consists of a Mandrel, Grapple, Release Ring and Nut. The Mandrel may be ordered in either a Flush Type or a Shoulder Type. Mandrel top connections are furnished to order.

The flexible one-piece Grapple has an internal helix matching the Mandrel helix. The tang of the Grapple rests against a stop on the Mandrel when the Spear is in the engaged position. The large engaging surface of the Grapple permits heavy jarring and pulling strains without distorting the fish.

The helix of the Mandrel ends at the point where the Release Ring is mounted. The cam of the Release Ring matches the cam on the face of the Nut. The matching cams of the Release Ring and the Nut are a safety device which resists locking, freezing or jamming of the Spear, assuring an easy release.

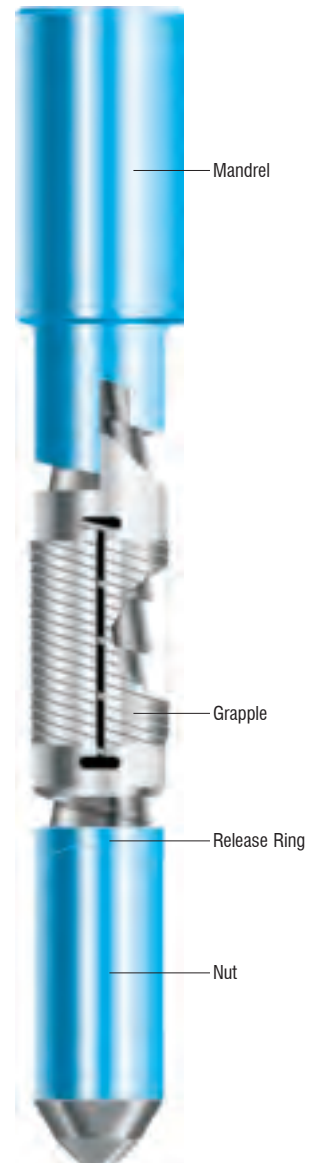
The standard plain bull-nose nut is furnished on the tool when ordered unless an alternate type is specified. Also available as accessory items at extra cost are Mill Type, Sub Type and Side-hill Type nuts.

### Heavy Duty Itco Type Releasing Spears

**Bowen Heavy Duty Itco Type Releasing Spears** have a relatively longer Mandrel and Grapple than the Standard Spear resulting in twice as much supported wickered area in engagement with the fish. These assemblies are listed, along with the standard assemblies, in the specifications found below in this manual.

The Heavy Duty Itco Type Spear is intended for use in situations where swelling of the fish is a problem. This spear, which has a much longer mandrel and grapple, distributes the swelling forces over a greater area and thus substantially reduces these forces. While the tensile strength of the mandrel is the same as the standard spear, the Heavy Duty Spear is far less prone to damage from swelling of the fish and is actually much stronger in this sense.

Since the swelling forces being delivered to the fish vary with grapple size, type of lubrication used, straight pull or jarring, etc.; it is very difficult to provide meaningful strength data for each condition. While such calculations are possible, it would mean providing a different strength for each casing or tubing size, weight, and material grade for each spear size. Since it would require many pages of published data, many hours of calculations, many assumptions regarding coefficient of friction and condition of casing, we have never attempted to provide such data.



Shoulder Type in Engaging Position



**Flush Type Spear in Releasing Position  
(with Sub Type Nut)**

The published data is the pull load necessary to break the mandrel at the root of the spirals. This published strength has no bearing on the more common mode of failure which occurs when the grapple “jumps” and causes damage to the outer spiral diameter of the mandrel. This type of incident is the result of the fish swelling and allowing the grapple to keep moving down the mandrel until it finally “jumps” over the spiral or concentrates the load on a very small spiral area and causes damage in the process. The likelihood of this problem occurring increases as the grapple size increases on any given spear. For example, a No. 9281 spear is more likely to be damaged when catching 13<sup>3</sup>/<sub>8</sub>" casing than when catching 9<sup>5</sup>/<sub>8</sub>" casing.



**Standard Duty  
Itco Spear**



**Heavy Duty  
Itco Spear**

**Accessories**



**Type F Stop Sub**

**Type F Stop Subs**

The Type F Stop Sub is designed to be used with the Flush Mandrel Type Bowen Releasing Spear when use of a stop is desirable. It is installed in the box connection at the top of the Mandrel.



**Type S Oversize Stop Ring**

**Type S Oversize Stop Rings**

The Type S Oversize Stop Ring is designed to be used with the Shoulder Mandrel type Bowen Releasing Spear when use of a larger stop is desirable. It is installed on the Spear shoulder with set screws.



**Mill Type Nut**

**Mill Type Nut**

The Mill Type Nut is used in place of the standard bullnose nut to mill away the distorted end of a fish to insure entrance of the Spear into the fish. It is also effective for drilling out a sand-plugged fish.



Sidehill Type Nut

### Sidehill Type Nut

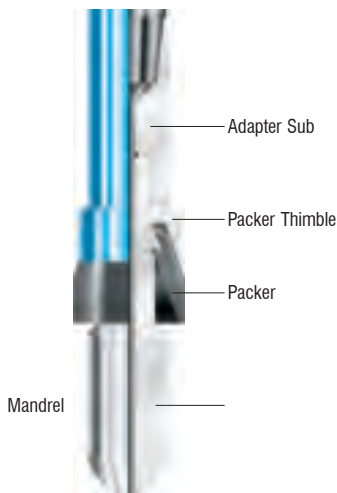
The Sidehill Type Nut is used in place of the standard bullnose nut to align the Spear with a fish that is imbedded in the side wall of the hole.



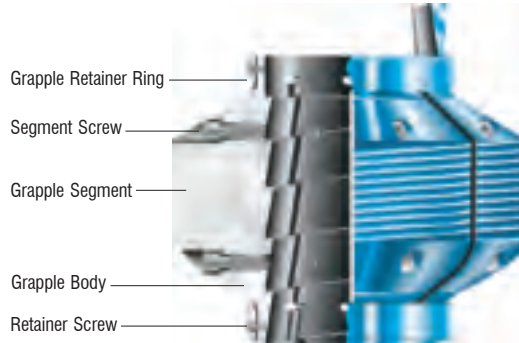
Sub Type Nut

### Sub Type Nut

The Sub Type Nut is used in place of the standard bullnose nut to provide the connection required to utilize other tools below the Spear, such as the Spear Pack-Off or Internal Cutters.



Spear Pack-Off Assembly



Segment-Type Spear Grapple Assembly for 8-5/8 Casing Spear, Part No. 9380

### Segment-Type Spear Grapple Assembly

The Segment-Type Spear Grapple is used in place of the standard one-piece Grapple on the 8<sup>5</sup>/<sub>8</sub>" and 9<sup>5</sup>/<sub>8</sub>" size Spears to convert them to Spears capable of engaging up to 20" casing. The Segment Type Spear Grapple consists of a Grapple Body, eight grapple segments and 16 Grapple Segment Screws. The helix of the Grapple Body matches the helix of the Spear Mandrel making the action of the Spear the same as with the standard Grapple.

### Spear Pack-Off Assembly

The Spear Pack-Off Assembly is attached to the Sub Type Nut below the Spear to pack off the fish in order to circulate through the fish. The Spear Pack-Off Assembly consists of an Adapter Sub, Packer Thimble, Packer and Mandrel. The Adapter Sub of the Spear Packoff will be furnished with a box connection to match the pin connection of the Sub Type Nut on which it is to be used, or as otherwise ordered. The Mandrel of the Spear Pack-Off may be ordered plain bullnose or with a pin connection for attachment of other tools, as specified.

### Bowen Internal Cutters For Use in Cut and Pull Operations

Bowen Internal Cutters may be run below the Bowen Releasing Spear and are spaced as desired, depending upon the length of the fish and the length of the cut to be made. The Spear should be spaced far enough above the cutter so that the Spear is clear of the fish during cutting operations. After cutting is completed, the Spear can be lowered to retrieve the cut-off section. Bowen Internal Cutters are fully described in Instruction Manual No. 5600.

### Operation

Examine and assure that the Bowen Releasing Spear is the correct size for the pipe to be caught and is properly assembled. Refer to the Specification Chart and to the Grapple Range Chart in this manual.

Connect the Spear to the fishing string. Set the Spear in released position by screwing the Grapple down the helix against the Release Ring as far as it will go by hand. In this position the Grapple is caused to contract inward and will not engage the pipe as it is run in.

### **To Engage and Pull the Fish**

Lower the fishing string slowly until the Spear has entered the fish to the desired depth. Rotate one full turn to the left, then pull the fish by elevating the fishing string.

As the fishing string is rotated to the left, it turns the Mandrel down through the Grapple, putting the Grapple in engaging position.

A straight pull will then wedge the Grapple into positive engagement with the fish.

### **To Release from the Fish**

Bump down with the weight of the fishing string to break the engagement; rotate two to three turns to the right, then elevate the string until the Spear is clear of the fish.

This moves the Mandrel upward through the Grapple, forcing the Grapple down against the Release Ring and putting the Spear in the released position. If the Spear does not release, bump down; then simultaneously rotate to the right while slowly elevating the fishing string until the Spear is clear of the fish.

### **Operation with Accessories**

The Bowen Itco Type Releasing Spear, when being run alone, is assembled with a standard bullnose Nut. If a positive stop is desired, use either a Shoulder Type Spear Mandrel, a Type F Stop Sub with the Flush type Mandrel, or a Type S Oversize Stop Ring (on either the Type F Stop Sub or Shoulder type mandrel).

### **Mill Type Nut**

If the top of the fish is distorted or plugged in any manner that would prevent easy entry of the Spear into the fish, install a Mill Type Nut in place of the Bullnose Nut.

When the top of the fish is reached, rotate slowly to the right and slowly lower the Spear into the fish until mill has cleaned burrs from top of fish and then lower into the fish to the desired depth. Sidehill Type Nut

If the top of the fish is out of line with the well bore or is imbedded in the sidewall, install a Sidehill Type Nut in place of the bullnose Nut.

When the top of the fish is reached, the fishing string must be lowered, elevated, rotated a portion of a turn and lowered repeatedly until the leading edge of the Sidehill Type Nut encounters the section of the top of the fish that overlaps the well bore, and directs the Spear into the fish.

### **Sub Type Nut**

If it is desired to run a Spear Pack-Off Assembly or an Internal Cutter below the Spear, install a Sub Type Nut in place of the bullnose Nut.

### **Spear Pack-Off Assembly**

In order to circulate through the fish, install the proper size Spear Pack-Off Assembly on the Sub Type Nut of the Spear.

After the Spear has entered and engaged the fish, begin flow with the circulation pumps while maintaining a heavy upward strain on the fish. The fluid passing through the Adapter Sub and Mandrel backs up against the Packer, causing a positive seal on the inside of the fish. This will add lifting power to the pulling force applied to the fishing string, while at the same time begin a breakdown of the sediment or formation between the fish and the walls of the well bore, freeing the fish.

### **Internal Cutter**

When it is desired to run an Internal Cutter below the Spear, a Sub Type Nut is installed in place of the bullnose Nut. Sufficient pipe is made up between the Internal Cutter and the Spear to enable the Spear to remain above the fish during the cutting operation. After the cut has been completed, the Spear is lowered into the cut-off section to retrieve it.

### **Precautions**

In deep or crooked holes, it may be necessary to rotate the fishing string more than one full turn, to set or release the Spear. Moderate additional rotation is not harmful to the operation, or to the Spear.

During operation, always maintain a moderate upward strain on the fishing string when rotating either right-hand or left-hand.

Always bump down with the full weight of the fishing string before the releasing operation.

### **Maintenance**

After each use, the Bowen Itco Type Releasing Spear should be completely disassembled, thoroughly cleaned, inspected for signs of damage or advanced wear, lubricated and reassembled. If the tool is to be stored, the exterior surface should be greased or painted, after assembly.

### **Disassembly**

1. Secure the Spear in a suitable vise, clamping on the (upper) tool Joint end.
2. Loosen and remove the Nut (or Spear Pack-Off Assembly).
3. Slide the Release Ring off the Mandrel.
4. Remove the Grapple by screwing it down the helix. Use right-hand rotation.

5. Clean all the parts thoroughly. Examine and replace any damaged or badly worn parts.

### **Reassembly**

1. Secure the Mandrel in a vise, clamping it near the upper end.
2. Apply a heavy coat of grease to the helix of the Mandrel.
3. If the Grapple is large, grease the interior, and install it on the Mandrel. Screw it on, using left-hand rotation.
4. Install the Release Ring with the cammed face downward (facing the Nut).
5. Apply thread dope or lubricant to the threads and assemble the Nut on the Mandrel lower end. Buck it up tight.
6. Screw the Grapple down the helix until it rests against the Release Ring (and Nut).
7. Paint or lubricate the exterior surfaces to prevent rust or deterioration.

### **Maintenance of Spear Pack-Off**

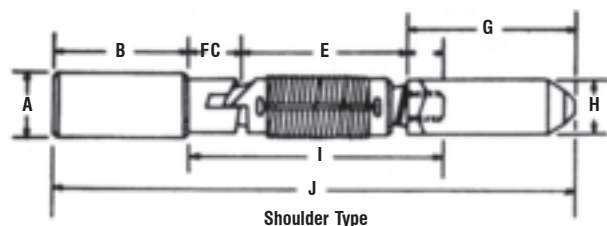
The Spear Pack-Off Assembly should be disassembled, cleaned and re-assembled after each use. Disassembly should proceed as follows:

### **Disassembly of Spear Pack-Off**

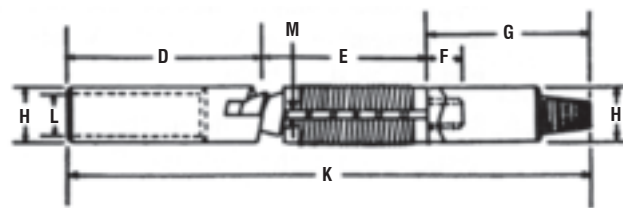
1. Secure the assembly in a suitable vise, clamping on the lower end of the Mandrel.
2. Loosen and remove the Adapter Sub.
3. Slide off the Packer Thimble.
4. Remove the Packer.
5. Thoroughly clean all the parts. Examine the Packer carefully. If it is worn or damaged, replace it with a new Packer.

### **Reassembly of Spear Pack-Off**

1. Secure the Mandrel in a vise, clamping it on the lower end.
2. Slide the Packer onto the Mandrel. Make sure that it seats properly on the shoulder of the Mandrel, and that the large open end faces downward, (toward the fish).
3. Slide the Packer Thimble over the Mandrel and onto the Packer. Force it down tightly around the upper end of the Packer.
4. Apply thread dope or grease to the threads and assemble the Adapter Sub onto the Mandrel. Buck the Sub up tight.
5. Paint or lubricate the exterior metal parts of the assembly. Do not paint or lubricate the rubber Packer. Paint, solvents, sunlight and most lubricants are harmful to rubber products when the rubber is exposed to them for long periods of time.



Shoulder Type



Flush Type

### Principal Dimensions for Releasing Spears

| Spear Assy. No. | Spear Size (inches)  | Class           | I.D.    | A       | B      | Shoulder Type      |                 | E       | F     | G       | H       | I       | J        | K        | L      | M     |
|-----------------|----------------------|-----------------|---------|---------|--------|--------------------|-----------------|---------|-------|---------|---------|---------|----------|----------|--------|-------|
|                 |                      |                 |         |         |        | Shoulder Type Only | Flush Type Only |         |       |         |         |         |          |          |        |       |
| 16455           | 1.050 O.D.Pipe       | Standard        | —       | 1-1/2   | 4-1/8  | 6                  | —               | 2-3/8   | 7/8   | 2-3/8   | 11/16   | 9-5/8   | 15-1/4   | —        | —      | 3/16  |
| 19350           | 1.313 O.D.Pipe       | Standard        | —       | 1-5/8   | 3      | 3                  | —               | 3-5/16  | 1-3/8 | 2-1/2   | 15/16   | 7-11/16 | 11-13/16 | —        | —      | 1/4   |
| 11195           | 1.660 O.D.Tubing     | Standard        | —       | 1-13/16 | 3      | 3                  | 3-25/32*        | 3-5/16  | 1-3/8 | 2-1/2   | 1-1/8   | 7-11/16 | 11-13/16 | —        | —      | 3/8   |
| 35841           | 1.660 O.D.Tubing     | Standard L.H.   | —       | 1-13/16 | 3      | 3                  | 3-25/32*        | 3-5/16  | 1-3/8 | 2-1/2   | 1-1/8   | 7-11/16 | 11-13/16 | —        | —      | 3/8   |
| 9915            | 1.900 O.D.Tubing     | Standard        | —       | 2-1/2   | 5      | 3                  | 7               | 5-1/16  | 2-1/4 | 5-5/8   | 1-3/8   | 10-5/16 | 18-11/16 | —        | —      | 7/16  |
| 9645            | 2-3/8 O.D.Drill Pipe | Standard        | —       | 3-1/8   | 7      | 3                  | 7               | 5-29/32 | 2-1/4 | 6-17/32 | 1-11/16 | —       | —        | 19-7/16  | —      | 5/8   |
| 17470           | 2-3/8 O.D.Drill Pipe | Heavy Duty      | —       | 3-1/8   | 7      | 3                  | 7               | 9       | 2-1/4 | 6-5/8   | 1-11/16 | 14-1/4  | 25-5/8   | 22-5/8   | —      | 5/8   |
| 1344            | 2-3/8 O.D.Tubing     | Standard        | 3/8     | 3-1/8   | 7      | 3                  | 7               | 6-3/4   | 2-1/4 | 6-5/8   | 1-7/8   | 12      | 23-3/8   | 23-3/8   | —      | 5/8   |
| 17228           | 2-3/8 O.D.Tubing     | Heavy Duty      | 3/8     | 3-1/8   | 7      | 3                  | 7               | 9       | 2-1/4 | 6-5/8   | 1-7/8   | 14-1/4  | 25-5/8   | 22-5/8   | —      | 5/8   |
| 1227            | 2-7/8 O.D.Tubing     | Standard        | 3/8     | 3-3/4   | 7      | 3                  | 7-1/4           | 6-3/4   | 2-1/2 | 7       | 2-5/16  | 12-1/4  | 23-3/4   | 21       | —      | 5/8   |
| 17231           | 2-7/8 O.D.Tubing     | Heavy Duty      | 3/8     | 3-3/4   | 7      | 3                  | 7-1/4           | 9       | 2-1/2 | 7       | 2-5/16  | 14-1/2  | 26       | 23-1/4   | —      | 5/8   |
| 18820           | 2-7/8 O.D.Tubing     | Heavy Duty L.H. | 3/8     | 3-3/4   | 7      | 3                  | 7-1/4           | 9       | 2-1/2 | 7       | 2-5/16  | 14-1/2  | 26       | 23-1/4   | —      | 5/8   |
| 9410            | 3-1/2 O.D.Tubing     | Standard        | 1/2     | 3-3/4   | 7      | 3-1/2              | 10-1/2          | 12      | 3-1/2 | 9       | 2-13/16 | 19      | 31-1/2   | 32-1/2   | —      | 5/8   |
| 9945            | 3-1/2 O.D.Drill Pipe | Heavy Duty      | 1/2     | 3-3/8   | 7      | 3-1/2              | 10-1/2          | 9-3/4   | 3-5/8 | 8-1/8   | 2-1/2   | 16-5/8  | 31-1/8   | —        | —      | 5/8   |
| 530             | 4 O.D.Tubing         | Light Duty      | 3/4     | 3-3/4   | 7-1/2  | 3                  | 10-3/8          | 8-1/8   | 2-1/2 | 8       | 3-1/4   | 13-5/8  | 26-5/8   | 26-1/2   | —      | 5/8   |
| 9485            | 4 O.D.Tubing         | Standard        | 3-1/4   | 4-1/8   | 7-1/2  | 3                  | 10-1/2          | 12      | 3-1/2 | 9       | 3-1/4   | 18-1/2  | 31-1/2   | 31-1/2   | —      | 5/8   |
| 13200           | 4-1/2 O.D.Tubing     | Light Duty      | 3/4     | 4-1/2   | 8      | 3-1/2              | 3-3/4           | 9-3/4   | 3-1/2 | 10-3/4  | 3-5/8   | 16-3/4  | 32       | 32       | —      | 1     |
| 17475           | 4-1/2 O.D.Tubing     | Standard        | 3/4     | 4-1/2   | 8      | 3-1/2              | 11              | 14-1/4  | 3-1/2 | 10      | 3-5/8   | 21-1/4  | 35-3/4   | 33-3/4   | —      | 3/4   |
| 1332            | 5 O.D.Casing         | Light Duty      | 7/8     | 4-3/8   | 8      | 3-1/2              | 9-1/2           | 9-3/4   | 3-1/2 | 10-5/8  | 4-1/32  | 16-3/4  | 31-7/8   | 29-7/8   | —      | 13/16 |
| 9680            | 5 O.D.Casing         | Standard        | 7/8     | 5       | 8      | 3-1/2              | 12              | 14-1/4  | 3-1/2 | 10-5/8  | 4-1/32  | 21-1/4  | 36-3/8   | 36-7/8   | —      | 13/16 |
| 18270           | 5 O.D.Casing         | Heavy Duty      | 7/8     | 5       | 8      | 3-1/2              | 12              | 14-1/4  | 3-1/2 | 10      | 4-1/32  | 21-1/4  | 36-3/8   | 36-7/8   | —      | 1     |
| 20115           | 5 O.D.Casing         | Standard L.H.   | 7/8     | 5       | 8      | 3-1/2              | 12              | 14-1/4  | 3-1/2 | 10-5/8  | 4-1/32  | 21-1/4  | 36-3/8   | 36-7/8   | —      | 13/16 |
| 9715            | 6 O.D.Casing         | Light Duty      | 1       | 6       | 8      | 5-1/2              | 12              | 13      | 3-1/2 | 12      | 5       | 16-3/8  | 39-3/16  | 37-11/16 | 3-5/16 | 1-1/4 |
| 17234           | 6 O.D.Casing         | Standard        | 1       | 6       | 8      | 5-1/2              | 12              | 19      | 3-1/2 | 12      | 5       | 16-3/8  | —        | 43       | 3-5/16 | 1-1/4 |
| 9266            | 7 O.D.Casing         | Standard        | 2       | 7       | 10     | 6-1/2              | 16-1/2          | 14-5/8  | 3-1/2 | 12-3/4  | 5-11/16 | —       | —        | 40-1/4   | 3-1/2  | 1-5/8 |
| 20890           | 7 O.D.Casing         | Standard L.H.   | 2       | 7       | 10     | 6-1/2              | 12-7/8          | 14-5/8  | 3-1/2 | 12-3/4  | 5-11/16 | —       | —        | 40-1/4   | 3-1/2  | 1-5/8 |
| 17237           | 7 O.D.Casing         | Heavy Duty      | 2       | 7       | 10     | 6-1/2              | 13-1/2          | 21-3/8  | 3-1/2 | 12-3/4  | 5-11/16 | 31-3/8  | 53-3/8   | 47       | 3-1/2  | 1-5/8 |
| 9572            | 8 O.D.Casing         | Light Duty      | 2       | 8       | 10     | 6-1/2              | 20-7/8          | 14-5/8  | 4-1/2 | 13-3/4  | 6-15/16 | —       | —        | 49-1/4   | 5-3/4  | 1-5/8 |
| 17240           | 8 O.D.Casing         | Heavy Duty      | 2-3/4   | 8       | —      | 7                  | —               | —       | 3-3/4 | 13      | 7-1/4   | —       | —        | —        | —      | —     |
| 9380            | 8-5/8 O.D.Casing     | Standard        | 2-3/4   | 8-5/8   | 14     | 7                  | 20-7/8          | 14-5/8  | 4-1/2 | 13-3/4  | 7-1/4   | 26-1/8  | 53-7/8   | 49-1/4   | 5      | 1-5/8 |
| 17243           | 8-5/8 O.D.Casing     | Heavy Duty      | 2-3/4   | 8-5/8   | —      | —                  | 20-7/8          | 21-3/8  | 4-1/2 | 13-3/4  | 7-1/4   | —       | —        | 56       | 5-3/4  | 1-5/8 |
| 20895           | 8-5/8 O.D.Casing     | Standard L.H.   | 2-3/4   | 8-5/8   | —      | —                  | 20-7/8          | 14-5/8  | 4-1/2 | 13-3/4  | 7-1/4   | —       | —        | 49-1/4   | 5-3/4  | 1-5/8 |
| 9281            | 9-5/8 O.D.Casing     | Standard        | 2-13/16 | 9-5/8   | 15-3/8 | 7                  | 20-7/8          | 14-5/8  | 3-1/2 | 14      | 8-1/4   | 25-1/8  | 51       | 49-1/4   | 6-1/4  | 1-5/8 |
| 20120           | 9-5/8 O.D.Casing     | Standard L.H.   | 2-3/4   | 9-5/8   | —      | —                  | 20-7/8          | 14-5/8  | 3-1/2 | 13-3/4  | 8-1/4   | —       | —        | 49-1/4   | 6-1/4  | 1-5/8 |
| 17246           | 9-5/8 O.D.Casing     | Heavy Duty      | 2-13/16 | 9-5/8   | —      | —                  | 20-7/8          | 21-3/8  | 3-1/2 | 13-3/4  | 8-1/4   | —       | —        | 56       | 6-1/4  | 1-5/8 |
| 27780           | 13-3/8 O.D.Casing    | Standard        | 3-1/2   | 13-3/8  | 17-7/8 | 7                  | 22-3/8          | 16-7/8  | 3-1/2 | 12      | 11-3/4  | 27-3/8  | 53-3/4   | 51-1/4   | 7-3/4  | 1-5/8 |

\* Without Sub

## Specifications

|                              |                                  |                       |                       |                       |                       |                       |                       |                                       |                                |                                |                                |                                |            |
|------------------------------|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|------------|
| <b>Nominal Catch Size</b>    | 1.050<br>O.D.<br>Pipe            | 1.313<br>O.D.<br>Pipe | 1.660<br>O.D.<br>Pipe | 1-1/4<br>O.D.<br>Pipe | 1.900<br>O.D.<br>Pipe | 2-3/8<br>O.D.<br>Pipe | 2-3/8<br>O.D.<br>Pipe | 2-3/8<br>O.D.<br>Tubing<br>Drill Pipe | 2-3/8<br>O.D.<br>Tub.          | 2-3/8<br>O.D.<br>Tub.          | 2-3/8<br>O.D.<br>Tub.          | 2-7/8<br>O.D.<br>Tub.          |            |
| <b>Additional Catch Size</b> | All<br>Weights                   | All<br>Weights        | All<br>Weights        | All<br>Weights        | All<br>Weights        | All<br>Weights        | All<br>Weights        | All<br>Weights                        | 2-7/8<br>D.P.<br>2-7/8<br>Tub. | 2-7/8<br>D.P.<br>2-7/8<br>Tub. | 2-7/8<br>D.P.<br>2-7/8<br>Tub. | 3-1/2<br>D.P.<br>3-1/2<br>Tub. |            |
| <b>Spear O.D. (H)</b>        | 11/16                            | 7/8                   | 1-1/8                 | 1-1/8                 | 1-3/8                 | 1-11/16               | 1-11/16               | 1-11/16                               | 1-7/8                          | 1-7/8                          | 1-7/8                          | 2-5/16                         |            |
| <b>Spear I.D.</b>            |                                  |                       |                       |                       |                       |                       |                       |                                       | 3/8                            | 3/8                            | 3/8                            | 3/8                            |            |
| <b>Class</b>                 | Std.                             | Std.                  | Std.                  | Std.<br>LH.           | Std.                  | Std.                  | Std.<br>LH.           | Heavy<br>Duty                         | Std.<br>LH.                    | Std.                           | Heavy<br>Duty                  | Std.                           |            |
| <b>Complete Assembly</b>     | <b>Part No.</b><br><b>Weight</b> | 16455<br>6            | 19350<br>8            | 11195<br>9            | 35841<br>9            | 9915<br>10            | 9645<br>12            | 74509<br>12                           | 17470<br>19                    | 42069<br>14                    | 1344<br>14                     | 17228<br>29                    | 1227<br>24 |

## Replacement Parts

|  |                                  |                 |                 |              |              |             |             |              |             |              |             |             |             |
|--|----------------------------------|-----------------|-----------------|--------------|--------------|-------------|-------------|--------------|-------------|--------------|-------------|-------------|-------------|
| <b>Flush Type Mandrel</b>  | <b>Part No.</b><br><b>Weight</b> | 16456*<br>3-3/4 | 19351*<br>4-1/2 | 11196*<br>5  | 35842<br>5   | 9916<br>6   | 9646<br>7   | 74554<br>7   | 17471<br>9  | 42070<br>8   | 1345<br>8   | 17229<br>16 | 1231<br>14  |
| <b>Shoulder Type Mandrel (A)</b>                                     | <b>Part No.</b><br><b>Weight</b> | 16456<br>4      | 19351<br>5      | 11196<br>6   | 35842<br>6   | 9916<br>9   | 9646<br>11  | 74554<br>11  | 17471<br>10 | 42070<br>16  | 1345<br>16  | 17229<br>23 | 1231<br>22  |
| <b>Grapple</b>   | <b>Part No.</b>                  | 16457           | 19352           | 11197        | 35843        | 9917        | 9647        | 74555        | 17472       | 42071        | 1348        | 17230       | 1230        |
| <i>(for Weights and Catch Ranges, see Calculated Strength Chart)</i> |                                  |                 |                 |              |              |             |             |              |             |              |             |             |             |
| <b>Release Ring</b>  | <b>Part No.</b><br><b>Weight</b> | 16458<br>1/8    | 19353<br>1/8    | 11198<br>1/8 | 35844<br>1/8 | 9918<br>1/8 | 9649<br>1/4 | 74557<br>1/4 | 9649<br>1/4 | 42072<br>1/4 | 1347<br>1/4 | 1347<br>1/4 | 1229<br>1/2 |
| <b>Bullnose Nut</b>  | <b>Part No.</b><br><b>Weight</b> | 16459<br>2      | 19354<br>2      | 11199<br>2   | 35845<br>2   | 9919<br>2   | 9648<br>3   | 74556<br>3   | 9648<br>3   | 42073<br>4   | 1346<br>4   | 1346<br>4   | 1228<br>7   |

## Accessories

|                           |                                  |              |              |              |              |             |             |              |             |              |             |             |             |
|---------------------------|----------------------------------|--------------|--------------|--------------|--------------|-------------|-------------|--------------|-------------|--------------|-------------|-------------|-------------|
| <b>Mill Type Nut</b>      | <b>Part No.</b><br><b>Weight</b> | 16459-A<br>2 | 19354-A<br>2 | 11199-A<br>2 | 35845-A<br>2 | 9919-A<br>2 | 9648-A<br>3 | 74556-A<br>3 | 9648-C<br>3 | 42073-A<br>4 | 1346-A<br>4 | 1346-A<br>4 | 1228-A<br>7 |
| <b>Sub Type Nut</b>       | <b>Part No.</b><br><b>Weight</b> | 16459-B<br>2 | 19354-B<br>2 | 11199-B<br>2 | 35845-B<br>2 | 9919-B<br>2 | 9648-B<br>3 | 74556-B<br>3 | 9648-C<br>3 | 42073-A<br>4 | 1346-B<br>4 | 1346-B<br>4 | 1228-B<br>7 |
| <b>Side Hill Type Nut</b> | <b>Part No.</b><br><b>Weight</b> | 16459-C<br>2 | 19354-C<br>2 | 11199-C<br>2 | 35845-C<br>2 | 9919-C<br>2 | 9648-C<br>3 | 74556-C<br>3 | 9648-C<br>3 | 42073-A<br>4 | 1346-C<br>4 | 1346-C<br>4 | 1228-C<br>7 |

## Stop Subs - Stop Rings

|                           |                 |   |   |   |   |         |         |         |       |       |       |        |
|---------------------------|-----------------|---|---|---|---|---------|---------|---------|-------|-------|-------|--------|
| <b>Stop Sub Body O.D.</b> | —               | — | — | — | — | 1-11/16 | 1-11/16 | 1-11/16 | 1-7/8 | 1-7/8 | 1-7/8 | 2-5/16 |
| <b>Stop Sub Stop O.D.</b> | —               | — | — | — | — | 3-1/8   | 3-1/8   | 3-1/8   | 3-1/8 | 3-1/8 | 3-1/8 | 3-3/4  |
| <b>Stop Ring O.D.</b>     | —               | — | — | — | — | 3-5/8   | 3-5/8   | 3-5/8   | 3-5/8 | 3-5/8 | 3-5/8 | 4-1/2  |
| <b>Stop Sub Type F</b>    | <b>Part No.</b> | — | — | — | — | 19050   | 19050   | 19050   | 19051 | 19051 | 19051 | 19052  |
| <b>Stop Ring Type S</b>   | <b>Part No.</b> | — | — | — | — | 18809   | 18809   | 18809   | 18809 | 18809 | 18809 | 18800  |

\* Optional two-piece mandrel

### How to Order

Specify:

- (1) Name and part number of assembly or part
- (2) Size and type of top connection
- (3) Size and weight or weights of pipe to be caught
- (4) Flush or shoulder type  
(specify O.D. of shoulder – A)
- (5) Mandrel length desired (C)
- (6) Thread size and type of nut, if wanted  
See page 8 for dimensions

### RECOMMENDED SPARES:

(1) 2 Grapples for Each Catch Size

### How to Order Type F Stop

Specify:

- (1) O.D. of Stop Sub Body
- (2) Length from Stop to thread connection
- (3) Top and bottom connection desired
- (4) Number of spear on which Stop Sub  
will be used

### How to Order Type S Stop Ring

Specify:

- (1) O.D. of Ring
- (2) O.D. on Spear shoulder or Stop Sub shoulder  
with which Stop Ring is to be used

### Specifications

|                              |                 |        |        |        |        |         |            |        |        |        |        |       |
|------------------------------|-----------------|--------|--------|--------|--------|---------|------------|--------|--------|--------|--------|-------|
| <b>Nominal Catch Size</b>    | 2-7/8           | 2-7/8  | 2-7/8  | 2-7/8  | 2-7/8  | 3-1/2   | 3-1/2      | 4 O.D. | 4 O.D. | 4-1/2  | 4-1/2  |       |
|                              | O.D.            | O.D.   | O.D.   | O.D.   | O.D.   | O.D.    | O.D.       | Tubing | Tubing | O.D.   | O.D.   |       |
|                              | Tubing          | Tubing | Tubing | Tubing | Tubing | Tubing  | Drill Pipe |        | Tubing | Tubing |        |       |
| <b>Additional Catch Size</b> | 3-1/2           | 3-1/2  | 3-1/2  | 3-1/2  | 3-1/2  | 4 O.D.  | 4 O.D.     | 4-1/2  | 4-1/2  | 4-1/2, | 4-1/2, |       |
|                              | D.P.            | D.P.   | D.P.   | D.P.   | D.P.   | Tubing  | Tubing     | &5     | &5     | 4-3/4, | 4-3/4, |       |
|                              | 3-1/2           | 3-1/2  | 3-1/2  | 3-1/2  | 3-1/2  |         |            | Casing | Casing | &5     | &5     |       |
|                              | Tubing          | Tubing | Tubing | Tubing | Tubing |         |            |        |        | Casing | Casing |       |
| <b>Spear O.D. (H)</b>        | 2-5/16          | 2-5/16 | 2-5/16 | 2-5/16 | 2-5/16 | 2-13/16 | 2-1/2      | 3-1/4  | 3-1/4  | 3-5/8  | 3-5/8  |       |
| <b>Spear I.D.</b>            | 3/8             | 3/8    | 3/8    | 3/8    | 3/8    | 1/2     | 1/2        | 3/4    | 3/4    | 3/4    | 3/4    |       |
| <b>Class</b>                 | Std.            | Std.   | H.D.   | Heavy  | Heavy  | Std.    | Heavy      | Light  | Std.   | Light  | Std.   |       |
|                              | L.H.T.          | L.H.   | L.H.   | Duty   | Duty   | L.H.    | Duty       | Duty   |        | Duty   |        |       |
| <b>Complete Assembly</b>     | <b>Part No.</b> | 62242  | 62198  | 195015 | 17231  | 18820   | 9410       | 9945   | 530    | 9485   | 13200  | 17475 |
|                              | <b>Weight</b>   | 24     | 24     | 37     | 37     | 37      | 50         | 63     | 50     | 68     | 45     | 95    |

### Replacement Parts

|  |                 |       |       |        |       |       |      |      |        |        |       |       |
|--|-----------------|-------|-------|--------|-------|-------|------|------|--------|--------|-------|-------|
| <b>Mandrel – Flush Type</b>  | <b>Part No.</b> | 62243 | 62199 | 145016 | 17232 | 18821 | 9411 | 9946 | 531    | 9486   | 13201 | 17476 |
|  | <b>Weight</b>   | 14    | 14    | 20     | 20    | 20    | 28   | 31   | 28     | 42     | 58    | 58    |
| <b>Mandrel – Shoulder Type (A)</b>                                   | <b>Part No.</b> | 62243 | 62199 | 145016 | 17232 | 18821 | 9411 | 9946 | 531    | 9486   | 13201 | 17476 |
|  | <b>Weight</b>   | 22    | 22    | 28     | 28    | 28    | 32   | 38   | 28     | 46     | 65    | 67    |
| <b>Grapple</b>   | <b>Part No.</b> | 1230  | 49888 | 145017 | 17233 | 18822 | 9412 | 9947 | 532    | 9487   | 13202 | 17477 |
| <i>(for Weights and Catch Ranges, see Calculated Strength Chart)</i> |                 |       |       |        |       |       |      |      |        |        |       |       |
| <b>Release Ring</b>  | <b>Part No.</b> | 1229  | 1229  | 1229   | 1229  | 18823 | 1584 | 9948 | 534    | 534    | 13183 | 13183 |
|  | <b>Weight</b>   | 1/2   | 1/2   | 1/2    | 1/2   | 1/2   | 1/2  | 3/4  | 3/4    | 3/4    | 7/8   | 7/8   |
| <b>Bullnose Nut</b>  | <b>Part No.</b> | 62200 | 62200 | 145018 | 1228  | 18824 | 9413 | 9949 | 533    | 9488   | 13184 | 13184 |
|  | <b>Weight</b>   | 7     | 7     | 7      | 7     | 7     | 14   | 16   | 14-1/2 | 16-1/2 | 24    | 24    |

### Accessories

|                           |                 |         |         |          |        |         |        |        |       |        |         |         |
|---------------------------|-----------------|---------|---------|----------|--------|---------|--------|--------|-------|--------|---------|---------|
| <b>Mill Type Nut</b>      | <b>Part No.</b> | 62200-A | 62200-A | 145018-A | 1228-A | 18824-A | 9413-A | 9949-A | 533-A | 9488-A | 13184-A | 13184-A |
|                           | <b>Weight</b>   | 7       | 7       | 7        | 7      | 7       | 14     | 16     | 16    | 16     | 24      | 24      |
| <b>Sub Type Nut</b>       | <b>Part No.</b> | 62200-B | 62200-B | 145018-B | 1228-B | 18824-B | 9413-B | 9949-B | 533-B | 9488-B | 13184-B | 13184-B |
|                           | <b>Weight</b>   | 7       | 7       | 7        | 7      | 7       | 14     | 16     | 16    | 16     | 24      | 24      |
| <b>Side Hill Type Nut</b> | <b>Part No.</b> | 62200-C | 62200-C | 145018-C | 1228-C | 18824-C | 9413-C | 9949-C | 533-C | 9488-C | 13184-C | 13184-C |
|                           | <b>Weight</b>   | 7       | 7       | 7        | 7      | 7       | 14     | 16     | 16    | 16     | 24      | 24      |

### Stop Subs - Stop Rings

|                           |                 |        |        |        |        |         |         |       |       |       |       |       |
|---------------------------|-----------------|--------|--------|--------|--------|---------|---------|-------|-------|-------|-------|-------|
| <b>Stop Sub Body O.D.</b> | 2-5/16          | 2-5/16 | 2-5/16 | 2-5/16 | 2-5/16 | 2-13/16 | 2-13/16 | 3-1/4 | 3-1/4 | 3-3/4 | 3-3/4 |       |
| <b>Stop Sub Stop O.D.</b> | 3-3/4           | 3-3/4  | 3-3/4  | 3-3/4  | 3-3/4  | 3-3/4   | 3-3/4   | 4-1/8 | 4-1/8 | 4-1/2 | 4-1/2 |       |
| <b>Stop Ring O.D.</b>     | 4-1/2           | 4-1/2  | 4-1/2  | 4-1/2  | 4-1/2  | 4-1/2   | 4-1/2   | 4-3/4 | 4-3/4 | 5     | 5     |       |
| <b>Stop Sub Type F</b>    | <b>Part No.</b> | 19052  | 19052  | 19052  | 19052  | 19052   | 19053   | 19053 | 19054 | 19054 | 19055 | 19055 |
| <b>Stop Ring Type S</b>   | <b>Part No.</b> | 18800  | 18800  | 18800  | 18800  | 18800   | 18801   | 18801 | 18802 | 18802 | 18803 | 18803 |

#### How to Order

Specify:

- (1) Name and part number of assembly or part
- (2) Size and type of top connection
- (3) Size and weight or weights of pipe to be caught
- (4) Flush or shoulder type  
(specify O.D. of shoulder – A)
- (5) Mandrel length desired (C)
- (6) Thread size and type of nut, if wanted  
See page 8 for dimensions

#### RECOMMENDED SPARES:

(1) 2 Grapples for Each Catch Size

#### How to Order Type F Stop

Specify:

- (1) O.D. of Stop Sub Body
- (2) Length from Stop to thread connection
- (3) Top and bottom connection desired
- (4) Number of spear on which Stop Sub will be used

#### How to Order Type S Stop Ring

Specify:

- (1) O.D. of Ring
- (2) O.D. on Spear shoulder or Stop Sub shoulder with which Stop Ring is to be used



## Specifications

|                              |                 |        |        |        |           |        |        |        |         |         |         |
|------------------------------|-----------------|--------|--------|--------|-----------|--------|--------|--------|---------|---------|---------|
| <b>Nominal Catch Size</b>    |                 | 5      | 5      | 5      | 5         | 6      | 6      | 6      | 7       | 7       | 7       |
|                              |                 | O.D.   | O.D.   | O.D.   | O.D.      | O.D.   | O.D.   | O.D.   | O.D.    | O.D.    | O.D.    |
|                              |                 | Casing | Casing | Casing | Casing    | Casing | Casing | Casing | Casing  | Casing  | Casing  |
| <b>Additional Catch Size</b> |                 | 5-1/2, | 5-1/2, | 5-1/2, | 5-1/2,    | 6-5/8  | 6-5/8  | 6-5/8  | 7-5/8,  | 7-5/8,  | 7-5/8,  |
|                              |                 | 5-3/4, | 5-3/4, | 5-3/4, | 5-3/4,    | & 7    | & 7    | & 7    | 8, &    | 8, &    | 8, &    |
|                              |                 | & 6    | & 6    | & 6    | & 6       | Casing | Casing | Casing | 8-1/8   | 8-1/8   | 8-1/8   |
|                              |                 | Casing | Casing | Casing | Casing    |        |        |        | Casing  | Casing  | Casing  |
| <b>Spear O.D. (H)</b>        |                 | 4-1/32 | 4-1/32 | 4-1/32 | 4-1/32    | 5      | 5      | 5      | 5-11/16 | 5-11/16 | 5-11/16 |
| <b>Spear I.D.</b>            |                 | 7/8    | 1      | 1      | 7/8       | 1      | 1      | 1      | 2       | 2       | 2       |
| <b>Class</b>                 |                 | Light  | Std.   | Std.   | Light     | Light  | Std.   | Std.   | Std.    | Std.    | Heavy   |
|                              |                 | Duty   |        | L.H.   | Duty, L.H | Duty   |        | L.H.   |         | L.H.    | Duty    |
| <b>Complete Assembly</b>     | <b>Part No.</b> | 1332   | 9680   | 18270  | 20115     | 9715   | 17234  | 58292  | 9266    | 20890   | 17237   |
|                              | <b>Weight</b>   | 110    | 115    | 175    | 117       | 150    | 186    | 186    | 241     | 241     | 310     |

## Replacement Parts

|   |                 |      |      |       |       |      |       |       |       |        |       |
|---|-----------------|------|------|-------|-------|------|-------|-------|-------|--------|-------|
| <b>Mandrel – Flush Type</b>   | <b>Part No.</b> | 1333 | 9681 | 18271 | 20116 | 9716 | 17235 | 58293 | 9267  | 20891  | 17238 |
|   | <b>Weight</b>   | 65   | 72   | 85    | 73    | 110  | 118   | 118   | 141   | 141    | 205   |
| <b>Mandrel – Shoulder Type (A)</b>                                    | <b>Part No.</b> | 1333 | 9681 | 18271 | 20116 | 9716 | 17235 | 58293 | 9267  | 20891  | 17238 |
|   | <b>Weight</b>   | 67   | 77   | 91    | 80    | 115  | 123   | 123   | 146   | 146    | 214   |
| <b>Grapple</b>  | <b>Part No.</b> | 1334 | 9682 | 18272 | 20117 | 9717 | 17236 | 58294 | 9268  | 20892  | 17239 |
| <i>(For weights and catch ranges, see Calculated Strength Chart.)</i> |                 |      |      |       |       |      |       |       |       |        |       |
| <b>Release Ring</b>   | <b>Part No.</b> | 1336 | 1336 | 20119 | 20119 | 9718 | 9718  | 9718  | 9279  | 152677 | 9279  |
|   | <b>Weight</b>   | 1    | 1    | 1     | 1     | 2    | 2     | 2     | 3-1/2 | 3-1/2  | 3-1/2 |
| <b>Bullnose Nut</b>   | <b>Part No.</b> | 1335 | 1335 | 20118 | 20118 | 9719 | 9719  | 58295 | 9269  | 20893  | 9269  |
|   | <b>Weight</b>   | 28   | 28   | 28    | 29    | 48   | 48    | 48    | 65    | 65     | 65    |

## Accessories

|                           |                 |        |        |        |         |        |        |         |        |         |        |
|---------------------------|-----------------|--------|--------|--------|---------|--------|--------|---------|--------|---------|--------|
| <b>Mill Type Nut</b>      | <b>Part No.</b> | 1335-A | 1335-A | 1335-A | 20118-A | 9719-A | 9719-A | 58295-A | 9269-A | 20893-A | 9269-A |
|                           | <b>Weight</b>   | 28     | 28     | 28     | 29      | 48     | 48     | 48      | 65     | 65      | 65     |
| <b>Sub Type Nut</b>       | <b>Part No.</b> | 1335-B | 1335-B | 1335-B | 20118-B | 9719-B | 9719-B | 58295-B | 9269-B | 20893-B | 9269-B |
|                           | <b>Weight</b>   | 28     | 28     | 28     | 29      | 48     | 48     | 48      | 65     | 65      | 65     |
| <b>Side Hill Type Nut</b> | <b>Part No.</b> | 1335-C | 1335-C | 1335-C | 20118-C | 9719-C | 9719-C | 58295-C | 9269-C | 20893-C | 9269-C |
|                           | <b>Weight</b>   | 28     | 28     | 28     | 29      | 48     | 48     | 48      | 65     | 65      | 65     |

## Stop Subs - Stop Rings

|                           |                 |        |        |        |        |       |       |       |         |         |         |
|---------------------------|-----------------|--------|--------|--------|--------|-------|-------|-------|---------|---------|---------|
| <b>Stop Sub Body O.D.</b> |                 | 4-1/32 | 4-1/32 | 4-1/32 | 4-1/32 | 5     | 5     | 5     | 5-11/16 | 5-11/16 | 5-11/16 |
| <b>Stop Sub Stop O.D.</b> |                 | 5      | 5      | 5      | 5      | 6     | 6     | 6     | 7       | 7       | 7       |
| <b>Stop Ring O.D.</b>     |                 | 5-1/2  | 5-1/2  | 5-1/2  | 5-1/2  | 6-5/8 | 6-5/8 | 6-5/8 | 7-5/8   | 7-5/8   | 7-5/8   |
| <b>Stop Sub Type F</b>    | <b>Part No.</b> | 19056  | 19056  | 19056  | 19056  | 19057 | 19057 | 19057 | 19058   | 19058   | 19058   |
| <b>Stop Ring Type S</b>   | <b>Part No.</b> | 18804  | 18804  | 18804  | 18804  | 18805 | 18805 | 18805 | 18806   | 18806   | 18806   |

### How to Order

Specify:

- (1) Name and part number of assembly or part
- (2) Size and type of top connection
- (3) Size and weight or weights of pipe to be caught
- (4) Flush or shoulder type  
(specify O.D. of shoulder – A)
- (5) Mandrel length desired (C)
- (6) Thread size and type of nut, if wanted  
See page 8 for dimensions

### RECOMMENDED SPARES:

(1) 2 Grapples for Each Catch Size

### How to Order Type F Stop

Specify:

- (1) O.D. of Stop Sub Body
- (2) Length from Stop to thread connection
- (3) Top and bottom connection desired
- (4) Number of spear on which Stop Sub will be used

### How to Order Type S Stop Ring

Specify:

- (1) O.D. of Ring
- (2) O.D. on Spear shoulder or Stop Sub shoulder with which Stop Ring is to be used

### Specifications

|                              |                 |          |        |        |        |         |        |         |         |        |       |
|------------------------------|-----------------|----------|--------|--------|--------|---------|--------|---------|---------|--------|-------|
| <b>Nominal Catch Size</b>    | 8               | 8        | 8-5/8  | 8-5/8  | 8-5/8  | 9-5/8   | 9-5/8  | 9-5/8   | 9-5/8   | 13-3/8 |       |
|                              | O.D.            | O.D.     | O.D.   | O.D.   | O.D.   | O.D.    | O.D.   | O.D.    | O.D.    | O.D.   |       |
|                              | Casing          | Casing   | Casing | Casing | Casing | Casing  | Casing | Casing  | Casing  | Casing |       |
| <b>Additional Catch Size</b> | 8-1/8,          | 8-1/8,   | 9      | 9      | 9      | 10-3/4  | 10-3/4 | 10-3/4  | 10-3/4  | 16     |       |
|                              | 8-5/8, &        | 8-5/8, & | Thru   | Thru   | Thru   | Thru    | Thru   | Thru    | Thru    | Thru   |       |
|                              | 9-5/8           | 9-5/8    | 13-3/8 | 15-3/8 | 15-3/8 | 20      | 20     | 20      | 20      | 20     |       |
|                              | Casing          | Casing   | Casing | Casing | Casing | Casing  | Casing | Casing  | Casing  | Casing |       |
| <b>Spear O.D. (H)</b>        | 6-15/16         | 7-1/4    | 7-1/4  | 7-1/4  | 7-1/4  | 8-1/4   | 8-1/8  | 8-1/4   | 8-1/4   | 11-3/4 |       |
| <b>Spear I.D.</b>            | 2               | 2-3/4    | 2-3/4  | 2-3/4  | 2-3/4  | 2-13/16 | 2-3/4  | 2-13/16 | 2-13/16 | 3-1/2  |       |
| <b>Class</b>                 | Light           | Heavy    | Std.   | Heavy  | Std.   | Std.    | Std.   | Std.    | Heavy   | Std.   |       |
|                              | Duty            | Duty     |        | Duty   | L.H.   |         | L.H.   | L.T.    | Duty    |        |       |
| <b>Complete Assembly</b>     | <b>Part No.</b> | 9572     | 17240  | 9380   | 17243  | 20895   | 9281   | 20120   | 81470   | 17246  | 27780 |
|                              | <b>Weight</b>   | 400      | 438    | 415    | 400    | 415     | 558    | 558     | 558     | 600    | 750   |

### Replacement Parts

|   |                 |      |       |      |       |       |       |       |       |       |       |
|---|-----------------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| <b>Mandrel – Flush Type</b>   | <b>Part No.</b> | 9573 | 17241 | 9381 | 17244 | 20896 | 9282  | 20121 | 81471 | 17247 | 27781 |
|   | <b>Weight</b>   | 250  | 325   | 250  | 250   | 250   | 344   | 344   | 344   | 400   | 510   |
| <b>Mandrel – Shoulder Type (A)</b>                                    | <b>Part No.</b> | 9573 | 17241 | 9381 | 17244 | 20896 | 9282  | 20121 | 81471 | 17247 | 27781 |
|   | <b>Weight</b>   | 255  | 334   | 257  | 264   | 250   | 350   | 350   | 350   | 405   | 530   |
| <b>Grapple</b>  | <b>Part No.</b> | 9574 | 17242 | 9382 | 17245 | 20897 | 9283  | 20122 | 9283  | 17248 | 27782 |
| <i>(For Weights and Catch Ranges, see Calculated Strength Chart.)</i> |                 |      |       |      |       |       |       |       |       |       |       |
| <b>Release Ring</b>   | <b>Part No.</b> | 9575 | 9575  | 9383 | 9383  | 9383  | 9286  | 9286  | 9286  | 9286  | 27783 |
|   | <b>Weight</b>   | 5    | 5     | 5    | 5     | 5     | 5-1/2 | 5-1/2 | 5-1/2 | 5-1/2 | 6     |
| <b>Bullnose Nut</b>   | <b>Part No.</b> | 9576 | 9576  | 9384 | 9384  | 20898 | 9284  | 20123 | 81422 | 9284  | 27784 |
|   | <b>Weight</b>   | 100  | 100   | 115  | 115   | 115   | 152   | 152   | 152   | 152   | 165   |

### Accessories

|                           |                 |        |        |        |        |         |        |         |         |        |         |
|---------------------------|-----------------|--------|--------|--------|--------|---------|--------|---------|---------|--------|---------|
| <b>Mill Type Nut</b>      | <b>Part No.</b> | 9269-A | 9576-A | 9384-A | 9384-A | 20898-A | 9284-A | 20123-A | 81472-A | 9284-A | 27784-A |
|                           | <b>Weight</b>   | 65     | 100    | 115    | 115    | 115     | 152    | 152     | 152     | 152    | 165     |
| <b>Sub Type Nut</b>       | <b>Part No.</b> | 9269-B | 9576-B | 9384-B | 9384-B | 20898-B | 9284-B | 20123-B | 81472-B | 9284-B | 27784-B |
|                           | <b>Weight</b>   | 65     | 100    | 115    | 115    | 115     | 152    | 152     | 152     | 152    | 165     |
| <b>Side Hill Type Nut</b> | <b>Part No.</b> | 9269-C | 9576-C | 9384-C | 9384-C | 20898-C | 9284-C | 20123-C | 81472-C | 9284-C | 27784-C |
|                           | <b>Weight</b>   | 65     | 100    | 115    | 115    | 115     | 152    | 152     | 152     | 152    | 165     |

### Stop Subs - Stop Rings

|                           |                 |   |        |        |        |        |        |        |        |        |       |
|---------------------------|-----------------|---|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| <b>Stop Sub Body O.D.</b> | —               | — | 7-1/4  | 7-1/4  | 7-1/4  | 8-1/4  | 8-1/4  | 8-1/4  | 8-1/4  | 11-3/4 |       |
| <b>Stop Sub Stop O.D.</b> | —               | — | 8-5/8  | 8-5/8  | 8-5/8  | 9-5/8  | 9-5/8  | 9-5/8  | 9-5/8  | 13-3/8 |       |
| <b>Stop Ring O.D.</b>     | —               | — | 9-1/16 | 9-1/16 | 9-1/16 | 10-3/4 | 10-3/4 | 10-3/4 | 10-3/4 | 16     |       |
| <b>Stop Sub Type F</b>    | <b>Part No.</b> | — | —      | 19059  | 19059  | 19059  | 19049  | 19049  | 19049  | 19049  | 27871 |
| <b>Stop Ring Type S</b>   | <b>Part No.</b> | — | —      | 18807  | 18807  | 18807  | 18808  | 18808  | 18808  | 18808  | 27870 |

### How to Order

Specify:

- (1) Name and part number of assembly or part
- (2) Size and type of top connection
- (3) Size and weight or weights of pipe to be caught
- (4) Flush or shoulder type (specify O.D. of shoulder – A)
- (5) Mandrel length desired (C)
- (6) Thread size and type of nut, if wanted. See page 8 for dimensions

### RECOMMENDED SPARES:

(1) 2 Grapples for Each Catch Size

### Segment Type Grapple Assembly

|                               |                 |        |        |        |        |        |        |        |        |        |
|-------------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Fits Spear Number</b>      |                 | 9380   | 9380   | 9380   | 9380   | 17243  | 17243  | 17243  | 17243  | 20895  |
| <b>To Catch – Pipe Size</b>   |                 | 10-3/4 | 11-3/4 | 12-3/4 | 13-3/8 | 10-3/4 | 11-3/4 | 12-3/4 | 13-3/8 | 13-3/8 |
| <b>To Catch – Pipe Weight</b> |                 | 32.75  | 38.00  | 45.45  | 48.00  | 32.75  | 38.00  | 45.45  | 48.60  | 48.60  |
|                               |                 | 48.00  | 54.00  | 66.72  | 68.00  | 48.00  | 54.00  | 66.72  | 68.00  | 68.00  |
|                               |                 | 40.00  | 47.00  | —      | 61.00  | 40.00  | 47.00  | —      | 61.00  | 61.00  |
|                               |                 | 55.50  | 60.00  | —      | 85.00  | 55.50  | 60.00  | —      | 85.00  | 85.00  |
| <b>Complete Assembly</b>      | <b>Part No.</b> | 9382   | 9382   | 9382   | 9382   | 17245  | 17245  | 17245  | 17245  | 20897  |
|                               | <b>Weight</b>   | 178    | 189    | 198    | 197    | 337    | 350    | 359    | 382    | 401    |

### Replacement Parts

|  |                   |        |        |        |        |         |         |         |         |         |
|--|-------------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
| <b>Grapple Body</b>                              | <b>Part No.</b>   | 9382-A | 9382-A | 9382-A | 9382-A | 17245-A | 17245-A | 17245-A | 17245-A | 20897-A |
|  | <b>Weight</b>     | 75     | 75     | 75     | 75     | 100     | 100     | 100     | 100     | 110     |
| <b>Grapple Segment<br/>(8 per Set)</b>           | <b>Part No.</b>   | 9382-B | 9382-B | 9382-B | 9382-B | 17245-B | 17245-B | 17245-B | 17245-B | 20897-B |
|  | <b>Weight</b>     | 96     | 112    | 115    | 120    | 175     | 100     | 191     | 220     | 240     |
| <b>Segment Screw</b>                             | <b>Part No.</b>   | 12198  | 12198  | 12198  | 12198  | 12198   | 12198   | 12198   | 12198   | 12198   |
|  | <b>No. Req'd.</b> | 16     | 16     | 16     | 16     | 32      | 32      | 32      | 32      | 16      |
| <b>Retainer Ring (2 Req'd.)</b>                  | <b>Part No.</b>   | 56855  | 56855  | 56855  | 56855  | 56855   | 56855   | 56855   | 56855   | 56855   |
|  | <b>Weight</b>     | 4      | 4      | 4      | 4      | 4       | 4       | 4       | 4       | 4       |
| <b>Retainer Ring Screw<br/>(6 Req'd.)</b>        | <b>Part No.</b>   | 23535  | 23535  | 23535  | 23535  | 23535   | 23535   | 23535   | 23535   | 23535   |
| <b>Retainer Ring Screw Spacer<br/>(6 Req'd.)</b> | <b>Part No.</b>   | 56979  | 56979  | 56979  | 56979  | 56979   | 56979   | 56979   | 56979   | 56979   |

### Segment Type Grapple Assembly (Continued)

|                               |                 |        |       |       |        |        |       |       |        |        |
|-------------------------------|-----------------|--------|-------|-------|--------|--------|-------|-------|--------|--------|
| <b>Fits Spear Number</b>      |                 | 9281   | 9281  | 9281  | 9281   | 17246  | 17246 | 17246 | 17246  | 27780  |
| <b>To Catch – Pipe Size</b>   |                 | 13-3/8 | 14    | 16    | 20     | 13-3/8 | 14    | 16    | 20     | 20     |
| <b>To Catch – Pipe Weight</b> |                 | 48.00  | 42.00 | 55.00 | 90.00  | 48.00  | 42.00 | 55.00 | 90.00  | 90.00  |
|                               |                 | 68.00  | 57.00 | 65.00 | 94.00  | 68.00  | 57.00 | 65.00 | 94.00  | 94.00  |
|                               |                 | 61.00  | —     | —     | 106.00 | 61.00  | —     | —     | 133.00 | 133.00 |
|                               |                 | 85.00  | —     | —     | 133.00 | 85.00  | —     | —     | —      | —      |
| <b>Complete Assembly</b>      | <b>Part No.</b> | 9283   | 9283  | 9283  | 9283   | 17248  | 17248 | 17248 | 17248  | 27782  |
|                               | <b>Weight</b>   | 197    | 207   | 216   | 536    | 392    | 412   | 430   | 720    | 800    |

### Replacement Parts (Continued)

|  |                   |        |        |        |        |         |         |         |         |         |
|--|-------------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
| <b>Grapple Body</b>                              | <b>Part No.</b>   | 9283-A | 9283-A | 9283-A | 9283-A | 17248-A | 17248-A | 17248-A | 17248-A | 27782-A |
|  | <b>Weight</b>     | 85     | 85     | 85     | 85     | 170     | 170     | 170     | 170     | 200     |
| <b>Grapple Segment<br/>(8 per Set)</b>           | <b>Part No.</b>   | 9283-B | 9283-B | 9283-B | 9283-B | 17248-B | 17248-B | 17248-B | 17248-B | 27782-B |
|  | <b>Weight</b>     | 110    | 120    | 129    | 450    | 220     | 240     | 258     | 550     | 600     |
| <b>Segment Screw</b>                             | <b>Part No.</b>   | 23020  | 23020  | 23020  | 23020  | 23020   | 23020   | 23020   | 23020   | 12019   |
|  | <b>No. Req'd.</b> | 16     | 16     | 16     | 16     | 16      | 16      | 16      | 16      | 16      |
| <b>Retainer Ring<br/>(2 Req'd.)</b>              | <b>Part No.</b>   | 56409  | 56409  | 56409  | 56409  | 56409   | 56409   | 56409   | 56409   | 56858   |
|  | <b>Weight</b>     | 4-1/2  | 4-1/2  | 4-1/2  | 4-1/2  | 4-1/2   | 4-1/2   | 4-1/2   | 4-1/2   | 5       |
| <b>Retainer Ring Screw<br/>(6 Req'd.)</b>        | <b>Part No.</b>   | 56813  | 56813  | 56813  | 56813  | 56859   | 56859   | 56859   | 56859   | 56859   |
| <b>Retainer Ring Screw Spacer<br/>(6 Req'd.)</b> | <b>Part No.</b>   | 56979  | 56979  | 56979  | 56979  | 56979   | 56979   | 56979   | 56979   | 56979   |

### How to Order

Specify:

- (1) Name and part number of assembly or part
- (2) Size and type of top connection
- (3) Size and weight or weights of pipe to be caught
- (4) Flush or shoulder type (specify O.D. of shoulder – A)
- (5) Mandrel length desired (C)
- (6) Thread size and type of nut, if wanted. See page 8 for dimensions

### RECOMMENDED SPARES:

(1) 2 Grapples for Each Catch Size

### Packoff Assembly

| Size – (inches)<br>(please specify) | 1-1/2<br>Tub    | 2-3/8<br>Tub | 2-7/8<br>Tub | 3-1/2<br>Tub | 4<br>Tub | 4-1/2<br>CSG | 5<br>CSG | 5-1/2<br>CSG | 6<br>CSG | 6-5/8<br>CSG | 7<br>CSG | 7-5/8<br>CSG | 8-5/8<br>CSG | 9-5/8<br>CSG | 10-3/4<br>CSG |      |
|-------------------------------------|-----------------|--------------|--------------|--------------|----------|--------------|----------|--------------|----------|--------------|----------|--------------|--------------|--------------|---------------|------|
| <b>O.D. Adapter Sub (inches)</b>    | 1-3/8           | 1-7/8        | 1-13/16      | 2-1/2        | 3-1/4    | 3-1/2        | 4        | 4            | 4-3/4    | 4-3/4        | 4-3/4    | 4-3/4        | 6-1/8        | 6-1/8        | 6-1/8         |      |
| <b>Complete Assembly</b>            | <b>Part No.</b> | 18835        | 9590         | 9595         | 9600     | 9605         | 9604     | 9610         | 9760     | 9775         | 9780     | 9615         | 9770         | 9620         | 9625          | 9765 |
|                                     | <b>Weight</b>   | 7-3/4        | 10-1/4       | 13           | 27-1/2   | 40           | 46       | 68           | 74       | 1000         | 104      | 114          | 120          | 181          | 210           | 216  |

### Replacement Parts

| Mandrel            | Part No.        | 18837 | 9591  | 9596  | 9601  | 9606  | 9608  | 9611   | 9761   | 9776  | 9781  | 9616  | 9771  | 9621  | 9626  | 9766  |
|--------------------|-----------------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
|                    | <b>Weight</b>   | 4     | 6     | 7     | 17    | 22    | 23    | 28     | 33     | 55    | 57    | 63    | 67    | 106   | 126   | 136   |
| <b>Adapter Sub</b> | <b>Part No.</b> | 18836 | 9592  | 9597  | 9602  | 9607  | 9609  | 9612   | 9612   | 9777  | 9777  | 9617  | 9617  | 9622  | 9627  | 9627  |
|                    | <b>Weight</b>   | 3     | 3-1/2 | 4-3/4 | 8-1/2 | 15    | 19    | 34-1/2 | 34-1/2 | 38    | 38    | 40    | 60    | 60    | 58    | 58    |
| <b>Packing</b>     | <b>Part No.</b> | 18838 | 10716 | 10047 | 16146 | 14036 | 13486 | 13764  | 13654  | 14714 | 15490 | 13427 | 14178 | 14965 | 10354 | 13197 |
|                    | <b>Weight</b>   | 1/2   | 1/2   | 3/4   | 1     | 1-1/2 | 2     | 2-1/2  | 3      | 3-1/2 | 4-1/2 | 5-1/2 | 6-1/2 | 7-3/4 | 9     | 12    |
| <b>Thimble</b>     | <b>Part No.</b> | 18839 | 6435  | 6436  | 16440 | 6696  | 18319 | 6448   | 16183  | 18321 | 15532 | 17542 | 6366  | 18242 | 17575 | 1478  |
|                    | <b>Weight</b>   | 1/4   | 1/4   | 1/2   | 3/4   | 1-1/4 | 1-3/4 | 2-1/2  | 3      | 3-1/4 | 4-1/4 | 5     | 6     | 7     | 8     | 10    |

### How to Order

Specify:

- (1) Name and part number of assembly or part
- (2) Top connection
- (3) Size and weight of pipe to be run in

**RECOMMENDED SPARES:**  
**(1) 2 Packers for each size**  
**(2) 1 Thimble for each size**

### Standard and Oversize Packers

|                        | Size            | Weight (lbs) | Cup No. | Thimble No. |
|------------------------|-----------------|--------------|---------|-------------|
| <b>1-1/2" O.D. Tub</b> | 1-1/2" Tub      | 2.75         |         |             |
| <b>No. 18835</b>       | 1-1/2" Tub      | 2.90         | 18838   | 18839       |
| <b>2-3/8" O.D. Tub</b> | 2-3/8" O.D. Tub | 4.00         |         |             |
| <b>No. 9590</b>        | 2-3/8" O.D. Tub | 4.70         | 10716   |             |
|                        | 2-7/8" O.D. DP  | 10.4         | 12993   | 6435        |
| <b>2-7/8" O.D. Tub</b> | 2-7/8" O.D. Tub | 6.40         | 10047   | 6436        |
| <b>3-1/2" O.D. DP</b>  | 2-7/8" O.D. Tub | 6.50         |         |             |
| <b>No. 9595</b>        | 3-1/2" O.D. DP  | 13.30        | 14082   | 14085       |
|                        | 3-1/2" O.D. DP  | 12.40        |         |             |
|                        | 3-1/2" O.D. DP  | 11.20        | 14960   | 6437        |
|                        | 3-1/2" O.D. DP  | 10.20        |         |             |
| <b>3-1/2" O.D. Tub</b> | 3-1/2" O.D. Tub | 9.20         |         |             |
| <b>4" O.D. Tub</b>     | 3-1/2" O.D. Tub | 10.20        | 16146   | 16440       |
| <b>No. 9600</b>        | 3-1/2" O.D. Tub | 7.70         | 16370   |             |
|                        | 4" O.D. Tub     | 11.00        |         |             |
|                        | 4" O.D. Tub     | 11.60        | 14036   | 6696        |
|                        | 4" O.D. Tub     | 9.50         | 14034   |             |
| <b>4" O.D. Tub</b>     | 4" O.D. Tub     | 11.00        |         |             |
| <b>No. 9605</b>        | 4" O.D. Tub     | 11.60        | 14036   | 6696        |
|                        | 4" O.D. Tub     | 9.50         | 14034   |             |
| <b>4-1/2" O.D. Tub</b> | 4-1/2" O.D. Tub | 9.5 – 13.5   | 13486   | 18319       |
| <b>No. 9604</b>        | 4-1/2" O.D. Tub | 15.3 – 16.6  |         |             |
|                        | 4-1/2" O.D. DP  | 18.10        | 10430   | 16297       |
| <b>5" O.D. Csg</b>     | 5" O.D. Csg     | 13 – 15      | 13764   | 6448        |
| <b>No. 9610</b>        | 5" O.D. Csg     | 18 – 21      | 13489   | 6754        |
| <b>5-1/2" O.D. Csg</b> | 5-1/2" O.D. Csg | 13 – 15      | 13654   |             |
| <b>No. 9760</b>        | 5-1/2" O.D. Csg | 15.5 – 17    | 30847   | 16183       |
|                        | 5-1/2" O.D. Csg | 17 – 23      | 13657   |             |
|                        | 6" O.D. Csg     | 14 – 18      | 16178   | 18233       |

### Standard and Oversize Packers

|                         | Size             | Weight      | Cup No. | Thimble No. |
|-------------------------|------------------|-------------|---------|-------------|
| <b>6" O.D. Csg</b>      | 6" O.D. Csg      | 22 – 23     | 14714   | 18321       |
| <b>No. 9775</b>         | 6" O.D. Csg      | 14 – 18     | 14721   | 8160        |
| <b>6-5/8" O.D. Csg</b>  | 6-5/8" O.D. Csg  | 32 – 34     | 15490   | 15532       |
| <b>No. 9780</b>         | 6-5/8" O.D. Csg  | 24 – 26     | 14962   | 18251       |
| <b>7" O.D. Csg</b>      | 7" O.D. Csg      | 17 – 20     | 13427   |             |
| <b>No. 9615</b>         | 7" O.D. Csg      | 22 – 24     | 14232   | 17542       |
|                         | 7" O.D. Csg      | 26 – 30     | 13385   | 17543       |
|                         | 7" O.D. Csg      | 32 – 35.3   | 14723   | 18322       |
|                         | 7" O.D. Csg      | 38 – 40     | 14144   |             |
| <b>7-5/8" O.D. Csg</b>  | 7-5/8" O.D. Csg  | 26.4 – 29.7 | 14178   | 6366        |
| <b>No. 9770</b>         | 7-5/8" O.D. Csg  | 29.7 – 33.7 | 16410   |             |
| <b>8" O.D. Csg</b>      | 8" O.D. Csg      | 26          | 14965   | 18242       |
| <b>8-1/2" O.D. Csg</b>  | 8-1/8" O.D. Csg  | 32          |         |             |
| <b>9" O.D. Csg</b>      | 8" O.D. Csg      | 16          |         |             |
| <b>No. 9620</b>         | 8-1/8" O.D. Csg  | 28          | 16114   |             |
|                         | 8-5/8" O.D. Csg  | 28 – 36     |         |             |
|                         | 9" O.D. Csg      | 45          | 16110   | 17546       |
|                         | 8-5/8" O.D. Csg  | 36 – 40     |         |             |
|                         | 9" O.D. Csg      | 55          | 16112   |             |
|                         | 8-5/8" O.D. Csg  | 40 – 49     | 16114   |             |
| <b>9-5/8" O.D. Csg</b>  | 9-5/8" O.D. Csg  | 36 – 43.5   | 10354   | 17575       |
| <b>No. 9625</b>         |                  |             |         |             |
| <b>10-3/4" O.D. Csg</b> | 10-3/4" O.D. Csg | 32.7 – 55.5 | 13197   | 1478        |
| <b>No. 9765</b>         | 11-3/4" O.D. Csg | 38 – 60     | 14246   | 14248       |

### Calculated Strengths

| Grapple No.   | Actual Catching Range |                     | Old Nominal Size                             | Grapple O.D.                               | Tensile Strength of       |         |
|---------------|-----------------------|---------------------|--|--|---------------------------|---------|
|               | Minimum I.D.          | Nominal* Catch Size | (Grapples were marked with this description) | - .000 + .005                              | Body Yield Strength (lbs) |         |
| 16457         | 0.725                 | 0.742               | 0.750  | 3/4" I.D. & 3/4" Extra Strong Pipe         | 0.770                     | 20,800  |
|               | 0.799                 | 0.813               | 0.824  | 3/4" Std. Pipe 0.824" I.D.                 | 0.844                     |         |
|               | 0.850                 | 0.864               | 0.875  | 7/8" - 0.864" I.D. 1" - 2.25 # C.S. Hydril | 0.895                     |         |
|               | 0.912                 | 0.924               | 0.937  | 0.937" I.D.                                | 0.957                     |         |
|               | 0.932                 | 0.944               | 0.957  | 1" Extra Strong Pipe 0.957" I.D.           | 0.977                     |         |
|               | 0.955                 | 0.967               | 0.982  | 0.982" I.D.                                | 1.000                     |         |
|               | 0.975                 | 0.987               | 1.000  | 1" I.D.                                    | 1.020                     |         |
|               | 1.033                 | 1.049               | 1.058  | 1" Std. Pipe, 1.049"                       | 1.078                     |         |
|               | 1.050                 | 1.062               | 1.075  | —  | 1.095                     |         |
|               | 1.100                 | 1.112               | 1.125  | 1-1/8" I.D.                                | 1.145                     |         |
| 19352         | 0.913                 | 0.937               | 0.957  | 0.957" I.D. - 1" Extra Strong Pipe         | 0.988                     | 29,400  |
|               | 0.956                 | 0.978               | 1.000  | 1.000" I.D.                                | 1.031                     |         |
|               | 1.005                 | 1.027               | 1.049  | 1.045" - 1" Std. Pipe                      | 1.080                     |         |
|               | 1.050                 | 1.072               | 1.093  | 1.093" I.D.                                | 1.125                     |         |
|               | 1.081                 | 1.103               | 1.125  | 1.125" I.D.                                | 1.156                     |         |
| 11197 & 35843 | 1.137                 | 1.170               | 1.207  | 1.187" I.D.                                | 1.227                     | 43,600  |
|               | 1.180                 | 1.215               | 1.250  | 1.250" - 1.219" I.D.                       | 1.270                     |         |
|               | 1.211                 | 1.246               | 1.281  | 1.281" - 1.250" I.D.                       | 1.301                     |         |
|               | 1.242                 | 1.277               | 1.312  | 1.312" - 1.281" I.D.                       | 1.332                     |         |
|               | 1.273                 | 1.308               | 1.342  | 1.343" - 1.312" I.D.                       | 1.363                     |         |
|               | 1.332                 | 1.367               | 1.402  | 1-3/8" I.D. - 1-1/4" Tubing                | 1.422                     |         |
|               | 1.394                 | 1.429               | 1.464  | 1.438" I.D.                                | 1.484                     |         |
|               | 1.430                 | 1.465               | 1.500  | 1.500" - 1.469" I.D.                       | 1.520                     |         |
|               | 1.580                 | 1.615               | 1.652  | 1-1/2" Std. Pipe & 1-5/8" I.D.             | 1.672                     |         |
|               | 1.481                 | 1.516               | 1.551  | 1.531" I.D.                                | 1.571                     |         |
|               | 1.519                 | 1.554               | 1.589  | 1-9/16" I.D.                               | 1.609                     |         |
|               | 1.650                 | 1.687               | 1.720  | 1.687" - 1.700" I.D.                       | 1.740                     |         |
|               | 1.722                 | 1.757               | 1.792  | 1-3/4" - 1-25/32" I.D.                     | 1.812                     |         |
|               | 1.771                 | 1.806               | 1.841  | 1.815" I.D.                                | 1.861                     |         |
| 1.836         | 1.875                 | 1.906               | 1-7/8" - 1-29/32" I.D.                       | 1.936                                      |                           |         |
| 1.895         | 1.930                 | 1.965               | 1-15/16" I.D.                                | 1.985                                      |                           |         |
| 1.957         | 1.992                 | 2.027               | 2" I.D.                                      | 2.047                                      |                           |         |
| 2.024         | 2.061                 | 2.094               | 2.067" I.D.                                  | 2.114                                      |                           |         |
| 9917 & 49372  | 1.441                 | 1.470               | 1.500  | 1-1/2" Extra Strong Pipe (1.500" I.D.)     | 1.546                     | 62,000  |
|               | 1.553                 | 1.583               | 1.610  | 1-1/2" Std. Pipe (1.610" I.D.)             | 1.658                     |         |
|               | 1.566                 | 1.596               | 1.625  | 1-5/8" I.D.                                | 1.671                     |         |
|               | 1.598                 | 1.628               | 1.657  | 1.657" I.D.                                | 1.703                     |         |
|               | 1.612                 | 1.642               | 1.670  | 1.670" I.D.                                | 1.717                     |         |
|               | 1.673                 | 1.700               | 1.734  | 1.700" I.D.                                | 1.781                     |         |
|               | 1.707                 | 1.737               | 1.765  | —  | 1.812                     |         |
|               | 1.742                 | 1.772               | 1.800  | 1.800" I.D.                                | 1.847                     |         |
|               | 1.817                 | 1.847               | 1.875  | 1.7/8" I.D.                                | 1.922                     |         |
|               | 1.881                 | 1.911               | 1.939  | 1.939" I.D.                                | 1.986                     |         |
| 1.942         | 1.972                 | 2.000               | 2" I.D.                                      | 2.047                                      |                           |         |
| 74555 & 9647  | 1.677                 | 1.719               | 1.750  | 1.719" - 1.750" I.D.                       | 1.781                     | 116,400 |
|               | 1.742                 | 1.778               | 1.815  | 2-3/8" D.P. 6.65#                          | 1.846                     |         |
|               | 1.802                 | 1.838               | 1.875  | 1-7/8" I.D. & 1-27/32" I.D.                | 1.906                     |         |
| 42071         | 1.864                 | 1.900               | 1.937  | 1.875" - 1.937" I.D.                       | 1.968                     | 132,000 |
|               | 1.968                 | 2.004               | 2.041  | 2-3/8" Tubing, 4.0# - 4.7#                 | 2.072                     |         |
| 17230         | 1.788                 | 1.828               | 1.867  | 1.867" I.D. (Turn Body Down)***            | 1.898                     | 132,000 |
| 1348          | 1.796                 | 1.836               | 1.876  | 1.875" I.D. (Turn Body Down)***            | 1.922                     |         |
| &             | 1.889                 | 1.929               | 1.968  | 1.937" - 1.968" I.D.                       | 2.015                     |         |
| 42071         | 1.952                 | 1.992               | 2.041  | 2-3/8" Tubing - 4# - 4.70#                 | 2.078                     |         |
|               | 1.983                 | 2.023               | 2.062  | 2.000" - 2.062" I.D.                       | 2.109                     |         |

### Calculated Strengths

| Grapple No. | Actual Catching Range |                     |                                  | Old Nominal Size<br>(Grapples were marked with this description) | Grapple O.D.<br>- .000<br>+ .005             | Tensile Strength of<br>Body Yield Strength (lbs) |         |
|-------------|-----------------------|---------------------|----------------------------------|--|--|--|---------|
|             | Minimum I.D.          | Nominal* Catch Size | Maximum I.D.                     |  |  |  |         |
| 42071       | 2.045                 | 2.085               | 2.125                            | 2-1/8" I.D. (Turn Body Down) ***                                 | 2.171  |  |         |
|             | 2.091                 | 2.131               | 2.172                            | 2-7/8" D.P., 9.75 - 10.4#  | 2.218  |  |         |
|             | 2.170                 | 2.211               | 2.250                            | 2-1/4" - 2-3/16" I.D.  | 2.296  |  |         |
|             | 2.186                 | 2.226               | 2.266                            | 2-17/64" I.D.  | 2.312  |  |         |
|             | 2.233                 | 2.273               | 2.312                            | 2-5/16" I.D.   | 2.359  |  |         |
|             | 2.249                 | 2.289               | 2.329                            | 2-7/8" O.D. D.P., 7.80# - 8.35#                                  | 2.375  |  |         |
|             | 2.295                 | 2.335               | 2.375                            | 2-3/8" I.D. NX 1/2 Drill Rod                                     | 2.421  |  |         |
|             | 17230                 | 2.358               | 2.398                            | 2-3/8" I.D. & 2-7/16" I.D.                                       | 2.484  |  |         |
|             | 1348                  | 2.390               | 2.430                            | 2-7/8" Tubing, 6.25 to 6.5, 2-7/8" O.D. 6.45# BX                 | 2.515  | 132,000  |         |
|             | &                     | 2.420               | 2.460                            | 2-7/16" I.D. & 2-1/2" I.D.                                       | 2.546  |  |         |
| 42071       | 2.556                 | 2.596               | 2.625                            | 2-5/8" I.D. & 2-9/16" I.D.                                       | 2.671  |  |         |
|             | 2.608                 | 2.648               | 2.688                            | 2-5/8" I.D. & 2-11/16" I.D.                                      | 2.734  |  |         |
|             | 2.670                 | 2.710               | 2.750                            | 2-3/4" I.D.  | 2.796  |  |         |
|             | 2.921                 | 2.961               | 3.000                            | 3" I.D. & 2-15/16" I.D. NX Drive Csg.                            | 3.046  |  |         |
|             | 3.046                 | 3.086               | 3.126                            | 3-1/16" I.D. & 3-1/8" I.D.                                       | 3.171  |  |         |
|             | 3.170                 | 3.210               | 3.250                            | 3-1/4" I.D. & 3-3/16" I.D.                                       | 3.296  |  |         |
|             | 3.264                 | 3.304               | 3.344                            | 3-11/32" I.D. & 3-9/32" I.D.                                     | 3.390  |  |         |
|             | 145017                | 2.280               | 2.328                            | 2.375  | 2-3/8" I.D. (Turn Body Down) ***             | 2.421  |         |
|             |                       | 2.351               | 2.399                            | 2.446  | 2-3/8" - 2-7/16" I.D. (Turn Body Down) ***   | 2.490  |         |
|             |                       | 2.390               | 2.438                            | 2.487  | 2-7/8" Tubing, 6.25 - 6.5# 2-7/8" D.P. 6.45# | 2.531  |         |
| 2.468       |                       | 2.516               | 2.563                            | 2.562" - 2-15/32" I.D.   | 2.609  |  |         |
| 2.515       |                       | 2.562               | 2.610                            | 3-1/2" O.D., 15.5# D.P.  | 2.656  |  |         |
| 2.593       |                       | 2.641               | 2.688                            | 2-11/16" - 2-5/8" I.D.   | 2.734  |  |         |
| 2.671       |                       | 2.718               | 2.766                            | 3-1/2" O.D., 13.3 - 12.4# D.P.                                   | 2.812  |  |         |
| 99888       |                       | 2.718               | 2.766                            | 2-13/16" I.D. & 2-3/4" I.D.                                      | 2.859  |  |         |
| 1230        |                       | 2.827               | 2.875                            | 3-1/2" O.D., 10.2 - 11.2# D.P.                                   | 2.968  | 270,000  |         |
| 49888       |                       | 2.843               | 2.891                            | 2-7/8" - 2-15/16" I.D.   | 2.984  |  |         |
| &           | 2.890                 | 2.938               | 3-1/2" O.D., 9.20# - 10.20# D.P. | 3.031  |  |  |         |
| 17233       | 2.984                 | 3.032               | 3.079                            | 3-1/2" O.D., 7.70# Tubing to 8.5# D.P.                           | 3.125  |  |         |
|             | 3.030                 | 3.078               | 3.125                            | 3-1/8" - 3-1/16" I.D.  | 3.171  |  |         |
|             | 3.155                 | 3.203               | 3.250                            | 3-1/4" - 3-3/16" I.D.  | 3.296  |  |         |
|             | 3.297                 | 3.345               | 3.392                            | 3.340" - 3.382" I.D., 4" O.D., 12.50 - 15# D.P.                  | 3.437  |  |         |
|             | 3.437                 | 3.485               | 3.532                            | 3-1/2" I.D.  | 3.578  |  |         |
|             | 9947                  | 2.532               | 2.579                            | 2.625  | 3-1/2" O.D. D.P., 15.50#                     | 2.671  |         |
|             |                       | 2.671               | 2.718                            | 2.764  | 3-1/2" O.D. D.P., 13.30 - 12.40#             | 2.812  |         |
|             |                       | 2.829               | 2.875                            | 2.922  | 3-1/2" O.D. D.P., 11.20 - 10.20#             | 2.968  | 357,000 |
|             |                       | 2.985               | 3.032                            | 3.078  | 2-1/2" O.D. D.P., 8.50#                      | 3.125  |         |
|             | 9412                  | 2.881               | 2.933                            | 2.992  | 3-1/2" O.D., 9.20 - 10.20 #                  | 3.031  |         |
| 2.949       |                       | 3.001               | 3.068                            | 3-1/2" O.D., 7.70 - 9.20#  | 3.109  |  |         |
| 3.021       |                       | 3.073               | 3.125                            | 3-1/8" I.D.  | 3.171  |  |         |
| 3.146       |                       | 3.198               | 3.250                            | 3-1/4" - 3-3/16" I.D.  | 3.296  | 357,000  |         |
| 1582        |                       | 3.256               | 3.308                            | 4" O.D., 12.50 - 14 .00# D.P.                                    | 3.406  |  |         |
| 3.365       |                       | 3.417               | 3.476                            | 4" O.D., 11.00 - 11.60#  | 3.515  |  |         |
| 3.444       |                       | 3.496               | 3.548                            | 4" O.D., 9.50 - 11.00#   | 3.593  |  |         |
| 3.522       |                       | 3.574               | 3.625                            | 3.500" - 3.625" I.D.   | 3.671  |  |         |
| 3.584       |                       | 3.636               | 3.687                            | 3-11/16" I.D.  | 3.734  |  |         |
| 3.646       |                       | 3.698               | 3.750                            | 3-3/4" I.D.  | 3.796  |  |         |
| 9487        | 3.218**               | 3.291               | 3.364                            | 4" O.D., 12.50 - 14.00# Tubing (Turn Body Down) ***              | 3.406  |  |         |
|             | 3.327                 | 3.400               | 3.476                            | 4" O.D., 11.00 - 11.60# Tubing                                   | 3.515  |  |         |
|             | 3.406                 | 3.479               | 3.548                            | 4" O.D., 9.50 - 11.00# Tubing                                    | 3.593  |  |         |
|             | &                     | 3.484               | 3.557                            | 3-5/8" I.D. & 3-9/16" I.D.                                       | 3.671  | 530,000  |         |
|             | 532                   | 3.608               | 3.681                            | 4-1/2" O.D., 18.10 - 22# Tubing                                  | 3.796  |  |         |
|             | 3.671                 | 3.744               | 3.826                            | 4-1/2" O.D., 15.35 - 18.10# Tubing                               | 3.859  |  |         |
|             | 3.812                 | 3.885               | 3.958                            | 4-1/2" O.D., 13.75 - 15.35# Tubing                               | 4.000  |  |         |

**Calculated Strengths**

| Grapple No.                                  | Actual Catching Range |                     |                            | Old Nominal Size<br>(Grapples were marked with this description) | Grapple O.D.<br>- .000<br>+ .005 | Tensile Strength of<br>Body Yield Strength (lbs) |
|--|-----------------------|---------------------|----------------------------|--|----------------------------------|--|
|  | Minimum I.D.          | Nominal* Catch Size | Maximum I.D.               |  |                                  |  |
| 9487<br>&<br>532                             | 3.874                 | 3.947               | 4.026                      | 4-1/2" O.D. 11.00 - 13.75# Tubing                                | 4.062                            | 530,000  |
|  | 3.937                 | 4.010               | 4.090                      | 4-1/2" O.D., 9.50 - 11.60# Tubing                                | 4.125                            |  |
|  | 4.134                 | 4.207               | 4.276                      | 5" O.D., 18-21# Tubing   | 4.312                            |  |
|  | 4.155                 | 4.228               | 4.300                      | 5" O.D., 17.70 - 18.00# Tubing                                   | 4.343                            |  |
|  | 4.358                 | 4.431               | 4.506                      | 5" Tubing, 12.04 - 15# (4.408) I.D.                              | 4.546                            |  |
|  | 4.406                 | 4.479               | 4.560                      | 5" O.D., 11.5# Tubing  | 4.593                            |  |
| 17477<br>&<br>13202                          | 4.874                 | 4.947               | 5.012                      | 5-1/2", 14 - 17# Tubing  | 5.062                            | 725,000  |
|  | 3.682                 | 3.782               | 3.881                      | 4-1/2" O.D. Tubing, 15.35 - 18.10#                               | 3.921                            |  |
|  | 3.761                 | 3.861               | 3.958                      | 4-1/2" O.D. Tubing, 13.75 - 15.35#                               | 4.000                            |  |
|  | 3.823                 | 3.923               | 4.026                      | 4-1/2" O.D. Tubing, 11.00 - 13.75#                               | 4.062                            |  |
|  | 3.886                 | 3.986               | 4.090                      | 4-1/2" O.D., 9.50 - 11.60# Csg.                                  | 4.125                            |  |
|  | 4.073                 | 4.173               | 4.276                      | 5" O.D., 18.00 - 21.00# Csg.                                     | 4.312                            |  |
|  | 4.214                 | 4.314               | 4.408                      | 5" O.D., 15.00 - 18.00# Csg.                                     | 4.453                            |  |
|  | 4.307                 | 4.407               | 4.506                      | 5" O.D., 12.64 - 15.00# Csg.                                     | 4.547                            |  |
| 20117<br>1334<br>18272<br>16446<br>&<br>9682 | 4.093                 | 4.179               | 4.276                      | 5" O.D., 18 - 21# Csg.   | 4.312                            | 920,000  |
|  | 4.234                 | 4.320               | 4.408                      | 5" O.D., 15 - 18# Csg.   | 4.453                            |  |
|  | 4.390                 | 4.476               | 4.562                      | 5" O.D., 11.5 - 15# Csg.   | 4.609                            |  |
|  | 4.469                 | 4.555               | 4.642                      | 5" O.D., 9 - 13# Csg.  | 4.687                            |  |
|  | 4.515                 | 4.601               | 4.696                      | 5" O.D., 8#, 5-1/2" O.D., 23-25" # Csg.                          | 4.734                            |  |
|  | 4.609                 | 4.695               | 4.782                      | 5-1/2" O.D., 20 - 23# Csg.                                       | 4.828                            |  |
|  | 4.719                 | 4.805               | 4.892                      | 5-1/2" O.D., 17 - 20# Csg.                                       | 4.937                            |  |
|  | 4.875                 | 4.961               | 5.048                      | 5-1/2" O.D., 14 - 17# Csg.                                       | 5.093                            |  |
|  | 4.922                 | 5.008               | 5.095                      | 5-3/4" O.D., 19.5 - 22.5# Csg.                                   | 5.140                            |  |
|  | 5.015                 | 5.101               | 5.192                      | 5-3/4" O.D., 17 - 19.5# Csg., 5-1/2" 9 - 13# Csg.                | 5.234                            |  |
|  | 5.124                 | 5.210               | 5.297                      | 5-3/4" O.D., 14-17# Csg.   | 5.343                            |  |
|  | 5.218                 | 5.304               | 5.390                      | 6" O.D., 20 - 23# Csg.   | 5.437                            |  |
| 58294<br>17236<br>&<br>9717                  | 5.281                 | 5.367               | 5.454                      | 6" O.D., 17 - 20# Csg.   | 5.500                            | 1,175,000  |
|  | 5.375                 | 5.461               | 5.552                      | 6" O.D., 14 - 17# Csg.   | 5.593                            |  |
|  | 5.500                 | 5.586               | 5.675                      | 6-5/8" O.D., 32-34# Csg.   | 5.718                            |  |
|  | 5.000                 | 5.134               | 5.266                      | 6" O.D., 23 - 26# Csg.   | 5.312                            |  |
|  | 5.093                 | 5.227               | 5.360                      | 6" O.D., 20 - 23# Csg.   | 5.406                            |  |
|  | 5.187                 | 5.321               | 5.454                      | 6" O.D., 17 - 20# Csg.   | 5.500                            |  |
|  | 5.280                 | 5.414               | 5.547                      | 6" O.D., 14 - 17# Csg.   | 5.593                            |  |
|  | 5.406                 | 5.540               | 5.675                      | 6" O.D., 10.5 - 14# Csg.   | 5.718                            |  |
|  | 5.530                 | 5.664               | 5.797                      | 6-5/8" O.D., 28 - 32# Csg.                                       | 5.843                            |  |
|  | 5.593                 | 5.727               | 5.860                      | 6-5/8" O.D., 26 - 29# Csg.                                       | 5.906                            |  |
|  | 5.656                 | 5.790               | 5.923                      | 6-5/8" O.D., 24 - 28# Csg.                                       | 5.968                            |  |
|  | 5.671                 | 5.805               | 5.938                      | 7" O.D., 38 - 40# Csg.   | 5.984                            |  |
|  | 5.781                 | 5.915               | 6.049                      | 6-5/8" O.D., 20 - 24# Csg.                                       | 6.093                            |  |
|  | 5.796                 | 5.930               | 6.063                      | 7" O.D., 33.7 - 38# Csg.   | 6.109                            |  |
|  | 5.875                 | 6.009               | 6.142                      | 6-5/8" O.D., 17 - 22# Csg.                                       | 6.187                            |  |
|  | 5.937                 | 6.071               | 6.204                      | 7" O.D., 29 - 33.7# Csg.   | 6.250                            |  |
|  | 6.015                 | 6.149               | 6.282                      | 7" O.D., 26 - 29# Csg.   | 6.328                            |  |
|  | 6.140                 | 6.274               | 6.407                      | 7" O.D., 22 - 26# Csg.   | 6.453                            |  |
| 6.202  | 6.335                 | 6.469               | 7" O.D., 20 - 23# Csg.     | 6.515  |                                  |  |
| 6.281  | 6.415                 | 6.548               | 7" O.D., 17 - 20# Csg.     | 6.593  |                                  |  |
| 17239<br>&<br>9268                           | 5.770                 | 5.970               | 6.173                      | 7" O.D., 30 - 40# & 6-5/8" O.D., 24# Csg.                        | 6.218                            | 972,000  |
|  | 5.895                 | 6.095               | 6.297                      | 7" O.D., 26 - 35# Csg.   | 6.343                            |  |
|  | 6.020                 | 6.220               | 6.423                      | 7" O.D., 22 - 33.7# Csg.   | 6.468                            |  |
|  | 6.270                 | 6.470               | 6.673                      | 7" O.D., 13 - 24# Csg.   | 6.718                            |  |
|  | 6.364                 | 6.564               | 6.765                      | 7-5/8" O.D., 33.7 - 45# Csg.                                     | 6.812                            |  |
|  | 6.567                 | 6.767               | 6.969                      | 7-5/8" O.D., 26.4 - 39# Csg.                                     | 7.015                            |  |
|  | 6.864                 | 7.064               | 7.263                      | 7-5/8" O.D., 14.75 - 26.4# Csg.                                  | 7.312                            |  |
|  | 6.987                 | 7.187               | 7.391                      | 8-1/8" O.D., 32 - 42# Csg.                                       | 7.437                            |  |
|  | 7.225                 | 7.425               | 7.628                      | 8" O.D., 16 - 26# Csg.   | 7.673                            |  |
|  | 7.239                 | 7.439               | 7.642                      | 7-9/16" I.D. Csg.  | 7.687                            |  |
| 7.489  | 7.689                 | 7.892               | 8-5/8" O.D., 36 - 48# Csg. | 7.937  |                                  |  |

### Calculated Strengths

| Grapple No.         | Actual Catching Range |                     |                             | Old Nominal Size<br>(Grapples were marked with this description) | Grapple O.D.<br>- .000<br>+ .005 | Tensile Strength of<br>Body Yield Strength (lbs) |
|---------------------|-----------------------|---------------------|-----------------------------|--|----------------------------------|--|
|                     | Minimum I.D.          | Nominal* Catch Size | Maximum I.D.                |  |                                  |  |
| 17239<br>&<br>9268  | 7.755                 | 7.955               | 8.157                       | 8-5/8" O.D., 24 - 38# Csg. 9" O.D., 40 - 55# Csg.                | 8.203                            | 972,000  |
|                     | 7.911                 | 8.111               | 8.313                       | 8-5/8" O.D., 17.6 - 29.35# Csg.                                  | 8.359                            |  |
|                     | 7.958                 | 8.158               | 8.360                       | 9" O.D., 34 - 45# Csg.   | 8.406                            |  |
|                     | 8.442                 | 8.642               | 8.844                       | 9-5/8" O.D. 43.5 - 53.5# Csg.                                    | 8.890                            |  |
| 9574                | 8.692                 | 8.892               | 9.094                       | 9-5/8" O.D. 29.3 - 42# Csg.                                      | 9.140                            | 1,800,000  |
|                     | 7.102                 | 7.245               | 7.385                       | 8" O.D., 26# & 8-1/8" O.D., 32 - 42# Csg.                        | 7.437                            |  |
|                     | 6.352                 | 7.495               | 7.635                       | 8" O.D., 16 - 26# & 8-1/8" O.D., 28 - 32.20# Csg.                | 7.687                            |  |
|                     | 7.537                 | 7.686               | 7.825                       | 8-5/8" O.D., 36 - 48# Csg.                                       | 7.875                            |  |
|                     | 7.759                 | 7.902               | 8.042                       | 8-5/8" O.D., 28 - 38# & 9" O.D., 45 - 55# Csg.                   | 8.093                            |  |
|                     | 7.981                 | 8.125               | 8.290                       | 8-5/8" O.D., 17.5 - 29.35# & 9" O.D., 34 - 45# Csg.              | 8.343                            |  |
|                     | 8.435                 | 8.578               | 8.760                       | 9" O.D., 19# & 9-5/8" O.D., 43.5 - 58# Csg.                      | 8.812                            |  |
|                     | 8.790                 | 8.833               | 9.073                       | 9-5/8" O.D., 29.3 - 42# Csg.                                     | 9.125                            |  |
|                     | 7.537                 | 7.690               | 7.846                       | 8-5/8" O.D., 36 - 48# Csg.                                       | 7.906                            |  |
|                     | 7.729                 | 7.882               | 8.034                       | 8-5/8" O.D., 28 - 38# & 9" O.D., 45 - 55# Csg.                   | 8.093                            |  |
| 9382<br>&<br>17245  | 8.009                 | 8.162               | 8.315                       | 8-5/8" O.D., 17.5 - 29.35# & 9" O.D., 34 - 45# Csg.              | 8.375                            | 1,946,000  |
|                     | 8.447                 | 8.600               | 8.755                       | 9" O.D., 19# & 9-5/8" O.D., 43.5 - 58# Csg.                      | 8.813                            |  |
|                     | 8.535                 | 8.688               | 8.846                       | 9-5/8" O.D., 40 - 53.5# Csg.                                     | 8.906                            |  |
|                     | 8.760                 | 8.913               | 9.065                       | 9-5/8" O.D., 29.3 - 42# Csg.                                     | 9.125                            |  |
|                     | 9.479                 | 9.632               | 9.784                       | 10-3/4" O.D., 55.5 - 65.7# Csg.                                  | 9.843                            |  |
|                     | 9.760                 | 9.913               | 10.065                      | 10-3/4" O.D., 40 - 55.5# Csg.                                    | 10.125                           |  |
|                     | 9.885                 | 10.038              | 10.192                      | 10-3/4" O.D., 32.75 - 48.0# Csg.                                 | 10.250                           |  |
|                     | 10.729                | 10.882              | 11.034                      | 11-3/4" O.D., 47 - 60# Csg.                                      | 11.093                           |  |
|                     | 10.854                | 11.007              | 11.159                      | 11-3/4" O.D., 38 - 54# Csg.                                      | 11.218                           |  |
|                     | 12.228                | 12.381              | 12.534                      | 13-3/8" O.D., 61 - 85# Csg.                                      | 12.593                           |  |
| 20122<br>&<br>17248 | 12.415                | 12.568              | 12.721                      | 13-3/8" O.D., 48 - 68# Csg.                                      | 12.781                           | 2,700,000  |
|                     | 8.435                 | 8.597               | 8.755                       | 9-5/8" O.D., 47 - 58# Csg.                                       | 8.812                            |  |
|                     | 8.519                 | 8.681               | 8.844                       | 9-5/8" O.D., 40 - 53.5# Csg.                                     | 8.906                            |  |
|                     | 8.596                 | 8.758               | 8.921                       | 9-5/8" O.D., 36 - 43.5# Csg.                                     | 8.984                            |  |
|                     | 8.738                 | 8.900               | 9.063                       | 9-5/8" O.D., 29.3 - 42# Csg.                                     | 9.125                            |  |
|                     | 9.738                 | 9.900               | 10.063                      | 10-3/4" O.D., 40 - 55.5# Csg.                                    | 10.125                           |  |
|                     | 9.867                 | 10.029              | 10.192                      | 10-3/4" O.D., 32.75 - 48# Csg.                                   | 10.250                           |  |
|                     | 9.225                 | 9.387               | 9.550                       | 10-3/4" O.D., 71 - 76# Csg.                                      | 9.612                            |  |
|                     | 11.206                | 11.369              | 11.531                      | 11.500" I.D. Csg.  | 11.594                           |  |
|                     | 10.581                | 10.743              | 10.906                      | 11-3/4" O.D., 54 - 65# Csg.                                      | 10.968                           |  |
|                     | 10.832                | 10.994              | 11.157                      | 11-3/4" O.D., 38 - 54# Csg.                                      | 11.219                           |  |
|                     | 10.612                | 10.774              | 10.937                      | 11-3/4" O.D., 60# Csg.   | 11.000                           |  |
|                     | 10.675                | 10.837              | 11.000                      | 11-3/4" O.D., 47 - 60# Csg.                                      | 11.062                           |  |
|                     | 11.643                | 11.805              | 11.968                      | 13-3/8" O.D., & 11.937" I.D. Csg.                                | 12.031                           |  |
|                     | 11.674                | 11.837              | 12.000                      | 13-3/8" O.D., 96# & 11.975" I.D. Csg.                            | 12.062                           |  |
|                     | 12.022                | 12.184              | 12.347                      | 13-3/8" O.D., 72 - 92# Csg.                                      | 12.406                           |  |
|                     | 12.393                | 12.555              | 12.718                      | 13-3/8" O.D., 48 - 68# Csg.                                      | 12.781                           |  |
|                     | 12.455                | 12.617              | 12.780                      | 12-3/4" I.D. Csg.  | 12.834                           |  |
|                     | 13.143                | 13.305              | 13.468                      | 14" O.D., 42 - 57# Csg.  | 13.531                           |  |
|                     | 13.312                | 13.474              | 13.637                      | 13.599" I.D. & 13.609" I.D. Csg.                                 | 13.700                           |  |
| 13.330              | 13.492                | 13.655              | 13-5/8" I.D. Csg.           | 13.718   |                                  |  |
| 15.112              | 15.274                | 15.437              | 16" O.D., 55 - 75# Csg.     | 15.500   |                                  |  |
| 14.925              | 15.087                | 15.250              | 16" O.D., 65 - 84# Csg.     | 15.312   |                                  |  |
| 17.331              | 17.493                | 17.656              | 17-1/2" I.D. Csg.           | 17.718   |                                  |  |
| 18.862              | 19.024                | 19.187              | 20" O.D., 90 - 106.5# Csg.  | 19.250   |                                  |  |
| 12.097              | 12.259                | 12.422              | 13-3/8" O.D., 68 - 85# Csg. | 12.484   |                                  |  |
| 27782               | 12.390                | 12.552              | 12.715                      | 13-3/8" O.D., 48 - 61# Csg.                                      | 12.781                           | 6,840,000  |

\* Grapples are marked with this size.

\*\* Mandrel is 3<sup>1</sup>/<sub>4</sub>" O.D.

\*\*\* Mandrel, Release Ring,

Nut must be turned down 1/32" below minimum I.D.

The strengths shown are theoretical calculations based on yield strength of the material used in each case. The strengths shown are therefore accurate, plus or minus 20% of the figures shown, only. These figures do not constitute a guarantee, actual or implied. They are meant to serve as a guide only, and appropriate allowance must be made in use as a safety factor.



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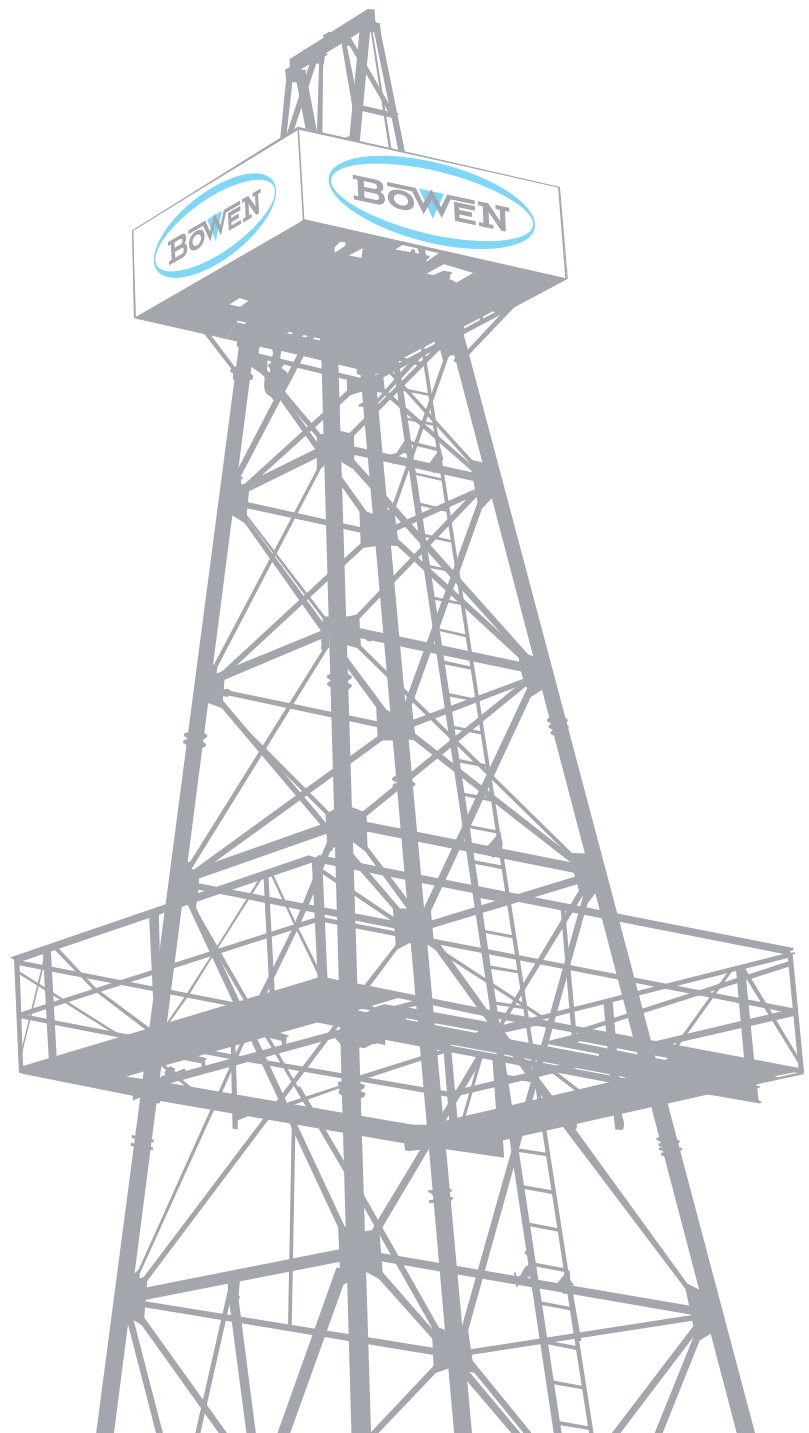
Tubular and Corrosion Control Solutions

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# Bowen Wide Catch Spears

Instruction Manual 2500



**Bowen | NOV**

# Bowen Wide Catch Spears

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# Bowen Wide Catch Spears

## General Description

The Bowen™ Wide Catch spear is a superior fishing spear that is designed to assure positive internal engagement with the fish. It is ruggedly built to withstand severe jarring and pulling strains and engages the fish over a large area without damaging or distorting the fish. If the fish cannot be pulled, the spear may easily be disengaged and released.

## Use

Optimized for strength, the Bowen Wide Catch spear features an increased load capacity to handle heavier pull loads as well as an increased functional catch range, which covers the full tolerance range for casing IDs as set forth by API. Ideal for offshore operations, the spear can pull old casing with internal wear, reducing the risk of casing failure. The extended-catch range and grapple engagement area allow the spear to increase the length of casing strings that can be pulled in each trip.

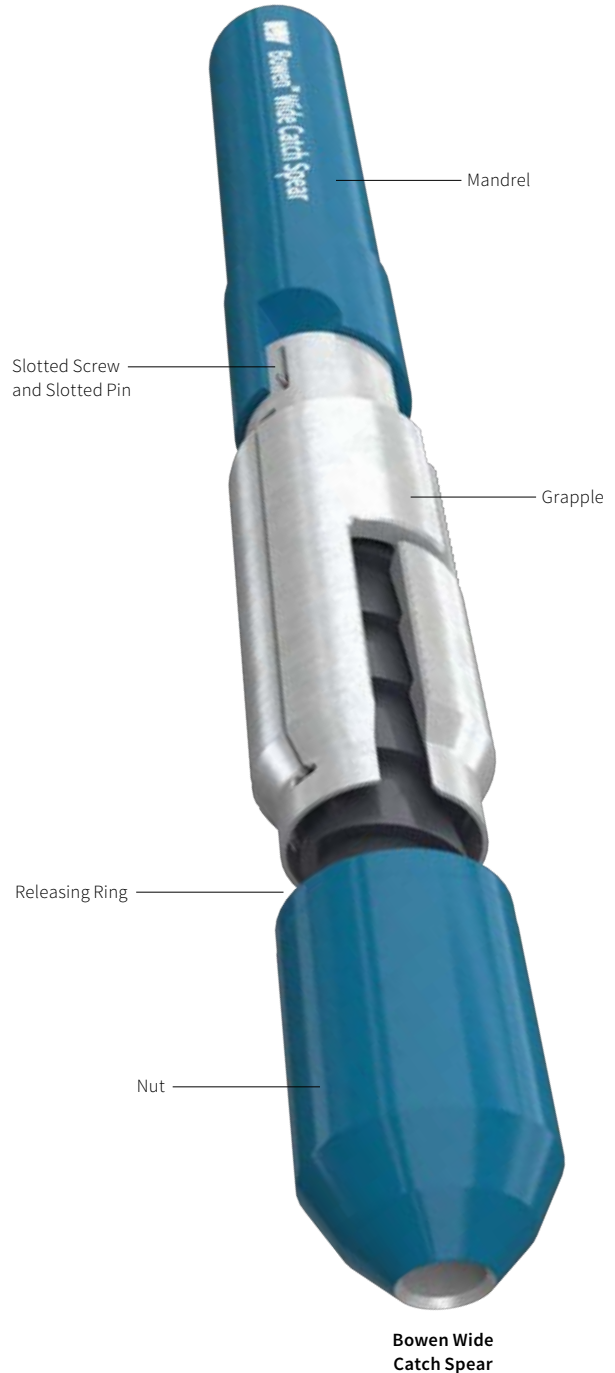
## Construction

The Bowen Wide Catch spear consists of a mandrel, grapple, release ring, nut, modified screw, and slotted spring pin. The mandrel may be ordered in either a flush type or a shoulder type. Mandrel top connections are furnished to order.

The flexible one-piece Grapple has an internal helix, matching that of the external helix found on the mandrel. The finger of the grapple rests against a stop on the mandrel when the spear is in the run-in position. The large engaging surface of the grapple permits heavy jarring and pulling strains without distorting the fish.

The helix of the mandrel terminates at the point where the release ring is installed. The cam face of the release ring matches the cam on the face of the nut. The matching cams of the release ring and the nut are a safety device that resists locking and/or jamming of the spear, assuring an easy release.

In comparison with our standard Itco™ Spears, the Wide Catch spear utilizes an optional modified screw and slotted spring pin to help keep the grapple in the run-in position at the top of the helix on the mandrel. This is a standard feature and is the best alternative to adding shear pins to the body or other method of keeping the grapple in the run-in position.



# Bowen Wide Catch Spears

## Tool Ratings

The maximum tool tensile data that is published below, is similar to the data found in the Itco spear manual, and is based on the minimum cross section in the helix of the mandrel. This generalization of the strength is used to serve as a guide and is not indicative of the strength for a specific grapple size, casing OD, and weight for any given mandrel, as it does not

take the system parameters into account. Since the swelling forces being delivered to the fish vary with grapple size, type of lubrication, straight pulling or jarring, etc., it is difficult to provide meaningful strength data for each condition in a chart. This level of calculation would result in several pages of data that cannot be published due to the many variables. In order to provide system ratings,

information will be required regarding the casing, as well as the specific details for the spear. The most common mode of failure is a result of the fish swelling and allowing the grapple to keep moving down the mandrel until it finally “jumps” over the helix of the mandrel. Below is the typical process as well as some sample ratings for casing with ID wear. These requirements are shown

below as “Inputs.” The appropriate system rating and mode of failure can then be provided.

Download the Bowen Casing Spear Calculator app via [nov.com](http://nov.com)



| Tool Size  | Grapple Number | Connection     | Catch Range | ID Wear Coverage | Max Tool Tensile |
|------------|----------------|----------------|-------------|------------------|------------------|
| 7.00 in.   | 508264         | 4½ in. API REG | 0.450 in.   | 30%              | 1M lbs           |
| 9.625 in.  | 507649         | 6% in. API REG | 0.500 in.   | 20%              | 2M lbs           |
| 13.375 in. | 507653         | 6% in. API REG | 0.625 in.   | 30%              | 3.5M lbs         |

## Accessories

### Type F Stop Subs

The type F stop sub is designed to be used with the flush type when use of a stop is desirable. It is installed in the box connection at the top of the mandrel.

### Type S Oversize Stop Rings

The type S oversize stop ring is designed to be used with the shoulder type mandrel when use of a larger stop is desirable. It is installed on the spear shoulder with set screws.

### Mill Type Nut

The mill type nut is used in place of the standard bullnose nut to mill away the distorted end of a

fish to insure ensure entrance of the spear into the fish. It is also effective for drilling out a sand-plugged fish.

### Side Hill Type Nut

The side hill type nut is used in place of the standard bullnose nut to align the spear with a fish that is embedded in the side wall of the hole.

### Sub Type Nut

The sub type nut is used in place of the standard bullnose nut to provide the connection required to utilize other tools below the spear, such as the spear pack-off or internal cutters.

### Spear Pack-Off Assembly

The spear pack-off assembly is attached to the sub type nut below the spear to pack off the fish in order to circulate through the fish. The spear pack-off assembly consists of an adapter sub, packer thimble, packer, and mandrel. The adapter sub of the spear pack-off will be furnished with a box connection to match the pin connection of the sub type nut on which it is to be used, or as otherwise ordered. The mandrel of the spear pack-off may be ordered with a plain bullnose or with a pin connection for attachment of other tools, as specified.

### Bowen Internal Cutters

For use in cut-and-pull operations, Bowen internal cutters may be run below the Bowen Wide Catch spear and spaced as desired, depending upon the length of the fish and the length of the cut to be made. The spear should be spaced far enough above the cutter so that the spear is clear of the fish during cutting operations. After cutting is completed, the spear can be lowered to retrieve the cut-off section. Bowen internal cutters are fully described in Instruction Manual No. 5600.

# Bowen Wide Catch Spears

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## Operation

Examine and assure that the Bowen Wide Catch spear is the correct size for the casing to be caught and that it is properly assembled. Refer to the Specification Table and to the Grapple Range information found in this manual for confirmation. Connect the spear to the fishing string. If a modified screw and pin were used, the grapple will stay at its engaged or run-in position until rotation is applied. The slotted pin is not loaded, except for holding the weight of the grapple, preventing it from rotating downward.

### To Engage and Pull the Fish

If no slotted pin was used, lower the fishing string slowly until the spear has entered the fish to the desired depth. Rotate one full turn to the left, then pull the fish by elevating the fishing string. As the fishing string is rotated to the left, it turns the mandrel down through the grapple, putting the grapple into the engaging position. A straight pull will then wedge the grapple into positive engagement with the fish. If a slotted pin was used, pulling will wedge the grapple into a positive engagement with the fish directly.

### To Release from the Fish

Bump down with the weight of the fishing string to break the engagement; rotate two to three turns to the right, then elevate the string until the spear is clear of the fish. This moves the mandrel upward through the grapple, forcing the grapple down against the release ring and putting the spear in the released position. If the spear does not release, bump down, then simultaneously rotate to the right while slowly elevating the fishing string until the spear is clear of the fish.

## Precautions

In deep or deviated holes, it may be necessary to rotate the fishing string more than one full turn to set or release the spear. Moderate additional rotation is not harmful to the operation or the spear.

During operation, always maintain a moderate upward strain on the fishing string when rotating either to the right or to the left.

Always bump down with the full weight of the fishing string before the releasing operation.

## Maintenance

After each use, the Bowen Wide Catch spear should be completely disassembled, thoroughly cleaned, inspected for signs of damage or advanced wear, lubricated, and reassembled. If the tool is to be stored, the exterior surface should be greased or painted, after assembly.

**NOTE:** NOV recommends that grapples are replaced after they have been used downhole.

# Bowen Wide Catch Spears

## Assembly

1. Secure the mandrel in a vise, clamping it near the upper end.

| Nominal Catch Size | 7 in. OD Casing | 9 1/2 in. OD Casing | 13 3/4 in. OD Casing |
|--------------------|-----------------|---------------------|----------------------|
| Mandrel            | 508263          | 507650              | 507654               |

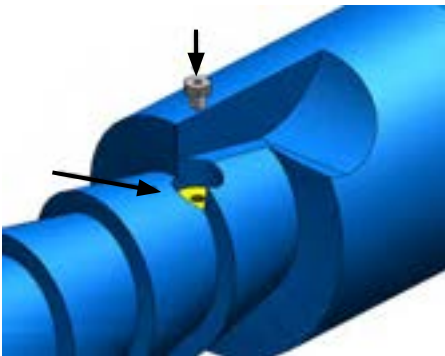


2. Apply a heavy coat of grease to the Helix of the mandrel.



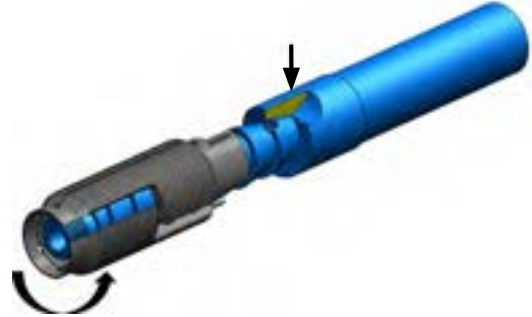
3. Add the modified screw with grease applied onto the threads with right hand rotation (optional).

| Nominal Catch Size | 7 in. OD Casing | 9 1/2 in. OD Casing | 13 3/4 in. OD Casing |
|--------------------|-----------------|---------------------|----------------------|
| Slotted Screw      | 508420          | 507664              | 507664               |
| Make Up Torque     | 10 ft-lbs       | 80 ft-lbs           | 80 ft-lbs            |



4. Screw the grapple onto the mandrel using left-hand rotation until the grapple hits the shoulder of the mandrel.

| Nominal Catch Size | 7 in. OD Casing | 9 1/2 in. OD Casing | 13 3/4 in. OD Casing |
|--------------------|-----------------|---------------------|----------------------|
| Grapple            | 508264          | 507649              | 507653               |



5. Install the release ring with the cammed face downward (facing the nut).

| Nominal Catch Size | 7 in. OD Casing | 9 1/2 in. OD Casing | 13 3/4 in. OD Casing |
|--------------------|-----------------|---------------------|----------------------|
| Releasing Ring     | 508265          | 507648              | 507652               |



6. Add the bull nose / sub type nut onto the mandrel with a right-hand rotation.

| Nominal Catch Size                 | 7 in. OD Casing | 9 1/2 in. OD Casing | 13 3/4 in. OD Casing |
|------------------------------------|-----------------|---------------------|----------------------|
| Nut                                | 508266          | 507647              | 507651               |
| Max Make Up Torque W/Bull Nose Nut | 400 ft-lbs      | 5,500 ft-lbs        | 14,000 ft-lbs        |
| Max Make Up Torque W/Sub Type Nut  | 6,750 ft-lbs    | 16,700 ft-lbs       | 47,950 ft-lbs        |

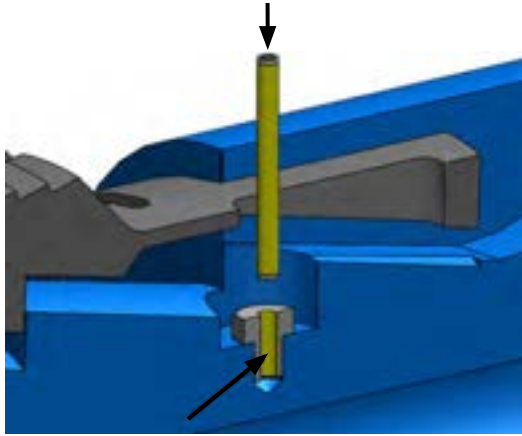




# Bowen Wide Catch Spears

7. Line up the slotted pin on the grapple finger with the modified screw and install the slotted pin (optional).

| Nominal Catch Size | 7 in. OD Casing | 9 in. OD Casing | 13 in. OD Casing |
|--------------------|-----------------|-----------------|------------------|
| 508419             | 507665          | 507665          | 508419           |



3. Remove the bull nose / sub type nut from the mandrel with a left-hand rotation.

| Nominal Catch Size                 | 7 in. OD Casing | 9 in. OD Casing | 13 in. OD Casing |
|------------------------------------|-----------------|-----------------|------------------|
| Nut                                | 508266          | 507647          | 507651           |
| Max Make Up Torque W/Bull Nose Nut | 400 ft-lbs      | 5,500 ft-lbs    | 14,000 ft-lbs    |
| Max Make Up Torque W/Sub Type Nut  | 6,750 ft-lbs    | 16,700 ft-lbs   | 47,950 ft-lbs    |

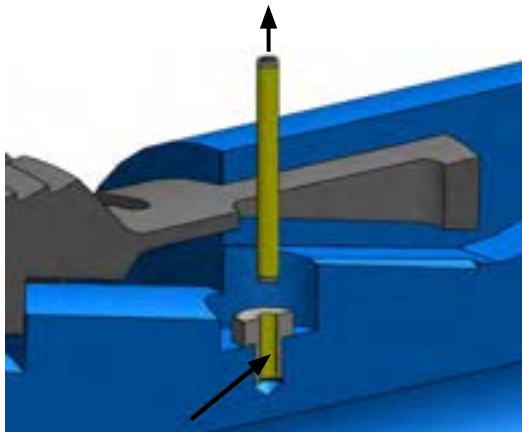


## Disassembly

1. Secure spear assembly on vice at the fish neck area.



2. Remove the slotted pin from the modified screw. Please note that if the grapple was released, the pin will likely be bent or partially sheared. If necessary, push the spring pin through the screw hole to remove it.



4. Remove the release ring.

| Nominal Catch Size | 7 in. OD Casing | 9 in. OD Casing | 13 in. OD Casing |
|--------------------|-----------------|-----------------|------------------|
| Releasing Ring     | 508265          | 507648          | 507652           |



5. Unscrew the grapple from the mandrel using right-hand rotation.

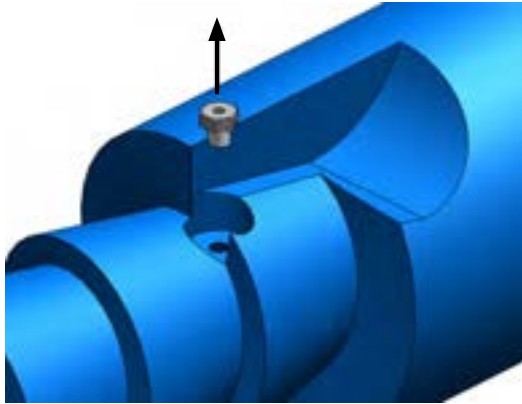
| Nominal Catch Size | 7 in. OD Casing | 9 in. OD Casing | 13 in. OD Casing |
|--------------------|-----------------|-----------------|------------------|
| Grapple            | 508264          | 507649          | 507653           |



# Bowen Wide Catch Spears

6. Remove modified screw from the mandrel with left hand rotation (optional).

| Nominal Catch Size | 7 in. OD Casing | 9 1/2 in. OD Casing | 13 3/4 in. OD Casing |
|--------------------|-----------------|---------------------|----------------------|
| Slotted Screw      | 508420          | 507664              | 507664               |
| Make Up Torque     | 10 ft-lbs       | 80 ft-lbs           | 80 ft-lbs            |

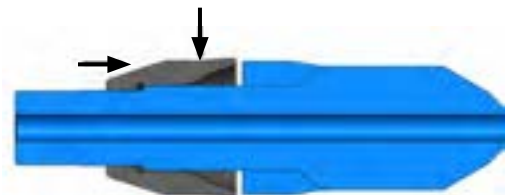


## Assembly of Spear Pack-Off

1. Secure the mandrel in a vise, clamping it on the lower end.



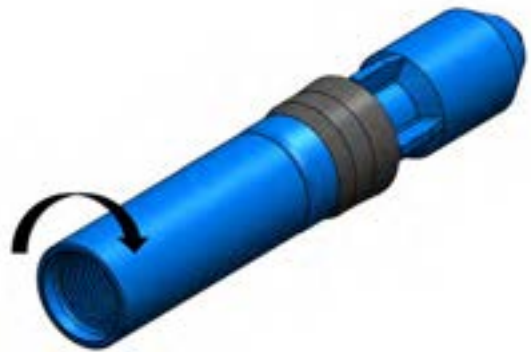
2. Slide the packer onto the mandrel. Make sure that it seats properly on the shoulder of the mandrel, and that the large open end faces downward, toward the fish.



3. Slide the packer thimble over the mandrel and onto the packer. Force it down tightly around the upper end of the packer.

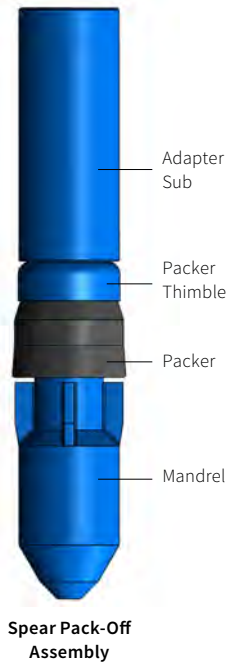


4. Apply thread dope or grease to the threads and assemble the adapter sub onto the mandrel. Buck the sub up tight.



## Maintenance of Spear Pack-Off

The spear pack-off assembly should be disassembled, cleaned, and re-assembled after each use. Disassembly should proceed as follows:



# Bowen Wide Catch Spears

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5. Paint or lubricate the exterior metal parts of the assembly. Do not paint or lubricate the rubber packer. Paint, solvents, sunlight, and most lubricants are harmful to rubber products when the rubber is exposed to them for long periods of time.

## Disassembly of Spear Pack-Off

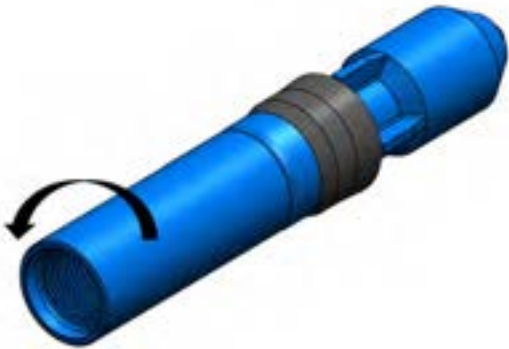
1. Secure the assembly in a suitable vise, clamping on the lower end of the mandrel.



5. Thoroughly clean all the parts. Examine the packer carefully. If it is worn or damaged, replace it with a new packer.

**NOTE:** It is at the operator's discretion to determine if the packer can be run again. Due to the unknown chemicals, stresses, and temperatures downhole, NOV does not recommend the rerunning of packers.

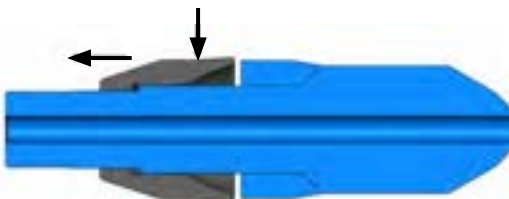
2. Loosen and remove the adapter sub.



3. Slide off the packer thimble.



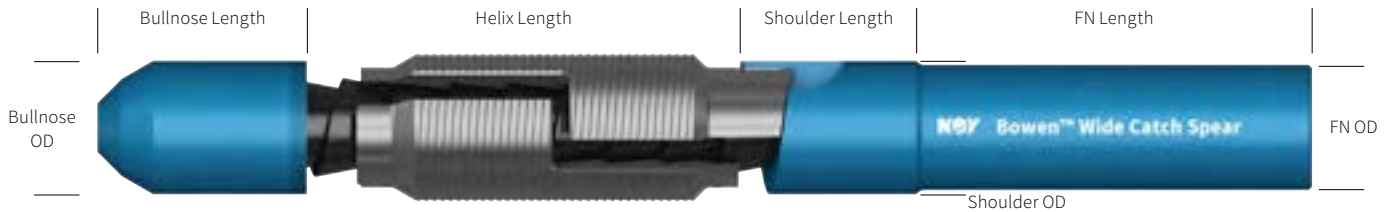
4. Remove the packer.



# Bowen Wide Catch Spears

## Principal Dimensions of Bowen Wide Catch Spear

| Size       | Spear Assembly | FN Length | Shoulder Length | Helix Length | Bullnose Length | FN OD    | Shoulder OD | Bullnose OD |
|------------|----------------|-----------|-----------------|--------------|-----------------|----------|-------------|-------------|
| 7.00 in.   | 508262         | 24 in.    | 6.75 in.        | 24 in.       | 12 in.          | 5.50 in. | 5.75 in.    | 5.75 in.    |
| 9.63 in.   | 507769         | 24 in.    | 11.25 in.       | 26.88 in.    | 12 in.          | 7.75 in. | 8.25 in.    | 8.25 in.    |
| 13.375 in. | 507770         | 24 in.    | 12.75 in.       | 26.88 in.    | 12 in.          | 7.75 in. | 11.75 in.   | 11.75 in.   |



## Specifications and Replacement Parts

### Specifications for Bowen Wide Catch Spear

| Nominal Size                      | 7 in. OD Casing | 9½ in. OD Casing | 13¾ in. OD Casing |
|-----------------------------------|-----------------|------------------|-------------------|
| <b>Spear OD</b>                   | 5¾ in.          | 8¼ in.           | 11¾ in.           |
| <b>Spear ID</b>                   | 2 in.           | 2½ in.           | 3½ in.            |
| <b>Complete Assembly Part No.</b> | 508262          | 507769           | 507770            |

### Replacement Parts for Bowen Wide Catch Spear

|                      |        |        |        |
|----------------------|--------|--------|--------|
| <b>Mandrel</b>       | 508263 | 507650 | 507654 |
| <b>Grapple</b>       | 508264 | 507649 | 507653 |
| <b>Release Ring</b>  | 508265 | 507648 | 507652 |
| <b>Bullnose Nut</b>  | 508266 | 507647 | 507651 |
| <b>Slotted Screw</b> | 508420 | 507664 | 507664 |
| <b>Slotted Pin</b>   | 508419 | 507665 | 507665 |

|                           |          |          |          |
|---------------------------|----------|----------|----------|
| <b>Mill Type Nut</b>      | 508266-A | 507651-A | 507651-A |
| <b>Sub Type Nut</b>       | 508266-B | 507651-B | 507651-B |
| <b>Side Hill Type Nut</b> | 508266-C | 507651-C | 507651-C |

|                         |                                     |                                    |         |
|-------------------------|-------------------------------------|------------------------------------|---------|
| <b>Stop Sub Body OD</b> | 5 <sup>11</sup> / <sub>16</sub> in. | 8¼ in.                             | 11¾ in. |
| <b>Stop Sub Stop OD</b> | 7 in.                               | 9 <sup>9</sup> / <sub>16</sub> in. | 13¾ in. |
| <b>Stop Sub Type F</b>  | 7 <sup>7</sup> / <sub>8</sub> in.   | 10¼ in.                            | 16 in.  |
| <b>Stop Sub Type F</b>  | 19058                               | 19049                              | 27871   |
| <b>Stop Ring Type S</b> | 18806                               | 188808                             | 27870   |

|                          |        |        |        |
|--------------------------|--------|--------|--------|
| <b>OD Adapter Sub</b>    | 4¾ in. | 6½ in. | 6½ in. |
| <b>Complete Assembly</b> | 9615   | 9625   | 505386 |
| <b>Mandrel</b>           | 9616   | 9626   | 505384 |
| <b>Adapter Sub</b>       | 9617   | 9627   | 9267   |
| <b>Packing</b>           | 13427  | 10354  | 505385 |
| <b>Thimble / Spacer</b>  | 17542  | 17575  | 505388 |



### How to Order

To order, please contact your local NOV Bowen representative. You can also email us at [wt-BowenTools@nov.com](mailto:wt-BowenTools@nov.com)

To order, please specify:

- (1) Name and part number of assembly or part
- (2) Size and type of top connection
- (3) Size and weight or weights to be caught
- (4) Flush or shoulder type
- (5) Mandrel length desired
- (6) Thread size and type of nut



### Recommended Spare Parts:

- (1) 2 Grapples for each catch size
- (2) 2 Slotted Pins for each grapple
- (3) 1 Slotted Screw for each mandrel



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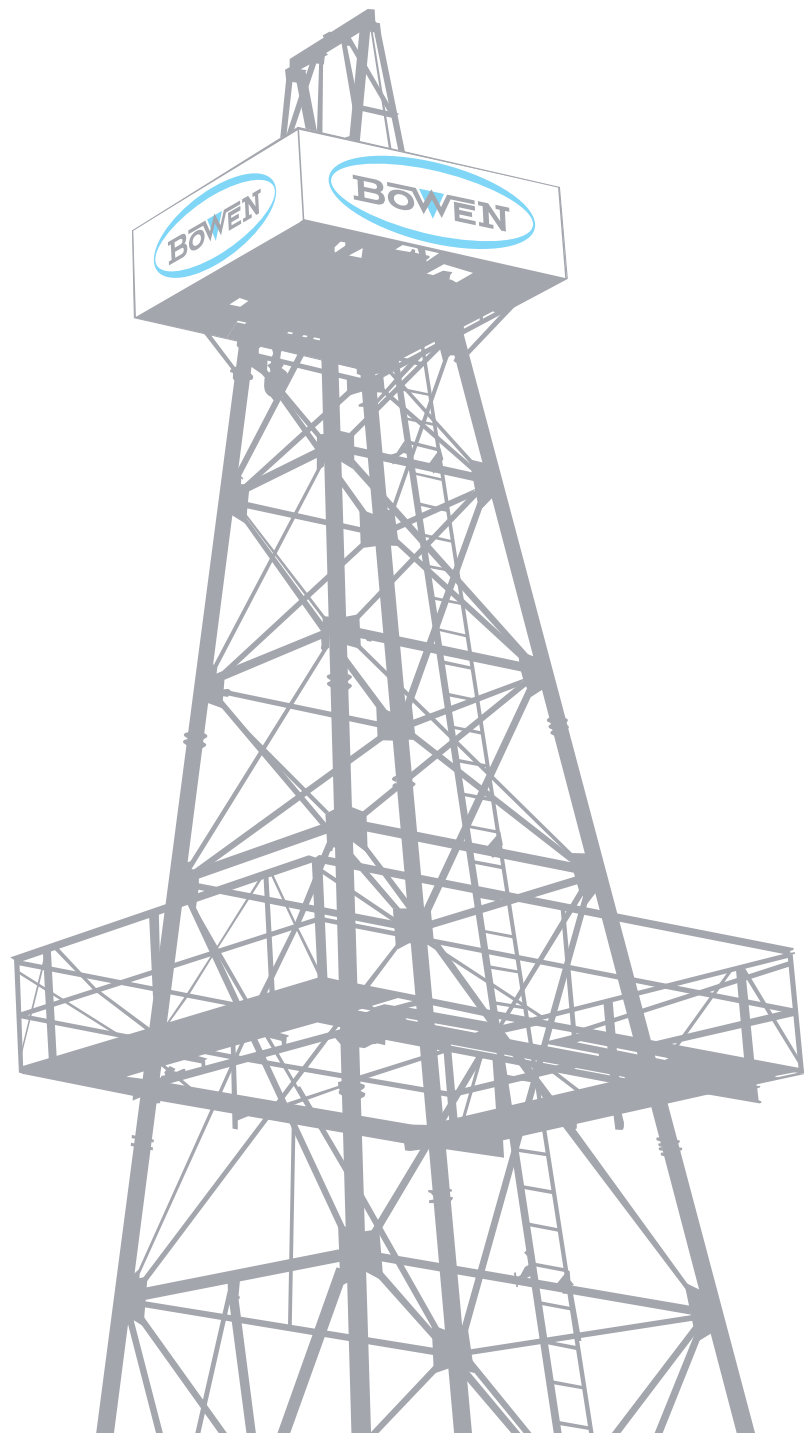
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# Bowen Simplex Packer Retrievers

Instruction Manual 2710



**Bowen | NOV**

# Bowen Simplex Packer Retrievers

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## General Description

The Bowen™ Simplex packer retriever is an internally engaging fishing tool especially designed for the retrieving of drillable type production packers. With its accessory components (stinger, bushing and mill shoe), the Bowen Simplex packer retriever passes through the bore of the packer, prevents loss of the packer during milling and pulls the packer after it has been milled over, all in one trip. If necessary, the Bowen Simplex packer retriever can be released and reset to catching position — all without coming out of the hole.

## Use

The Bowen Simplex packer retriever is used to retrieve all types of drillable production packers from the wellbore. Types and sizes of production packers recoverable with Bowen Simplex packer retrievers are listed in the range tables on the following pages.

## Construction

The Bowen Simplex packer retriever consists of a top sub, lock pin, cage, mandrel and bottom nut. The top sub connects the retriever to a stinger or extension. The cage is installed on the mandrel which is threaded into the top sub and secured at assembly with the lock pin. The bottom nut is a bullnose type and is furnished with the tool unless an alternate is specified. It may be removed so that a tool or other type nut may be run below the retriever if required.

The cage has two automatic J slots with internal lug keyways, friction wickers, lifting shoulder, and a tapered ID at the bottom with milled slots so that the lifting shoulder can expand. The mandrel

has two J slot lugs and a tapered cone which makes the cage lifting shoulder expand.

The retriever also has a small bore for high velocity jetting in case the packer has been sanded over.

## Accessories

### Stinger

Bowen Simplex packer retriever stingers are simply extensions that permit the retriever to be lowered completely through the packer during the milling operation.

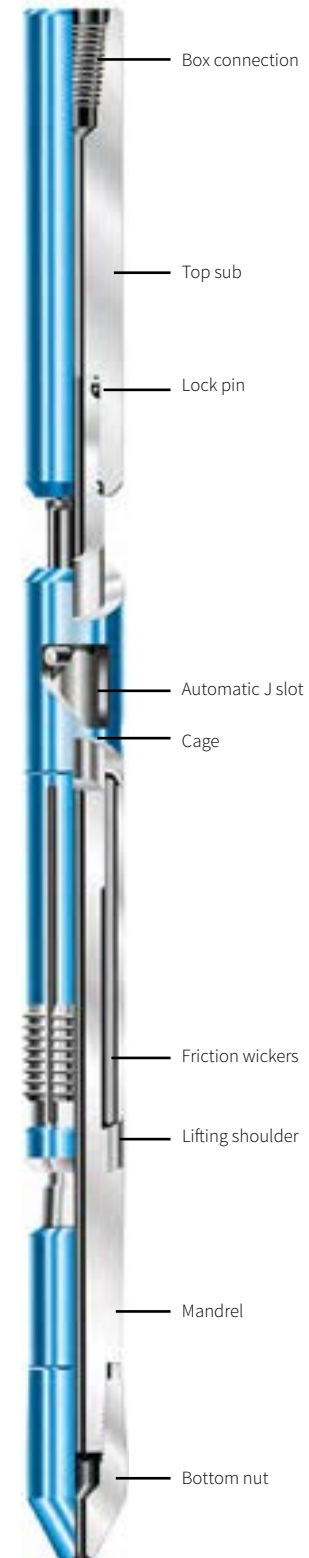
### Bushing

The bushing is provided with a box connection at its lower end for attaching the stinger, also a pin connection at the lower end for attaching a mill shoe and a box connection at its upper end for connection to the run-in or fishing string. Bushings are provided with circulation ports that may direct some fluid down around the outside of the retriever.

### Mill shoes

Mill shoes for Bowen Simplex packer retrievers are of sufficient length to completely mill away the slips of the packer and contain the packer within its length. The mill shoe is faced with Bowen Itcoloy (sintered tungsten carbide) on its leading edge and on its internal diameter. The lower outside diameter may be dressed with hard-facing material to reduce wear. Mill shoes are made with additional length to permit redressing with Bowen Itcoloy several times. The mill shoe must be of a length which will shroud the packer.

When more length is needed, a short mill shoe may be used with a piece of washpipe of sufficient length in place of the long mill shoe. (See assembly illustrated on next page.)



**Bowen Simplex packer retriever**

# Bowen Simplex Packer Retrievers

## Operation

Make up a complete Bowen Simplex packer retriever assembly consisting of retriever, stinger, bushing and mill shoe. Make sure to determine the following:

1. That the retriever is the correct size for the packer to be caught.
2. That the stinger is sufficiently long to permit the retriever to pass completely through the packer.
3. That the bushing and mill shoe are the correct size for the casing specifications.

Refer to the specification tables and range tables on the following pages.

Make up the complete assembly to the fishing string.

Lower the retriever into the hole on the fishing string and pass it through the packer. As the retriever passes through the packer, the cage is free to ride up on the mandrel while the lugs are in the bottom of its internal keyways, and the friction wickers and lifting shoulder are free to collapse to permit passage. After the friction wickers pass through, the cage will fall onto the tapered cone of the mandrel which expands the lifting shoulder. The mandrel lugs are then near the top of the internal keyways. Now, raise the fishing string slowly and carefully until it takes weight. This ensures that the retriever will engage the packer seat.

Lower the fishing string until the mill shoe contacts the slips of the packer. Start circulation and right-hand rotation to mill away the slips and sealing element of the packer. When the packer begins to slide down the hole, stop rotation,

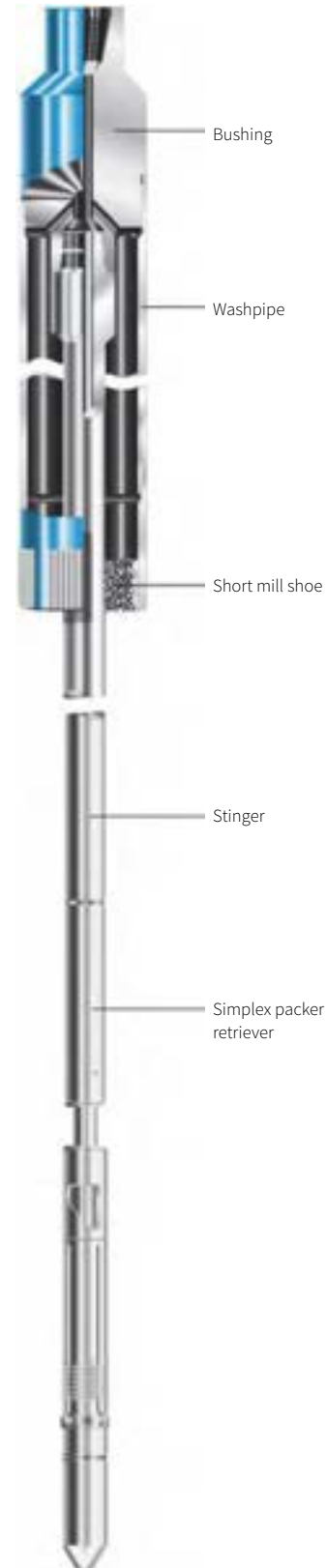
raise the fishing string to engage it with the lifting shoulder and then pull the assembly and the fish from the hole. Procedure steps are shown on page 6.

### To Release the Retriever

If for any reason you wish to release the retriever from the packer, observe the following procedure.

1. Elevate the fishing string until weight is indicated.
2. Lower the fishing string about three inches.
3. Rotate about 90° to the right.
4. Slowly elevate the string to withdraw the retriever from the packer.

When the fishing string is lowered three inches, the friction wickers drag on the packer ID causing the mandrel lugs to ride down the keyways into the J slots. As this occurs, the cage slides off the mandrel tapered cone. The friction wickers remain in the packer and still provide slight drag enough to hold the cage stationary while the 90° right-hand turn is applied which moves the lugs out of the keyways and into the J slots. When the string is raised, the lugs engage the top of the J slots, leaving the lifting shoulder free to collapse and to be removed from the packer.



**Complete retrieving unit  
with bushing, shoe, and stinger**

## To Reset the Retriever in the Hole

After releasing from the packer and it is desirable to reset the retriever, observe the following procedure. Refer to fourth view of procedure figure on page 6.

1. Lower the fishing string until the retriever passes through the packer bore. As it passes through, the drag of the friction wickers on the packer bore makes the lugs ride on the bottom of the J slots and back into the keyways. Once through, the cage falls back onto the tapered cone of the mandrel, which again expands the lifting shoulder.
2. Elevate the fishing string until weight is indicated, demonstrating that the retriever is in the catch position and is engaging the packer seat.
3. Continue elevating and pull the assembly and fish from the hole.

## Maintenance

To guard against misruns and to prolong the life of the Bowen Simplex packer retriever, it should be completely disassembled, thoroughly cleaned, lubricated and reassembled before storing. Exterior surfaces may be either painted or lubricated to prevent rust and deterioration.

## Disassembly of Simplex Packer Retriever

1. Rest top sub in vise or clamp so that the lock pin is in a position where it can be driven out. Drive lock pin out. This pin must be removed first.
2. Reposition assembly in vise to clamp on mandrel just above bottom nut. Rest top end of mandrel (between the cage and top sub) on padded

support so that assembly will not flex when applying torque to top sub. Using wrench, break out and remove top sub.

3. Remove cage by manually aligning mandrel lugs with the internal cage keyways and slide cage off threaded end of mandrel.
4. Using wrench, remove bottom nut to make sure there is no debris inside which could obstruct the bore.

## Reassembly of Simplex Packer Retriever

1. Clamp mandrel's largest diameter in vise and coat all threads with grease. Using wrench, make up bottom nut to threads near vise.
2. Coat mandrel between tapered cone and lug area and ID of cage generously with grease. Slip lifting shoulder and friction wicker end of cage onto other end of mandrel. When mandrel lugs near J slot area of cage, manually align and enter mandrel lugs into cage internal keyways.
3. Position padded support under mandrel between threads and cage so that when making up top sub to mandrel, the assembly will not flex. Make up top sub to mandrel.
4. Reposition in vise and clamp so that lock pin can be driven into hole on top sub. Make sure light can be seen through this hole before installing pin. If no light can be seen, the top sub is not made up far enough for groove in mandrel end to align with lock pin.

## Bowen Simplex Retriever Strength Data

| Retriever assembly no. | Tensile strength* |
|------------------------|-------------------|
| 74770                  | 43,000 lb         |
| 69035                  | 115,000 lb        |
| 69040                  | 153,000 lb        |
| 69045                  | 216,000 lb        |
| 69050                  | 392,000 lb        |
| 69055                  | 544,000 lb        |

\* The strengths shown are theoretical calculations based on yield strength of the material used in each case. The strengths shown are only plus or minus 20% accurate of the figure shown.

These figures do not constitute a guarantee, actual or implied. They are meant to serve as a guide only, and appropriate allowance must be made in use, as a safety factor.

# Bowen Simplex Packer Retrievers

---



*Pass Through  
Packer*



*Mill Away Slips  
and Sealing Element*



*Engage and  
Pull Packer*



*Lower and Rotate  
to Release*

## Bowen Simplex Retriever Specifications

|                             |                               |                               |           |           |           |           |           |       |           |           |                               |           |           |           |           |
|-----------------------------|-------------------------------|-------------------------------|-----------|-----------|-----------|-----------|-----------|-------|-----------|-----------|-------------------------------|-----------|-----------|-----------|-----------|
| <b>Catch size Packer ID</b> | 1.500 in.                     | 1.968 in.                     | —         | —         | —         | —         | —         | —     | —         | —         | 2.375 in.                     | —         | —         | —         | —         |
| <b>Extra part to Catch</b>  | —                             | —                             | 2.000 in. | 2.188 in. | 2.262 in. | 2.312 in. | 2.375 in. | 2.390 | 2.468 in. | 2.500 in. | —                             | 2.390 in. | 2.437 in. | 2.468 in. | 2.500 in. |
| <b>Outside diameter</b>     | 17/16 in.                     | 13/16 in.                     | —         | —         | —         | —         | —         | —     | —         | —         | 2 1/4 in.                     | —         | —         | —         | —         |
| <b>Inside diameter</b>      | 1/4 in.                       | 1/4 in.                       | —         | —         | —         | —         | —         | —     | —         | —         | 3/8 in.                       | —         | —         | —         | —         |
| <b>Box connection</b>       | 1 13/16 in.<br>Wilson<br>F.J. | 1 13/16 in.<br>Wilson<br>F.J. | —         | —         | —         | —         | —         | —     | —         | —         | 1 13/16 in.<br>Wilson<br>F.J. | —         | —         | —         | —         |
| <b>Complete assembly</b>    | <b>Part no.</b>               | 74770                         | 69035     | —         | —         | —         | —         | —     | —         | —         | 69040                         | —         | —         | —         | —         |
|                             | <b>Weight</b>                 | 18 lb                         | 14 lb     | —         | —         | —         | —         | —     | —         | —         | 20 lb                         | —         | —         | —         | —         |

## Replacement Parts

|                   |                 |          |          |       |       |          |          |          |          |          |          |          |          |          |          |          |
|-------------------|-----------------|----------|----------|-------|-------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>Lock pin</b>   | <b>Part no.</b> | 150952   | 15143    | —     | —     | —        | —        | —        | —        | —        | —        | A14152   | —        | —        | —        | —        |
|                   | <b>Weight</b>   | 1/16 lb  | 1/16 lb  | —     | —     | —        | —        | —        | —        | —        | —        | 1/16 lb  | —        | —        | —        | —        |
| <b>Top sub</b>    | <b>Part no.</b> | 150953   | 69036    | —     | —     | —        | —        | —        | —        | —        | —        | 69041    | —        | —        | —        | —        |
|                   | <b>Weight</b>   | 10 lb    | 4 lb     | —     | —     | —        | —        | —        | —        | —        | —        | 6 lb     | —        | —        | —        | —        |
| <b>Mandrel</b>    | <b>Part no.</b> | 150954   | 69037    | —     | —     | —        | —        | —        | —        | —        | —        | 69042    | —        | —        | —        | —        |
|                   | <b>Weight</b>   | 6 lb     | 7 lb     | —     | —     | —        | —        | —        | —        | —        | —        | 10 lb    | —        | —        | —        | —        |
| <b>Cage</b>       | <b>Part no.</b> | 150955   | 69038    | 69693 | 69694 | 69695    | 69696    | 69697    | 69698    | 69699    | 69700    | 69043    | 69701    | 79079    | 69702    | 69703    |
|                   | <b>Weight</b>   | 1 lb     | 1 lb     | 1 lb  | 1 lb  | 1 1/8 lb | 1 1/8 lb | 1 1/8 lb | 1 1/4 lb | 1 1/4 lb | 1 1/4 lb | 1 1/2 lb | 1 1/2 lb | 1 1/2 lb | 1 1/2 lb | 1 1/2 lb |
| <b>Bottom nut</b> | <b>Part no.</b> | 150956   | 69039    | —     | —     | —        | —        | —        | —        | —        | —        | 69044    | —        | —        | —        | —        |
|                   | <b>Weight</b>   | 1 1/2 lb | 1 1/2 lb | —     | —     | —        | —        | —        | —        | —        | —        | 2 lb     | —        | —        | —        | —        |
| <b>Set screw</b>  | <b>Part no.</b> | —        | 17762    | —     | —     | —        | —        | —        | —        | —        | —        | 17762    | —        | —        | —        | —        |
|                   | <b>Weight</b>   | —        | —        | —     | —     | —        | —        | —        | —        | —        | —        | —        | —        | —        | —        | —        |

## Bowen Simplex Specifications

|                             |                 |           |           |           |           |           |           |   |   |                             |           |           |           |           |           |   |
|-----------------------------|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|---|---|-----------------------------|-----------|-----------|-----------|-----------|-----------|---|
| <b>Catch size Packer ID</b> | —               | —         | —         | —         | —         | —         | —         | — | — | 2.688 in.                   | —         | —         | —         | —         | —         | — |
| <b>Extra part to Catch</b>  | 2.550 in.       | 2.635 in. | 2.688 in. | 2.750 in. | 2.812 in. | 2.866 in. | 3.000 in. | — | — | 2.750 in.                   | 2.812 in. | 2.875 in. | 3.000 in. | 3.062 in. | 3.109 in. |   |
| <b>Outside diameter</b>     | —               | —         | —         | —         | —         | —         | —         | — | — | 2 9/16 in.                  | —         | —         | —         | —         | —         |   |
| <b>Inside diameter</b>      | —               | —         | —         | —         | —         | —         | —         | — | — | 1/2 in.                     | —         | —         | —         | —         | —         |   |
| <b>Box connection</b>       | —               | —         | —         | —         | —         | —         | —         | — | — | 2 3/8 in.<br>Wilson<br>F.J. | —         | —         | —         | —         | —         |   |
| <b>Complete assembly</b>    | <b>Part no.</b> | —         | —         | —         | —         | —         | —         | — | — | 69045                       | —         | —         | —         | —         | —         |   |
|                             | <b>Weight</b>   | —         | —         | —         | —         | —         | —         | — | — | 23 lb                       | —         | —         | —         | —         | —         |   |

## Replacement Parts

|                   |                 |          |          |          |          |          |          |          |       |          |       |          |          |          |          |   |
|-------------------|-----------------|----------|----------|----------|----------|----------|----------|----------|-------|----------|-------|----------|----------|----------|----------|---|
| <b>Lock pin</b>   | <b>Part no.</b> | —        | —        | —        | —        | —        | —        | —        | —     | 2702     | —     | —        | —        | —        | —        | — |
|                   | <b>Weight</b>   | —        | —        | —        | —        | —        | —        | —        | —     | 1/16 lb  | —     | —        | —        | —        | —        | — |
| <b>Top sub</b>    | <b>Part no.</b> | —        | —        | —        | —        | —        | —        | —        | —     | 69046    | —     | —        | —        | —        | —        | — |
|                   | <b>Weight</b>   | —        | —        | —        | —        | —        | —        | —        | —     | 6 1/2 lb | —     | —        | —        | —        | —        | — |
| <b>Mandrel</b>    | <b>Part no.</b> | —        | —        | —        | —        | —        | —        | —        | —     | 69047    | —     | —        | —        | —        | —        | — |
|                   | <b>Weight</b>   | —        | —        | —        | —        | —        | —        | —        | —     | 12 lb    | —     | —        | —        | —        | —        | — |
| <b>Cage</b>       | <b>Part no.</b> | 69079    | 69704    | 69705    | 69706    | 69707    | 78349    | 69708    | 69048 | 69080    | 69709 | 70770    | 69081    | 69710    | 69711    |   |
|                   | <b>Weight</b>   | 1 1/8 lb | 1 1/8 lb | 1 1/8 lb | 1 3/4 lb | 1 3/4 lb | 1 3/4 lb | 1 3/4 lb | 2 lb  | 2 lb     | 2 lb  | 2 1/8 lb | 2 1/8 lb | 2 1/8 lb | 2 1/8 lb |   |
| <b>Bottom nut</b> | <b>Part no.</b> | —        | —        | —        | —        | —        | —        | —        | —     | 69049    | —     | —        | —        | —        | —        |   |
|                   | <b>Weight</b>   | —        | —        | —        | —        | —        | —        | —        | —     | 2 1/2 lb | —     | —        | —        | —        | —        |   |
| <b>Set screw</b>  | <b>Part no.</b> | —        | —        | —        | —        | —        | —        | —        | —     | 23342    | —     | —        | —        | —        | —        |   |
|                   | <b>Weight</b>   | —        | —        | —        | —        | —        | —        | —        | —     | —        | —     | —        | —        | —        | —        |   |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Make, model, and ID of packer to be caught



### Recommended Spare Parts:

- (1) 1 Cage, each catch size

# Bowen Simplex Packer Retrievers

## Bowen Simplex Retriever Specifications

|                             |                 |           |                |           |           |           |           |           |                |           |           |           |           |           |           |           |           |
|-----------------------------|-----------------|-----------|----------------|-----------|-----------|-----------|-----------|-----------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Catch size Packer ID</b> | —               | —         | 3.250 in.      | —         | —         | —         | —         | —         | 3.875 in.      | —         | —         | —         | —         | —         | —         | —         | —         |
| <b>Extra part to Catch</b>  | 3.250 in.       | 3.500 in. | —              | 3.500 in. | 3.688 in. | 3.810 in. | 3.875 in. | 4.000 in. | —              | 4.000 in. | 4.187 in. | 4.250 in. | 4.400 in. | 4.500 in. | 4.560 in. | 4.750 in. | 5.000 in. |
| <b>Inside diameter</b>      | —               | —         | 5/8 in.        | —         | —         | —         | —         | —         | 3/4 in.        | —         | —         | —         | —         | —         | —         | —         | —         |
| <b>Box connection</b>       | —               | —         | 2 3/8 in. Reg. | —         | —         | —         | —         | —         | 2 7/8 in. Reg. | —         | —         | —         | —         | —         | —         | —         | —         |
| <b>Complete assembly</b>    | <b>Part no.</b> | —         | —              | 69050     | —         | —         | —         | —         | 69055          | —         | —         | —         | —         | —         | —         | —         | —         |
|                             | <b>Weight</b>   | —         | —              | 28 lb     | —         | —         | —         | —         | 35 lb          | —         | —         | —         | —         | —         | —         | —         | —         |

## Replacement Parts

|                   |                 |          |          |        |       |        |       |          |          |          |          |          |          |          |          |          |          |          |
|-------------------|-----------------|----------|----------|--------|-------|--------|-------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>Lock pin</b>   | <b>Part no.</b> | —        | —        | 13430  | —     | —      | —     | —        | —        | 25243    | —        | —        | —        | —        | —        | —        | —        |          |
|                   | <b>Weight</b>   | —        | —        | 1/8 lb | —     | —      | —     | —        | —        | 1/8 lb   | —        | —        | —        | —        | —        | —        | —        |          |
| <b>Top sub</b>    | <b>Part no.</b> | —        | —        | 69051  | —     | —      | —     | —        | —        | 69056    | —        | —        | —        | —        | —        | —        | —        |          |
|                   | <b>Weight</b>   | —        | —        | 8 lb   | —     | —      | —     | —        | —        | 10 lb    | —        | —        | —        | —        | —        | —        | —        |          |
| <b>Mandrel</b>    | <b>Part no.</b> | —        | —        | 69052  | —     | —      | —     | —        | —        | 69057    | —        | —        | —        | —        | —        | —        | —        |          |
|                   | <b>Weight</b>   | —        | —        | 14 lb  | —     | —      | —     | —        | —        | 15 lb    | —        | —        | —        | —        | —        | —        | —        |          |
| <b>Cage</b>       | <b>Part no.</b> | 69712    | 69713    | 69053  | 72205 | 147573 | 69714 | 69715    | 69082    | 69058    | 69716    | 69718    | 73687    | 69717    | 73688    | 147572   | 69719    | 69083    |
|                   | <b>Weight</b>   | 2 1/4 lb | 2 1/4 lb | 3 lb   | 3 lb  | 3 lb   | 3 lb  | 3 1/8 lb | 3 1/8 lb | 5 1/2 lb | 5 1/2 lb | 5 1/2 lb | 5 1/2 lb | 5 5/8 lb | 5 5/8 lb | 5 5/8 lb | 5 5/8 lb | 5 5/8 lb |
| <b>Bottom nut</b> | <b>Part no.</b> | —        | —        | 69054  | —     | —      | —     | —        | —        | 69059    | —        | —        | —        | —        | —        | —        | —        |          |
|                   | <b>Weight</b>   | —        | —        | 3 lb   | —     | —      | —     | —        | —        | 4 lb     | —        | —        | —        | —        | —        | —        | —        |          |
| <b>Set screw</b>  | <b>Part no.</b> | —        | —        | 23360  | —     | —      | —     | —        | —        | 17762    | —        | —        | —        | —        | —        | —        | —        |          |
|                   | <b>Weight</b>   | —        | —        | —      | —     | —      | —     | —        | —        | —        | —        | —        | —        | —        | —        | —        | —        |          |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Make, model, and ID of packer to be caught



### Recommended Spare Parts:

- (1) 1 Cage, each catch size

## Stingers

|                                    |                              |                              |                             |                           |                           |                           |        |  |  |
|------------------------------------|------------------------------|------------------------------|-----------------------------|---------------------------|---------------------------|---------------------------|--------|--|--|
| <b>To fit Packer Retriever no.</b> | 69035                        | 69040                        | 69045                       | 69050                     | 69055                     | —                         |        |  |  |
| <b>Top connection</b>              | 2½ in.<br>API<br>Reg. Pin    | 2½ in.<br>API<br>Reg. Pin    | 2¾ in.<br>API<br>Reg. Pin   | 2¾ in.<br>API<br>Reg. Pin | 2¾ in.<br>API<br>Reg. Pin | 3½ in.<br>API<br>Reg. Pin |        |  |  |
| <b>Bottom connection</b>           | 1⅜ in.<br>Wilson<br>F.J. Pin | 1⅜ in.<br>Wilson<br>F.J. Pin | 2 in.<br>Wilson<br>F.J. Pin | 2 in.<br>API<br>Reg. Pin  | 2 in.<br>API<br>Reg. Pin  | 3½ in.<br>API<br>Reg. Pin |        |  |  |
| <b>Stinger (120 inches)</b>        | <b>Part no.</b>              | 18053                        | 18058                       | 18063                     | 18088                     | 18073                     | 18078  |  |  |
|                                    | <b>Weight</b>                | 75 lb                        | 105 lb                      | 115 lb                    | 150 lb                    | 180 lb                    | 205 lb |  |  |

## Long Mill Shoes and Bushings

|   |                                  |                                  |                                  |   |  |   |                                   |  |                              |
|---|----------------------------------|----------------------------------|----------------------------------|---|--|---|-----------------------------------|--|------------------------------|
| <b>Casing range</b>                     | 4½ in.<br>12.6 to<br>11.6 lb     | 5 in.<br>21.0 to<br>13.0 lb      | 5½ in.<br>20.0 to<br>17.0 lb     | 5½ in.<br>13.0 to<br>14.0 lb                                | 6 in.<br>14.0 to<br>15.0 lb                          | 6½ in.<br>20.0 to<br>17.0 lb                          | 7 in.<br>17 lb.<br>—              | 8½ in.<br>40.0 to<br>36.0 lb               | 9½ in.<br>40.0 to<br>53.5 lb |
| <b>Casing range</b>                     | 4¾ in.<br>16.0 lb<br>—<br>—<br>— | 5½ in.<br>25.0 lb<br>—<br>—<br>— | 5¾ in.<br>25.2 lb<br>—<br>—<br>— | 5¾ in.<br>19.5 to<br>17.0 lb<br>6 in.<br>23.0 to<br>20.0 lb | 6 in.<br>32.0 to<br>29.0 lb<br>7 in.<br>40.0 lb<br>— | 7 in.<br>32.0 to<br>24.0 lb<br>7½ in.<br>45.0 lb<br>— | 7½ in.<br>24-39 lb<br>—<br>—<br>— | 9 in.<br>40.0 to<br>55.0 lb<br>—<br>—<br>— | —<br>—<br>—<br>—<br>—        |
| <b>Shoe (60-inch long single piece)</b> | <b>Part no.</b>                  | 18052                            | 18057                            | 18062   | 18064  | 18069   | 18067                             | 18024                                      | 18072                        |
|   | <b>Weight</b>                    | 45 lb                            | 55 lb                            | 70 lb   | 87 lb  | 97 lb   | 107 lb                            | 117 lb                                     | 137 lb                       |
| <b>Bushing</b>                          | <b>Part no.</b>                  | 18051                            | 28199                            | 18061   | 18061  | 28200   | 28201                             | 28202                                      | 28203                        |
|   | <b>Weight</b>                    | 29 lb                            | 35 lb                            | 45 lb   | 45 lb  | 64 lb   | 69 lb                             | 80 lb                                      | 95 lb                        |

NOTE: When retrieving a 3.250" packer from 9½" casing, part no. 18079 crossover sub is required between a part no. 18088 stinger and a part no. 28204 bushing.

## Short Mill Shoes, Washpipes, and Bushings

|                                |                             |                             |                           |                          |                         |                          |                       |                          |                            |
|--------------------------------|-----------------------------|-----------------------------|---------------------------|--------------------------|-------------------------|--------------------------|-----------------------|--------------------------|----------------------------|
| <b>Casing range</b>            | 3½ in.<br>7.7 to<br>10.2 lb | 4½ in.<br>9.5 to<br>16.6 lb | 5 in.<br>11.5 to<br>18 lb | 5½ in.<br>13 to<br>23 lb | 6 in.<br>14 to<br>15 lb | 6½ in.<br>17 to<br>24 lb | 7 in.<br>17 lb<br>—   | 8½ in.<br>24 to<br>49 lb | 9½ in.<br>40 to<br>53.5 lb |
| <b>Casing range</b>            | —<br>—                      | 4¾ in.<br>16 to 18 lb       | 5½ in.<br>25 lb           | 5¾ in.<br>14 to 25 lb    | 6 in.<br>26 to 34 lb    | 7 in.<br>20 to 38 lb     | 7½ in.<br>24 to 39 lb | 9 in.<br>40 to 55 lb     | —<br>—                     |
| <b>Casing range</b>            | —<br>—                      | 5 in.<br>24 lb              | —<br>—                    | 6 in.<br>16 to 23 lb     | 7 in.<br>40 lb          | 7½ in.<br>45 lb          | —<br>—                | —<br>—                   | —<br>—                     |
| <b>Mill shoe</b>               | <b>Part no.</b>             | 44422                       | 25746                     | 25748                    | 25750                   | 25752                    | 25754                 | 25756                    | 25758                      |
|                                | <b>Weight</b>               | 7 lb                        | 10 lb                     | 15 lb                    | 18 lb                   | 20 lb                    | 30 lb                 | 35 lb                    | 40 lb                      |
| <b>Washpipe (57-inch long)</b> | <b>Part no.</b>             | 44423                       | 25745                     | 25747                    | 25749                   | 25751                    | 25753                 | 25755                    | 25757                      |
|                                | <b>Weight</b>               | 25 lb                       | 35 lb                     | 50 lb                    | 75 lb                   | 80 lb                    | 85 lb                 | 120 lb                   | 130 lb                     |
| <b>Bushing</b>                 | <b>Part no.</b>             | 44424                       | 18051                     | 28199                    | 18061                   | 28200                    | 28201                 | 28202                    | 28203                      |
|                                | <b>Weight</b>               | 20 lb                       | 29 lb                     | 35 lb                    | 45 lb                   | 64 lb                    | 69 lb                 | 80 lb                    | 95 lb                      |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Casing size (OD and weight)
  - (3) Top connection of bushing
  - (4) Make, model, and number of packer to be caught

Prices quoted on request.

# Bowen Simplex Packer Retrievers

## Bowen Simplex Packer Retriever

Assembly part no. 69035

Dressed with cage part no. 69038 — Standard Catch size 1.968 in. ID

Dressed with cage part no. 69038 will catch the following Baker Packers with 1.968 inch ID

| Packer type | Packer no. | Casing size | Casing weight   |
|-------------|------------|-------------|-----------------|
| D           | 22-19      | 4½ in.      | 12.6 to 16.6 lb |
| DA          | 24DA-25    | 4½ in.      | 9.5 to 11.6 lb  |
| DA          | 23DA-25    | 4¾ in.      | 16 to 18 lb     |
| D           | 24-19      | 4½ in.      | 9.5 to 11.6 lb  |
|             |            | 4¾ in.      | 16 to 18 lb     |
| DA          | 25DA       | 5 in.       | 21 lb           |
| D           | 25-19      | 5 in.       | 21 lb           |
| DA          | 27DA-25    | 5 in.       | 15 to 18 lb     |
| D           | 27-19      | 5 in.       | 15 to 18 lb     |
| DA          | 29DA-25    | 5 in.       | 11.5 to 13 lb   |
|             |            | 5½ in.      | 25 lb           |
| D           | 29-19      | 5 in.       | 11.5 to 13 lb   |
|             |            | 5½ in.      | 25 lb           |
| D           | 43-19      | 5½ in.      | 20 to 23 lb     |
| D           | 45-19      | 5½ in.      | 15 to 17 lb     |
|             |            | 5¾ in.      | 25.2 lb         |
| D           | 47-19      | 5½ in.      | 13 to 14 lb     |
|             |            | 5¾ in.      | 19.5 to 22.5 lb |
| D           | 49-19      | 5¾ in.      | 14 to 17 lb     |
|             |            | 6 in.       | 23 to 26 lb     |

Dressed with cage part no. 69695 will catch the following Guiberson Packers with 2.262 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| B and BL    | 27618      | 5 in.       | 15 to 18 lb   |

Dressed with cage part no. 69693 will catch the following Halliburton Packers with 2.000 inch ID

| Packer type | Packer no. | Casing size | Casing weight  |
|-------------|------------|-------------|----------------|
| C           | 801.848    | 4½ in.      | 9.5 to 11.6 lb |
|             |            | 4¾ in.      | 16 lb          |
|             |            | 4 in. LP    | 11 lb          |
| CL          | 801.901    | 4½ in.      | 9.5 to 11.6 lb |
|             |            | 4¾ in.      | 16 lb          |
|             |            | 4 in. LP    | 11 lb          |
| C           | 801.849    | 4½ in.      | 13.5 lb        |
|             |            | 4½ in. DP   | 16.6 lb        |
| CL          | 801.902    | 4½ in.      | 13.5 lb        |
|             |            | 4½ in. DP   | 16.6 lb        |
| C           | 801.853    | 5 in.       | 11.5 to 15 lb  |
| CL          | 801.903    | 5 in.       | 11.5 to 15 lb  |
| C           | 801.854    | 5 in.       | 18 to 21 lb    |
| CL          | 801.904    | 5 in.       | 18 to 21 lb    |

Dressed with cage part no. 69693 will catch the following Guiberson Packers with 2.000 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| BL          | 29567      | 5 in.       | 15 to 18 lb   |

## Bowen Simplex Packer Retriever

Assembly part no. 69040

Dressed with cage part no. 69043 — Standard Catch size 2.375 in. ID

Dressed with cage part no. 69702 will catch the following Baker Packers with 2.468 inch ID

| Packer type | Packer no. | Casing size | Casing weight   |
|-------------|------------|-------------|-----------------|
| D           | 43-24      | 5½ in.      | 20 to 23 lb     |
| D           | 45-24      | 5¾ in.      | 25.2 lb         |
|             |            | 5½ in.      | 15 to 17 lb     |
| D           | 27-24      | 5½ in.      | 13 to 14 lb     |
|             |            | 5¾ in.      | 19.5 to 22.5 lb |
| D           | 49-24      | 5¾ in.      | 14 to 17 lb     |
|             |            | 6 in.       | 23 to 26 lb     |

Dressed with cage part no. 69703 will catch the following Baker Packers with 2.500 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| D           | 27-25      | 5 in.       | 15 to 18 lb   |
| D           | 29-25      | 5 in.       | 11.5 to 13 lb |
|             |            | 5½ in.      | 25 lb         |

Dressed with cage part no. 69705 will catch the following Baker Packers with 2.688 inch ID

| Packer type | Packer no. | Casing size | Casing weight   |
|-------------|------------|-------------|-----------------|
| DA          | 43DA-32    | 5½ in.      | 20 to 23 lb     |
| D           | 43-26      | 5½ in.      | 20 to 23 lb     |
| DA          | 45DA-32    | 5½ in.      | 15 to 17 lb     |
|             |            | 5¾ in.      | 25.2 lb         |
| D           | 45-26      | 5½ in.      | 15 to 17 lb     |
|             |            | 5¾ in.      | 25.2 lb         |
| DA          | 47DA-32    | 5½ in.      | 13 to 14 lb     |
|             |            | 5¾ in.      | 19.5 to 22.5 lb |
|             |            | 5 in.       | 13 to 14 lb     |
| D           | 47-26      | 5½ in.      | 13 to 14 lb     |
|             |            | 5¾ in.      | 19.5 to 22.5 lb |
| DA          | 49DA-32    | 5¾ in.      | 14 to 17 lb     |
|             |            | 6 in.       | 14 to 17 lb     |
| D           | 49-26      | 5¾ in.      | 14 to 17 lb     |
|             |            | 6 in.       | 23 to 26 lb     |
| D           | 83-26      | 6 in.       | 20 to 24 lb     |
|             |            | 7 in.       | 32 to 38 lb     |
| D           | 85-26      | 6 in.       | 17 lb           |
|             |            | 7 in.       | 26 to 30 lb     |
| D           | 87-26      | 7 in.       | 20 to 24 lb     |
|             |            | 7 in.       | 45 lb           |
| D           | 89-26      | 7 in.       | 17 lb           |
| D or N      |            | 7 in.       | 39 lb           |
| D or N      | 91-25      | 7 in.       | 24 to 33.7 lb   |

Dressed with cage part no. 69706 will catch the following Halliburton Packers with 2.750 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| C           | 801.857    | 5½ in.      | 13 to 17 lb   |
|             |            | 5¾ in.      | 22.5 lb       |
| CL          | 801.907    | 5½ in.      | 13 to 17 lb   |
|             |            | 5¾ in.      | 22.5 lb       |
| C           | 801.858    | 5½ in.      | 20 to 23 lb   |
| CL          | 801.908    | 5½ in.      | 20 to 23 lb   |
| C           | 801.859    | 5¾ in.      | 14 to 19.5 lb |
|             |            | 6 in.       | 23 lb         |
| CL          | 801.909    | 5¾ in.      | 14 to 19.5 lb |
|             |            | 6 in.       | 23 lb         |
| C           | 801.860    | 6 in.       | 15 to 20 lb   |
| CL          | 801.910    | 6 in.       | 15 to 20 lb   |

Dressed with cage part no. 69707 will catch the following Guiberson Packers with 2.812 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| B & BL      | 27735      | 5½ in.      | 13 to 14 lb   |
| B & BL      | 27274      | 5½ in.      | 15 to 17 lb   |
| B & BL      | 27279      | 5½ in.      | 20 to 23 lb   |
| B & BL      | 28280      | 6 in.       | 16 to 20 lb   |
| B & BL      | 31481      | 6 in.       | 24 to 28 lb   |

Dressed with cage part no. 69708 will catch the following Baker Packers with 3.000 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| D           | 63-30      | 6 in.       | 16 to 20 lb   |
| D           | 65-30      | 6 in.       | 14 to 15 lb   |
|             |            | 6 in.       | 32 to 24 lb   |
| D           | 67-30      | 6 in.       | 26 to 49 lb   |
|             |            | 7 in.       | 40 lb         |



# Bowen Simplex Packer Retrievers

## Bowen Simplex Packer Retriever

Assembly part no. 69045

Dressed with cage part no. 69048 – Standard Catch size 2.688 in. ID

Dressed with cage part no. 69712 will catch the following Baker Packers with 3.250 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| DA          | 83DA-40    | 6½ in.      | 20 to 24 lb   |
|             |            | 7 in.       | 32 to 38 lb   |
| D           | 83-32      | 6½ in.      | 20 to 24 lb   |
|             |            | 7 in.       | 32 to 38 lb   |
| DA          | 85DA-40    | 6½ in.      | 17 lb         |
|             |            | 7 in.       | 26 to 30 lb   |
| D           | 85-32      | 6½ in.      | 17 lb         |
|             |            | 7 in.       | 26 to 30 lb   |
| DA          | 87DA-40    | 7 in.       | 20 to 24 lb   |
|             |            | 7½ in.      | 45 lb         |
| D           | 87-32      | 7 in.       | 20 to 24 lb   |
|             |            | 7½ in.      | 45 lb         |
| DA          | 89DA-40    | 7 in.       | 17 lb         |
|             |            | 7½ in.      | 36 to 39 lb   |
| D           | 89-32      | 7 in.       | 17 lb         |
|             |            | 7½ in.      | 36 to 39 lb   |
| DA          | 91DA-40    | 7½ in.      | 24 to 33.7 lb |
| D or N      | 91-32      | 7½ in.      | 24 to 33.7 lb |
| D           | 195-32     | 9½ in.      | 40 to 53.5 lb |

Dressed with cage part no. 69712 will catch the following Halliburton Packers with 3.250 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| C           | 801.861    | 6½ in.      | 4 to 32 lb    |
|             |            | 7 in.       | 34 to 40 lb   |
| CL          | 801.911    | 6½ in.      | 24 to 32 lb   |
|             |            | 7 in.       | 34 to 40 lb   |

Dressed with cage part no. 69713 will catch the following Halliburton Packers with 3.500 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| C           | 801.862    | 7 in.       | 17 to 24 lb   |
|             |            | 7½ in.      | 39 lb         |
| CL          | 801.912    | 7 in.       | 17 to 24 lb   |
|             |            | 7½ in.      | 39 lb         |
| C           | 801.863    | 7 in.       | 26 to 32 lb   |
|             |            | 6½ in.      | 17 to 22 lb   |
| CL          | 801.913    | 7 in.       | 26 to 32 lb   |
|             |            | 6½ in.      | 17 to 22 lb   |
| C           | 801.865    | 7½ in.      | 20 to 33 lb   |
| CL          | 801.915    | 7½ in.      | 20 to 33 lb   |

Dressed with cage part no. 69713 will catch the following Guiberson Packers with 3.500 inch ID

| Packer type | Packer no. | Casing size | Casing weight |
|-------------|------------|-------------|---------------|
| B and BL    | 27299      | 7 in.       | 20 to 24 lb   |
| B and BL    | 27314      | 7 in.       | 26 to 30 lb   |
| B and BL    | 27440      | 7 in.       | 32 to 38 lb   |
| B and BL    | 31550      | 7½ in.      | 24 to 33.7 lb |

## Bowen Simplex Packer Retriever

Assembly Part no. 69050

Dressed with cage Part no. 69053 – Standard Catch size 3.250 in. ID

Dressed with cage part no. 69715 will catch the following Baker Packers with 3.875 inch ID

| Packer type | Packer no. | Casing size | Casing weight (lb) |
|-------------|------------|-------------|--------------------|
| D or N      | 127-38     | 8½ in.      | 40 to 49 lb        |
| D or N      | 129-38     | 8½ in.      | 24 to 36 lb        |
| D           |            | 9 in.       | 40 to 55 lb        |

Dressed with cage part no. 69082 will catch the following Baker Packers with 4.000 inch ID

| Packer type | Packer no. | Casing size | Casing weight (lb) |
|-------------|------------|-------------|--------------------|
| C           | 801.869    | 8½ in.      | 24 to 36 lb        |
|             |            | 9 in.       | 45 to 55 lb        |
| CL          | 801.919    | 8½ in.      | 24 to 36 lb        |
|             |            | 9 in.       | 45 to 55 lb        |
| C           | 801.871    | 8½ in.      | 38 to 49 lb        |
| CL          | 801.921    | 8½ in.      | 38 to 49 lb        |

## Bowen Simplex Packer Retriever

Assembly part no. 69055

Dressed with cage part no. 69058 – Standard Catch size 3.875 in. ID

Dressed with cage part no. 69719 will catch the following Baker Packers with 4.750 inch ID

| Packer type | Packer no. | Casing size | Casing weight (lb) |
|-------------|------------|-------------|--------------------|
| DA          | 195DA-60   | 9½ in.      | 40 to 53.5 lb      |
| D           | 195-47     | 9½ in.      | 40 to 53.5 lb      |

Dressed with cage part no. 69083 will catch the following Baker Packers with 5.000 inch ID

| Packer type | Packer no. | Casing size | Casing weight (lb) |
|-------------|------------|-------------|--------------------|
| C           | 801.874    | 9½ in.      | 29.3 to 40 lb      |
| CL          | 801.924    | 9½ in.      | 29.3 to 40 lb      |
| C           | 801.875    | 9½ in.      | 43.5 to 53.5 lb    |
| CL          | 801.925    | 9½ in.      | 43.5 to 53.5 lb    |

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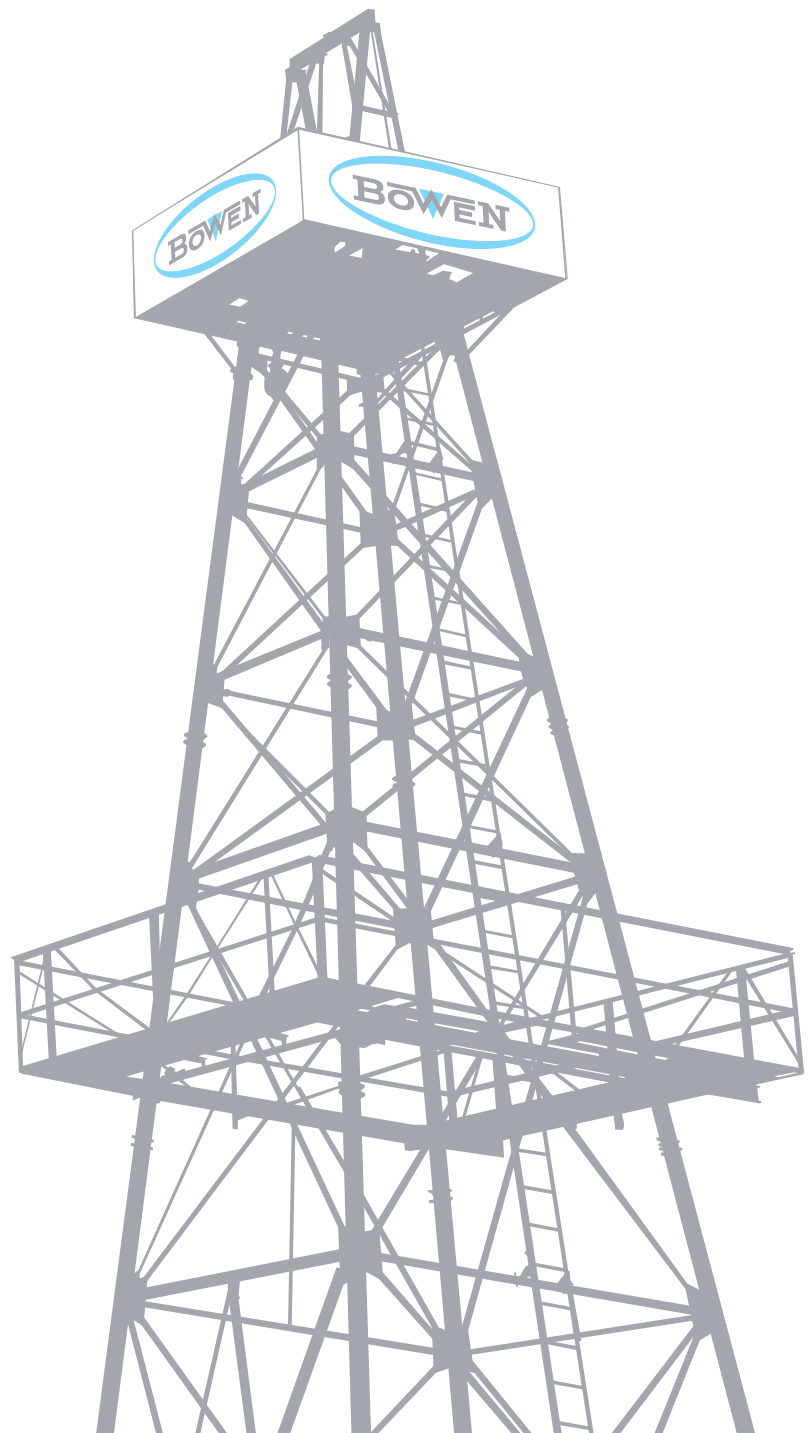
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# Bowen Smooth Bore Packer Retrievers

Instruction Manual 2750



# Bowen Smooth Bore Packer Retrievers

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Smooth Bore Packer Retrievers

## General Description

The Bowen™ Smooth Bore Packer Retriever is an internally engaging fishing tool specifically designed to retrieve a packer and extension thereof, that has a smooth ID. The tool is often run below a packer mill that is used to mill away the outside of the packer through constant rotation. During this milling operation however, the tool remains in the engaged position to prevent the packer from falling upon breaking loose. The grapple body remains fixed while the rest of the tool rotates. The tool can transfer torque to the packer if required and can also be engaged and released multiple times if needed.

## Use

The Bowen Smooth Bore Packer Retriever is used to retrieve packers, and extensions thereof, which have a smooth ID from the wellbore. Complete operating instructions of the tool and different sizes of production packers recoverable with Bowen smooth bore packer retriever are listed in the on the following pages.

## Construction

The Bowen Smooth Bore Packer Retriever is comprised of a few major components namely: the mandrel, the upper and lower bearings, the grapple body, the splined ring and the nut. The mandrel which is the backbone of the tool houses the tool joint connection and holds together the other components. The upper and lower bearings act as a wear surface during milling. The grapple carrier holds the grapple and the two are locked together by a key to form the grapple body. The splined ring allows torque to be transmitted to the grapple and the nut keeps the components from sliding off the mandrel.

The grapple body has a central opening and external wickers (teeth) on the grapple for engaging inside a bore of a packer. The tool is also adapted for use with a milling tool in a wellbore. The mandrel has a shaft coupled directly (e.g., screwed) to the bottom of the milling tool. Alternatively, a stinger, which is a separate part or extension (i.e., of the shaft) can be installed between the milling tool and the packer retriever to regulate the distance of the tool below the milling tool. The shaft typically has a smooth external surface adapted to extend through the central opening to permit rotation and/or vertical movement of the shaft relative to the grapple body while the external teeth of the grapple are engaged inside a bore of a packer. The grapple teeth have an external diameter sized for catching the packer to prevent it from falling while the packer is milled. The grapple body does not rotate when released from teeth of a nut on the mandrel and can remain engaged to the packer (or the extension) as milling proceeds.

## Assembly of the Equipment

### Assembly of smooth bore packer retriever:

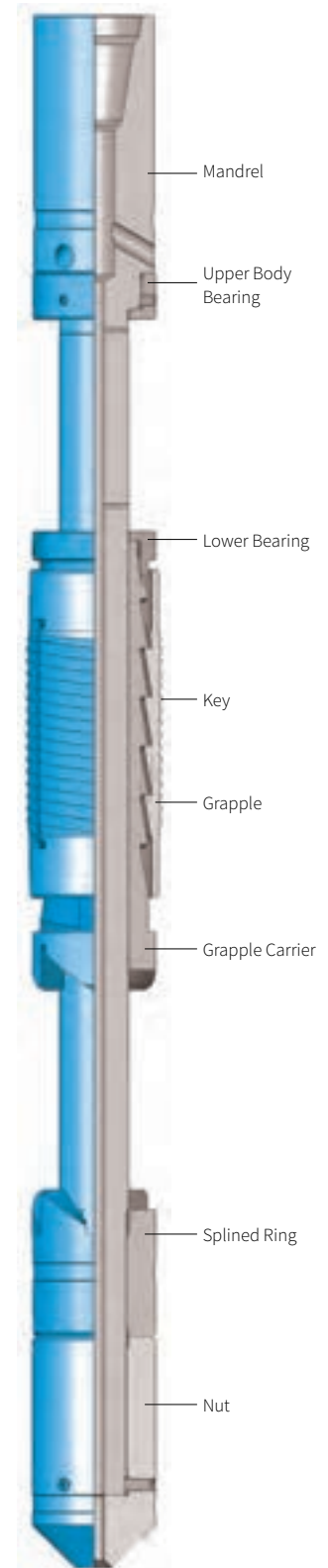
1. Attach the upper bearings onto the mandrel.
2. Rotate the grapple onto the grapple carrier and position the key to lock the grapple onto the grapple carrier forming the grapple body.
3. Attach the lower bearings to the grapple body.
4. Slide the grapple body onto the mandrel so that the lower and upper bearings are in contact.

**NOTE: Make sure the key remains in place.**

5. Slide on the Splined Ring.
6. Mount the nut onto the mandrel and fasten the set screws.

### Disassembly of Smooth Bore Packer Retriever:

1. Reverse the above described assembly process.



**Bowen Smooth Bore Packer Retriever**

# Bowen Smooth Bore Packer Retrievers



Placing the Retriever



Engaging the Packer



Milling the Packer



Retrieving the Packer and Tubing



Releasing the Packer  
(if required)

## Operation of the Bowen Smooth Bore Packer Retriever

### Operation

Before operation, make sure to determine the following:

1. That the retriever is the correct size for the packer to be caught.
2. That the bushing and mill shoe are the correct size for the casing specifications.

Refer to the specification tables and range charts on the following pages.

The operation of the retriever is simple. The grapple is locked to the grapple carrier in a manner that prevents rotation while still allowing up and down movement between the grapple and grapple carrier. The grapple carrier is free to rotate on the mandrel unless the teeth are engaged between the

grapple carrier and the nut. Only right hand rotation and movement up and down are required for complete operation of this tool.

#### Placing the Retriever

The retriever is placed far enough under the packer mill to locate the grapple inside of the bore to be caught before milling begins. The length of the stinger/extension between the packer mill and the retriever is varied to adjust the location of the tool.

#### Engaging the Packer

The milling assembly is run into the hole and the top of the packer is located. Rotation should be ceased or slowed to a minimum while entering the packer bore. As the retriever enters the bore, the grapple and grapple carrier will slide up to the shoulder of the mandrel. Additional downward

force will compress the grapple to enter the bore. The entire assembly may now be lowered until the mill contacts the top of the packer. Once the grapple is positioned in the bore to be engaged, rotation may be resumed.

#### Milling the Packer

The packer may be milled at any speed and weight. The retriever will travel downward with the mill while staying in the engaged position should the packer break loose and fall.

#### Retrieving the Packer and Tubing

Engagement of the grapple may be tested at any time during the milling operation by stopping rotation and lifting the entire assembly. After the packer has broken free, it is recommended that rotation be ceased. Upward movement will engage the

grapple. It is best if the entire assembly can be pulled out of the hole without any right hand rotation to prevent the risk of the retriever releasing from the packer.

#### Releasing the Packer

At any point during the milling operation, the grapple may be released by first setting down load and then lifting upward slightly while rotating to the right. The grapple will unscrew by an amount equal to the lead of the wickers for each rotation.

#### To Reset the Retriever in the Hole

If the tool has been released from the packer and one wants to reset the retriever in the hole, one need not come out of the hole. Simply follow the same procedure of placing the retriever as described above.

# Bowen Smooth Bore Packer Retrievers

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## Maintenance

To guard against misruns and to prolong the life of the Bowen Smooth Bore Packer Retriever, it should be completely disassembled, thoroughly cleaned, lubricated and reassembled before storing. Exterior surfaces may be either painted or lubricated to prevent rust and deterioration.

## Inspection of Tools

Visual inspection of all tools should be a routine practice performed prior to every job. Should any damage that could hinder the tools performance, such as cracks, deformations, deep gouges or yielding be found, the tool should be replaced or returned to NOV for repair. On a regular basis, the tools should be disassembled, cleaned, inspected and properly reassembled to ensure proper performance and a long life. Please refer to the sections below for key items to look for during this process.

### Deformation

Deformation can be found due to yielding under excessive or improper load, tools being dropped or banged on hard surfaces, or improper assembly of the tools (i.e., connections over-torqued or cross threaded). Repairing deformed tools can only be done by replacing parts.

### Damaged Threads

All threads should be inspected for damage. All tool connections should be able to rotate by hand. Check threads for dents, cracks and galling. Tool and/or part should be replaced if any damage is found.

### Cracks

Cracks can form for several reasons. It only takes a small

imperfection in the metal to create a stress riser that can propagate a crack as the tool becomes fatigued. Often, welds are susceptible to cracks, which are extremely dangerous as they lead to sudden failure of the tool. It is recommended that liquid (dye) penetrant or magnetic particle Inspections (see the following) procedures be used to examine parts for cracks. Replace the tool or part immediately if any cracks are found.

### Liquid (Dye) Penetrant/ Magnetic Particle Examination

All welds and highly stressed areas should be inspected on a regular basis to ensure that no cracks exist. Either liquid (dye) penetrant or magnetic particle Inspection may be performed. This inspection procedure should only be performed by a qualified ASNT Level II examiner. Correct visual interpretation is critical to ensure that there are no missed cracks and no false indications. Quite often there are indications detected along the edge of welds that are only material magnetic discontinuities and not cracks.

### Fatigue/Wear and Tear

As common in the oilfield, tools get used and abused. All of the tools should be inspected for signs of fatigue and abnormal wear and tear. Fatigue becomes a major concern as the tools become older and have been used over and over. Abnormal wear and tear includes damage such as dings, deep scratches or gouges, excessive rust etc. that can occur due to improper care of the tools (i.e. left in a corrosive environment, banged around in a truck bed between jobs or dropped on the ground). Replace the tools or parts that show signs of fatigue or abnormal wear and tear.

**CAUTION: Replacement parts should only be purchased from NOV to ensure proper performance of tools as our parts have stringent material specifications they must meet. NOV is not responsible for the performance of parts purchased or manufactured outside of NOV.**

# Bowen Smooth Bore Packer Retrievers

## Bowen Smooth Bore Packer Retriever Specifications

| Size                                    | 2 1/4 in. OD        | 3 1/2 in. OD                      | 3 3/4 in. OD                      | 4 1/4 in. OD        |
|---|---------------------|-----------------------------------|-----------------------------------|---------------------|
| <b>Complete assembly (less grapple)</b> | 501329              | 500977                            | 503845                            | 501650              |
| <b>Mandrel OD</b>                       | 2 1/4 in.           | 3 1/2 in.                         | 3 3/4 in.                         | 4 1/4 in.           |
|   | 57.2 mm             | 77 mm                             | 95.3 mm                           | 107.9 mm            |
| <b>ID</b>                               | 3/8 in.             | 3/8 in.                           | 5/8 in.                           | 1 in.               |
|   | 9.5 mm              | 9.5 mm                            | 15.9 mm                           | 25.4 mm             |
| <b>Packer size range</b>                | 2.50 in. - 3.50 in. | 3.25 in. - 4.50 in.               | 4.00 in. - 6.00 in.               | 4.50 in. - 6.00 in. |
|   | 63.5 mm - 82.6 mm   | 82.6 mm - 114.3 mm                | 101.6 mm - 152.4 mm               | 114.3 mm - 152.4 mm |
| <b>Nominal catch range</b>              | ±1/32 in.           | ±1/16 in.                         | ±1/16 in.                         | ±1/16 in.           |
|   | ±0.79 mm            | ±1.59 mm                          | ±1.59 mm                          | ±1.59 mm            |
| <b>Maximum tensile yield strength</b>   | 113,300 lbf         | 262,000 lbf                       | 402,000 lbf                       | 512,000 lbf         |
|   | 504 kN              | 1,165 kN                          | 1,788 kN                          | 2,277 kN            |
| <b>Maximum torsional yield strength</b> | 2,790 ft-lbs        | 5,100 ft-lbs                      | 9,500 ft-lbs                      | 11,000 ft-lbs       |
|   | 3782 Nm             | 6,914 Nm                          | 12,880 Nm                         | 14,914 Nm           |
| <b>Free stroke</b>                      | 12 in.              | 12 in. standard (36 in. optional) | 12 in. standard (36 in. optional) | 12 in.              |
|   | 304.8 mm            | 304.8 mm (914.4 mm)               | 304.8 mm (914.4 mm)               | 304.8 mm            |
| <b>Overall length</b>                   | 39 7/8 in.          | 40 13/16 in.                      | 47 1/2 in.                        | 48 1/8 in.          |
|   | 1,012.8 mm          | 1,036.6 mm                        | 1,206.5 mm                        | 1,222.4 mm          |
| <b>Splined ring</b>                     | Yes                 | No                                | Yes                               | Yes                 |

## Replacement Parts

| Part Description                     |                 | 2 1/4 in. OD | 3 1/2 in. OD | 3 3/4 in. OD | 4 1/4 in. OD |
|--------------------------------------|-----------------|--------------|--------------|--------------|--------------|
| <b>Mandrel (12" Stroke standard)</b> | <b>Part No.</b> | 501301       | 500969       | 503846       | 501644       |
|                                      | <b>Weight</b>   | 18 lbs       | 30 lbs       | 55 lbs       | 69.5 lbs     |
| <b>Upper Bearing</b>                 | <b>Part No.</b> | 501302       | 500970       | 503847       | 501645       |
|                                      | <b>Weight</b>   | 1 lbs        | 1 lbs        | 1.96 lbs     | 2.29 lbs     |
| <b>Lower Bearing</b>                 | <b>Part No.</b> | 501304       | 500967       | 503848       | 501647       |
|                                      | <b>Weight</b>   | 0.5 lbs      | 2 lbs        | 1.76 lbs     | 2.05 lbs     |
| <b>Grapple Carrier</b>               | <b>Part No.</b> | 501303       | 500968       | 503853       | 501646       |
|                                      | <b>Weight</b>   | 5 lbs        | 10 lbs       | 14.88 lbs    | 19.12 lbs    |
| <b>Grapple</b>                       | <b>Part No.</b> | 501305/**    | 500100/**    | 503852/**    | 501648/**    |
|                                      | <b>Weight</b>   | 3.75 lbs     | 8 lbs        | 10 lbs       | 11.1 lbs     |
| <b>Key</b>                           | <b>Part No.</b> | 501307       | 500102       | 503849       | 504156       |
|                                      | <b>Weight</b>   | 0.25 lbs     | 0.25 lbs     | 0.3 lbs      | 0.4 lbs      |
| <b>Splined Ring</b>                  | <b>Part No.</b> | 501300       | NA           | 503850       | 504072       |
|                                      | <b>Weight</b>   | 0.3 lbs      | NA           | 8.21 lbs     | 10.76 lbs    |
| <b>Nut</b>                           | <b>Part No.</b> | 501299       | 500103       | 503851       | 501643       |
|                                      | <b>Weight</b>   | 1.7 lbs      | 14 lbs       | 15.2 lbs     | 19.4 lbs     |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Top connection
  - (3) ID to be caught





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# BOWEN-LEBUS ANCHOR WASHPIPE SPEARS

Instruction Manual 2900



**Bowen-Lebus Anchor Washpipe Spears**

# Anchor Washpipe Spears

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## **Anchor Washpipe Spears**

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Fifteenth Printing, September 2005

### General Description

The **Bowen-Lebus Anchor Washpipe Spear** is specifically designed for the purpose of aiding in washing over and retrieving stuck drill stem, when stuck off bottom, with safety to prevent the dropping of the washed over and freed fish. This can be accomplished in a single round trip, thus effecting a considerable time saving.

The Bowen-Lebus Anchor Washpipe Spear when in service is always in position to automatically catch the fish off bottom, when being run into the well, while being raised or lowered to make kelly connections, or when coming out of the hole.

The Bowen-Lebus Anchor Washpipe Spear is one of the most versatile tools ever designed for washover fishing operations. The method of anchoring this Spear inside the washpipe is to expand the catching slips with a threaded tapered cone and without using a special landing collar or nipple for making connection with the fish.

When the Washpipe Spear is anchored properly inside the Washpipe, it will not release due to rotation of the washpipe and Spear. Neither will it release by the application of any amount of weight applied against the Spear slips while being lowered into the well, but only after the operator has connected onto the fish by right-hand rotation where this is required. After connecting onto the fish by right-hand rotation, the slips of the Washpipe Spear may be released by continued right-hand rotation and tension load on the washpipe string. If the washover starts as soon as the washpipe will turn over the spear, the slips will drag, causing excessive wear on the slips.

### Use

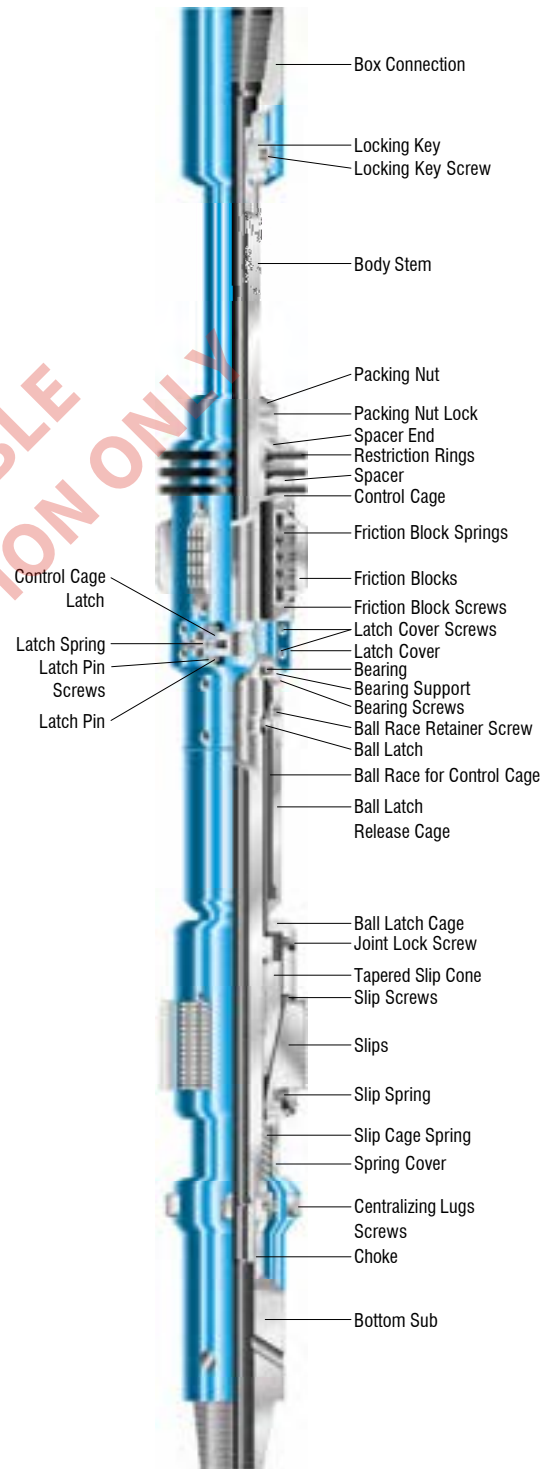
The Bowen-Lebus Anchor Washpipe Spear is designed to be run inside washover pipe. It engages the Fish at its lower end, usually by a threaded connection, preventing the fish from dropping to the bottom when it is washed loose. The Anchor Washpipe Spear will recover drill pipe, drill collars, packers, bridge plugs, etc., that are to be washed over, either off bottom or on bottom, and bring the fish out of the hole, inside the washpipe, after it has been washed loose. This saves additional trips with the fishing string.

Fishing Spears, taper taps or other applicable fishing tools may be run on the Anchor Washpipe Spear to engage the fish.

The Bowen-Lebus Unlatching Joint should always be run between the Washpipe Spear and the fish.

When the Bowen-Lebus Anchor Washpipe Spear is not available, various methods are attempted for the release of a stuck drill stem. Among these are: mixing oil in the drilling mud, inserting jars and bumper subs in the string, using explosives in the string, and as a last resort, washing over.

By using the Bowen-Lebus Anchor Washpipe Spear, washing over need no longer be considered as a last resort.



Bowen-Lebus Anchor Washpipe Spear

### Construction

The Bowen-Lebus Anchor Washpipe Spear consists essentially of a Head, Body Stem, Control Cage, Restriction Rings, Slips, Friction Blocks, Choke, Ball Latch, Slip Cone, Ball Latch Cage, Centralizing Lugs and Bottom Sub.

The parts that comprise the Bowen-Lebus Anchor Washpipe Spear are manufactured from carefully selected, high grade alloy steel, fully heat treated to obtain the best quality of operation and long life.

The Bowen-Lebus Anchor Washpipe Spear is available in all drill pipe sizes from 2 3/8" A.P.I. Regular 3 1/4" O.D. through 5 1/2" A.P.I. Regular 8 1/4" O.D., inclusive.

These tools may be dressed with oversize Slips, Restriction Rings, Friction Blocks and Centralizer Lugs, to allow operation in larger sizes than the size for which the tool was designed.

Each Slip (part 12) is marked with the size range of washpipe inside diameter in which it is used.

Restriction Ring (part 4) should be 1/16" smaller than the inside diameter of the washpipe in which they are used.

The Friction Blocks (part 5) are marked with size numbers which match the size number marked on the Slips.

Centralizer Lugs (part 14-A) are marked with the size number to indicate the inside diameter in which they are used.

All oversize parts may be changed without completely disassembling the Washpipe Spear.

### Critical Sizing

In the larger three sizes JCF-27, JCF-28 and JCF-29, it is important to use a choke (part 15) which has less area than exists between the washpipe and drill collars, or the area between the washpipe and well bore, being certain it is small enough for the rig mud pump to provide adequate fluid to operate the restriction rings.

### Operation

#### Assembly of the Washpipe Spear

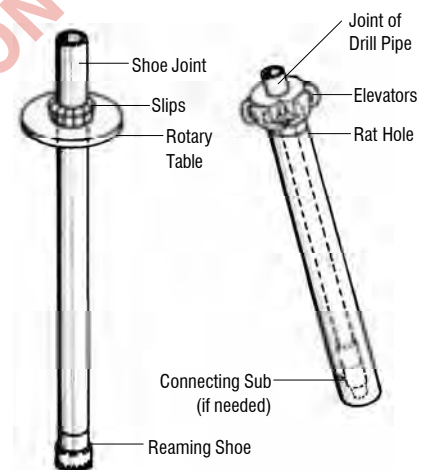
The Anchor Washpipe Spear should be assembled and thoroughly checked, making sure the appropriate choke is inside the spear, to match the pump size on the rig. Make up the appropriate fishing tool to the bottom of the Washpipe Spear. It is recommended that a Bowen-Lebus Unlatching Joint be run between the Anchor Washpipe Spear and the primary fishing tool at the bottom.

Assemble the Anchor Washpipe Spear in running position in the washover string as follows:

Lower the Washpipe down over the Washpipe Spear, then raise the washpipe so that the weight of the Washpipe Spear will set the Slips. While holding the washpipe, rotate the Bottom Sub to the right (clockwise). This will screw the Tapered Slip Cone down and wedge the Slips between the Tapered Slip Cone and the washpipe. Large tongs may then be used to set the Slips as tight as desired for making the subsequent connection between the Washpipe Spear and the fish.

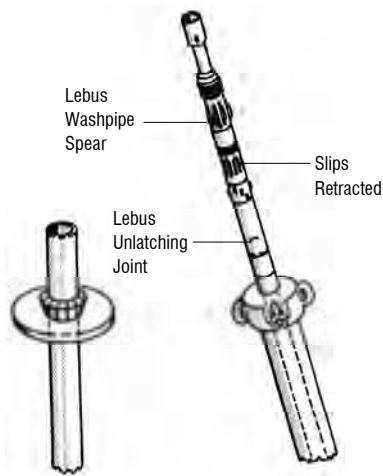
If it is desired to anchor the Washpipe Spear comparatively high above the washover shoe, a joint of drill pipe may be connected between the Washpipe Spear and the primary fishing tools; and a joint of washpipe added below, before connecting the washover shoe.

The recommended best procedure for assembling the Bowen-Lebus Anchor Washpipe Spear, and anchoring it into the lower end of the second joint of washpipe is described below, and illustrated in the sequence of drawings labeled step 1 through step 5.



Step 1

Step 1 illustrates the washover shoe joint, with the washover shoe made up ready to run, and set in the rotary table. A joint of drill pipe with a connecting sub (if required) with a total length of both being at least two or three feet shorter than the combined length of the shoe joint and shoe, is also desirable.



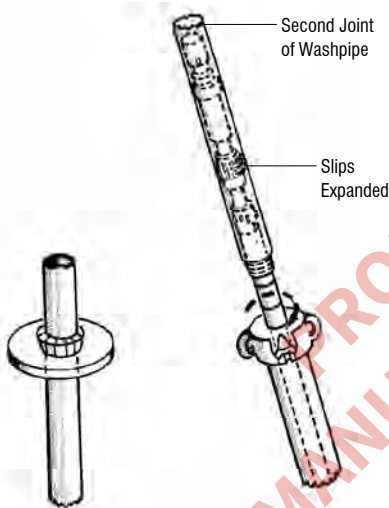
Step 2

Step 2 shows the Spear (and Unlatching Joint) made up tong-tight to the joint of drill pipe.



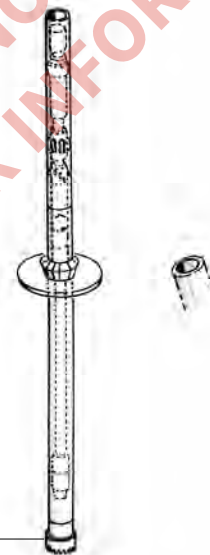
Step 4

Step 4 shows the same operation as Step 3, except that the joint of drill pipe is set in the elevators of the shoe joint in the well bore instead of in the rat hole.



Step 3

Step 3 illustrates the second joint of washpipe being placed over the Spear Assembly, and raised to set the Spear Slips to the inside wall of the washpipe. The joint of washpipe is then held inoperative while the lower pin connection of the Spear and joint of drill pipe are turned enough turns to anchor the Spear Slips, using large tongs (as shown by arrow).



Step 5

Step 5 illustrates the shoe joint and second joint of washpipe made tight. Sufficient additional washpipe has been added to complete the washover operation or any part thereof.

By using a joint of drill pipe below the Spear, the Kelly can be used for making a connection to the fish; also after washing over is begun, the next joint and all additional joints of drill pipe can be added below the Kelly without pulling the shoe off the top of the fish.

The joint will have lateral flexibility for ease in making a connection to the top of the fish.

The Bowen-Lebus Unlatching Joint may be run on the bottom of the joint of drill pipe, rather than on top if desired.

**CAUTION:** Always use the shortest possible string of washpipe required to complete the washing over operation. In deep wells, it is better to plan several trips to washover and bring the stuck stem out in sections, rather than washover in one trip, with the attendant risk of sticking a long string of washpipe.

After the Anchor Washpipe Spear is assembled as described the Slips will keep the Spear securely anchored to the washpipe until the fish is contacted and engaged for pulling. Once the fish is tightly engaged, so that rotation is prevented, pressure from above or below the Washpipe Spear will not cause the slips to release from the washpipe. However, continued rotation will release the slips from the washpipe. Picking up additional right-hand rotation will clear the slips and prevent them from dragging in the washpipe. The Slips will then have the necessary operational free travel so that they are easily released into a catching position by a downward movement of the washpipe.

**Washing Over**

As washpipe is added to the washpipe string and the string is lowered, the Washpipe Spear remains anchored in the washpipe and will rotate with the string. Once the Washpipe Spear is firmly connected to the fish however, the washover string will rotate around and move down over the Washpipe Spear and fish which remain stationary. Only

the Control Assembly will rotate with the washpipe. The rest of the Washpipe Spear will remain securely connected to the fish.

During operation, when it becomes necessary to raise the Washpipe Spear to make a kelly connection or to free a tight washover shoe, the pump pressure should be increased to prevent the upward movement of the Control Assembly. The increase in pump pressure will push against the restriction rings, keeping the Friction Blocks from setting the Slips. If the washover shoe begins to stick, raise the pump pressure and lift the washpipe at least 36 inches (3 feet). Then lower the washpipe 18 inches to 24 inches before resuming rotation.

One of the principal features of the Bowen-Lebus Anchor Washpipe Spear, is that if the fish were to come loose while making a kelly connection, or during any up or down movement of the washpipe, the swabbing action of the Restriction Rings against the fluid column below and the friction blocks, would prevent the Control and Slip Assemblies from moving downward. Since the Body Stem Assembly and Tapered Cone would move down with the loosened and falling fish, the Slips would expand to catch the inside of the washpipe. The expanding action of the Slips will take place within a few inches of downward movement.

Where it is desired or necessary to recover the fish in sections, it is recommended that a string shot be used to loosen the washed-over portion and back it off. Due care must be exercised to assure that the string shot is not detonated in, or very near either the Washpipe Spear or other auxiliary tools such as jars or bumper subs, as serious damage to these tools would result.

A stripping job may be saved by setting the Anchor Washpipe Spear in the lower (or washover shoe) joint of Washpipe, when coming out of the hole with the Fish after a backoff. Normally, the only time the slips need be latched off to make them inoperative is after the fish has been raised to the rotary table by the Spear.

This is done by setting the washpipe in the rotary, picking up the drill pipe with the elevators and running it inside the washpipe. On contacting the top of the Spear, screw it in tightly enough to hold the fish. Pick up on the drill pipe a few inches and release the Spear. Next, rotate the drill pipe to the right until the Control Cage Latch dogs off in the Body Stem Slot. It will then be possible to lower the fish so that the Spear may again be set in the bottom (washover shoe) joint of washpipe, preventing having to strip off the washpipe.

On reaching the desired setting point, the drill pipe is rotated to the left one half turn to disengage the Control Latch and allow the slips to set in the washpipe. After setting the slips, additional left-hand rotation is taken, to back the drill pipe out of the Spear and bring out the balance of the washpipe, with the fish hanging in the bottom.

The operating drill pipe is connected tong tight, directly to the top of the Anchor Washpipe Spear. The top joint of the washpipe is set in the rotary table. The Body Stem and loosened fish are raised 12 inches to 18 inches, to release the slips. The drill pipe is then lowered 6 inches and turned to the right, to lock the control assembly. This operation holds the catching slips inoperative, and allows the Spear and fish to be lowered to the lower (washover shoe) joint of the washpipe.

The Slips are held in release position until the last joint of washpipe is reached. Left hand rotation of the drill pipe releases the latch. Further downward movement will cause the control assembly to set the Washpipe Spear Slips in the washpipe. The balance of the washpipe may then be removed without a costly stripping job.

The Bowen-Lebus Anchor Washpipe Spear may be re-anchored to the fish without the necessity of removing the washpipe from the well.

After a portion of the fish has been backed off, the washpipe may be set in the rotary table to allow the Spear and portion of the fish to be removed from the well. The tool may be latched off and lowered down into the washpipe on the end of a string of drill pipe.

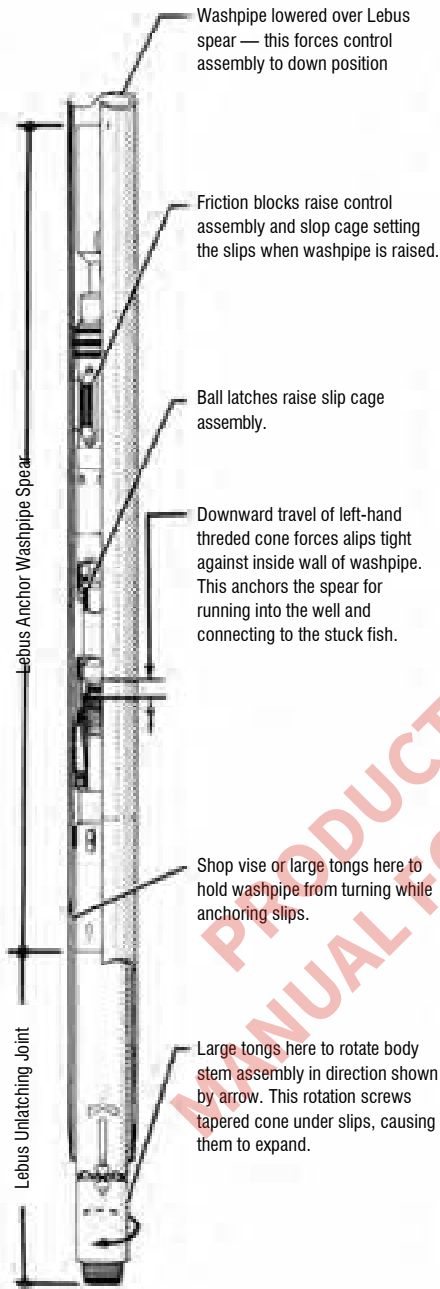
A Bowen Safety joint should be run between the drill pipe and the top of the Anchor Washpipe Spear. After the Spear has been anchored securely in the bottom joint of washpipe by right-hand rotation, the presence of the Safety Joint allows the drill pipe to be removed from the Washpipe Spear by left-hand rotation. The washpipe and Washpipe Spear may be run back to the stuck fish top, and the Washpipe Spear connected to the fish.

This operation permits the removal of the backed-off section of the fish, without removing the washpipe from the well.

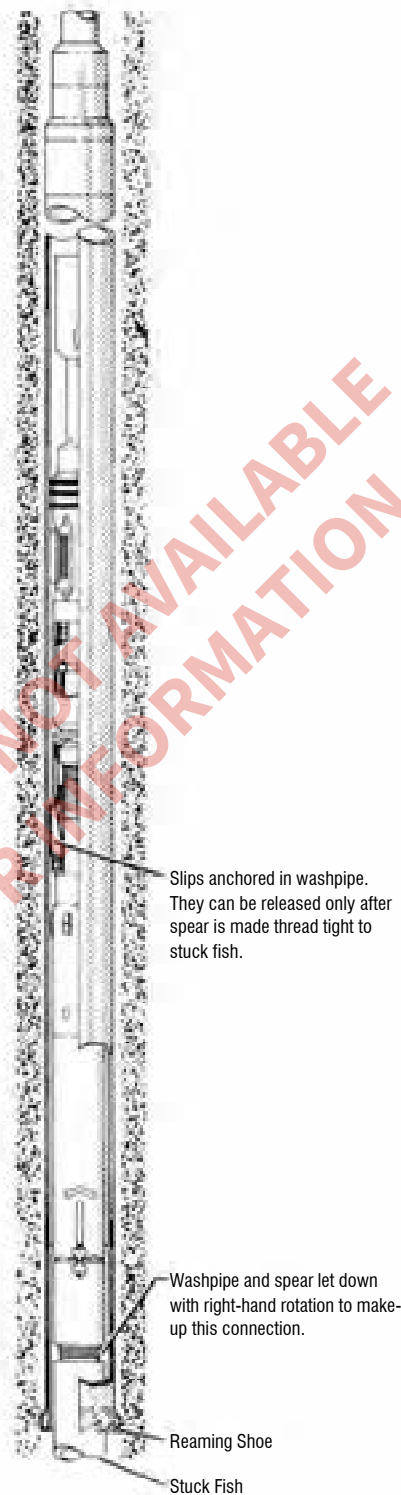
Before starting the operation, a new snap bar should be installed in the Unlatching Joint when this tool is used on bottom of the Anchor Washpipe Spear.

During operation, the latch locks the control assembly to the body stem to hold the slips retracted. The Slips will be in released position.

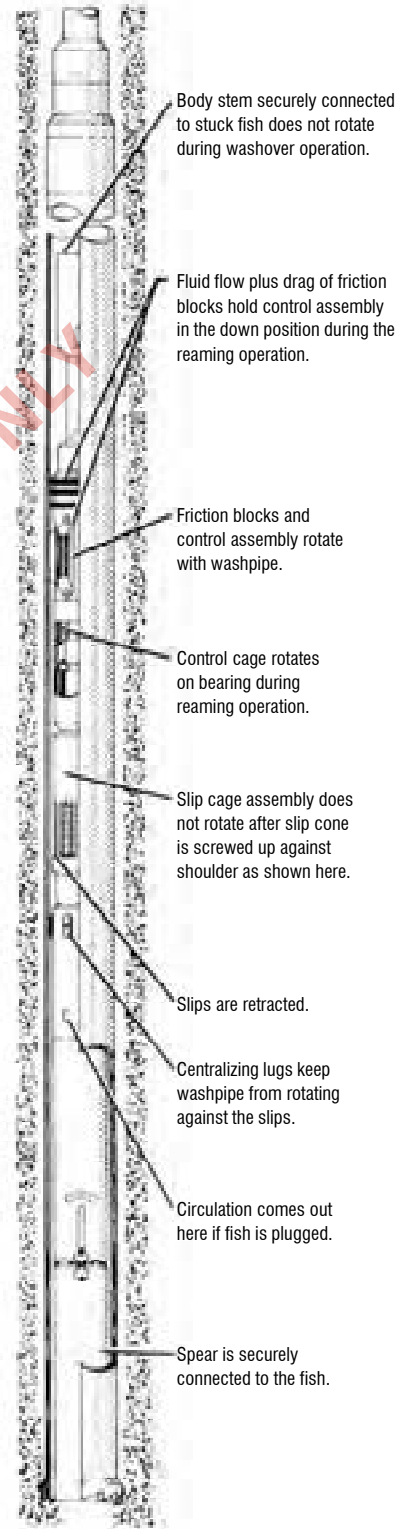




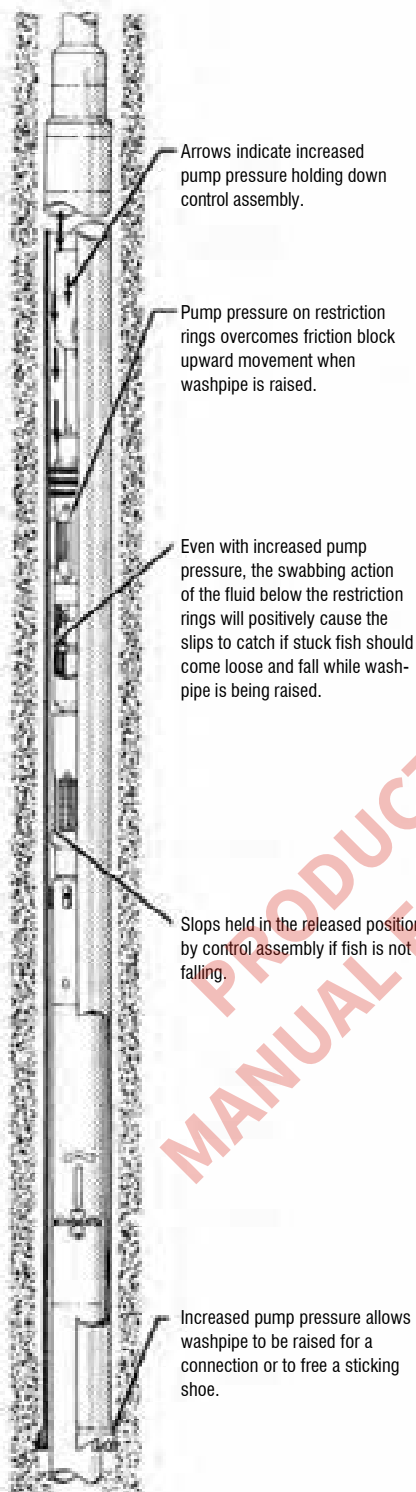
**Figure 1**  
Anchoring Spear in the Washpipe  
While in the Shop Vise  
or Swinging in the Derrick



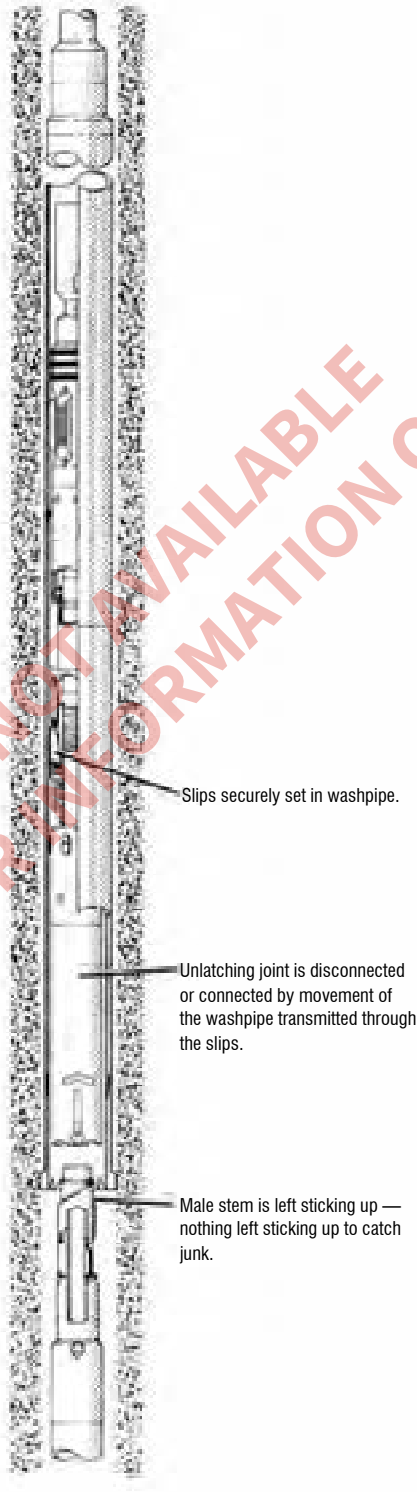
**Figure 2**  
Connecting to Stuck Fish



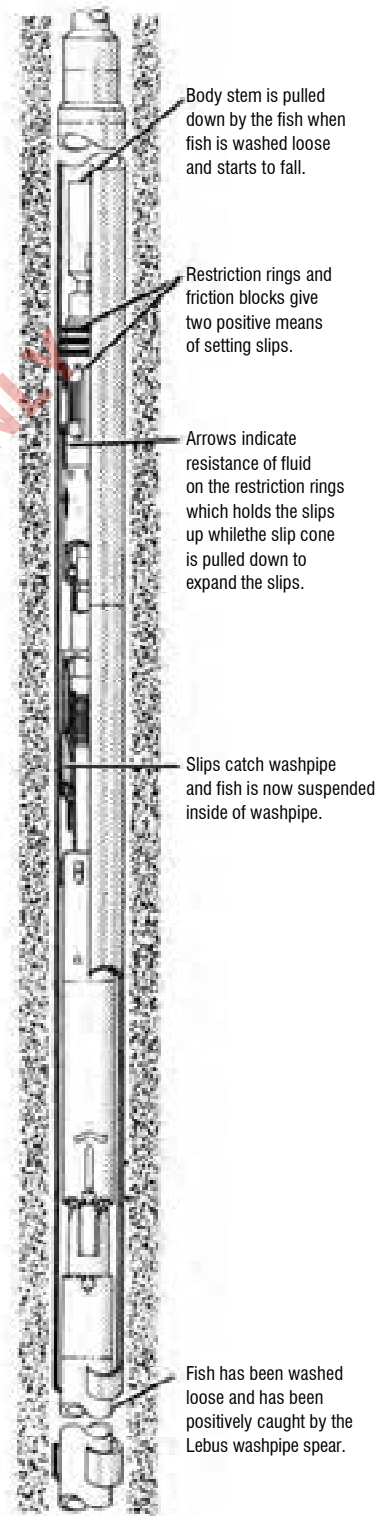
**Figure 3**  
Reaming Over Fish



**Figure 4**  
Raising Washpipe to Make Kelly Connection or Free a Tight Reaming Shoe



**Figure 5**  
Operating the Unlatching Joint



**Figure 3**  
Reaming Over Fish

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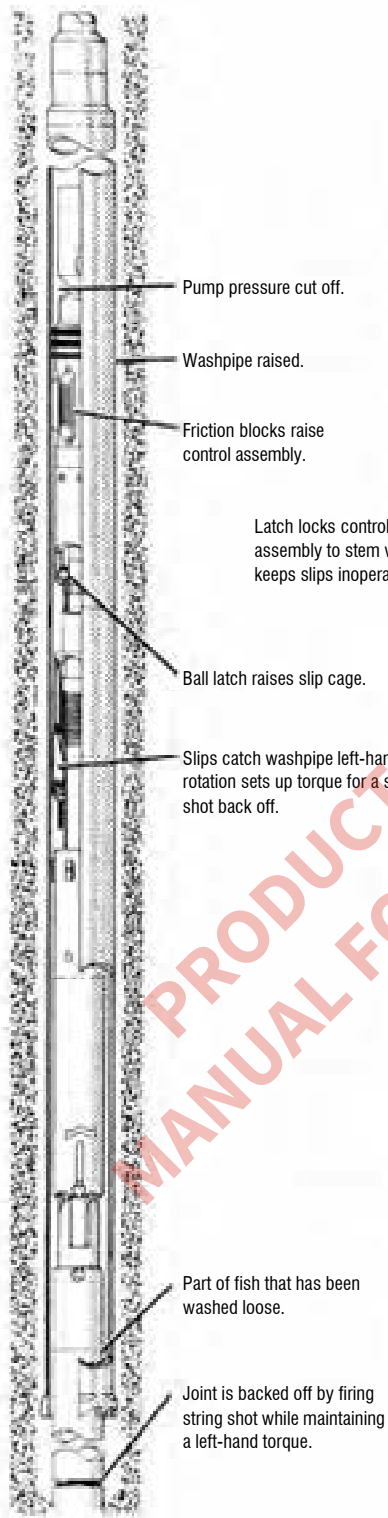


Figure 7  
Backing Off Stuck Fish in Sections

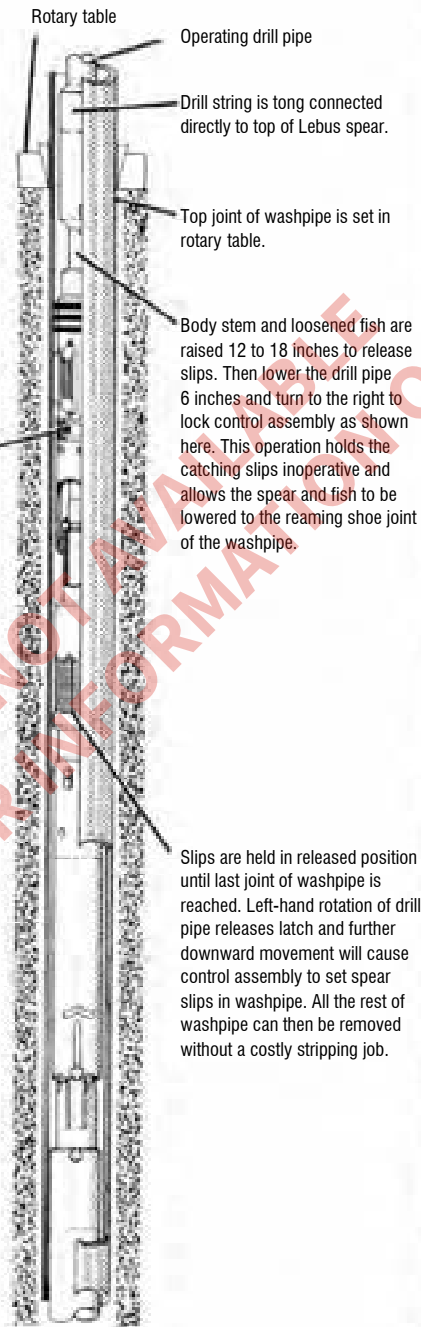


Figure 8  
Save a Stripping Job

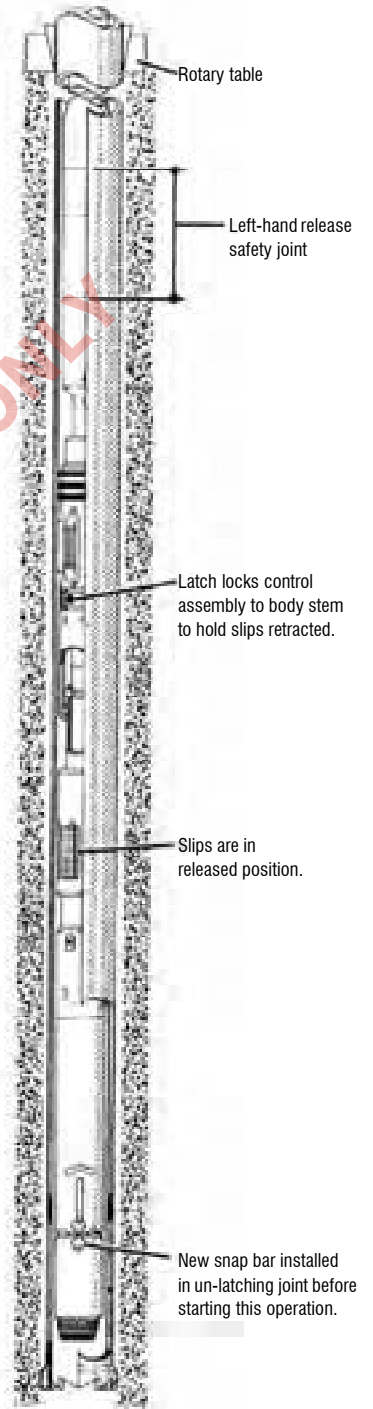


Figure 9  
Re-anchoring Spear without Removing Washover Pipe from the Well

### Maintenance

Maintenance of the Bowen-Lebus Anchor Washpipe Spear is confined primarily to disassembly, cleaning and re-assembly after long usage.

### Complete Disassembly

The tool should be clamped horizontally in a vise. Clamp on the Body Stem, immediately below the Head. Proceed in removal of each part as follows:

1. Remove the Locking Key Screw.
2. Remove the Locking Key. This may best be done by inserting the Locking Key Puller Screw (Part F-50), and pulling on this screw with a pair of large pliers. (See Locking Key Puller page 11)
3. Loosen and remove the Head from the Body Stem.
4. Remove the bottom Sub Locking Key Screw and pull out the Locking Key.
5. Remove the Centralizing Lug Screws and Centralizing Lugs.
6. Unscrew and remove the Bottom Sub.
7. Remove the Choke from the lower end of the Body Stem.
8. Slide the Spring Cover and Slip Cage Spring off the Body Stem. Remove the Slip Cage Spring from the Spring Cover.
9. With a socket head wrench, remove the Packing Nut Lock Screw.
10. Hold the Control Cage with a pipe wrench, and remove the Packing Nut.
11. Slide the Restriction Rings, Spacer Centers and Spacer End off the Control Cage.

12. Remove the Friction Block Screws. There will be six or twelve of these depending on the size of the tool.
13. Remove the Friction Blocks and Friction Block Springs.
14. Remove the four Latch Cover Screws and Latch Cover.
15. Remove the two Latch Pin Screws and Latch Pin. Lift out of Latch.
16. Disengage and remove the Latch Spring.
17. Remove the Ball Race Retainer Screw.
18. Remove the six Bearing Screws.
19. Slide the Control Cage off the Body Stem.
20. Pull the Control Cage Ball Race and Bearing from the Control Cage.
21. Remove the six Slip Screws.
22. Lift out the six Slips and six Slip Springs.
23. Remove the Joint Lock Screw.
24. Unscrew and remove the Slip Cage from the lower end of the Body Stem.
25. Slide the Ball Latch Release Cage off the upper end of the Body Stem.
26. Unscrew and remove the Tapered Slip Cone from the Body Stem.  
Note: This thread is a loose fitting left-hand-thread. The upper face of the Tapered Slip Cone has integral ball faces to assure that the Tapered Slip Cone will not seize against the shoulder of the Body Stem when it is "bottomed" against it during operation.

All parts should be thoroughly cleaned and examined for damage or advanced wear. Replace any worn or damaged parts. Oil or grease all parts before re-assembly.

### Reassembly

Reassembly of the Bowen-Lebus Anchor Washpipe Spear should proceed as follows:

1. Clamp the Body Stem horizontally in a vise. Clamp immediately below the top thread area.
2. Screw the Tapered Slip Cone onto the low-end of the Body Stem, using left-hand rotation.
3. Slide the Slip Cage onto the lower end of the Body Stem, with the threaded end up (toward the Head).
4. Insert a Slip Spring into a Slip and depress the Spring while inserting the Slip into the Slip Cage. Repeat this with the remaining Slips.
5. Slide the Spring Cover onto the Body Stem with the shouldered end against the Slip Cage.
6. Insert the Slip Cage Spring into the Spring Cover.
7. Insert the Choke into the Body Stem lower end and tighten it. Caution: Make sure the choke opening is of the proper size required.
8. Screw the Bottom Sub onto the lower end of the Body Stem until the slot in the bottom Sub is completely aligned with the matching slot in the Body Stem.
9. Insert the Locking Key into the slot in the Bottom Sub and secure it in place with the Locking Key Screw.
10. Insert the Centralizing Lugs and secure them with the Screws.
11. Reclamp the tool on the Bottom Sub.

12. Slide the Ball Latch Cage over the upper end of the Body Stem with its threaded end toward the Slip Cage. Slide it down until the holes near the upper end are aligned with the shallow groove in the Body Stem. It will be necessary to make the thread up into the Slip Cage.
  13. Slide the Ball Latch Release Cage over the Body Stem with the threaded end up. Slide the Control Cage Ball Race onto the Body Stem with the grooved end up.
  14. Drop the Latch Balls into the holes in the Ball Latch Cage. Apply the Balls with heavy cup grease to keep them in position while the Ball Race is slid down over the Balls to maintain them.
  15. Drop the Bearing Support and Bearing into the Control Cage. Lock them into position with the Bearing Screws.
  16. Slide the Control Cage onto the Body Stem. Screw it onto the Ball Latch Release Cage.
  17. Insert the Ball Race Retainer Screw and tighten it into the groove in the Control Cage Ball Race.
  18. Insert the Latch Spring into the Control Cage Latch, and seat the Control Cage Latch in position in the Control Cage.
  19. Insert the Latch Pin through the Control Cage Latch and Latch Spring.
  20. Seat the Latch Cover in place and insert the four Latch Cover Screws.
  21. Seat the Friction Block Springs in the Friction Blocks and the Friction Blocks into the Control Cage. Nine to 24 of these springs are required, depending on size of the tool.
  22. Insert and tighten the Friction Block Screws.
  23. Assemble the three Restriction Rings, separated by the two Spacer Centers. Follow with the Spacer End.
  24. Slide the Packing Nut over the Body Stem and make it up to the Control Cage upper end.
  25. Insert and tighten the Packing Nut Lock Screw.
  26. Assemble the Head onto the Body Stem. Make it up until the slot in the Body Stem aligns with the slot in the Head, then insert the Locking Key and secure it with the Locking Key Screws.
- This completes assembly of the tool. The tool should be checked after assembly to assure that:
- A. The Friction Blocks do not bind and will deflect and extend freely.
  - B. The Slips may be extended and retracted by manipulating the Body Stem (and Tapered Slip Cone).
  - C. The Centralizing Lugs from the correct diameter for operation in the washpipe to be run.
  - D. The Friction Blocks are matched to the washpipe to be run.
  - E. The Slips will catch properly in the washpipe to be run and will completely release when retracted.
- The most convenient way to check the items listed above, is to use a "try nipple" several feet long, cut from a length of washpipe to be run.

### **Assembly of Oversize Washpipe**

The Bowen-Lebus Anchor Washpipe Spear may be easily and quickly dressed for different sizes of washpipe. Only four sets of parts need be changed: Restriction Ring, Friction Blocks, Slips, and Centralizing Lugs.

The Restriction Rings should be in all cases, be 1/16" smaller than the inside diameter of the washpipe in which they operate.

To replace the Restriction Rings, remove the Packing Nut Lock screw, and back off the Packing Nut until the Spacer End and Spacer Centers move apart sufficient to allow the split cross-cut Restriction Rings to be removed and replaced. The Packing Nut may then be retightened and the Packing Nut screw re-set.

To replace the Slips, loosen and remove the Slip Screws. The Slips may then be pulled out of the windows. Use caution to assure that the Slip Springs are not lost or harm done to the operator as the Slips are removed.

When the tool is dressed with different size Slips, be sure to use properly matched corresponding number Centralizing Lugs, Friction Blocks and Restriction Rings. All should be marked with the same size number as the Slips.

To replace the Friction Blocks, remove the Friction Block Screws at one end and loosen the Screws at the other. Use caution not to lose the Friction Block Springs or be harmed by them in the process.

The Centralizing Lugs may be changed by removing the Screws and pulling the Centralizing Lugs out with large pliers. The new Lugs may be inserted and locked with the Screws. If difficulty is experienced in getting the Lugs in the slots, dress the edges of the slots and Lugs with a small hand file.

**Bowen-Lebus Anchor Washpipe Spears**

| Tool No.          | JCF-23     | JCF-24   | JCF-25   | JCF-26   | JCF-27   | JCF-28   | JCF-29    |       |
|-------------------|------------|----------|----------|----------|----------|----------|-----------|-------|
| Body O.D.         | 3-1/4      | 4        | 4-9/16   | 5-7/16   | 5-13/16  | 6-7/16   | 8-1/4     |       |
| Connections       | 2-3/8 Reg. | 2-3/8 IF | 2-7/8 IF | 3-1/2 IF | 4-1/2 FH | 4-1/2 FH | 5-1/2 Reg |       |
| I.D.              | 3/4        | 1        | 1-1/8    | 1-1/4    | 1-3/4    | 2        | 2         |       |
| Complete Assembly | Part No.   | 38139    | 38189    | 38224    | 38260    | 38299    | 38337     | 38550 |
|                   | Weight     | 85       | 145      | 185      | 280      | 330      | 410       | 480   |

**Calculated Strengths**

|                                   |        |         |         |         |         |         |         |
|-----------------------------------|--------|---------|---------|---------|---------|---------|---------|
| Tensile Strength @ Yield in lbs   | 93,000 | 192,732 | 279,480 | 487,320 | 553,200 | 822,960 | 822,960 |
| Torque Strength @ Yield in ft-lbs | 1,063  | 3,023   | 5,633   | 11,346  | 14,000  | 24,934  | 24,934  |
| Recommended Maximum* Pull in lbs  | 61,400 | 127,000 | 184,300 | 322,000 | 364,000 | 543,000 | 543,000 |

\* Based on 66% of calculated yield strength

NOTE: These calculations are based on the yield strength of the material. They are theoretical, and do not constitute any guarantee, actual or implied.

PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

### Bowen-Lebus Anchor Washpipe Spear

| Tool No.       |                            | JCF-23         | JCF-24 | JCF-25 | JCF-26 | JCF-27  | JCF-28 | JCF-29 |
|----------------|----------------------------|----------------|--------|--------|--------|---------|--------|--------|
| Body O.D.*     |                            | 3-1/4          | 4      | 4-9/16 | 5-7/16 | 5-13/16 | 6-7/16 | 8-1/4  |
| Connections    |                            | 2-3/8          | 2-3/8  | 2-7/8  | 3-1/2  | 4-1/2   | 4-1/2  | 5-1/2  |
|                |                            | Reg            | IF     | IF     | IF     | FH      | FH     | Reg    |
| I.D.           |                            | 3/4            | 1      | 1-1/8  | 1-1/4  | 1-25/32 | 2      | 2      |
| Lebus Part No. | Complete Assembly          | Part No. 38139 | 38189  | 38224  | 38260  | 38299   | 38337  | 38550  |
|                |                            | Weight 85      | 145    | 185    | 280    | 330     | 410    | 480    |
| 1              | Head                       | Part No. 38140 | 38190  | 38225  | 38261  | 38300   | 38338  | 38551  |
|                |                            | Weight 25      | 26     | 30     | 40     | 55      | 75     | 85     |
| 1-A            | Locking Key                | Part No. 38141 | 38191  | 38226  | 38262  | 38301   | 38339  | 38552  |
|                |                            | Quantity 4     | 4      | 4      | 2      | 2       | 2      | 2      |
|                |                            | Weight 1/2     | 1/2    | 1/2    | 1/2    | 1/2     | 1/2    | 1/2    |
| 1-B            | Locking Key Screw          | Part No. 13847 | 13847  | 6964   | 6964   | 6964    | 6964   | 6964   |
|                |                            | Quantity 4     | 4      | 4      | 2      | 2       | 2      | 2      |
|                |                            | Weight 1/16    | 1/16   | 1/8    | 1/8    | 1/8     | 1/8    | 1/8    |
| F-25           | Body Stem                  | Part No. 38142 | 38192  | 38227  | 38263  | 38302   | 38340  | 38340  |
|                |                            | Weight 14      | 36     | 55     | 110    | 130     | 170    | 170    |
| F-26           | Packing Nut                | Part No. 38143 | 38193  | 38228  | 38264  | 38303   | 38341  | 38341  |
|                |                            | Weight 4       | 5      | 6      | 7      | 9       | 10     | 10     |
| F-28           | Packing Nut Lock           | Part No. 38144 | 38144  | 38144  | 38265  | 38304   | 38342  | 38304  |
|                |                            | Weight 1/4     | 1/4    | 1/4    | 1/4    | 1/4     | 1/4    | 1/4    |
| 4              | Restriction Rings *        | Part No. 38145 | 38195  | 38230  | 38305  | 38305   | 38343  | 38553  |
|                |                            | Quantity 3     | 3      | 3      | 3      | 3       | 3      | 3      |
|                |                            | Weight 1       | 1      | 1      | 1-1/4  | 1-1/4   | 1-1/2  | 1-1/2  |
| 4-A            | Spacer End                 | Part No. 38146 | 38196  | 38231  | 38267  | 38306   | 38344  | 38554  |
|                |                            | Weight 1       | 1-1/2  | 2      | 2-1/2  | 3       | 3-1/2  | 3-1/2  |
| 4-B            | Spacer Centers (2 Req'd.)  | Part No. 38147 | 38197  | 38232  | 38268  | 38307   | 38345  | 38555  |
|                |                            | Weight 3/4     | 1      | 1-1/4  | 1-1/2  | 1-3/4   | 3      | 3      |
| F-29           | Control Cage               | Part No. 38148 | 38198  | 38233  | 38269  | 38308   | 38346  | 38556  |
|                |                            | Weight 20      | 50     | 60     | 65     | 70      | 80     | 125    |
| 5              | Friction Blocks            | Part No. 38150 | 38200  | 38235  | 38271  | 38310   | 38348  | 38557  |
|                |                            | Quantity 3     | 3      | 3      | 6      | 6       | 6      | 6      |
|                |                            | Weight 3/4     | 1      | 1-1/2  | 1-1/2  | 2       | 2-1/4  | 3      |
| 5-A            | Friction Block Spring      | Part No. 38151 | 38201  | 38201  | 38201  | 38201   | 38201  | 38201  |
|                |                            | Quantity 9     | 9      | 12     | 24     | 24      | 24     | 24     |
|                |                            | Weight 1/8     | 1/4    | 1/4    | 1/4    | 1/4     | 1/4    | 1/4    |
| 5-B            | Friction Block Screw       | Part No. 23160 | 23160  | 23160  | 23208  | 23208   | 23208  | 23208  |
|                |                            | Quantity 6     | 6      | 6      | 12     | 12      | 12     | 12     |
|                |                            | Weight 1/16    | 1/16   | 1/16   | 1/8    | 1/8     | 1/8    | 1/8    |
| F-30           | Bearing                    | Part No. 38152 | 38202  | 38237  | 38273  | 38312   | 38350  | 38350  |
|                |                            | Weight 1/2     | 3/4    | 1-1/4  | 1-3/4  | 2-1/4   | 3-1/2  | 3-1/2  |
| F-31           | Bearing Screw (6 Req'd.)   | Part No. 38153 | 38205  | 38240  | 38276  | 38315   | 38315  | 38315  |
|                |                            | Weight 1/16    | 1/16   | 1/16   | 1/8    | 1/8     | 1/8    | 1/8    |
| F-32           | Control Cage Latch         | Part No. 38154 | 38206  | 38241  | 38277  | 38316   | 38354  | 38354  |
|                |                            | Weight 1/4     | 1/4    | 1/4    | 3/8    | 3/8     | 1/2    | 1/2    |
| F-33           | Latch Pin Screw (2 Req'd.) | Part No. 23508 | 13847  | 13847  | 23518  | 13847   | —      | —      |
|                |                            | Weight 1/16    | 1/16   | 1/16   | 1/16   | 1/16    | —      | —      |
| 7-A            | Latch Pin                  | Part No. 38156 | 38207  | 38207  | 38317  | 38317   | 38317  | 38317  |
|                |                            | Weight 3/4     | 3/4    | 1      | 1      | 1-1/4   | 1-1/4  | 1-1/4  |

\* Restriction Rings OD should be 1/16" smaller than the washpipe ID being used.

**Bowen-Lebus Anchor Washpipe Spear**

| Lebus Part No. | Tool No.                         |          | JCF-23 | JCF-24 | JCF-25 | JCF-26 | JCF-27 | JCF-28 | JCF-29 |
|----------------|----------------------------------|----------|--------|--------|--------|--------|--------|--------|--------|
|                | Complete Assembly                | Part No. | 38139  | 38189  | 38224  | 38260  | 38299  | 38337  | 38550  |
| F-34           | Latch Spring (2 Req'd.)          | Part No. | 38157  | 38208  | 38208  | 38318  | 38318  | 38318  | 38318  |
|                |                                  | Weight   | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    |
| F-35           | Latch Cover                      | Part No. | 38158  | 38209  | 38244  | 38280  | 38319  | 38357  | 38559  |
|                |                                  | Weight   | 3/4    | 1      | 1-1/2  | 2      | 3      | 3      | 4      |
| F-36           | Latch Cover Screw (4 Req'd.)     | Part No. | 25214  | 23125  | 23125  | 23139  | 25220  | 25220  | 25220  |
|                |                                  | Weight   | 1/16   | 1/16   | 1/16   | 1/8    | 1/8    | 1/8    | 1/8    |
| F-37           | Ball Latch (8 Req'd.)            | Part No. | 38159  | 38210  | 38245  | 38320  | 20936  | 20936  | 38320  |
|                |                                  | Weight   | 1/16   | 1/16   | 1/8    | 3/16   | 3/16   | 3/16   | 3/16   |
| F-38           | Ball Latch Release Cage          | Part No. | 38160  | 38211  | 38246  | 38282  | 38321  | 38359  | 38359  |
|                |                                  | Weight   | 7      | 12     | 15     | 28     | 30     | 33     | 40     |
| F-42           | Tapered Slip Cone                | Part No. | 38163  | 38214  | 38250  | 38285  | 38324  | 38362  | 38563  |
|                |                                  | Weight   | 2-1/4  | 2-1/4  | 2-1/2  | 2-1/2  | 3      | 5      | 6      |
| 12             | Slip (6 Req'd.)                  | Part No. | 38164  | 38215  | 38251  | 38286  | 38325  | 38363  | 38564  |
|                |                                  | Weight   | 2      | 2      | 2-1/4  | 2-1/2  | 3      | 4      | 6      |
| 12-A           | Slip Screw (6 Req'd.)            | Part No. | 38165  | 38165  | 38165  | 38165  | 38165  | 38165  | 38165  |
|                |                                  | Weight   | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    |
| 12-B           | Slip Spring (6 Req'd.)           | Part No. | 38166  | 38253  | 38253  | 38288  | 38288  | 38288  | 38288  |
|                |                                  | Weight   | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    |
| F-43           | Slip Cage Spring                 | Part No. | 38167  | 38218  | 38254  | 38289  | 38328  | 38366  | 38366  |
|                |                                  | Weight   | 1/4    | 1/4    | 5/16   | 3/8    | 7/16   | 1/2    | 1/2    |
| F-44           | Spring Cover                     | Part No. | 38168  | 38219  | 38255  | 38290  | 38329  | 38367  | 38367  |
|                |                                  | Weight   | 1/2    | 2-1/4  | 3-1/4  | 5      | 11     | 13     | 13     |
| 14             | Bottom Sub                       | Part No. | 38169  | 38220  | 38256  | 38291  | 38330  | 38368  | 38566  |
|                |                                  | Weight   | 30     | 30     | 42     | 47     | 95     | 72     | 150    |
| 14-A           | Centralizing Lug                 | Part No. | 38170  | 38221  | 38257  | 38292  | 38331  | 38567  | 38567  |
|                |                                  | Quantity | 4      | 4      | 5      | 5      | 5      | 5      | 5      |
|                |                                  | Weight   | 1/4    | 3/8    | 1/2    | 1/2    | 1/2    | 1/2    | 1/2    |
| 14-B           | Centralizing Lug Screw           | Part No. | 6964   | 6964   | 6964   | 38293  | 6964   | 22830  | 22830  |
|                |                                  | Quantity | 4      | 4      | 5      | 5      | 5      | 5      | 5      |
|                |                                  | Weight   | 1/16   | 1/16   | 1/16   | 1/16   | 1/16   | 1/16   | 1/16   |
| 15             | Choke **                         | Part No. | —      | —      | —      | —      | 38332  | 38369  | 38369  |
|                |                                  | Weight   | —      | —      | —      | —      | 1-1/2  | 1-1/2  | 1-1/2  |
| F-45           | Allen Wrench<br>(6 Sizes Req'd.) | Part No. | —      | —      | —      | —      | —      | —      | —      |
|                |                                  | Weight   | —      | —      | —      | —      | —      | —      | —      |
| F-46           | Choke Wrench                     | Part No. | —      | —      | —      | —      | 38334  | 38334  | 38334  |
|                |                                  | Weight   | —      | —      | —      | —      | 1/4    | 1/4    | 1/4    |
| F-47           | Break Out Lug                    | Part No. | 38171  | 38222  | 38258  | 38294  | 38333  | 38333  | 38568  |
|                |                                  | Weight   | 1/4    | 1/4    | 1/4    | 1/4    | 1/4    | 1/4    | 1/4    |
| F-48           | Locking Key Puller               | Part No. | 42580  | 42580  | 42579  | 38172  | 38172  | 38172  | 38172  |
|                |                                  | Weight   | 3/4    | 3/4    | 3/4    | 3/4    | 3/4    | 3/4    | 3/4    |
| F-50           | Locking Key Puller Screw         | Part No. | 14744  | 14744  | 8229   | 15553  | 15553  | 15112  | 15112  |
|                |                                  | Weight   | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    |
| F-39           | Joint Lock Screw<br>(2 Req'd.)   | Part No. | 23124  | 23125  | 38247  | 25220  | 25220  | 25220  | 23138  |
|                |                                  | Weight   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   |
| F-40           | Ball Latch Cage                  | Part No. | 38161  | 38212  | 38248  | 38283  | 38322  | 38360  | 38561  |
|                |                                  | Weight   | 3-1/2  | 5-1/4  | 11-1/2 | 17     | 18     | 20     | 25     |
| F-41           | Slip Cage                        | Part No. | 38162  | 38213  | 38249  | 38284  | 38323  | 38361  | 38562  |
|                |                                  | Weight   | 6      | 12-1/4 | 13     | 15     | 17     | 32     | 40     |
|                | Ball Race for Control Cage       | Part No. | 38149  | 38199  | 38234  | 38270  | 38309  | 38347  | 38347  |
|                |                                  | Weight   | 1      | 1-1/8  | 1-1/4  | 1-1/2  | 1-1/2  | 2      | 2      |
|                | Bearing Support                  | Part No. | —      | —      | —      | —      | —      | 38352  | 38352  |
|                |                                  | Weight   | —      | —      | —      | —      | —      | 1      | 1      |
|                | Ball Race Retainer Screw         | Part No. | 23328  | 23328  | 23328  | 23328  | 23328  | 17762  | 17762  |
|                |                                  | Weight   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   |

\*\* Choke ID to be less than area between washpipe and well bore, or the area between washpipe and drill collars.



### Bowen-Lebus Anchor Washpipe Spear

| Tool No. | Body OD | Connections               | Hole Size   | Min. Weight*   | Slip number and the minimum and maximum inside diameter of washpipe each slips will catch. |   |                                 |  |   |                                  |                                 |                                |
|----------|---------|---------------------------|-------------|----------------|--|---|---------------------------------|--|---|----------------------------------|---------------------------------|--------------------------------|
| JCF-23   | 3-1/4   | 2-3/8<br>API Reg          | 3/4         | 85             | Slip 31<br>3-3/8 to<br>3-9/16  | Slip 32<br>3-9/16 to<br>3-3/4             | Slip 33<br>3-3/4 to<br>3-15/16  | Slip 34<br>3-15/16 to<br>4-1/8               | Slip 35†<br>4-5/16 to<br>4-5/16         |                                  |                                 |                                |
| JCF-24   | 4       | 2-3/8<br>API IF<br>4-5/16 | 1<br>4-9/16 | 145<br>4-13/16 | Slip 41<br>4-1/8 to<br>5-1/16  | Slip 42<br>4-5/16 to<br>5-5/16            | Slip 43<br>4-9/16 to<br>4-13/16 | Slip 44<br>4-13/16 to<br>5-1/16              | Slip 45†<br>5-1/16 to<br>5-5/16         |                                  |                                 |                                |
| JCF-25   | 4-9/16  | 2-7/8<br>API IF           | 1-1/8       | 185            | Slip 50<br>4-11/16 to<br>4-15/16   | Slip 51<br>4-15/16 to<br>5-3/16           | Slip 52<br>5-3/16 to<br>5-7/16  | Slip 53<br>5-7/16 to<br>5-11/16              | Slip 54<br>5-11/16 to<br>5-15/16        | Slip 55†<br>5-15/16 to<br>6-3/16 |                                 |                                |
| JCF-26   | 5-7/16  | 3-1/2<br>API IF           | 1-1/4       | 280            | Slip 60<br>5-9/16 to<br>5-3/4  | Slip 61<br>5-5/8 to<br>5-7/8              | Slip 62<br>5-7/8 to<br>6-1/8    | Slip 63<br>6-1/8 to<br>6-3/8                 | Slip 64<br>6-3/8 to<br>6-5/8            | Slip 65<br>6-5/8 to<br>6-7/8     | Slip 66<br>6-7/8 to<br>7-1/8    |                                |
| JCF-27   | 5-13/16 | 4-1/2<br>API FH           | 1-25/32     |                | Slip 67<br>6-5/16 to<br>7 to<br>7-5/16   | Slip 68<br>6-3/8 to<br>7-1/4 to<br>7-9/16 | Slip 69<br>6-5/8 to<br>7-9/16   | Slip 70<br>6-11/16 to<br>7-13/16 to<br>8-1/8 | Slip 71<br>6-15/16 to<br>7 to<br>8-7/16 | Slip 72<br>7 to<br>8-1/8         | Slip 73<br>7-1/4 to<br>8-1/8    | Slip 74<br>7-1/4 to<br>8-15/16 |
| JCF-28   | 6-7/16  | 4-1/2<br>API FH           | 2           | 410            | Slip 75<br>6-9/16 to<br>6-13/16  | Slip 76<br>6-11/16 to<br>6-15/16          | Slip 77<br>6-15/16 to<br>7-3/16 | Slip 78<br>7-3/16 to<br>7-7/16               | Slip 79<br>7-7/16 to<br>7-11/16         | Slip 80<br>7-11/16 to<br>7-15/16 | Slip 81<br>7-15/16 to<br>8-3/16 | Slip 82<br>8-3/16 to<br>8-7/16 |
| JCF-29   | 8-1/4   | 5-1/2<br>API Reg          | 2           | 480            | Slip 83<br>8-1/2 to<br>8-3/4   | Slip 84<br>8-3/4 to<br>9                  | Slip 85<br>9 to<br>9-1/4        | Slip 86<br>9-1/4 to<br>9-1/2                 | Slip 87<br>9-1/2 to<br>9-3/4            | Slip 88<br>9-3/4 to<br>10        | Slip 89<br>10 to<br>10-1/2      | Slip 90<br>10-1/2 to<br>10-3/4 |

\* With small size slips, etc. Crating not included.

† Special size not usually carried in stock.

### How To Order

Specify:

- (1) Complete assembly number
- (2) Slip size by size number
- (3) Body size OD only
- (4) Spare parts desired

NOTE: Friction blocks, restriction rings, and centralizing lugs must be changed with slips.

### RECOMMENDED SPARE PARTS

- 4 - Sets (24), Part No. 12, Slips
- 4 - Sets (12), Part No. 4, Restriction Rings
- 1 - Set (3), Part No. 5, Friction Blocks
- 2 - Sets (8), Part No. 14-A, Centralizing Lugs
- 2 - Sets (4), Part No. 1-B, Locking Key Screws
- 2 - Sets (4), Part No. 1-A, Locking Keys
- 2 - Sets (18), Part No. 5-A, Friction Block Springs
- 2 - Sets (12), Part No. 5-B, Friction Block Screws
- 2 - Part No. F-30, Bearings
- 2 - Part No. F-32, Control Cage Latches
- 2 - Sets (4), Part No. F-33, Latch Pin Screws
- 4 - Part No. 7-A, Latch Pins
- 6 - Sets (12), Part No. F-34, Latch Springs
- 4 - Sets (8), Part No. F-39, Joint Lock Screws
- 4 - Sets (24), Part No. 12-A, Slip Screws
- 4 - Sets (24), Part No. 12-B, Slip Springs
- 2 - Sets (16), Part No. F-37, Ball Latch
- 1 - Part No. F-42, Tapered Slip Cone
- 1 - Part No. F-28, Packing Nut Lock Screw
- 1 - Set (6), Part No. F-31, Bearing Screws
- 1 - Set (4), Part No. F-36, Latch Cover Screws
- 1 - Set (4), Part No. 14-B, Centralizing Lug Screws



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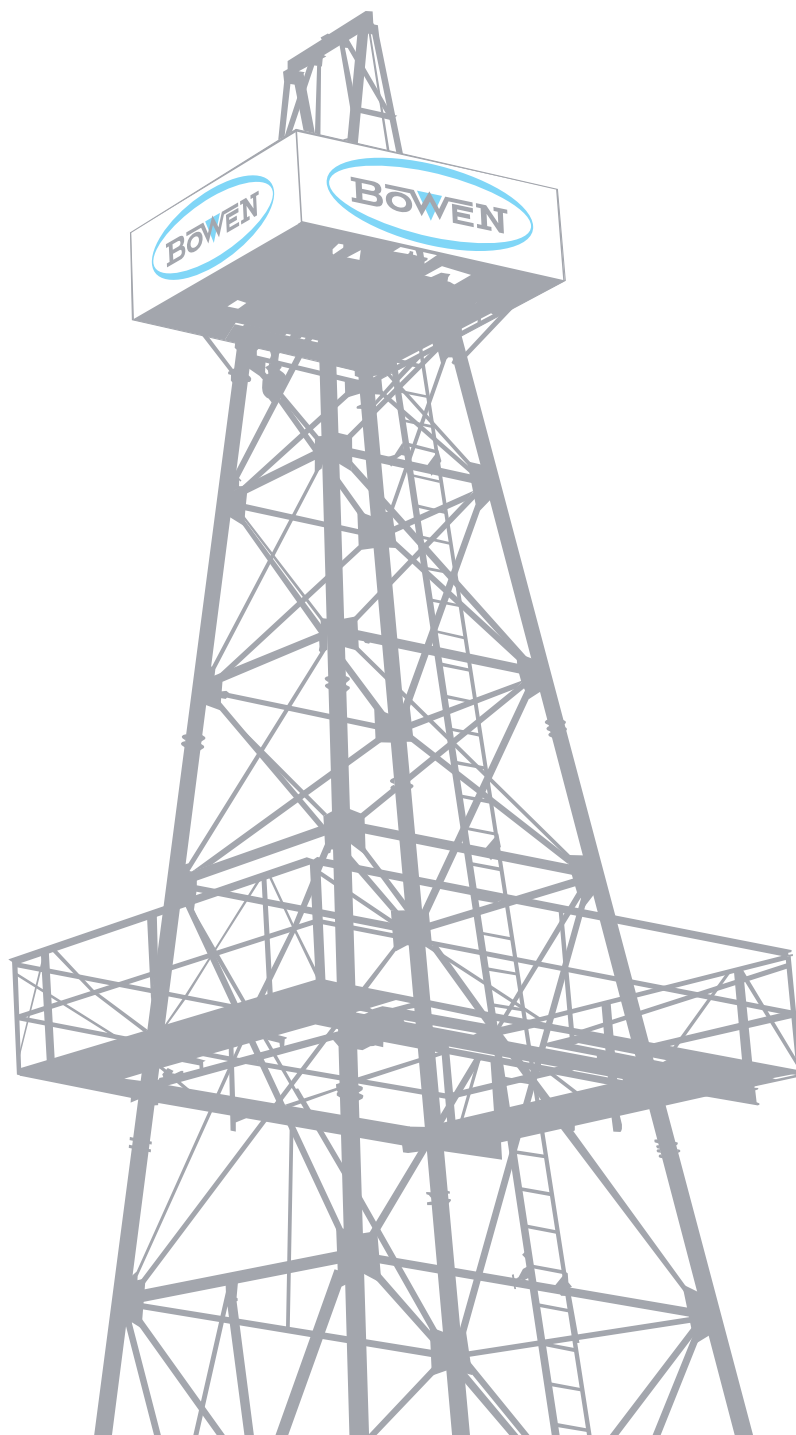
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# Bowen Rotary Taper Taps

Instruction Manual 2800



# Bowen Rotary Taper Taps

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**Bowen Rotary Tap Tapers**



The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Rotary Taper Taps

## General Description

Bowen™ Rotary Taper Taps are the simplest means available for engaging a fish internally and retrieving it. This tool has been skillfully designed to obtain the greatest benefit from a basic, one piece tool.

## Use

The Bowen Rotary Taper Tap is used to engage and retrieve tubing, drillpipe, casing and other similar tubular items having bores, from any wellbore. They are particularly valuable in cases where the annulus between the fish and the wellbore is too narrow

to permit engaging the outside diameter of the fish.

## Construction

Bowen Rotary Taper Taps are externally threaded with a proven buttress form wicker, cut on a 3/4 in. taper. This taper is the same as standard casing thread tapers, and has proven to be the most effective .

Standard Taper Taps are plain, with no flutes and not threaded for Guides. Flutes will be provided when specified at no additional

charge. Threads will be provided on special order at extra cost for attachment of a guide or skirt and guide (or oversize guide). A thread protector is furnished when the tap is provided with skirt and guide threads .

All Bowen taper taps are bored with a generous watercourse hole. Unless otherwise specified, each tap is furnished with the connection shown in the table below.

These Taps are available either right-or left-hand, but will be furnished right-hand engaging unless otherwise specified.

## Operation

Attach the proper taper tap to the fishing string. Run it into the hole to fish depth, and establish circulation. When fish depth is reached, cease circulation and engage the fish. Apply only one point of weight or less. Slowly rotate sufficient to embed the taper tap wickers into the fish. cease rotation and pull the fish. Circulation may be resumed to add lift to the fish, if desired.

## Taper Taps Specifications

| Nominal Size       | Outside Diameter | To Catch   | Total Length | Diameter Smallest Wicker | Diameter Largest Wicker | Complete Assembly |         |
|--------------------|------------------|--|--------------|--------------------------|-------------------------|-------------------|---------|
|                    |                  |  |              |                          |                         | Part No.          | Weight  |
| 5/8 in. S.R.       | 1 1/2 in.        | 1/2 in. I.D. - 1 in. I.D.  | 16 in.       | 3/8 in.                  | 1 1/4 in.               | 25939             | 11 lbs  |
| 3/4 in. S.R.       | 1 3/4 in.        | 5/8 in. I.D. - 1 1/4 in. I.D.                                    | 18 in.       | 1/2 in.                  | 1 1/2 in.               | 14458             | 12 lbs  |
| 1 13/16 in. F.J.   | 1 13/16 in.      | 3/4 in. I.D. - 1 3/8 in. I.D.                                    | 18 in.       | 5/8 in.                  | 1 5/8 in.               | 15247             | 15 lbs  |
| 1 in. EUE          | 1.9 in.          | 1 in. Pipe   | 18 in.       | 3/4 in.                  | 1 3/4 in.               | 25880             | 16 lbs  |
| 7/8 in. S.R.       | 2 3/16 in.       | 7/8 in. I.D. - 1 1/2 in. O.D.                                    | 20 in.       | 3/4 in.                  | 1 3/4 in.               | 14448             | 19 lbs  |
| 1 1/4 in. EUE      | 2 3/8 in.        | 1 1/4 in. Pipe   | 20 in.       | 7/8 in.                  | 1 7/8 in.               | 25881             | 20 lbs  |
| 2 3/8 in. EUE      | 3 1/16 in.       | 2 3/8 in. O.D. Pipe and CPL                                      | 23 in.       | 1 3/8 in.                | 2 3/8 in.               | 25882             | 23 lbs  |
| 2 3/8 Reg.         | 3 1/8 in.        | 2 3/8 in. API Reg. T.J.  | 23 in.       | 5/8 in.                  | 1 5/8 in.               | 15233             | 24 lbs  |
| 2 3/8 I.F.         | 3 3/8 in.        | 2 3/8 in. API, API I.F., HYD., I.F. T.J.                         | 23 in.       | 1 3/8 in.                | 2 3/8 in.               | 15234             | 31 lbs  |
| 2 7/8 in. Reg.     | 3 3/4 in.        | 2 7/8 in. API Reg. T.J.  | 23 in.       | 7/8 in.                  | 1 7/8 in.               | 19487             | 36 lbs  |
| 2 7/8 in. I.F.     | 4 1/8 in.        | 2 7/8 in. Pipe, API I.F., HYD., I.F. T.J.                        | 23 in.       | 1 3/4 in.                | 2 3/4 in.               | 19488             | 41 lbs  |
| 3 1/2 in. Reg.     | 4 1/4 in.        | 3 1/2 in. API Reg. T.J.  | 29 in.       | 1 in.                    | 2 1/2 in.               | 19489             | 56 lbs  |
| 3 1/2 in. F.H.     | 4 3/8 in.        | 3 1/2 in. Pipe, API F.H., T.J.                                   | 29 in.       | 1 1/8 in.                | 3 1/8 in.               | 19490             | 70 lbs  |
| 3 1/2 in. I.F.     | 4 3/4 in.        | 3 1/2 in. I.F. T.J., 3 1/2 in. Pipe                              | 29 in.       | 2 3/16 in.               | 3 11/16 in.             | 19491             | 82 lbs  |
| 4 1/2 in. Reed D.S | 5 in.            | 4 1/2 in. Reed D.S. T.J.   | 29 in.       | 2 3/16 in.               | 3 13/16 in.             | 25883             | 90 lbs  |
| 4 in. F.H.         | 5 1/4 in.        | 4 in. API F.H. T.J.  | 32 in.       | 2 3/16 in.               | 3 15/16 in.             | 25884             | 96 lbs  |
| 4 1/2 in. Reg.     | 5 1/2 in.        | 4 1/2 in. API Reg. T.J.  | 32 in.       | 1 3/4 in.                | 3 3/8 in.               | 19492             | 105 lbs |
| 4 1/2 in. F.H.     | 5 3/4 in.        | 4 in. I.F. T.J., 4 in. Pipe, 4 1/2 in. F.H. T.J., 4 1/2 in. Pipe | 32 in.       | 2 5/8 in.                | 4 1/4 in.               | 19493             | 120 lbs |
| 4 1/2 in. X.H.     | 6 in.            | 4 1/2 in. X.H. T.J.  | 32 in.       | 2 7/8 in.                | 4 1/2 in.               | 25885             | 126 lbs |
| 4 1/2 in. I.F.     | 6 1/8 in.        | 4 1/2 in. I.F. T.J., 4 1/2 in. Pipe                              | 32 in.       | 3 1/4 in.                | 4 3/4 in.               | 19494             | 132 lbs |
| 5 1/2 Reg.         | 6 3/4 in.        | 5 1/2 in. or 5 5/16 in. Reg. T.J.                                | 34 in.       | 2 1/4 in.                | 4 in.                   | 15240             | 164 lbs |
| 5 1/2 F.H.         | 7 in.            | 5 1/2 in. or 5 5/16 in. F.H. T.J. or Pipe                        | 34 in.       | 3 3/8 in.                | 5 3/8 in.               | 15241             | 186 lbs |
| 5 1/2 I.F.         | 7 3/8 in.        | 5 1/2 in. or 5 5/16 in. I.F. T.J. or Pipe                        | 34 in.       | 4 1/4 in.                | 6 in.                   | 15242             | 198 lbs |
| 6 3/8 in. Reg.     | 7 3/4 in.        | 6 3/8 in. API Reg., T.J.   | 34 in.       | 3 in.                    | 4 3/4 in.               | 15243             | 215 lbs |
| 6 3/8 in. F.H.     | 8 in.            | 6 3/8 in. API I.F., F.H. and Pipe                                | 34 in.       | 4 3/8 in.                | 6 3/8 in.               | 15244             | 242 lbs |



## How to Order

- Specify:
- (1) Number of assembly
  - (2) Size of fish to be caught
  - (3) Top connection, size and type

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# HYDRAULIC ROD JAR

Instruction Manual 4010



PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

Hydraulic Rod Jar



# Hydraulic Rod Jar

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## Hydraulic Rod Jar

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*Sixteenth printing, March 2006*



**General Description**

**Bowen® Hydraulic Rod Jars** provide a means for dependable, controlled jarring whenever required in sucker rod operations where electrical continuity or circulation is not required. A simple hydraulic system, comparable to the well known Bowen® Hydraulic Rotary Jar, is employed in the Bowen® Hydraulic Rod Jar which permits the operator to control the intensity of the blow within very wide ranges. The Bowen® Hydraulic Rod Jar can be controlled to deliver a light blow or a very hard blow.

**Use**

Bowen® Hydraulic Rod Jars may be used in any sucker rod operation that does not require electrical continuity or circulation to the tools or equipment below the jar. These operations would include fishing jobs and other related services.

**Explanation of Mechanism**

The Bowen® Hydraulic Rod Jar consists essentially of a sliding Mandrel within a hydraulic chamber. When the jar is in the closed position, an integral piston on the lower end of the Mandrel rests in the Middle Body cylinder of restricted clearance.

When an upward strain is taken on the string, the Top Sub and Mandrel are pulled upward with respect to the Body Assembly. The Piston, moving upward within the cylinder, is impeded by the hydraulic fluid.

The hydraulic fluid, now under pressure from the Piston, tries to flow from above the Piston to below but is restricted in its flow by the extremely narrow annular passage between the Piston and the cylinder wall. This very close fit retards the fluid flow, delaying the completion of the jarring stroke until a sufficient strain has been taken on the string to produce a blow of the required intensity.

As soon as the Piston passes from the restricted cylinder into the enlarged cylinder, the fluid resistance ceases. The Top Sub and Mandrel travel upward at greatly accelerated speed until the Piston strikes the Mandrel Body, transmitting a jarring force proportional to the strain taken on the string.

After the jarring stroke, slacking off the string allows the Bowen® Hydraulic Rod Jar to close. A one-way Check Valve in the Piston permits free passage of the fluid on the closing stroke.

The Jar will deliver full torque in the string while in the open or closed position.

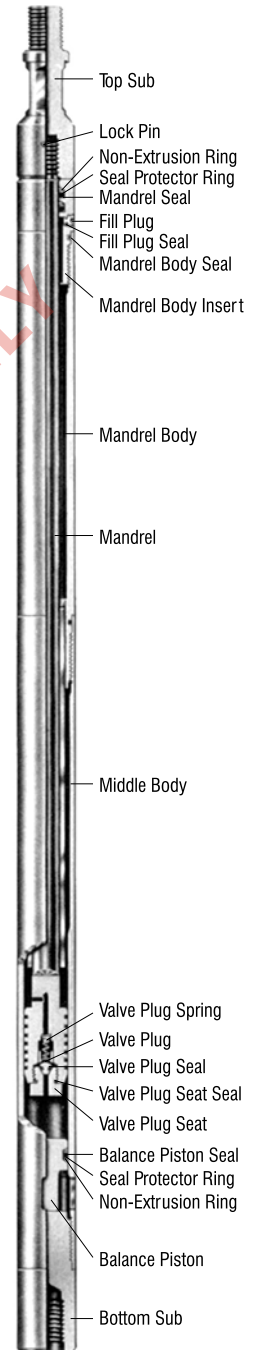
A sliding Balance Piston near the lower end of the Middle Body provides the volume equalization necessary to the functioning of the Jar's hydraulic system. Bowen® patented Seal Ring Assemblies prevent any leakage around the Balance Piston. A Bowen® Seal is located in the Mandrel Body Insert sealing off the Mandrel. Each Bowen® Hydraulic Rod Jar is provided with a fishing neck on the Top Sub.

**Operation**

The Bowen® Hydraulic Rod Jar is made up in the string just above the tools or equipment to be run.

The assembled tools are run into the well on the sucker rod in the normal manner and the fish or equipment is engaged.

An upward strain is taken on the string by pulling upward. Then set the string and wait for the jar to strike a blow. After the jar has struck, slack off sufficiently to allow the jar to close; then repeat the jarring by pulling another strain on the string. The frequency of blows struck may be as rapid as the operator can pick up and slack off the running string.



**Hydraulic Rod Jar**

To increase the intensity of the jarring blow, take a greater strain on the string. To lessen the intensity of the jarring blow, take a lighter strain on the string. Bowen® Hydraulic Rod Jars are run into and out of the well on sucker rods just like any other Rod tool. No special precautions are necessary. Zero point or measurement reference should take into account the length of the stroke of the jar; this information is given in the Specification Table.

High temperature seals are available for high temperature service.

### Disassembly

1. Secure the jar in a suitable vise at the Middle Body.
2. Remove the Bottom Sub from the Middle Body.
3. Remove Fill Plug from the Mandrel Body Insert, allowing oil to drain from Jar.
4. Back off Mandrel Body Insert from Mandrel Body.
5. Back off Mandrel Body from Middle Body.
6. Withdraw assembly of Top Sub, Mandrel Body Insert, Mandrel Body, Mandrel and Piston from Middle Body.
7. Remove Balance Piston from Middle Body by forcing it out the bottom with a dowel rod.
8. Remove Middle Body from vise.
9. Secure the Mandrel Assembly in the vise, anchoring it by the Top Sub.
10. Unscrew Valve Plug and remove Check Valve Assembly from the Piston.

11. Using a drift punch, remove the Lock Pin from the Top Sub. Back off and remove Mandrel from the Top Sub.

**CAUTION: Use a wrench only on the wrench flats provided. Any gouges or upsets on the finished Mandrel surface will cause loss of seals and leakage of fluid.**

12. Slide Mandrel Body Insert and Mandrel Body off over the threaded end of the Mandrel. **NOTE: Clamp the Mandrel Body Insert in a vise and remove the Insert Bushing from it (where applicable.)**

13. Remove all O-Ring Seals, Seal Protector and Non-Extrusion Rings.

### Reassembly

All parts should be thoroughly cleaned, then lubricated with a lightweight oil. Carefully examine the Non-Extrusion Rings and Seal Protector Rings for any damage. If damaged, they should be replaced with new rings. Remove any burrs or nicks on Non-Extrusion Rings with a small hand file.

1. Insert Non-Extrusion Rings into their beveled grooves in the Mandrel Body Insert and on the Balance Piston. Make sure that the bevel of the ring matches the bevel of the grooves. Press firmly into place with the thumbs.
2. Insert Seal Protector Rings on the inside surface of each Non-Extrusion Ring. Press and straighten into place with the thumbs.
3. Insert O-Rings between or next to the Seal Protector Ring.
4. After Seal Ring Assemblies have been properly positioned, set them in place by using the proper Setting Tool and tapping the Setting Tool around its periphery.

5. Insert O-Ring on Mandrel Body Insert. Screw the Insert Bushing into the Mandrel Body Insert (where applicable). Make up Mandrel Body Insert in Mandrel Body.

6. Slide Mandrel Body Insert and Mandrel Body carefully over threaded end of the Mandrel.

7. Secure the Top Sub in a vise, then make up Mandrel to the Top Sub using the wrench flats provided.

8. Insert the Lock Pin into the Top Sub and through the mandrel end. Drive it in with a light hammer until it is flush with the Top Sub OD.

9. Install Check Valve Assembly in the Piston on the end of the Mandrel.

10. Make up Middle Body to Mandrel Body. Insert Fill Plug in the Mandrel Body Insert. Remove from vise.

11. Secure assembly in the vise in a vertical position with the Top Sub down and the jar in its open position or at the top of its stroke.

12. Pour an approved ISO grade 22 hydraulic oil into the Middle Body until the oil overflows through the equalizing holes. **NOTE: If heavier jarring blows are desired, the Jar may be filled with a heavier weight oil.**

13. Place Balance Piston into Middle Body.

14. Make up the Bottom Sub to the Middle Body hand tight.

15. Place assembly in a horizontal position in the vise with the Fill Plug up. Remove the Fill Plug. Tighten the Bottom Sub.

16. Close the Jar slowly. When completely closed, insert the Fill Plug.

### Testing

The Jar can best be tested for operation by making up a lifting type sub with a bail (or equivalent) to the Top Sub. Make up another sub to the Bottom Sub to which an 850 lb. weight can be attached.

Obtain a dead weight of approximately 850 lbs. The usual method is to hang the Jar on a 2,000 lb. minimum capacity hoist, with the weight suspended from the Bottom Sub of the Jar. The hoist is slacked off until the weight rests on the floor and the Jar closes. The Jar and weight are then hoisted rapidly until the weight is raised off the floor by a height equal to the stroke of the Jar, less 1 or 2 inches. As soon as the load is lifted, begin checking the time required for the Jar to stroke open.

The chart below lists approximate time lapse for standard Rod Jars, under a fixed pull load.

#### Hydraulic Rod Jar Load and Time Recommendations

| Jar O.D. | Load in lbs | Time Required to Stroke |
|----------|-------------|-------------------------|
| 1-1/2    | 850         | 1 min to 2 min          |
| 1-3/4    | 850         | 1-1/2 min to 2-1/2 min  |
| 2-1/8    | 850         | 2 min to 3 min          |

**CAUTION:** This method should not be employed using a hoist of less than 1 ton (2,000 lb.) capacity, as there is danger of damage to the hoist or injury to operating personnel if the hoist is too light.

If leaks are detected at the seals, or if the Jar is low on fluid, the tool should be disassembled for repair.

### Bowen® Hydraulic Rod Jars Strength Data and Recommended Tightening Torque

| Jar Assembly Number | O.D. (in) | Top Sub to Mandrel | Tightening Torque (ft-lbs)            |                                     |                             |                           | Strength Data                       |   |                   |
|---------------------|-----------|--------------------|---------------------------------------|-------------------------------------|-----------------------------|---------------------------|-------------------------------------|---|-------------------|
|                     |           |                    | Insert Bushing to Mandrel Body Insert | Mandrel Body Insert to Mandrel Body | Mandrel Body to Middle Body | Middle Body to Bottom Sub | Max. Recommended Jarring Load (lbs) | Calculated Max. Lift Load After Jarring @ Yield Point (lbs) | Calculated Torque |
| 28591               | 1-1/2     | 75                 | —                                     | 210                                 | 210                         | 300                       | 9,200                               | 37,500  | 150               |
| 79316               | 1-3/4     | 135                | 230                                   | 390                                 | 390                         | 440                       | 15,500                              | 54,500  | 270               |
| 13570               | 2-1/8     | 325                | —                                     | 690                                 | 690                         | 800                       | 21,000                              | 92,500  | 650               |

The above makeup torques are the maximum recommended makeup torques for each connection and are set at 50% of the calculated theoretical yield torque.

The above tensile strength is a calculate theoretical yield point and is considered accurate to ± 20%.

### Hydraulic Rod Jar Specifications and Replacement Parts

|                   |          |          |        |        |
|-------------------|----------|----------|--------|--------|
| Outside Diameter  |          | 1-1/2    | 1-3/4  | 2-1/8  |
| Connections       |          | 15/16    | 3/4    | 7/8    |
|                   |          | 10 Thd   | SR     | SR     |
| Total Stroke (in) |          | 8-3/16   | 10     | 11-1/8 |
| Length Closed     |          | 38-15/16 | 42-3/8 | 64-1/8 |
| Complete Assembly | Part No. | 28591    | 79316  | 13570  |
|                   | Weight   | 17       | 22     | 39     |

### Replacement Parts

|   |          |        |        |        |
|---|----------|--------|--------|--------|
| Top Sub                                   | Part No. | 10761  | 12761  | 11543  |
|   | Weight   | 1-3/4  | 2      | 4      |
| Mandrel Body Insert                       | Part No. | 28594  | 79317  | 10723  |
|   | Weight   | 1-1/4  | 1-1/2  | 3      |
| Mandrel Body                              | Part No. | 28593  | 12763  | 13572  |
|   | Weight   | 4      | 4-1/2  | 7      |
| Mandrel                                   | Part No. | 28592  | 79318  | 13571  |
|   | Weight   | 5      | 6      | 11-1/2 |
| Middle Body                               | Part No. | 11182  | 12765  | 11537  |
|   | Weight   | 5      | 5-1/2  | 8-1/2  |
| Balance Piston                            | Part No. | 11185  | 12766  | 11540  |
|   | Weight   | 1/2    | 1/2    | 1/2    |
| Bottom Sub                                | Part No. | 11181  | 12767  | 11536  |
|   | Weight   | 1-1/2  | 1-3/4  | 3-1/2  |
| Valve Plug                                | Part No. | 11189  | 11189  | 11189  |
|   | Weight   | 1/4    | 1/4    | 1/4    |
| Valve Plug Spring                         | Part No. | 834    | 834    | 834    |
|   | Weight   | 1/100  | 1/100  | 1/100  |
| Valve Plug Seat                           | Part No. | 11186  | 11186  | 11186  |
|   | Weight   | 1/8    | 1/8    | 1/8    |
| Mandrel Non-Extrusion Ring<br>(2 Req'd.)  | Part No. | 365-15 | 365-17 | 365-21 |
|   | Weight   | 1/8    | 1/8    | 1/8    |
| Mandrel Seal Protector Ring<br>(2 Req'd.) | Part No. | 375-15 | 375-17 | 375-21 |
|   | Weight   | 1/16   | 1/16   | 1/32   |
| Balance Piston Non-Extrusion Ring         | Part No. | 366-16 | 366-20 | 366-24 |
|   | Weight   | 2      | 2      | 4      |
| Balance Piston Seal Protector Ring        | Part No. | 82-16  | 82-20  | 82-24  |
|   | Weight   | 2      | 2      | 4      |
| Fill Plug                                 | Part No. | 617    | 617    | 329    |
|   | Weight   | 1/8    | 1/8    | 1/8    |
| Lock Pins                                 | Part No. | 13432  | 18183  | 42732  |
|   | Weight   | 1/16   | 1/16   | 1/8    |
| Insert Bushing                            | Part No. | —      | 79319  | —      |
|   | Weight   | —      | 1/2    | —      |

### Hydraulic Rod Jar Specifications and Replacement Parts

|                   |          |       |       |       |
|-------------------|----------|-------|-------|-------|
| Complete Assembly | Part No. | 28591 | 79316 | 13570 |
|-------------------|----------|-------|-------|-------|

#### Replacement Parts (Continued)

|                                  |          |        |        |          |
|----------------------------------|----------|--------|--------|----------|
| O-Ring Packing Set               | Part No. | 32679  | 79328  | 13573    |
| Consists of:                     | Weight   | 1/8    | 1/8    | 1/8      |
| Mandrel Seal (2 Req'd.)          | Part No. | 568210 | 568212 | 568216   |
|                                  | Weight   | 1/32   | 1/32   | 1/32     |
| Balance Piston Seal              | Part No. | 568211 | 568215 | 568219   |
|                                  |          |        |        | 2 Req'd. |
|                                  | Weight   | 1/32   | 1/32   | 1/32     |
| Mandrel Body Insert - Small Seal | Part No. | —      | —      | 568221   |
|                                  | Weight   | —      | —      | 1        |
| Mandrel Body Insert - Large Seal | Part No. | 568215 | 568218 | 568223   |
|                                  | Weight   | 1/32   | 1/32   | 1/32     |
| Middle Body Seal                 | Part No. | 568215 | 568218 | 568223   |
|                                  | Weight   | 1/32   | 1/32   | 1/32     |
| Valve Plug Seal                  | Part No. | 568007 | 568007 | 568007   |
|                                  | Weight   | 1/32   | 1/32   | 1/32     |
| Fill Plug Seal                   | Part No. | 568005 | 568005 | 568006   |
|                                  | Weight   | 1/32   | 1/32   | 1/32     |
| Valve Plug Seat Seal             | Part No. | 568112 | 568112 | 568112   |
|                                  | Weight   | 1/32   | 1/32   | 1/32     |

#### Accessories - Extra

|                                  |          |          |          |          |
|----------------------------------|----------|----------|----------|----------|
| Jar Service Kit                  | Part No. | 11178    | 15997    | 11554    |
|                                  | Weight   | 14       | 15       | 17       |
| Mandrel Body Setting Tool        | Part No. | 22709-15 | 22709-17 | 22709-21 |
|                                  | Weight   | 3/4      | 1        | 1-1/2    |
| Balance Piston Stem Setting Tool | Part No. | 22729-16 | 22729-20 | 22729-24 |
|                                  | Weight   | 3/4      | 1        | 1-1/2    |

NOTE: Setting Tools are included in the Jar Service Kit, but may be purchased separately, if desired.

#### How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Size and type of connections, if other than standard

#### RECOMMENDED SPARES:

- (1) 1 Balance Piston
- (2) 1 Valve Plug
- (3) 3 Valve Plug Springs
- (4) 1 Valve Plug Seat
- (5) 4 Mandrel Non-Extrusion Rings
- (6) 4 Mandrel Seal Protector Rings
- (7) 4 Balance Piston Non-Extrusion Rings
- (8) 4 Balance Piston Seal Protector Rings
- (9) 2 Fill Plugs
- (10) 6 O-Rings Complete Packing Sets
- (11) 1 Jar Service Kit

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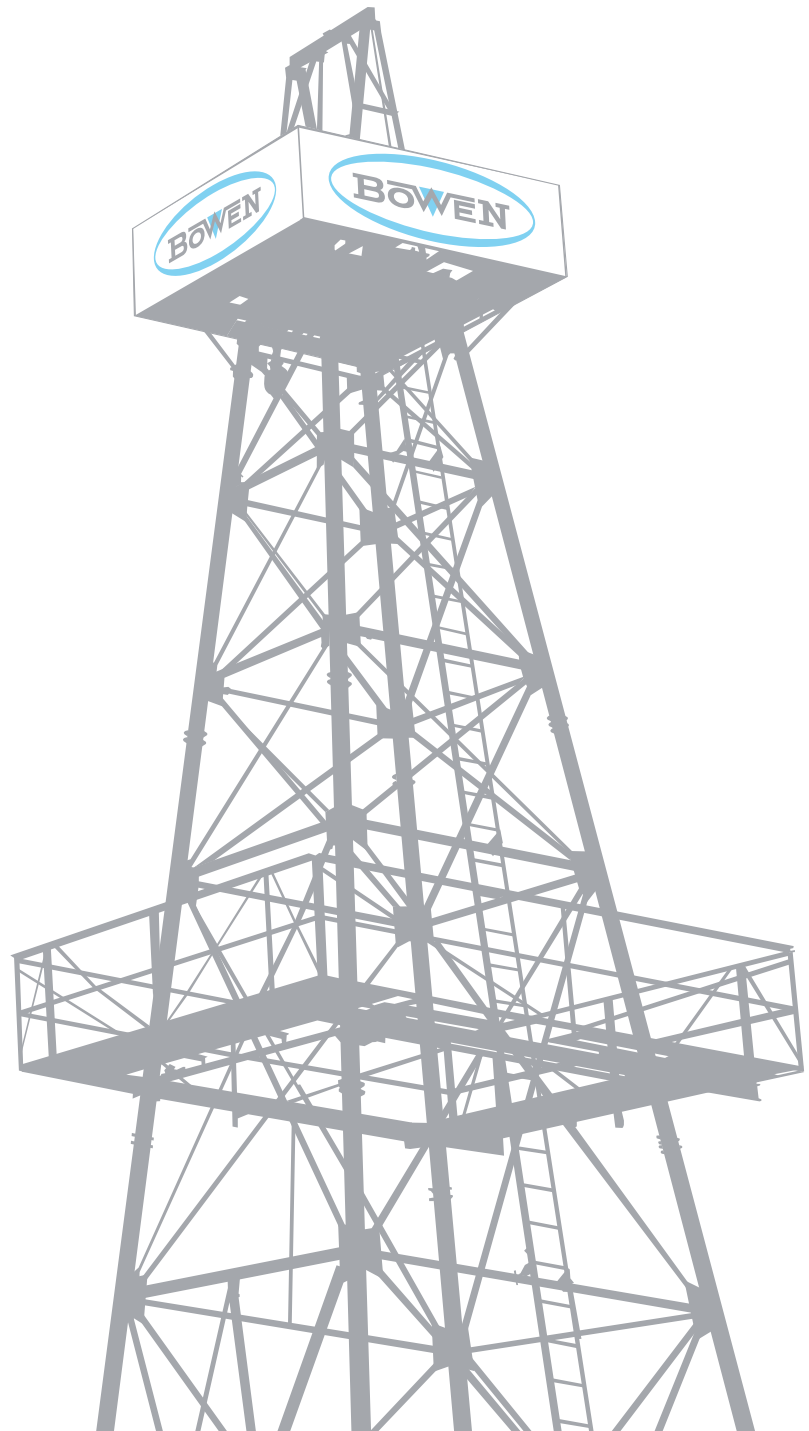
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# Bowen Type Z Oil Jars

Instruction Manual 4065



**Bowen | NOV**

# Bowen Type Z Oil Jars

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV In., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.



## General Description

The Bowen™ Type Z oil jar is easy to use and operate, allowing you to positively control each blow to deliver a light or heavy impact. The straight-pull operated jar maintains full circulation for effective flushing and uses full torque in either direction. Offering a wide range of jarring blow intensity, this jar may be used for fishing, testing, coring, reaming, light drilling, side tracking, and other washover operations.

No setting or adjustment is required before going in the hole, or after the fish has been engaged. This tool does not interfere with the free operation of fishing tools, formation testers, safety joints, reversing tools, etc. The Bowen Type Z Oil Jar is designed to permit the operator to easily and simply control the intensity of the jarring blow within a wide range, from a very light impact to a blow of very high impact.

Because of the jar's closed hydraulic system, the hydraulic fluid within the jar cannot escape and well fluids cannot enter the tool. The hydraulic fluid within the tool constantly lubricates the internal working parts, thus promoting long wear life of the parts.

The unique impact control of the Bowen hydraulic jar is made possible by the metering action of the patented piston assembly. As pull is applied to the jar, fluid is metered from one cavity to another through this piston assembly. By being forced through a restricted passage, the fluid is retarded in such a manner that the stroke is delayed until the operator has ample time to take the necessary stretch in the running string (and intensifier, when it is used) to strike a blow of given impact.

An important feature of the Bowen Type Z oil jar is the ease of closing or resetting the tools. Overcoming friction only requires a few hundred pounds of weight. Closing does not cause damage to the tool, since the metering action does not take place during re-setting.

During re-setting, large ports are opened in the piston assembly, allowing unimpeded flow of fluid from one cavity to the other.

Other important features are: The ability to transmit full torque at all times during operation in either direction; your ability to control the intensity of the blow of the jar at will without prior adjustment and to deliver a rapid series of blows when desired, the only limitation being the time required to raise and lower the fishing string the short distance required to make each stroke.

## Use Fishing

When using the Bowen Type Z oil jar in fishing operations, install it immediately below a string of drill collars. See the chart on page 18 for approximate weights of collars. For maximum effectiveness of jarring, install a Bowen jar intensifier in the fishing string. The intensifier should be located in the fishing string about four drill collars above the jar.

## Formation Testing

The Bowen Type Z oil jar is commonly used in drill stem testing, since the jar does not interfere with the testing equipment and does not cause the test to be lost when jarring becomes necessary. The packing used in the Bowen jar withstands much higher pressures than would be encountered in drill stem testing.

In drill stem testing, three to fifteen drill collars are usually installed just above the jar, depending on conditions of operation. A Bowen jar intensifier used in conjunction with the jar permits the use of fewer drill collars.

When an open-hole or hook-wall packer sticks enough to require jarring, one or two moderate blows is usually sufficient to loosen the packer. The hook-wall packer sticks less often than the open-hole type, but requires heavier jarring action to release it.

## Coring

The Bowen Type Z oil jar is often run just above a diamond core barrel. As in drill stem testing, from three to fifteen drill collars are placed in the string just above the jar. Breaking a core without a jar in the string often requires taking considerable pull load in the drill pipe. When a jar is in the string, moderate pull load is all that is required to deliver a comparatively light blow which is usually sufficient to break the core.



Figure 1  
Jar in Closed Position

# Bowen Type Z Oil Jars

## Construction

The Bowen Type Z oil jar consists essentially of a mandrel-piston assembly which slides within a cylinder assembly. Refer to the illustrations on pages 3 and 5.

The mandrel-piston assembly is composed of a mandrel (or top sub), piston assembly, washpipe, knocker and seal ring assemblies.

The cylinder assembly is composed of a mandrel body, middle body, washpipe body, fill plugs and seal assemblies.

The patented seal assemblies, which are located in high differential pressure areas, are composed of a standard o-ring seal, a seal protector ring and a non-extrusion ring. Where the seal is subject to high pressure in both directions, two seal protectors and two non-extrusion rings are utilized with the o-ring seal. Refer to the illustration on Page 10.

The piston assembly is composed of a piston, (2) piston rings, a seal, a non-extrusion ring and a seal protector ring.

When the piston is properly assembled in the jar, the piston is located between the shoulders of the Washpipe upper end and the knocker or mandrel lower end. The piston must be assembled with its o ring seal (i.d.) nearest its upper end and the by-pass relief ports above the piston rings. The seal non-extrusion ring will be located below the seal, toward the washpipe.

During the operation, the piston rings will always be in contact with the bore of the middle body. The piston rings are free to move up and down a short distance in

the grooves of the piston. During the pull stroke, the piston rings are forced down against the bottom of their grooves, forming a positive metal-to-metal seal, while the O.D. of the piston rings are sealed against the bore of the middle body. The piston assembly is thus sealed against the flow of fluid from the upper cavity to the lower cavity, except through the gaps left in each piston ring through which the fluid is metered by design.

As the fluid meters through the piston rings, the piston-mandrel assembly moves slowly upward with relation to the body parts, until the piston reaches a point in the middle body which has a series of internal splines (grooves) which suddenly allow unobstructed flow of fluid, bypassing the piston assembly. This comparatively unimpeded flow of fluid allows the piston to move upward at a continuously accelerating velocity, until the knocker strikes the bottom of the mandrel body, delivering the desired, sharp impact blow. During the impeded portion of the pull stroke (before the free-stroke is reached), the operator will have ample time to apply sufficient strain to the running string to strike a blow of the desired intensity.

When the piston-mandrel assembly is lowered to reset the tool to deliver another blow, the piston rings move up-ward in their grooves, exposing a series of by-pass relief ports in the piston, which permits a comparatively unrestricted flow of fluid from the lower to the upper cavity. The tool can thus be reset with very little resistance.



Figure 2  
Piston Has Just  
Cleared Cylinder

Figure 3  
Jar in Open  
Position

## Operation

Prior to use, carefully examine the Bowen Type Z oil jar to assure that it is properly assembled and filled with hydraulic fluid. Test the tool in a Bowen jar tester if one is available to assure proper performance.

Check the threaded connections between the mandrel body and middle body, and between the middle body and washpipe body to assure that they are made up as tightly as the joints in the running string. Do not tong on the threaded connections; tong at least 4 inches from the joint.

Assemble the jar in the string below the drill collars to be used. We recommend running a Bowen jar intensifier with the jar for maximum effectiveness; particularly in shallow, very deep or crooked holes. When the intensifier is run, it should be located in the string about four drill collars above the jar.

**NOTE: See Instruction Manual No. 4019 for recommended weights to be run with Bowen jar intensifier.**

To strike the initial blow, raise the string sufficiently enough to take a stretch to produce the required impact; set the brake, and wait for the jar to hit. The first blow may take from a few seconds to several minutes, depending on circumstances. The variables are depth of operation, amount of stretch

in the string, whether an accelerator is used, downhole temperature and mechanical condition of the hole.

For example, when a crooked hole prevents a uniform stretch over the entire string, it is impossible

to exert as much pull at the jar as would be exerted if the hole were straight.

Use caution in applying pull load to the jar, taking care to not exceed the safe working load for the particular jar being used. Especially on the first pull, the tendency is to speed the action by applying additional load. Determine the maximum safe working load for the jar (refer to the Calculated Strength Chart, next to last column, on page 18) and never exceed this load during operation.

The velocity and relative impact load of the blow are controlled by the amount of stretch taken in the running string and the weight of the drill collars installed above the jar.

After a stroke has been made, it is only necessary to close the jar and then to take the necessary stretch in the string to strike the next blow. Several blows per minute, at any desired intensity, may be struck, even in a crooked hole.

**CAUTION: The jar will usually be brought out of the hole in the open position. It should be closed, taken from the string and laid on the derrick floor. Once closed, the jar should not be left suspended from the elevators, especially with any appreciable weight suspended below it. The jar can open, dropping the length of its travel and may cause damage to the rig or injury to a crewman.**

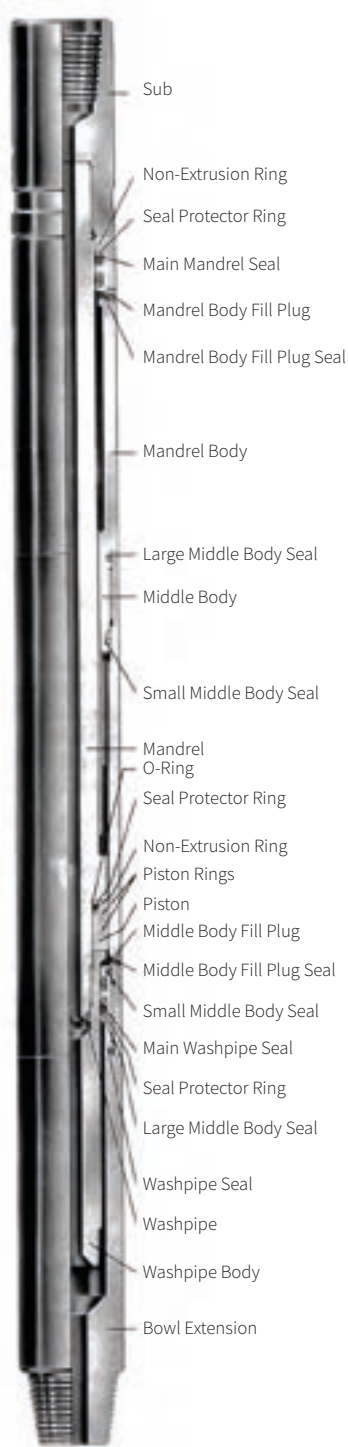
Operational difficulties are sometimes encountered by operators, some of which are listed below along with corrective procedures.

1. If not able to hit the first blow:
  - a. Pull up to the desired stretch in the string and set the brake. Hold this position until the jar strikes its blow.
  - b. Increase the tension in the running string if possible, but do not exceed the allowable working load on the jar.
2. If unable to hit the second blow, lower the string farther, as the jar is probably not closing sufficiently.
3. If the time required for the jar to strike seems excessive, do not lower the string quite as far as on the previous pull. This will prevent the jar from closing completely. Also, if the piston ring gap is plugged by contaminated oil, the jar would hit too hard or not pull open at all. This would require that the jar be taken from the hole, disassembled, cleaned and refilled with clean oil.
4. If the blows being struck are not as heavy as desired:
  - a. Be sure that the jar is fully closed.
  - b. Pull the running string up faster.
  - c. Increase the number of drill collars installed above the jar.
  - d. Install a jar intensifier above the drill collar.
5. If the jar still does not hit hard enough:
  - a. The piston rings may be worn excessively requiring replacement of the rings.
  - b. The seals of the tool may be damaged, requiring you to remove the jar from the hole, disassemble it, replace all sealing elements, clean the jar, and fill it with clean oil.

## Before Running in Hole

Check both connections shown in Figure 6. These joints should be as tight as the tool joints in the string.

# Bowen Type Z Oil Jars



**Figure 4**  
 Sub Type  
 Jar



**Figure 5**  
 Integral  
 Mandrel Jar

## Rig Floor Maintenance

After moderate use on a short job and when the jar is to be kept at the rig site, it will require only minor maintenance, which in most cases may be done on the rig floor.

Immediately after removal from the fishing string, flush all mud from the bore especially in the washpipe body and around the washpipe. The mandrel seal surface should be cleaned, well-greased to prevent rust, and then the jar should be pushed into the closed position until its next use.

Before storing, coat box and pin threads with Bowen Itcolube (anti-gall grease) to prevent corrosion and to aid make-up in next use. The jar should be stored with the mandrel end up or horizontally on a suitable rack.

## Dressing Area Maintenance

After prolonged and/or hard use, take the Bowen Type Z oil jar to an adequate dressing area, then disassemble, clean, and inspect it. Repair as required and reassemble.

### Complete Disassembly

1. Secure the jar in a pipe vise at approximately the center of the middle body.

**CAUTION: Do not remove the fill plugs until the tool is fully disassembled. The possibility of trapped residual pressure exists and can cause possible damage or injury.**

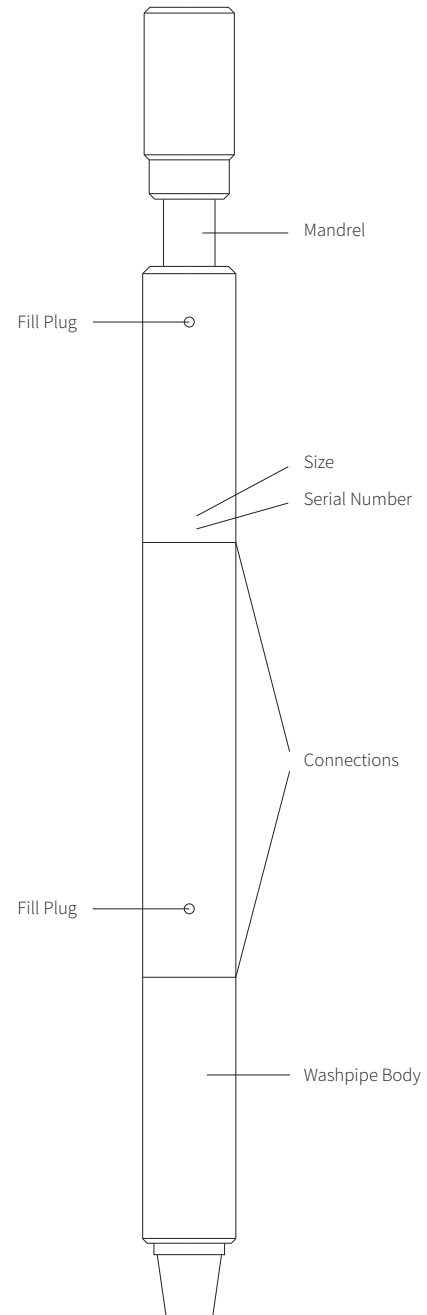
2. Break the connections at the washpipe body and the mandrel body.
3. Place an open-mouthed container below the joint of the washpipe body.

4. Back off the washpipe body until the oil runs out of the tool, past the threads, allowing the oil to drain into the open container. This oil should not be re-used in the jar. Remove the washpipe body and lay it aside.

**CAUTION: The washpipe body must be secured firmly during removal due to the possibility of trapped residual pressure.**

5. Re-clamp the tool on the mandrel body.
6. Loosen and remove the washpipe. Place the wrench only on the wrench surface provided at the lower (small) end of the washpipe.
7. Remove the middle body, allowing the oil to drain in a container.
8. Remove the piston. If necessary, drive the blade of a thin screwdriver between the upper end of the piston and the knocker or mandrel shoulder to loosen the piston. Take care not to mar the parts in doing this.
9. Loosen and remove the knocker, using the wrench flats provided.
10. Re-clamp the tool on the tool joint end of the mandrel.
11. Slide the mandrel body off the mandrel and lay it aside.
12. Remove the seal from the small (washpipe) end of the mandrel.

13. Unclamp the mandrel from the vise and lay it aside. Use care in handling to prevent marring or denting the mandrel seal surface.



# Bowen Type Z Oil Jars

## Piston Ring Removal

Using piston ring pliers (see Figure 7), carefully spread each ring at the gap until their inner diameters are larger than the piston O.D. and lift them off. **Do not spread more than necessary. Excessive spreading may distort the rings.**

14. Remove the two seals from the O.D. of the mandrel body and from the washpipe body.

15. Remove the two seal assemblies from the inside upper end of the mandrel body. To remove upper end of the mandrel body. To remove these seals, proceed as follows: Using either a 625 (or 626) tool, or a bent screwdriver, carefully insert the tip of the blade between the o-ring and the seal protector ring. Then lift out the o-ring, taking care to not damage or mar the seal protector rings or non-extrusion rings. Do not run the tool around the groove under the rings, which tends to mar the groove by scratching the surface. Refer to figure 8.



Figure 7  
Piston ring removal



Figure 8  
Seal assembly removal

16. With the o-ring removed, visually examine the seal protector rings and non extrusion rings for any indication of damage, burrs or advanced wear. Remove any such damaged rings. If the seal protector rings and non-extrusion rings are in good condition, they need not be removed.

17. Check the similar seal assemblies in the washpipe body and the piston seal body.

18. Carefully clean all the disassembled parts with solvent and wipe them dry with a lint-free, clean cloth, then thoroughly oil all the parts with a good grade of light, clean oil.

19. Check all parts for defects. Examine the polished surfaces for pits or scratches. Any abrasions on these surfaces will damage the o-ring seals, resulting in loss of fluid during the operation of the tool. Any rough, shallow pits, or burrs, may be removed by use of fine emery cloth. Parts with major pits or

deep scratches and grooves must be replaced.

20. Check the splines on the mandrel and in the mandrel body for burrs or upsets. Upsets may be carefully ground away with a grinder or a small hand file and afterwards polished with emery cloth.

21. Examine the middle body bore for signs of scratches or galls. Minor damage of this nature may be smoothed out with emery cloth, or if very minor, may be disregarded. Any deep scratches in the smooth bore of the middle body will render it unfit for further service.

22. Carefully examine the piston. Polish off any abrasions, nicks, galls or burrs at the outer diameter, inner diameter, or faces. Use a small hand file or emery cloth. Any damage to the piston ring seating surface will render the piston unusable.

23. Carefully check the tool joint threads for nicks or burrs, removing any found.

24. Remove the fill plugs and install new fill Plug o-ring seals on the fill plugs.

## Complete Reassembly Non-Extrusion Ring Assemblies

Prior to assembly, the parts should all be thoroughly cleaned, dried and oiled, after which, the Bowen non-extrusion seal ring assemblies should be installed in the mandrel body; washpipe body and piston seal body. Refer to the following step-by-step sequence of illustrations.

1. Non-extrusion rings are first installed, with their beveled faces conforming to the beveled surfaces of the seal ring groove. The seal protector rings are next installed, being first slightly deformed to permit entry into the body. Once in place the seal protector rings are straightened and flattened by use of tool No. 625. After the non-extrusion rings and seal protector rings are in place, the rubber o-ring is inserted into the middle of the assembly between the two seal protector rings. The complete assembly is then properly set with a ring setting tool.

**NOTE: Some newer non-extrusion rings made from black reinforced nylon will not require a setting tool.**

2. After the non-extrusion ring seal assemblies have been installed in the mandrel body, secure the mandrel horizontally in a vise, clamping on the tool joint end.
3. Assemble the seal in the groove at the lower end of the mandrel.
4. Slide the mandrel body over the mandrel with its seal end toward the tool joint (up), using care to prevent any damage to the seal assemblies. rotate the mandrel body until the splines in the mandrel body align with those on the mandrel and slide the mandrel body all the way up to the face of the mandrel ring. Assemble the two o-rings and the seal protector and non extrusion

ring on the outer diameter of the mandrel body lower end.

- Use Bowen Itcolube on all threads to aid make up and next break out. Screw the knocker on the mandrel lower end and buck it up tight. The knocker is provided with wrench flats. Avoid wrenching on the ends or major outside diameters of the knocker. Remove any burrs or steel slivers which may be produced by wrenching. This is important; if these burrs or slivers are allowed to enter the tool and come loose, they may cause great damage to the tool, or plug the by-pass orifice of the piston, preventing it from operating.

- Assemble the piston rings on the piston as follows:

## Piston Ring Installation

Most of these rings have a slight bevel on the O.D. which makes one side appear wider than the other. The wide side should always be toward the seal face (see Figure 26).

Position the piston so the bypass relief holes in the grooves are up. Position the gap of each ring in piston ring pliers (see Figure 7) with the narrow side up (see Figure 25). Spread gap until ring I.D. is slightly more than piston O.D. and lower into appropriate groove.

Assemble the piston on the mandrel. Slide the assembled piston on the mandrel with the seal assembly and thinner inside wall up toward the knocker (or knocker shoulder). Refer to Figure 26. Use caution to assemble the piston properly; it can be

assembled upside-down, but if so, it will not function.

- Screw the washpipe onto the bottom of the mandrel. Using the wrench surface at the lower end of the washpipe, buck it up tightly.

## Note: Excessive torque on the Washpipe on small, thin Jars can distort the Piston.

The jar piston rings effect a metal-to-metal seal against the middle body cylinder. When strain is taken, and fluid under pressure tries to flow from above the piston to below, it is restricted in its flow to the ring gaps. This builds up a sufficient strain, enabling a blow of desired intensity to be struck.

However, when resetting for another stroke, relatively unrestricted movement is made possible by the jar's unique one-way by-pass system. On the closing stroke, fluid flowing from below the piston to above opens the by-pass relief ports, permitting unobstructed fluid flow and thus easy re-entry of the piston into its cylinder.

- Slide the middle body over the mandrel-washpipe assembly and screw it onto the mandrel body. Be sure the larger I.D. is uppermost and the fill plug end is down. Tighten the middle body.
- Assemble the seals on the O.D. of the washpipe, screw it into the middle body, and tighten it up.

## Filling the Jar

We recommend Bowen Part Number 49842 hydraulic oil, but you can use any ISO grade 22 hydraulic oil that has the required properties, such as Sunvis 722 or Rando HD22.

## Filling Procedure

The jar may be filled in either the open or closed position but open is usually more convenient. To fill, place the jar in a pipe vise loosely, allowing the washpipe to drop down until the jar is resting at approximately a 30° angle. The mandrel body fill plug hole should be on the upper side of the tool. Attach the volume hose to the middle body, Body fill plug hole and its opposite end to the volume pump. Attach the exhaust hose to the mandrel body fill plug hole and drop its free end into the filler opening of the volume pump.

Operate the hand pump at moderate speed. Hydraulic fluid will enter the tool, forcing the piston rings to travel far enough to open the bypass ports, allowing unimpeded flow of oil into the tool.

Occasionally the jar will pump open if it is being filled in a closed position during this time but this is normal and no cause for alarm.

Continue pumping at a moderate speed. As the jar fills, you will see oil will flow out through the exhaust hose. Continue pumping slowly until all air bubbles cease to appear in the outflowing oil. When all air bubbles cease, detach the exhaust hose with fittings and immediately insert the mandrel body fill plug. Do not over tighten this plug.

Place the jar back in a level position in the vise and rotate until the middle body fill plug is on

the upper side of the tool. Detach the volume hose and immediately insert and tighten the middle body fill plug.

If the jar was filled in the open position, it should be closed prior to transporting it and running it in the hole. In most instances, the jar may be closed by one or two men pushing on the mandrel by hand. A very large jar may require the application of several hundred pounds of weight while in vertical position. The jar may readily be closed at the well head by applying the weight of the drill string.

## Testing the Jar

After the jar has been completely assembled, it should be tested in a Bowen jar tester if one is available.

To proof load test a jar in a Bowen jar tester. Use the chart on page 16 as a guide and use the following procedure:

- Using the accompanying chart as a guide, set the pull of the jar tester to the figure shown in the chart under "Low Pull" heading. This pull is found in the horizontal column adjacent to the jar as listed by symbol number.
- Actuate the jar in the pull stroke. Observe the movement of the jar during this time to assure that it is opening properly. Movement should be slow but steady without any jerks or stops. If the jar does not open as required, it is permissible to close the jar and start the pull stroke again.

# Bowen Type Z Oil Jars

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3. If the jar still does not pull completely through its stroke without stopping, the low pull load may be set 2,000 lbs. higher than shown in the chart and the test repeated. If this test is not successful, the jar should be redressed to eliminate possible contaminated hydraulic oil or anything which might contribute to excessive friction.
4. Repeat low pull Test 4 to 6 times to assure uniform action.
5. Reset the jar tester to 20% above the maximum load listed in the chart under Testing Pull Load lbs.
6. Test pull the jar 8 to 10 times, recording the load of each pull, and use the average.
7. If the average actual load requirement for the stroke does not exactly match the loads shown, it should not be alarming. These listed loads are a median for most jars but they all vary somewhat. They should be considered as a nominal figure and are meant only as a guide.
8. Carefully inspect the tool for any leaks during the testing pull, particularly around the mandrel seals and the mandrel body fill plug.



Figure 25  
Piston ring installation



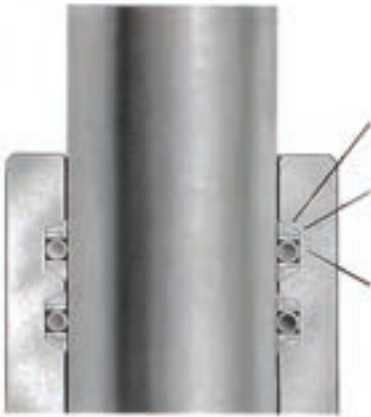


Figure 9  
This illustration shows the location of parts of the Patented *Bowen* seal ring assembly.



Figure 10  
Hold the non-extrusion Ring between thumbs and forefingers as shown.



Figure 11  
Overlap the ends until the diameter is small enough to fit inside the body.



Figure 12  
Place edge of ring opposite the split into the lower groove and spread from center towards ends. Be sure the beveled side of the ring matches the beveled groove side.

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Figure 13  
Using thumbs, press ring into groove until ends match up and ring is firmly seated in the groove.



Figure 14  
Ring is shown before being bent. It will look like this after it is properly installed in the groove.



Figure 15  
Bend the ring until it is small enough to allow entry into bore.



Figure 16  
Insert one edge into the groove. Then insert the opposite edge and press down until the entire ring is in place.

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Figure 17  
Use a seal protector ring Installation Tool to straighten and flatten the ring by pressing against the ring as shown.



Figure 18  
O-ring packing before installation.



Figure 19  
Bend the o-ring as shown to insert into the groove.



Figure 20  
Insert o-rings between seal protection rings in each groove.

# Bowen Type Z Oil Jars

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Figure 21  
Use this setting tool from the accessory kit to seat the ring seal assemblies after installation. (Not required with black nylon rings.)



Figure 22  
The above illustration shows the o-ring seal assemblies in place in the mandrel body. The setting tool is shown in position as it is being driven into the bore to conform the copper rings to proper bore size.



Figure 23  
Insert the setting tool as shown. Use any convenient rod or bar to hold the tool.



Figure 24  
Drive in as shown and tap several times around the periphery of the tool to set the rings. Continue until both ring assemblies are seated. Then remove the tool and continue assembly of the sub.

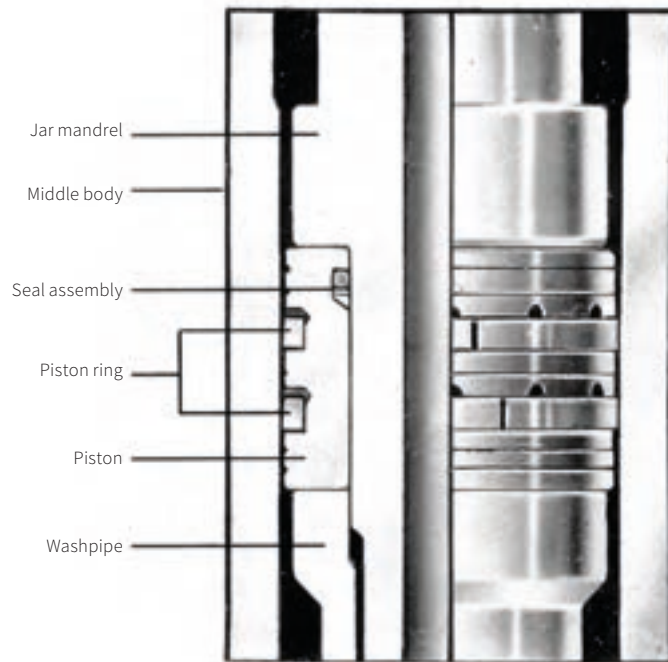
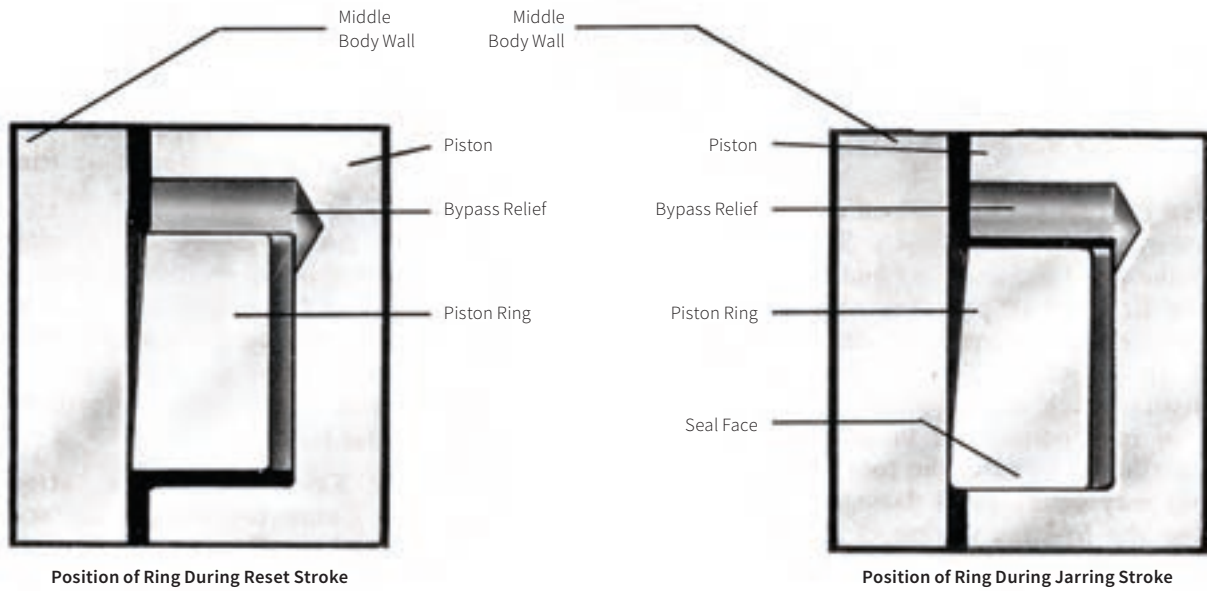


Figure 26  
Piston ring installation

# Bowen Type Z Oil Jars

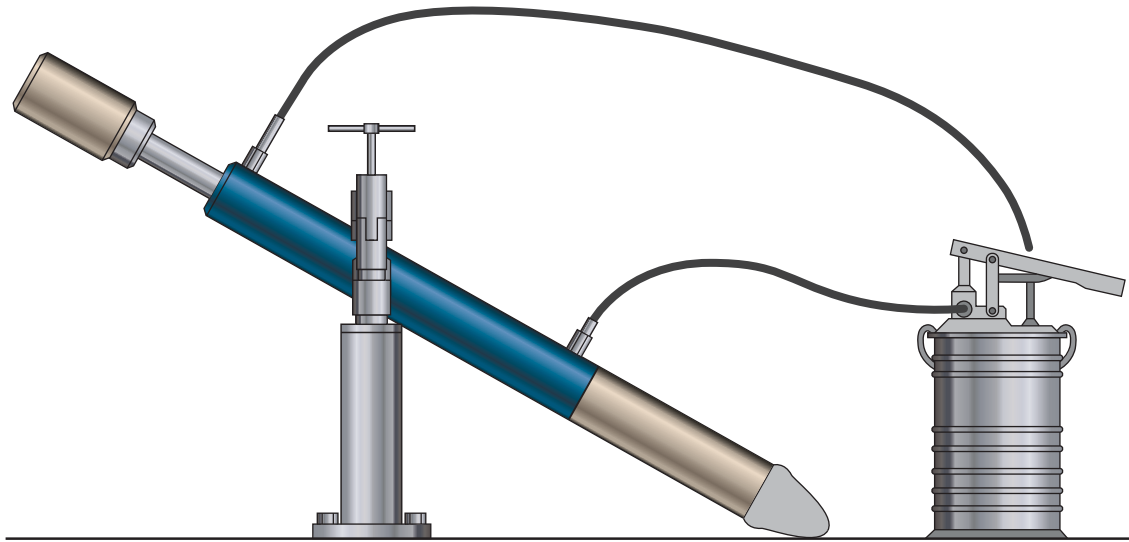


Figure 27 - Filling the Jar

## Recommended Test Loads for Bowen Type Z Hydraulic Jars

| Jar Assembly No. | Jar Size        | O.D.        | I.D.        | Testing Pull Load*       | Allowable Load - Jarring in Hole | Low Pull   |
|------------------|-----------------|-------------|-------------|--------------------------|----------------------------------|------------|
| 70822            | 1 in. M.T.      | 1 5/8 in.   | 1/4 in.     | 5,000 lbs – 8,500 lbs    | 15,400 lbs                       | 4,000 lbs  |
| 74723            | 1 13/16 in. WFJ | 1 13/16 in. | 5/16 in.    | 6,000 lbs – 10,000 lbs   | 18,000 lbs                       | 4,000 lbs  |
| 54020            | 1 1/4 in. REG   | 2 1/4 in.   | 3/8 in.     | 7,200 lbs – 12,000 lbs   | 21,000 lbs                       | 4,000 lbs  |
| 68010            | 2 3/8 in. PH-6  | 2 29/32 in. | 1 in.       | 12,600 lbs – 19,000 lbs  | 35,400 lbs                       | 6,000 lbs  |
| 55670            | 2 3/8 in. EUE   | 3 1/8 in.   | 1 1/2 in.   | 12,000 lbs – 16,000 lbs  | 27,800 lbs                       | 6,000 lbs  |
| 52504            | 2 3/8 in. REG   | 3 1/8 in.   | 1 in.       | 15,000 lbs – 23,000 lbs  | 32,400 lbs                       | 7,000 lbs  |
| 52528            | 2 3/8 in. IF    | 3 3/4 in.   | 1 1/2 in.   | 15,000 lbs – 26,000 lbs  | 46,000 lbs                       | 8,000 lbs  |
| 52497            | 2 3/8 in. EUE   | 3 3/4 in.   | 1 7/8 in.   | 15,000 lbs – 26,000 lbs  | 46,500 lbs                       | 8,000 lbs  |
| 52506            | 2 3/8 in. REG   | 3 3/4 in.   | 1 1/4 in.   | 18,000 lbs – 26,000 lbs  | 56,500 lbs                       | 8,000 lbs  |
| 52502            | 2 7/8 in. IF    | 4 1/4 in.   | 1 15/16 in. | 18,000 lbs – 28,000 lbs  | 46,700 lbs                       | 8,000 lbs  |
| 52653            | 2 7/8 in. EUE   | 4 1/2 in.   | 2 3/8 in.   | 18,000 lbs – 28,000 lbs  | 49,000 lbs                       | 8,000 lbs  |
| 52530            | 3 1/2 in. FH    | 4 3/4 in.   | 1 1/2 in.   | 28,000 lbs – 45,000 lbs  | 85,000 lbs                       | 10,000 lbs |
| 52500            | 3 1/2 in. FH    | 4 3/4 in.   | 2 in.       | 28,000 lbs – 45,000 lbs  | 74,500 lbs                       | 10,000 lbs |
| 52498            | 4 1/2 in. FH    | 6 in.       | 2 in.       | 41,000 lbs – 62,000 lbs  | 136,400 lbs                      | 10,000 lbs |
| 52544            | 4 1/2 in. IF    | 6 1/4 in.   | 2 1/4 in.   | 55,000 lbs – 80,000 lbs  | 159,000 lbs                      | 12,000 lbs |
| 52680            | 5 1/2 in. REG   | 6 3/4 in.   | 2 3/8 in.   | 62,000 lbs – 110,000 lbs | 172,800 lbs                      | 12,000 lbs |
| 52711            | 6 in. REG       | 7 3/4 in.   | 3 1/8 in.   | 63,000 lbs – 100,000 lbs | 149,000 lbs                      | 12,000 lbs |
| 66346            | 7 in. REG       | 9 in.       | 3 3/4 in.   | 80,000 lbs – 120,000 lbs | 214,000 lbs                      | 14,000 lbs |

\* These figures are based on a Tester speed of 2.50 feet per minute.

Full speed to reach maximum allowable load, approximately 6 1/2 feet per minute. \*\* See calculated strengths table for warnings and notes.

## Recommended Tightening Torque

### Bowen Type Z Oil Jars - Maximum Recommended Tightening Torque for Threaded Connections

| Jar Assembly No. | Jar O.D. x I.D.         | Top Sub to Mandrel | Knocker to Mandrel | Mandrel to Washpipe | Mandrel Body Insert to Mandrel Body | Mandrel Body to Middle Body | Middle Body to Washpipe Body |
|------------------|-------------------------|--------------------|--------------------|---------------------|-------------------------------------|-----------------------------|------------------------------|
| 70822            | 1 1/8 in. x 1/4 in.     | 130 ft-lb          | —                  | 80 ft-lb            | 320 ft-lb                           | 150 ft-lb                   | 270 ft-lb                    |
| 74723            | 1 13/16 in. x 3/16 in.  | 170 ft-lb          | —                  | 100 ft-lb           | —                                   | 350 ft-lb                   | 520 ft-lb                    |
| 54020            | 2 1/4 in. x 3/8 in.     | —                  | 30 ft-lb           | 150 ft-lb           | —                                   | 900 ft-lb                   | 1,050 ft-lb                  |
| 68010            | 2 29/32 in. x 1 in.     | 1,130 ft-lb        | —                  | 800 ft-lb           | —                                   | 1,950 ft-lb                 | 2,070 ft-lb                  |
| 55670            | 3 1/16 in. x 1 1/2 in.  | 1,100 ft-lb        | —                  | 690 ft-lb           | —                                   | 2,100 ft-lb                 | 2,100 ft-lb                  |
| 52504            | 3 1/8 in. x 1 in.       | —                  | 200 ft-lb          | 690 ft-lb           | —                                   | 2,030 ft-lb                 | 2,030 ft-lb                  |
| 52506            | 3 3/4 in. x 1 1/4 in.   | —                  | 300 ft-lb          | 1,140 ft-lb         | —                                   | 3,820 ft-lb                 | 3,820 ft-lb                  |
| 52528            | 3 3/4 in. x 1 1/2 in.   | 2,670 ft-lb        | —                  | 890 ft-lb           | —                                   | 3,570 ft-lb                 | 3,570 ft-lb                  |
| 52497            | 3 3/4 in. x 1 7/8 in.   | 1,490 ft-lb        | —                  | 410 ft-lb           | —                                   | 3,570 ft-lb                 | 3,570 ft-lb                  |
| 52502            | 4 1/4 in. x 1 15/16 in. | —                  | 500 ft-lb          | 1,880 ft-lb         | —                                   | 4,960 ft-lb                 | 4,960 ft-lb                  |
| 52653            | 4 1/2 in. x 2 3/8 in.   | —                  | 500 ft-lb          | 1,930 ft-lb         | —                                   | 5,580 ft-lb                 | 5,580 ft-lb                  |
| 52530            | 4 3/4 in. x 1 1/2 in.   | —                  | 700 ft-lb          | 2,130 ft-lb         | —                                   | 9,770 ft-lb                 | 9,210 ft-lb                  |
| 52500            | 4 3/4 in. x 2 in.       | —                  | 500 ft-lb          | 2,010 ft-lb         | —                                   | 9,750 ft-lb                 | 8,600 ft-lb                  |
| 52498            | 6 in. x 2 in.           | —                  | 2,200 ft-lb        | 4,990 ft-lb         | —                                   | 17,530 ft-lb                | 17,160 ft-lb                 |
| 52544            | 6 1/4 in. x 2 1/4 in.   | —                  | 2,000 ft-lb        | 5,460 ft-lb         | —                                   | 20,340 ft-lb                | 20,340 ft-lb                 |
| 52680            | 6 3/4 in. x 2 3/8 in.   | —                  | 1,900 ft-lb        | 7,260 ft-lb         | —                                   | 24,330 ft-lb                | 24,330 ft-lb                 |
| 52711            | 7 3/4 in. x 3 1/16 in.  | —                  | 3,200 ft-lb        | 11,680 ft-lb        | —                                   | 32,020 ft-lb                | 32,010 ft-lb                 |
| 66346            | 9 in. x 3 3/4 in.       | —                  | 6,200 ft-lb        | 21,540 ft-lb        | —                                   | 57,760 ft-lb                | 46,130 ft-lb                 |

The above make up torques are the maximum recommended make up torques for each connection. They are set at 50% of the calculated theoretical yield torque.

Torques this high are not required for all fishing jobs, and lower values will result in less wear and tear on the threads.

The tightening torques above are based on use of Itcolube or similar zinc-based grease on all threads and shoulders.

# Bowen Type Z Oil Jars

## Calculated Strengths and Collar Weight

### Warning

All jarring and pulling loads shown in this manual assume that the force is acting alone and is essentially along the major axis of the tool. If torque and tension or bending and tension are used together, the resulting combined stresses may lead to failure at subsequently less than rated loads. Rotation and bending together can lead to fatigue.

### Bowen Type Z Oil Jars – Calculated Strengths

| Jar Assembly No. | Jar Type         | Jar O.D.    | Jar I.D.    | Recommended Maximum Jarring Load | Lift Load After Jarring Tensile @ Yield | Torque @ Yield | Recommended Weight of Collars Above Jar** |
|------------------|------------------|-------------|-------------|----------------------------------|---|----------------|---|
| 70822            | Sub Type         | 1 5/8 in.   | 1/4 in.     | 15,400 lbs                       | 46,300 lbs                              | 260 ft-lbs     | 1,100 lbs - 1,450 lbs                     |
| 74723            | Sub Type         | 1 13/16 in. | 3/16 in.    | 18,000 lbs                       | 59,400 lbs                              | 340 ft-lbs     | 1,360 lbs - 1,800 lbs                     |
| 54020            | Integral Mandrel | 2 1/4 in.   | 3/8 in.     | 21,000 lbs                       | 118,500 lbs                             | 1,800 ft-lbs   | 1,560 lbs - 2,100 lbs                     |
| 68010            | Sub Type         | 2 23/32 in. | 1 in.       | 35,400 lbs                       | 194,800 lbs                             | 2,260 ft-lbs   | 2,200 lbs - 3,000 lbs                     |
| 55670            | Sub Type         | 3 1/16 in.  | 1 1/2 in.   | 27,800 lbs                       | 160,200 lbs                             | 2,200 ft-lbs   | 2,300 lbs - 3,100 lbs                     |
| 52504            | Integral Mandrel | 3 3/8 in.   | 1 in.       | 32,400 lbs                       | 229,200 lbs                             | 4,060 ft-lbs   | 2,400 lbs - 3,300 lbs                     |
| 52506            | Integral Mandrel | 3 3/4 in.   | 1 1/4 in.   | 56,500 lbs                       | 345,000 lbs                             | 7,640 ft-lbs   | 4,200 lbs - 5,700 lbs                     |
| 52528            | Sub Type         | 3 3/4 in.   | 1 1/2 in.   | 46,000 lbs                       | 299,700 lbs                             | 5,340 ft-lbs   | 3,400 lbs - 4,600 lbs                     |
| 52497            | Sub Type         | 3 3/4 in.   | 1 7/8 in.   | 46,500 lbs                       | 179,500 lbs                             | 2,980 ft-lbs   | 3,500 lbs - 4,700 lbs                     |
| 52502            | Integral Mandrel | 4 1/4 in.   | 1 15/16 in. | 46,700 lbs                       | 430,300 lbs                             | 9,920 ft-lbs   | 3,500 lbs - 4,700 lbs                     |
| 52653            | Integral Mandrel | 4 1/2 in.   | 2 3/8 in.   | 49,000 lbs                       | 375,000 lbs                             | 11,160 ft-lbs  | 3,600 lbs - 4,900 lbs                     |
| 52530            | Integral Mandrel | 4 3/4 in.   | 1 1/2 in.   | 85,000 lbs                       | 591,900 lbs                             | 18,420 ft-lbs  | 6,300 lbs - 8,500 lbs                     |
| 52500            | Integral Mandrel | 4 3/4 in.   | 2 in.       | 74,500 lbs                       | 468,800 lbs                             | 17,200 ft-lbs  | 5,600 lbs - 7,500 lbs                     |
| 52498            | Integral Mandrel | 6 in.       | 2 in.       | 136,400 lbs                      | 937,000 lbs                             | 34,320 ft-lbs  | 10,200 lbs - 13,800 lbs                   |
| 52544            | Integral Mandrel | 6 1/4 in.   | 2 1/4 in.   | 159,000 lbs                      | 917,400 lbs                             | 40,680 ft-lbs  | 11,800 lbs - 16,000 lbs                   |
| 52680            | Integral Mandrel | 6 3/4 in.   | 2 3/8 in.   | 172,800 lbs                      | 1,013,800 lbs                           | 48,660 ft-lbs  | 13,000 lbs - 17,500 lbs                   |
| 52711            | Integral Mandrel | 7 3/4 in.   | 3 1/16 in.  | 149,000 lbs                      | 1,587,900 lbs                           | 64,020 ft-lbs  | 11,000 lbs - 15,000 lbs                   |
| 66346            | Integral Mandrel | 9 in.       | 3 3/4 in.   | 214,000 lbs                      | 1,621,000 lbs                           | 92,260 ft-lbs  | 14,300 lbs - 19,600 lbs                   |

\* The above tensile strengths are calculated theoretical yield strengths and are considered accurate to ±20%.

\*\* Optimum weights can be determined only by calculation and only if sufficient well data is available.

**THESE FIGURES DO NOT CONSTITUTE A GUARANTEE, ACTUAL OR IMPLIED. THEY ARE MEANT TO SERVICE AS A GUIDE ONLY, AND APPROPRIATE ALLOWANCE MUST BE MADE IN USE AS A SAFETY FACTOR.**

Users of jars and bumper subs should be aware that milling operations may develop stresses in these tools that are more complex than the simple torsional and tensile values listed in *Bowen* strength data. If un-stabilized, the weight necessary for milling can induce bending forces that combine with torsional forces to generate very high stresses in some areas of the tool. Rotating in a deviated hole condition or with the tool in a neutral point may have the same effect. The necessity for milling is recognized and this is not intended to advise against such operations, but merely to caution the user of possible dangers when rotating under the conditions described.



# Bowen Type Z Oil Jars

## Service Kit

A service kit is necessary to properly service the intensifier. These kits are identical for every size of intensifier, so one kit may be used for any number of intensifiers. The kit does not include any seal setting tool, two of which are required for each size of intensifier. These tools must be ordered separately. They are usually stored in the service kit's metal box.



# Bowen Type Z Oil Jars

## Specifications and Replacement Parts

### Bowen Type Z Oil Jars Specifications

|                          |                          |                      |                    |                             |               |                   |                   |                  |               |                  |         |
|--------------------------|--------------------------|----------------------|--------------------|-----------------------------|---------------|-------------------|-------------------|------------------|---------------|------------------|---------|
| <b>Size Connections</b>  | 7/8 in. Sucker Rod Conn. | 1 1/16 in. Wilson FJ | 1 1/4 in. API Reg. | 2 3/8 in. PH6 5.9# Hyd. Bx. | 2 3/8 in. EUE | 2 3/8 in. API Reg | 2 7/8 in. API Reg | 2 3/8 in. API IF | 2 3/8 in. EUE | 2 7/8 in. API IF |         |
| <b>Outside diameter</b>  | 1 1/8 in.                | 1 13/16 in.          | 2 1/4 in.          | 2 29/32 in.                 | 3 1/8 in.     | 3 1/8 in.         | 3 3/4 in.         | 3 3/4 in.        | 3 3/4 in.     | 4 1/4 in.        |         |
| <b>Inside diameter</b>   | 1/4 in.                  | 5/16 in.             | 3/8 in.            | 1 in.                       | 1 1/2 in.     | 1 in.             | 1 1/4 in.         | 1 1/2 in.        | 1 7/8 in.     | 1 15/16 in.      |         |
| <b>Total stroke</b>      | 7 1/16 in.               | 7 in.                | 6 15/16 in.        | 11 7/16 in.                 | 11 9/16 in.   | 11 13/16 in.      | 11 13/16 in.      | 12 1/8 in.       | 10 3/8 in.    | 11 13/16 in.     |         |
| <b>Type jar</b>          | Sub                      | Special Sub          | Int. Mand.         | Sub                         | Sub           | Int. Mand.        | Int. Mand.        | Sub              | Sub           | Int. Mand.       |         |
| <b>Complete assembly</b> | <b>Part No.</b>          | 70822                | 74723              | 54020                       | 68010         | 55670             | 52504             | 52506            | 52528         | 52497            | 52502   |
|                          | <b>Weight</b>            | 41 lbs               | 60 lbs             | 50 lbs                      | 108 lbs       | —                 | 125 lbs           | 168 lbs          | 119 lbs       | 158 lbs          | 220 lbs |

### Replacement Parts

|   |                 |          |           |           |                   |          |           |           |           |           |           |
|---|-----------------|----------|-----------|-----------|-------------------|----------|-----------|-----------|-----------|-----------|-----------|
| <b>Top sub</b>                                | <b>Part No.</b> | 70823    | 21156     | —         | 68015             | 55889    | —         | —         | 37412     | 20156     | —         |
|   | <b>Weight</b>   | 2 lbs    | 3 lbs     | —         | 10 lbs            | 12 lbs   | —         | —         | 12 lbs    | 18 lbs    | —         |
| <b>Mandrel</b>                                | <b>Part No.</b> | 70825    | 21155     | 18780     | 68014             | 55888    | 38056     | 38041     | 37411     | 20155     | 44484     |
|   | <b>Weight</b>   | 9 lbs    | 12 lbs    | 16 lbs    | 25 lbs            | 25 lbs   | —         | —         | 29 lbs    | 34 lbs    | —         |
| <b>Piston assembly ring type standard</b>     | <b>Part No.</b> | 70853    | 74725     | 59585     | 68019             | 56368    | 61282     | 68128     | 61288     | 61285     | 68420     |
|   | <b>Weight</b>   | 3/4 lb   | 3/4 lb    | 3/4 lb    | 1 1/2 lbs         | —        | 1 1/2 lbs | 2 1/4 lbs | 1 1/2 lbs | 1 3/4 lbs | 2 1/2 lbs |
| <b>Mandrel body</b>                           | <b>Part No.</b> | 70824    | 21153     | 56571     | 68013             | 55887    | 52764     | 52770     | 52771     | 52772     | 52780     |
|   | <b>Weight</b>   | 6 lbs    | 11 lbs    | 9 lbs     | 25 lbs            | 20 lbs   | 13 lbs    | 28 lbs    | 30 lbs    | 22 lbs    | 28 lbs    |
| <b>Middle body</b>                            | <b>Part No.</b> | 70826    | 74724     | 18777     | 68012             | 55886    | 42737     | 38044     | 20152     | 20152     | 41840     |
|   | <b>Weight</b>   | 5 lbs    | 9 lbs     | 9 lbs     | 26 lbs            | 20 lbs   | 29 lbs    | 30 lbs    | 26 lbs    | 26 lbs    | 39 lbs    |
| <b>Washpipe body</b>                          | <b>Part No.</b> | 70829    | 21151     | 18776     | 68011             | 55885    | 38064     | 38045     | 37407     | 20151     | 44487     |
|   | <b>Weight</b>   | 15 lbs   | 6 lbs     | 10 lbs    | 27 lbs            | 30 lbs   | 21 lbs    | 50 lbs    | 14 lbs    | 30 lbs    | 50 lbs    |
| <b>Knocker</b>                                | <b>Part No.</b> | —        | —         | 18781     | —                 | —        | 38060     | 38049     | —         | —         | 44490     |
|   | <b>Weight</b>   | —        | —         | 4 lbs     | —                 | —        | 1 lb      | 6 lbs     | —         | —         | 5 lbs     |
| <b>Washpipe</b>                               | <b>Part No.</b> | 70828    | 21154     | 18779     | 68016             | 55890    | 42738     | 38046     | 37410     | 20154     | 44488     |
|   | <b>Weight</b>   | 2 lbs    | 1 1/2 lbs | 4 lbs     | 10 lbs            | 10 lbs   | 11 lbs    | 6 lbs     | 13 lbs    | 12 lbs    | 20 lbs    |
| <b>Mandrel body fill plug</b>                 | <b>Part No.</b> | 617T     | 689T      | 329T      | 617T              | 617T     | 329T      | 329T      | 329T      | 329T      | 329T      |
|   | <b>Weight</b>   | 2 Req'd. | 2 Req'd.  | 1/8 lb    | 1/8 lb            | 1/8 lb   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    |
| <b>Middle body fill plug</b>                  | <b>Part No.</b> | —        | —         | 689T      | 10641             | 10641    | 617T      | 617T      | 617T      | 617T      | 617T      |
|   | <b>Weight</b>   | —        | —         | 1/8 lb    | 1/8 lb            | 1/8 lb   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    |
| <b>Packing set †</b>                          | <b>Part No.</b> | 70961    | 74802     | 18793     | 68017             | 55924    | 44622     | 38048     | 37415     | 20163     | 44491     |
|   | <b>Weight</b>   | 1/4 lb   | 1/4 lb    | 1/4 lb    | 1/4 lb            | 1/4 lb   | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb    |
| <b>Mandrel non-extrusion ring (8 Req'd.)</b>  | <b>Part No.</b> | 365-16   | 365-17    | 365-24    | 365-30.5          | 364-32.5 | 365-32    | 365-35    | 365-36    | 365-36    | 365-40    |
|   | <b>Weight</b>   | 4 Req'd. | 4 Req'd.  | 4 Req'd.  | 1/8 lb (10 Req'd) | 1/8 lb   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    |
| <b>Mandrel seal protector ring (8 Req'd.)</b> | <b>Part No.</b> | 375-16   | 375-17    | 375-24    | 375-30.5          | 375-32.5 | 375-32    | 375-35    | 375-36    | 375-36    | 375-40    |
|   | <b>Weight</b>   | 4 Req'd. | 4 Req'd.  | 4 Req'd.  | 1/8 lb (10 Req'd) | 1/8 lb   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    |
| <b>Mandrel body non-extrusion ring</b>        | <b>Part No.</b> | —        | —         | 56542     | —                 | —        | —         | —         | —         | —         | —         |
|   | <b>Weight</b>   | —        | —         | 1/8 lb    | —                 | —        | —         | —         | —         | —         | —         |
| <b>Mandrel body insert</b>                    | <b>Part No.</b> | 71254    | —         | —         | —                 | —        | —         | —         | —         | —         | —         |
| <b>Mandrel body seal protector ring</b>       | <b>Part No.</b> | —        | —         | 227-27.25 | —                 | —        | —         | —         | —         | —         | —         |
|   | <b>Weight</b>   | —        | —         | 1/8 lb    | —                 | —        | —         | —         | —         | —         | —         |
| <b>Seal body</b>                              | <b>Part No.</b> | —        | 74728     | —         | 68021             | 55892    | —         | —         | —         | —         | —         |
| <b>By-pass body</b>                           | <b>Part No.</b> | —        | 74727     | —         | —                 | —        | —         | —         | —         | —         | —         |
| <b>Cone</b>                                   | <b>Part No.</b> | —        | 74726     | —         | 68020             | 55891    | —         | —         | —         | —         | —         |

#### NOTES:

- (1) Piston seals are listed with piston assemblies and packing sets and are included with both when ordered separately.
- (2) Part breakdowns of sub-assemblies are shown on following page.
- † Packing sets include all seals necessary to dress the jar. non-extrusion rings and seal protector rings are not included, and must be ordered separately.

## Specifications and Replacement Parts

### Bowen Type Z Oil Jars Replacement Parts (Continued)

|  |                   |        |        |        |         |         |         |        |         |         |         |
|--|-------------------|--------|--------|--------|---------|---------|---------|--------|---------|---------|---------|
| <b>Complete assembly</b>                 | <b>Weight</b>     | 70822  | 74723  | 54020  | 68010   | 55670   | 52504   | 52506  | 52528   | 52497   | 52502   |
| <b>Ring type piston assembly</b>         | <b>Part No.</b>   | 70853  | 74725  | 59585  | 68019   | 56368   | 61282   | 68128  | 61288   | 61285   | 68420   |
| <b>Consists of:</b>                      | <b>Weight</b>     | ¾ lb   | ¾ lb   | ¾ lb   | 1 ½ lbs | —       | 1 ½ lbs | 2 lb   | 1 ½ lbs | 2 lb    | 2 ½ lbs |
| <b>Piston</b>                            | <b>Part No.</b>   | 70827  | —      | 59586  | —       | —       | 61283   | 68127  | 61289   | 61286   | 68413   |
|  | <b>Weight</b>     | ¾ lb   | —      | ½ lb   | —       | —       | 1 lb    | 1 lb   | 1 ¼ lbs | 1 ¾ lbs | 2 ¼ lbs |
| <b>Wave spring (2 req'd.)</b>            | <b>Part No.</b>   | 66164  | —      | —      | —       | —       | —       | —      | —       | —       | —       |
|  | <b>Weight</b>     | ½ lb   | —      | —      | —       | —       | —       | —      | —       | —       | —       |
| <b>Piston ring</b>                       | <b>Part No.</b>   | —      | —      | 18783  | —       | —       | 61284   | 61287  | 61287   | 61287   | 68414   |
|  | <b>Weight</b>     | —      | —      | ½ lb   | —       | —       | ½ lb    | ½ lb   | ½ lb    | ½ lb    | ½ lb    |
|  | <b>No. Req'd.</b> | —      | —      | 2      | —       | —       | 4       | 2      | 4       | 4       | 3       |
| <b>Seal</b>                              | <b>Part No.</b>   | —      | —      | 568214 | —       | —       | 568223  | 568226 | 568228  | 568230  | 568231  |
| <b>Non-extrusion ring</b>                | <b>Part No.</b>   | —      | —      | 365-19 | 370-1.5 | 370-3.5 | 370-1   | 370-4  | 370-6   | 52495   | 370-9   |
| <b>Seal protector ring</b>               | <b>Part No.</b>   | —      | —      | 375-19 | 376-1.5 | 376-3.5 | 376-1   | 376-4  | 376-6   | 52496   | 376-9   |
| <b>Complete packing set</b>              | <b>Part No.</b>   | 70961  | 74802  | 18793  | 68017   | 55924   | 44622   | 38048  | 37415   | 20163   | 44491   |
| <b>Consists of:</b>                      | <b>Weight</b>     | —      | ¼ lb   | ¼ lb   | —       | ¼ lb    | ¼ lb    | ¼ lb   | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Main mandrel &amp; washpipe seal</b>  | <b>Part No.</b>   | 568211 | 568212 | 568219 | 568328  | 568330  | 568329  | 568332 | 568333  | 568333  | 568337  |
|  | <b>Weight</b>     | —      | ½ lb   | ½ lb   | —       | ½ lb    | ½ lb    | ½ lb   | ½ lb    | ½ lb    | ½ lb    |
|  | <b>No. Req'd.</b> | 2      | 2      | 4      | 5       | 4       | 4       | 4      | 4       | 4       | 4       |
| <b>Large middle body seal (2 Req'd.)</b> | <b>Part No.</b>   | 568216 | 568219 | 568224 | 568036  | 568038  | 568231  | 568235 | 568235  | 568235  | 568239  |
|  | <b>Weight</b>     | —      | ½ lb   | ½ lb   | ½ lb    | ½ lb    | ½ lb    | ½ lb   | ½ lb    | ½ lb    | ½ lb    |
| <b>Small middle body seal</b>            | <b>Part No.</b>   | 568214 | 568027 | 568222 | 568035  | 568036  | 568228  | 568233 | 568233  | 568233  | 568237  |
|  | <b>Weight</b>     | —      | ½ lb   | ½ lb   | ½ lb    | ½ lb    | ½ lb    | ½ lb   | ½ lb    | ½ lb    | ½ lb    |
|  | <b>No. Req'd.</b> | 2      | 3      | 3      | 4       | 3       | 3       | 3      | 3       | 3       | 3       |
| <b>Washpipe seal</b>                     | <b>Part No.</b>   | —      | 568115 | 568210 | 568224  | 568226  | 568220  | 568222 | 568224  | 568227  | 568227  |
|  | <b>Weight</b>     | —      | ½ lb   | ½ lb   | ½ lb    | ½ lb    | ½ lb    | ½ lb   | ½ lb    | ½ lb    | ½ lb    |
| <b>Mandrel body fill plug seal</b>       | <b>Part No.</b>   | 568005 | 568005 | 568006 | 568005  | 568006  | 568006  | 568006 | 568006  | 568006  | 568006  |
|  | <b>Weight</b>     | —      | —      | —      | ½ lb    | —       | —       | —      | —       | —       | —       |
| <b>Middle body fill plug seal</b>        | <b>Part No.</b>   | —      | —      | 568005 | —       | —       | 568005  | 568005 | 568005  | 568005  | 568005  |
| <b>Piston seal</b>                       | <b>Part No.</b>   | —      | —      | 568214 | —       | —       | 568223  | 568226 | 568228  | 568230  | —       |
|  | <b>Weight</b>     | —      | —      | ½ lb   | —       | —       | ½ lb    | ½ lb   | ½ lb    | ½ lb    | —       |
| <b>Back-up rings</b>                     | <b>Part No.</b>   | 8-024  | —      | —      | —       | —       | —       | —      | —       | —       | —       |
| <b>Mandrel seal</b>                      | <b>Part No.</b>   | 568015 | —      | —      | —       | —       | —       | —      | —       | —       | —       |
| <b>Mandrel body seal (2 req'd.)</b>      | <b>Part No.</b>   | 568024 | —      | —      | —       | —       | —       | —      | —       | —       | —       |
| <b>Seal body seal</b>                    | <b>Part No.</b>   | —      | 568020 | —      | 568224  | 568226  | —       | —      | —       | —       | —       |

### Optional - Extra

|                                   |                 |          |          |          |   |            |          |          |          |          |          |
|-----------------------------------|-----------------|----------|----------|----------|---|------------|----------|----------|----------|----------|----------|
| <b>Mandrel body setting tool</b>  | <b>Part No.</b> | 22709-16 | 22709-17 | 22709-24 | 22709-29.5  | 22709-32.5 | 22709-32 | 22709-35 | 22709-36 | 22709-36 | 22709-40 |
| <b>Piston setting tool</b>        | <b>Part No.</b> | —        | —        | 22709-19 | 22709-30.5  | 22709-31.5 | 22709-29 | 22709-32 | 22709-34 | 54922    | 22709-37 |
| <b>Service kit</b>                | <b>Part No.</b> | 21279    | 55403    | 55403    | Only one Service Kit is required for all sizes of tools except for 1 ½ in. O.D. size. It does not include any Seal Setting Tool, which must be ordered separately as required for each tool, at extra cost. |            |          |          |          |          |          |
|                                   | <b>Weight</b>   | 60 lbs   | 75 lbs   | 75 lbs   |   |            |          |          |          |          |          |
| <b>Hi-temp o-ring packing set</b> | <b>Part No.</b> | —        | 148845   | 148774   | —   | 148247     | 73659    | 80004    | —        | —        | 78330    |
| <b>Hydraulic jar oil</b>          | <b>Part No.</b> | 49842    | —        | —        | —   | —          | —        | —        | —        | —        | —        |

Miscellaneous o-ring seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing sets, however, will always be furnished in sealed plastic bags.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of connections, if other than standard
  - (3) Outside diameter, if other than standard
  - (4) Any spares or extras desired, by name and number



### Recommended Spare Parts:

- (1) 1 service kit
- (2) 1 washpipe
- (3) 2 piston assemblies
- (4) 16 non-extrusion rings
- (5) 16 seal protector rings
- (6) 4 mandrel body fill plugs
- (7) 4 middle body fill plugs
- (8) 8 packing sets
- (9) 1 mandrel body setting tool
- (10) 1 piston setting tool
- (11) 4 mandrel body non-extrusion rings
- (12) 4 mandrel body seal protector rings

# Bowen Type Z Oil Jars

## Specifications and Replacement Parts

### Bowen Type Z Oil Jars Specifications

|                          |                 |                  |                     |                     |                     |                     |                       |                       |                       |
|--------------------------|-----------------|------------------|---------------------|---------------------|---------------------|---------------------|-----------------------|-----------------------|-----------------------|
| <b>Size Connections</b>  |                 | 2 7/8 in.<br>EUE | 3 1/2 in.<br>API FH | 3 1/2 in.<br>API FH | 4 1/2 in.<br>API FH | 4 1/2 in.<br>API IF | 5 1/2 in.<br>API Reg. | 6 3/8 in.<br>API Reg. | 7 3/8 in.<br>API Reg. |
| <b>Outside diameter</b>  |                 | 4 1/2 in.        | 4 3/4 in.           | 4 3/4 in.           | 6 in.               | 6 1/4 in.           | 6 3/4 in.             | 7 3/4 in.             | 9 in.                 |
| <b>Inside diameter</b>   |                 | 2 3/8 in.        | 1 1/2 in.           | 2 in.               | 2 in.               | 2 1/4 in.           | 2 3/8 in.             | 3 1/16 in.            | 3 3/4 in.             |
| <b>Total stroke</b>      |                 | 12 1/4 in.       | 11 13/16 in.        | 13 5/16 in.         | 11 7/16 in.         | 14 3/8 in.          | 14 11/16 in.          | 14 3/8 in.            | 13 13/16 in.          |
| <b>Type jar</b>          |                 | Int. Mand.       | Int. Mand.          | Int. Mand.          | Int. Mand.          | Int. Mand.          | Int. Mand.            | Int. Mand.            | Int. Mand.            |
| <b>Complete assembly</b> | <b>Part No.</b> | 52653            | 52530               | 52500               | 52498               | 52544               | 52680                 | 52711                 | 66346                 |
|                          | <b>Weight</b>   | 202 lbs          | 325 lbs             | 285 lbs             | 590 lbs             | 640 lbs             | 757 lbs               | 800 lbs               | 1700 lbs              |

### Replacement Parts

|   |                 |           |           |           |           |         |           |           |         |
|---|-----------------|-----------|-----------|-----------|-----------|---------|-----------|-----------|---------|
| <b>Top sub</b>                                | <b>Part No.</b> | —         | —         | —         | —         | —       | —         | —         | —       |
|   | <b>Weight</b>   | —         | —         | —         | —         | —       | —         | —         | —       |
| <b>Piston assembly ring type standard</b>     | <b>Part No.</b> | 68421     | 55285     | 55193     | 55246     | 55212   | 55335     | 68924     | 66355   |
|   | <b>Weight</b>   | 2 3/4 lbs | 2 3/4 lbs | 3 1/4 lbs | 3 1/4 lbs | 6 lbs   | 6 1/2 lbs | 6 1/2 lbs | 70 lbs  |
| <b>Mandrel body</b>                           | <b>Part No.</b> | 52815     | 52749     | 52833     | 52834     | 52835   | 52836     | 53088     | 66354   |
|   | <b>Weight</b>   | 52 lbs    | 66 lbs    | 62 lbs    | 92 lbs    | 102 lbs | 143 lbs   | 164 lbs   | 202 lbs |
| <b>Middle body</b>                            | <b>Part No.</b> | 35853     | 25962     | 38112     | 14712     | 12372   | 11133     | 15158     | 66347   |
|   | <b>Weight</b>   | 45 lbs    | 60 lbs    | 51 lbs    | 85 lbs    | 92 lbs  | 102 lbs   | 142 lbs   | 397 lbs |
| <b>Washpipe body</b>                          | <b>Part No.</b> | 35854     | 25961     | 38111     | 14711     | 12371   | 701       | 15164     | 66350   |
|   | <b>Weight</b>   | 40 lbs    | 85 lbs    | 66 lbs    | 145 lbs   | 170 lbs | 220 lbs   | 250 lbs   | 300 lbs |
| <b>Knocker</b>                                | <b>Part No.</b> | 35857     | 25966     | 38116     | 14717     | 12377   | 11134     | 15159     | 66348   |
|   | <b>Weight</b>   | 4 lbs     | 5 lbs     | 4 lbs     | 10 lbs    | 10 lbs  | 10 lbs    | 10 lbs    | 34 lbs  |
| <b>Washpipe</b>                               | <b>Part No.</b> | 35855     | 25964     | 38114     | 14714     | 12374   | 704       | 15163     | 66349   |
|   | <b>Weight</b>   | 17 lbs    | 25 lbs    | 21 lbs    | 36 lbs    | 47 lbs  | 56 lbs    | 65 lbs    | 135 lbs |
| <b>Mandrel body fill plug</b>                 | <b>Part No.</b> | 329T      | 329T      | 329T      | 508       | 508     | 508       | 508       | 508     |
|   | <b>Weight</b>   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb  |
| <b>Middle body fill plug</b>                  | <b>Part No.</b> | 617T      | 329T      | 329T      | 329T      | 329T    | 329T      | 329T      | 508     |
|   | <b>Weight</b>   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb  |
| <b>Packing set †</b>                          | <b>Part No.</b> | 35858     | 25892     | 38120     | 14720     | 12383   | 9738      | 20980     | 66359   |
|   | <b>Weight</b>   | 1/4 lb    | 1/2 lb    | 1/2 lb    | 3/4 lb    | 3/4 lb  | 3/4 lb    | 1 lb      | 1 lb    |
| <b>Mandrel non-extrusion ring (8 Req'd.)</b>  | <b>Part No.</b> | 365-42    | 365-40    | 365-41    | 453       | 365-48  | 708       | 365-59    | 365-65  |
|   | <b>Weight</b>   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb  |
| <b>Mandrel seal protector ring (8 Req'd.)</b> | <b>Part No.</b> | 375-42    | 375-40    | 375-41    | 449       | 375-48  | 709       | 375-59    | 375-65  |
|   | <b>Weight</b>   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb  |
| <b>Non-extrusion ring</b>                     | <b>Part No.</b> | —         | —         | —         | —         | —       | —         | —         | 216-68  |
|   | <b>Weight</b>   | —         | —         | —         | —         | —       | —         | —         | 1/8 lb  |
| <b>Seal protector ring</b>                    | <b>Part No.</b> | —         | —         | —         | —         | —       | —         | —         | 227-68  |
|   | <b>Weight</b>   | —         | —         | —         | —         | —       | —         | —         | 1/8 lb  |

#### NOTES:

(1) Piston seals are listed with piston assemblies and packing sets and are included with both when ordered separately.

(2) Part breakdowns of sub-assemblies are shown on following page.

† Packing sets include all seals necessary to dress the jar. non-extrusion rings and seal protector rings are not included, and must be ordered separately.

## Specifications and Replacement Parts

### Bowen Type Z Oil Jars Replacement Parts (Continued)

|  |                   |         |         |         |           |         |         |         |         |
|--|-------------------|---------|---------|---------|-----------|---------|---------|---------|---------|
| <b>Complete assembly</b>                             | <b>Weight</b>     | 52653   | 52530   | 52500   | 52498     | 52544   | 52680   | 52711   | 66346   |
| <b>Mandrel</b>                                       | <b>Part No.</b>   | 35850   | 25965   | 38115   | 14715     | 12375   | 11131   | 15156   | 66352   |
|  | <b>Weight</b>     | 52 lbs  | 100 lbs | 74 lbs  | 200 lbs   | 200 lbs | 224 lbs | 254 lbs | 511 lbs |
| <b>Ring type piston assembly<br/>Consists of:</b>    | <b>Part No.</b>   | 68421   | 55285   | 55193   | 55246     | 55212   | 55335   | 68924   | 66355   |
|  | <b>Weight</b>     | 3 lbs   | 3 lbs   | 3 ½ lbs | 4 lbs     | 6 lbs   | 7 lbs   | 7 lbs   | 70 lbs  |
| <b>Piston</b>  | <b>Part No.</b>   | 68415   | 55286   | 55194   | 55247     | 55213   | 55339   | 68925   | 66357   |
|  | <b>Weight</b>     | 2 ¾ lbs | 2 ¾ lbs | 3 ¼ lbs | 3 ¾ lbs   | 5 ½ lbs | 6 ½ lbs | 6 ½ lbs | 48 lbs  |
| <b>Piston ring</b>                                   | <b>Part No.</b>   | 68416   | 25968   | 25293   | 1999      | 12379   | 719     | 15162   | 66356   |
|  | <b>Weight</b>     | ½ lb    | ½ lb    | ½ lb    | ½ lb      | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
|  | <b>No. Req'd.</b> | 3       | 2       | 2       | 2         | 2       | 4       | 4       | 5       |
| <b>Seal<br/>Non-extrusion ring</b>                   | <b>Part No.</b>   | 568233  | 568231  | 568232  | 568236    | 568237  | 568239  | 568426  | 568430  |
|  | <b>Part No.</b>   | 370-11  | 370-8.5 | 370-10  | 370-13.75 | 370-15  | 370-17  | 365-53  | 365-57  |
| <b>Seal protector ring</b>                           | <b>Part No.</b>   | 376-11  | 376-8.5 | 376-10  | 376-13.75 | 376-15  | 376-17  | 375-53  | 375-57  |
| <b>Complete packing set<br/>Consists of:</b>         | <b>Part No.</b>   | 35858   | 25892   | 38120   | 14720     | 12383   | 9738    | 20980   | 66359   |
|  | <b>Weight</b>     | ¼ lb    | ½ lb    | ½ lb    | ¾ lb      | ¾ lb    | ¾ lb    | 1 lb    | 1 lb    |
| <b>Main mandrel and washpipe<br/>seal (4 req'd.)</b> | <b>Part No.</b>   | 568339  | 568337  | 568338  | 568344    | 568345  | 568348  | 568432  | 568438  |
|  | <b>Weight</b>     | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb      | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Large middle body seal<br/>(2 Req'd.)</b>         | <b>Part No.</b>   | 568241  | 568241  | 568241  | 568248    | 568252  | 568256  | 568261  | 568265  |
|  | <b>Weight</b>     | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb      | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Small middle body seal<br/>(3 req'd.)</b>         | <b>Part No.</b>   | 568239  | 568239  | 568239  | 568246    | 568250  | 568254  | 568259  | 568263  |
|  | <b>Weight</b>     | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb      | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Washpipe seal</b>                                 | <b>Part No.</b>   | 568233  | 568228  | 568228  | 568234    | 568235  | 568235  | 568242  | 568246  |
|  | <b>Weight</b>     | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb      | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Mandrel body fill plug seal</b>                   | <b>Part No.</b>   | 568006  | 568006  | 568006  | 568011    | 568011  | 568011  | 568011  | 568011  |
| <b>Middle body fill plug seal</b>                    | <b>Part No.</b>   | 568005  | 568006  | 568006  | 568006    | 568006  | 568006  | 568006  | 568011  |
| <b>Piston seal</b>                                   | <b>Part No.</b>   | 568233  | 568231  | 568232  | 568236    | 568237  | 568239  | 568426  | 568430  |
|  | <b>Weight</b>     | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb      | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| <b>Middle body - mandrel body<br/>seal - small</b>   | <b>Part No.</b>   | —       | —       | —       | —         | —       | —       | —       | 568441  |
|  | <b>Weight</b>     | —       | —       | —       | —         | —       | —       | —       | ¼ lb    |

### Optional - Extra

|                                   |                 |          |   |          |             |          |          |           |          |
|-----------------------------------|-----------------|----------|---|----------|-------------|----------|----------|-----------|----------|
| <b>Mandrel body setting tool</b>  | <b>Part No.</b> | 22709-42 | 22709-40  | 22709-41 | 448         | 22709-48 | 715      | 22709-59  | 22709-6  |
| <b>Piston setting tool</b>        | <b>Part No.</b> | 22709-39 | 22709-36.5  | 22709-38 | 22709-41.75 | 54309    | 22709-45 | 22709-53  | 22709-57 |
| <b>Service kit</b>                | <b>Part No.</b> | 55403    | Only one Service Kit is required for all sizes of tools except for 1 ½ in. O.D. size. It does not include any Seal Setting Tool, which must be ordered separately as required for each tool, at extra cost. |          |             |          |          |           |          |
|                                   | <b>Weight</b>   | 75 lbs   |   |          |             |          |          |           |          |
| <b>Hi-temp o-ring packing set</b> | <b>Part No.</b> | —        | 80115   | 80005    | 148246      | 79015    | 9738/006 | 20980/006 | —        |
|                                   | <b>Weight</b>   | —        | —   | —        | —           | 147932   | —        | 20980/007 | —        |

Miscellaneous o-ring seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing sets, however, will always be furnished in sealed plastic bags.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of connections, if other than standard
  - (3) Outside diameter, if other than standard
  - (4) Any spares or extras desired, by name and number



### Recommended Spare Parts:

- (1) 1 service kit
- (2) 1 washpipe
- (3) 2 piston assemblies
- (4) 16 non-extrusion rings
- (5) 16 seal protector rings
- (6) 4 mandrel body fill plugs
- (7) 4 middle body fill plugs
- (8) 8 packing sets
- (9) 1 mandrel body setting tool
- (10) 1 piston setting tool

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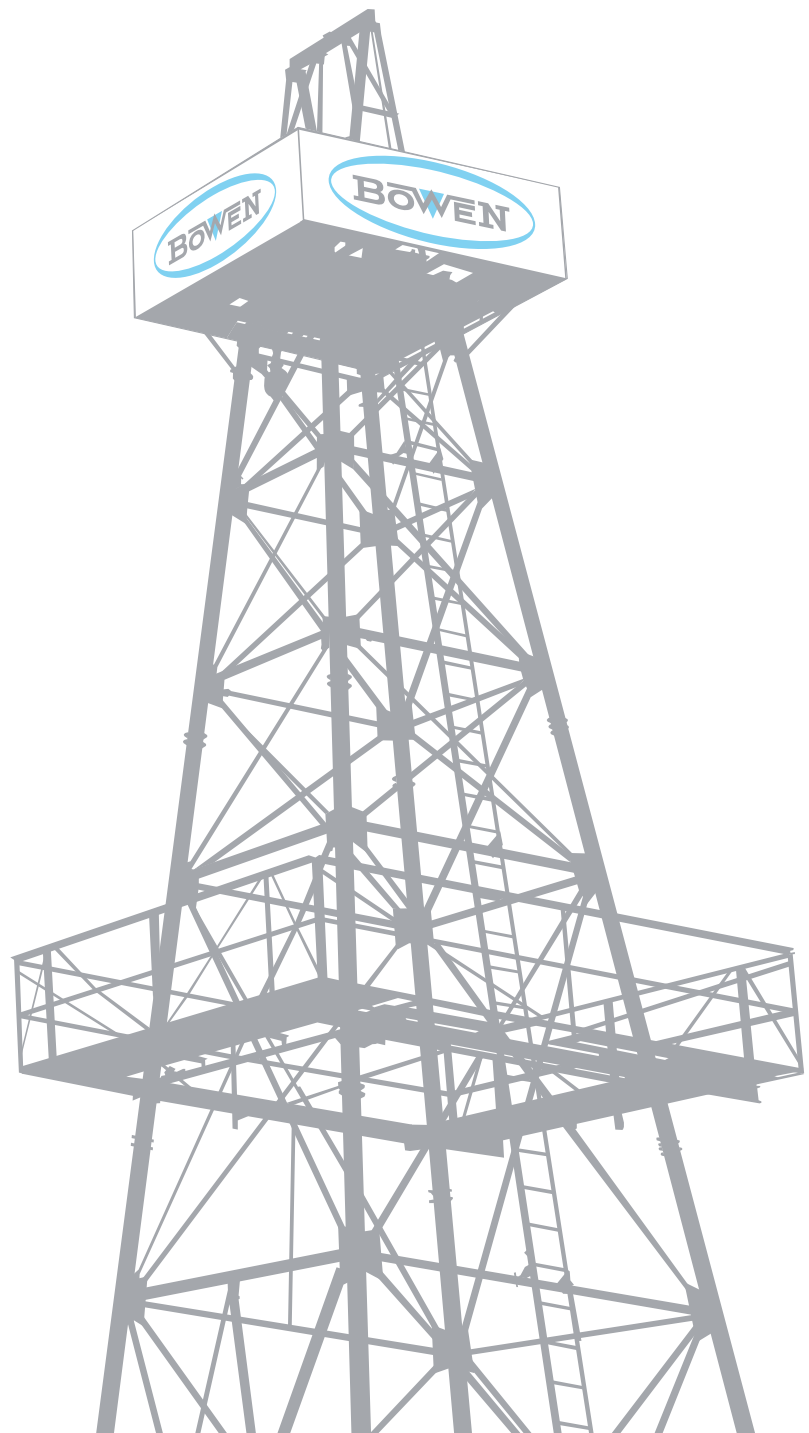
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# Bowen Super Fishing Jar

Instruction Manual 4100



**Bowen | NOV**

# Bowen Super Fishing Jar

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.



## General Description

The Bowen™ Super fishing jar is a straight-pull operated jar that is easy to assemble and requires no adjustment before you go into the hole or after you have retrieved the fish. A restricted passage slows down the fluid flow, delaying the stroke until you have ample time to take the necessary stretch in the running string.

The Bowen Super fishing jar permits you to easily and simply control the intensity of the jarring blow within a wide range, from a very light impact to a blow of very high impact. The unique impact control of the Bowen Super fishing jar is made possible by the metering action of the patented cone assembly. As pull is applied to the jar, oil is forced from one side of the cone to the other through a metering slot. By being forced through a restricted passage, the fluid flow is retarded in such a manner that the stroke is delayed until you have ample time to take the necessary stretch in the running string (and intensifier, when it is used) to strike a blow of given impact.

Another important feature of the Super fishing jar is the ease of closing or resetting. Only sufficient weight to overcome friction is required. Closing is free of any danger of causing damage to the tool, since the metering action does not take place during resetting. During resetting, large ports are opened in the cone assembly, allowing unimpeded flow of fluid from one cavity to the other.

Other important features are: The ability to transmit full torque at all times during operation, in either direction; the ability to deliver a rapid series of blows when

desired, with the only limitation being the time required to raise and lower the fishing string the short distance required to make each stroke; this tool does not interfere with the free operation of fishing tools, formation testers, safety joints, reversing tools, etc.

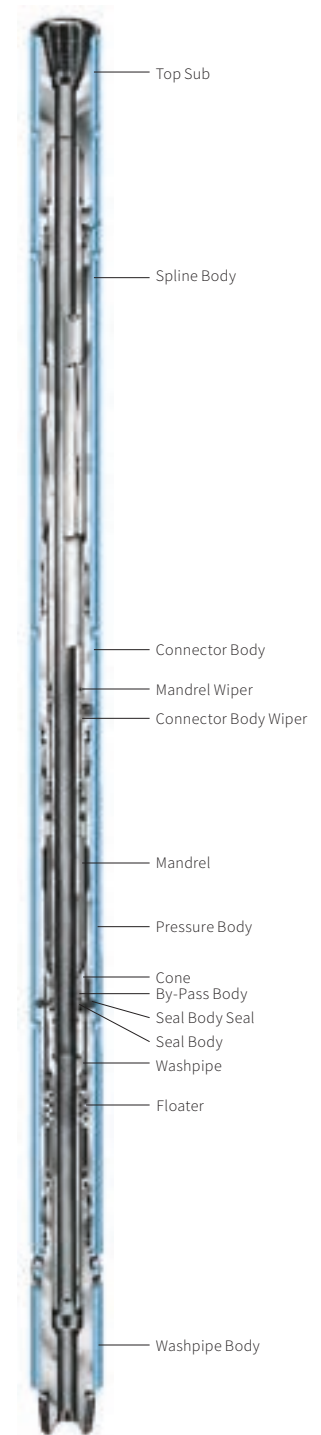
## Use Fishing

When used in fishing operations, a Bowen Super fishing jar should be installed immediately below a string of drill collars. See Chart C on page 16 for approximate weights of collars. For maximum effectiveness of jarring, a Bowen jar intensifier should be installed in the fishing string. The intensifier should be located in the fishing string about four drill collars above the jar.

## Coring

The Bowen Super fishing jar is often run just above a diamond core barrel. As in drill stem testing, from three to fifteen drill collars are placed in the string, just above the jar. Breaking a core without a jar in the string is often awkward and requires considerable pull load be taken in the drill pipe.

When a jar is in the string, moderate pull load is all that is required to deliver a comparatively light blow which is usually sufficient to break the core.



**Bowen Super Fishing Jar**

# Bowen Super Fishing Jar

## Operation

Prior to use, carefully examine the Bowen Super fishing jar to assure that it is properly assembled and filled with Bowen jar lube. Test the tool in a Bowen jar tester (or equal testing equipment) if one is available, to assure proper performance.

Check all threaded connections to assure that they are made up as tightly as the joints in the running string. (See Maximum Recommended Tightening Torque, Chart A, page 16.) Do not tong on the threaded connections; tong at least 4 in. from the joint.

Assemble the jar in the string below the drill collars. We recommend running the Bowen jar intensifier with the jar for maximum effectiveness; particularly in shallow, deep or crooked holes. When the intensifier is run, it should be located in the string about four drill collars above the jar.

**NOTE: See Bowen Instruction Manual No.4019 for recommended weights to be run with Bowen jar intensifier.**

To strike the initial blow, raise the string enough to take the stretch judged necessary to produce the required impact; set the brake, and wait for the jar to hit. The first blow may take from a few seconds to several minutes, depending on circumstances. The variables are depth of operation, amount of stretch in the string, whether an intensifier is used, downhole temperature and mechanical condition of the hole.

For example, when a crooked hole prevents a uniform stretch over

the entire string, it is impossible to exert as much pull at the jar as would be exerted if the hole were straight.

Use caution in applying pull load to the jar. Do not exceed the safe working load for the particular jar you are using. On the first pull, the tendency is to speed the action by applying additional load. Determine the maximum safe working load for the jar (Refer to Strength and Test Data Chart B on page 16), and never exceed this load during operation.

The velocity and the relative impact load of the blow is controlled by the amount of stretch taken in the running string and the weight of the drill collars installed above the jar.

After a stroke has been made, it is only necessary to close the jar and then to take the necessary stretch in the string to strike the next blow. Several blows per minute, at any desired intensity, may be struck, even in a crooked hole.

**CAUTION: The jar will usually be brought out of the hole in the open position. Perform rig floor maintenance described at right. It should be closed, taken from the string and laid on the derrick floor. Once closed, the jar should not be left suspended from the elevators, especially with any appreciable weight suspended below it. The jar can open in this position, dropping the length of its travel, and may cause damage to the rig or injury to crewmen.**

Listed below are difficulties and their corrective procedures sometimes encountered by operators:

1. If not able to hit the first blow:
  - A. Pull up to the desired stretch in the string and set the brake. Hold this position until the jar strikes its blow.
  - B. Increase the tension in the running string if possible, but do not exceed the allowable working load on the jar. Refer to Chart B on page 16.
2. If you are unable to hit the second blow, lower the string farther, as the jar is probably not closing sufficiently.
3. If the blows being struck are not as heavy as desired:
  - A. Be sure that the jar is fully closed. B. Pull the running string up faster.
  - C. Increase the number of drill collars installed above the jar.
  - D. Install a jar intensifier above the drill collar.

## Rig Floor Maintenance

After moderate use on a short job, the jar is usually kept at the rig site where it will require only minor maintenance that can usually be done on the rig floor.

Immediately after removal from the fishing string, flush all mud from the bore especially in the washpipe body and around the washpipe. Also, flush all mud from the connector body pressure balance ports on the

O.D. of the connector body. Clean the mandrel seal surface, grease it to prevent rust, and push the jar into the closed position until its next use.

Before storing, coat the box and pin threads with anti-gall grease or an approved thread lubricant such as Kopr Kote to prevent corrosion and to aid make-up in next use. Store the jar with the mandrel end up or horizontally on a suitable rack.

## Dressing Area Maintenance

After prolonged and/or hard use, take the Bowen Super fishing jar to an adequate dressing area as soon as possible, then completely disassemble it, inspect it, reassemble it, fill it with *Bowen jar lube* and test it.

Obtain the following list of tools, equipment and parts before starting dressing area maintenance:

1. Bowen vise and tong or equivalent (suitable for the jar size).
2. Overhead crane (2,000 lb. minimum capacity).
3. Pipe wrenches (suitable for the O.D.s of interior jar parts).
4. Chain wrenches (suitable for spinning on or off threaded parts. (See Figure 2, page 7).
5. Bowen V-Belt pulley assembly no. 92070 (or equal) which can be suspended from the crane to support threaded parts while spinning them on or off (See Figure 2, page 7).

6. Nylon strap (suitable for lifting and handling parts with the overhead crane without damaging the parts).
7. Bowen jar tester or equivalent (suitable for the jar size). (See Figure 1, page 6).
8. Bowen Super fishing jar service kit (See page 14 or Parts List, page 15).
9. Packing assembly sleeve (for the jar being worked on) (See Figure 6, page 11 or the Replacement Parts list on page 17).
10. Connector body wiper installation tool (for 3 1/8 in. thru 6 in. O.D. Tools) (See Figure 5, page 11 or the replacement parts list on page 17).
11. Floater positioning tool (for the size jar being worked on. See Figure 7, page 12 or the replacement parts list on page 17).
12. Complete packing set, floater and fill plugs (for the size jar being worked on. See the replacement parts list on pages 17 thru 19).
13. Thread lubricant: Kopr Kote® (P/N 153823).
14. Bowen jar lube (P/N 49842).

**CAUTION: The Bowen Super fishing jar is a hydraulic jar: therefore, close tolerances and smooth finishes are mandatory. Also, the jar must be kept free of contamination (dirt, sand, metal, etc.). Contamination left on the parts can damage them or the seals and could result in a malfunction of the jar.**

Throughout the entire disassembly, inspection and reassembly procedure, refer to the following notes:

1. For proper location of parts during disassembly and assembly procedures, item numbers in parenthesis will correspond to Figures 3 and 4 on pages 8 and 9. Item numbers in parenthesis, part numbers, part names, and number of parts required are shown under specifications and replacement parts on pages 17, 18, and 19.
2. On the replacement parts list, major parts are listed in the order that they are assembled; other parts are listed below the major part that they go in or on.
3. Top (upper end) and bottom (lower end) will refer to the ends of the jar as it is run in a fishing string. The jar is run with the mandrel (11) and top sub (16) up and the washpipe body (48) down.
4. To prevent damaging parts during servicing, DO NOT use the vice, tongs, wrenches or chains over the fill plug (42) holes, on any of the seal surfaces or on any of the other smooth surfaces.

## Complete Disassembly

Before reading this section, read Dressing Area Maintenance on page 4.

For proper location of parts during disassembly and assembly

procedures, item numbers in parenthesis will correspond to Figures 3 and 4 on pages 8 and 9. Item numbers in parenthesis, part numbers, part names, and number of parts required are shown under Specifications and Replacement Parts on pages 17, 18, and 19. Bowen recommends making available an assembly drawing of the size Super fishing jar being serviced when you are disassembling, inspecting, or reassembling the tool. Assembly drawings are available through Bowen.

**CAUTION: Do not remove the fill plugs until the tool is fully disassembled. The possibility of trapped residual pressure exists and can cause possible damage or injury.**

When disassembling the Bowen Super fishing jar, note the direction and location of all packing, o-rings, back-up rings, and wipers. This will help in the reassembly of the jar.

1. Place the Super fishing jar in the tester and close the jar if not already closed. Pull the jar open until it releases and stop there. When the jar is in this position (approximately 7 in.) the mandrel (11) seal surface is exposed (See Figure 8, page 13) and the cone (33) O.D. is in the free area of the pressure body (41). This will prevent damaging to the piston assembly (31) and the pressure body (41) bore while disassembling the jar.

**CAUTION: DO NOT remove the fill plugs (42) or washpipe body (48) first. Removal of these before the release of any possible internally trapped**

**pressure may result in the ejection of loosened fill plugs (42) or the floater (44), once the washpipe body (48) is removed.**

2. Clamp the fully extended jar in the vise on the center of the connector body (18). Place pans under the pressure body (41) joints to catch the hydraulic oil.
3. Using the tong centered between the fill plug (42) holes on the pressure body (41), break the connection (right hand threads) between the pressure body (41) and the connector body (18). Use a chain wrench and the v-belt pulley assembly (see Figure 2, page 7) to unscrew the pressure body (41) and let the oil drain into the pans. DO NOT reuse this oil.
4. Reposition the jar in the vise and clamp onto the pressure body (41) within the vise centered between the lower fill plug (42) hole and the lower end of the pressure body (41).
5. Use the tong to break the connection (right hand threads) between the washpipe body (48) and the pressure body (14). Use a chain wrench and the V-Belt pulley assembly (see Figure 2, page 7) to unscrew and remove the washpipe body (48). Using the crane to support the pressure body (41), slide it off.
6. Remove the male adapter from the bore of the pressure body. Remove the floater (44) which usually remains in the

# Bowen Super Fishing Jar

pressure body (41). Reach inside and pull it out; or if necessary, use a long thin board to push it out of the bottom from the upper end. Be careful not to damage the pressure body (41) bore or the floater (44). If the floater (44) is on the washpipe (38), pull it off.

7. Break the washpipe (38) to mandrel (11) connection (right hand threads) by using a pipe wrench on the under-cut wrench area on the upper end (large end) of the washpipe (38) stenciled, "wrench here." Be careful not to damage the long seal surface. Use a chain wrench and the v-belt assembly (See Figure 2, page 7) to unscrew and remove the wash-pipe (38).
8. Remove the seal body (34), cone (33) and by-pass body (32). These parts simply slide off the lower end of the mandrel (11). Handle these critical parts with care and wrap them in cloth for protection.
9. If the jar is equipped with a single connector body packing set (27), remove the connector body packing set (27), connector

body packing male adapter (26) and connector body packing female adapter (28). On jars with two connector body packing sets (24 and 25), the packing is removed with the connector body (18).

10. Reposition the jar in the vise and clamp on the center of spline body (1).
11. Use the tong to break the connection (right hand threads) between the connector body (18) and the spline body (1). Use a chain wrench and the v-belt pulley assembly (see Figure 2, page 7) to unscrew and remove the connector body (18).
12. The mandrel (11) is a sub type mandrel. Use the tong to break the connection (right-hand threads) between the top sub (16) and the mandrel (11). Use a chain wrench and the v-belt pulley assembly (see Figure 2, below) to unscrew and remove the top sub (16), and the v-belt pulley assembly (see Figure to unscrew and remove the top sub (16).
13. While supporting the mandrel (11) with a nylon

strap and the overhead crane, slide the mandrel (11) toward the lower end of the jar and remove it.

**CAUTION: Handle with care. The entire O.D. of the mandrel (11) consists of threads, seal surfaces and metal-to-metal sliding surfaces.**

14. If the jar has a mandrel body (5), use the tong to break the connection (left hand threads) between the mandrel body (5) and the spline body (1). Use a chain wrench and the v-belt pulley assembly (see Figure 2) to unscrew and remove the mandrel body (5).
15. Remove the spline body (1) from the vise.
16. Remove the fill plugs (42) from the pressure body (41).
17. Remove all o-rings, back-up rings, wipers and packing from all parts by using a No. 625 (or 626) tool (see Service Kit, page 16) or a screwdriver with its tip bent at an 80- to 90-degree angle. Be careful not to damage the seal grooves or other surfaces of the parts.
18. Immediately after disassembling the jar,

thoroughly inspect all the metal parts and the floater (44).

## Inspection of Parts

Before reading this section, read Dressing Area Maintenance on page 4.

Bowen recommends referring to an assembly drawing of the size Super fishing jar being serviced when you are disassembling, inspecting, or reassembling the tool. Assembly drawings are available through *Bowen*.

Notes:

- A) The types of damage to inspect for are: pits, nicks, scratches, burrs, cracks, galled areas, worn areas, etc.
- B) In general, minor damage may be removed by polishing with fine emery cloth.
- C) Parts with major damage must be replaced or must undergo a more extensive repair process.
- D) Any abrasions on o-ring, wiper or packing grooves or on seal surfaces can damage the seals and result in a loss of fluid or pressure control during the operation of the tool.

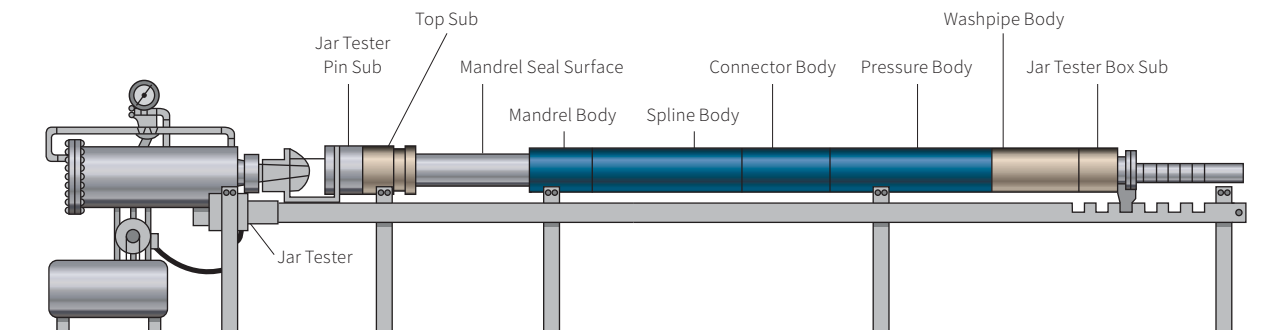


Figure 1. Testing the Jar (Shown in Open Position)

- E) Any damage areas left uncorrected can cause additional damage to that part and possible other parts. This could result in the parts(s) being unreparable and/or in the jar failing to work properly.
1. Carefully clean all parts with solvent and wipe them dry with a clean, lint free cloth.
  2. Inspect all straight box and pin thread sections of all parts:
    - a) Check the threads on all parts for damage. Minor damage may be removed with a triangular hand file before polishing with fine emery cloth.
    - b) Inspect all seal surfaces and grooves for fluid erosion, burrs, mushroomed lands, and other deformities. Repair if possible. Using a seal pick, fingernail, or other pointed object, feel the entire width and depth of the grooves. If possible, r repair any steps or surface interruptions.
    - c) Inspect the 15-degree shoulder (butting faces) on all bodies (1, 5,18, 41 and 48). Inspect both end faces of the mandrel (11). Inspect the shoulder that the mandrel (11) butts against inside the top sub (16) and the washpipe (38). If damage is found, take appropriate action described in the notes above.
    - d) If the jar has been heavily abused (pulled than the maximum allowable or excessively

bent in a crooked hole) fatigue cracking may occur. If fatigue cracking occurs, it is most likely to occur in the corners where the cross sectional area changes. Therefore, examine the inside corner of the 15-degree shoulder of the pin sections, the corners at the bottom of the o-ring and seal grooves, the corners at the bottom of the thread reliefs and threads (particularly the first six or eight threads nearest the thread relief). Parts with cracks must be replaced.

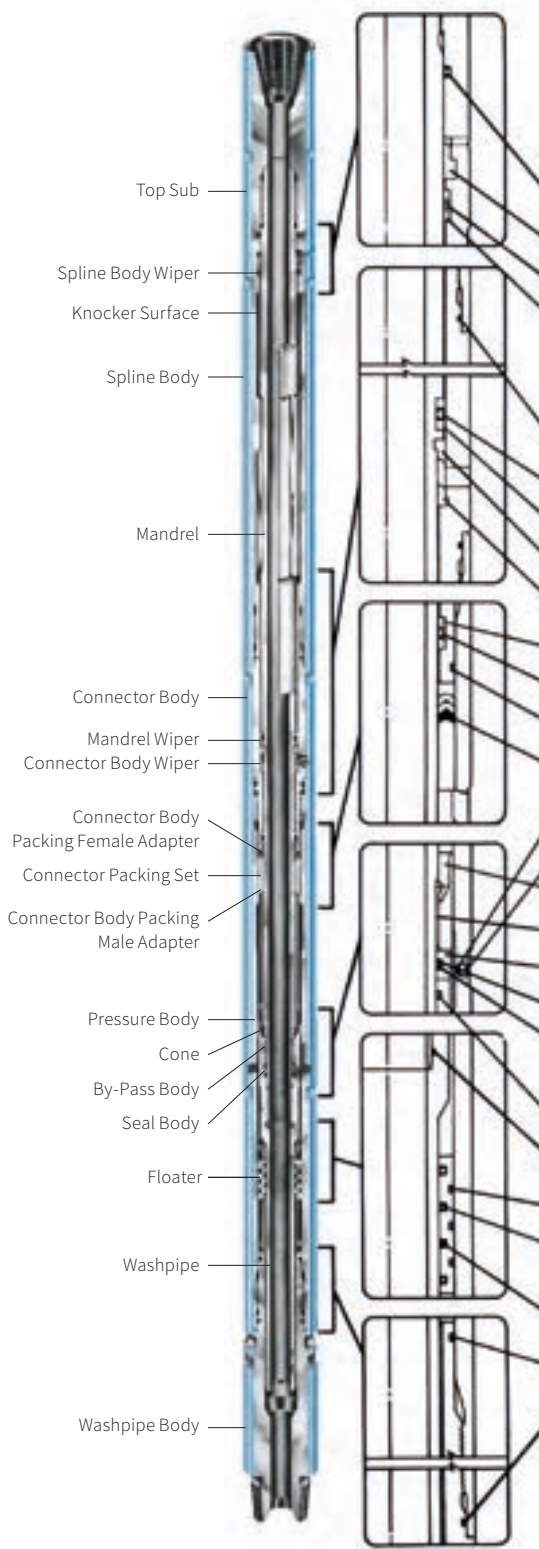
3. Examine the pressure body (41) bores (the bores that the cone (33) and floater (44) seal on). Smooth out minor damage with a very fine emery cloth. Damage which cannot be smoothed out will render it unfit for further service unless the bores are reworked. Also, inspect the seal bore and threads in both fill plug (42) holes.



**Figure 2**  
**V-Belt Pulley Assembly No. 92070**  
**with Chain Wrench**

4. Carefully examine the cone (33), seal body (34) and by-pass body (32). Polish off any damage found by using a very fine hand file, hand grinding stone, or emery cloth. Be very careful when working on these parts because the critical surfaces are ground and polished. Also, the mating surfaces of the cone (33) and seal body (34) must remain flat and smooth. Damage which cannot be smoothed out will render these parts unusable. The cone (33) O.D. should interfere slightly with the pressure body (41) bore. If the cone (33) O.D. does not interfere with the pressure body (41) bore or if the cone (33) or seal body (34) has minor damage which cannot be easily polished out, *Bowen* can possibly rework and salvage the cone (33) and/or seal body (34).
5. Examine the seal surfaces, seal grooves and the metal-to-metal sliding surfaces of the mandrel (11) and the washpipe (38). If damage is found, take the appropriate action described in the notes above.
6. Inspect the bores and the I.D. seal grooves of the connector body (18), the spline body (1) and the mandrel body (5), if the jar has one. If you find damage, take the appropriate action described in the notes above.
7. Inspect the knocker surface for upset metal. The knocker surface on the mandrel (11) is the upper end of the spline. This area should also be examined by magnetic particle methods for small cracks at the intersections of the spline and the upper seal surface. Such damage may be caused by prolonged or excessive impact loads from use at insufficient collars. On jars without a mandrel body (5), the other knocker surface is the shoulder inside the spline body (1) just above the splines (See Figures 3 and 4 on Pages 6 and 7). Upsets are to be removed with a hand grinder or file. The area should then be polished with fine emery cloth. Do not leave sharp corners.
8. Inspect the splines on the mandrel (11) and the spline body (1). Any damage found is to be removed. A hand grinder or file may be used followed by polishing the area with fine emery cloth.
9. The mandrel should be inspected for “necking” in the cone area. This type of damage is always the result of excessive pull loads creating high internal pressure which tends to collapse the mandrel at this point. A straight edge of some form may be necessary to detect such damage.
10. Inspect the floater (44), particularly the corners, sides and bottom of all seal grooves for chips, nicks, scratches and cracks. If the floater (44) is not damaged or excessively worn, it may be reused.

# Bowen Super Fishing Jar

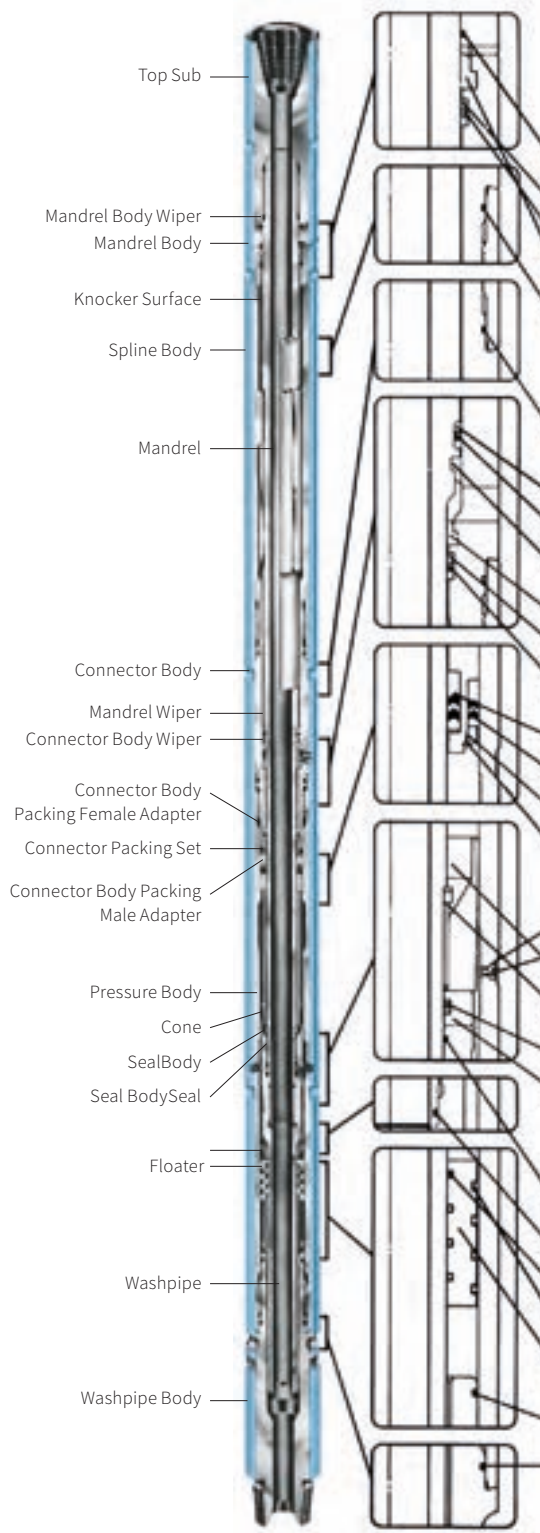


NOTE: Soft Rubber Packing Rings Shown in Black

|          |  | Assembly Number |                   |                    |                   |                   |                   |
|----------|--|-----------------|-------------------|--------------------|-------------------|-------------------|-------------------|
|          |  | 72888           | 145737            | 147902             | 80468             | 79789             |                   |
| Item No. | Part No.   | Nominal O.D.    | 3 1/8 in.         | 3 3/4 in.          | 3 3/4 in.         | 4 1/4 in.         | 4 3/4 in.         |
| 17       | Top Sub O-Ring                                       |                 | 30-4              | 27-35              | 27-38             | 27-40             | 30-15             |
| 4        | Spline Body Wiper                                    |                 | 72892             | 145741             | 147905            | 80472             | 79793             |
| 2        | Spline Body I.D. O-Ring                              |                 | 27-32<br>(2 req.) | 27-35              | 27-38             | 27-40             | -                 |
| 3        | Back-up Ring F/ Spline Body I.D. O-Ring (2 req.)     |                 | 78281             | 145740             | 147904            | 80471             | -                 |
| 8        | Mandrel Body I.D. O-Ring (Not Shown)                 |                 | -                 | -                  | -                 | -                 | 27-43             |
| 9        | Back-up Ring F/ Mandrel Body I.D. O-Ring (Not Shown) |                 | -                 | -                  | -                 | -                 | 79792<br>(2 req.) |
| 20       | Connector Body O-Ring (Large) (2 req.)               |                 | 568-144           | 30-12              | 30-13             | 568-153           | 30-20             |
| 13       | Mandrel O-Ring Middle                                |                 | 27-29             | 27-32              | 27-34             | 27-36             | 27-39             |
| 14       | Back-up Ring F/ Mandrel Middle O-Ring (2 req.)       |                 | 78282             | 145743             | 147907            | 80474             | 79795             |
| 15       | Mandrel Wiper  |                 | 72895             | 145744             | 147908            | 80475             | 79796             |
| 23       | Connector Body Wiper                                 |                 | 72898             | 145747             | 147912            | 80479             | 79800             |
| 22       | Back-up Ring F/ Connector Body I.D. O-Ring           |                 | 78289             | 145746<br>(2 req.) | 147911            | 80478<br>(2 req.) | 79799             |
| 21       | Connector Body I.D. O-Ring                           |                 | 27-30             | 27-32              | 27-36             | 27-37             | 27-39             |
| 19       | Connector Body O-Ring (Small)                        |                 | 568-141           | 30-10<br>(2 req.)  | 30-11             | 30-14             | 30-17             |
| 27       | Connector Body Packing                               |                 | 148309            | 148304             | 147913            | 148299            | 148293            |
| 43       | Fill Plug O-Ring (2 req.)                            |                 | 568-005           | 568-005            | 568-005           | 568-005           | 568-005           |
| 42       | Fill Plug (2 req.)                                   |                 | 617               | 617                | 617               | 617               | 617               |
| 33       | Cone   |                 | 72904             | 145755             | 147917            | 80484             | 80809             |
| 32       | By-Pass Body   |                 | 72905             | 145754             | 147916            | 80483             | 79802             |
| 34       | Seal Body  |                 | 72906             | 148347             | 147918            | 148344            | 79803             |
| 35       | Seal Body Seal O-Ring                                |                 | 30-1              | 30-3               | 30-7              | 30-8              | 27-38             |
| 36       | Seal Body Seal Protector Ring                        |                 | 148329            | 148345             | 147919            | 148342            | 148338            |
| 37       | Seal Body Seal Non Ext. Ring (Not Shown)             |                 | 148328            | 148346             | 148886            | 148343            | 148337            |
| 40       | Washpipe O-Ring (Large)                              |                 | 568-130           | 568-133            | 568-142           | 30-8              | 30-9              |
| 39       | Washpipe O-Ring (Small)                              |                 | 27-26             | 568-130            | -                 | 30-6              | 30-7              |
| 45       | Floater O.D. Seal                                    |                 | 30-5<br>(3 req.)  | 30-9<br>(3 req.)   | 30-10<br>(3 req.) | 30-13<br>(3 req.) | 27-43<br>(4 req.) |
| 46       | Floater I.D. Seal                                    |                 | 72910<br>(4 req.) | 27-32<br>(3 req.)  | 27-36<br>(3 req.) | 80490<br>(4 req.) | 79810<br>(4 req.) |
| 47       | Back-up Ring F/ Floater I.D. O-Ring (Not Shown)      |                 | -                 | 8-329<br>(6 req.)  | 8-333<br>(6 req.) | -                 | -                 |
| 44       | Floater  |                 | 148807            | 149053             | 147922            | 80489             | 79809             |
| 49       | Washpipe Body O-Ring (Small)                         |                 | 568-139           | 30-9               | 30-9              | 30-13             | 30-16             |
| 50       | Washpipe Body O-Ring (Large)                         |                 | 568-144           | 30-12              | 30-12             | 568-153           | 30-20             |

CAUTION: Tool will not operate if Packing Seals are improperly installed.

**Fig. 3**  
Super Jar 3 1/8, 3 3/4, 4 1/4 and 4 3/4 in.



NOTE: Soft rubber packing rings shown in black

| Assembly Number |   | 145484             | 79691             | 145440             | 72978             |
|-----------------|---|--------------------|-------------------|--------------------|-------------------|
| Item No.        | Part No.                                    | Nominal O.D.       |                   |                    |                   |
|                 |   | 6 in.              | 6 ¼ in.           | 6 ¾ in.            | 7 ¾ in.           |
| 17              | Top Sub O-Ring                              | 30-18              | 30-21             | 30-23              | 30-31             |
| 9               | Back-Up Ring F/Mandrel Body 1.0. O-Ring     | 145487<br>(2 req.) | 79693<br>(2 req.) | 145443<br>(2 req.) | 72981<br>(2 req.) |
| 8               | Mandrel Body 1.0. O-Ring                    | 27-46              | 27-49             | 27-51              | 27-59             |
| 10              | Mandrel Body Wiper                          | 145488             | 79701             | 145444             | 72982             |
| 7               | Mandrel Body O-Ring                         | 30-28              | 30-29             | 30-33              | 30-38             |
| 6               | Mandrel Body O-Ring (Small) (Not Shown)     | -                  | -                 | -                  | 30-36             |
| 19              | Connector Body O-Ring (Small) (Not Shown)   | -                  | -                 | -                  | 30-36             |
| 20              | Connector Body O-Ring                       | 30-28<br>(2 req.)  | 30-29<br>(2 req.) | 30-33<br>(2 req.)  | 30-38<br>(2 req.) |
| 14              | Back-Up Ring for Mandrel Middle O-Ring      | 145490<br>(2 req.) | 79692<br>(2 req.) | 145446<br>(2 req.) | 72948<br>(2 req.) |
| 13              | Mandrel O-Ring Middle                       | 27-42              | 27-45             | 27-47              | 27-55             |
| 15              | Mandrel Wiper                               | 145491             | 79702             | 145447             | 72985             |
| 23              | Connector Body Wiper                        | 145495             | 79700             | 145451             | 72988             |
| 22              | Back-Up Ring for Connector Body 1.0. O-Ring | 145494<br>(2 req.) | 79695<br>(2 req.) | 145450<br>(2 req.) | 72989<br>(2 req.) |
| 21              | Connector Body I.D. O-Ring                  | 27-40              | 27-42             | 27-44              | 27-53             |
| 24              | Connector Body I.D. Packing Set             | 148628             | 148633            | 148638             | 148643            |
| 25              | Connector Body O.D. Packing Set             | 148629             | 148634            | 148639             | 148644            |
| 29              | Connector Body O.D. Packing Retainer        | 145498             | 79703             | 145454             | 72992             |
| 30              | Connector Body O.D. Packing Retainer Ring   | 145499             | 79697             | 145455             | 78427             |
| 42              | Fill Plug                                   | 329<br>(2 req.)    | 329<br>(2 req.)   | 329<br>(2 req.)    | 329<br>(2 req.)   |
| 43              | Fill Plug O-Ring                            | 27-1<br>(2 req.)   | 27-1<br>(2 req.)  | 27-1<br>(2 req.)   | 27-1<br>(2 req.)  |
| 33              | Cone  | 145505             | 79709             | 145458             | 69275             |
| 32              | By-Pass Body                                | 145504             | 79704             | 145457             | 69277             |
| 36              | Seal Body Seal O-Ring                       | 27-39              | 27-41             | 27-43              | 27-52             |
| 34              | Seal Body                                   | 145506             | 79705             | 145459             | 69276             |
| 36              | Seal Body Seal Protector Ring (Not Shown)   | 148503             | 148493            | 148501             | 148499            |
| 37              | Seal Body Seal Non-Ext. Ring (Not Shown)    | 148504             | 148494            | 148502             | 148500            |
| 40              | Washpipe O-Ring                             | 30-11              | 30-13             | 30-15              | 30-24             |
| 12              | Mandrel O-Ring (Lower)                      | 30-6               | 30-8              | 30-10              | 30-18             |
| 46              | Floater Seal I.d.                           | 145509<br>(4 req.) | 79738<br>(4 req.) | 148689<br>-        | 73782<br>(4 req.) |
| 45              | Floater O.d. O-Ring                         | 27-51<br>(4 req.)  | 27-52<br>(4 req.) | 568-353<br>-       | 27-61<br>(4 req.) |
| 44              | Floater                                     | 145508             | 79706             | 148679             | 69279             |
| 49              | Washpipe Body O-Ring (Small)                | 30-25              | 30-26             | 30-29              | 30-35             |
| 50              | Washpipe Body O-Ring (Large)                | 30-28              | 30-29             | 30-33              | 30-38             |

CAUTION: Tool will not operate if Packing Seals are improperly installed.

**Fig. 4**  
**Super Jar 6, 6 ¼, 6 ¾ and 7 ¾ in.**

# Bowen Super Fishing Jar

11. Inspect the fill plugs (42). If damaged, they should be replaced.
12. Thoroughly oil all parts with a good grade of clean, light oil.

## Reassembly

Before reading this section, read Dressing Area Maintenance on page 4.

For proper location of parts during disassembly and assembly procedures, item numbers in parenthesis will correspond to Figures 3 and 4 on pages 8 and 9. Item numbers in parenthesis, part numbers, part names, and number of parts required are shown under specifications and replacement parts on pages 17, 18, and 19.

Bowen recommends an assembly drawing of the Super fishing jar being serviced be available when disassembling, inspecting, or reassembling the tool. Assembly drawings are available through Bowen.

Make sure all parts are clean and in good condition (See Inspection of Parts on pages 7 thru 10). Coat all metal parts with a good grade of clean, light oil and lay them out on clean cloths or paper.

We recommend redressing the jar with a new complete packing set (58).

The complete packing set (58) consists of all packing, o-rings, back-up rings, wipers and the seal body seal.

1. Coat all o-rings, back-up rings and wipers with a good grade of clean, light oil and install them in their proper places. To

install the connector body wiper (23) in the 3 1/8 in. thru 6 in. jar follow the procedure in Figure 5.

2. On jars that have two connector body packing sets (24 and 25), install the packing on the connector body (18). On the I.D packing set (24), install the flat spacers after all other rings are in place. After sliding the O.D. packing set (25) in place, install the packing retainer (29) and the packing retainer ring (30). On jars with a single connector body packing set (27), the packing will be installed later.
3. Center the body (1) in the vise and clamp securely. Coat the splines generously with Bowen thread lubricant (KOPR-KOTE).

**NOTE: On jars that have a spline body (1) with threads on one end only, skip steps 4 and 5.**

4. Coat the threads, the surfaces on both ends of the threads, and the 15-degree shoulder of mandrel body (5) with Bowen thread lubricant (KOPR-KOTE®).
5. Using the crane to lift mandrel body (5), slide it over the mandrel (11). Use a chain wrench and the v-belt pulley assembly (See Figure 2, page 7) to screw the mandrel body (5) (left hand threads) into the spline body (1). Tighten this connection with the vise and tong. See Chart A, page 15 for the recommend tightening

torque. If this connection is not properly tightened, it could result in a fatigue failure of the mandrel body (5).

6. Coat the splines on the mandrel (11) with KOPR-KOTE®. Using the crane and nylon strap, lift the mandrel (11) and insert it upper end (largest diameter end) through the lower end of the spline body (1) end with internal threads visible). Align the splines and push the mandrel (11) through until the splines bottom out (jar fully extended with mandrel (11) upper seal surface exposed).
7. On the upper end of the mandrel (11), coat the threads, the surface at both ends of the threads, and the end of the mandrel (11) with Bowen Itcolube.
8. Use a crane to lift the top sub (16) into place. Use a chain wrench and the v-belt pulley assembly (See Figure 2, page 7) to screw the top sub (16) onto the mandrel (11). Tighten this connection with the vise and tong. (See Chart A, page 16 for the recommended lightening torque.)
9. Coat the packing assembly sleeve (51) with Bowen jar lube and slide it up over the lower end of the mandrel (11) until it is against the by-pass body shoulder. DO NOT use thread lubricant (KOPR-KOTE). See Figure 6, page 11.
10. Coat the smooth mandrel (11) surface from the

by pass body shoulder up to and including the mandrel wiper (15) with Bowen jar lube. Also coat the entire bore of the connector body (18) with jar lube. This will make the connector body (18) slide on more easily.

11. Coat the threads, the surfaces on both ends of the threads and the 15-degree shoulder of the upper end of the connector body (18) with KOPR-KOTE®.
12. Using the crane to lift the connector body (18), slide it over the mandrel (11). Use a chain wrench and the V-belt pulley assembly (see Figure 2, page 7) to screw the connector body (18) into the spline body (1). Tighten this connection with the vise and tong. See Chart A, page 16 for the recommended tightening torque.
13. On jars with two connector body packing sets (24 and 25), skip this step since the packing is already installed. Install the female adapter (28) over the mandrel; up against the connector body (18), coat the connector body packing set (25) with Bowen jar lube and install it over the mandrel against the female adapter (28).
14. Remove the packing assembly sleeve (51) from the mandrel (11). (See Figure 6)
15. Reposition the jar with the vise centered on the connector body (18) and clamp securely.



16. Thoroughly clean the cone (33). Install the piston assembly (31) onto the mandrel (11). The piston assembly (31) consists of the by-pass body (32), the cone (33), the seal body (34), the seal body seal (35), the seal body seal protector ring (36), and the seal body seal non-extrusion ring (37).

17. On the lower end of the mandrel (11), coat the threads and the end with KOPR-KOTE®. Be careful not to get KOPR-KOTE above the thread relief. Remove any excess KOPR-KOTE from the threads.

18. Use a chain wrench and the v-belt pulley assembly (see Figure 2, page 7) to screw the washpipe (38) onto the mandrel (11). If KOPR-KOTE is picked up from the mandrel threads, it is to be wiped and washed off with solvent.

**CAUTION: This connection is not torqued as high as the other connections in the jar. See the recommended tightening torque on Chart A on page 16. Tighten this connection using a pipe wrench on the undercut wrench area of the upper end (large end) of the wash-pipe (38) (stenciled “wrench here”). Remove any burrs on the wrench area. Coat the long seal surface of the washpipe (38) with Bowen jar lube.**

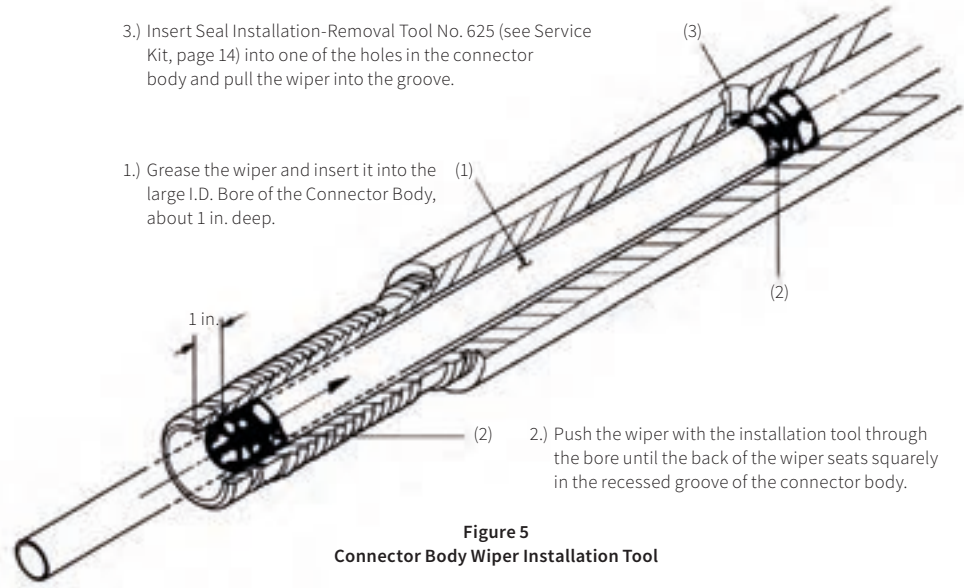
19. Coat the threads, the surfaces on both sides of the threads and the 15-degree shoulder of the lower end of the connector body (18) with KOPR-KOTE.

20. Install the male adapter (26) inside the bore of the pressure body (41) until it stops on the I.D. shoulder next to the fill plug (42) hole. Coat the bore of the pressure body (41) with Bowen jar lube. Using the crane, lift the pressure body (41) and slide it over the washpipe (38). Be careful not to damage the connector body packing (25 or 27). Use a chain wrench and the v-belt assembly (see Figure 2, page 5) to screw the pressure body (41) onto the connector body (18). Place the tong between the fill plug (42) holes and tighten this connection (right hand threads). See recommended tightening torque on Chart A on page 16.

21. Reposition and clamp the jar in the vise on the pressure body (41) with the vise centered between the lower fill plug (42) hole and the lower end of the pressure body (41).

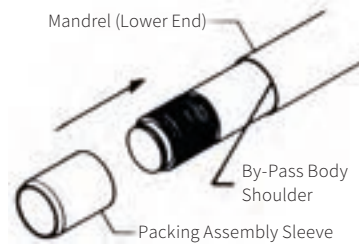
3.) Insert Seal Installation-Removal Tool No. 625 (see Service Kit, page 14) into one of the holes in the connector body and pull the wiper into the groove.

1.) Grease the wiper and insert it into the large I.D. Bore of the Connector Body, about 1 in. deep.



**Figure 5**  
Connector Body Wiper Installation Tool

2.) Push the wiper with the installation tool through the bore until the back of the wiper seats squarely in the recessed groove of the connector body.



**Figure 6**  
Packing Assembly Sleeve

22. Coat the I.D and O.D. of the floater (44) with Bowen jar lube. Slide the floater (44) over the washpipe (38). Push the floater (44) with the floater positioning tool (52) until the positioning tool comes in contact with the end of the pressure body (see Figure 7, page 12).

If no floater positioning tool is available for the jar you are using, set the floater at its proper position, refer to Chart D, page 16.

**NOTE: THE FLOATER MUST BE POSITIONED IN THIS MANNER (WHICH GIVES IT SPACE TO MOVE BOTH UP AND DOWN) TO FUNCTION PROPERLY.**

23. Coat the washpipe body (48) straight threads, the surface at both ends of the threads and the 15-degree shoulder with KOPR-KOTE®.

24. Using the crane, lift the washpipe body (48) and slide it over the wash-pipe (38). Use a chain wrench and the v-belt pulley assembly (see Figure 2, page 7) to screw the washpipe body (48) into the pressure body (41). Tighten this connection with the vise and tong. See Chart A, page 16 for the recommended tightening torque.

25. Install the thread protector for tool joint pin (55) on the washpipe body (48) to protect the tool joint pin from damage during the filling operation. The jar is now ready for filling with Bowen jar lube.

**NOTE: THE JAR IS NOT TO BE CLOSED UNTIL AFTER IT IS FILLED WITH JAR LUBE.**

# Bowen Super Fishing Jar

## Filling the Jar

**NOTE:** The jar is still in the open position fully extended with the mandrel (11) seal surface exposed (See Figure 8, page 13) and is not to be closed until it is filled with Bowen jar lube. If the mandrel (11) was moved, the floater (44) may have moved from its proper position. This would require that the washpipe body (48) be removed, the floater (44) position checked, and corrected if it has moved.

Position the jar with one of the pressure body fill plug (42) holes at the top of the jar's O.D. This will allow maximum air removal during filling. (See Figure 8.)

1. Tilt the jar at least 10° from horizontal with the mandrel (11) end lower than the washpipe body (48) end. (See Figure 8.)

**NOTE:** This can be done by using a crane to position the jar in a floor vise with the vise between the pressure body fill plug (42) holes and the connector body (18). By leaving the vise loosened slightly, the jar can be loosened to the required angle for filling.

2. Attach the volume oil supply hose to the pressure body fill plug (42) hole on the underside of the jar using the assembled adapter and male coupler. Both fill plug holes are located near the center of the pressure body (41) at 180° from one another. (See Figure 8.) Attach the volume pump oil exhaust hose to the top fill plug hole using the assembled adapter and male coupler. Required hardware is included in service kit (56).

3. Operate the hand pump at a moderate speed until a bubble-free flow of Bowen jar lube comes through the clean oil exhaust hose.
4. Slowly raise the jar to the horizontal position. Continue to fill the jar, allowing air to escape as the jar is gradually raised to horizontal. (See Figure 9.) When the jar is horizontal and no more air is bubbling in the clear exhaust hose, it may be necessary to raise and lower the jar slightly above and below horizontal while pumping slowly to remove the last of the air.
5. Remove the oil exhaust hose and coupler with adapter from the top fill plug hole. Check the fill plug hole for fluid. If not full,

very slowly pump in additional jar lube until the air is removed. With the jar horizontal, remove the oil supply hose from the bottom fill plug hole, but leave this coupler and adapter in the pressure body. This will prevent jar lube from draining from the jar back into the volume pump. The male coupler has a check valve that will prevent jar lube from leaking out when the hose is disconnected.

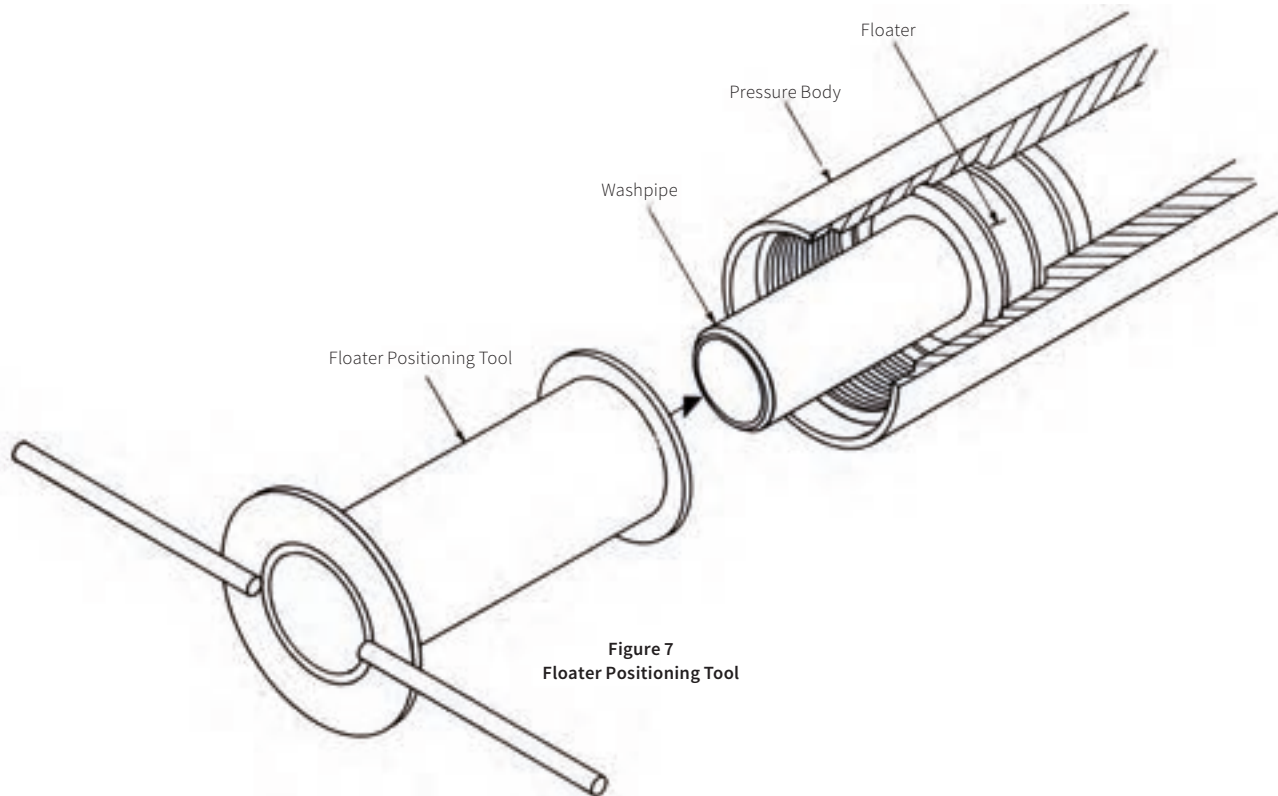
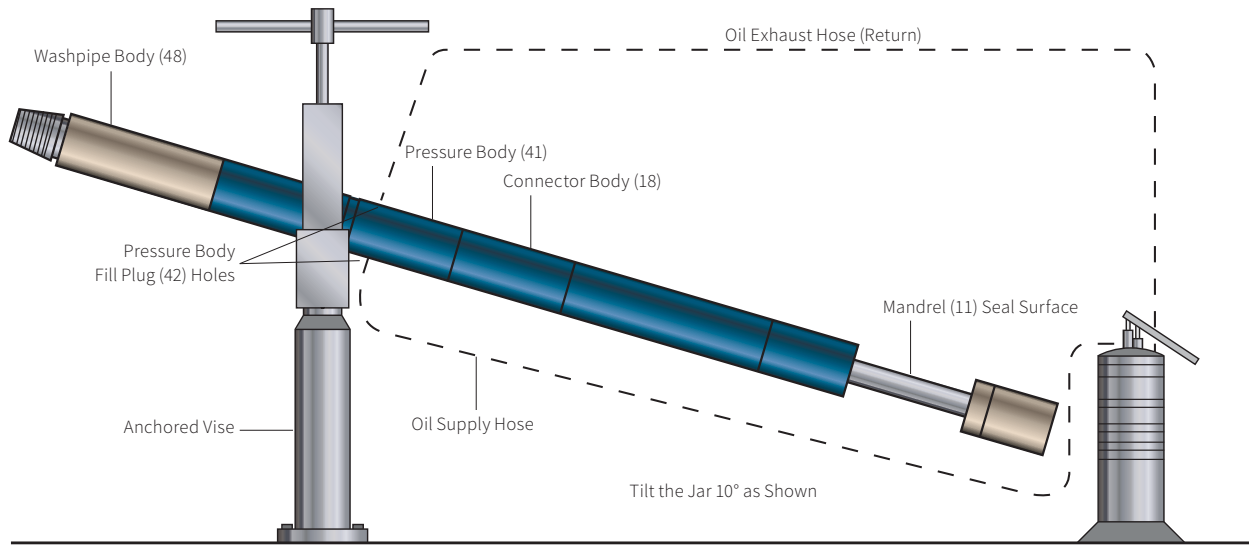
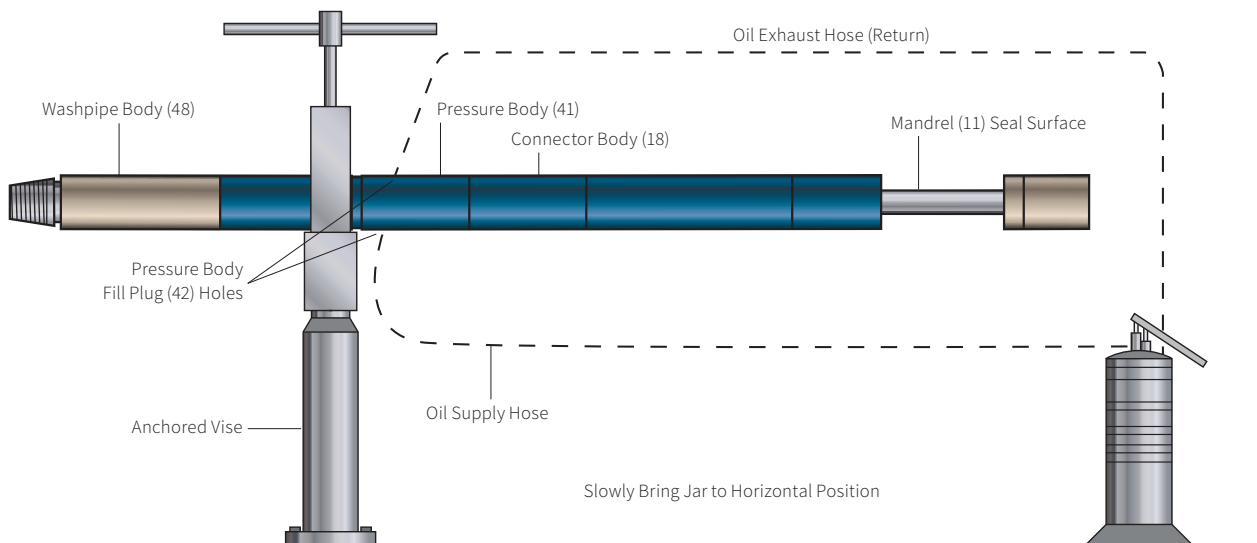


Figure 7  
Floater Positioning Tool



**Figure 8**  
Initial Position of Super Fishing Jar During Filling Operation



**Figure 9**  
Final Position of Super Fishing Jar During Filling Operation

# Bowen Super Fishing Jar

6. Install fill plug (42) with installed fill plug o-ring (43) into top fill plug hole and tighten securely.
7. Keep the jar horizontal and rotate jar until the other fill plug hole is at the top of jar's OD. Remove coupler with adapter.
8. Install fill plug (42 with installed fill plug o-ring (43) into pressure body (41) and tighten securely.
9. The Bowen Super fishing jar is now ready for testing.

## Testing the Jar

After the Bowen Super fishing jar has been completely assembled and filled with jar lube, it is to be tested in a Bowen jar tester (or equal) (see Figure 1, page 6) to insure that it is functioning properly.

1. Screw the jar tester subs on the jar. Using a crane, place the jar in the jar tester.
2. See strength and test data, Chart B, page 16, for correct low pull load for the size jar being tested. Set the jar tester for this load.
3. Close the jar. Actuate the jar tester in the pull direction. The jar should pull up to the set pull load and maintain that load until it reaches its release point. Observe the movement of the mandrel (11). It should move slowly and steadily. It should take a few minutes to pull through its stroke. When the jar reaches its release point, the mandrel (11) should pull easily and the pull load should be lower. Pull the jar until it

is completely open to be sure that it moves smoothly through its entire stroke. Repeat the low pull test 4 to 6 times to assure uniform action.

**NOTE: If the jar does not pull through, increase the low pull load setting by 2,000 lb. and repeat this test. If the jar still does not pull through, it is malfunctioning, and you must determine and correct the problem, then retest the jar. Contaminated jar lube and /or plugged slots on the bottom of the cone are possible causes of a malfunction. Also, see Inspection of Parts on page 7.**

4. See Strength and Test Data, Chart B, page 16, for the correct standard jar tester pull load for the size jar being tested. Set the jar tester for this load.
5. Pull test the jar 6 to 8 times. The test procedure is the same as in the low pull test except the jar will pull through faster (See procedure 3). If the jar does not pull at least up to the minimum standard jar tester pull load, the jar is malfunctioning. Determine and correct the problem, then retest the jar before field use.

**NOTE: Possible causes of a malfunction are: the jar is not completely filled with jar lube; incorrect jar lube; diluted jar lube; damaged by-pass body (32), cone (33), seal body (34), or seal body seal (35); damaged bore in the pressure body (41) damaged connector body packing (24 and 25 or 27); damaged o-rings (40 and 39**

**or 12); damaged floater (44) or floater seals (45, 46 and 47); or damaged fill plugs (42) or o-rings (43). See inspection of parts on pages 6.**

6. Close the jar and remove it from the jar tester. Remove the jar tester subs. Install the tool joint thread protectors (54 and 55). The Bowen Super fishing jar, after painting, is ready for field use.

## Jar Service Kit

A jar service kit (see page 16) is necessary to properly service the Bowen Super fishing jar. These kits are identical for every size jar, so one kit may be used for any number of jars. The kit does not include the packing assembly sleeve for mandrel or the floater positioning tool. These parts are different for each size jar and must be ordered separately (see Parts List, pages 17-19).

## Jar Service Kit

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# Bowen Super Fishing Jar

## Chart A – Super Fishing Jar Maximum Recommended Tightening Torque for Threaded Connections

| Assembly Part Number | Connection        | Jar Size O.D. | I.D.      | Top Sub To Mandrel | Mandrel Body To Spline Body | Spline Body To Connector Body | Connector Body To Pressure Body | Pressure Body To Washpipe Body | Internal Joint Washpipe To Mandrel |
|----------------------|-------------------|---------------|-----------|--------------------|-----------------------------|-------------------------------|---------------------------------|--------------------------------|------------------------------------|
| 72888                | 2 3/8 REG.        | 3 1/8 in.     | 1 in.     | 1,640 ft-lb        | -                           | 2,650 ft-lb                   | 3,520 ft-lb                     | 3,330 ft-lb                    | 750 ft-lb                          |
| 145737               | 2 7/8 REG.        | 3 3/4 in.     | 1 1/4 in. | 2,500 ft-lb        | -                           | 3,360 ft-lb                   | 4,060 ft-lb                     | 4,060 ft-lb                    | 750 ft-lb                          |
| 146544               | 2 3/8 I.F.        | 3 3/4 in.     | 1 1/2 in. | 2,400 ft-lb        | -                           | 3,160 ft-lb                   | 4,170 ft-lb                     | 4,170 ft-lb                    | 800 ft-lb                          |
| 147902               | 2 3/8 EUE         | 3 3/4 in.     | 1 7/8 in. | 2,260 ft-lb        | -                           | 3,050 ft-lb                   | 3,690 ft-lb                     | 3,690 ft-lb                    | 1,100 ft-lb                        |
| 80468                | 2 7/8 I.F.        | 4 1/4 in.     | 2 in.     | 3,400 ft-lb        | -                           | 4,230 ft-lb                   | 5,100 ft-lb                     | 5,100 ft-lb                    | 1,000 ft-lb                        |
| 79789                | 3 1/2 F.H. & I.F. | 4 3/4 in.     | 2 in.     | 5,730 ft-lb        | 6,710 ft-lb                 | 6,710 ft-lb                   | 8,100 ft-lb                     | 8,100 ft-lb                    | 1,500 ft-lb                        |
| 145484               | 4 1/2 F.H.        | 6 in.         | 2 in.     | 10,450 ft-lb       | 14,390 ft-lb                | 14,390 ft-lb                  | 17,400 ft-lb                    | 17,400 ft-lb                   | 1,500 ft-lb                        |
| 79691                | 4 1/2 I.F.        | 6 1/4 in.     | 2 1/4 in. | 13,600 ft-lb       | 17,630 ft-lb                | 17,630 ft-lb                  | 21,310 ft-lb                    | 21,310 ft-lb                   | 1,500 ft-lb                        |
| 145440               | 5 1/2 REG.        | 6 3/4 in.     | 2 3/8 in. | 15,980 ft-lb       | 21,160 ft-lb                | 21,160 ft-lb                  | 25,560 ft-lb                    | 25,560 ft-lb                   | 2,700 ft-lb                        |
| 72978                | 6 3/8 REG.        | 7 3/4 in.     | 3 1/8 in. | 28,300 ft-lb       | 35,000 ft-lb                | 35,000 ft-lb                  | 42,300 ft-lb                    | 42,300 ft-lb                   | 3,000 ft-lb                        |

The make-up torques are the maximum recommended make-up torques for each connection. They are set at 50% of the calculated theoretical yield torque.

The tightening torque values were calculated assuming Itcolube or similar zinc-based grease on all threads and shoulders. Multiply chart values by .1382 to obtain Kg-m.

## Chart B – Strength and Test Data for Bowen Super Fishing Jar

**Warning!** All jarring and pulling loads shown in the manual assume that the force is acting alone and is essentially along with major axis of the tool. If torque and tension or bending and tension are used together, the resulting combined stresses may lead to failure at substantially less than rated loads. Rotation and bending together can lead to fatigue.

| Assembly Part Number | Connection        | Jar Size O.D. | I.D.      | Maximum Recommended Jarring Load in Hole* | Tensile @ Yield After Jarring | Torque @ at Yield | Jar Tester Pull Load Low** Min. - Max. | Jar Tester Pull Load Standard |
|----------------------|-------------------|---------------|-----------|---|-------------------------------|-------------------|--|-------------------------------|
| 72888                | 2 3/8 REG.        | 3 1/8 in.     | 1 in.     | 59,000 lbs                                | 240,000 ft-lb                 | 3,280 ft-lb       | 9,000 lbs-12,000 lbs                   | 30,000 lbs                    |
| 145737               | 2 7/8 REG.        | 3 3/4 in.     | 1 1/4 in. | 78,000 lbs                                | 324,000 ft-lb                 | 5,000 ft-lb       | 12,000 lbs-16,000 lbs                  | 39,000 lbs                    |
| 146544               | 2 3/8 I.F.        | 3 3/4 in.     | 1 1/2 in. | 66,000 lbs                                | 306,000 ft-lb                 | 4,800 ft-lb       | 11,000 lbs-15,000 lbs                  | 33,000 lbs                    |
| 147902               | 2 3/8 EUE         | 3 3/4 in.     | 1 7/8 in. | 48,000 lbs                                | 258,000 ft-lb                 | 4,520 ft-lb       | 10,000 lbs-15,000 lbs                  | 24,000 lbs                    |
| 80468                | 2 7/8 I.F.        | 4 1/4 in.     | 2 in.     | 62,000 lbs                                | 374,000 ft-lb                 | 6,800 ft-lb       | 12,000 lbs-18,000 lbs                  | 31,000 lbs                    |
| 79789                | 3 1/2 F.H. & I.F. | 4 3/4 in.     | 2 in.     | 98,000 lbs                                | 575,000 ft-lb                 | 11,460 ft-lb      | 14,000 lbs-20,000 lbs                  | 49,000 lbs                    |
| 145484               | 4 1/2 F.H.        | 6 in.         | 2 in.     | 196,000 lbs                               | 913,000 ft-lb                 | 20,900 ft-lb      | 14,000 lbs-20,000 lbs                  | 98,000 lbs                    |
| 79691                | 4 1/2 I.F.        | 6 1/4 in.     | 2 1/4 in. | 200,000 lbs                               | 1.1 million ft-lb             | 27,200 ft-lb      | 16,000 lbs-25,000 lbs                  | 100,000 lbs                   |
| 145440               | 5 1/2 REG.        | 6 3/4 in.     | 2 3/8 in. | 250,000 lbs                               | 1.2 million ft-lb             | 31,960 ft-lb      | 16,000 lbs-25,000 lbs                  | 110,000 lbs                   |
| 72978                | 6 3/8 REG.        | 7 3/4 in.     | 3 1/8 in. | 265,000 lbs                               | 1.7 million ft-lb             | 56,600 ft-lb      | 16,000 lbs-25,000 lbs                  | 110,000 lbs                   |

The above tensile strengths are calculated theoretical yield strengths and are considered accurate to ± 20%

\*Loads shown are maximum recommended pull loads. Pulling above the valve shown can damage the tools.

\*\*If Jar does not test at maximum low pull load shown, disassemble, inspect and repair tool.

## Chart C – Super Fishing Jar Weight Chart

The following weights are provided as a guideline to the number of drill collars to be used and do not necessarily constitute the optimum weight for each hole condition which may be encountered.

| Assembly Part Number | Connection        | O.D.      | I.D.      | Weight Range            |
|----------------------|-------------------|-----------|-----------|-------------------------|
| 72888                | 2 3/8 REG.        | 3 1/8 in. | 1 in.     | 2,100 lbs - 3,600 lbs   |
| 145737               | 2 7/8 REG.        | 3 3/4 in. | 1 1/4 in. | 3,000 lbs - 5,000 lbs   |
| 147902               | 2 3/8 EUE         | 3 3/4 in. | 1 7/8 in. | -                       |
| 80468                | 2 7/8 I.F.        | 4 1/4 in. | 2 in.     | 3,300 lbs - 5,700 lbs   |
| 79789                | 3 1/2 F.H. & I.F. | 4 3/4 in. | 2 in.     | 4,400 lbs - 7,500 lbs   |
| 145484               | 4 1/2 F.H.        | 6 in.     | 2 in.     | 7,600 lbs - 12,900 lbs  |
| 79691                | 4 1/2 I.F.        | 6 1/4 in. | 2 1/4 in. | 8,100 lbs - 13,600 lbs  |
| 145440               | 5 1/2 REG.        | 6 3/4 in. | 2 3/8 in. | 9,400 lbs - 16,200 lbs  |
| 72978                | 6 3/8 REG.        | 7 3/4 in. | 3 1/8 in. | 12,100 lbs - 20,500 lbs |

## Chart C – Super Fishing Jar Weight Chart

| Assembly Part Number | Connection        | O.D.      | I.D.      | Steel Floater Number | Floater Position Normal Service | Floater Position High Temp. |
|----------------------|-------------------|-----------|-----------|----------------------|---------------------------------|-----------------------------|
| 72888                | 2 3/8 REG.        | 3 1/8 in. | 1 in.     | 151580/005           | 7 7/8 in.                       | 9 1/16 in.                  |
| 145737               | 2 7/8 REG.        | 3 3/4 in. | 1 1/4 in. | 151584/005           | 8 5/8 in.                       | 10 3/16 in.                 |
| 146544               | 2 3/8 I.F.        | 3 3/4 in. | 1 1/2 in. | 151583/005           | 8 in.                           | 9 1/16 in.                  |
| 147902               | 2 3/8 EUE         | 3 3/4 in. | 1 7/8 in. | 151577/005           | 8 3/4 in.                       | 10 1/8 in.                  |
| 80468                | 2 7/8 I.F.        | 4 1/4 in. | 2 in.     | 151576/005           | 8 11/16 in.                     | 10 1/2 in.                  |
| 79789                | 3 1/2 F.H. & I.F. | 4 3/4 in. | 2 in.     | 151578/005           | 10 9/16 in.                     | 12 13/16 in.                |
| 145484               | 4 1/2 F.H.        | 6 in.     | 2 in.     | 151579/005           | 10 3/8 in.                      | 12 3/8 in.                  |
| 79691                | 4 1/2 I.F.        | 6 1/4 in. | 2 1/4 in. | 151582/005           | 10 11/16 in.                    | 12 1/2 in.                  |
| 145440               | 5 1/2 REG.        | 6 3/4 in. | 2 3/8 in. | 151581/005           | 10 15/16 in.                    | 13 in.                      |
| 72978                | 6 3/8 REG.        | 7 3/4 in. | 3 1/8 in. | 102516/005           | 12 1/4 in.                      | 12 1/4 in.                  |

NOTE: Measure distance from floater face to pressure body end.

Users of Jars and Bumper Subs should be aware that milling or light drilling operations may develop stresses in these tools that are more complex than the simple torsional and tensile values listed in Bowen strength data. If unstabilized, the weight necessary for milling can induce bending forces that combine with torsional forces to generate very high stresses in some areas of the tool. Rotating in a deviated hole condition or with the tool in a neutral point may have the same effect.

The necessity for milling is recognized and this is not intended to advise against such operations, but merely to caution the user of possible dangers when rotating under the conditions described.

## Specifications and Replacement Parts

### Bowen Super Fishing Jar Specifications

**Note: Major parts are listed in the order that they are assembled. Other parts are listed below the major part that they go in or on.**

| Size connection   | 2 3/8 in.<br>API Reg. | 2 7/8 in.<br>API Reg. | 2 3/4 in.<br>API EUE | 2 3/4 in.<br>API I.F. | 2 1/2 in.<br>API I.F. | 3 1/2 in.<br>API I.F. | 4 1/2 in.<br>API F.H. | 4 1/2 in.<br>API I.F. | 5 1/2 in.<br>API Reg. | 6 1/2 in.<br>API Reg. |          |
|-------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------|
| Outside diameter  | 3 1/8 in.             | 3 3/4 in.             | 3 3/4 in.            | 3 3/4 in.             | 4 1/4 in.             | 4 3/4 in.             | 6 in.                 | 6 1/4 in.             | 6 3/4 in.             | 7 3/4 in.             |          |
| Inside diameter   | 1 in.                 | 1 1/4 in.             | 1 7/8 in.            | 1 1/2 in.             | 2 in.                 | 2 in.                 | 2 in.                 | 2 1/4 in.             | 2 3/8 in.             | 3 1/16 in.            |          |
| Complete assembly | Part No.              | 72888                 | 145737               | 147902                | 146544                | 80468                 | 79789                 | 145484                | 79691                 | 145440                | 72978    |
|                   | Weight                | 160 lbs               | —                    | —                     | —                     | 320 lbs               | 465 lbs               | —                     | 890 lbs               | —                     | 1464 lbs |

### Replacement Parts

| Item No. | Name                                    | Part No.   | 72889  | 145739 | 147903 | 146545 | 80469  | 79790   | 145492 | 79708   | 145441 | 72979   |   |
|----------|---|------------|--------|--------|--------|--------|--------|---------|--------|---------|--------|---------|---|
| 1        | Spline body                             | Part No.   | 72889  | 145739 | 147903 | 146545 | 80469  | 79790   | 145492 | 79708   | 145441 | 72979   |   |
|          |   | Weight     | 38 lbs | —      | —      | —      | 47 lbs | —       | —      | —       | —      | —       | — |
|          |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       | 1      | 1       | 1 |
| 2        | Spline body I.D. O-ring                 | Part No.   | 568329 | 568332 | 568335 | 568333 | 568337 | —       | —      | —       | —      | —       |   |
|          |   | Weight     | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | —       | —      | —       | —      | —       | — |
| 3        | Back up ring F/spline body I.D. O-ring  | Part No.   | 78281  | 145740 | 147904 | 146546 | 80471  | —       | —      | —       | —      | —       |   |
|          |   | No. Req'd. | 2      | 2      | 2      | 2      | 2      | —       | —      | —       | —      | —       |   |
| 4        | Spline body wiper                       | Part No.   | 72892  | 145741 | 147905 | 146547 | 80472  | —       | —      | —       | —      | —       |   |
|          |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | —       | —      | —       | —      | —       |   |
| 5        | Mandrel body                            | Part No.   | —      | —      | —      | —      | —      | 79791   | 145486 | 79714   | 145442 | 78266   |   |
|          |   | Weight     | —      | —      | —      | —      | —      | 32 lbs  | —      | 70 lbs  | —      | 110 lbs |   |
|          |   | No. Req'd. | —      | —      | —      | —      | —      | 1       | 1      | 1       | 1      | 1       |   |
| 6        | Mandrel body O-ring (small)             | Part No.   | —      | —      | —      | —      | —      | —       | —      | —       | —      | 568258  |   |
|          |   | No. Req'd. | —      | —      | —      | —      | —      | —       | —      | —       | —      | 1       |   |
| 7        | Mandrel body O-ring                     | Part No.   | —      | —      | —      | —      | —      | 568242  | 568250 | 568251  | 568255 | 568260  |   |
|          |   | No. Req'd. | —      | —      | —      | —      | —      | 1       | 1      | 1       | 1      | 1       |   |
| 8        | Mandrel body I.D. O-ring                | Part No.   | —      | —      | —      | —      | —      | 568340  | 568343 | 568346  | 568348 | 568432  |   |
|          |   | No. Req'd. | —      | —      | —      | —      | —      | 1       | 1      | 1       | 1      | 1       |   |
| 9        | Back up ring F/mandrel body I.D. O-ring | Part No.   | —      | —      | —      | —      | —      | 79792   | 145487 | 79693   | 145443 | 72981   |   |
|          |   | No. Req'd. | —      | —      | —      | —      | —      | 2       | 2      | 2       | 2      | 2       |   |
| 10       | Mandrel body wiper                      | Part No.   | —      | —      | —      | —      | —      | 79793   | 145488 | 79701   | 145444 | 72982   |   |
|          |   | No. Req'd. | —      | —      | —      | —      | —      | 1       | 1      | 1       | 1      | 1       |   |
| 11       | Mandrel                                 | Part No.   | 72893  | 145742 | 147906 | 146548 | 80473  | 79794   | 145489 | 79711   | 145445 | 72983   |   |
|          |   | Weight     | 36 lbs | —      | —      | —      | 82 lbs | 120 lbs | —      | 200 lbs | —      | 440 lbs |   |
|          |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       | 1      | 1       |   |
| 12       | Mandrel O-ring (lower)                  | Part No.   | —      | —      | —      | —      | —      | —       | 568228 | 568230  | 568232 | 568240  |   |
|          |   | No. Req'd. | —      | —      | —      | —      | —      | —       | 1      | 1       | 1      | 1       |   |
| 13       | Mandrel O-ring (middle)                 | Part No.   | 568326 | 568329 | 568331 | 568330 | 568333 | 568336  | 568339 | 568342  | 568344 | 568428  |   |
|          |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       | 1      | 1       |   |
| 14       | Back up ring F/mandrel middle O-ring    | Part No.   | 78282  | 145743 | 147907 | 146549 | 80474  | 79795   | 145490 | 79692   | 145446 | 72984   |   |
|          |   | No. Req'd. | 2      | 2      | 2      | 2      | 2      | 2       | 2      | 2       | 2      | 2       |   |
| 15       | Mandrel wiper                           | Part No.   | 72895  | 145744 | 147908 | 146550 | 80475  | 79796   | 145491 | 79702   | 145447 | 72985   |   |
|          |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       | 1      | 1       |   |
| 16       | Top sub                                 | Part No.   | 72896  | 145738 | 147909 | 146551 | 80476  | 79797   | 145485 | 79751   | 145448 | 72986   |   |
|          |   | Weight     | 17 lbs | —      | —      | —      | 42 lbs | 53 lbs  | —      | 125 lbs | —      | 189 lbs |   |
|          |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       | 1      | 1       |   |
| 17       | Top sub O-ring                          | Part No.   | 568226 | 568332 | 568335 | 568333 | 568337 | 568237  | 568240 | 568243  | 568245 | 568253  |   |
|          |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       | 1      | 1       |   |
| 18       | Connector body                          | Part No.   | 72897  | 145745 | 147910 | 146552 | 80477  | 79798   | 145493 | 79710   | 145449 | 729     |   |
|          |   | Weight     | 21 lbs | —      | —      | —      | 37 lbs | 53 lbs  | —      | 93 lbs  | —      | 140 lbs |   |
|          |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       | 1      | 1       |   |
| 19       | Connector body O-ring (small)           | Part No.   | 568141 | 568232 | 568233 | 568233 | 568236 | 568239  | —      | —       | —      | 568258  |   |
|          |   | No. Req'd. | 2      | 2      | 1      | 1      | 1      | 1       | —      | —       | —      | 1       |   |
| 20       | Connector body O-ring (large)           | Part No.   | 568144 | 568234 | 568235 | 568235 | 568153 | 568242  | 568250 | 568251  | 568255 | 568260  |   |
|          |   | No. Req'd. | 2      | 2      | 2      | 2      | 2      | 2       | 2      | 2       | 2      | 2       |   |
| 21       | Connector body I.D. O-ring              | Part No.   | 568327 | 568329 | 568333 | 568330 | 568334 | 568336  | 568337 | 568339  | 568341 | 568426  |   |
|          |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       | 1      | 1       |   |

# Bowen Super Fishing Jar

## Specifications and Replacement Parts

### Bowen Super Fishing Jar Specifications

| Complete assembly | Part No. | 72888 | 145737 | 147902 | 146544 | 80468 | 79789 | 145484 | 79691 | 145440 | 72978 |
|-------------------|----------|-------|--------|--------|--------|-------|-------|--------|-------|--------|-------|
|-------------------|----------|-------|--------|--------|--------|-------|-------|--------|-------|--------|-------|

### Replacement Parts

| Item No. | Name   | Part No.   | 72888  | 145737  | 147902 | 146544  | 80468   | 79789   | 145484  | 79691   | 145440   | 72978  |         |
|----------|--|------------|--------|---------|--------|---------|---------|---------|---------|---------|----------|--------|---------|
| 23       | Connector body wiper                                       | Part No.   | 72898  | 145747  | 147912 | 146554  | 80479   | 79800   | 145495  | 79700   | 145451   | 72988  |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      | 1       |
| 24       | Connector body I.D. packing Set                            | Part No.   | —      | —       | —      | —       | —       | —       | 148628  | 148633  | 148638   | 148643 |         |
|          |  | No. Req'd. | —      | —       | —      | —       | —       | —       | 1       | 1       | 1        | 1      |         |
| 25       | Connector body O.D. packing set                            | Part No.   | —      | —       | —      | —       | —       | —       | 148629  | 148634  | 148639   | 148644 |         |
|          |  | No. Req'd. | —      | —       | —      | —       | —       | —       | 1       | 1       | 1        | 1      |         |
| 26       | Connector body packing male adapter                        | Part No.   | 148312 | 148307  | 147914 | 146556  | 148302  | 148316  | —       | —       | —        | —      |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | —       | —       | —        | —      |         |
| 27       | Connector body packing set                                 | Part No.   | 148309 | 148304  | 147913 | 146555  | 148299  | 148293  | —       | —       | —        | —      |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | —       | —       | —        | —      |         |
| 28       | Connector body packing Female adapter                      | Part No.   | 148313 | 148308  | 148885 | 150926  | 148303  | 148317  | —       | —       | —        | —      |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | —       | —       | —        | —      |         |
| 29       | Connector body O.D. packing retainer                       | Part No.   | —      | —       | —      | —       | —       | —       | 145498  | 79703   | 145454   | 72992  |         |
|          |  | Weight     | —      | —       | —      | —       | —       | —       | —       | —       | ½ lb     | —      | 1 lb    |
|          |  | No. Req'd. | —      | —       | —      | —       | —       | —       | 1       | 1       | 1        | 1      | 1       |
| 30       | Connector body O.D. packing retainer ring                  | Part No.   | —      | —       | —      | —       | —       | —       | 79697   | 79697   | 145455   | 78427  |         |
|          |  | No. Req'd. | —      | —       | —      | —       | —       | —       | 1       | 1       | 1        | 1      |         |
| 31       | Piston assembly (cone type) (consists of items 32 thru 37) | Part No.   | 72903  | 145753  | 147915 | 146557  | 80482   | 79801   | 145503  | 81617   | 145456   | 69274  |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      |         |
| 32       | By-pass body   | Part No.   | 72905  | 145754  | 147916 | 146558  | 80483   | 79802   | 145504  | 79704   | 145457   | 69277  |         |
|          |  | Weight     | ½ lb   | —       | —      | —       | ¼ lb    | ½ lb    | —       | —       | 1 lb     | —      | 1 lb    |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      | 1       |
| 33       | Cone   | Part No.   | 72904  | 145755  | 147917 | 146559  | 80484   | 80809   | 145505  | 79709   | 145458   | 69275  |         |
|          |  | Weight     | 1 lb   | —       | —      | —       | ¼ lb    | 5 lbs   | —       | —       | 12 lbs   | —      | 14 lbs  |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      | 1       |
| 34       | Seal body  | Part No.   | 72906  | 148347  | 147918 | 146560  | 148344  | 79803   | 145506  | 79705   | 145459   | 69276  |         |
|          |  | Weight     | ¼ lb   | —       | —      | —       | ¾ lb    | 1 ½ lbs | —       | —       | 3 lbs    | —      | 3 ½ lbs |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      | 1       |
| 35       | Seal body seal O-ring                                      | Part No.   | 568223 | 568225  | 568229 | 568226  | 568230  | 568335  | 568336  | 568338  | 568340   | 568349 |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      | 1       |
| 36       | Seal body seal protector ring                              | Part No.   | 148329 | 148345  | 147919 | 150925  | 148342  | 148338  | 148503  | 148493  | 148501   | 148499 |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      |         |
| 37       | Seal body seal non extrusion ring                          | Part No.   | 148328 | 148346  | 148886 | 146561  | 148343  | 148337  | 148504  | 148494  | 148502   | 102253 |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      |         |
| 38       | Washpipe   | Part No.   | 72908  | 145752  | 147920 | 146562  | 80487   | 79805   | 145502  | 79712   | 145461   | 73058  |         |
|          |  | Weight     | 12 lbs | —       | —      | —       | 21 lbs  | 29 lbs  | —       | —       | 46 lbs   | —      | 97 lbs  |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      | 1       |
| 39       | Washpipe O-ring (small)                                    | Part No.   | 568221 | 568130  | —      | 568225  | 568228  | 568229  | —       | —       | 30-15    | —      |         |
|          |  | No. Req'd. | 1      | 1       | —      | 1       | 1       | 1       | —       | —       | 1        | —      |         |
| 40       | Washpipe O-ring (large)                                    | Part No.   | 568130 | 568133  | 568142 | 568226  | 568230  | 568231  | 568233  | 568235  | 568237   | 568246 |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      |         |
| 41       | Pressure body  | Part No.   | 72900  | 145750  | 147921 | 146563  | 80488   | 79806   | 145500  | 79713   | 145462   | 72994  |         |
|          |  | Weight     | 34 lbs | —       | —      | —       | 64 lbs  | 48 lbs  | —       | —       | 160 lbs  | —      | 260 lbs |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      | 1       |
| 42       | Fill plug  | Part No.   | 617T   | 617T    | 617T   | 617T    | 617T    | 617T    | 329T    | 329T    | 329T     | 329T   |         |
|          |  | No. Req'd. | 2      | 2       | 2      | 2       | 2       | 2       | 2       | 2       | 2        | 2      | 2       |
| 43       | Fill plug O-ring   | Part No.   | 568005 | 568005  | 568005 | 568005  | 568005  | 568005  | 568006  | 568006  | 568006   | 568006 |         |
|          |  | No. Req'd. | 2      | 2       | 2      | 2       | 2       | 2       | 2       | 2       | 2        | 2      |         |
| 44       | Floater  | Part No.   | 151580 | 151584  | 151577 | 151583  | 151576  | 151578  | 151579  | 151582  | 151581   | 102303 |         |
|          |  | Weight     | 1 lb   | 2.3 lbs | 2 lbs  | 1.8 lbs | 2.7 lbs | 2.3 lbs | 7.1 lbs | 7.7 lbs | 10.3 lbs | —      |         |
|          |  | No. Req'd. | 1      | 1       | 1      | 1       | 1       | 1       | 1       | 1       | 1        | 1      |         |
| 45       | Floater O.D. seal  | Part No.   | 568227 | 568231  | 568232 | 568232  | 568235  | 568340  | 568349  | 568350  | 568354   | 568434 |         |
|          |  | No. Req'd. | 3      | 3       | 3      | 3       | 3       | 3       | 3       | 3       | 3        | 3      |         |



## Specifications and Replacement Parts

### Bowen Super Fishing Jar Specifications

|                   |          |       |        |        |        |       |       |        |       |        |       |
|-------------------|----------|-------|--------|--------|--------|-------|-------|--------|-------|--------|-------|
| Complete assembly | Part No. | 72888 | 145737 | 147902 | 146544 | 80468 | 79789 | 145484 | 79691 | 145440 | 72978 |
|-------------------|----------|-------|--------|--------|--------|-------|-------|--------|-------|--------|-------|

### Replacement Parts

| Item No. | Name                         | Part No.   | 72910  | 151684 | 151686 | 146565 | 151678 | 151677 | 151688 | 151675  | 73779  | 151691  |
|----------|------------------------------|------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|---------|
| 46       | Floater I.D. seal set        | Part No.   | 72910  | 151684 | 151686 | 146565 | 151678 | 151677 | 151688 | 151675  | 73779  | 151691  |
|          |                              | No. Req'd. | 2      | 2      | 2      | 2      | 2      | 2      | 2      | 2       | 2      | 2       |
| 47       | Floater I.D. O-ring          | Part No.   | 568224 | 568225 | 568230 | 568330 | 568231 | 568335 | 568337 | 568339  | 568341 | 568426  |
|          |                              | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       |
| 48       | Washpipe body                | Part No.   | 72913  | 145751 | 147924 | 146566 | 80491  | 79915  | 145501 | 79707   | 145465 | 73063   |
|          |                              | Weight     | 32 lbs | —      | —      | —      | 47 lbs | 68 lbs | —      | 167 lbs | —      | 211 lbs |
|          |                              | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       |
| 49       | Washpipe body O-ring (small) | Part No.   | 568139 | 568231 | 568232 | 568232 | 568235 | 568238 | 568247 | 568248  | 568251 | 568257  |
|          |                              | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       |
| 50       | Washpipe body O-ring (large) | Part No.   | 568144 | 568234 | 568235 | 568235 | 568153 | 568242 | 568250 | 568251  | 568255 | 568260  |
|          |                              | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1       | 1      | 1       |

### Required Accessories

|    |   |            |        |        |        |        |        |        |        |        |        |        |
|----|---|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 51 | Packing assembly sleeve for mandrel         | Part No.   | 74957  | 145762 | 147925 | 146567 | 80494  | 79813  | 145512 | 79755  | 145478 | 70635  |
|    |   | Weight     | —      | —      | —      | —      | —      | —      | —      | —      | —      | —      |
|    |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 52 | Floater positioning tool required accessory | Part No.   | 145215 | 153141 | 153142 | 153142 | 153144 | 153145 | 145513 | 153146 | 153147 | 153148 |
|    |   | Weight     | 5 lbs  | —      | —      | —      | 9 lbs  | 6 lbs  | —      | 11 lbs | —      | 17 lbs |
|    |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| 53 | Connector body wiper installation tool      | Part No.   | 81897  | 146996 | 147927 | 146768 | 146749 | 146741 | 146748 | —      | —      | —      |
|    |   | Weight     | —      | —      | —      | —      | —      | —      | —      | —      | —      | —      |
|    |   | No. Req'd. | 1      | 1      | 1      | 1      | 1      | 1      | 1      | —      | —      | —      |

### Optional - Extra

|    |  |            |        |        |        |   |        |        |        |        |        |        |
|----|--|------------|--------|--------|--------|---|--------|--------|--------|--------|--------|--------|
| 54 | Thread protector For tool joint box                | Part No.   | 146986 | 146984 | 149032 | 147649  | 147559 | 146959 | 63102  | 147552 | 63103  | 147540 |
|    |  | No. Req'd. | 1      | 1      | 1      | 1   | 1      | 1      | 1      | 1      | 1      | 1      |
| 55 | Thread protector for tool joint pin                | Part No.   | 146987 | 146985 | 149031 | 63091   | 147558 | 146960 | 63083  | 147551 | 63084  | 147538 |
|    |  | No. Req'd. | 1      | 1      | 1      | 1   | 1      | 1      | 1      | 1      | 1      | 1      |
| 56 | Service kit  | Part No.   | 145213 | 145213 | 145213 | Only one Service Kit Required For All Sizes of Jars |        |        |        |        |        |        |
|    |  | Weight     | —      | —      | —      |   |        |        |        |        |        |        |
|    |  | No. Req'd. | 1      | 1      | 1      |   |        |        |        |        |        |        |
| 57 | O-ring packing set                                 | Part No.   | 72914  | 145760 | 147928 | 146569  | 80492  | 79811  | 145510 | 79696  | 145466 | 73064  |
|    |  | Weight     | —      | —      | —      | —   | —      | —      | —      | —      | —      | —      |
|    |  | No. Req'd. | 1      | 1      | 1      | 1   | 1      | 1      | 1      | 1      | 1      | 1      |
| 58 | Complete packing set (includes O-ring packing set) | Part No.   | 72915  | 145761 | 147929 | 146570  | 80493  | 79812  | 145511 | 79698  | 145467 | 73065  |
|    |  | Weight     | —      | —      | —      | —   | —      | —      | —      | —      | —      | —      |
|    |  | No. Req'd. | 1      | 1      | 1      | 1   | 1      | 1      | 1      | 1      | 1      | 1      |
| 59 | Thread lubricant (KOPR-KOTE)                       | Part No.   | 153823 |        |        |   |        |        |        |        |        |        |
| 60 | Bowen jar lube                                     | Part No.   | 49842  |        |        |   |        |        |        |        |        |        |



### How to Order

Specify:

- (1) Name and number of assembly or part.
- (2) Size and type of connections, if other than standard.
- (3) Outside diameter, if other than standard.
- (4) Any spares or extras desired, by name and number.

Miscellaneous o-ring seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing sets, however, will always be furnished in sealed plastic bags.

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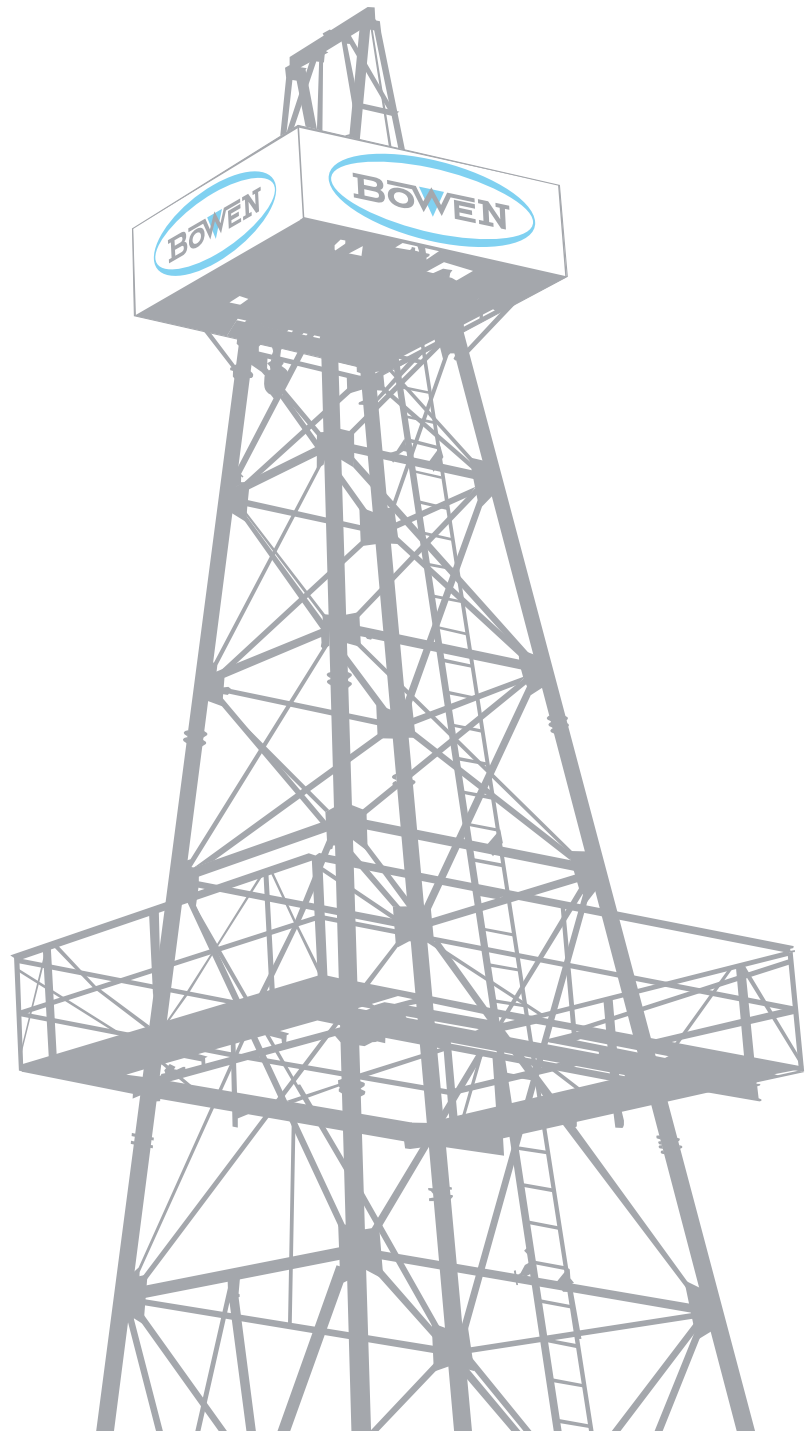
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# Bowen Super II Fishing Jar

Instruction Manual 4102



# Bowen Super II Fishing Jar

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Super II Fishing Jar

## General Description and Construction

The Bowen™ Super II fishing jar is a versatile straight-pull operated jar that allows you to control the intensity of the jarring blow by varying the applied pull load. Simple to assemble, it allows easy operation with no adjusting required before you go into the hole or after you have retrieved the fish. A restricted passage slows down the fluid flow, delaying the stroke until you have ample time to take the necessary stretch in the running string.

The straight pull-up jarring tool employs a patented combination of proven principles of hydraulics and mechanics. The one-piece mandrel design (integral top sub) enables greater torque and bending strength than other jars.

The variable impact control of the Super II fishing jar is made possible by the metering action of the cone assembly. Fluid flows from one side of the piston to the other through a metering port as pull is applied to the jar. Forced through this restricted passage, flow is retarded in a manner that delays the stroke. This gives you ample time to take the necessary stretch in the running string (and Bowen jar intensifier, when used) to strike a blow of given impact. The jar delivers blows ranging from low to very high impact and impulse forces, and you can deliver a rapid series of blows when desired. You only need to lower and raise the fishing string the short distance necessary to make each stroke.

Another advantage of the Super II fishing jar is the ease of closing or resetting. During closing or resetting, large ports open in the piston assembly, allowing

unimpeded fluid flow. Since the metering action does not occur during closing, only sufficient weight is required to overcome friction and close the jar.

The jar's internal chambers are sealed at both ends. Therefore, the lubricating and operating fluids cannot escape and well fluids cannot enter these chambers.

The lubricating and operating fluids constantly lubricate the internal working parts, promoting long wear life of the jar.

The Super II fishing jar does not interfere with the free operation of fishing tools, formation testers, or other tools, and is able to transmit torque in either direction.

## Applications

### Important Information

The Bowen Fishing Jar Placement Program is available to Bowen™ customers. The program should be run and used as a guide to optimize the string configuration to include, if an intensifier should be used. The program provides information on impact forces and impulse values based on the fishing string components, the fish, the applied pull loads at the jar, and other downhole information. This maximizes the likelihood of success in all jarring operations. The program also provides information to help you avoid excessively high impact loads. Pull load and impact force information can be compared to the strength of the fishing string (to include all tools being used) and to the fish for possible limitations on pull loads and impact forces. Time spend running the program and planning the fishing job is very beneficial.

**WARNING: The Bowen Fishing Jar Placement Program is written specifically for Bowen jars and intensifiers with the unique characteristics of each tool incorporated in the program. See program for additional information. Contact NOV for a copy of the computer program.**

A Bowen intensifier should be installed in the string when maximum jarring impact and impulse are needed. This is particularly true in shallow, deviated, or directional holes.

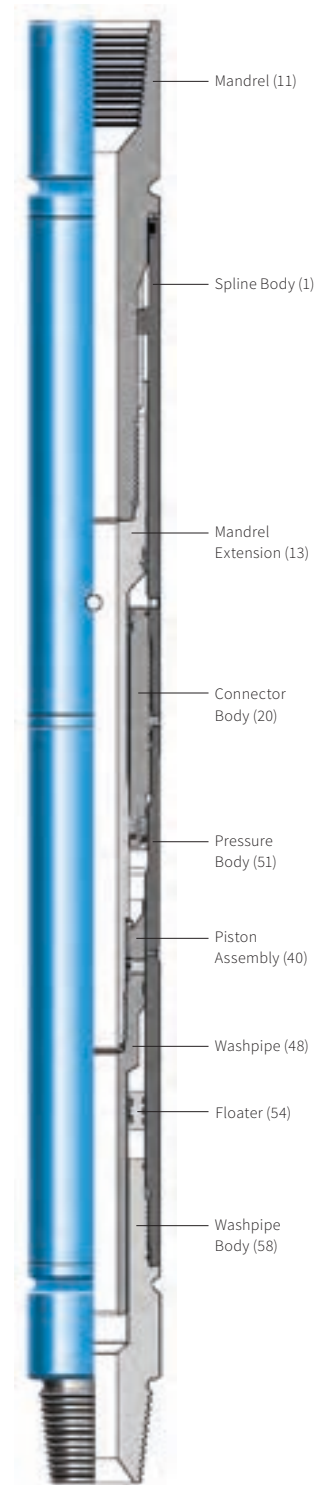


Figure 1  
6 ¼ in. Bowen Super II Fishing Jar

# Bowen Super II Fishing Jar

**CAUTION:** The intensifier should be located above all the concentrated mass (drill collars, heavy weight drill pipe, etc.) which is immediately above the jar. This concentrated mass is used to provide the impact and impulse at the stuck point while jarring. The working string above the intensifier should NOT have a weight per foot change for at least 1,000 feet of string directly above the intensifier. The only exception is for a fighter joint to be screwed directly into the intensifier for flexibility, when needed for bending. No mass above the intensifier improves the jarring results at the stuck point. Concentrated weight mass directly above the intensifier can cause the impact to occur in the intensifier. At the surface, this may give the impression of harder hitting, but will most likely result in less impact at the stuck point and can damage the BHA components or the fish.

The fishing tools should not be run at a highly deviated point in the hole or in the curvature of a directional hole if it can be avoided. In deviated, directional, or oversized holes, any jar and intensifier should be isolated from stiffer sections by a more flexible joint of string. This will protect the tools and other string components from excessive bending loads, which can result in premature fatigue failure.

We recommend running NO LESS than two (2) joints of drill collars NOR LESS than four (4) joints of heavy weight drill pipe between the Super II fishing jar and the intensifier or between the jar and the working string.

However, if this is absolutely necessary or desired, take care to avoid excessively high impact loads. Also, the Bowen Fishing Jar Placement Program should be run, especially in these cases.

## Fishing, Milling, and Washover

For fishing operations, the Bowen Super II fishing jar should be placed immediately below a string of concentrated mass (drill collars, heavy weight drill pipe, etc.). For maximum effectiveness, place it as close to the stuck point as possible. The Super II jar is particularly well-suited for milling and washover operations due to the rugged, integral top sub construction.

If it is not possible to run the Bowen Fishing Jar Placement Program, use the approximate drill collar weight range shown in Chart A -Specifications on page 18 as a guide. See Important Information starting on page 3.

## Formation Testing

The Bowen Super II fishing jar is excellent for use in drill stem testing. The jar will not interfere with the testing equipment and does not cause the test to be lost when jarring becomes necessary. The packing used in the Bowen Super II fishing jar is designed to withstand much higher pressure than would normally be encountered in drill stem testing.

When an open-hole or hook-wall packer sticks enough to require jarring, one or two moderate jarring blows is usually sufficient to loosen the packer. The hookwall packer sticks less often than the open-hole type but requires higher jarring forces to free it.

In drill stem testing, if it is not possible to run the *Bowen* Fishing

Jar Placement Program, three to fifteen drill collars are usually installed immediately above the jar, depending on conditions of operation.

For additional information and recommendations, see Important Information starting on page 3.

## Coring

Breaking a core without a jar in the string can require considerable pull load on the drill pipe. When a jar is used, only a comparatively moderate pull is usually required to deliver an impact sufficient to break the core. The Super II fishing jar should be run directly above a diamond core head assembly.

If it is not possible to run the Bowen Fishing Jar Placement Program, three to fifteen drill collars are usually installed immediately above the jar. See Important Information starting on page 3.

## Operation

### Preparation

Before use, carefully examine the Bowen Super II Fishing Jar to ensure it has been properly assembled and is filled with Bowen jar lube. The tool should be tested in a Bowen jar tester or equivalent to ensure proper performance.

Check all threaded connections to ensure they are made-up per Chart C Recommended Tightening Torques on page 17. Place tongs at least four (4) inches from the jar's straight threads.

### Rig Up

**WARNING:** The Super II jar is in the cocked (closed) position when it is shipped to the rig. When closed, the jar should NOT be left suspended from the elevators, especially with any

appreciable weight suspended below it. From this position, the jar may open and drop the length of its stroke, which can cause bodily harm or damage.

The Super II Jar should be carefully opened and assembled in the string below the concentrated mass (drill collars, heavy weight drill pipe, etc.). It is recommended that a Bowen intensifier be run with the Super II fishing jar for maximum effectiveness.

See sections under Applications on pages 3 and 4. See Intensifier Instruction Manual for more information on Bowen intensifiers.

## Jarring

**WARNING:** At no time during the pull cycle of the jar should the Field Load: Maximum Pull Load (lbs) be exceeded. See "Chart B -Strength and Test Data" on page 17.

We recommend applying a low initial load (30 to 50% of "Maximum Pull Load") and increasing the load on the following strokes if needed. This allows you to see and feel the effects of the jarring action.

If an intensifier is being used, the minimum applied pull load should be per the Minimum Pull Required (Above Weight of String and Collars) to Obtain Effective Blow (lbs)" per Strength Data chart in the *Bowen* Intensifier Manual.

The velocity and relative impact load of the jarring blow is controlled by the amount of stretch taken in the running string (pull load) and the weight of the drill collars installed above the jar.

## Jarring Procedure:

1. To strike the initial blow, set

# Bowen Super II Fishing Jar

the string down to ensure the jar is closed. Then, raise the string, applying the desired pull load at the jar. (See “Warning” at the beginning of this section.)

2. Set the brake and wait for the jar to strike. The first blow may take a few seconds to several minutes, depending on such variables as depth of operation, amount of stretch in the string (pull load), use of intensifier, downhole temperature, and hole condition.
3. Close the jar and repeat. After jarring, it is only necessary to close the jar before applying pull load to strike the next blow. Each blow may be struck at any desired pull load at the jar within the previously determined limits. Do not exceed the previously determined safe load limits, based on the earlier fishing job analysis and the Field Load: Maximum Pull Load (lbs) per Chart B - Strength and Test Data” on page 17 for the jar size being used.

See sections under “Applications” starting on pages 3 and 4.

## Troubleshooting

You may encounter some operation difficulties, some of which are listed below along with corrective procedures.

- A. If unable to strike the initial blow:
  1. Make sure the jar is fully closed.
    - a. Lower the string further to apply more closing force before
- B. If you are unable to hit subsequent blows, the corrective procedure is the same as listed under A.above.

applying pull load.

- b. If the pumps are running, the pump pressure will exert an opening force on the jar. To determine the additional closing force required to overcome the pump opening force, multiply the pump pressure at the jar by the pump opening area shown in Chart A - Specification on page 17. Apply the additional required closing force.
  - c. If enough additional weight cannot be applied to the jar to fully close it during the jar’s closing cycle, it may be necessary to temporarily reduce the pump pressure to allow the jar to fully close.
2. Pull up to the desired stretch in the string and set the brake. Hold this position until the jar strikes a blow.
  3. If you are still unable to strike the initial blow, increase tension in the running string if possible, but do not exceed the previously determined safe load nor the Field Load: Maximum Pull Load (lbs) for the jar per Chart B - Strength and Test Data on page 17.

- C. If blows are not as high as desired, ensure that the jar is fully closed before applying pull. See A. above.
2. Pull the running string up faster, but do not exceed the previously determined safe loads nor the Field Load: Maximum Pull Load (lbs)” for the jar. Refer to Chart B Strength and Test Data on page 17.
  3. Run the Bowen Fishing Jar Placement Program and vary the fishing string or fish configuration, if possible, to obtain better results. i.e, add an intensifier, use more or fewer drill collars or heavy weight drill pipe, or if fishing for drill pipe, try using drill pipe for weight between the jar and intensifier.

## Rig Down and Floor Maintenance

The Super II fishing jar will usually be brought out of the hole in the open position.

**WARNING: Once closed, the jar should NOT be left suspended from the elevators, especially with any appreciable weight suspended below it. From this position, the jar may open and drop the length of its stroke, which can cause bodily harm or damage.**

To prevent corrosion, the mandrel seal surface (see Figure 8 on page 14) should be thoroughly cleaned and well-greased prior to closing the jar for storage until its next use or shipping for service. Flush all mud and corrosive fluids,

including saltwater, from the bore, especially inside the washpipe body and around the washpipe up to the floater. Also flush the ports on the OD of the spline body and the cavity inside the ports. Allow all fluid to drain from these

areas. Clean the tool joint box and pin connections and coat with Bowen Itcolube or other high quality anti-gall grease to prevent corrosion and facilitate tool make-up in next use.

After moderate use on a short job, the Super II fishing jar is usually kept at the rig site, where it requires only minor maintenance that in most cases can be done on the rig floor.

The Super II fishing jar should be stored with the mandrel end up or horizontally on a suitable rack.

## Dressing Area Maintenance

After prolonged or hard use, the *Bowen Super II* fishing jar should be taken to an adequate dressing area as soon as possible for complete maintenance, including:

1. Disassembly
2. Inspection
3. Assembly
4. Filling with *Bowen* jar lube
5. Testing

**CAUTION: The Bowen Super II fishing jar is a hydraulic jar; therefore, close tolerances and smooth finishes are mandatory. Also, the jar must be kept free of all contamination (dirt, sand, metal, etc). Contamination left on parts can cause damage or malfunction.**

## Equipment

The following tools, equipment, and parts should be obtained before starting dressing area maintenance:

# Bowen Super II Fishing Jar

1. Bowen vise and tongs, or equivalent, suitable for jar size.
2. Overhead crane with 2,000 lb. minimum capacity.
3. Pipe wrenches, suitable for outside diameters (ODs) of interior jar parts.
4. Chain wrenches, suitable for spinning on/off threaded parts as shown in Figure 2.
5. Bowen v-belt pulley assembly no. 92070 or equivalent, which can be suspended from the crane to support threaded parts while spinning on/off. See Figure 2.
6. Nylon strap of suitable strength and condition for safely lifting and handling parts with overhead crane.
7. Bowen jar tester or equivalent, suitable for jar size.
8. Bowen Super II fishing jar service kit, as shown



Figure 2

V-Belt Pulley Assembly and Chain Wrench

9. Packing assembly sleeve for specific jar size seen on Figure 6 on page 12 and Accessories – Required and Recommended on page 21 for part numbers.
10. Floater positioning tool for specific jar size. See Figure 7 on page 13 and Accessories – Required and Recommended on page 21 for part numbers.
11. Spare parts for specific jar size. See Recommended Spares on page 21.

## Notes

Throughout the dressing area maintenance procedures, the following notes should be helpful:

- Replacement parts on pages 18 through 21 list all major components in the order in which they are assembled with subassembly parts (seals, etc.) listed below each major component. Item numbers are assigned to each part name for use in this manual only.
- Item numbers in parentheses indicate the location of parts as shown in the diagrams on pages 8, 9, and 10. They are also used throughout the text in this manual.
- Each item number corresponds to a part name and a specific part number in the chart accompanying diagrams on pages 8, 9, and 10 and in the

replacement parts list on pages 18 through 21.

- Part numbers are specific to jar OD size.

## Example:

| Item No. | Part Name   | Part No. (3 1/4 in.) | Part No. (4 3/4 in.) |
|----------|-------------|----------------------|----------------------|
| (1)      | Spline Body | 153284               | 152799               |

- “Top” and “bottom” refer to the ends of the jar as it is run in a fishing string; i.e., the mandrel (11) is on the top end, and the washpipe body (58) is on the bottom end.
- To prevent damage during servicing, do not use vice, tongs, wrenches, or chains on any seal surfaces or on any other smooth surfaces of the internal parts that are not stenciled “wrench area.”
- When disassembling the Bowen Super II fishing jar, note the direction and location of all packing, O-rings, backup rings, and wipers. This will help in reassembly of the jar.

## Disassembly

**WARNING: Do not remove fill plugs (37 and 52) or washpipe body (58). First, internal residual well pressure may exist within the jar and can cause serious damage or injury. Follow the procedure under Preparation below to release trapped internal well pressure.**

Before proceeding with disassembly, read the Dressing Area Maintenance starting on page 5.

## Disassembly Procedure Preparation:

1. Place the Super II fishing jar

in the jar tester and close the jar if it is not already closed. Then pull the jar open until it just releases. Do not stroke the jar fully open. When the jar is in this position, the cone (42) is in the relief area of the pressure body (51). This prevents damage to the piston assembly (40) and pressure body (51) bore during disassembly.

2. Clamp the jar in the vice on the center of the connector body (20). Position a pan under the pressure body (51) to catch jar lube.
  3. Place the tongs on the pressure body (51), centered between the fill plug (52) and the connector body (20) end of the pressure body.
  4. Release trapped internal well pressure by breaking the connection (right-hand threads) between the pressure body and connector body.
  5. Use chain wrench and v-belt pulley assembly (See Figure 2 on page 6) to carefully unscrew the pressure body (51) and allow any residual well pressure to escape. Then let the jar lube drain into the pan. Do not reuse this jar lube.
- Remove Washpipe Body (58):**
1. Reposition the jar in the vice and clamp onto the pressure body (51) with the vice centered between the fill plug (52) and the



# Bowen Super II Fishing Jar

lower end of the pressure body.

2. Use tongs to break the connection (right hand threads) between the washpipe body (58) and the pressure body (51). Use a chain wrench and v-belt pulley assembly to unscrew and remove the washpipe body.

## Remove Pressure Body (51) and Floater (54):

1. Using a chain wrench and v-belt pulley assembly, unscrew and remove the pressure body.
2. On 3 1/8 in. OD jar only, remove packing male adapter (30), packing pressure ring set (29), and packing female adapter (28) from bore of pressure body if they remained in the pressure body.
3. Remove the floater (54), which usually remains inside the pressure body. Reach inside and pull it out, or if necessary, use a long board to push it out of the bottom from the upper end. Be careful not to damage the pressure body bore or floater. If the floater is on the washpipe (48), simply pull it off.

## Remove washpipe (48) and piston assembly (40):

**CAUTION: On 4 3/4 in. OD x 2 1/4 in. ID Jar, remove the cone retainer (43) before disassembling the washpipe (48). To remove the cone retainer, use a suitable tool to spread its longitudinal split just enough to slide it off. Do not open the split too wide or the cone retainer will be damaged.**

1. Break the washpipe (48) to mandrel extension (13) connection (right hand threads) by using a pipe wrench on the undercut wrench area of the upper (large) end of the washpipe, stenciled "wrench here." Make sure the wrench only contacts the area marked "wrench here." Be careful not to damage the long seal surface. Use a chain wrench and the v-belt pulley assembly to unscrew and remove the washpipe.
2. Remove the seal body (44), cone (42) and bypass body (41). These parts simply slide off the lower end of the mandrel extension (13). Handle these critical parts with care! Wrap them in cloth for protection.
3. On 3 1/8 in. OD jars only, which are equipped with a single connector body packing set (29), remove this packing set, the packing male adapter (30), and the packing female adapter (28) from the mandrel extension.

**NOTE: All other Super II fishing jar sizes have two connector body packing sets (32 and 34). These are removed with the connector body.**

## Remove Connector Body (20):

1. Reposition the jar in the vice and clamp onto the center of the spline body (1).
2. Use the tongs to break the connection (right-hand threads) between the connector body (20) and the spline body (1). Use a chain wrench and v-belt

pulley assembly to unscrew and remove the connector body.

## Remove Mandrel (11) and Mandrel Extension (13):

**CAUTION: Handle with care! The OD of the mandrel extension (13) consists of threads, seal surfaces, and only one wrench area. The OD of the mandrel (11) consists of threads, spline, and seal surface.**

1. Use the tongs to break the connection (right-hand threads) between the mandrel (11) and mandrel extension (13). Make sure the wrench only contacts the mandrel extension in the undercut area stenciled "wrench here." Use a chain wrench and v-belt pulley assembly to unscrew the mandrel extension.
2. While supporting the mandrel extension (13) with a nylon strap and the overhead crane, slide the mandrel extension toward the lower end of the jar and remove it. Then, supporting the mandrel with the crane and nylon strap, slide the mandrel out of the spline body toward the upper end of the jar.

## Remove Mandrel Body (7):

(Only the 4 3/4 in. OD jar has a mandrel body.)

**CAUTION: The Mandrel Body has left-hand threads.**

1. Use the tongs to break the connection (left-hand threads) between the mandrel body (7) and the spline body (1). Use a chain wrench and v-belt

pulley assembly to unscrew and remove the mandrel body.

## Remove Spline Body (1) and Sub-Assemblies:

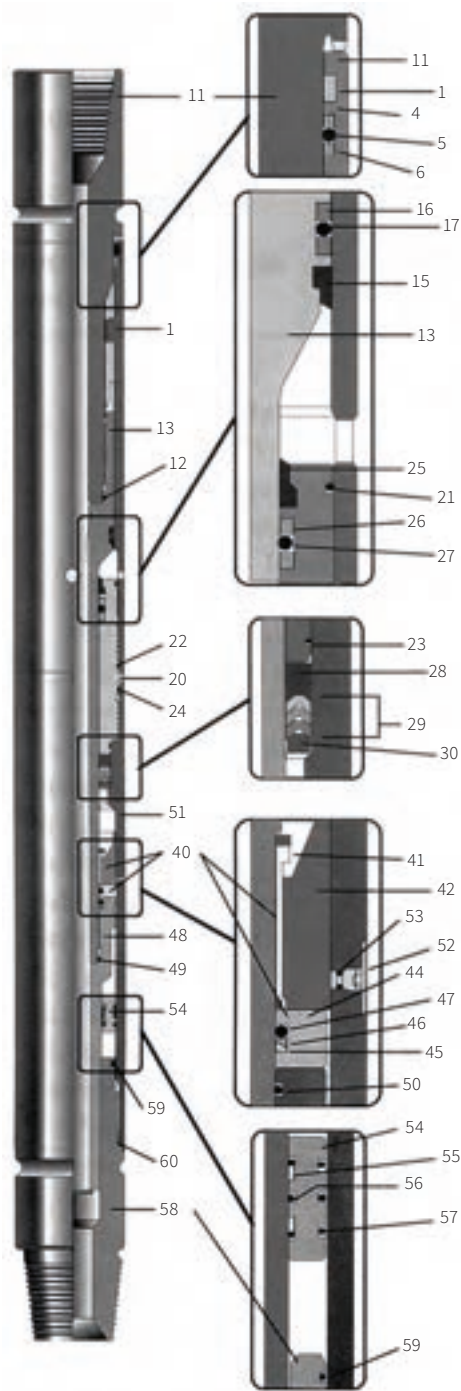
1. Remove the spline body from the vice.
2. Remove the fill plug(s) (52) from the pressure body (51), and on the 4 3/4 in. OD jar, remove the fill plug (37) from the connector body (20).
3. Remove all sealing components from all parts using tools 625 or 626 in Service Kit, shown on page 22.

**CAUTION: Be careful not to damage the seal grooves or other surfaces.**

**NOTE: Immediately after disassembly, thoroughly clean and inspect all parts according to Inspection beginning on page 11.**

# Bowen Super II Fishing Jar

## 3 1/8 in. O.D. x 1 in. I.D. Super II Fishing Jar Diagram



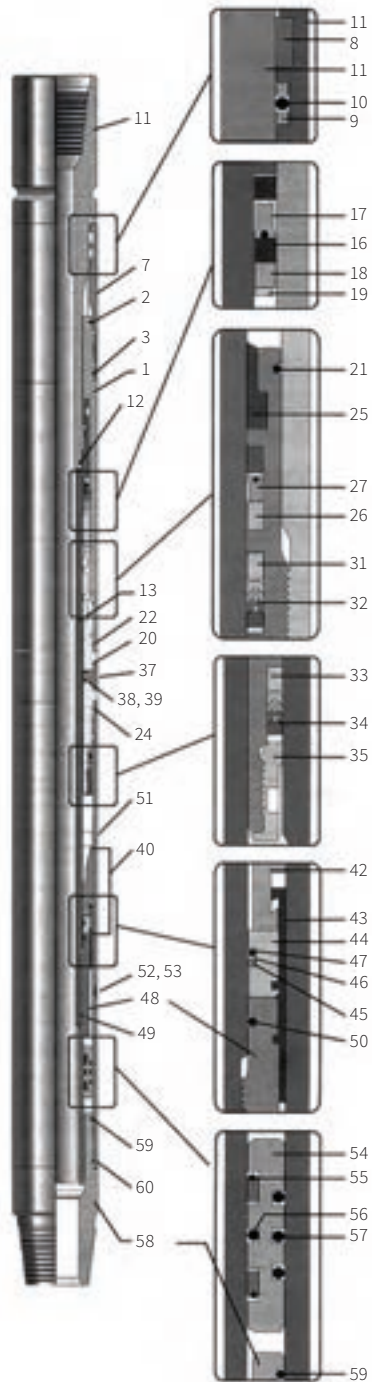
**Fig. 3**  
3 1/8 in. O.D. x 1 in. I.D. Super II Fishing Jar

| Item No. | Part Name                                     | 3 1/8 in. Part No. |
|----------|---|--------------------|
| 1        | Spline Body                                   | 153284             |
| 4        | Wiper   | 153286             |
| 5        | I.D. O-Ring                                   | 568334             |
| 6        | Back-up Ring (2 req.)                         | 153285             |
| 11       | Mandrel (integral type)                       | 153287             |
| 12       | O.D. O-Ring (small)                           | 568221             |
| 13       | Mandrel Extension                             | 153288             |
| 15       | Wiper   | 153290             |
| 16       | Back-up Ring for O.D. Seal (box end) (2 req.) | 153289             |
| 17       | O.D. Seal (box end)                           | 568330             |
| 20       | Connector Body                                | 153291             |
| 21       | O.D. O-Ring (small) for Spline Body End       | 568142             |
| 22       | O.D. O-Ring (large) for Spline Body End       | 568145             |
| 23       | O.D. O-Ring (small) for Pressure Body End     | 568141             |
| 24       | O.D. O-Ring (large) for Pressure Body End     | 568144             |
| 25       | Wiper   | 153293             |
| 26       | Back-up Ring (2 req.)                         | 153292             |
| 27       | I.D. Seal                                     | 568327             |
| 28       | Packing Female Adapter                        | 148313             |
| 29       | Packing Pressure Ring Set                     | 153294             |
| 30       | Packing Male Adapter                          | 148312             |
| 40       | Piston Assembly                               | 72903              |
| 41       | Bypass Body                                   | 72905              |
| 42       | Cone  | 156486             |
| 44       | Seal Body                                     | 72906              |
| 45       | Non Extrusion Ring for O-Ring                 | 148328             |
| 46       | Seal Protector Ring for O-Ring                | 148329             |
| 47       | O-Ring  | 568223             |
| 48       | Washpipe                                      | 72908              |
| 49       | O-Ring (small)                                | 568221             |
| 50       | O-Ring (large)                                | 568130             |
| 51       | Pressure Body                                 | 72900              |
| 52       | Fill Plug (2 req.)                            | 617T               |
| 53       | O-Ring (2 req.)                               | 568005             |
| 54       | Floater (steel)                               | 151580             |
| 55       | I.D. Seal (2 req.)                            | 72910              |
| 56       | I.D. O-Ring (2 req.)                          | 568224             |
| 57       | O.D. O-Ring (3 req.)                          | 568227             |
| 58       | Washpipe Body                                 | 72913              |
| 59       | O-Ring (small)                                | 568139             |
| 60       | O-Ring (large)                                | 568144             |

NOTE: Item numbers not shown are not in this assembly.

# Bowen Super II Fishing Jar

## 4 3/4 in. O.D. x 2 1/4 in. I.D. Super II Fishing Jar Diagram



**Fig. 4**  
4 3/4 in. O.D. x 2 1/4 in. I.D. Super II Fishing Jar

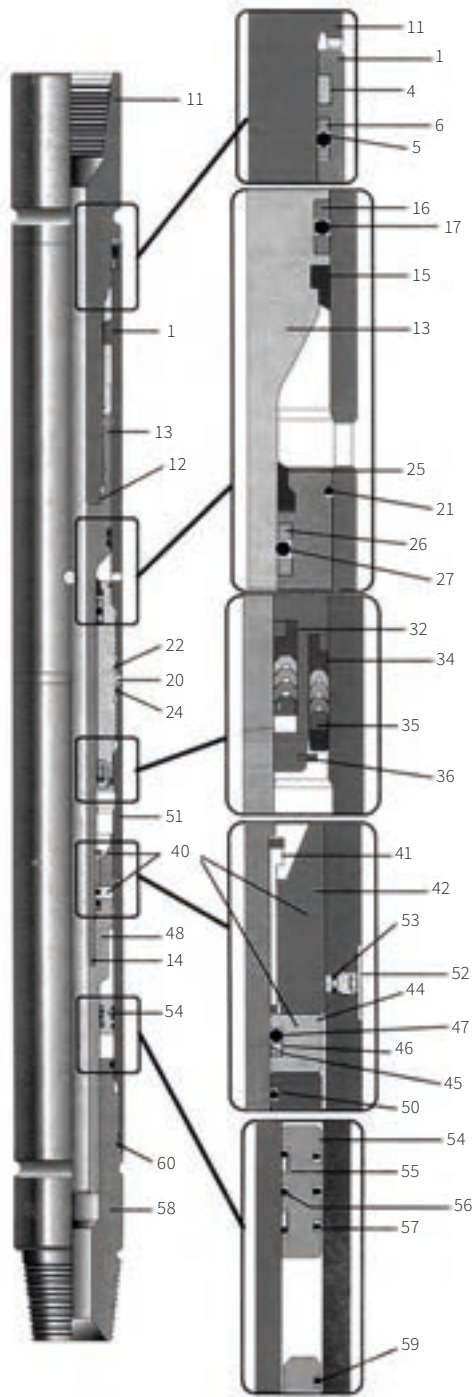
| Item No. | Part Name                                     | 4 3/4 in. Part No. |
|----------|---|--------------------|
| 1        | Spline Body                                   | 152799             |
| 2        | O.D. O-Ring (small)                           | 568241             |
| 3        | O.D. O-Ring (large)                           | 565243             |
| 7        | Mandrel Body                                  | 153355             |
| 8        | Wiper for Mandrel Body                        | 153356             |
| 9        | Back-up Ring (2 req.)                         | 153357             |
| 10       | I.D. O-Ring                                   | 568343             |
| 11       | Mandrel (integral type)                       | 153354             |
| 12       | O.D. O-Ring (small)                           | 568231             |
| 13       | Mandrel Extension                             | 152797             |
| 16       | Back-up Ring for O.D. Seal (box end) (2 req.) | 152795             |
| 17       | O.D. Seal (box end)                           | 152815             |
| 18       | Seal Retainer for O.D. Seal (box end)         | 152794             |
| 19       | Seal Retainer Ring for O.D. Seal (box end)    | 152442             |
| 20       | Connector Body                                | 152443             |
| 21       | O.D. O-Ring (small) for Spline Body End       | 568239             |
| 22       | O.D. O-Ring (large) for Spline Body End       | 568242             |
| 24       | O.D. O-Ring (large) for Pressure Body End     | 568242             |
| 25       | Wiper   | 70536              |
| 26       | Back-up Ring (2 req.)                         | 152796             |
| 27       | I.D. Seal                                     | 152813             |
| 31       | I.D. Packing Female Adapter                   | 152926             |
| 32       | I.D. Packing Set                              | 152793             |
| 33       | O.D. Packing Female Adapter                   | 102387             |
| 34       | O.D. Packing Set                              | 102400             |
| 35       | O.D. Packing Retainer                         | 152801             |
| 37       | Fill Plug (1 req.)                            | 102025             |
| 38       | Back-up Ring                                  | 8-010              |
| 39       | O-Ring  | 568010             |
| 40       | Piston Assembly                               | 152817             |
| 42       | Cone  | 152317             |
| 43       | Cone Retainer*                                | 153203             |
| 44       | Seal Body                                     | 152316             |
| 45       | Non Extrusion Ring                            | 370-11             |
| 46       | Seal Protector Ring                           | 376-11             |
| 47       | O-Ring  | 568233             |
| 48       | Washpipe                                      | 152314             |
| 49       | O-Ring (small)                                | 568231             |
| 50       | O-Ring (large)                                | 568233             |
| 51       | Pressure Body                                 | 153183             |
| 52       | Fill Plug (1 req.)                            | 617T               |
| 53       | O-Ring  | 568005             |
| 54       | Floater (steel)                               | 102301             |
| 55       | I.D. Seal (2 req.)                            | 152816             |
| 56       | I.D. O-Ring                                   | 568336             |
| 57       | O.D. O-Ring (3 req.)                          | 568341             |
| 58       | Washpipe Body                                 | 152315             |
| 59       | O-Ring (small)                                | 568239             |
| 60       | O-Ring (large)                                | 568242             |

NOTE: Item numbers not shown are not in this assembly.

\*Installed after washpipe body

# Bowen Super II Fishing Jar

## 6 ¼ in. O.D. x 2 ¼ in. I.D. and 7 ¾ in. O.D. x 3 ⅛ in. I.D. Super II Fishing Jar Diagram



| Item No. | Part Name                                     | 6 ¼ in. Part No. | 7 ¾ in. Part No. |
|----------|---|------------------|------------------|
| 1        | Spline Body                                   | 152565           | 152409           |
| 4        | Wiper   | 152569           | 152413           |
| 5        | I.D. O-Ring                                   | 568430           | 568439           |
| 6        | Back-up Ring (2 req.)                         | 152570           | 154414           |
| 11       | Mandrel (integral type)                       | 152566           | 152410           |
| 12       | O.D. O-Ring                                   | 568238           | 568246           |
| 13       | Mandrel Extension                             | 152567           | 152411           |
| 14       | O.D. O-Ring (small) (pin end)                 | 568230           | 568240           |
| 15       | Wiper   | 152571           | 152415           |
| 16       | Back-up Ring for O.D. Seal (box end) (2 req.) | 152572           | 152416           |
| 17       | O.D. Seal (box end)                           | 568426           | 568435           |
| 20       | Connector Body                                | 152568           | 152412           |
| 21       | O.D. O-Ring (small) for Spline Body End       | 568249           | 568258           |
| 22       | O.D. O-Ring (large) for Spline Body End       | 568252           | 568260           |
| 24       | O.D. O-Ring (large) for Pressure Body End     | 568251           | 568260           |
| 25       | Wiper   | 79700            | 72988            |
| 26       | Back-up Ring (2 req.)                         | 79695            | 72989            |
| 27       | D Seal  | 568339           | 568246           |
| 32       | I.D. Packing Set                              | 148633           | 148643           |
| 34       | O.D. Packing Set                              | 148634           | 148644           |
| 35       | O.D. Packing Retainer                         | 79703            | 72992            |
| 36       | I.D. Packing Retainer Ring                    | 79697            | 78427            |
| 40       | Piston Assembly                               | 81617            | 69274            |
| 41       | By-pass Body                                  | 79704            | 69277            |
| 42       | Cone  | 79709            | 69275            |
| 44       | Seal Body                                     | 79705            | 69276            |
| 45       | Non Extrusion Ring                            | 148494           | 102253           |
| 46       | Seal Protector Ring                           | 148493           | 148499           |
| 47       | O-Ring  | 568338           | 568349           |
| 48       | Washpipe                                      | 79712            | 73058            |
| 50       | O-Ring (large)                                | 568235           | 568246           |
| 51       | Pressure Body                                 | 79713            | 72994            |
| 52       | Fill Plug (2 req.)                            | 329T             | 329T             |
| 53       | O-Ring (2 req.)                               | 568006           | 568006           |
| 54       | Floater (steel)                               | 151582           | 102303           |
| 55       | I.D. Seal (2 req.)                            | 151675           | 151691           |
| 56       | I.D. O-Ring                                   | 568339           | 568426           |
| 57       | O.D. O-Ring (3 req.)                          | 568350           | 568434           |
| 58       | Washpipe Body                                 | 79707            | 73063            |
| 59       | O-Ring (small)                                | 568243           | 568257           |
| 60       | O-Ring (large)                                | 568251           | 568260           |

NOTE: Item numbers not shown are not in this assembly.

**Fig. 5**  
6 ¼ in. O.D. 2 ¼ in. I.D. Super II Fishing Jar

# Bowen Super II Fishing Jar

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## Inspection

During inspection of Super II fishing jar parts, look for damage to smooth surfaces, sliding surfaces, seal surfaces, threads, spline, grooves, and bores. Types of damage include: pits, nicks, scratches, burrs, abrasions, cracks, and galled or worn areas. Minor damage refers to damage which will not cause further damage to parts or to seals after it has been removed using a small hand grinder or file, followed by polishing with fine emery cloth. Major damage cannot be restored by hand grinding and polishing. All parts with major damage or fatigue cracking must be replaced.

**CAUTION: Uncorrected major or minor damage may render parts non-repairable and could interfere with proper jar operation or cause additional damage.**

## Inspection Procedure

### All Parts:

Carefully steam clean all parts or clean with solvent and wipe them dry with a clean, lint-free cloth. Examine straight box and pin threads, removing any minor damage with a triangular profile grinder or hand file before polishing with emery cloth. Inspect seal surfaces and grooves for fluid erosion, burrs, mushroomed lands, and other deformities. Repair if possible. Using a seal pick, fingernail, or other pointed object, feel the entire width and depth of the groove. If possible, repair any steps or other surface interruptions.

**We strongly recommend using magnetic particle inspection is for locating fatigue cracks.** Parts with cracks **MUST NOT** be used. Use magnetic particle inspection for fatigue cracking on:

- pin sections at inside corner of the 15° shoulder
- corners at the bottom of all grooves
- corners at bottom of thread relief
- threads nearest the thread relief
- all locations where there is a cross sectional area change (where a face or beveled surface intersects a cylinder)
- mud port holes in the spline body and fill plug holes

### Pressure Body (51):

Examine the bore of the pressure body where the cone and floater seal. Remove minor damage using very fine emery cloth. If damage cannot be smoothed out, the bores must be reworked before being put back in to service. Also inspect seal bore and threads in fill plug hole(s).

### Piston Assembly (40):

Inspect piston assembly components, including cone (42), seal body (44) and bypass body (41) or cone retainer (43). Remove minor damage with extreme care, as critical surfaces of these parts are ground and polished. Ensure that mating surfaces of the cone and seal body remain flat and smooth, and that the cone OD interferes slightly with the bore of the pressure body. If they do not, these parts are unusable. In such cases, *Bowen* may be able to rework and salvage the part(s).

### Mandrel Extension (13):

Use a micrometer or straight edge to inspect the cone area of the mandrel extension for necking

caused by excessively high pull loads. If necking has occurred, the part must be replaced. Also, inspect the 90° shoulder on the mandrel extension, which retains the bypass body and cone. It must be square, smooth, and not have an excessively large bevel at the OD corner.

### Knocker Surfaces:

The knocker surface on the mandrel extension (13) is the uppermost face of the box end. The mating knocker surface is the shoulder inside the spline body (1) at the lower end of the spline on the connector body side. Examine knocker surfaces and spline in this area for damage. Remove upset material and sharp corners. Also, using magnetic particle inspection methods for crack detection, inspect the inside corner at the intersections of spline with the bores at both ends of the spline in the spline body. If you find cracks, replace the spline body.

### Mandrel (11) and Spline Body (1):

Inspect the spline on both the mandrel and spline body, removing any minor damage.

### Seals, O-Rings, Packing, and Wipers:

These parts are to be replaced during dressing area maintenance. However, inspect these parts to detect potential problems with the other jar parts due to wear or damage.

### Backup Rings, Packing Adapters, Packing Retainers, Seal Retainers, Packing Retainer Rings, and Seal Retainer Rings, Non Extrusion Rings, Seal Protector Rings, Floater, and Fill Plugs:

Inspect and repair all minor damage or replace with new parts.

### All Parts:

Thoroughly oil all metal parts with Bowen jar lube (69) to protect from corrosion.

# Bowen Super II Fishing Jar

## Assembly

Before proceeding with assembly, read Dressing Area Maintenance starting on page 5.

### Assembly Procedure

#### Preparation:

Before assembly, make sure all parts are clean and in good condition per Inspection on page 11. Coat the mating surfaces of all metal parts with Bowen jar lube (69) before assembly, except where *Bowen Itcolube* (68) is specified. We recommend redressing the Super II fishing jar with a new complete packing set (65 or 67).

Install o-rings, seals, wipers, backup rings, packing sets (with adapters, which may be separate), non-extrusion rings, and seal protector rings:

1. Coat all parts with Bowen jar lube (69).
2. Install parts in their location and orientation. Refer to Figures 3, 4, or 5 on pages 8, 9, and 10.

**NOTE: The 3 1/8 in. OD jar has a single connector body packing set. It will be installed later in the procedure.**

#### Prepare Spline Body (1):

1. Center and secure the spline body in the vise.
2. Coat the spline generously with Bowen Itcolube (68).

#### Install Mandrel Body (7) to Spline Body (1):

(4 3/4 in. OD size only)

1. Coat the threads, including surfaces on both ends of the threads, and the 15° shoulder of spline body pin thread using *Bowen Itcolube* (68).

2. Use a chain wrench and v-belt pulley assembly (as shown in Figure 2 on page 6) to screw the mandrel body to the spline body.

**NOTE: This join has LEFT-HAND threads.**

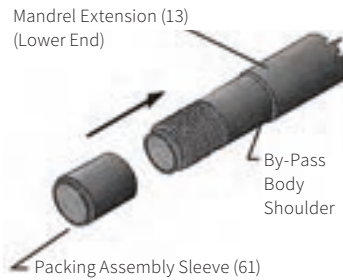
3. Tighten with vise and tongs. Refer to Chart C – Recommended Tightening Torques on page 17 for proper makeup torque.

#### Install Mandrel (11):

1. Coat the mandrel splines with Bowen Itcolube (68). On the end with Bowen straight threads, also coat the threads, the OD surfaces on both ends of the threads, and the end face with Bowen Itcolube.
2. Using crane and nylon strap, lift mandrel and insert the lower end through the spline body. In the 4 3/4 in. OD jar, slide the mandrel through the mandrel body and spline body.

#### Install Mandrel Extension (13) to Mandrel (11):

1. Lightly coat the OD of the box thread with *Bowen Itcolube* (68).
2. Use the crane to lift the mandrel extension into place and screw onto mandrel using chain wrench and v-belt pulley assembly as shown in Figure 2 on page 6. Place wrench on the area stenciled, “wrench here.”
3. Tighten connection with vise and tongs according to Chart C – Recommended Tightening Torque on page 17.



**Figure 6**  
Packing Assembly Sleeve Installation

#### Prepare Packing Assembly Sleeve (61):

(Not required on 4 3/4 in. OD Jar)

1. Slide packing assembly sleeve over the lower end of the mandrel extension (13) until it is against the bypass body shoulder. (See Figure 6 above).
2. Coat packing assembly sleeve and entire length of mandrel extension with *Bowen jar lube* (69). Do not use *Itcolube* (68) or grease.

#### Install Connector Body (20) to Spline Body (1):

1. Coat only the upper threads of the connector body with *Itcolube* (68), including OD surfaces on both ends of the threads and the 15° shoulder.
2. Using the crane to lift the connector body, slide it over the mandrel extension.
3. Remove the packing assembly sleeve (see Figure 6 above) from mandrel extension (13).
4. Use the chain wrench and v-belt pulley assembly to screw connector body to spline body.
5. Tighten the connection with vise and tong according to Chart C – Recommended

Tightening Torques on page 17.

#### Reposition Jar in Vise:

1. Reposition the jar with the connector body centered in the vise and clamp securely.

#### Install Connector Body Packing:

(3 1/8 in. OD jar only)

Refer to Figure 3 on page 8 for proper orientation and location.

1. Install the female adaptor (28), pressure ring set (29), and male adapter (30), in that order, over the mandrel extension.
2. Slide up against the connector body (20).

#### Install Piston Assembly (40) on mandrel extension (13):

(All except 4 3/4 in. OD jar)

1. The piston assembly consists of the bypass body (41), cone (42), and seal body (44) with the non extrusion ring (45), seal protector ring (46), and o-ring (47) installed earlier.
2. Thoroughly clean the piston assembly and install it onto the mandrel extension per Figures 3, 4, or 5 on pages 8, 9, or 10.

#### Install Piston Assembly (40) on Mandrel Extension (13):

(On 4 3/4 in. OD Jar)

1. The piston assembly consists of the cone (42), cone retainer (43), and seal body with non-extrusion ring (45), seal protector ring (46), and o-ring (47) installed earlier.
2. Thoroughly clean the piston assembly and install the cone and seal body per Figure 4 on page 9.

# Bowen Super II Fishing Jar

3. The cone retainer (43) will be installed later.

## Install Washpipe (48) to Mandrel Extension (13):

1. Coat threads and only the OD surface and face at the very end of mandrel extension using Bowen Itcolube (68), taking care not to lube above thread relief.
2. Remove excess Itcolube from threads.
3. Using chain wrench on undercut wrench area of upper (large) end of washpipe stenciled “wrench here” and the v-belt pulley assembly, screw washpipe onto mandrel extension. Again, wipe off any excess Itcolube and wash with solvent to prevent contamination of fluid reservoir with Itcolube.
4. Tighten connection using pipe wrench on wrench area. Remove any burrs and filings left on wrench area.

**CAUTION: Washpipe to mandrel extension connection is not torqued as high as other connections. Refer to Chart C – Recommended Tightening Torques on page 18.**

## Install Cone Retainer (43):

(4 ¾ in. OD jar only)

1. To install the cone retainer, use a suitable tool to spread the longitudinal split just enough to slide it over the end of the washpipe (48), seal body (44), and lower end of the cone (42).

**CAUTION: DO NOT open the split too wide or the cone**

**retainer will be damaged. Be sure the three rings on the ID of the cone retainer fully engage the three grooves on the OD of the washpipe, seal body, and cone. The cone should be free to slide a short distance but must be held relatively close to the seal body. The cone retainer must fit tightly around the parts to function properly; if not, it should be replaced.**

## Lube washpipe (48) and connector body (20):

1. Coat long seal surface of washpipe (48) using Bowen jar lube (69).
2. Coat connector body packing (34) on 4 ¾ in., 6 ¼ in., and 7 ¾ in. OD jars OR connector body packing (29) on 3 ½ in. OD jar using Bowen jar lube.
3. On lower end of connector body, coat threads, including OD surfaces on both sides of threads, and 15° shoulder with Bowen

Itcolube (68). Take care not to get Itcolube on the packing or on the fluid chamber end of the packing.

## Install Pressure Body (51) to Connector Body (20):

1. Coat bore of pressure body using Bowen jar lube (69).
2. Using crane, lift pressure body and slide it over washpipe (48), taking care not to damage connector body packing set (29 or 34).
3. Use chain wrench and v-belt pulley assembly to screw pressure body onto connector body.
4. Place tongs between fill plug hole(s) (52) and upper end of pressure body and tighten connection (right-hand threads) according to Chart C – Recommended Tightening Torques on page 17.

## Install Floater (54):

See Figure 7 below)

1. Before installing floater, pull the jar to the fully open position (fully extended), if not already in this position.
2. Coat ID and OD of floater, seals installed earlier with Bowen jar lube (69).

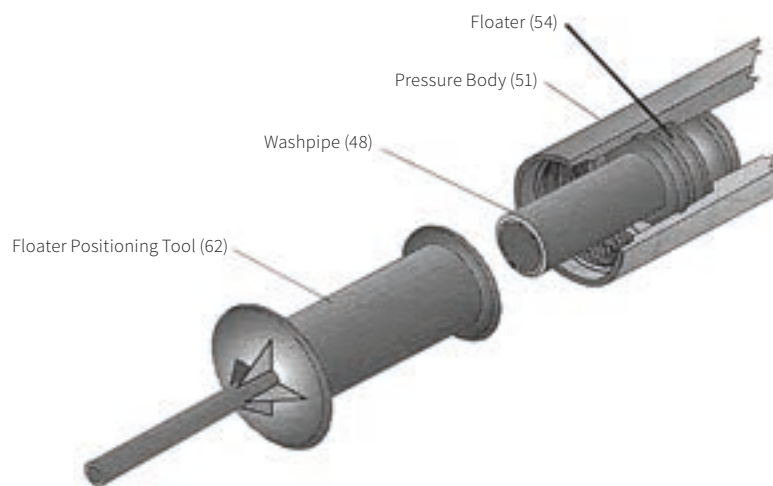


Figure 7  
Floater Positioning Tool

# Bowen Super II Fishing Jar

- Slide floater over washpipe (48).
- Push floater with floater positioning tool (62) until tool contacts end of pressure body.

**NOTE:** If proper size positioning tool is unavailable, refer to floater position in Chart A – Specifications on page 17. To function properly, floater must be positioned with sufficient space to move both up and down.

## Install Washpipe Body (58) to Pressure Body (51):

- Reposition jar in vise with vise centered between pressure body fill plug hole(s) and lower end of pressure body.
- Coat washpipe body straight threads, including OD surfaces at both ends of threads, and 15° shoulder using *Bowen Itcolube* (68).
- Use the crane to lift the washpipe body and slide it over washpipe (48).
- Use the chain wrench and v-belt pulley assembly to screw washpipe body onto pressure body.
- Tighten the connection with vise and tongs according to Chart C – Recommended Tightening Torques on page 18. Install the tool joint pin thread protection and install the jar tester sub on the tool joint pin connection for protection while handling and filling the jar.

**NOTE:** Do not close the Super II jar until it is filled with Bowen jar lube (69).

## Filling the Super II Fishing Jar

**NOTE:** After assembly, all Super II fishing jars must remain open and fully extended with the mandrel (11) seal surface exposed until jar is filled. See Figures 8, 9, and 10 on pages 14 and 15. If the mandrel moves, the floater may shift from its proper position, requiring removal of washpipe body to check and correct floater position.

The volume pump shown on page 22 is to be filled with clean *Bowen* jar lube (69).

## Filling the 4 3/4 in. OD Super II fishing jar

(see page 21 for other sizes of jars.)

- Position the jar with the connector body fill plug (37) hole at the top of the jar's OD. This will allow maximum air removal

during filling. See Figure 8 below.

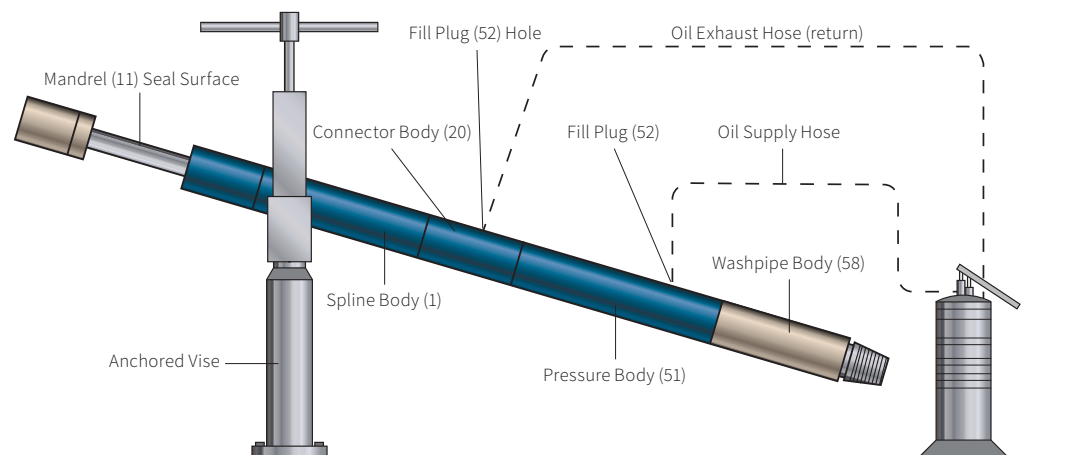
- Tilt the jar at least 10° from horizontal with the washpipe body (58) and lower than the mandrel (11) end. See Figure 8 below.

**NOTE:** This can be done by using the crane to position the jar in the floor vise. Center the vise on the spline body (1). By leaving the vise loosened slightly, the jar can be lowered to the required angle for filling.

- Attach the volume pump oil supply hose to the pressure body fill plug (52) hole using the assembled adapter and male coupler. This fill plug hole may be located anywhere around the OD, but is near the center of the length of the pressure body (51), see Figure 8 below. Attach the volume pump oil exhaust hose to the connector body fill plug (37) hole using the assembled

adapter and male coupler. Required hardware is included in service kit (63), shown on page 22.

- Operate the volume pump and moderate speed until a bubble-free flow of Bowen jar lube comes through the clear oil exhaust hose.
- Remove the oil exhaust hose and coupler with adapter connector body (20). Check the fill plug hole for fluid; if not full, very slowly pump in additional jar lube until the last of the air is removed. Remove oil supply hose, but leave this coupler and adapter in the pressure body. This will prevent jar lube from draining from the jar back into volume pump. The male coupler has a check valve that will prevent jar lube from leaking out when the hose is disconnected.



**Figure 8**  
Position of 4 3/4 in. Super II Fishing Jar During Filling Operation



# Bowen Super II Fishing Jar

6. Install fill plug (37) with fill plug o-ring (38) in place into connector body (20) and tighten securely.
7. Raise lowered end of jar until it is horizontal. Rotate jar until pressure body fill plug (52) hole is at the top of jar's OD. Remove coupler with adapter.
8. Install fill plug (52) with fill plug o-ring (53) in place into pressure body (51) and tighten securely.
9. The 4 3/4 in. OD Super II fishing jar is now ready for testing.

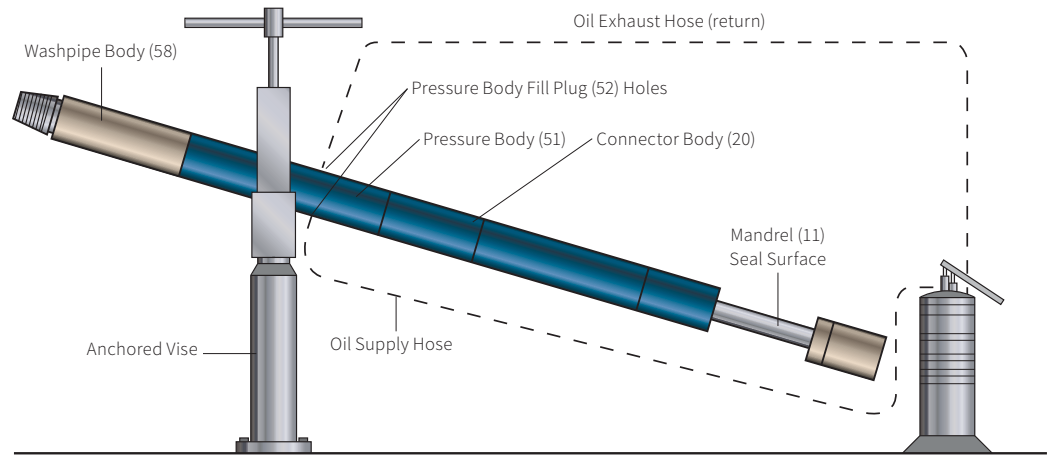


Figure 9. Initial Position of Super II Fishing Jar During Filling Operation

**Filling the 3 1/8 in., 6 1/4 in., and 7 3/4 in. OD Super II Fishing Jars:** (4 3/4 in. OD jar is at the beginning of Filling the Super II Fishing Jar on page 14).

1. Position the jar with one of the pressure body fill plug (52) holes at the top of the jar's OD. This will allow maximum air removal during filling. See Figure 9 at right.
2. Tilt the jar at least 10° from horizontal with the mandrel (11) end lower than the washpipe body (58) end. See Figure 9 at right.

**NOTE: You can do this by using the crane to position the jar in the floor vise with the vise between the pressure body fill plugs (52) holes and the connector body (20). By leaving the vise loosened slightly, the jar can be lowered to the required angle for filling.**

3. Attach the volume pump oil supply hose to the pressure body fill plug (52) hole on the underside of the jar

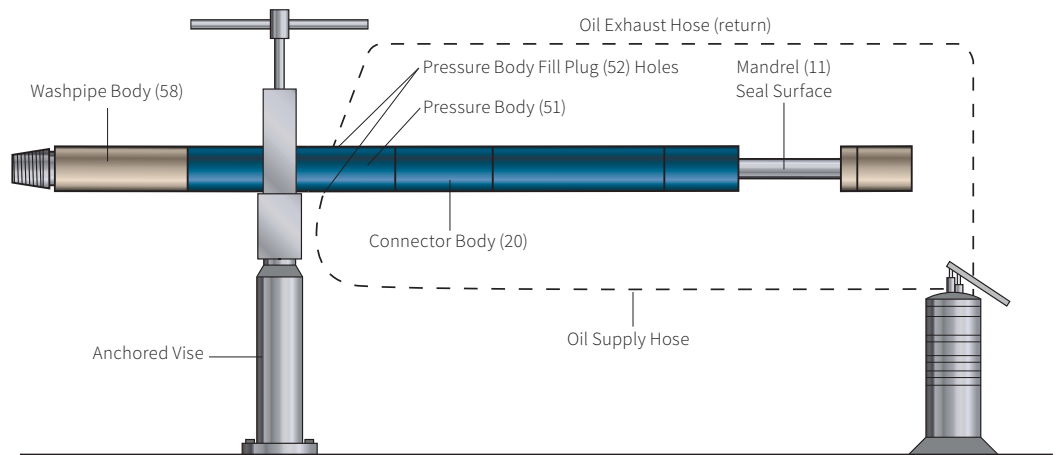


Figure 10. Final Position of Super II Fishing Jar During Filling Operation

4. Operate hand pump at moderate speed until a bubble-free flow of *Bowen* jar lube comes through the clean oil exhaust hose.
- using the assembled adapter and male coupler. Both fill plug holes are located near the center of the pressure body (51) at 180° from one another. See Figure 9 at right. Attach the volume pump oil exhaust hose to the top fill plug hole using the assembled adapter and male coupler. Required hardware is included in service kit (63), shown on page 22.

5. Slowly raise the jar to the horizontal position. Continue to fill the jar, allowing air to escape as the jar is gradually raised to horizontal. See Figure 10 above. When the jar is horizontal and no more air is bubbling in the clear exhaust hose, it may be necessary to raise and lower the jar slightly above and below horizontal while pumping slowly to remove the last of the air.

very slowly pump in additional jar lube until the air is removed. With the jar horizontal, remove the oil supply hose from the bottom fill plug hole, but leave this coupler and adapter in the pressure body. This will prevent jar lube from draining from the jar back into the volume pump. The male coupler has a check valve that will prevent jar lube from leaking out when the hose is disconnected.

6. Remove the oil exhaust hose and coupler with adaptor from the top fill plug hole. Check the fill plug hole for fluid; if not full,
7. Install fill plug (52) with installed fill plug o-ring (53) into top fill plug hole and tighten securely.

# Bowen Super II Fishing Jar

8. Keep the jar horizontal and rotate jar until the other fill plug hole is at the top of jar's OD. Remove coupler with adapter.
9. Install fill plug (52) with installed fill plug o-ring (53) into pressure body (51) and tighten securely.
10. The Super II fishing jar is now ready for testing.

## Testing the Super II Fishing Jar

After the Super II fishing jar has been completely assembled and filled with Bowen jar lube (69), test it in a Bowen jar tester (or equivalent) to ensure that it functions properly. (See Figure 11 below.)

1. Screw the jar tester subs on jar.
2. Using crane, place the jar in the jar tester.
3. Reduce the jar tester set load to zero.
4. Apply pull load to the fully open jar and adjust the pull load to the Jar Tester: Low Test Pull Load (lbs) for jar size being tested, see Chart B – Strength and Test Data on page 17.

5. Close the jar.
6. Activate jar tester in the pull direction. The jar should pull up to the set pull load, with only minor adjustment to pull load until it reaches the release point. It may take a few minutes to pull through its stroke. When the jar reaches the release point, the mandrel should pull easily and pull load should be lower. Pull jar until it is completely open to ensure it moves smoothly through the free stroke. Repeat low pull test to ensure uniform action.

**NOTE: If jar does not pull through, increase low pull load setting by 2,000 lbs. and repeat test. If the jar still does not pull through, the jar is malfunctioning. Determine and correct the problem, then test the jar again before continuing. Contaminated jar lube and/or plugged metering grooves on the bottom of the cone (42) may be possible causes of malfunction. Also, refer to Inspection on page 11 for additional information.**

7. Apply pull load to the fully open jar and adjust the pull load to the Jar Tester:

Standard Test Pull Load (lbs.) for jar size being tested, see Chart B – Strength and Test Data on page 17.

8. Close the jar.
9. Activate jar tester in the pull direction. The jar should pull up to the set pull load and maintain that load until it reaches the release point. Minor adjustment to tester pull load may be necessary, but do not over pull the jar. The jar should take from 15 to 45 seconds to pull through its pull stroke. When the jar reaches the release point, the mandrel should pull easily and the pull load should be considerably lower. Pull jar until it is completely open to ensure it moves smoothly through the free stroke. Repeat this test six to eight times to ensure proper operation.

**NOTE: If the jar does not pull at least up to Jar Tester: Standard Test Pull Load, there is a malfunction. You must determine and correct the problem, then test the jar again before use. Some possible causes may include: The jar is not completely filled with jar lube; wrong or diluted jar**

**lube was used; damage exists on various jar parts or seal assemblies; or the jar tester is not functioning properly. Also refer to Inspection on page 11 for additional information.**

10. Close the jar and remove it from jar tester. Remove jar tester subs and instant tool joint thread protectors. The Super II fishing jar is now ready for use.

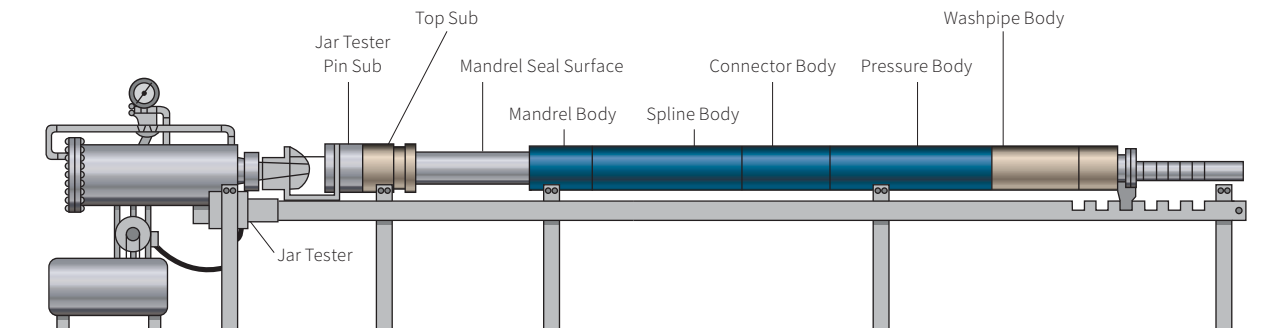


Figure 11. Jar Tester with Jar

# Bowen Super II Fishing Jar

## Specifications

### Chart A – Bowen Super II Fishing Jar Specifications

|   |   |                      |                        |                         |
|---|---|----------------------|------------------------|-------------------------|
| <b>Outside diameter (O.D.)</b>                | 3 ½ in.   | 4 ¾ in.              | 6 ¼ in.                | 7 ¾ in.                 |
| <b>Inside diameter (O.D.)</b>                 | 1 in.   | 2 ¼ in.              | 2 ¾ in.                | 3 ½ in.                 |
| <b>Connection</b>                             | 2 ¾ in. API Reg.  | 3 ½ in. IF           | 4 ½ in. IF             | 6 ¾ in. API Reg.        |
| <b>Assembly number</b>                        | 153283  | 152790               | 152564                 | 152408                  |
| <b>Length (closed position)</b>               | 9 - 10 ¾ in.  | 12 - 6 ¾ in.         | 12 - 10 ¾ in.          | 13 - 2 in.              |
| <b>Stroke</b>                                 | 11 ¾ in.  | 12 in.               | 12 in.                 | 12 in.                  |
| <b>Pump open area</b>                         | 2.4 in. <sup>2</sup>  | 6.5 in. <sup>2</sup> | 8.3 in. <sup>2</sup>   | 16.8 in. <sup>2</sup>   |
|   | Measured Distance from Floater Face to End of Pressure Body |                      |                        |                         |
| <b>Floater position standard temperature</b>  | 7 ¾ in.   | 9 ½ in.              | 8 1 ½ in.              | 8 ¾ in.                 |
| <b>Floater position high temperature</b>      | 10 in.  | 12 ½ in.             | 12 ¼ in.               | –                       |
| <b>Drill collar weight range (see note 7)</b> | 2,100 lbs to 3,600 lbs                                      | 440 lbs to 7,500 lbs | 8,100lbs to 13,600 lbs | 12,100lbs to 20,500 lbs |

### Chart B – Strength and Test Data

|   |                                  |                                   |                                   |                                   |
|---|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| <b>Jar tester low test pull load (see note 1)</b>                           | 9,000 lbs min. / 12,000 lbs max. | 14,000 lbs min. / 20,000 lbs max. | 16,000 lbs min. / 25,000 lbs max. | 16,000 lbs min. / 20,000 lbs max. |
| <b>Jar tester standard test pull load (see note 1)</b>                      | 30,000 lbs                       | 50,000 lbs                        | 100,000 lbs                       | 110,000 lbs                       |
| <b>Field load: Max pull load (during pull stroke) (see notes 2 and 4)</b>   | 59,000 lbs                       | 100,000 lbs                       | 200,000 lbs                       | 265,000 lbs                       |
| <b>Lift load: Tensile at yield (jar fully extended) (see notes 2 and 4)</b> | 257,000 lbs                      | 484,000 lbs                       | 900,000 lbs                       | 1.58 million lbs                  |
| <b>Torque at yield (see notes 2, 4, and 5)</b>                              | 5,630 ft-lbs                     | 16,700 ft-lbs                     | 36,300 ft-lbs                     | 76,000 ft-lbs                     |

### Chart C – Recommended Tightening Torques (see note 6)

|   |              |              |               |               |
|---|--------------|--------------|---------------|---------------|
| <b>Mandrel extension to mandrel</b>                   | 1,000 ft-lbs | 1,200 ft-lbs | 1,900 ft-lbs  | 2,200 ft-lbs  |
| <b>Washpipe to mandrel extension</b>                  | 500 ft-lbs   | 600 ft-lbs   | 900 ft-lbs    | 1,200 ft-lbs  |
| <b>Mandrel body to spline body (lefthand threads)</b> | –            | 6,850 ft-lbs | –             | –             |
| <b>Connector body to spline body</b>                  | 2,830 ft-lbs | 8,350 ft-lbs | 18,150 ft-lbs | 38,040 ft-lbs |
| <b>Pressure body to connector body</b>                | 3,560 ft-lbs | 9,280 ft-lbs | 21,300 ft-lbs | 39,450 ft-lbs |
| <b>Washpipe body to pressure body</b>                 | 3,330 ft-lbs | 9,280 ft-lbs | 21,330 ft-lbs | 39,450 ft-lbs |

#### NOTES:

1. If jar does not test at low and standard pull loads shown, disassemble, inspect and repair tool.
2. All strengths listed are calculated theoretical yield points and are accurate within 20%. The strength values shown are based on only one load type being applied at a time; this is consistent with API methods for their published strength values for drill string components. When two or more load types (pull, lift, torque, rotation and/or bending) are applied at the same time, the stresses on the tool are increased and the listed load ratings are reduced substantially. This is particularly true in milling, hover or drilling operations; in deviated or directional holes; and in the neutral zone, where combining loads (stress) can also lead to fatigue failure. We acknowledge the need for operating under such. This is not intended to advise against such operations, but merely to caution you of possible risks when operating in these conditions. Rotation and bending together can lead to fatigue failure. As with all oil field equipment, a safety factor should be applied with running the tools to avoid damage.
3. Loads indicated are maximum recommended pull loads during the pull stroke of the jars. Pulling above the value show can damage the jar. The Bowen Jar Placement Program should also be run to avoid excessively high impact loads.
4. The values shown do not cover API tool joints or other downhole connection strengths since various connections may be used on either end of the tools. Users should be guided by API or other published specifications covering downhole connections for the connection strengths.
5. Torque at yield is the value that will cause yield of the material in one or more parts of a tool. It may or may not refer to yielding of a threaded connection within the tool, but will always refer to the weakest torsional components within the tool.
6. The make-up torques are the maximum recommended make up torques for each connection. They are set at 50% of the calculated theoretical yield torque. Tightening torque values were calculated assuming Itcolube or similar anti-galling grease with low coefficient of friction being applied to all threads and butting shoulders of the connections. Tightening torque values are in ft-lbs. Multiply chart value by 0.1382 to obtain kg-m.
7. These weight values are provided as a guideline to the weight of drill collars to be used and do not necessarily constitute the optimum weight for each hole condition which may be encountered. We recommend using the *Bowen Fishing Jar Placement Program* be used.

# Bowen Super II Fishing Jar

## Specifications and Replacement Parts

### Bowen Super II Fishing Jar Specifications

| Outside diameter  |          | 3 1/8 in.      | 4 3/4 in.    | 6 1/4 in.    | 7 3/4 in.      |
|-------------------|----------|----------------|--------------|--------------|----------------|
| Inside diameter   |          | 1 in.          | 2 1/4 in.    | 2 1/4 in.    | 3 1/8 in.      |
| Connection        |          | 2 3/8 in. Reg. | 3 1/2 in. IF | 4 1/2 in. IF | 6 3/8 in. Reg. |
| Complete assembly | Part No. | 153283         | 152790       | 152564       | 152408         |
|                   | Weight   | -              | -            | -            | -              |

### Replacement Parts

| Item No. | Name  | Part Number |                 |                 |                 |                 |
|----------|---|-------------|-----------------|-----------------|-----------------|-----------------|
| 1        | Spline body   | Part No.    | 153284          | 152799          | 152565          | 152409          |
|          |   | Weight      | -               | -               | -               | -               |
| 2        | O.D. O-ring for spline body (small)                       | Part No.    | -               | 568241          | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 3        | O.D. O-ring for spline body (large)                       | Part No.    | -               | 568243          | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 4        | Wiper for spline body                                     | Part No.    | 153286          | -               | 152569          | 152413          |
|          |   | Weight      | -               | -               | -               | -               |
| 5        | I.D. O-ring for spline body                               | Part No.    | 568334          | -               | 568430          | 568439          |
|          |   | Weight      | -               | -               | -               | -               |
| 6        | Back-up ring for spline body, for I.D. O-ring             | Part No.    | 153285 (2 Req.) | -               | 152570 (2 Req.) | 152414 (2 Req.) |
|          |   | Weight      | -               | -               | -               | -               |
| 7        | Mandrel body  | Part No.    | -               | 15335           | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 8        | Wiper for mandrel body                                    | Part No.    | -               | 153356          | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 9        | Back-up ring for I.D. O-ring, for mandrel body            | Part No.    | -               | 153357 (2 Req.) | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 10       | I.D. O-ring for mandrel body                              | Part No.    | -               | 568343          | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 11       | Mandrel (integral type) (std. with J. box conn.)          | Part No.    | 153287          | 153354          | 152566          | 152410          |
|          |   | Weight      | -               | -               | -               | -               |
| 12       | O.D. O-ring for mandrel (small)                           | Part No.    | 568221          | 568231          | 568238          | 568246          |
|          |   | Weight      | -               | -               | -               | -               |
| 13       | Mandrel extension   | Part No.    | 153288          | 152797          | 152567          | 152411          |
|          |   | Weight      | -               | -               | -               | -               |
| 14       | O.D. O-ring (small) (pin end) of mandrel extension        | Part No.    | -               | -               | 568230          | 568240          |
|          |   | Weight      | -               | -               | -               | -               |
| 15       | Wiper for mandrel extension                               | Part No.    | 153290          | -               | 152571          | 152415          |
|          |   | Weight      | -               | -               | -               | -               |
| 16       | Back-up ring for O.D. seal of mandrel extension (box end) | Part No.    | 153289 (2 Req.) | 153795          | 152572          | 152416          |
|          |   | Weight      | -               | -               | -               | -               |
| 17       | O.D. seal of mandrel extension (box end)                  | Part No.    | 568330          | 152815          | 568426          | 568435          |
|          |   | Weight      | -               | -               | -               | -               |

# Bowen Super II Fishing Jar

## Specifications and Replacement Parts

### Bowen Super II Fishing Jar Specifications (Continued)

| Outside diameter  |          | 3 1/8 in.      | 4 3/4 in.    | 6 1/4 in.    | 7 3/4 in.      |
|-------------------|----------|----------------|--------------|--------------|----------------|
| Inside diameter   |          | 1 in.          | 2 1/4 in.    | 2 1/2 in.    | 3 1/8 in.      |
| Connection        |          | 2 3/8 in. Reg. | 3 1/2 in. IF | 4 1/2 in. IF | 6 3/8 in. Reg. |
| Complete assembly | Part No. | 153283         | 152790       | 152564       | 152408         |
|                   | Weight   | -              | -            | -            | -              |

### Replacement Parts

| Item No. | Name  | Part Number |                 |                 |                |                |
|----------|---|-------------|-----------------|-----------------|----------------|----------------|
| 18       | Seal Retainer for O.D. seal (box end), of mandrel extension     | Part No.    | -               | 152794          | -              | -              |
|          |   | Weight      | -               | -               | -              | -              |
| 19       | Seal retainer ring for O.D. seal (box end) of mandrel extension | Part No.    | -               | 152442          | -              | -              |
|          |   | Weight      | -               | -               | -              | -              |
| 20       | Connector body  | Part No.    | 153291          | 152443          | 152568         | 152412         |
|          |   | Weight      | -               | -               | -              | -              |
| 21       | O.D. O-ring for spline body end, of conn. body (small)          | Part No.    | 568142          | 568239          | 568249         | 568258         |
|          |   | Weight      | -               | -               | -              | -              |
| 22       | O.D. O-ring for spline body end, of conn. Body (large)          | Part No.    | 568145          | 568242          | 568252         | 568260         |
|          |   | Weight      | -               | -               | -              | -              |
| 23       | O.D. O-ring for pressure body end, of conn. body (small)        | Part No.    | 568141          | -               | -              | -              |
|          |   | Weight      | -               | -               | -              | -              |
| 24       | O.D. O-ring for pressure body end, of conn. body (large)        | Part No.    | 568144          | 568242          | 568251         | 568260         |
|          |   | Weight      | -               | -               | -              | -              |
| 25       | Wiper for conn. body  | Part No.    | 153293          | 70536           | -              | 72988          |
|          |   | Weight      | -               | -               | -              | -              |
| 26       | Backup ring for id sea, for conn. body                          | Part No.    | 153292 (2 req.) | 152796 (2 req.) | 79695 (2 req.) | 72989 (2 req.) |
|          |   | Weight      | -               | -               | -              | -              |
| 27       | I.D. seal for conn. body  | Part No.    | 568327          | 152813          | 568339         | 568246         |
|          |   | Weight      | -               | -               | -              | -              |
| 28       | Packing female adapter body for conn. body                      | Part No.    | 153294          | -               | -              | -              |
|          |   | Weight      | -               | -               | -              | -              |
| 29       | Packing pressure ring set for conn. body                        | Part No.    | 153294          | -               | -              | -              |
|          |   | Weight      | -               | -               | -              | -              |
| 30       | Packing male adapter for conn. body                             | Part No.    | 148312          | -               | -              | -              |
|          |   | Weight      | -               | -               | -              | -              |
| 31       | I.D. packing female adapter for conn. body                      | Part No.    | -               | 152926          | -              | -              |
|          |   | Weight      | -               | -               | -              | -              |
| 32       | I.D. packing set for conn.body                                  | Part No.    | -               | 152793          | 148633         | 148643         |
|          |   | Weight      | -               | -               | -              | -              |
| 33       | O.D. packing female adapter for conn. body                      | Part No.    | -               | 102387          | -              | -              |
|          |   | Weight      | -               | -               | -              | -              |
| 34       | O.D. packing set for conn. body                                 | Part No.    | -               | 152801          | 79703          | 72992          |
|          |   | Weight      | -               | -               | -              | -              |
| 35       | O.D. packing retainer for conn. body                            | Part No.    | -               | -               | 79697          | 78427          |
|          |   | Weight      | -               | -               | -              | -              |
| 36       | O.D. packing retainer ring for conn. body                       | Part No.    | -               | -               | 79697          | 78427          |
|          |   | Weight      | -               | -               | -              | -              |
| 37       | Fill plug for conn. body (also see pressure body fill plug)     | Part No.    | -               | 102025 (1 req.) | -              | -              |
|          |   | Weight      | -               | -               | -              | -              |

# Bowen Super II Fishing Jar

## Specifications and Replacement Parts

### Bowen Super II Fishing Jar Specifications (Continued)

| Outside diameter  |          | 3 ½ in.      | 4 ¾ in.    | 6 ¼ in.    | 7 ¾ in.      |
|-------------------|----------|--------------|------------|------------|--------------|
| Inside diameter   |          | 1 in.        | 2 ¼ in.    | 2 ¼ in.    | 3 ⅙ in.      |
| Connection        |          | 2 ¾ in. Reg. | 3 ½ in. IF | 4 ½ in. IF | 6 ⅝ in. Reg. |
| Complete assembly | Part No. | 153283       | 152790     | 152564     | 152408       |
|                   | Weight   | -            | -          | -          | -            |

### Replacement Parts

| Item No. | Name  | Part Number |                 |                 |                 |                 |
|----------|---|-------------|-----------------|-----------------|-----------------|-----------------|
| 38       | Backup ring for O-ring for fill plug, for conn. body                        | Part No.    | -               | 8-010           | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 39       | O-ring for fill plug, for conn. body  | Part No.    | -               | 568010 (2 Req.) | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 40       | Piston assembly (cone type) consists of 6 of next 7 items                   | Part No.    | 72903           | 152817          | 81617           | 69274           |
|          |   | Weight      | -               | -               | -               | -               |
| 41       | Bypass body   | Part No.    | 72905           | -               | 79704           | 69277           |
|          |   | Weight      | -               | -               | -               | -               |
| 42       | Cone  | Part No.    | 156486          | 152317          | 79709           | 69275           |
|          |   | Weight      | -               | -               | -               | -               |
| 43       | Cone retainer (note: installed after washpipe)                              | Part No.    | -               | 153203          | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 44       | Seal body   | Part No.    | 72906           | 152316          | 79705           | 69276           |
|          |   | Weight      | -               | -               | -               | -               |
| 45       | Non-extrusion ring for O-ring, for seal body                                | Part No.    | 148328          | 370-11          | 148494          | 102253          |
|          |   | Weight      | -               | -               | -               | -               |
| 46       | Seal Protector Ring For O-ring, For Seal Body                               | Part No.    | 148329          | 376-11          | 148493          | 148499          |
|          |   | Weight      | -               | -               | -               | -               |
| 47       | O-ring for seal body  | Part No.    | 568223          | 568233          | 568338          | 568349          |
|          |   | Weight      | -               | -               | -               | -               |
| 48       | Washpipe  | Part No.    | 72908           | 152314          | 79712           | 73058           |
|          |   | Weight      | -               | -               | -               | -               |
| 49       | O-ring for washpipe (small)   | Part No.    | 568221          | 568231          | -               | -               |
|          |   | Weight      | -               | -               | -               | -               |
| 50       | O-ring for washpipe (large)   | Part No.    | 568130          | 568233          | 568235          | 568246          |
|          |   | Weight      | -               | -               | -               | -               |
| 51       | Pressure body   | Part No.    | 72900           | 153183          | 79713           | 72994           |
|          |   | Weight      | -               | -               | -               | -               |
| 52       | Fill plug (torx hd.), for pressure body (also see connector body fill plug) | Part No.    | 617t (2 Req.)   | 617t (1 Req.)   | 329t (2 Req.)   | 329t (2 Req.)   |
|          |   | Weight      | -               | -               | -               | -               |
| 53       | O-ring for fill plug, for pressure body                                     | Part No.    | 568005 (2 Req.) | 568005 (2 Req.) | 568006 (2 Req.) | 568006 (2 Req.) |
|          |   | Weight      | -               | -               | -               | -               |
| 54       | Floater (metal)   | Part No.    | 151580          | 102301          | 151582          | 102303          |
|          |   | Weight      | -               | -               | -               | -               |
| 55       | I.D. seal for floater   | Part No.    | 72910 (2 Req.)  | 152816 (2 Req.) | 151675 (2 Req.) | 151691 (2 Req.) |
|          |   | Weight      | -               | -               | -               | -               |
| 56       | I.D. ring for floater   | Part No.    | 568224          | 568336          | 568339          | 568426          |
|          |   | Weight      | -               | -               | -               | -               |
| 57       | O.D. ring for floater   | Part No.    | 568227 (3 Req.) | 568341 (3 Req.) | 568350 (3 Req.) | 568434 (3 Req.) |
|          |   | Weight      | -               | -               | -               | -               |

# Bowen Super II Fishing Jar

## Specifications and Replacement Parts

### Bowen Super II Fishing Jar Specifications (Continued)

| Outside diameter  |          | 3 ½ in.      | 4 ¾ in.    | 6 ¼ in.    | 7 ¾ in.      |
|-------------------|----------|--------------|------------|------------|--------------|
| Inside diameter   |          | 1 in.        | 2 ¼ in.    | 2 ¼ in.    | 3 ½ in.      |
| Connection        |          | 2 ¾ in. Reg. | 3 ½ in. IF | 4 ½ in. IF | 6 ¼ in. Reg. |
| Complete assembly | Part No. | 153283       | 152790     | 152564     | 152408       |
|                   | Weight   | -            | -          | -          | -            |

### Replacement Parts (continued)

| Item No. | Name                                    | Part Number |        |        |        |        |
|----------|---|-------------|--------|--------|--------|--------|
| 58       | Washpipe body* (std. with J. pin conn.) | Part No.    | 72913  | 152315 | 79707  | 73063  |
|          |   | Weight      | -      | -      | -      | -      |
| 59       | O-ring for washpipe body (small)        | Part No.    | 568139 | 568239 | 568248 | 568257 |
|          |   | Weight      | -      | -      | -      | -      |
| 60       | O-ring for washpipe body (large)        | Part No.    | 568144 | 568242 | 568251 | 568260 |
|          |   | Weight      | -      | -      | -      | -      |

### Accessories - Required and Recommended

|    |   |          |  |   |        |        |
|----|---|----------|--|---|--------|--------|
| 61 | Packing assembly sleeve for mandrel extension, required accessory | Part No. | 74957  | - | 79755  | 70635  |
|    |   | Weight   | -  | - | -      | -      |
| 62 | Floater positioning tool (sid. Temp.)<br>Recommended accessory    | Part No. | 145215   | - | 153146 | 153148 |
|    |   | Weight   | -  | - | -      | -      |
| 63 | Service kit - assembly recommended accessory                      | Part No. | 145213 - Only one service kit required for all sizes of jars |   |        |        |
|    |   | Weight   | -  | - | -      | -      |

### Extra

|    |   |          |            |            |            |            |
|----|---|----------|------------|------------|------------|------------|
| 64 | O-ring pkg. set (std. temp.) included in complete packing set | Part No. | 153315/005 | 152818/005 | 152573/005 | 152417/005 |
|    |   | Weight   | -          | -          | -          | -          |
| 65 | Complete pkg. set (std. temp.) includes O-ring pkg. set       | Part No. | 153316/005 | 152819/005 | 152574/005 | 152418/005 |
|    |   | Weight   | -          | -          | -          | -          |
| 66 | O-ring pkg. set (hi-temp.) included in complete packing set   | Part No. | 153315/006 | 152818/006 | 152573/006 | 152417/006 |
|    |   | Weight   | -          | -          | -          | -          |
| 67 | Complete Pkg. Set (hi-temp) includes O-ring pkg. set          | Part No. | 153316/006 | 152819/006 | 152574/006 | 152418/006 |
|    |   | Weight   | -          | -          | -          | -          |
| 68 | Bowen ltcolube, anti-gall grease                              | Part No. | 64919      | 64919      | 64919      | 64919      |
|    |   | Weight   | -          | -          | -          | -          |
| 69 | Bowen jar lube  | Part No. | 49842      | 49842      | 49842      | 49842      |
|    |   | Weight   | -          | -          | -          | -          |



### How to Order

Specify:

- (1) Specify name, part number, and quality of assembly of part.
- (2) Specify O.D., I.D., and connection size & type. Label oversize O.D. and undersize I.D. If other than standard.
- (3) Specify with or without pin stress relief groove and box bore-back reliefs. *Bowen* pin stress relief groove is standard where a pin stress relief is permitted for the tool O.D./I.D. combination API pin stress relief groove can be supplied if specified. Box bore-back is not standard but can be supplied if specified.
- (4) Specify any desired spare parts, accessories, and extras. Include above information 1 through 3, for each part ordered.
- (5) Note: Thread protectors are extra and can be found in Section 4100 of the *Bowen* price manual.



### Recommended Spare Parts:

- (1) 1 Bypass bodies
- (2) 2 Cone
- (3) 1 Cone retainer
- (4) 2 Seal bodies
- (5) 1 Pressure body (f/one to ten tools)
- (6) 8 Fill plugs (or 4 of each size, for 4 ¾ in O.D. Tool)
- (7) 1 Floater
- (8) 12 Complete packing sets
- (9) 4 O-ring packing sets
- (10) 1 *Bowen* ltcolube, anti-gall/grease
- (11) 1 *Bowen* jar lube

Note:

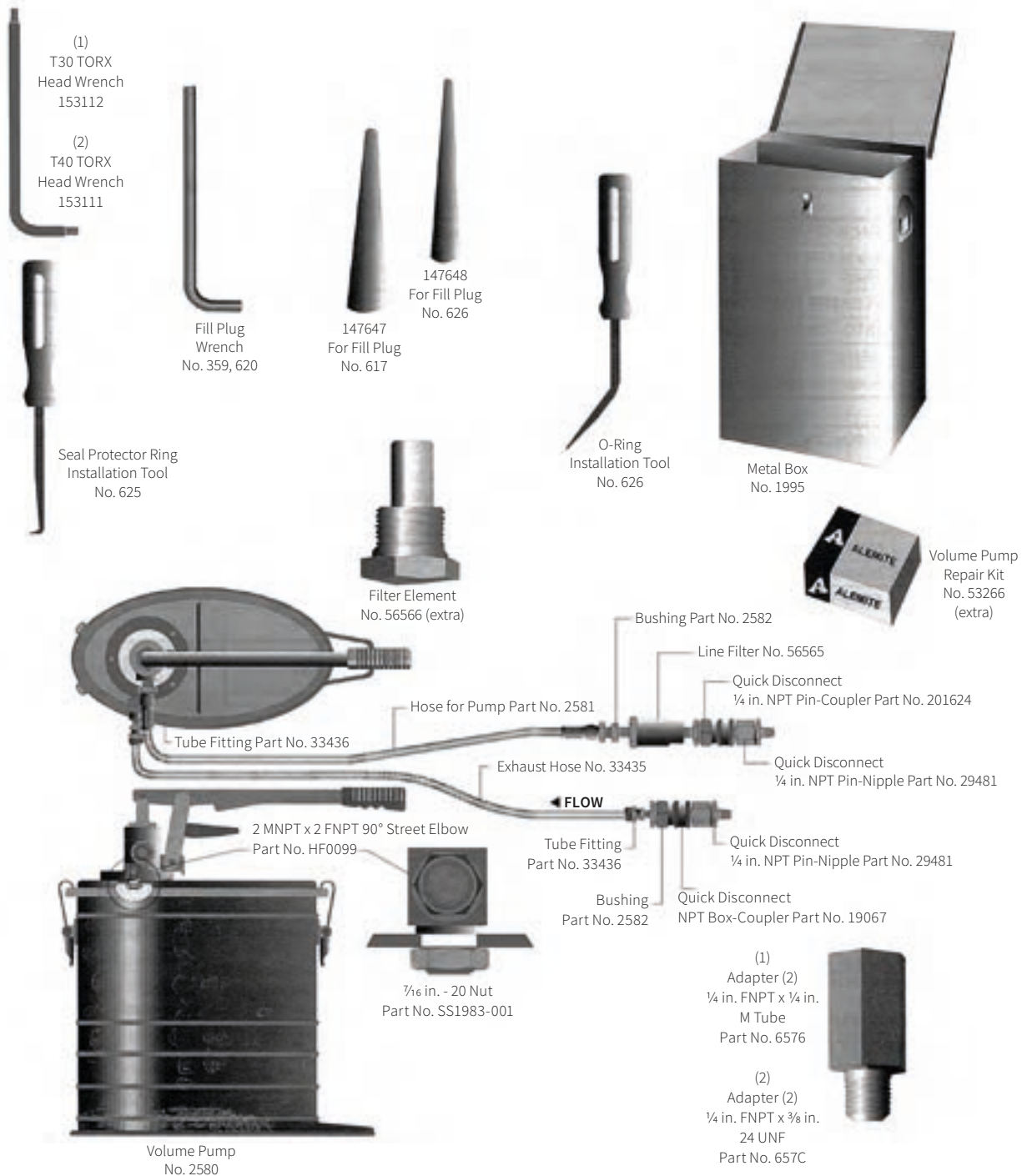
Miscellaneous O-ring seals are normally furnished in sealed plastic bags with one (1) O-ring per bag to prevent deterioration.

O-ring packing sets are furnished in sealed plastic bags.

# Bowen Super II Fishing Jar

## Super II Fishing Jar Service Kit (145213)

A service kit is necessary to properly service the jar. Because these kits are identical for every size jar, a single kit may be used for all jars at a particular site. The kit does not include a seal setting tool, which is required for each size jar. This setting tool must be ordered separately. It is usually stored in the service kit metal box.







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# MECHANICAL TYPE J ROTARY JAR

Instruction Manual 4170



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MANUAL FOR INFORMATION ONLY

Mechanical Type J Rotary Jar



**NATIONAL OILWELL VARCO**

One Company Unlimited Solutions

# Mechanical Type J Rotary Jar

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

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### General Description

The **Bowen Mechanical Type J Rotary Jar** is installed in a fishing string to enable the operator to strike heavy upward blows against a fish. It is also installed as a safety device in strings during testing, coring, reaming, drilling, sidetracking and washing over operations to free the string should it stick.

Sealed Bowen Type J Rotary Jars are adjustable straight pull mechanical type Rotary Jars of which the proven working parts operate in a bath of oil. Their torque free operation eliminates the tendency to accidentally release the fishing tools, as well as rig floor hazards. The oil bath insures long life of the tool with a minimum of servicing and a constant tripping tonnage regardless of the hole conditions or rate of operation.

### Use

The Bowen Mechanical Type J Rotary Jar is used in Fishing operations, located immediately above the fishing tool. It is also very useful in coring operations to assure that cores are cleanly broken.

The Mechanical Type J Rotary Jar is frequently used in deep, hot holes. In the event that extreme temperatures and pressures cause loss of seals, the Type J Jar will continue to function long afterward, since the tools functioning ability does not depend on the tool being sealed.

The Bowen Mechanical Rotary Jar is used in any operation where the ability to deliver a forceful upward blow may become necessary.

### Construction

The Type J Bowen Mechanical Rotary Jar is essentially an expansion joint with a limited longitudinal stroke. The inner or Main Mandrel Assembly and the outer or Bowl Assembly have interlocking splines for the transmission of torque and are packed off with Seals for the Transmission of circulating fluid.

The Jar is filled with oil and sealed top and bottom to prevent the entry of well fluids. Since all parts work in a sealed oil bath, service life of these parts is greatly extended. Presence of sand or oil in the well fluid has no effect on the tripping tonnage, which can be varied only by the operator.

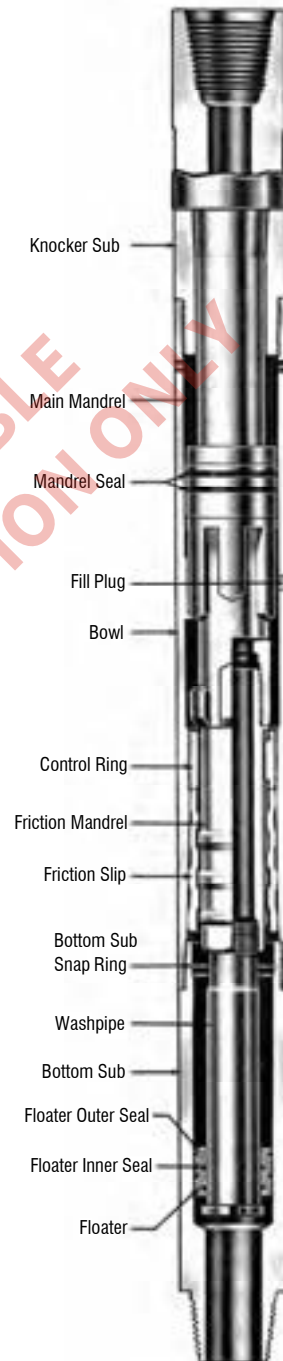
A Floater automatically moves up or down the Washpipe, maintaining a pressure balance within the Jar and eliminating excessive pressures on the Seals.

An unusually large circulating hole is provided in order to pass large volumes of fluid in coring or washing over operations and to pass free point indicators and string shots in fishing operations.

### Explanation of Mechanism Tripping Mechanism

The Friction Mandrel projects through the Control Ring which is threaded into the Bowl and when the Jar is in its closed position the Friction Mandrel also projects through the Friction Slip which is located within the taper in the Bowl.

When the Jar is being opened or tripped, the Friction Mandrel pulls the Friction Slip into a reduced section of the taper in the Bowl and against the bottom of the Control Ring. Hence, depending upon the position of the Control Ring, only a slight pull or a pull of many tons is required to open the Jar.



Mechanical Type J Rotary Jar

When the Jar is in the hole and a straight upward pull is exerted against it, the Friction Slip frictions upon the enclosed Friction Mandrel and arrests upward movement while the drill pipe is being stretched. When the upward pull reaches the preset tripping tonnage, the Friction Mandrel is pulled through the Friction Slip. The upward surge of the drill pipe in returning to its normal length causes a sudden separation of the Main Mandrel and Bowl assemblies and the shoulder on the Main Mandrel strikes solidly against the lower face of the Kocker Sub producing a heavy upward blow.

When the Jar is being closed the Friction Mandrel pushes the Friction Slip into the enlarged section of the taper in the Bowl and then slides easily through it. Hence, the Jar can be closed by the application of slightly more than its own weight.

#### Adjusting Mechanism

When the Jar is in a certain partially closed position, the Bowl Splines are opposite staggered gaps in the Main Mandrel Splines. When the Jar is in this position, the Main Mandrel can be rotated either a sixth of a turn to the right or a sixth of a turn to the left in relation to the Bowl. The Control Ring is joined to the Bowl with a left hand thread and it has an integral key that projects into a keyway in the Friction Mandrel which is screwed into the Main Mandrel. With this arrangement, any right hand rotation of the Main Mandrel in relation to the Bowl will screw the Control Ring up the Bowl and after the Jar has been closed a greater pull will be required to trip it. This results because the Friction Slip will now be pulled into a more reduced section of the taper in the Bowl. It follows that any left hand rotation of the Main Mandrel in relation to the Bowl will screw the Control Ring down the Bowl, and after the Jar

has been closed a lesser pull will be required to open or trip it. This results because the Friction Slip will now operate in a more enlarged section of the taper in the Bowl.

#### Operation

First, check the Type J Jar to assure that it is properly assembled, and that all its parts are in good working condition. Refer to the illustration on page 5.

Since the stretch of the running drill pipe provides the force to strike the blow, and since the force of the blow is increased as the pull on the drill pipe is increased, additional weight should be located immediately above the Jar. Accordingly, it is common practice to locate from three to fifteen drill collars immediately above the Jar. The greater the number of drill collars used above the Jar, the more effective will be the blow delivered.

#### Location of Jar in the String

The best location of the Jar in the running string should be determined by the operating conditions, and the job to be performed. The following are usually recommended:

#### For Fishing

Locate the Jar immediately above the fishing tool, and as close to the fish stuck-point as possible.

#### For Testing

Locate the Jar immediately above the test tool.

#### For Coring or Reaming

Locate the Jar one drill collar above the coring tool or reamer.

#### For Drilling

Locate the Jar immediately above the area where a "close-in" could occur to stick the drill pipe or bit.

#### For Sidetracking

Locate the Jar so that it is close above the whipstock at all times.

#### For Washing Over

Locate the Jar immediately above the washover string.

#### To Jar

1. Elevate the running string until the initial blow is struck.
2. Lower the running string until it loses weight, indicating that the Jar has re-engaged.

Repeat the above steps for as long as is necessary.

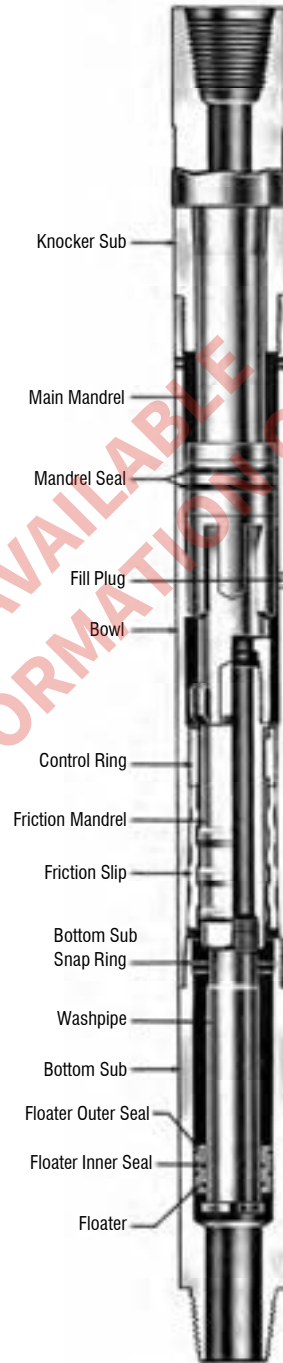
#### To Increase Jarring Blows

1. Elevate the running string until the blow has been struck.
2. Rotate the running string one-third of a turn to the right.
3. Engage the table dog.
4. Lower the running string until loss of weight indicates that the Jar has re-engaged.
5. Remove the table dog, and allow all excess torque to slack out of the running string.
6. Continue Jarring and increasing the blow by steps 1 thru 5 above, until the Jar is delivering blows of desired intensity.

**NOTE: In sticky formations or very deep or crooked holes it may be necessary to rotate the string more than one-third of a turn to transmit the necessary torque required to adjust the mechanism. One way to find the torque required in each particular hole is by rotating the string in increasing amounts and releasing it until at least one-sixth of a turn even if excessive torque is placed in the string. Always allow excess torque to rotate out of the string before jarring operation is continued.**



Sealed Type J Rotary Jar  
in Open Position



Sealed Type J Rotary Jar  
in Closed Position

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### To Decrease Jarring Blows

To decrease the Jarring blows, follow the procedure for increasing Jarring blows above, but use left hand torque.

### Precautions

1. Never put the tongs on the Main Mandrel. This mandrel has a finished sealing surface, which must not be marred.
2. Never strike Jarring blows while torque is in the running string.

### Maintenance

The working parts of the Type J Jar are sealed in oil to reduce wear and frequency of complete servicing. After each normal use, a service inspection should be made to assure that all working parts are still functioning properly, and that the oil bath is intact and not contaminated. After service inspection, rust preventative measures should be taken, after which the Jar may be stored for its next use.

To assure trouble-free operation of the Jar following severe and abusive service, and after five or six routine jobs, the Jar should be completely serviced.

To accommodate the differing circumstances, servicing procedures are outlined below in three classifications:

1. Service Inspection  
To be performed after each use.
2. Replacing Seals  
To be performed only if oil is found to be contaminated or depleted in the Service Inspection.
3. Complete Servicing  
To be performed after any severe or abusive use, or after five or six routine jobs.



Servicing Tools for Sealed Type J Rotary Jar

### 1. Service Inspection

- A. Remove the Fill Plug and check the condition of the oil. If the oil is not contaminated, replace any lost fluid and the Fill Plug.
- B. If it is necessary to replace the oil, follow the instructions listed for Complete Servicing, section 3. below.
- C. Place the Jar in a Jar Tester and trip the Jar several times. Set the desired tripping tonnage.
- D. Take the necessary rust preventative measures outlined on page 8.

### 2. Replacing Seals

Replacement of seals is necessary when leakage is evident or when the oil is found to be contaminated.

To replace the seals, perform all operations listed under Complete Servicing, except omit operations F, G, I, M, P, Q, R, S, T, and U.

### 3. Complete Servicing

Complete servicing should proceed as follows:

- A. Pull the Jar to the open position.
- B. Clamp the Jar in a vise, and place an open container below the Knocker Sub. Break the Knocker Sub connection and allow the oil to run out of the tool.

- C. Using the Washpipe Wrench or a piece of flat stock, unscrew the Washpipe from the Friction Mandrel. The Washpipe may be temporarily left in the Bottom Sub. See Figure 1.

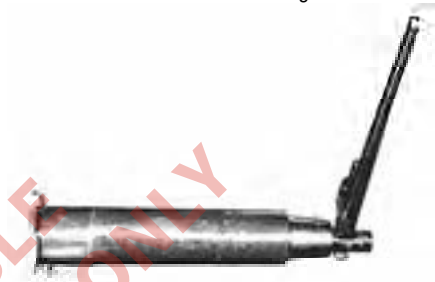


Figure 1

- D. Unscrew the Bottom Sub from the Bowl, and remove the Friction Slip. See Figure 2.



Figure 2

- E. With the snap ring pliers, remove the Bottom Sub Snap Ring. Slide the Washpipe and Floater out the upper end of the Bottom Sub. See Figure 3.
- F. With the jar in the closed position and using the Hex Wrench, Socket Wrench and Centering Guide, unscrew the Friction Mandrel and Control Ring from the Main Mandrel. The Control Ring is keyed to the Friction Mandrel and they will unscrew simultaneously.





Figure 3

- G. Slide the Friction Mandrel and Control Ring out of the Bowl.
- H. Remove the Main Mandrel from the Bowl.
- I. Remove the oil seals from the Main Mandrel and Floater. See Figures 4 and 5.



Figure 4



Figure 5

- J. Check the splines in the Bowl and on the Mandrel for indications of advanced wear or damage.
- K. Remove the Fill Plug and Vent Plug.
- L. Thoroughly clean and carefully check each part for any evidence of advanced wear or damage.

To reassemble the Jar, proceed as follows:

- M. Insert new oil seals on the Main Mandrel and insert the Main Mandrel into the Bowl.
- N. Screw the Kocker Sub into the Bowl and tighten it.
- O. Install the Control Ring on the Friction Mandrel, and with the Jar in the closed position and using the Hex Wrench, Socket Wrench and Centering Guide, screw this sub-assembly into the lower end of the Main Mandrel.

**NOTE: These are left-hand threads, and if care is taken to assure that the Control Ring is held at the end of its slot, they may be screwed in simultaneously. To insure shouldering the Friction Mandrel, use a sledge hammer on the handle of the Hex Wrench.**

- P. Place the Setting Gage against the Control Ring, in the Bowl taper.
- Q. While holding the Setting Gage firmly against the Control Ring, turn the Main Mandrel to the right until the Setting Gage seats in the Bowl.

**NOTE: Because of the construction of the splined area of the Main Mandrel, it will be necessary to move the Main Mandrel in and out, in order to rotate it.**

- R. Rotate Main Mandrel in opposite direction until the Setting Gage just unseats.
- S. Remove Setting Gage and install Friction Slip in its place. This setting, with oil lubricant, produces the following pulling tonnages:

|                  |             |
|------------------|-------------|
| 5-1/2" Jar ..... | 15 tons     |
| 4-1/2" Jar ..... | 12-1/2 tons |
| 3-1/2" Jar ..... | 10 tons     |
| 2-7/8" Jar ..... | 10 tons     |
| 2-3/8" Jar ..... | 8 tons      |

- T. If the Setting Gage is not available, omit steps P, Q, R, and S, and proceed as follows:

Install the Friction Slip in the Bowl. While holding the Friction Slip firmly against the Control Ring, rotate the Main Mandrel until the distance from the top of the Friction Slip to the end of the Bowl is one-fourth (1/4) inch greater than the length of the pin on the Bottom Sub.

- U. Fill the Jar with oil. Use only a low viscosity oil, SAE 10 or equivalent hydraulic or turbine grade. Use the Bowen Filling Stand to fill the Jar. See description and illustration on page 11.

- a. With the Bottom Sub Assembly removed, make certain that the Jar is in the closed position and that it is properly installed in the Filling Stand with Top Sub end down.
- b. Install the hose valve and hose of the Filling Stand into the fill plug hole.
- c. Operating the lever of the Filling Stand, pump oil into the Jar until oil reaches top of Friction Mandrel.
- d. Push Floater down Washpipe until threaded end of Washpipe is partially within the Floater.

**NOTE: In this position, the Washpipe will be located in its uppermost position within the Bottom Sub and the Floater will be resting on the Bottom Sub Snap Ring). See Figure 6.**



Figure 6

e. Install Washpipe-Floater Unit in Bottom Sub and install Bottom Sub Snap Ring.

f. Pick up Bottom Sub Assembly and screw it into the Bowl to shoulder.

g. With Washpipe Wrench, screw in Washpipe and tighten.

h. Operating the lever of the Filling Stand, pump additional oil into the Jar until the Floater is pushed up against the head of the Washpipe.

i. Continue pumping oil until gauge of Filling Stand reads 1,000 lbs. (If there is no leakage, Jar will maintain this pressure.)

j. If the Jar does not hold this pressure, inspect around Knockers Sub and down through the circulation hole in Bottom Sub to see if there are any leaks.

If there is a leak between the Washpipe and the Friction Mandrel, tighten Washpipe.

If there is a leakage around the Floater, replace faulty Floater Seals.

If there is a leak around the Knockers Sub, replace Mandrel seals.

k. Close valve and disconnect union between valve and hose of Filling Stand.

l. Open valve slightly and bleed off excess pressure.

m. Remove Jar from Filling Stand and lay on its side with Hose Valve up.



Figure 7



Figure 8

n. Insert Floater Setting Gage between the Washpipe and the Bottom Sub and push Floater down until proper space interval is reached so Floater Setting Gage can be hooked into the head of the Washpipe. (The Floater Setting Gage is a spacing device that will properly locate the Floater so that it will not contact the head of the Washpipe during operation of the Jar). See Figures 7 and 8.

Performing the operation shown in Figure 7 results in positioning the Floater on the Washpipe as illustrated above.

If a Floater Setting Gage is not available, use a small rod and tap the Floater down until there is one-half inch (1/2") space between the head of the Washpipe and the top of the Floater.

**NOTE: In performing either of the above operations, it will be necessary to open the Hose Valve to bleed off excess oil.**

o. Remove Floater Setting Gage.

p. Remove Hose Valve and install Fill Plug.

V. Method of filling Jar when Bowen Filling Stand is not available.

a. Make sure Jar is in closed position.

b. Make sure Floater is located at head of Washpipe and that Washpipe-Floater unit is at extreme bottom end of bore of Bottom Sub.

c. Install Bottom Sub Snap Ring.

d. Install Complete Bottom Sub Assembly and Tighten Washpipe.

e. Stand Jar vertically with Bottom Sub end down.

f. Remove both Vent Plug and Fill Plug.

g. Install Street Ell in the Vent Plug hole.

h. Pour oil into upturned Street Ell until oil flows out the Fill Plug hole.

i. Install Fill Plug in Fill Plug hole.

j. Lay Jar on its side with Street Ell up.

k. Insert Floater Setting Gage between the Washpipe and the Bottom Sub and push Floater down until proper space interval is reached so Floater Setting Gage can be hooked into the head of the Washpipe. (The Floater Setting Gage is a spacing device that will properly locate the Floater so that it will not contact the head of the Washpipe during the operation of the Jar). If a Floater Setting Gage is not available, use a small rod and tap the Floater down until there is one-half inch (1/2") space between the head of the Washpipe and the top of the Floater.

**NOTE: In performing either of the above operations, the excess oil will flow out through the Street Ell.**

- I. Remove Floater Setting Gage.
  - m. Remove Street Ell.
  - n. Install Vent Plug, and tighten.
- W. Place Jar in Jar Tester and adjust Jar to desired tripping tonnage. See page 10 for instructions for using Jar Tester.

If Jar Tester is not available and all above instructions have been followed carefully, the assembled Jar is now set at a very low tripping tonnage. See page 7. Thereafter, tripping tonnages can be increased as described under Operating Instructions on page 4 under section entitled "To Increase Jarring Blows."

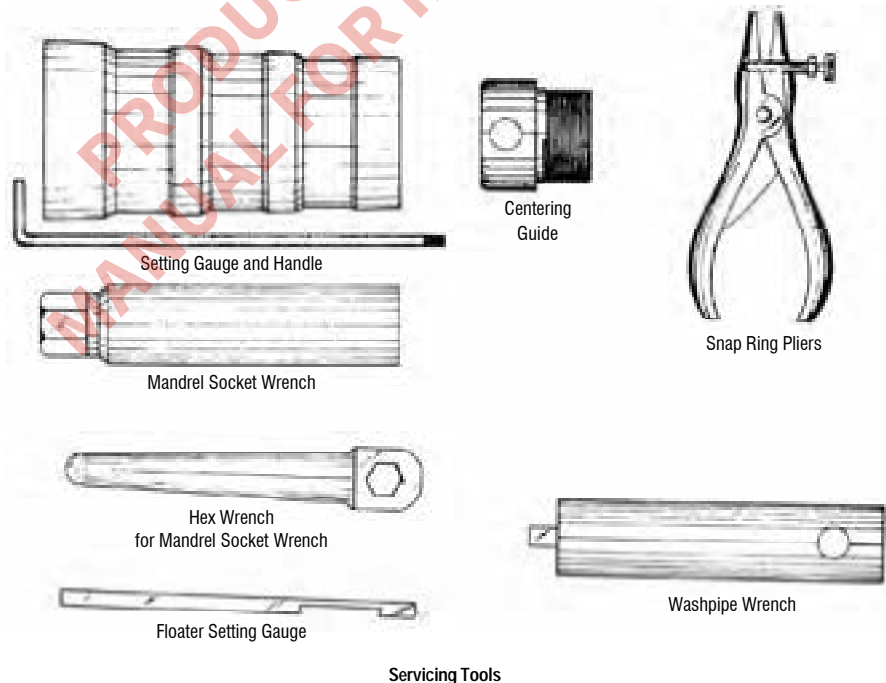
- X. To prevent rust, close Jar and grease joints and paint exterior surfaces.

**Precautions**

- A. In servicing procedures make certain that every effort is exerted to prevent scoring the Main Mandrel and Washpipe as their outside diameters are finished surfaces for seals.
- B. If Jar is to be stored, make certain that it is in its closed position.

**Setting Tripping Tonnage Using the Bowen Jar Tester**

1. Install Jar in Jar Tester.
2. Open Jar by moving Crosshead of Jar Tester toward the Cylinder of the Jar Tester. The maximum reading on the red figures of the Gauge indicated the tons pull required to trip the Jar. No blow is struck but the gauge will show an immediate drop in pressure.
3. To adjust the Jar, close the Jar by moving the Crosshead away from the Cylinder and at intervals stop pumping and apply torque by hand to the Jar Bowl until a position is located where the Jar Bowl will rotate relative to the mandrel.
4. One sixth of a turn of the Jar Bowl to the right will increase the tonnage pull required to trip the Jar approximately two tons. One sixth of a turn of the Jar Bowl to the left decreases the tonnage pull required to trip the Jar approximately two tons. One sixth of a turn of the Jar Bowl is the maximum amount that the bowl can be turned. To increase or decrease the tripping tonnage more than two tons, open the Jar and repeat paragraph 3 above.



Servicing Tools

### Filling Stand

This device is used to facilitate filling the Sealed Type J Bowen Rotary Jar. It consists essentially of a Lever to activate the pump, a Stand to hold the Jar, a Tank to hold the oil, and a Hose to convey the oil from the tank through the pump into the Jar.



Filling Stand

### To Install Jar in Filling Stand

1. Unhook vise chain.
2. Place Jar in Filling Stand with bottom sub end of bowl up.
3. Hook vise chain and tighten Jar in Filling Stand securely.

After the Jar has been securely installed in Filling Stand, the Jar may be filled with oil as described in paragraph V under Section 3, Complete Servicing, on page 6.

### Maximum Field Set Load and Jar Tester Test Load

| Assembly Part No. | Jar Size      |               |               | Max. Field Set Load (lbs) | Jar Tester Test Load (lbs) * | Stroke (inches) |
|-------------------|---------------|---------------|---------------|---------------------------|------------------------------|-----------------|
|                   | Connection    | O.D. (inches) | I.D. (inches) |                           |                              |                 |
| 12411             | 2-3/8 API Reg | 3-1/8         | 5/8           | 40,000                    | 16,000                       | 6               |
| 12422             | 2-7/8 API Reg | 3-3/4         | 3/4           | 40,000                    | 20,000                       | 6               |
| 12068             | 2-7/8 API IF  | 4-1/8         | 1-1/8         | 50,000                    | 20,000                       | 6               |
| 81113             | 3-1/2 API FH  | 4-1/4         | 1-1/2         | 70,000                    | 20,000                       | 6               |
|                   |               | 4-5/8         |               |                           |                              |                 |
| 12431             | 4-1/2 API Reg | 5-1/2         | 1-1/2         | 100,000                   | 25,000                       | 6               |
|                   |               | 6             |               |                           |                              |                 |
| 81114             | 4-1/2 API FH  | 5-3/4         | 2-1/4         | 100,000                   | 25,000                       | 6               |
|                   |               | 6-1/4         |               |                           |                              |                 |
| 81118             | 5-1/2 API Reg | 6-3/4         | 3             | 100,000                   | 30,000                       | 7               |
| 81119             | 6-5/8 API Reg | 7-3/4         | 3             | 120,000                   | 30,000                       | 7               |

### Maximum Recommended Tightening Torque for Threaded Connections

| Assembly Part No. | Jar Size | Knocker Sub to Bowl | Bowl to Bottom Sub | Main Mandrel to Friction Mandrel | Friction Mandrel to Washpipe |
|-------------------|----------|---------------------|--------------------|----------------------------------|------------------------------|
| 12411             | 3-1/8    | 2010                | 2010               | 600                              | 50                           |
| 12422             | 3-3/4    | 4330                | 3700               | 990                              | 55                           |
| 12068             | 4-1/8    | 4525                | 4525               | 1565                             | 75                           |
| 81113             | 4-5/8    | 4660                | 5585               | 2485                             | 275                          |
|                   |          | 6390                | 5625               | 2485                             | 275                          |
| 12431             | 5-1/2    | 11715               | 11715              | 3050                             | 200                          |
|                   |          | 6                   | 15045              | 14685                            | 3745                         |
| 81114             | 6-1/4    | 18985               | 14845              | 3745                             | 765                          |
|                   |          | 6-1/2               | 19190              | 15000                            | 3745                         |
| 81118             | 6-3/4    | 13500               | 13500              | 5585                             | 575                          |
| 81119             | 7-3/4    | 23825               | 13400              | 4055                             | 585                          |

The above makeup torques are the maximum recommended makeup torques for each connection. They are set at 50% of the calculated theoretical yield torque. Torques this high are not required for all fishing jobs, and lower values will result in less wear and tear of the threads. The tightening torque values were calculated assuming Itcolube or similar zinc base grease on all threads and shoulders.

### Bowen Mechanical Type J Rotary Jar

| Size                      | 2-3/8    | 2-7/8 | 2-7/8 | 3-1/2 | 4-1/2 | 4-1/2 | 5-1/2 | 6-5/8 |       |
|---------------------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|
|                           | API      | API   | API   | API   | API   | API   | API   | API   |       |
|                           | Reg.     | Reg.  | I.F.  | F.H.  | Reg.  | F.H.  | Reg.  | Reg.  |       |
| Outside Diameter          | 3-1/8    | 3-3/4 | 4-1/8 | 4-5/8 | 5-1/2 | 5-3/4 | 6-3/4 | 7-3/4 |       |
| Circulation Hole          | 5/8      | 3/4   | 1-1/8 | 1-1/2 | 1-1/2 | 2-1/4 | 3     | 3     |       |
| Stroke                    | 6        | 6     | 6     | 6     | 6     | 6     | 7     | 7     |       |
| Complete Assembly         | Part No. | 12411 | 12422 | 12068 | 81113 | 12431 | 81114 | 81118 | 81119 |
| (Includes Servicing Tool) | Weight   | 118   | 171   | 233   | 313   | 418   | 460   | 578   | 834   |

### Replacement Parts

|                               |          |        |        |        |        |        |            |        |        |
|-------------------------------|----------|--------|--------|--------|--------|--------|------------|--------|--------|
| Main Mandrel                  | Part No. | 12412  | 12423  | 12069  | 81091  | 12432  | 81097      | 81103  | 81109  |
| (Includes Knocker Sub)        | Weight   | 50     | 72     | 103    | 153    | 190    | 214        | 235    | 350    |
| Main Mandrel Seal (2 Req'd.)  | Part No. | 568329 | 568333 | 568336 | 568340 | 568346 | 568348     | 568431 | 568437 |
|                               | Weight   | 1/100  | 1/50   | 1/50   | 1/50   | 1/50   | 1/50       | 1/32   | 1/32   |
| Knocker Sub (Blank)           | Part No. | 12413  | 12424  | 12070  | 81092  | 12433  | 81098      | 81104  | 81110  |
|                               | Weight   | 12     | 18     | 22     | 30     | 40     | 48         | 55     | 68     |
| Bowl                          | Part No. | 12414  | 12425  | 12071  | 81093  | 12434  | 81099      | 81105  | 81111  |
|                               | Weight   | 30     | 45     | 57     | 73     | 110    | 102        | 119    | 210    |
| Bowl Vent Plug                | Part No. | 12415  | 12415  | 11650  | 11650  | 11650  | 28189      | 11650  | 11650  |
|                               | Weight   | 1/50   | 1/50   | 1/50   | 1/50   | 1/50   | 1/50       | 1/50   | 1/50   |
| Bowl Fill Plug                | Part No. | 12416  | 12416  | 11649  | 11649  | 11649  | 11649      | 12416  | 12416  |
|                               | Weight   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32       | 1/32   | 1/32   |
| Control Ring                  | Part No. | 1405   | 115    | 9277   | 7520   | 7520   | 7266       | 7282   | 7282   |
|                               | Weight   | 1      | 1-1/2  | 2      | 2      | 2      | 3-1/2      | 6      | 6      |
| Friction Mandrel              | Part No. | 1404   | 114    | 9278   | 81094  | 7519   | 81100      | 81106  | 81106  |
|                               | Weight   | 4-1/4  | 6-1/4  | 12     | 16     | 16     | 19         | 35     | 35     |
| Friction Slip                 | Part No. | 136    | 116    | 9279   | 7382   | 7382   | 7134       | 7283   | 7283   |
|                               | Weight   | 2      | 3-1/2  | 5      | 6      | 6      | 15         | 21     | 21     |
| Washpipe                      | Part No. | 12417  | 12426  | 12072  | 81095  | 12435  | 81101      | 81107  | 81107  |
|                               | Weight   | 2      | 3-1/2  | 5      | 7      | 9      | 14         | 18     | 18     |
| Bottom Sub                    | Part No. | 12418  | 12427  | 12073  | 81096  | 12436  | 81102      | 81108  | 81112  |
|                               | Weight   | 27     | 37     | 47     | 53     | 80     | 89         | 140    | 183    |
| Bottom Sub Snap Ring          | Part No. | 12419  | 12197  | 12074  | 12045  | 9311   | 11422      | 9333   | 9459   |
|                               | Weight   | 1/100  | 1/100  | 1/100  | 1/50   | 1/50   | 1/50       | 1/10   | 1/10   |
| Floater                       | Part No. | 12420  | 12428  | 12075  | 12046  | 12437  | 11423      | 12444  | 12453  |
|                               | Weight   | 1-1/4  | 1-3/4  | 2      | 2-1/2  | 4-1/2  | 3          | 5-1/2  | 11     |
| Floater Outer Seal (2 Req'd.) | Part No. | 568326 | 568329 | 568331 | 568336 | 568338 | 568343     | 568349 | 568427 |
|                               | Weight   | 1/100  | 1/100  | 1/50   | 1/50   | 1/50   | 1/50       | 1/32   | 1/32   |
| Floater Inner Seal (2 Req'd.) | Part No. | 568214 | 568217 | 568326 | 568330 | 568329 | 568337     | 568341 | 568341 |
|                               | Weight   | 1/100  | 1/100  | 1/100  | 1/100  | 1/100  | 1/50       | 1/50   | 1/50   |
| Bowl Spline Insert            | Part No. | —      | —      | —      | 9554   | —      | 9576       | 9624   | 9620   |
| O-Ring                        | Part No. | —      | —      | —      | 568225 | —      | 568236     | 568239 | 568236 |
| O-Ring                        | Part No. | —      | —      | —      | 568241 | —      | 568239     | 568258 | 568239 |
| O-Ring                        | Part No. | —      | —      | —      | 568242 | —      | 568249     | 568236 | 568258 |
| O-Ring                        | Part No. | —      | —      | —      | 568331 | —      | 568258     | —      | 568259 |
|                               |          |        |        |        |        |        | (2 Req'd.) |        |        |
| O-Ring                        | Part No. | —      | —      | —      | —      | —      | —          | —      | 568261 |

### How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Size and type of top and bottom connections
- (3) Size and type of thread

### RECOMMENDED SPARES:

- |                         |                            |
|-------------------------|----------------------------|
| (1) 6 Main Mandrel Seal | (6) 2 Washpipes            |
| (2) 1 Bowl Fill Plug    | (7) 2 Bottom Sub Snap Ring |
| (3) 1 Control Ring      | (8) 1 Floater              |
| (4) 1 Friction Mandrel  | (9) 6 Floater Outer Seal   |
| (5) 1 Friction Slip     | (10) 6 Floater Inner Seal  |

### Servicing Tools

|                                |          |       |        |       |        |        |        |        |        |
|--------------------------------|----------|-------|--------|-------|--------|--------|--------|--------|--------|
| Centering Guide                | Part No. | 12458 | 9270   | 12459 | 12454  | 9313   | 12455  | 12456  | 12457  |
|                                | Weight   | 3     | 6      | 6     | 6      | 8      | 10     | 18     | 21     |
| Friction Mandrel Socket Wrench | Part No. | 144   | 124    | 9285  | 7523   | 7523   | 7274   | 7291   | 7291   |
|                                | Weight   | 6     | 11     | 12    | 12     | 12     | 24     | 29     | 29     |
| Hex Wrench                     | Part No. | 146   | 126    | 126   | 106    | 106    | 106    | 246    | 246    |
|                                | Weight   | 6     | 10     | 10    | 10     | 10     | 10     | 24     | 24     |
| Setting Gauge                  | Part No. | 148   | 4127   | 9582  | 7404   | 7404   | 7276   | 7293   | 7293   |
|                                | Weight   | 2     | 3-1/2  | 5-1/2 | 5-1/2  | 5-1/2  | 10     | 13     | 13     |
| Floater Setting Gauge          | Part No. | 9258  | 9258   | 9258  | 9258   | 9258   | 9258   | 9258   | 9258   |
|                                | Weight   | 1/4   | 1/4    | 1/4   | 1/4    | 1/4    | 1/4    | 1/4    | 1/4    |
| Washpipe Wrench                | Part No. | 9581  | 9584   | 9593  | 9598   | 9598   | 9591   | 9609   | 9609   |
|                                | Weight   | 4-1/2 | 6-1/16 | 8-5/8 | 12-7/8 | 12-7/8 | 35-5/8 | 17-3/8 | 17-3/8 |
| Snap Ring Pliers               | Part No. | 7209  | 7209   | 7209  | 7209   | 7209   | 9472   | 9472   | 9472   |
|                                | Weight   | 1/10  | 1/10   | 1/10  | 1/10   | 1/10   | 1/4    | 1/4    | 1/4    |

### Accessories - Extra

|                      |          |        |        |        |        |     |        |        |        |
|----------------------|----------|--------|--------|--------|--------|-----|--------|--------|--------|
| Lifting Sub          | Part No. | 142    | 122    | 122    | 59600  | 102 | 59602  | 59592  | 59593  |
|                      | Weight   | 13-1/2 | 16-7/8 | 16-7/8 | 25-3/4 | 28  | 28     | 51     | 70-3/4 |
| Washpipe Wrench Bar  | Part No. | —      | —      | —      | 9598-1 | —   | 9591-1 | 9609-1 | 9609-1 |
| Washpipe Wrench Body | Part No. | —      | —      | —      | 9598-2 | —   | 9591-2 | 9609-2 | 9609-2 |
| Thread Lubricant     | Part No. | 153823 |        |        |        |     |        |        |        |

### How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Size and type of top and bottom connections
- (3) Size and type of thread

### RECOMMENDED SPARES:

- (1) 6 Main Mandrel Seal
- (2) 1 Bowl Fill Plug
- (3) 1 Control Ring
- (4) 1 Friction Mandrel
- (5) 1 Friction Slip
- (6) 2 Washpipes
- (7) 2 Bottom Sub Snap Ring
- (8) 1 Floater
- (9) 6 Floater Outer Seal
- (10) 6 Floater Inner Seal

PRODUCT INFORMATION AVAILABLE ONLY  
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\* Denotes Manufacturing and Engineering facilities

Downhole Solutions

Drilling Solutions

Engineering and Project Management Solutions

Lifting and Handling Solutions

Production Solutions

Supply Chain Solutions

Tubular and Corrosion Control Solutions

Well Service and Completion Solutions

Corporate Headquarters

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Houston, Texas 77042  
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# WIRELINER JARS

Instruction Manual 8630



PRODUCT NOT AVAILABLE  
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Hydraulic and Tubular Wireline Jars



**NATIONAL OILWELL VARCO**

One Company Unlimited Solutions



# Wireline Jars

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## Hydraulic Wireline Jars

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## Tubular Wireline Jars

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Seventeenth Printing, September 2005

## General Description

**Bowen Hydraulic Wireline Jars** provide the means for dependable, controlled jarring when required during wire line operations. A patented, closed hydraulic system, comparable to well known Bowen Hydraulic Rotary Jar system is employed in the Bowen Hydraulic Wireline Jar. This design permits the operator to control the intensity of the jarring blow within a broad range. The Bowen Hydraulic Wireline Jar can be made to deliver a very light blow, as would be required with measuring line, or a very heavy blow, as might be required with stranded wire lines.

## Use

Bowen Hydraulic Wireline Jars may be used in any wire line operation that does not require electrical continuity to tools or instruments below the Jar. These operations include permanent well completion services, setting and pulling gas lift valves, chokes and other downhole retrievables tubing equipment and cable tool services such as swabbing, bailing and fishing.

## Construction

The Bowen Hydraulic Wireline Jar consists of two separate assemblies. A Mandrel Assembly which includes the Top Sub, Mandrel with integral piston, Valve Plug Seal and a Valve Plug. The Middle Body Assembly consists of the Bottom Sub, Middle Body, Middle Body Insert and a Balance Piston. When completely assembled, the two principle assemblies are free to move in relationship to each other and movement is controlled by the hydraulic fluid. Bowen patented seal ring assemblies are used in the critical areas subjected to high internal pressures.

## Explanation of Mechanism

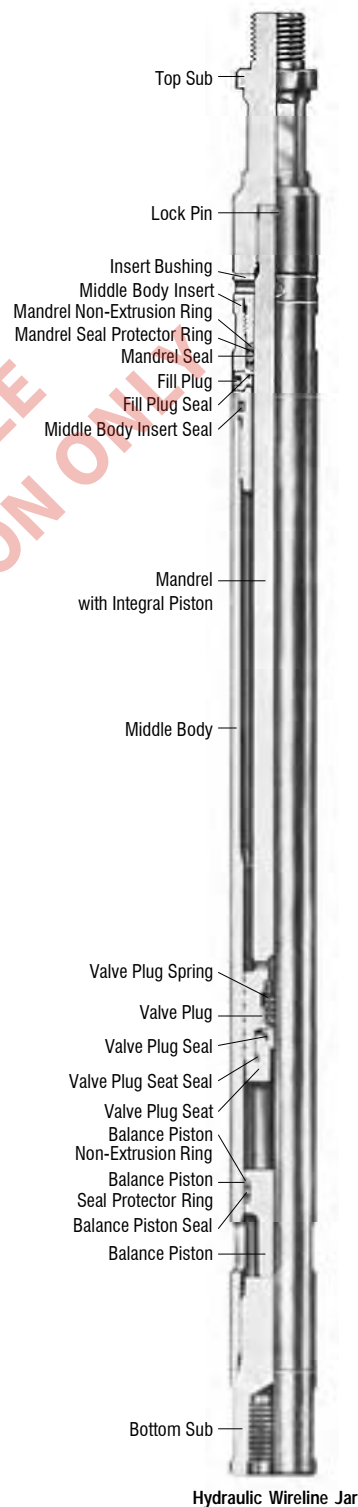
When the Bowen Hydraulic Wireline Jar is in the closed position, the integral piston which is part of the Mandrel unit rests within the restricted inside diameter portion of the Middle Body. When an upward strain is taken on the wire line, the Mandrel Assembly is pulled upward with respect to the Middle Body Assembly. Upward movement is impeded by the hydraulic fluid which must pass the extremely narrow annular passage between the integral piston of the Mandrel and the restricted inside diameter portion of the Middle Body.

As soon as the integral piston passes from the restricted inside diameter of the Middle Body into the enlarged inside diameter portion of the Middle Body, the fluid resistance ceases. The Mandrel Assembly will then travel upward at a constantly accelerating velocity until the shoulder on the integral piston strikes the Middle Body Insert transmitting an upward jarring blow to the tools installed below the Hydraulic Wireline Jar.

After the jarring blow has been struck, the wire line is slacked off to allow the Jar to close. While being closed, the Valve Plug is lifted away from the Valve Seat to permit a rapid transfer of the hydraulic fluid as the tool moves back into its closed position.

A Balance Piston located near the lower end of the Middle Body is free to move up and down as required to equalize the internal pressure of the tool with the well pressure. This Balance Piston also accommodates any expansion of the internal hydraulic fluid so that high internal pressures due to expansion will not occur.

The Top Sub has an appropriate fishing neck and wrench flats. It is pinned to the Mandrel at the connection to offer positive safety against backing off during operation.



Hydraulic Wireline Jar

The Middle Body Insert for the 1 1/8", 1 1/4" and 1 1/2" O.D. Jars are made in two pieces, a Middle Body Insert Bushing being required. This arrangement allows the Seal Assembly to be installed more easily than it would be in a one-piece assembly because of the small bore through the Insert. Middle Body Inserts for the 1 1/4" O.D. and larger Jars have large enough bores to allow a one-piece unit.

### Operation

The Bowen Hydraulic Wireline Jar is made up in the wireline string immediately above the tools or equipment being run. It is recommended that several Bowen Sinker Bars, having an outside diameter corresponding to the Jar, be assembled above the tool. The weight of these Sinker Bars, will to a large extent, determine the intensity of the jarring blow and will also aid in closing the Jar with a minimum time lapse.

A Bowen Tubular Wireline Jar may be assembled in the string immediately above the Hydraulic Wireline Jar to provide a convenient means for bumping down. The combination of the two tools is particularly useful in assuring the operator of the ability to effectively jar both up and down, whichever may be required in his operations.

The assembled tools are run into the well in the usual manner and the fish or equipment is engaged.

An upward strain is taken on the wireline by reeling at the hoist until stretch has been taken in the wireline. The operator then sets the hoist brake and waits for the Jar to strike its blow.

After the jarring blow has been struck, the wire line is slacked off enough to allow the Jar to close. The jarring operation is then repeated by taking another strain on the wire line. The frequency of

blows struck may be as rapid as the hoist operator can reel in and slack off the line at the hoist.

To increase the intensity of the blow, a greater strain (more stretch) is taken on the wire line. To reduce the intensity, less strain is taken on the wire line. Bowen Hydraulic Wireline Jars and Bowen Tubular Wireline Jars are run in and out of the well on the wireline exactly like any other wire line tool. No special precautions or considerations are necessary, except that the zero point or depth measuring reference should take into account the length of the stroke of the Jar. The length of stroke of each standard Jar is listed on the specification on page 7. The stroke of the Jar may be checked by measuring the length of the Jar when both open and closed — the difference being the stroke.

### Disassembly

Complete disassembly of the tool should proceed as follows:

1. Clamp the Jar in a suitable vise at the Middle Body.
2. Remove the Bottom Sub.
3. Set an open-mouthed container below the Middle Body Insert, then remove the Fill Plug, allowing the oil to drain from the Jar. Slide the Mandrel out slowly, forcing the oil out with the Piston.
4. Loosen and back out the Middle Body Insert from the Middle Body.
5. Withdraw the sub-assembly of the Top Sub, Mandrel and Middle Body Insert from the Middle Body. Lay it aside.
6. Remove the Balance Piston from the Middle Body by use of a wooden dowel or brass rod. Remove the Middle Body from the vise.

7. Secure the Top Sub/Mandrel Sub Assembly in the vise, clamping on the Top Sub.
8. Loosen and remove the Valve Plug Seat from the Piston. Remove the other valve parts: Valve Plug, and Valve Plug Spring.
9. Using a drift punch, remove the Lock Pin from the Top Sub. This Pin locks the Mandrel to the Top Sub to assure that it does not loosen and back off during operation.
10. Loosen and remove the Mandrel from the Top Sub.

**CAUTION: Use a wrench only on the wrench flats provided. Any gouges or upsets on the finished Mandrel surface will cause loss of seals and leakage of fluid.**

11. Slide the Middle Body Insert off the Mandrel. Clamp the Middle Body Insert in a vise and remove the Insert Bushing from it (where applicable).
12. Remove all O-Ring Seals from the Middle Body Insert, Bypass Valve and Balance Piston. Examine the Non-Extrusion Rings and Seal Protector Rings. If any show signs of wear or damage, remove them.

### Reassembly

Thoroughly clean and dry all parts and apply them with a coat of light weight oil. Replace any damaged or badly worn parts.

1. To replace a seal assembly, insert the Non-Extrusion Ring (or rings) into the groove with the bevel of the Non-Extrusion Ring facing the matching bevel of the groove.
2. Insert the Seal Protector Ring (or rings) into the groove, against the flat face of the Non-Extrusion Ring, Press and straighten them in place with the thumbs.

3. Insert the O-Rings between the Seal Protector Rings.
4. After the Seal Assemblies have been positioned, set them in place by use of the appropriate Setting Tool.
5. Secure the Top Sub in a vise horizontally, clamping on the large O.D.
6. Screw the Insert Bushing into the Middle Body Insert, and carefully slide them over the threaded end of the Mandrel so that the seal will not be damaged in the process.
7. Screw the Mandrel into the Top Sub and tighten it, using the wrench flats provided.
8. Insert the Lock Pin into the Top Sub and through the Mandrel end. Drive it in with a light hammer until it is flush with the Top Sub O.D.
9. Install the Check Valve Assembly into the Piston end of the Mandrel; the Spring Guide in the Spring, the Valve Plug with its Seal in place and the Valve Plug Seat with its Seal in place.
10. Re-clamp the tool, clamping on the O.D. of the Middle Body Insert Bushing. Tighten the Middle Body Insert on the Insert Bushing.
11. Slide the Middle Body over the Mandrel. Be sure the slotted end of the Middle Body is toward the lower end.
12. Re-clamp the assembly vertically in the vise, with the Top Sub down and the Mandrel pulled out (with the Jar open).

13. Fill the Jar with approved ISO grade 22 hydraulic oil. If this is not available, use a high quality non-foaming SAE 20W oil. If this is used and an increased Jar strike time is desired, use SAE 30W or a mixture with 20W. If a decreased Jar strike time is desired, use SAE 10W or a mixture with 20W.
14. Insert the Balance Piston in the Middle Body with the stinger end toward the Bottom Sub.
15. Screw the Bottom Sub into the Middle Body, hand tight.
16. Clamp the assembly in the vise horizontally, with the Fill Plug upward. Remove the Fill Plug. Tighten the Bottom Sub.
17. Close the Jar very slowly. When it is completely closed, insert and tighten the Fill Plug until snug. Avoid over-tightening this Fill Plug.

### Testing

The Jar can best be tested for operation by making up a lifting type sub with a bail (or equivalent) to the Top Sub. Make up another sub to the Bottom Sub to which an 850 lb. weight can be attached.

Obtain a dead weight of approximately 850 lbs. The usual method is to hang the Jar on a 2,000 lb. minimum capacity hoist, with the weight suspended from the Bottom Sub of the Jar. The hoist is slacked off until the weight rests on the floor and the Jar closes. The Jar and weight are then hoisted rapidly until the weight is raised off the floor by a height equal to the stroke of the Jar, less 1 or 2 inches. As soon as the load is lifted, begin checking the time required for the Jar to stroke open.

The chart below lists approximate time lapse for standard Wireline Jars, under a fixed pull load.

### Hydraulic Wireline Jar Load and Time Recommendations

| Jar O.D. | Load in lbs | Time Required to Stroke |
|----------|-------------|-------------------------|
| 1-1/8    | 850         | 30 sec to 1 min         |
| 1-1/4    | 850         | 45 sec to 1-1/2 min     |
| 1-1/2    | 850         | 1 min to 2 min          |
| 1-3/4    | 850         | 1-1/2 min to 2-1/2 min  |
| 2-1/8    | 850         | 2 min to 3 min          |

**CAUTION: This method should not be employed using a hoist of less than 1 ton (2,000 lb.) capacity, as there is danger of damage to the hoist or injury to operating personnel if the hoist is too light.**

**If leaks are detected at the seals, or if the Jar is low on fluid, the tool should be disassembled for repair.**

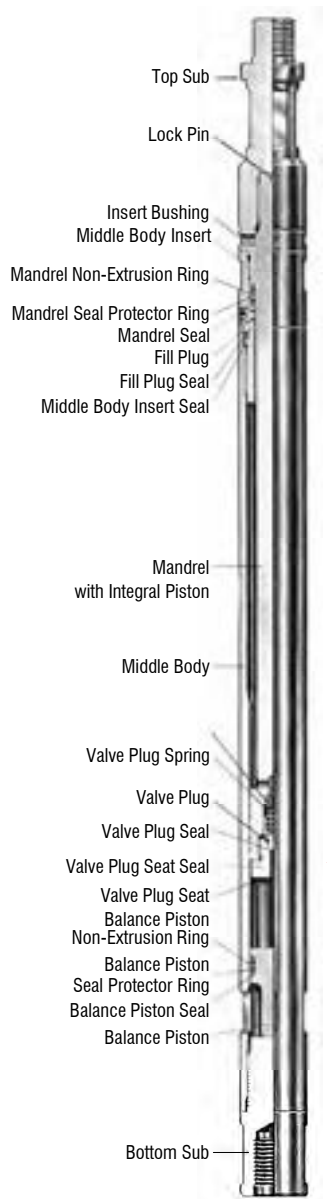
**Bowen Hydraulic Wireline Jars**  
**Strength Data and Recommended Tightening Torque**

| Tool Assembly<br>Part Number | O.D.  | Tightening Torque (ft-lbs) |   |                                      |                              | Strength Data                           |  |
|------------------------------|-------|----------------------------|---|--------------------------------------|------------------------------|---|--|
|                              |       | Top Sub to Mandrel         | Insert Bushing to<br>Middle Body Insert | Middle Body Insert<br>to Middle Body | Middle Body<br>to Bottom Sub | Maximum Allowable<br>Load Jarring (lbs) | Tensile @ Yield<br>After Jarring (lbs) |
| 35097                        | 1-1/8 | 40                         | 80                                      | 90                                   | 130                          | 5,300                                   | 22,000                                 |
| 11740                        | 1-1/4 | 35                         | 80                                      | 160                                  | 190                          | 6,500                                   | 22,000                                 |
| 11180                        | 1-1/2 | 75                         | 180                                     | 210                                  | 300                          | 9,200                                   | 37,500                                 |
| 48383                        | 1-1/2 | 75                         | 180                                     | 210                                  | 300                          | 9,200                                   | 37,500                                 |
| 51227                        | 1-1/2 | 75                         | 180                                     | 210                                  | 300                          | 9,200                                   | 37,500                                 |
| 35518                        | 1-1/2 | 75                         | 180                                     | 210                                  | 300                          | 9,200                                   | 37,500                                 |
| 79297                        | 1-3/4 | 135                        | 230                                     | 390                                  | 440                          | 15,500                                  | 54,500                                 |
| 11550                        | 2-1/8 | 325                        | —                                       | 690                                  | 800                          | 21,000                                  | 92,500                                 |

The above makeup torques are the maximum recommended makeup torques for each connection and are set at 50% of the calculated theoretical yield torque.

The above tensile strength is a calculate theoretical yield point and is considered accurate to ±20%.

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Closed Position



Piston has Just Cleared Cylinder



Completion of Jarring Stroke

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**Bowen Hydraulic Wireline Jars**

|                                  |                 |         |         |         |         |         |         |       |        |
|----------------------------------|-----------------|---------|---------|---------|---------|---------|---------|-------|--------|
| <b>Outside Diameter – Inches</b> |                 | 1-1/8   | 1-1/4   | 1-1/2   | 1-1/2   | 1-1/2   | 1-1/2   | 1-3/4 | 2-1/8  |
| <b>Connections:</b>              |                 | 5/8 -   | 15/16 - | 15/16 - | 15/16 - | 15/16 - | 15/16 - | 3/4   | 7/8    |
| <b>Pin Up – Box Down</b>         |                 | 11 Thd. | 10 Thd. | 10 Thd. | 10 Thd. | 10 Thd. | 10 Thd. | S.R.  | S.R.   |
| <b>Length of Stroke – Inches</b> |                 | 6-3/4   | 9-1/4   | 8-3/4   | 8-3/4   | 20      | 12      | 10    | 11-5/8 |
| <b>Complete Assembly</b>         | <b>Part No.</b> | 35097   | 11740   | 11180   | 48383*  | 51227   | 35518*  | 79297 | 11550  |
|                                  | <b>Weight</b>   | 10      | 10      | 11      | 11      | 12      | 13      | 20    | 30     |

**Replacement Parts**

|   |                 |        |        |        |        |        |        |        |        |
|---|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Top Sub</b>  | <b>Part No.</b> | 35098  | 11741  | 10761  | 10761  | 10761  | 10761  | 12761  | 11543  |
|   | <b>Weight</b>   | 1-1/4  | 1-1/4  | 1-1/2  | 1-1/2  | 1-1/2  | 1-1/2  | 3      | 4      |
| <b>Middle Body</b>                                      | <b>Part No.</b> | 35099  | 11744  | 11182  | 11182  | 51228  | 35519  | 12765  | 11537  |
|   | <b>Weight</b>   | 3-3/4  | 3-3/4  | 4      | 4      | 5      | 5      | 7      | 10-1/2 |
| <b>Middle Body Insert</b>                               | <b>Part No.</b> | 35100  | 29486  | 28652  | 28652  | 28652  | 28652  | 79298  | 11538  |
|   | <b>Weight</b>   | 1      | 1      | 1      | 1      | 1      | 1      | 2      | 3      |
| <b>Insert Bushing</b>                                   | <b>Part No.</b> | 35101  | 33572  | 33571  | 35085  | 33571  | 35085  | 79299  | —      |
|   | <b>Weight</b>   | 1/4    | 1/4    | 1/4    | 1/2    | 1/2    | 1/2    | 1/2    | —      |
| <b>Mandrel</b>  | <b>Part No.</b> | 35102  | 11742  | 11184  | 35086  | 51229  | 35520  | 79300  | 11539  |
|   | <b>Weight</b>   | 2      | 2      | 2      | 2      | 3      | 3      | 3-1/2  | 5-1/2  |
| <b>Bottom Sub</b>                                       | <b>Part No.</b> | 35103  | 11747  | 11181  | 11181  | 11181  | 11181  | 12767  | 11536  |
|   | <b>Weight</b>   | 1      | 1      | 1-1/4  | 1-1/4  | 1-1/4  | 1-1/4  | 2-1/4  | 3-1/2  |
| <b>Balance Piston</b>                                   | <b>Part No.</b> | 35104  | 11746  | 11185  | 11185  | 11185  | 11185  | 12766  | 11540  |
|   | <b>Weight</b>   | 1/4    | 1/4    | 1/4    | 1/4    | 1/4    | 1/4    | 1/2    | 1/2    |
| <b>Valve Plug</b>                                       | <b>Part No.</b> | 11189  | 11189  | 11189  | 11189  | 11189  | 11189  | 11189  | 11189  |
|   | <b>Weight</b>   | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    |
| <b>Valve Plug Spring</b>                                | <b>Part No.</b> | 834    | 834    | 834    | 834    | 834    | 834    | 834    | 834    |
|   | <b>Weight</b>   | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    |
| <b>Valve Plug Seat</b>                                  | <b>Part No.</b> | 11745  | 11745  | 11186  | 11186  | 11186  | 11186  | 11186  | 11186  |
|   | <b>Weight</b>   | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    |
| <b>Fill Plug</b>  | <b>Part No.</b> | 39941  | 617    | 617    | 617    | 617    | 617    | 617    | 329    |
|   | <b>Weight</b>   | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    |
| <b>Lock Pin</b>   | <b>Part No.</b> | 15136  | 16010  | 13432  | 13432  | 13432  | 13432  | 18183  | 42732  |
|   | <b>Weight</b>   | 1/16   | 1/16   | 1/16   | 1/16   | 1/16   | 1/16   | 1/8    | 1/8    |
| <b>Mandrel Non-Extrusion Ring</b><br>(2 Req'd.)         | <b>Part No.</b> | 365-11 | 365-11 | 365-15 | 365-15 | 365-15 | 365-15 | 365-17 | 365-21 |
|   | <b>Weight</b>   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/16   | 1/16   |
| <b>Mandrel Seal Protector Ring</b><br>(2 Req'd.)        | <b>Part No.</b> | 375-11 | 375-11 | 375-15 | 375-15 | 375-15 | 375-15 | 375-17 | 375-21 |
|   | <b>Weight</b>   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/16   | 1/16   |
| <b>Balance Piston Non-Extrusion Ring</b><br>(2 Req'd.)  | <b>Part No.</b> | 366-11 | 11750  | 366-16 | 366-16 | 366-16 | 366-16 | 366-20 | 366-24 |
|   | <b>Weight</b>   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/16   | 1/16   |
| <b>Balance Piston Seal Protector Ring</b><br>(2 Req'd.) | <b>Part No.</b> | 82-11  | 82-11  | 82-16  | 82-16  | 82-16  | 82-16  | 82-20  | 82-24  |
|   | <b>Weight</b>   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/16   | 1/16   |

\* With fishing neck on insert bushing

**How to Order**

Specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard

**RECOMMENDED SPARE PARTS:**

- (1) Balance Piston
- (2) 2 Valve Rings
- (3) 4 Valve Plug Springs
- (4) 2 Valve Plug Seats
- (5) 3 Mandrel Non-Extrusion Rings
- (6) 3 Mandrel Seal Protector Rings
- (7) 4 Balance Piston Non-Extrusion Rings
- (8) 4 Balance Piston Seal Protector Rings
- (9) 6 Complete Packing Sets
- (10) Jar Lube

### Bowen Hydraulic Wireline Jars (Continued)

|                          |                 |       |       |       |       |       |        |       |       |
|--------------------------|-----------------|-------|-------|-------|-------|-------|--------|-------|-------|
| <b>Complete Assembly</b> | <b>Part No.</b> | 35097 | 11740 | 11180 | 48383 | 51227 | 35518* | 79297 | 11550 |
|--------------------------|-----------------|-------|-------|-------|-------|-------|--------|-------|-------|

### Replacement Parts (Continued)

|                                 |                 |        |        |        |        |        |        |        |                  |
|---------------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|------------------|
| <b>Complete Packing Set</b>     | <b>Part No.</b> | 35106  | 11754  | 11191  | 11191  | 11191  | 11191  | 79327  | 11553            |
| <b>Consisting of:</b>           | <b>Weight</b>   | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8    | 1/8              |
| <b>Mandrel Seal</b>             | <b>Part No.</b> | 568113 | 568113 | 568210 | 568210 | 568210 | 568210 | 568212 | 568216 (2 req'd) |
|                                 | <b>Weight</b>   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/16   | 1/16             |
| <b>Balance Piston Seal</b>      | <b>Part No.</b> | 568113 | 568113 | 568211 | 568211 | 568211 | 568211 | 568215 | 568219 (2 req'd) |
|                                 | <b>Weight</b>   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/16             |
| <b>Middle Body Insert Seal</b>  | <b>Part No.</b> | 568116 | 568116 | 568215 | 568215 | 568215 | 568215 | 568218 | 568221           |
|                                 | <b>Weight</b>   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32             |
| <b>Middle Body Seal (Large)</b> | <b>Part No.</b> | —      | —      | —      | —      | —      | —      | —      | 568223           |
|                                 | <b>Weight</b>   | —      | —      | —      | —      | —      | —      | —      | 1/16             |
| <b>Valve Plug Seal</b>          | <b>Part No.</b> | 568007 | 568007 | 568007 | 568007 | 568007 | 568007 | 568007 | 568007           |
|                                 | <b>Weight</b>   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32             |
| <b>Valve Plug Seat Seal</b>     | <b>Part No.</b> | 568110 | 568110 | 568112 | 568112 | 568112 | 568112 | 568112 | 568112           |
|                                 | <b>Weight</b>   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32             |
| <b>Fill Plug Seal</b>           | <b>Part No.</b> | —      | 568005 | 568005 | 568005 | 568005 | 568005 | 568005 | 568006           |
|                                 | <b>Weight</b>   | —      | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32   | 1/32             |

### Accessories

|                                    |                     |          |          |          |          |          |          |          |          |
|------------------------------------|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>Service Kit</b>                 | <b>Part No.</b>     | 35105    | 11751    | 11178    | 11178    | 11178    | 11178    | 15997    | 11554    |
|                                    | <b>Weight</b>       | 2        | 2        | 2-1/2    | 2-1/2    | 2-1/2    | 2-1/2    | 3        | 3-1/2    |
| <b>Mandrel Body Setting Tool</b>   | <b>Part No.</b>     | 22709-11 | 22709-11 | 22709-15 | 22709-15 | 22709-15 | 22709-15 | 22709-17 | 22709-21 |
|                                    | <b>Weight</b>       | 1/2      | 1/2      | 1        | 1        | 1        | 1        | 1/4      | 1-1/2    |
| <b>Balance Piston Setting Tool</b> | <b>Part No.</b>     | 22729-11 | 11753    | 22729-16 | 22729-16 | 22729-16 | 22729-16 | 22729-20 | 22729-24 |
|                                    | <b>Weight</b>       | 5/8      | 5/8      | 7/8      | 7/8      | 7/8      | 7/8      | 1        | 1-1/2    |
| <b>High-Temp Packing Set</b>       | <b>Part No.</b>     | 35107    | 34761    | 34760    | 34760    | 34760    | 34760    | 34762    | 34763    |
|                                    | <b>Weight</b>       | 1/4      | 1/4      | 1/4      | 1/4      | 1/4      | 1/4      | 1/4      | 3/8      |
| <b>Bowen Jar Lube</b>              | <b>Part No.</b>     | 49842**  | 49842**  | 49842**  | 49842**  | 49842**  | 49842**  | 49842**  | 49842**  |
|                                    | <b>Pints Req'd.</b> | 1/2      | 3/4      | 3/4      | 3/4      | 1-1/2    | 1        | 3/4      | 3/4      |

### Extra for All Sizes of Tools

|                                |                 |         |            |
|--------------------------------|-----------------|---------|------------|
| <b>Bowen Jar Lube JL-519**</b> | <b>Part No.</b> | 49842-A | 1 Gallon   |
|                                | <b>Weight</b>   | 8-1/2   |            |
|                                | <b>Part No.</b> | 49842-B | 5 Gallons  |
|                                | <b>Weight</b>   | 40      |            |
|                                | <b>Part No.</b> | 49842-C | 20 Gallons |
|                                | <b>Weight</b>   | 248     |            |
|                                | <b>Part No.</b> | 49842-D | 55 Gallons |
|                                | <b>Weight</b>   | 455     |            |
| <b>Rotary Transfer Pump</b>    | <b>Part No.</b> | 50367   |            |
|                                | <b>Weight</b>   | 20      |            |
| <b>Barrel Faucet</b>           | <b>Part No.</b> | 50366   |            |
|                                | <b>Weight</b>   | 2       |            |

### How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard

### RECOMMENDED SPARE PARTS:

- (1) 1 Balance Piston
- (2) 4 Valve Plug Springs
- (3) 2 Valve Plug Seat
- (4) 3 Mandrel Non-Extrusion Rings
- (5) Mandrel Seal Protector Rings
- (6) 4 Balance Piston Non-Extrusion Rings
- (7) 4 Balance Piston Seal Protector Rings
- (8) 6 Complete Packing Sets
- (9) Jar Lube



### General Description

The **Bowen Tubular Wireline Jar** is designed for use with the Bowen Hydraulic Wireline Jar or as a separate tool by itself.

The Bowen Tubular Wireline Jar is a straight-pull actuated jar with no restricted stroke. It is simple, rugged, and inexpensive.

### Use

As stated above, the Tubular Jar may be used alone or in combination with the Bowen Hydraulic Wireline Jar.

The combination of the tools is particularly useful in permanent well completion operations to positively assure the ability to jar both ways as an aid in pulling, fishing, or gas lift operations.

Upward jarring with this combination is done in the usual manner with the Bowen Hydraulic Wireline Jar.

### Construction

Bowen Tubular Wireline Jars are composed of a Top Sub, Link Body, Mandrel, and Bottom Sub. The full stroke will be either 20 inches or 30 inches.

The Link Body is perforated to eliminate fluid cushioning and mudpacking while in service. The Mandrel has an integral knocker at its upper end. At the end of up-stroke in use, the knocker strikes the lower end of the Link Body, producing impact. The Link Body bottoms against the Bottom Sub when it closes on the down-stroke.

### Operation

To jar down, the Bowen Tubular Jar is actuated either manually or by the use of a reel. The Jar is put into position by pulling or reeling in. A sudden release or rapid unreeling causes the weight of the Jar and Sinkers to close the Jar. The downward blow is delivered sharply when the Jar Body strikes the Bottom Sub.

### Maintenance

Since the Bowen Tubular Wireline Jar is very simple, maintenance is confined primarily to cleaning after use.

After each job, the Jar should be completely disassembled, cleaned, and reassembled. Thread dope should be applied to the threaded joints and the mandrel coated with grease or heavy lubricating oil at reassembly. The exterior of the tool may be painted or greased before storage.



Tubular Wireline Jar

### Bowen Tubular Wireline Jars

|                           |                 |         |         |         |         |        |       |        |       |       |        |        |
|---------------------------|-----------------|---------|---------|---------|---------|--------|-------|--------|-------|-------|--------|--------|
| <b>Outside Diameter</b>   | 1 or<br>1-1/8   | 1-1/4   | 1-1/4   | 1-1/2   | 1-1/2   | 1-3/4  | 1-3/4 | 1-7/8  | 1-7/8 | 2-1/8 | 2-1/8  |        |
| <b>Connections</b>        | 5/8             | 15/16   | 15/16   | 15/16   | 15/16   | 3/4    | 3/4   | 3/4    | 3/4   | 7/8   | 7/8    |        |
| <b>Top-pin Bottom-box</b> | 11 Thd.         | 10 Thd. | 10 Thd. | 10 Thd. | 10 Thd. | S.R.   | S.R.  | S.R.   | S.R.  | S.R.  | S.R.   |        |
| <b>Length of Stroke</b>   | 18              | 20      | 30      | 20      | 30      | 20     | 30    | 20     | 30    | 20    | 30     |        |
| <b>Complete Assembly</b>  | <b>Part No.</b> | 19355   | 12350   | 12350   | 10689   | 10689  | 14235 | 14235  | 21430 | 21430 | 11551  | 11551  |
|                           | <b>Weight</b>   | 13      | 14      | 20      | 16-1/4  | 20-1/4 | 24    | 32-1/2 | 30    | 40    | 35-1/2 | 47-1/2 |

### Replacement Parts

|                   |                 |       |         |         |       |        |       |        |       |       |       |       |
|-------------------|-----------------|-------|---------|---------|-------|--------|-------|--------|-------|-------|-------|-------|
| <b>Top Sub</b>    | <b>Part No.</b> | 19356 | 12351   | 12351   | 10677 | 10677  | 14236 | 14236  | 21431 | 21431 | 11547 | 11547 |
|                   | <b>Weight</b>   | 1     | 1-1/4   | 1-1/4   | 1-1/2 | 1-1/2  | 2-1/2 | 2-1/2  | 3     | 3     | 4     | 4     |
| <b>Body</b>       | <b>Part No.</b> | 19357 | 12352   | 12352   | 10758 | 10758  | 14237 | 14237  | 21432 | 21432 | 11544 | 11544 |
|                   | <b>Weight</b>   | 5     | 5       | 7       | 5-1/2 | 7-1/2  | 8     | 11-1/2 | 9     | 13    | 11    | 16    |
| <b>Mandrel</b>    | <b>Part No.</b> | 19358 | 12368   | 12368   | 10924 | 10924  | 14232 | 14232  | 14232 | 14232 | 11531 | 11531 |
|                   | <b>Weight</b>   | 6     | 7-1/2   | 10-1/2  | 8-1/4 | 11-1/4 | 12    | 17     | 12    | 17    | 17    | 24    |
| <b>Bottom Sub</b> | <b>Part No.</b> | 19359 | 12356   | 12356   | 10678 | 10678  | 14233 | 14233  | 21433 | 21433 | 10732 | 10732 |
|                   | <b>Weight</b>   | 1     | 1       | 1       | 1     | 1      | 1-1/2 | 1-1/2  | 3     | 3     | 3-1/2 | 3-1/2 |
| <b>Spring Pin</b> | <b>Part No.</b> | 13431 | A-13568 | A-13568 | 15143 | 15143  | 27220 | 27220  | 18183 | 18183 | 25499 | 25499 |
|                   | <b>Weight</b>   | 1/16  | 1/16    | 1/16    | 1/16  | 1/16   | 1/16  | 1/16   | 1/8   | 1/8   | 1/8   | 1/8   |

Miscellaneous O-Ring seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing sets, however, will always be furnished in sealed plastic bags.

### How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Top and bottom connections
- (3) Length of stroke

PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY



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\* Denotes Manufacturing and Engineering facilities

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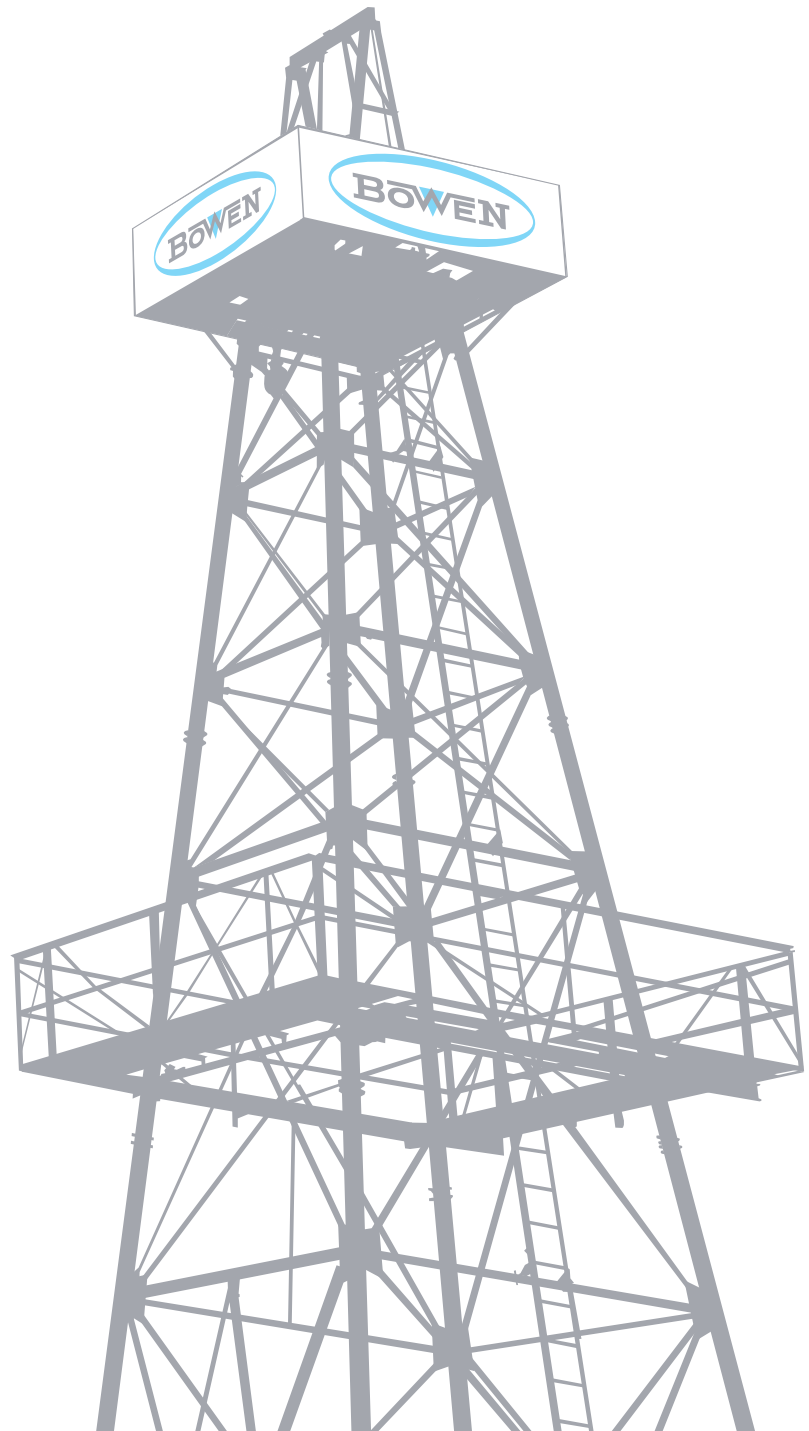
Well Service and Completion Solutions

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# Bowen Jar Intensifiers

Instruction Manual 4019



**Bowen | NOW**

# Bowen Jar Intensifiers

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

## General Description

The Bowen™ jar intensifier tool runs in conjunction with the Type Z Bowen oil jar, reaching in deep, crooked holes where the stretch of the string is lost in friction or at shallow depths where little stretch is available. The jar intensifier tool supplies acceleration to the upper end of the jar and lower portion of the work string during the jarring stroke. When you remove the strain by the free stroke of the jar, the stored energy releases, accelerating the drill collars and jar end upward until striking a blow of high impact.

Each Bowen jar intensifier matches a corresponding Type Z Bowen oil jar. The Bowen jar intensifier is a hydraulic fluid spring which stores energy when a strain is pulled on the running string. When the strain is removed by the free stroke of the jar, this stored energy is released, accelerating the drill collars and jar upward until striking a blow of high impact.

## Use

During conventional jarring operations with either mechanical or hydraulic jars, the accelerated movement of the entire running string above the jar is proportional to the intensity of blows struck. The friction of the running string against the wall of the hole will often diminish the accelerated movement, causing much of the energy to be lost. Also, at very shallow depth, the lack of available stretch in the running string causes a great loss in the effectiveness of expected acceleration.

The Bowen jar intensifier provides the means to store the required energy immediately above the jar and drill collars, effectively

offsetting the loss of stretch in or drag on the running string.

In The Bowen jar intensifier also utilizes its contained hydraulic fluid to cushion the shock of the running string as it rebounds, after each jarring stroke. This reduces the inherent tendency to cause shock-damage to the tool and running string.

The Bowen jar intensifier allows you to use fewer drill collars. This is particularly true at shallow operating depths, where excessive numbers of drill collars are sometimes used to utilize mass in place of available stretch. Using too many drill collars can damage the tools and the running string and should be avoided.

## Construction

The Bowen jar intensifier is composed of a mandrel assembly (or top sub and mandrel), mandrel body insert, mandrel body, middle body, washpipe body, washpipe, knocker and piston assembly. Between the mandrel body insert and washpipe body the tool is filled with silicone fluid of high compressibility index.

The mandrel has a ruggedly built splined section near its lower end, which is always engaged with matching splines in the lower end of the mandrel body. This allows torque to be transmitted in either direction and at all times, whether open, closed or in any position of stroke.

The high pressures produced within the Bowen jar intensifier during operation are maintained by the same patented Bowen non-extrusion seal ring assemblies, which are used in the Bowen hydraulic rotary jar. Use of these assemblies prevents radical rupture of seal rings and keeps wear to an absolute minimum.



**Bowen  
Jar Intensifier**

# Bowen Jar Intensifiers

The piston assembly is composed of a top adapter, bottom adapter and a set of Chevron packing rings, usually five rings per set. This piston assembly is assembled on the lower end of the mandrel between the knocker and wash-pipe. The piston assembly is moderately pre-compressed at its ID against the mandrel and at its OD against the middle body, forming a leak-proof, continuously sliding seal.

In operation, the fluid compresses as the running string applies tension by the upward travel of the piston in the middle body. When the jar reaches its free stroke and trips, the sudden release of stored energy in the intensifier accelerates the drill collars upward at tremendous and intensifying velocity. When the jar reaches its maximum travel, a blow of high impact is delivered directly to the fish. The action is independent of the running string. The intensifier tends to confine movement primarily to the drill collars and does not rely on movement of the entire running string. This confines the impact of the jar and drill collars to the fish, where it is most effective and least damaging, regardless of depth.

You should note that there is no hazard in filling or using the Bowen jar intensifier since the tool is filled with fluid and only the low hand pump pressure is required to fill it.

## Operation

Prior to operation, examine the Bowen jar intensifier to assure that it is completely assembled and in good working order.

The jar intensifier should be located in the running string immediately above the drill collars and just below the running string

lower end. The jar should be located immediately below the drill collars and just above the fishing tools. The sequence from the fish upward should be: fishing tool, jar, drill collars, jar intensifier and running string.

The fishing operation should be run in conventional manner; the fishing tool engages the fish and a strain is pulled on the fishing string. This will cause the jar intensifier to stroke 6 in. to 13 in., depending on size, compressing the hydraulic fluid and storing energy at the intensifier. This stored energy will cause the jar to operate. When the jar trips, the intensifier transfers stored energy to the drill collars and jar mandrel, causing the jar to strike a blow of very high impact value.

This procedure repeats as many times as required to free the fish. For complete detailed instructions on Type Z Bowen oil jars, see Bowen Instruction Manual 5/4065.

## Maintenance

Maintenance of the Bowen jar intensifier is minimal, but important. The primary maintenance is normally confined to complete inspection and redressing after each use. Magnetic particle inspection of stressed components should be performed after each use.

### Filling with Fluid

Proper filling of the Bowen jar intensifier requires the use of both fill plugs; in the mandrel insert. Proceed as follows:

1. Thoroughly clean and inspect all parts. Give special attention to the seals, replacing any that show signs of damage, wear or too pronounced a permanent set.

2. Assemble all parts except the fill plugs. Refer to "complete assembly" for detailed assembly instructions.
3. Clamp the intensifier in a vise at approximately 30° angle with the mandrel end up. Fill plug holes should be oriented vertically to each other.
4. Attach the fill hose from the fill pump to the fill plug hole on bottom. Attach the exhaust hose to the fill plug hole on top.
5. Pump the intensifier full of fluid. Operate hand pump at moderate speed until bubble-free flow comes through the clean exhaust hose.
6. As the tool fills, oil will begin to flow out the exhaust hose. Air bubbles will be observed in the exhaust oil. Continue to pump until all air bubbles cease to appear in the outflowing oil.
7. When air bubbles cease, detach exhaust hose and insert fill plug. Detach the volume pump hose and install fill plug.
8. Tighten the fill plugs to specifications. Test the tool in an appropriate tester.

## Testing

Test the action of the intensifier in a Bowen jar tester or other suitable test rack which has a readout for the applied pull load. The tool should be pulled open to its full stroke in the tester. The pull load required to open the tool should be within plus or minus 2,000 pounds of the load value

listed in the data sheet for the specific intensifier.

**CAUTION: Do not stand beside tool during tests. Extremely high pressures develop and metal body failure could cause serious injury.**

When the applied load is removed, the tool should close within 1½ in. of complete closure (measured where the mandrel shoulder meets the mandrel body insert).

If the recommended pull load is not reached or the tool remains open more than 1½ in., repeat filling procedure.

**CAUTION: Before removing intensifier from jar tester, push the intensifier in the complete closed position. (Mandrel and mandrel body insert shoulders must be touching.)**

Note that no harm will result to the tool if it remains open slightly either during service or in the shop. The only effect is a slight loss of effective stroke when in use. The loss of stroke should not be considered important unless it is greater than 1½ inch.

**NOTE: Use only Bowen liquid spring intensifier fluid in the Bowen intensifier; it is specially compounded to perform properly. Any attempt to use a substitute fluid will result in no performance and almost certain failure of the intensifier.**

The entrance of small amounts of lubricating oil into the intensifier fluid, such as might be used to oil the parts of the tool, will not be harmful, but should be kept to a practical minimum.

# Bowen Jar Intensifiers

The operator will note that the fluid will become discolored by traces of brown or amber stain during service. This is caused by bleeding of seals under high pressure and from thread dope. These traces of discoloration are not detrimental to the fluid or to the tool unless the concentration is heavy enough to include solid particles such as small slivers of rubber.

Bowen liquid spring intensifier fluid should be kept clean and as free of contamination as possible. It is a special purpose fluid and relatively expensive.

## Bowen Jar Intensifier Fluid Bleeding Prior to Field Use

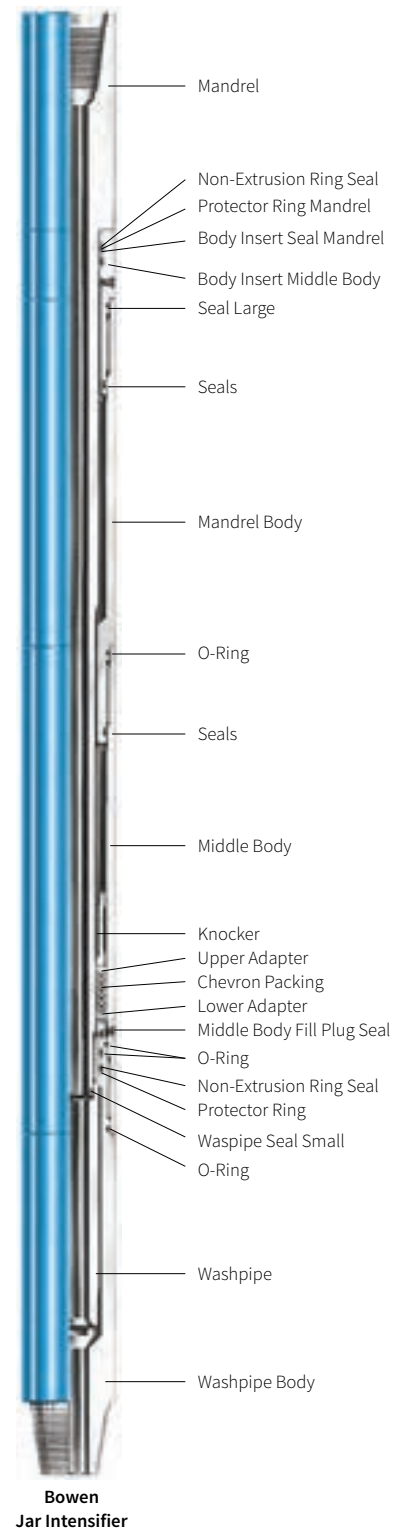
If the anticipated bottom hole temperature is greater than 180° F (82°C), then it is necessary to bleed a small amount of intensifier fluid from the tool following testing and prior to running it in the well. This ensures that the internal pressures will not damage the tool at operating temperatures and rated loads.

**WARNING: The intensifier must be in the closed position. This will ensure that little or no pressure is in the tool when the fill plug is removed.**

**CAUTION: Before bleeding any fluid from the intensifier, it must be completely filled and tested. If any appreciable amount of air is in the tool at this time, the final amount of fluid in the tool will be less than required for the jar to operate properly.**

1. Place the intensifier in the tester. Rotate the intensifier until one of the fill plugs in the mandrel body is straight up.

2. After making sure the intensifier is in the closed position, remove the top fill plug.
3. Slowly pull open the intensifier about ½ in. to 1 in. A small amount of intensifier fluid should bleed out.
4. Replace and tighten fill plug.



**Bowen  
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# Bowen Jar Intensifiers

## Complete Disassembly

Complete disassembly of the Bowen jar intensifier should proceed as follows:

1. Secure the jar in a pipe vice at the approximate center of the middle body.

**CAUTION: Do not remove the fill plugs until the tool is fully disassembled. Residual pressure may become trapped and cause possible injury or damage.**

2. Break the connectors at the washpipe body and the mandrel body.
3. Place an open-mouthed container below the joint of the washpipe body.
4. Back off the washpipe body until the oil runs out of the tool past the threads, allowing the oil to drain into the open container. Remove the washpipe body and lay it aside.

**CAUTION: The washpipe body must be secured firmly during removal due to the possibility of trapped residual pressure.**

5. Re-clamp the tool on the mandrel body.
6. Loosen and remove the washpipe. Place the wrench only on the wrench surface provided at the lower, smaller end of the washpipe.
7. Remove the middle body, allowing the oil to drain in a container.
8. Remove the piston assembly. If necessary, drive the blade of a thin

screwdriver between the upper end of the piston and the knocker or mandrel shoulder to loosen the piston. Take care not to mar the parts.

9. Loosen and remove the knocker using the provided wrench flats.

10. Re-clamp the tool on the tool joint end of the mandrel.

11. Slide the mandrel body off the mandrel and lay it aside.

12. Remove the seal from the small (washpipe) end of the mandrel.

13. Unclamp the mandrel from the vise and lay it aside. Use care in handling to prevent marring or denting the mandrel seal surface.

14. Remove the two seals from the O.D. of the mandrel body and from the washpipe body.

15. Remove the two seal assemblies from the inside upper end of the mandrel body. To remove these seals, proceed as follows: Using either a 625 or 626 tool or a bent screwdriver, carefully insert the tip of the blade between the o-ring and the seal protector ring. Then lift out the o-ring, taking care not to damage or mar the seal protector rings or non extrusion rings. Do not run the tool around the groove under the rings, which tends to mar the groove by scratching the surface. Refer to the illustration on the right.



Seal Assembly Removal

16. With the o-ring removed, visually examine the seal protector rings and non-extrusion rings for any indication of damage, burrs or advanced wear. Remove any such damaged rings. If the seal protector rings and non-extrusion rings are in good condition, they do not need to be removed.

17. Check the similar seal assemblies in the washpipe body and the piston seal body.

18. Carefully clean all the disassembled parts with solvent and wipe them dry with a lint-free, clean cloth, then thoroughly oil all the parts with a good grade of light, clean oil.

19. Check all parts for defects. Inspect seal surfaces for pits or scratches and grooves for fluid erosion, burrs, mushroomed lands, and other deformities. Repair if possible. Using a seal pick, fingernail, or other pointed object, feel the entire width and depth of the grooves. Repair any steps or surface interruptions. Any abrasions

on these surfaces will damage the seals, causing a loss of fluid during operation. Parts with major damage must be replaced.

20. Check the splines on the mandrel and in the mandrel body for burrs or upsets. Upsets may be carefully ground away with a grinder or a small hand file and afterward polished with emery cloth.

21. Examine the middle body bore for signs of scratches or galls. Minor damage of this nature may be smoothed out with emery cloth, or if very minor, disregarded. Any deep scratches in the smooth bore of the middle body will render it unfit for further service.

22. Carefully examine the piston. Polish off any abrasions, nicks, galls or burrs at the OD, ID, or faces. Use a small hand file or emery cloth. Any damage to the piston ring seating surface will render the piston unusable.

23. Carefully check the tool joint threads for nicks or burrs, removing any found.

24. Remove the fill plugs and install new fill plug O-ring seals on the fill plugs.

The intensifier fluid which was drained from the tool may be re-used, provided it is clean. Before it is re-used, it should be filtered through several thicknesses of clean small mesh cheese cloth or filter paper.

## Complete Assembly

Complete assembly of the Bowen jar intensifier should proceed as follows:

1. Assure that all parts are thoroughly clean and applied with a coat of good grade light oil as they are assembled.
2. Clamp the mandrel in a vise, clamping on the tool joint connection portion.
3. Assemble the seals, seal protector rings and non extrusion rings in the mandrel body insert. Refer to detailed instructions for this on page 8. Slide the mandrel body insert over the mandrel seal end first and slide it up against the mandrel shoulder.
4. Assemble the seals, seal protector rings and non-extrusion rings onto the mandrel body. Slide the mandrel body over the mandrel (female end first), engage the mandrel splines, and screw the mandrel body insert into the mandrel body. Buck them up tightly.
5. Assemble the knocker onto the lower end of the mandrel and buck it up tightly.
6. Assemble the piston on the lower end of the mandrel. Assemble the upper adapter on the mandrel, the flat face against the knocker. Follow this with the several Chevron packing rings, with their lips toward the upper adapter. Follow the packing rings with the lower adapter, its lips against the packing rings.

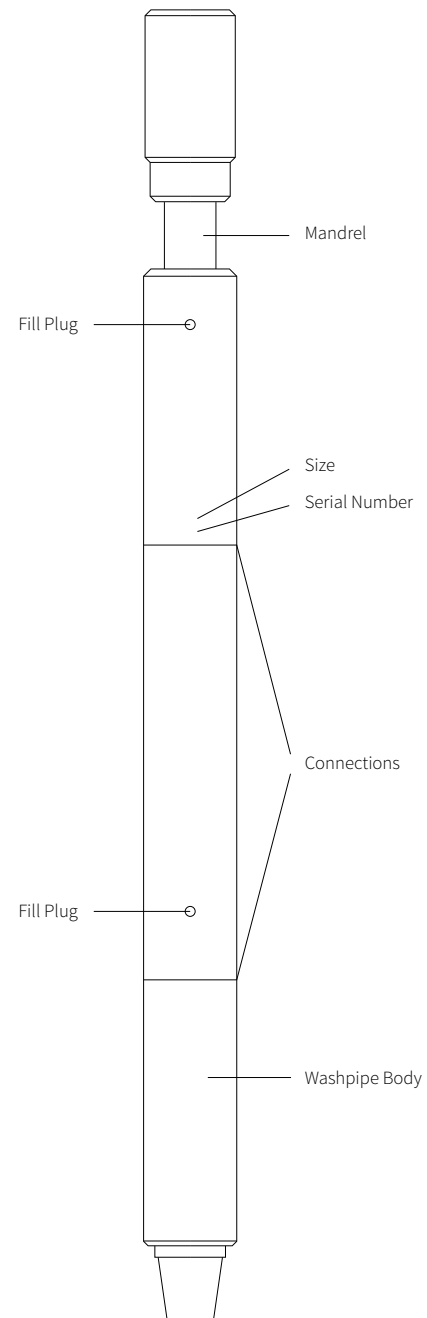
Use caution to assure that the piston assembly is not assembled upside down. If assembled this way, the tool can be opened, but it will not function and can't be closed.

7. Assemble the seal on the lower end of the mandrel, followed by the washpipe. Buck the washpipe up tightly, wrenching only on the surface provided at its small end.
8. Slide the middle body over the mandrel with the fill plug end down and make it up onto the mandrel body and buck it up tightly.
9. The assembly should be re-clamped at the middle body. Assemble the seals, seal protector rings and non-extrusion rings into the washpipe body, and thread the washpipe body into the lower end of the middle body. Buck it up tightly.
10. Fill the Intensifier with Bowen liquid spring as described under "Filling with Fluid" on page 4, steps 3 thru 8.
11. Test the intensifier's operation and pressure test the seals, as outlined under "Testing" on page 5.

The tool is now ready for service or storage.

If the tool is to be stored for future service or shipping, the tool joints should be applied with a good grade of thread dope, and thread protectors should be installed. The

outside of the tool should be cleaned and painted, or a heavy coat of grease applied. If the climate is very damp or salty, the bores through the tool should be greased.



# Bowen Jar Intensifiers

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Figure 1  
Hold non-extrusion ring between thumbs  
and forefingers as shown.



Figure 2  
Overlap ends until diameter is small enough  
to fit inside body.



Figure 3  
Place edge of ring opposite the split into the lower  
groove and spread from center toward ends. Be sure  
beveled side of ring matches beveled groove side.



Figure 4  
Using thumbs, press ring into groove until ends  
match up and ring is firmly seated in groove.



Figure 5  
Ring shown before being bent. It will look like this after it is properly installed in the groove.



Figure 6  
Bend the ring until it is small enough to allow entry into bore.



Figure 7  
Insert one edge in groove. Then insert the opposite edge and press down until entire ring is in place.



Figure 8  
Use seal protector ring installation tool to straighten and flatten ring by pressing against ring as shown.

# Bowen Jar Intensifiers



Figure 9  
O-ring packing before installation.



Figure 10  
Bend O-ring as shown to insert into groove.



Figure 11  
Insert O-rings between seal protection rings in each groove.



Figure 12  
This illustration shows the O-ring seal assemblies in place inside the mandrel body. The setting tool is shown in position as it is being driven into the bore to conform the copper rings to the proper size. If plastic seals are used, a setting tool is not required.



Figure 13  
Use this setting tool from the accessory kit to seat the ring seal assemblies after installation.  
(Not required with black nylon rings.)

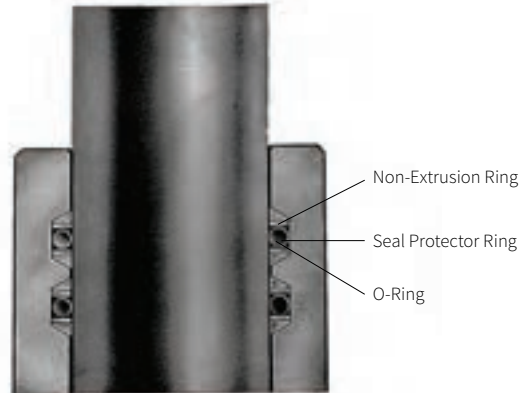


Figure 14  
This illustration shows the location of parts of the patented *Bowen* seal ring assembly after proper assembly.



Figure 15  
Insert the setting tool as shown.  
Use any convenient rod or bar to hold the tool.



Figure 16  
Drive in as shown and tap several times around the periphery of the tool to set the rings. Continue until both ring assemblies are seated. Then remove the tool and continue assembly of the sub.

# Bowen Jar Intensifiers

## Bowen Jar Intensifier Maximum Recommended Tightening Torque Specifications

| Jar Assembly No. | Jar OD x ID             | Top Sub to Mandrel | Knocker to Mandrel | Mandrel to Washpipe | Mandrel Body Insert to Mandrel Body | Mandrel Body to Middle Body | Middle Body to Washpipe Body | Mandrel Body Insert | Mandrel Body Extn. to Mandrel Body |
|------------------|-------------------------|--------------------|--------------------|---------------------|-------------------------------------|-----------------------------|------------------------------|---------------------|------------------------------------|
| 70957            | 1 1/8 in. x 1/4 in.     | 130 ft-lb          | —                  | 80 ft-lb            | 320 ft-lb                           | 150 ft-lb                   | 270 ft-lb                    | —                   | —                                  |
| 64460            | 1 13/16 in. x 5/16 in.  | 170 ft-lb          | —                  | 100 ft-lb           | 300 ft-lb                           | 350 ft-lb                   | 520 ft-lb                    | —                   | —                                  |
| 50640            | 2 1/4 in. x 3/8 in.     | —                  | 30 ft-lb           | 150 ft-lb           | 670 ft-lb                           | 900 ft-lb                   | 1,050 ft-lb                  | —                   | —                                  |
| 68262            | 2 29/32 in. x 1 in.     | 1,130 ft-lb        | —                  | 800 ft-lb           | —                                   | 1,950 ft-lb                 | 2,070 ft-lb                  | 1,450 ft-lb         | 1,570 ft-lb                        |
| 55867            | 3 1/8 in. x 1 in.       | —                  | 200 ft-lb          | 690 ft-lb           | 2,030 ft-lb                         | 2,030 ft-lb                 | 2,030 ft-lb                  | —                   | —                                  |
| 55895            | 3 3/4 in. x 1 1/4 in.   | —                  | 300 ft-lb          | 1,140 ft-lb         | 3,820 ft-lb                         | 3,820 ft-lb                 | 3,820 ft-lb                  | —                   | —                                  |
| 55747            | 3 3/4 in. x 1 1/2 in.   | 2,670 ft-lb        | —                  | 890 ft-lb           | 3,570 ft-lb                         | 3,570 ft-lb                 | 3,570 ft-lb                  | —                   | —                                  |
| 50660            | 3 3/4 in. x 1 7/8 in.   | 1,490 ft-lb        | —                  | 410 ft-lb           | 3,570 ft-lb                         | 3,570 ft-lb                 | 3,570 ft-lb                  | —                   | —                                  |
| 55664            | 4 1/4 in. x 1 15/16 in. | —                  | 500 ft-lb          | 1,880 ft-lb         | 4,960 ft-lb                         | 4,960 ft-lb                 | 4,960 ft-lb                  | —                   | —                                  |
| 50708            | 4 1/2 in. x 2 3/8 in.   | —                  | 500 ft-lb          | 1,930 ft-lb         | 5,580 ft-lb                         | 5,580 ft-lb                 | 5,580 ft-lb                  | —                   | —                                  |
| 50700            | 4 3/4 in. x 1 1/2 in.   | —                  | 700 ft-lb          | 2,130 ft-lb         | 9,210 ft-lb                         | 9,770 ft-lb                 | 9,210 ft-lb                  | —                   | —                                  |
| 55812            | 4 3/4 in. x 2 in.       | —                  | 500 ft-lb          | 2,010 ft-lb         | 6,800 ft-lb                         | 9,750 ft-lb                 | 8,600 ft-lb                  | —                   | —                                  |
| 55860            | 6 in. x 2 in.           | —                  | 2,200 ft-lb        | 4,990 ft-lb         | 11,500 ft-lb                        | 17,530 ft-lb                | 17,160 ft-lb                 | —                   | —                                  |
| 55905            | 6 1/4 in. x 2 1/4 in.   | —                  | 2,000 ft-lb        | 5,460 ft-lb         | 13,700 ft-lb                        | 20,340 ft-lb                | 20,340 ft-lb                 | —                   | —                                  |
| 50720            | 6 3/4 in. x 2 3/8 in.   | —                  | 1,900 ft-lb        | 7,260 ft-lb         | 17,400 ft-lb                        | 24,330 ft-lb                | 24,330 ft-lb                 | —                   | —                                  |
| 55910            | 7 3/4 in. x 3 1/16 in.  | —                  | 3,200 ft-lb        | 11,680 ft-lb        | 32,020 ft-lb                        | 32,020 ft-lb                | 32,010 ft-lb                 | —                   | —                                  |
| 66372            | 9 in. x 3 3/4 in.       | —                  | 6,200 ft-lb        | 21,540 ft-lb        | 39,000 ft-lb                        | 57,760 ft-lb                | 46,130 ft-lb                 | —                   | —                                  |

Note: Tightening torque values are in ft-lbs. The above make up torques are the maximum recommended make up torques for each connection. They are set at 50% of the calculated theoretical yield torque.

## Bowen Super Intensifier Maximum Recommended Tightening Torque Specifications

| Assembly No. | OD        | ID         | Top Sub to Mandrel | Mandrel to Washpipe | Mandrel Body to Spline Body | Spline Body to Connector Body | Connector Body to Pressure Body | Pressure Body to Washpipe Body | Mandrel Extn. to Washpipe | Mandrel to Mandrel Extn. |
|--------------|-----------|------------|--------------------|---------------------|-----------------------------|-------------------------------|---------------------------------|--------------------------------|---------------------------|--------------------------|
| 78964 **     | 7 3/4 in. | 3 1/16 in. | 26,350 ft-lb       | —                   | 33,850 ft-lb                | 33,850 ft-lb                  | 33,850 ft-lb                    | 39,500 ft-lb                   | 7,360 ft-lb               | 9,520 ft-lb              |

Note: Tightening torque values are in ft-lbs. The above make up torques are the maximum recommended make up torques for each connection. They are set at 50% of the calculated theoretical yield torque.

\*\* The super intensifier is used with the super fishing jar ONLY.

Information concerning disassembly, assembly, operation, etc. for the super intensifier will be provided upon request.

## Warning

All jarring and pulling loads shown in this manual assume that the force is acting alone and is essentially along the major axis of the tool. If torque and tension or bending and tension are used together, the resulting combined stresses may lead to failure at substantially less than rated loads. Rotation and bending together can lead to fatigue.

## Bowen Jar Intensifiers Strength Data

| Intensifier Assembly No. | O.D.        | I.D.        | Connection                 | Stroke     | Recommended Drill Collar Weight Range | Pull Load to Open Fully | Minimum Pull Req'd. (Above Weight of String and Collars) To Obtain Effective Blow | Calculated Strength Data |                |            | Fluid Capacity | Used with Jar No.       | Used with Super Fishing Jar No. |
|--------------------------|-------------|-------------|----------------------------|------------|---------------------------------------|-------------------------|---|--------------------------|----------------|------------|----------------|-------------------------|---------------------------------|
|                          |             |             |                            |            |                                       |                         |   | Tensile @Yield           | Torque         |            |                |                         |                                 |
|                          |             |             |                            |            |                                       |                         |   |                          | Max. Operating | At Yield   |                |                         |                                 |
| 70957                    | 1 5/8 in.   | 1/4 in.     | Per Order                  | 6 in.      | 1,100 lbs to 1,400 lbs                | 14,000 lbs              | 8,400 lbs   | 43,200 lbs               | 130 ft/lbs     | 260 ft/lbs | .13 gal        | 70822                   | —                               |
| 64460                    | 1 13/16 in. | 5/16 in.    | 1 13/16 in. Wilson F.J.    | 6 in.      | 1,360 lbs to 1,800 lbs                | 18,100 lbs              | 10,800 lbs  | 59,400 lbs               | 170 ft/lbs     | 340 ft/lbs | .195 gal       | 74223<br>21150<br>78074 | —<br>—<br>—                     |
| 50640                    | 2 1/4 in.   | 3/8 in.     | 1 1/4 in. A.P.I. Reg.      | 8 in.      | 1,560 lbs to 2,100 lbs                | 20,700 lbs              | 13,800 lbs  | 118,500 lbs              | 900 lbs        | 1,800 lbs  | .211 gal       | 18775<br>54020          | —<br>—                          |
| 68262                    | 2 29/32 in. | 1 in.       | 2 3/8 in. PH-6             | 12 3/4 in. | 2,200 lbs to 3,000 lbs                | 37,000 lbs              | 24,600 lbs  | 194,800 lbs              | 1,130 lbs      | 2,260 lbs  | .692 gal       | 68010                   | —                               |
| 55867                    | 3 1/8 in.   | 1 in.       | 2 3/8 in. A.P.I. Reg.      | 8 3/4 in.  | 2,400 lbs to 3,300 lbs                | 30,000 lbs              | 21,000 lbs  | 229,200 lbs              | 2,034 lbs      | 4,068 lbs  | .375 gal       | 42736<br>52504          | 72888<br>—                      |
| 55895                    | 3 3/4 in.   | 1 1/4 in.   | 2 7/8 in. A.P.I. Reg.      | 8 1/4 in.  | 4,200 lbs to 5,700 lbs                | 52,000 lbs              | 36,000 lbs  | 345,000 lbs              | 3,820 lbs      | 7,640 lbs  | .82 gal        | 38040<br>13255<br>52506 | —<br>—<br>145737                |
| 55747                    | 3 3/4 in.   | 1 1/2 in.   | 2 3/8 in. A.P.I. I.F.      | 7 7/8 in.  | 3,400 lbs to 4,600 lbs                | 43,500 lbs              | 30,000 lbs  | 299,700 lbs              | 2,670 lbs      | 5,340 lbs  | .63 gal        | 37406<br>52528          | —<br>—                          |
| 50660                    | 3 3/4 in.   | 1 7/8 in.   | 2 3/8 in. E.U.E.           | 7 7/8 in.  | 3,500 lbs to 4,700 lbs                | 43,000 lbs              | 30,000 lbs  | 179,500 lbs              | 1,490 lbs      | 2,980 lbs  | .613 gal       | 41355<br>20150<br>52497 | —<br>—<br>—                     |
| 55664                    | 4 1/4 in.   | 1 15/16 in. | 2 7/8 in. A.P.I. I.F.      | 8 3/8 in.  | 3,500 lbs to 4,700 lbs                | 43,000 lbs              | 30,000 lbs  | 430,300 lbs              | 4,960 lbs      | 9,920 lbs  | .92 gal        | 44483<br>13640<br>52502 | —<br>80468<br>—                 |
| 50708                    | 4 1/2 in.   | 2 3/8 in.   | 2 7/8 in. E.U.E.           | 10 3/8 in. | 3,600 lbs to 4,900 lbs                | 49,000 lbs              | 32,000 lbs  | 375,000 lbs              | 5,580 lbs      | 11,160 lbs | 1.15 gal       | 35849<br>52653          | —<br>—                          |
| 50700                    | 4 3/4 in.   | 1 1/2 in.   | 3 1/2 in. A.P.I. F.H.      | 8 7/8 in.  | 6,300 lbs to 8,500 lbs                | 78,000 lbs              | 54,000 lbs  | 591,900 lbs              | 9,210 lbs      | 18,420 lbs | 1.0 gal        | 25960<br>52530          | —<br>—                          |
| 55812                    | 4 3/4 in.   | 2 in.       | 3 1/2 in. A.P.I. F.H. I.F. | 10 1/8 in. | 5,600 lbs to 7,500 lbs                | 63,000 lbs              | 43,000 lbs  | 468,800 lbs              | 8,600 lbs      | 17,200 lbs | 1.35 gal       | 38110<br>52500          | 79789<br>—                      |
| 55860                    | 6 in.       | 2 in.       | 4 1/2 in. A.P.I. F.H.      | 8 3/8 in.  | 10,200 lbs to 13,800 lbs              | 128,500 lbs             | 77,000 lbs  | 937,000 lbs              | 17,160 lbs     | 34,320 lbs | 1.57 gal       | 14710<br>52498          | 145484<br>—                     |
| 55905                    | 6 1/4 in.   | 2 1/4 in.   | 4 1/2 in. A.P.I. I.F.      | 13 in.     | 1,800 lbs to 16,000 lbs               | 147,000 lbs             | 102,000 lbs   | 917,400 lbs              | 20,340 lbs     | 40,680 lbs | 4.24 gal       | 12370<br>52544          | 79691<br>—                      |
| 50720                    | 6 3/4 in.   | 2 3/8 in.   | 5 1/2 in. A.P.I. Reg.      | 13 in.     | 13,000 lbs to 17,500 lbs              | 172,900 lbs             | 102,000 lbs   | 1,013,800 lbs            | 24,330 lbs     | 48,660 lbs | 3.45 gal       | 11130<br>52680          | 145440<br>—                     |
| 55910                    | 7 3/4 in.   | 3 1/8 in.   | 6 3/8 in. A.P.I. Reg.      | 13 in.     | 11,000 lbs to 15,000 lbs              | 126,000 lbs             | 88,000 lbs  | 1,587,900 lbs            | 32,010 lbs     | 64,020 lbs | 4.65 gal       | 15160<br>52711          | —<br>—                          |
| 78964 **                 | 7 3/4 in.   | 3 1/8 in.   | 6 3/8 in. A.P.I. Reg.      | 12 in.     | 12,100 lbs to 20,500 lbs              | 220,000 lbs             | 23,000 lbs  | 1,600,000 lbs            | 26,350 lbs     | 52,700 lbs | —              | —                       | 72978                           |
| 66372                    | 9 in.       | 3 3/4 in.   | 7 7/8 in. A.P.I. Reg.      | 13 in.     | 12,000 lbs to 16,000 lbs              | 200,000 lbs             | 100,000 lbs   | 1,621,000 lbs            | 46,130 lbs     | 92,260 lbs | 3.2 gal        | 66346                   | —                               |

\* The above tensile strengths are calculated theoretical yield strengths and are considered accurate to ±20%.

The above operating torque is set at 50% of calculated theoretical yield torque and is the maximum recommended operating torque.

\*\* Bowen Super Intensifier — information provided on request.

THESE FIGURES DO NOT CONSTITUTE A GUARANTEE, ACTUAL OR IMPLIED. THEY ARE MEANT TO SERVE AS A GUIDE ONLY AND APPROPRIATE ALLOWANCE MUST BE MADE IN USE AS A SAFETY FACTOR.

Users of jars and bumper subs should be aware that milling or drilling operations may develop stresses in these tools that are more complex than the simple torsional and tensile values listed in Bowen strength data. If unstabilized, the weight necessary for milling can induce bending forces that combine with torsional forces to generate very high stresses in some areas of the tool. Rotating in a deviated hole condition or with the tool in a neutral point may have the same effect.

The necessity for milling is recognized and this is not intended to advise against such operations, but merely to caution the user of possible dangers when rotating under the conditions described.

NOTE: WEIGHT CONSISTING OF COLLARS, SINKER BARS, HEAVY WEIGHT, ETC., SHOULD NOT BE RUN ABOVE AN INTENSIFIER FOR AT LEAST 1,000 FEET.



# Bowen Jar Intensifiers

## Intensifier Service Kit

A service kit is necessary to properly service the intensifier. These kits are identical for every size of intensifier, so one kit may be used for any number of intensifiers. The kit does not include any seal setting tool, two of which are required for each size of intensifier. These tools must be ordered separately. They are usually stored in the service kit's metal box.



## Specifications and Replacement Parts

### Bowen Jar Intensifiers for Hydraulic Jars

| Connections           |          | Per Order | 1 1/16 in. Wilson F.J. | 1 1/4 in. A.P.I. Reg. | 2 3/8 in. PH-6 | 2 3/8 in. A.P.I. Reg. | 2 in. A.P.I. I.F. | 6 3/8 in. A.P.I. | 2 7/8 in. A.P.I. Reg. | 2 7/8 in. A.P.I. I.F. |
|-----------------------|----------|-----------|------------------------|-----------------------|----------------|-----------------------|-------------------|------------------|-----------------------|-----------------------|
| Outside Diameter      |          | 1 1/8 in. | 1 1/16 in.             | 2 1/4 in.             | 2 29/32 in.    | 3 1/8 in.             | 3 3/4 in.         | 3 3/4 in.        | 3 3/4 in.             | 4 1/4 in.             |
| Inside Diameter       |          | 3/4 in.   | 5/16 in.               | 3/8 in.               | 1 in.          | 1 in.                 | 1 1/2 in.         | 1 7/8 in.        | 1 1/4 in.             | 1 15/16 in.           |
| Jars Used with:       |          | 70822     | 21150                  | 54020                 | 68010          | 52504                 | 52528             | 52497            | 52506                 | 52502                 |
|                       |          | —         | 74723                  | 18775                 | —              | 42736                 | 37406             | 20150            | 38040                 | 44483                 |
| Total Stroke To Solid |          | 6 in.     | 6 in.                  | 6 in.                 | 12 3/4 in.     | 8 3/4 in.             | 7 7/8 in.         | 7 7/8 in.        | 8 1/4 in.             | 8 3/8 in.             |
| Complete Assembly     | Part No. | 70957     | 64460                  | 50640                 | 68262          | 55867                 | 55747             | 50660            | 55895                 | 55664                 |
|                       | Weight   | 40 lbs    | 48 lbs                 | 80 lbs                | —              | 117 lbs               | 154 lbs           | 241 lbs          | 99 lbs                | 222 lbs               |

### Replacement Parts

|   |              |           |           |          |          |            |            |           |            |             |
|---|--------------|-----------|-----------|----------|----------|------------|------------|-----------|------------|-------------|
| Top Sub                                   | Part No.     | 70823     | 21156     | —        | 68015    | —          | 37412      | 20156     | —          | —           |
|   | Weight       | 3 lbs     | 3 lbs     | —        | —        | —          | 12 lbs     | 18 lbs    | —          | —           |
| Mandrel                                   | Part No.     | 70959     | 64461     | 50641    | 68267    | 55869      | 55749      | 50661     | 55897      | 55769       |
|   | Weight       | 6 lbs     | 10 lbs    | 18 lbs   | —        | 53 lbs     | 60 lbs     | 70 lbs    | 72 1/2 lbs | 123 1/2 lbs |
| Piston Assembly                           | Part No.     | —         | 64455     | 64317    | 68268    | 64234      | 64211      | 64330     | 64248      | 64206       |
|   | Weight       | —         | —         | —        | —        | —          | —          | —         | —          | —           |
| Mandrel Body Insert                       | Part No.     | 71254     | 50634     | 50642    | 68266    | 50650      | 50283      | 50283     | 50591      | 49412       |
|   | Weight       | 5 lbs     | 6 lbs     | 8 lbs    | —        | 12 lbs     | 9 1/2 lbs  | 9 1/2 lbs | 9 1/2 lbs  | 11 lbs      |
| Mandrel Body Extension                    | Part No.     | —         | —         | —        | 68265    | —          | —          | —         | —          | —           |
|   | Weight       | —         | —         | —        | 55       | —          | —          | —         | —          | —           |
| Mandrel Body                              | Part No.     | 70958     | 50635     | 50643    | 68264    | 50651      | 50284      | 50284     | 50589      | 50371       |
|   | Weight       | 9 lbs     | 11 lbs    | 12 lbs   | —        | 12 1/2 lbs | 30 lbs     | 30 lbs    | 28 lbs     | 38 lbs      |
| Middle Body                               | Part No.     | 70960     | 50636     | 50644    | 68263    | 55870      | 55748      | 55748     | 55898      | 55660       |
|   | Weight       | 8 lbs     | 9 lbs     | 12 lbs   | —        | 29 lbs     | 26 lbs     | 26 lbs    | 30 lbs     | 39 lbs      |
| Washpipe Body                             | Part No.     | 70829     | 21151     | 18776    | 68011    | 38064      | 37407      | 20151     | 38045      | 44487       |
|   | Weight       | 19 lbs    | 22 lbs    | 20 lbs   | —        | 21 lbs     | 14 lbs     | 30 lbs    | 50 lbs     | 50 lbs      |
| Washpipe                                  | Part No.     | 70828     | 21154     | 18779    | 68016    | 42738      | 37410      | 64339     | 38046      | 44488       |
|   | Weight       | 1 1/2 lbs | 1 1/2 lbs | 3 lbs    | —        | 10 1/2 lbs | 12 1/2 lbs | 12 lbs    | 12 1/2 lbs | 20 lbs      |
| Knocker                                   | Part No.     | —         | —         | 18781    | —        | 38060      | —          | —         | 38049      | 51185       |
|   | Weight       | —         | —         | 1 lb     | —        | 1 lb       | —          | —         | 5 1/2 lbs  | 5 lbs       |
| Mandrel Body Insert Fill Plug (2 Req'd.)  | Part No.     | 617T      | 617T      | 329T     | 617T     | 329T       | 329T       | 329T      | 329T       | 329T        |
|   | Weight       | 1/8 lb    | 1/8 lb    | 1/8 lb   | —        | 1/8 lb     | 1/8 lb     | 1/8 lb    | —          | 1/8 lb      |
| Middle Body Fill Plug                     | Part No.     | 10641     | 10641     | 617T     | 10641    | 617T       | 617T       | 617T      | 617T       | 617T        |
|   | Weight       | 1/8 lb    | 1/8 lb    | 1/8 lb   | —        | 1/8 lb     | 1/8 lb     | 1/8 lb    | 1/8 lb     | 1/8 lb      |
| M.B. Insert Non-Extrusion Ring (2 Req'd.) | Part No.     | 8-024     | —         | 56542    | —        | —          | —          | —         | —          | —           |
|   | Weight       | 1/8 lb    | —         | 1/8 lb   | —        | —          | —          | —         | —          | —           |
| M.B. Insert Seal Ring (2 Req'd.)          | Part No.     | 568-024   | 8-027     | 227-2725 | —        | —          | —          | —         | —          | —           |
|   | Weight       | 1/4 lb    | 1/4 lb    | 1/4 lb   | —        | —          | —          | —         | —          | —           |
| Mandrel & W.P. Non-Extrusion Ring         | Part No.     | 365-16    | 365-17    | 365-24   | 365-30.5 | 365-32     | 365-36     | 365-36    | 365-35     | 365-40      |
|   | No. Req'd.   | 4         | 4         | 4        | 10       | 8          | 8          | 6         | 8          | 8           |
|   | Weight       | 1/8 lb    | 1/8 lb    | 1/8 lb   | 1/8 lb   | 1/8 lb     | 1/8 lb     | 1/8 lb    | 1/8 lb     | 1/8 lb      |
| Mandrel & W.P. Seal Protector Ring        | Part No.     | 375-16    | 375-17    | 375-24   | 375-30.5 | 375-32     | 375-36     | 375-36    | 375-35     | 375-40      |
|   | No. Req'd.   | 4         | 4         | 4        | 10       | 8          | 8          | 6         | 8          | 8           |
|   | Weight       | 1/8 lb    | 1/8 lb    | 1/8 lb   | 1/8 lb   | 1/8 lb     | 1/8 lb     | 1/8 lb    | 1/8 lb     | 1/8 lb      |
| Packing Set*                              | Part No.     | 70961     | 50638     | 50835    | 68272    | 55873      | 55816      | 55497     | 55902      | 55666       |
|   | Weight       | 1/4 lb    | 1/4 lb    | 1/4 lb   | 1/4 lb   | 1/4 lb     | 1/4 lb     | 1/4 lb    | 1/4 lb     | 1/4 lb      |
| Intensifier Fluid                         | Gals. Req'd. | .13       | .195      | .211     | .692     | .375       | .63        | .613      | .82        | .92         |

### Extra

|                           |          |          |          |  |            |          |          |          |          |          |
|---------------------------|----------|----------|----------|--|------------|----------|----------|----------|----------|----------|
| Mandrel Body Setting Tool | Part No. | 22709-16 | 22709-17 | 22709-24   | 22709-30.5 | 22709-32 | 22709-36 | 22709-36 | 22709-35 | 22709-40 |
| Service Kit               | Part No. | —        | 55403    | Only one service kit required for all sizes of intensifiers - Does not include any |            |          |          |          |          |          |
|                           | Weight   | —        | 75 lbs   | seal setting tool, which must be ordered separately as required for each tool.     |            |          |          |          |          |          |

### Extra for all Sizes of Tools

|  |          |         |           |
|--|----------|---------|-----------|
| Intensifier Fluid                        | Part No. | 50529-A | 1 Gallon  |
|  | Weight   | 10 lbs  |           |
|  | Part No. | 50529-B | 2 Gallon  |
|  | Weight   | 19 lbs  |           |
|  | Part No. | 50529-C | 5 Gallon  |
|  | Weight   | 50 lbs  |           |
| Intensifier Fluid Transfer & Filter Unit | Part No. | 50529-D | 30 Gallon |
|  | Weight   | 225 lbs |           |
| Intensifier Fluid Transfer & Filter Unit | Part No. | 52152   |           |
|  | Weight   | 50 lbs  |           |

\* Packing sets include all seals necessary to dress the tool; non-extrusion rings, seal protector rings and back-up rings are NOT included, and must be ordered separately.

# Bowen Jar Intensifiers

## Specifications and Replacement Parts

### Bowen Jar Intensifiers for Hydraulic Jars (Continued)

|                          |                 |       |       |       |       |       |       |       |       |       |
|--------------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Complete Assembly</b> | <b>Part No.</b> | 70957 | 64460 | 50640 | 68262 | 55867 | 55747 | 50660 | 55895 | 55664 |
|--------------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

### Replacement Parts (Continued)

|   |                 |          |          |          |          |          |          |          |          |          |
|---|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>Piston Assembly</b>                      | <b>Part No.</b> | —        | 64455    | 64317    | —        | 64234    | 64211    | 64330    | 64248    | 64206    |
| <b>Consists of:</b>                         | <b>Weight</b>   | —        | ¾ lb     | 1 lb     | —        | 1 lb     | 1 ½ lbs  | 1 ½ lbs  | 2 lbs    | 2 ½ lbs  |
| <b>Upper Adapter</b>                        | <b>Part No.</b> | —        | 64456    | 64318    | 68270    | 64236    | 64213    | 64331    | 64250    | 64208    |
|   | <b>Weight</b>   | —        | ¼ lb     | ¼ lb     | —        | ¼ lb     | ½ lb     | ½ lb     | ¾ lb     | 1 lb     |
| <b>Packing (5 Pcs./Set)</b>                 | <b>Part No.</b> | —        | 64458    | 64320    | —        | 64237    | 64214    | 64333    | 64251    | 64209    |
|   | <b>Weight</b>   | —        | ¼ lb     | ½ lb     | —        | ½ lb     | ½ lb     | ½ lb     | ½ lb     | ½ lb     |
| <b>Lower Adapter</b>                        | <b>Part No.</b> | —        | 64457    | 64319    | 68271    | 64235    | 64212    | 64332    | 64249    | 64207    |
|   | <b>Weight</b>   | —        | ¼ lb     | ¼ lb     | —        | ¼ lb     | ½ lb     | ½ lb     | ¾ lb     | 1 lb     |
| <b>Cone</b>                                 | <b>Part No.</b> | 77514    | —        | —        | —        | —        | —        | —        | —        | —        |
|   | <b>Weight</b>   | ½ lb     | —        | —        | —        | —        | —        | —        | —        | —        |
| <b>By-pass Body</b>                         | <b>Part No.</b> | 77513    | —        | —        | —        | —        | —        | —        | —        | —        |
|   | <b>Weight</b>   | ⅙ lb     | —        | —        | —        | —        | —        | —        | —        | —        |
| <b>Seal Body</b>                            | <b>Part No.</b> | 77515    | —        | —        | —        | —        | —        | —        | —        | —        |
|   | <b>Weight</b>   | ½ lb     | —        | —        | —        | —        | —        | —        | —        | —        |
| <b>O-Ring Seal</b>                          | <b>Part No.</b> | 2-019    | —        | —        | —        | —        | —        | —        | —        | —        |
|   | <b>Weight</b>   | ⅙ lb     | —        | —        | —        | —        | —        | —        | —        | —        |
| <b>O-Ring Packing Set</b>                   | <b>Part No.</b> | —        | 50638    | 50835    | 68272    | 55873    | 55816    | 55497    | 55902    | 55666    |
| <b>Consisting of:</b>                       | <b>Weight</b>   | —        | ¼ lb     | ¼ lb     | ¼ lb     | ¼ lb     | ¼ lb     | ¼ lb     | ¼ lb     | ¼ lb     |
| <b>Washpipe Seal</b>                        | <b>Part No.</b> | 568211   | 568115   | 568210   | 568224   | 568220   | 568224   | 568227   | 568222   | 568227   |
| <b>Mandrel &amp; W.P. Seal</b>              | <b>Part No.</b> | 568015   | 568212   | 568219   | 568328   | 568329   | 568333   | 568333   | 568332   | 568327   |
|   |                 | 1 Req'd. | 2 Req'd. | 4 Req'd. | 5 Req'd. | 4 Req'd. | 4 Req'd. | 3 Req'd. | 4 Req'd. | 4 Req'd. |
| <b>Mandrel Body &amp; Middle Body Seal</b>  | <b>Part No.</b> | 568016   | 568219   | 568224   | 568036   | 568231   | 568235   | 568235   | 568235   | 568239   |
|   |                 | 3 Req'd. | 3 Req'd. | 3 Req'd. | 4 Req'd. | 3 Req'd. | 3 Req'd. | 3 Req'd. | 3 Req'd. | 3 Req'd. |
| <b>Mandrel Body &amp; M.B. Seal - Small</b> | <b>Part No.</b> | 568214   | 568027   | 568222   | 568035   | 568228   | 568233   | 568233   | 568233   | 568237   |
|   |                 | 3 Req'd. | 3 Req'd. | 3 Req'd. | 8 Req'd. | 5 Req'd. | Req'd.   | 5 Req'd. | 5 Req'd. | 5 Req'd. |
| <b>Mandrel Body Insert</b>                  | <b>Part No.</b> |          |          |          |          |          |          |          |          |          |
| <b>F.P. Seal (2 Req'd.)</b>                 |                 | 568001   | —        | 568006   | 568005   | 568006   | 568006   | 568006   | 568006   | 568006   |
| <b>Middle Body F.P. Seal</b>                | <b>Part No.</b> | —        | 568005   | 568005   | —        | 568005   | 568005   | 568005   | 568005   | 568005   |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of connection, if other than standard
  - (3) Outside diameter, if other than standard
  - (4) Any spares or extras desired, by name and number



### Recommended Spare Parts:

- (1) 1 Service Kit
- (2) 1 Washpipe
- (3) 2 Piston Assemblies
- (4) 16 Non-Extrusion Rings
- (5) 16 Seal Protector Rings
- (6) 4 Mandrel Body Fill Plugs
- (7) 4 Middle Body Fill Plugs
- (8) 8 Packing Sets
- (9) 1 Mandrel Body Setting Tool
- (10) Seal Body Setting Tool

## Specifications and Replacement Parts

### Bowen Jar Intensifiers for Hydraulic Jars

|                              |                  |                               |                               |                       |                       |                       |                       |                       |                      |          |
|------------------------------|------------------|-------------------------------|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|----------|
| <b>Connections</b>           | 2 7/8 in. E.U.E. | 3 1/2 in. A.P.I. F.H. Or I.F. | 3 1/2 in. A.P.I. F.H. or I.F. | 4 1/2 in. A.P.I. F.H. | 4 1/2 in. A.P.I. I.F. | 5 1/2 in. A.P.I. Reg. | 6 3/8 in. A.P.I. Reg. | 6 3/8 in. A.P.I. Reg. | 7 1/2 in. A.P.I.Reg. |          |
| <b>Outside Diameter</b>      | 4 1/2 in.        | 4 3/4 in.                     | 4 3/4 in.                     | 6 in.                 | 6 1/4 in.             | 6 3/4 in.             | 7 3/4 in.             | 7 3/4 in.             | 9 in.                |          |
| <b>Inside Diameter</b>       | 2 3/8 in.        | 1 1/2 in.                     | 2 in.                         | 2 in.                 | 2 1/4 in.             | 2 3/8 in.             | 3 1/8 in.             | 3 1/8 in.             | 3 3/4 in.            |          |
| <b>Jars Used with:</b>       | 52653<br>35849   | 52530<br>25960                | 52500<br>36110                | 52498<br>14710        | 52544<br>12370        | 52680<br>11130        | 52711<br>15160        | 72978**               | 66346                |          |
| <b>Total Stroke To Solid</b> | 10 3/8 in.       | 8 7/8 in.                     | 10 1/8 in.                    | 8 3/8 in.             | 13 in.                | 13 in.                | 13 in.                | 12 in.                | 13 in.               |          |
| <b>Complete Assembly</b>     | <b>Part No.</b>  | 50708                         | 50700                         | 55812                 | 55860                 | 55905                 | 50720                 | 55910                 | 78964**              | 66372    |
|                              | <b>Weight</b>    | 356 lbs                       | 446 lbs                       | 460 lbs               | 653 lbs               | 820 lbs               | 928 lbs               | 1248 lbs              | —                    | 1870 lbs |

### Replacement Parts

|  |                     |         |             |         |           |           |           |         |        |           |
|--|---------------------|---------|-------------|---------|-----------|-----------|-----------|---------|--------|-----------|
| <b>Top Sub</b>   | <b>Part No.</b>     | —       | —           | —       | —         | —         | —         | —       | 72986  | —         |
|  | <b>Weight</b>       | —       | —           | —       | —         | —         | —         | —       | —      | —         |
| <b>Mandrel</b>   | <b>Part No.</b>     | 50709   | 50701       | 55817   | 55862     | 55908     | 50721     | 50146   | 72983  | 66376     |
|  | <b>Weight</b>       | 128 lbs | 127 3/4 lbs | 150 lbs | 268 lbs   | 337 lbs   | 285 lbs   | 564 lbs | —      | 791 lbs   |
| <b>Piston Assembly</b>                                       | <b>Part No.</b>     | 64340   | 64995       | 64264   | 64268     | 64272     | 64240     | 64276   | —      | 66382     |
|  | <b>Weight</b>       | —       | —           | —       | —         | —         | —         | —       | —      | —         |
| <b>Mandrel Body Insert</b>                                   | <b>Part No.</b>     | 50710   | 50702       | 49394   | 49635     | 50598     | 50722     | 50149   | —      | 66380     |
|  | <b>Weight</b>       | 10 lbs  | 11 lbs      | 12 lbs  | 25 lbs    | 25 lbs    | 35 lbs    | 47 lbs  | —      | 60 lbs    |
| <b>Mandrel Body</b>  | <b>Part No.</b>     | 50711   | 50703       | 50374   | 49634     | 50597     | 50723     | 50147   | 78266  | 66377     |
|  | <b>Weight</b>       | 45 lbs  | 66 lbs      | 62 lbs  | 92 lbs    | 103 lbs   | 143 lbs   | 160 lbs | —      | 310 lbs   |
| <b>Middle Body</b>   | <b>Part No.</b>     | 50712   | 50704       | 55814   | 55863     | 55920     | 50724     | 55911   | 78705  | 66373     |
|  | <b>Weight</b>       | 50 lbs  | 60 lbs      | 51 lbs  | 85 lbs    | 92 lbs    | 102 lbs   | 142 lbs | —      | 130 lbs   |
| <b>Washpipe Body</b>   | <b>Part No.</b>     | 35854   | 25961       | 38111   | 14711     | 12371     | 701       | 15164   | 78707  | 66350     |
|  | <b>Weight</b>       | 67 lbs  | 85 lbs      | 66 lbs  | 145 lbs   | 170 lbs   | 220 lbs   | 250 lbs | —      | 383 lbs   |
| <b>Washpipe</b>  | <b>Part No.</b>     | 64344   | 25964       | 38114   | 14714     | 55907     | 704       | 55912   | 73058  | 66349     |
|  | <b>Weight</b>       | 22 lbs  | 25 lbs      | 21 lbs  | 36 lbs    | 47 lbs    | 56 lbs    | 64 lbs  | —      | 135 lbs   |
| <b>Knocker</b>   | <b>Part No.</b>     | 35857   | 25966       | 38116   | 14717     | 12377     | 11134     | 50150   | —      | 66348     |
|  | <b>Weight</b>       | 5 lbs   | 5 lbs       | 4 lbs   | 9 1/2 lbs | 9 1/2 lbs | 9 1/2 lbs | 10 lbs  | —      | 34 lbs    |
| <b>Mandrel Body Insert Fill Plug (2 Req'd.)</b>              | <b>Part No.</b>     | 329T    | 329T        | 329T    | 508       | 508       | 508       | 508     | —      | 508       |
|  | <b>Weight</b>       | 1/8 lb  | 1/8 lb      | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | —      | 1/8 lb    |
| <b>Middle Body Fill Plug</b>                                 | <b>Part No.</b>     | 617T    | 329T        | 617T    | 329T      | 329T      | 329T      | 329T    | 329T   | —         |
|  | <b>Weight</b>       | 1/8 lb  | 1/8 lb      | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | 1/8 lb | —         |
| <b>Mandrel &amp; Washpipe</b>                                | <b>Part No.</b>     | 365-42  | 365-40      | 365-41  | 453       | 365-48    | 708       | 365-59  | —      | 365-65    |
| <b>Non-Extrusion Ring (8 Req'd.)</b>                         | <b>Weight</b>       | 1/8 lb  | 1/8 lb      | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | —      | 1/8 lb    |
| <b>Mandrel &amp; Washpipe Seal Protector Ring (8 Req'd.)</b> | <b>Part No.</b>     | 375-42  | 375-40      | 375-41  | 449       | 375-48    | 709       | 375-59  | —      | 375-65    |
|  | <b>Weight</b>       | 1/8 lb  | 1/8 lb      | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | —      | 1/8 lb    |
| <b>O-Ring Packing Set*</b>                                   | <b>Part No.</b>     | 50840   | 50841       | 55815   | 55866     | 55919     | 50842     | 55921   | —      | 66383     |
|  | <b>Weight</b>       | 1/4 lb  | 1/2 lb      | 1/2 lb  | 3/4 lb    | 3/4 lb    | 3/4 lb    | 1 lb    | —      | 1 1/2 lbs |
| <b>Intensifier Fluid</b>                                     | <b>Gals. Req'd.</b> | 1.15    | 1           | 1.35    | 1.57      | 4.24      | 3.45      | 4.65    | —      | 3.2       |

### Extra

|                                   |                 |               |                 |  |   |          |          |                 |         |           |
|-----------------------------------|-----------------|---------------|-----------------|--|---|----------|----------|-----------------|---------|-----------|
| <b>Mandrel Body Setting Tool</b>  | <b>Part No.</b> | 22709-42      | 22709-40        | 22709-41   | 448   | 22709-48 | 22709-51 | 2709-59         | —       | 22709-65  |
| <b>Service Kit</b>                | <b>Part No.</b> | 55403         | 55403           | 55403  | 55403   | 55403    | 55403    | 55403           | 145213  | 55403     |
|                                   | <b>Weight</b>   | 75 lbs        | 75 lbs          | 75 lbs   | 75 lbs  | 75 lbs   | 75 lbs   | 75 lbs          | —       | 75 lbs    |
| <b>Intensifier Fluid</b>          | <b>Part No.</b> | 50529-A       | 1 Gallon        | Bowen Super Intensifier<br>(Complete Assembly No. 78964)<br>Uses Approved ISO Grade 22 Hydraulic Oil ONLY. | Only For<br>Assembly No. 78964<br>Hydraulic Jar Oil 49842 |          |          | <b>Part No.</b> | 49842-A | 1 Gallon  |
|                                   | <b>Weight</b>   | 10 lbs        | <b>Weight</b>   |  |   |          |          | 8 1/2 lbs       |         |           |
|                                   | <b>Part No.</b> | 50529-B       | 2 Gallon        |  |   |          |          | <b>Part No.</b> | 49842-B | 5 Gallon  |
|                                   | <b>Weight</b>   | 19 lbs        | <b>Weight</b>   |  |   |          |          | 40 lbs          |         |           |
|                                   | <b>Part No.</b> | 50529-C       | 2 Gallon        |  |   |          |          | <b>Part No.</b> | 49842-C | 20 Gallon |
|                                   | <b>Weight</b>   | 50 lbs        | <b>Weight</b>   |  |   |          |          | 248 lbs         |         |           |
| <b>Part No.</b>                   | 50529-D         | 30 Gallon     | <b>Part No.</b> | 49842-D  | 55 Gallon   |          |          |                 |         |           |
| <b>Weight</b>                     | 225 lbs         | <b>Weight</b> | 455 lbs         |  |   |          |          |                 |         |           |
| <b>Intensifier Fluid</b>          | <b>Part No.</b> | 52152         |                 |  |   |          |          |                 |         |           |
| <b>Transfer &amp; Filter Unit</b> | <b>Weight</b>   | 50 lbs        |                 |  |   |          |          |                 |         |           |

\* Packing sets include all seals necessary to dress the tool.

non-extrusion rings, seal protector rings and back-up rings are NOT included, and must be ordered separately.

\*\* Super intensifier used with super fishing jar ONLY.

Information concerning disassembly, assembly, operation, etc., for the super intensifier provided on request.

# Bowen Jar Intensifiers

## Specifications and Replacement Parts

### Bowen Jar Intensifiers for Hydraulic Jars (Continued)

| Complete Assembly | Part No. | 50708 | 50700 | 55812 | 55860 | 55905 | 50720 | 55910 | 78964 | 66372 |
|-------------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|-------------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

### Replacement Parts (Continued)

|  |                 |          |          |          |          |          |          |          |        |        |
|--|-----------------|----------|----------|----------|----------|----------|----------|----------|--------|--------|
| <b>Piston Assembly Consists of:</b>                    | <b>Part No.</b> | 64340    | 64995    | 64264    | 64268    | 64272    | 64240    | 64276    | —      | 66382  |
|  | <b>Weight</b>   | 2 lbs    | 2 ¼ lbs  | 2 ½ lbs  | 3 lbs    | 4 lbs    | 4 lbs    | 5 lbs    | —      | 15 lbs |
| <b>Upper Adapter</b>                                   | <b>Part No.</b> | 64341    | 64997    | 64266    | 64269    | 64273    | 64242    | 64277    | —      | 66378  |
|  | <b>Weight</b>   | ¾ lbs    | ¾ lbs    | 1 lbs    | 1 lbs    | 1 ½ lbs  | 1 ½ lbs  | 2 lbs    | —      | 2 lbs  |
| <b>Packing</b>   | <b>Part No.</b> | 64343    | 64998    | 64267    | 64271    | 64275    | 64243    | 64279    | —      | 66384  |
|  | <b>Weight</b>   | ½ lb     | ½ lb     | ½ lb     | 1 lb     | 1 lb     | 1 lb     | 1 lb     | —      | 1 lb   |
|  | <b>Pcs/Set</b>  | 5        | 5        | 5        | 4        | 4        | 5        | 5        | —      | 5      |
| <b>Lower Adapter</b>                                   | <b>Part No.</b> | 64342    | 64996    | 64265    | 64270    | 64274    | 64241    | 64278    | —      | 66379  |
|  | <b>Weight</b>   | ¾ lb     | 1 lb     | 1 lb     | 1 lb     | 1 ½ lbs  | 1 ½ lbs  | 2 lbs    | —      | 2 lbs  |
| <b>O-Ring Packing Set Consists of:</b>                 | <b>Part No.</b> | 50840    | 50841    | 55815    | 55866    | 55919    | 50842    | 55921    | —      | 66383  |
|  | <b>Weight</b>   | ¼ lb     | ½ lb     | ½ lb     | ¾ lb     | ¾ lb     | ¾ lb     | ¾ lb     | —      | ¾ lb   |
| <b>Washpipe Seal</b>                                   | <b>Part No.</b> | 568233   | 568228   | 568228   | 568234   | 568232   | 568235   | 568242   | 568296 | 568296 |
| <b>Mandrel &amp; Washpipe Seal (4 Req'd.)</b>          | <b>Part No.</b> | 568339   | 568337   | 568338   | 568344   | 568345   | 568349   | 568432   | —      | 568438 |
| <b>Mandrel Body &amp; Middle Body Seal (3 Req'd.)</b>  | <b>Part No.</b> | 568241   | 568241   | 568241   | 568248   | 568252   | 568256   | 568261   | —      | 568265 |
| <b>Mandrel Body &amp; Middle Body Seal - Small</b>     | <b>Part No.</b> | 568239   | 568239   | 568239   | 568246   | 568250   | 568254   | 568437   | —      | 568263 |
|  |                 | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 4 Req'd. | —      | —      |
| <b>Mandrel Body Insert Fill Plug Seal (2 Req'd.)</b>   | <b>Part No.</b> | 568006   | 568006   | 568006   | 568011   | 568011   | 568011   | 568011   | —      | 568011 |
| <b>Middle Body Fill Plug Seal</b>                      | <b>Part No.</b> | 568005   | 568006   | 568005   | 568005   | 568005   | 568005   | 568006   | 568005 | —      |
| <b>Mandrel Body Insert Seal Small (4 Req'd.)</b>       | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | —      | 568441 |
| <b>Spline Body</b>                                     | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 72979  | —      |
| <b>Mandrel Body (Wiper)</b>                            | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 72982  | —      |
| <b>Mandrel Body I.D. Seal</b>                          | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568452 | —      |
| <b>Back Up Ring for Mandrel Body I.D. Seal</b>         | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 72981  | —      |
| <b>Mandrel Body Seal - Large (O-Ring)</b>              | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568260 | —      |
| <b>Mandrel Body Seal - Small (O-Ring)</b>              | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568258 | —      |
| <b>Mandrel Seal - Upper</b>                            | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568247 | —      |
| <b>Mandrel Seal - Middle</b>                           | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568428 | —      |
| <b>Back Up Ring for Mandrel Middle Seal (2 Req'd.)</b> | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 72984  | —      |
| <b>Mandrel Wiper</b>                                   | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 72985  | —      |
| <b>Mandrel Seal - Lower</b>                            | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568240 | —      |
| <b>Top Sub Seal</b>                                    | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568253 | —      |
| <b>Connector Body</b>                                  | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 72987  | —      |
| <b>Connector Body Seal - Small</b>                     | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568258 | —      |
| <b>Connector Body Seal - Large (2 Req'd.)</b>          | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568260 | —      |
| <b>Connector Body Wiper</b>                            | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 72988  | —      |
| <b>Back Up Ring for Connector Body I.D. Seal</b>       | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 72989  | —      |
| <b>Connector Body Packing Set (I.D.)</b>               | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 148643 | —      |
| <b>Connector Body Packing Set (O.D.)</b>               | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 148644 | —      |
| <b>Connector Body Packing Retainer (O.D.)</b>          | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 72992  | —      |
| <b>Connector Body Packing Retainer Ring (O.D.)</b>     | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 78427  | —      |
| <b>Mandrel Extension</b>                               | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 78706  | —      |
| <b>Mandrel Extension Seal - Lower</b>                  | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568240 | —      |
| <b>Mandrel Extension Seal - Upper</b>                  | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568246 | —      |
| <b>Mandrel Ext. Packing Set (O.D.)</b>                 | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 78946  | —      |
| <b>Mandrel Ext. Packing Retainer</b>                   | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 78960  | —      |
| <b>Washpipe Body Seal - Small</b>                      | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | 568259   | 568255 | —      |
| <b>Washpipe Body Seal - Large</b>                      | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 568260 | —      |
| <b>Washpipe Body Packing Set (I.D.)</b>                | <b>Part No.</b> | —        | —        | —        | —        | —        | —        | —        | 148643 | —      |

### Extra

|                             |                 |   |   |   |   |   |   |   |       |   |
|-----------------------------|-----------------|---|---|---|---|---|---|---|-------|---|
| <b>O-Ring Packing Set</b>   | <b>Part No.</b> | — | — | — | — | — | — | — | 78966 | — |
| <b>Complete Packing Set</b> | <b>Part No.</b> | — | — | — | — | — | — | — | 78967 | — |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of connection, if other than standard
  - (3) Outside diameter, if other than standard
  - (4) Any spares or extras desired, by name and number



### Recommended Spare Parts:

- (1) 1 Service Kit
- (2) 1 Washpipe
- (3) 2 Piston Assemblies
- (4) 16 Non-Extrusion Rings
- (5) 16 Seal Protector Rings
- (6) 4 Mandrel Body Fill Plugs
- (7) 4 Middle Body Fill Plugs
- (8) 8 Packing Sets
- (9) 1 Mandrel Body Setting Tool
- (10) Seal Body Setting Tool



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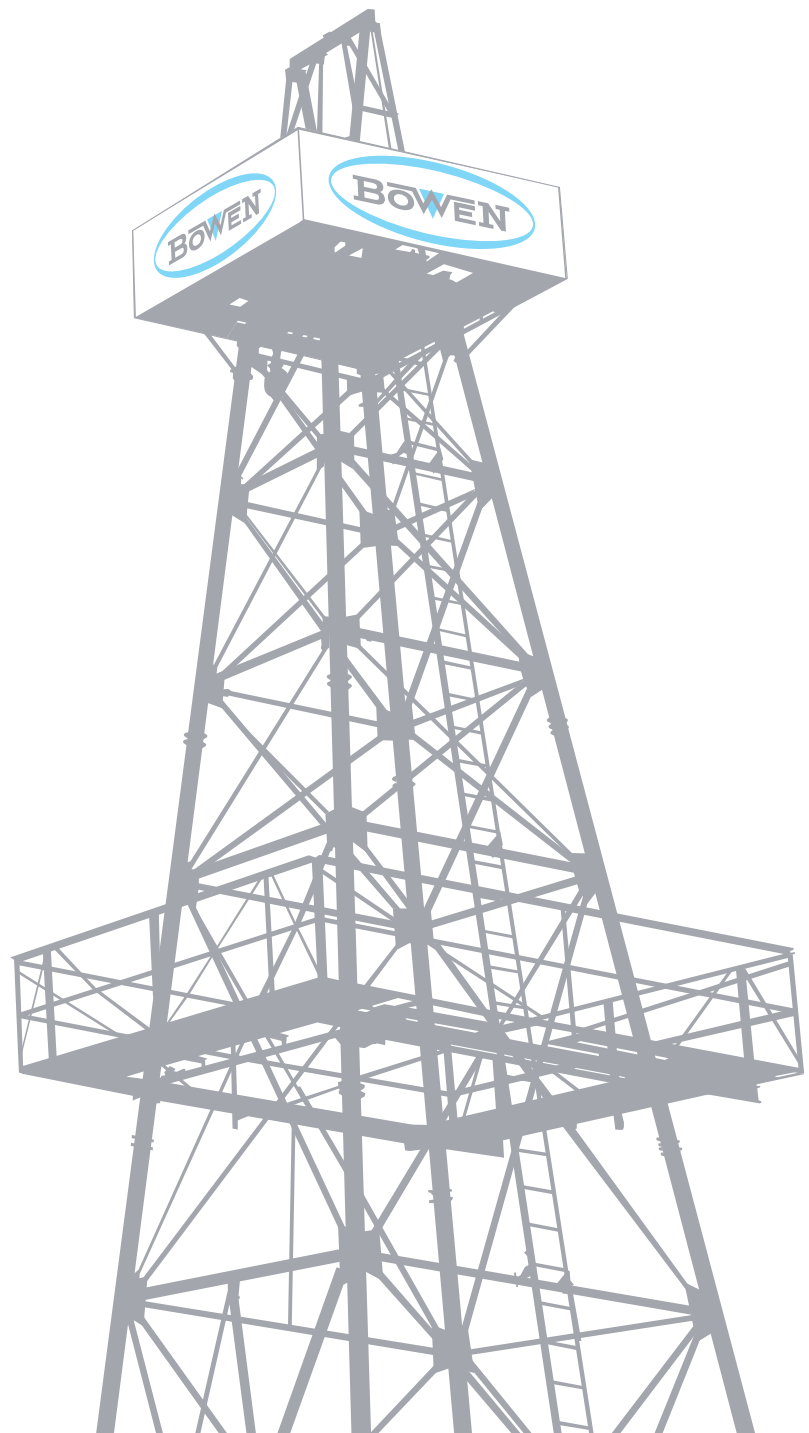
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# Bowen Super II Fishing Jar Intensifier

Instruction Manual 4025



**Bowen | NOV**



# Bowen Super II Fishing Jar Intensifier

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Super II Fishing Jar Intensifier

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## General Description

The Bowen™ Super II fishing jar intensifier is a hydraulic fluid spring that operates in a straight-pull operation to accentuate the jar force initiated by the Super or Super II fishing jar. The intensifier stores energy when a strain is pulled on the running string. When the strain is removed by the free stroke of the jar, this stored energy releases, accelerating the drill collars and jar upward until striking a blow of high impact. Each Bowen Super II fishing jar intensifier matches a corresponding Bowen Super or Super II oil jar.

The variable load of the Super II intensifier and jar is controlled by varying the pull load of the working string. A lighter pull creates a lighter impact at the struck point. A heavier pull creates a harder impact at the strike point. The intensifier will also amplify and accelerate the jarring action.

## Application

The Bowen Jar Placement Program, available to all Bowen customers, allows the operator to determine the best string configuration and applied pull load for a specific configuration or impact requirement that helps to avoid excessively high impact loads. The impact load information of the Jar Placement Program can be compared to the strength of the fishing string to include all tools being used and to the fish for possible limitations on pull and impact load.

Running the program and planning the fishing job is worth your time and very beneficial.

**NOTE: The Bowen Fishing Jar Placement Program is written specifically for Bowen jars and intensifiers, with the unique**

**characteristics of each tool incorporated in the program. See program for additional information.**

Install the Bowen Super II jar intensifier when maximum jarring impact and impulse are needed. This is particularly true in shallow, deviated or directional holes. The Super II jar intensifier should be located above all the concentrated mass of (drill collars or heavy weight drill pipe, etc.), which is located immediately above the jar. The working string directly above the intensifier should not have a weight per foot change in the first 1,000 feet of string directly above it, except for flexibility when needed for bending.

The fishing tools should not be run at a highly deviated point in the hole or in the curvature of a directional hole if it can be avoided. In deviated, directional or oversize holes, any jar and intensifier should be isolated from stiffer sections by a more flexible joint of string. This is to protect the tools from excessive bending loads and increase the probability of successful fishing.

We recommend installing no less than two (2) joints of drill collars or less than four (4) joints of heavy weight drill pipe between the fishing jar and the jar intensifier or between the fishing jar and the working string.

**CAUTION: We recommend running the Bowen Fishing Jar Placement Program for proper configuration to avoid excessively high impact loads that might damage equipment.**

## Use with Fishing Jar

The Super II jar intensifier is always used in conjunction with a Super or Super II fishing jar. During conventional jarring operations with either mechanical or hydraulic jars, the intensity of the blow struck is proportional to the accelerated rapid movement of the entire running string above the jar. This accelerated movement will often be considerably diminished by friction of the running string against the wall of the hole. In such cases, much of the energy will be lost. Also, at very shallow depth, the lack of available stretch in the running string causes a great loss in the effectiveness of expected acceleration, due to very small amount of stretch in the running string being available.

The Bowen jar intensifier provides the means to store the required energy immediately above the jar and drill collars to effectively offset the loss of stretch or drag on the running string. The Bowen jar intensifier also utilizes its contained hydraulic fluid to cushion the shock of the running string as it rebounds after each jarring stroke. This reduces the inherent tendency to cause shock damage to the tool and running string.

Use of the Bowen Super II jar intensifier allows you to use fewer drill collars. This is particularly true at shallower operating depths where excessive numbers of drill collars are sometimes used to utilize mass in place of available stretch. Using too many drill collars can damage the tools and the running string and should be avoided.

For any fishing operations involving the use of the Bowen fishing jar such as fishing,

coring, milling, or washover, we recommend using the Bowen Fishing Jar Placement Program to provide you with the specific configuration necessary for possible jar actions.

# Bowen Super II Fishing Jar Intensifier

## Operation

Before using the Bowen Super II jar intensifier, carefully examine it to ensure the unit has been assembled and filled correctly and no leaks are evident.

**NOTE: Bowen jar intensifiers give the best performance when they are used along with Bowen liquid spring intensifier fluid.**

Make sure the intensifier is filled with the proper Bowen liquid spring intensifier fluid and tested in a Bowen jar tester or equivalent tester to ensure the proper performance. The internal and external connections come from the Bowen manufacturing facilities with the proper torque. Check all external connections after use to ensure the proper torque of all the threaded connections are made up as per the Recommended Torque, in Table 10-1, page 12.

**CAUTION: Do not tong on the threaded connections. Doing so will damage the intensifier. Tong the unit approximately 4 in. from the threads.**

## Rig Up

For the maximum effectiveness of jar action, carefully install the Super II jar intensifier in the string above the concentrated mass (drill collars, heavy weight drill pipe, etc.), which is between the Bowen Super or Super II fishing jar and the intensifier.

**WARNING: The Super II fishing jar is in the cocked (closed) position when it is shipped to the rig from the factory. Once closed, the jar should not be left suspended from the elevator, especially with any appreciable weight suspended below it. From this position, the jar may open, dropping the length of its**

**stroke, and may cause damage or injury.**

## Jarring

When you use the Super or Super II fishing jar without an intensifier in the string, we recommend applying a low initial load (30-50% of maximum pull load) and then increasing the load on the proceeding strokes if needed. This allows the operator to see and feel the effects of the jarring action.

**CAUTION: At no time during the pull cycle of the jar should the maximum pull load (lbs.) be exceeded. See Strength and Test Data, Table 10-1.**

When you place the Super II jar intensifier in the string for maximum jar affect, use the minimum applied pull load, as per the Bowen Intensifier Strength Data in Table 10-1, page 12.

The velocity and relative impact load of the jar blow is controlled by the amount of stretch taken in the running string (pull load) and the weight of the drill collars installed above the fishing jar. When using the Super II jar intensifier, it is necessary to also install contiguous similar mass above the Super II jar intensifier for a minimum length of 1,000 feet to lessen the reverse wave inertia on the fishing jar.

1. To strike the initial blow: Set the string down to ensure the fishing jar is closed. Then raise the string, applying the desired pull load at the fishing jar.
2. Set the brake and wait for the fishing jar to strike. The first blow may take from a few seconds to several minutes, depending on such variables as depth of

operation, amount of stretch on the string (pull load) use of the intensifier, downhole temperature and hole condition.

3. Close jar and repeat: After a stroke is made, it is necessary only to close the jar before taking the stretch in the string to strike the next blow. Each blow may be struck at any desired pull load at the fishing jar up to the maximum pull load for the fishing jar. Refer to Strength & Test Data in Table 10-1, page 12.

## Rig Down

The Super II jar intensifier itself requires no specific action for rig down, but we recommend that you avoid allowing the intensifier to remain suspended in the elevator for extended periods of time. After performing rig floor inspection for oil leaks, lay it on the derrick floor.

**WARNING: The Super II fishing jar is in the cocked (closed) position. Once closed, the jar should not be left suspended from the elevator, especially with any appreciable weight suspended below it. From this position, the jar may open, dropping the length of its stroke and potentially causing damage or injury.**

## Maintenance

Maintenance of the Bowen Super II jar intensifier is minimal but important. After each prolonged or hard use, perform a complete inspection and redressing. Following moderate use, complete a careful check. Perform magnetic particle inspection of stressed components after each use.

## Rig Floor Maintenance

After moderate use on a short job, the Super II jar intensifier is kept at the rig site where it requires only minor maintenance, which is usually done on the rig floor.

Immediately after removing the jar intensifier from the fishing string, flush all mud from the bore, especially inside the washpipe (6).

To prevent corrosion and facilitate tool make-up during the next tool use, coat the intensifier joint box and pin threads with Bowen anti-gall grease.

## Dressing Area Maintenance

After prolonged and/or hard use, take the Bowen Super II jar intensifier to an adequate dressing area as soon as possible for complete maintenance including:

1. Disassembly;
2. Inspection;
3. Reassembly;
4. Re-Filling with Bowen Liquid Spring Intensifier Fluid; and Testing.

**CAUTION: The Bowen Super II fishing jar intensifier is a hydraulic jar; therefore, close tolerances and smooth finishes are mandatory. Also, to avoid causing damage or malfunction, keep the intensifier free of all contamination (dirt, sand, metal etc.).**

## Equipment

The following tools, equipment and parts should be obtained before starting dressing area maintenance:

1. Bowen vise and tong, or equivalent, suitable for jar size.

# Bowen Super II Fishing Jar Intensifier

- Overhead crane, 2,000 lb. minimum capacity.
- Pipe wrenches, suitable for the ODs of interior intensifier components.
- Chain wrenches, suitable for spinning on/off threaded parts.
- Bowen v-belt pulley assembly No. 92070, or equivalent, which can be suspended from the crane to support threaded parts while spinning on/off.
- Straps of suitable strength and condition for safely lifting and handling parts with overhead crane.
- Bowen jar tester, or equivalent, suitable for jar size. See Figure 11-1, page 13.
- Bowen Super II jar intensifier service kit, as shown on page 14. See also Replacement Parts List, page 7.
- Floater (9) positioning tool for specific intensifier size. See Replacement Parts List, page 11.
- Complete packing set and fill plugs (12) for specific intensifier size. See Replacement Parts List, page 11. Also see Recommended Spares on page 7.
- Bowen thread lubricant.
- Bowen liquid spring intensifier fluid.

specific size Super II jar intensifier being serviced. These drawings can be obtained through NOV. Throughout the disassembly, inspection and re-assembly procedures, the following notes may be helpful:

- Replacement Parts list on page 7 lists all major components in the order in which they are assembled, with sub-assembly parts listed below each major component. Item numbers are assigned here for each part name.
- In Figure 6-1 on page 7, the item number in parentheses indicates the location of parts as shown in the diagram.
- Each item number corresponds to a part name and specific part number in the chart accompanying Figure 6-1 and in the Replacement Parts list on page 7.
- Part numbers are specific to jar intensifier OD sizes.
- “Top” and “bottom” refer to the ends of the jar intensifier as it is run in a fishing string; i.e., the mandrel (39) is on the bottom end, while the top sub (1) and washpipe (6) is on the top.
- To prevent damage during servicing, do not use vise, tongs, wrenches, or chains over the fill plug (12), on any seal surfaces, or on any other smooth surface of the tool.
- When disassembling the Bowen Super II jar

intensifier, note the direction and location of all packing, o-rings and wipers. This may help in reassembly of the jar intensifier.

## Disassembly Procedure

Complete disassembly of the Bowen jar intensifier should proceed as follows:

- Secure the intensifier in a pipe vice at approximately the center of the jar intensifier on the spline body (32).

**WARNING: Do not remove the fill plugs (12 & 36) until the tool is fully disassembled. The possibility of trapped residual pressure exists and can cause possible damage or injury.**

- Break the connections at the pressure body (7) and the top sub (1). All connections are right handed threads.
- Place an open-mouthed container below the joint of the pressure body (7) and the top sub (1) to catch the compression fluid for use again during assembly.
- Back off the top sub (1) until the oil runs out of the tool, past the threads, allowing the oil to drain into the open container. Remove the top sub (1) and lay it aside.

**WARNING: The top sub (1) must be secured firmly during removal due to the possibility of trapped residual of high pressure.**

- Tilt the total unit with the top sub (1) end down to

allow the floater (9) spring (5) to carefully slide out and off the washpipe (6) seal surface and remove the spring. Re-clamp the intensifier to remove the remainder of the components.

- Place the open mouth container under the pressure body (7) to connector body (25) connection, allowing the oil to drain in a container when loosened.
- Loosen and remove the pressure body (7) with firm smooth action, being careful not to score the washpipe (6) seal finish surface or damage the piston (19) packing seals. The floater (9) attachment inside the washpipe (6) will be forced off the washpipe (6) at this same time and will cause some drag when attempting to remove the pressure body (7).
- Loosen and remove the washpipe (6) by placing a chain wrench on the large end of the washpipe (6). Lay the washpipe (6) body aside, ensuring that the seal finish is not scored or scratched.

**CAUTION: Place the wrench only on the wrench surface provided at the upper (larger) end of the washpipe (6).**

- Gently remove the seal body (15) and piston (19) from the mandrel extension (28).
- Loosen and remove the connector body (25) from the unit.

## Disassembly Notes

We recommend referring to an assembly drawing for the

# Bowen Super II Fishing Jar Intensifier

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11. After you remove the connector body (25), the wrench attachment location of the mandrel extension (28) will be revealed.
12. Use this raised area of the mandrel extension (28) to fasten the chain wrench to loosen and remove the mandrel extension (28).
13. Loosen and remove the mandrel from the mandrel body, (35) being careful not to damage the mandrel body (35) packing.
14. Loosen and remove the mandrel body (35) from the spline body, (32) which completes the disassembly.
15. Inspect the seals and seal surfaces for damage and replace all seals, o-rings and packing seals.
16. Unclamp the spline body (32) from the vise and lay it aside.
17. Remove the two seals from the OD. of the mandrel body (35) and from the connector body (25).
18. Remove the two seal packing assemblies from the inside upper end of the mandrel body (35) and the top sub (1). To remove these seals, proceed as follows: Using either a 625 (or 626) tool or a bent screw driver, carefully insert the tip of the blade between the o-ring and the seal protector ring. Then lift out the o-ring, taking care to not damage or mar the seal protector rings or non extrusion rings. Do not run the tool around the groove under the rings, which tends to mar the groove by scratching the surface.
19. With the o-ring removed, visually examine the seal protector rings and non extrusion rings for any indication of damage, burrs or advanced wear. Remove any such damaged or worn rings.
20. Check the similar seal assemblies in the washpipe (6) body and the piston (19) seal body (15).
21. Carefully clean all the disassembled parts with solvent and wipe them dry with a lint-free, clean cloth, then thoroughly oil all the parts with a good grade of light, clean oil.
22. Check all the parts for defects. Examine the polished surfaces for pits or scratches. Any abrasions on these surfaces will damage the o-ring seals, resulting in loss of fluid during the operation of the tool. Any rough, shallow pits, or burrs may be removed by use of fine emery cloth. Parts with major pits or deep scratches and grooves must be replaced.
23. Check the spline on the mandrel (39) and in the spline body (32) for burrs or upsets. Upsets may be carefully ground away with a grinder or a small hand file and afterwards polished with emery cloth.
24. Examine the washpipe (6) body bore for signs of scratches or galls.
25. Carefully examine the piston (19). Polish off any abrasions, nicks, galls or burrs at the OD or ID. Use a small hand file or emery cloth. Any damage to the piston (19) ring seating surface will render the piston (19) unusable.
26. Remove the fill plugs (12) and install new fill plug (12) o-ring seals on the fill plugs (12). (DO NOT reuse this fluid unless it is properly filtered using the *Bowen* silicone fluid reclamation unit part number 80960). If no new fluid is available the fluid must be filtered through the Bowen line filtered attached to the service kit.

Minor damage of this nature may be smoothed out with emery cloth, or if very minor, may be disregarded. Any deep scratches in the smooth bore of the washpipe (6) will render it unfit for further service.

# Bowen Super II Fishing Jar Intensifier

## Super II Jar Intensifier Diagram Assembly No. 153445

| Item  | Part Number | Replacement Part Name                                 |
|-------|-------------|---|
| 1     | 153455/005  | Top Sub   |
| 2     | 568241/005  | Top Sub O-Ring  |
| 3     | 153459/005  | Top Sub Packing Set                                   |
| 4     | 153464/005  | Top Sub Packing Retainer                              |
| 5     | 152859/005  | Floater Spring  |
| 6     | 153452/005  | Washpipe  |
| 7     | 153453/005  | Pressure Body   |
| 8     | 568342/005  | Floater OD O-Ring                                     |
| 9     | 153454/005  | Floater   |
| 10    | 568335/005  | Floater ID O-Ring                                     |
| 11    | 568010/005  | Fill Plug O-Ring                                      |
| 12*   | 102025/005  | Fill Plug (8)   |
| 13    | 568010/005  | Fill Plug Parbak for Fill Plug                        |
| 14    | 568232/005  | Washpipe O-Ring                                       |
| 15    | 153643/005  | Seal Body   |
| 16*   | 370-12      | Seal Body Non-Extrusion Ring (4)                      |
| 17*   | 376-12      | Seal Body Seal Protector Ring (4)                     |
| 18    | 568234/005  | Seal Body O-Ring                                      |
| 19*   | 153644/005  | Piston (2)  |
| 20    | 153461/005  | Piston Packing Set                                    |
| 21*   | 153462/005  | Piston Packing Backup Ring (2)                        |
| 22*   | 153463/005  | Piston Packing Retainer Ring (2)                      |
| 23    | 153458/005  | Connector Body Seal (Large)                           |
| 24    | 568243/005  | Connector Body O-Ring (Large)                         |
| 25    | 153450/005  | Connector Body  |
| 26    | 538242/005  | Connector Body O-Ring (Small)                         |
| 27    | 152915/005  | Connector Body Seal (Small)                           |
| 28    | 153642/005  | Mandrel Extension                                     |
| 29*   | 2249-9      | Mandrel Non-Extrusion Ring (2 each) (8)               |
| 30*   | 2250-9      | Seal Protector Ring for Mandrel O-Ring (2 each) (8)   |
| 31    | 568231/005  | Mandrel O-ring  |
| 32    | 153447/005  | Spline Body   |
| 33    | 152915/005  | Mandrel Body Seal                                     |
| 34    | 568242/005  | Mandrel Body O-Ring                                   |
| 35    | 153446/005  | Mandrel Body  |
| 36*   | 102025/005  | Second Fill Plug, see Item 12 (8)                     |
| 37*   | 153456/005  | Mandrel Body Packing (2 each)                         |
| 38*   | 153457/005  | Mandrel Body Wiper                                    |
| 39    | 153448/005  | Mandrel   |
| 40* † | 153465/005  | Complete Packing Set (12)                             |
| 41* † | 153466/005  | O-Ring Packing Set                                    |
| 42 †  | 146959/006  | Plastic Thread Protector for 3 1/2 in. IF (NC 38) Pin |
| 43 †  | 146960/006  | Plastic Thread Protector for 3 1/2 in. IF (NC 38) Box |
| 44* † | 22709/130   | 41.75 Setting Tool                                    |
| 45* † | 153707/005  | Floater Positioning Tool                              |
| 46* † | 50529       | Intensifier Fluid                                     |
| 47 †  | 153823      | Thread Lubricant                                      |

† Items not shown in the tool illustration

\* Recommended spare parts (recommended quantities)

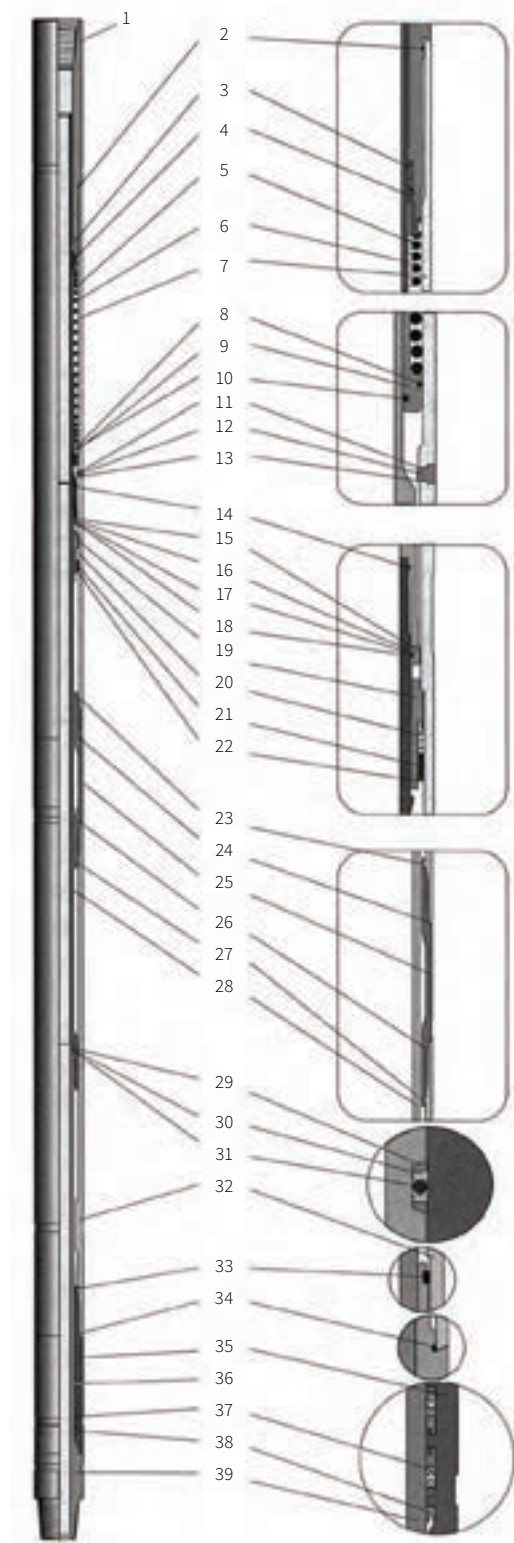


Figure 6-1  
Super II Jar Intensifier Parts Illustrated

# Bowen Super II Fishing Jar Intensifier

## Inspection

During inspection of the Super II jar intensifier parts, look for damage to smooth and sliding surfaces, threads, grooves and bores. Types of damage include pitting, nicks, scratches, burrs, abrasions, cracks, and galled or excessively worn areas. Minor damage refers to any flaws that can be removed using a triangular grinder or file, followed by polishing with fine emery cloth. Major damage cannot be restored by hand grinding and polishing such as fatigue cracking. All parts with major damage must be replaced.

**WARNING: Uncorrected damage, major or minor, may render parts undependable and could interfere with proper operation or seriously fail during test and cause personal injury.**

## Inspection Items

Carefully steam clean all parts or use solvent and wipe them dry with clean, lint-free cloth. Examine straight box and pin thread connections, removing any minor damage with a triangular hand file before polishing with emery cloth. Examine all seal surfaces and grooves. Using a seal pick, fingernail, or other pointed object, feel the entire width and depth of the grooves. If possible, repair any steps or surface interruptions. Also examine butting faces on all body parts as well as end faces of mandrel, mandrel extension (28), and washpipe (6). Look for fatigue cracking on:

- Pin sections at inside corner of the 15° shoulder;
- Corners at the bottom of o-ring and seal grooves;

- Corners at the bottom of the thread relief; and
- Thread nearest the thread relief.

**WARNING: Magnetic particle inspection is strongly recommended for locating fatigue cracks. Parts with cracks must be replaced.**

## Assembly Notes

We recommend referring to an assembly drawing for the specific size Super II jar intensifier being serviced. These drawings can be obtained through NOV. Throughout the disassembly, inspection and re-assembly procedures, the following notes may be helpful:

- The replacement parts list on page 7 lists all major components in the order in which they are assembled, with sub-assembly parts listed below each major component. Item numbers are assigned here for each part name.
- In Figure 6-1 on page 7, the item number in parentheses indicates the location of parts as shown in the diagram.
- Each item number corresponds to a part name and specific part number in the chart accompanying Figure 6-1 in the replacement parts list.
- Part numbers are specific to jar intensifier OD sizes.
- Top and bottom refer to the ends of the jar intensifier as it is run in a fishing string; i.e., the mandrel (39) is on the

bottom end, while the top sub (1) and washpipe (6) are on the top.

- To prevent damage during servicing, do not use vise, tongs, wrenches, or chains over fill plug (12), on any seal surfaces, or on any other smooth surface of the tool.
- When disassembling the Bowen Super II jar intensifier, note the direction and location of all packing, o-rings and wipers. This may help in re-assembly of the jar intensifier.
- All connections are made with right-handed threads and should be coated with anti-gall grease. Take care not to lubricate above thread relief. Remove excess anti-gall grease from the threads. Due to the weight of the Super II jar intensifier components, it is necessary to assemble the unit with access to a 2,000 lb. capacity overhead hoist. Before re-assembly, make sure all parts are clean and in good condition. Installing marginal components will in the long run cause time loss and cost more than replacing the worn components. Coat all metal parts with a good grade of clean, light oil and lay them out on clean cloths or paper. We recommend redressing the Super II jar intensifier with a new complete packing set (item 40) on page 7, which consists of all packing, o-rings, back up rings, wipers and seal body (15) seals for a specific intensifier.

## Pre-Assembly

1. Install o-rings, wiper: coat all o-rings, back-up rings and wipers with a good grade of clean, light oil and install them in their proper places.

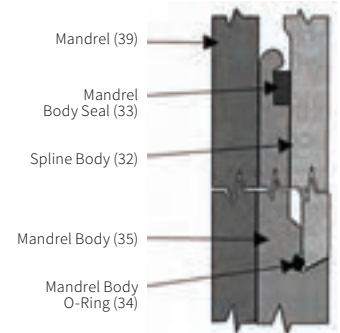


Figure 8-1: Mandrel Body O-Ring and Seal

2. Mandrel body (35) Install the mandrel body packing set (36)(37) into the ID of the stencil groove end of the mandrel body (35) as illustrated in Figure 6-1. Install the mandrel body wiper (38) into the ID on the stencil end as seen in Figure 8-1. Install the mandrel body (35) o-ring and the mandrel body (35) seal on the OD of the non stenciled groove side of the mandrel body (35).

Figure 8-2 shows the mandrel body (35) packing set, which comes in two major sections. When installed, the brass rings face each other and contact the mandrel seal surface, as seen below.

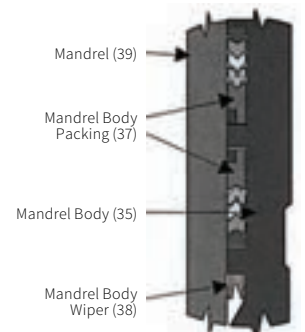


Figure 8-2: Mandrel Body Packing Set & Wiper

# Bowen Super II Fishing Jar Intensifier

- Mandrel (39): Install the o-ring, two (2) seal protector rings, and the mandrel non-extrusion ring onto the OD of the mandrel, as seen in figure 8-3, prior to the installation of the mandrel later on in this procedure.

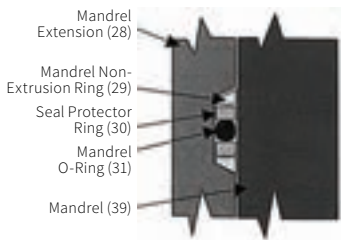


Figure 8-3: Mandrel OD Ring Seals

- Top sub (1): install the top sub (1) packing set, as illustrated in figure 8-4, into the ID of the top sub (1), which is the stencil groove end of the top sub (1). Install the top sub (1) packing retainer ring into the top sub (1) to contain the packing set. Install the top sub (1) o-ring in preparation for installation onto the main unit later in this procedure.

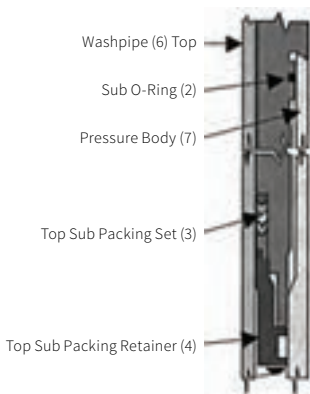


Figure 8-4: Top Sub Seal Installation

- Piston (19) packing set: install the piston packing set (20), piston packing backup ring (21), and the piston packing retainer ring

(22) in the piston (19) OD, as seen in figure 8-5 below. Put the piston (19) aside for installation later on in this procedure.

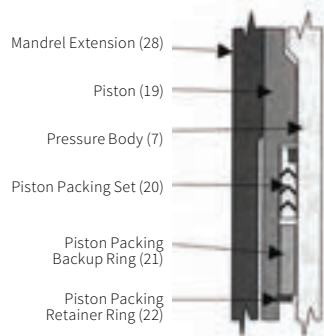


Figure 8-5: Piston Packing Set Installed

- Floater (9): install the two o-rings into the floater (9), as seen in figure 8-6. the floater (9) will be used later in this procedure.

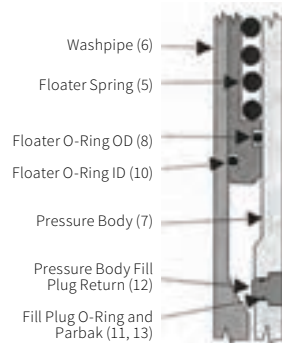


Figure 8-6: Floater O-Ring Installation

- Seal body (15): Install the seal body (15) o-ring, seal body (15) protector ring, and the non-extrusion ring into the ID of the seal body (15), shown in Figure 8-7 below. Lay the seal body (15) aside in preparation for use later in this procedure.

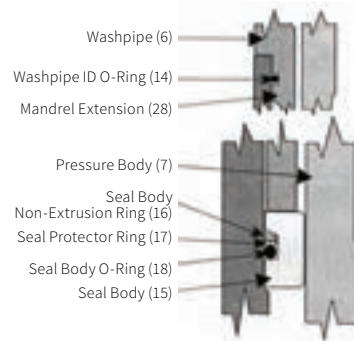


Figure 8-7: Seal Body Seal Installation

- Connector body (25): install the connector body (24) (large) o-rings and large seal (23) into the OD non-stencil groove end of the connector body (25), as illustrated in figure 8-8. The connector body (25) will be used later in these procedures.

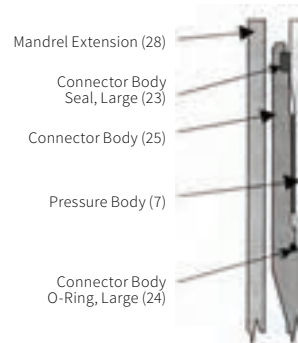


Figure 8-8: Connector Body Large Seal Installation

- Connector body (25): Install the connector body, (26) (small) o-rings, and small seal (27) into the ID stencil groove end of the connector body (25), as illustrated in Figure 8-9. The connector body (25) will be used later in these procedures.

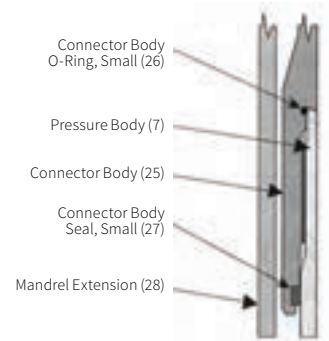


Figure 8-9: Connector Body Small Seal Installation

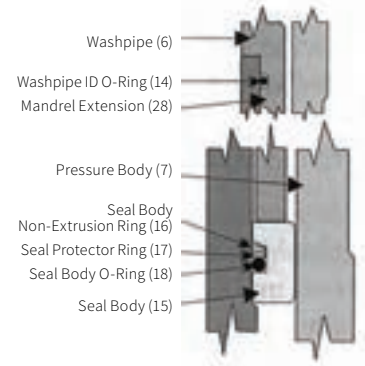


Figure 8-10: Washpipe O-Ring Installation

- Washpipe (6): Install the washpipe o-ring (14) in the ID past the threads of the wide-end of the washpipe (6) as shown in Figure 8-10 above.



# Bowen Super II Fishing Jar Intensifier

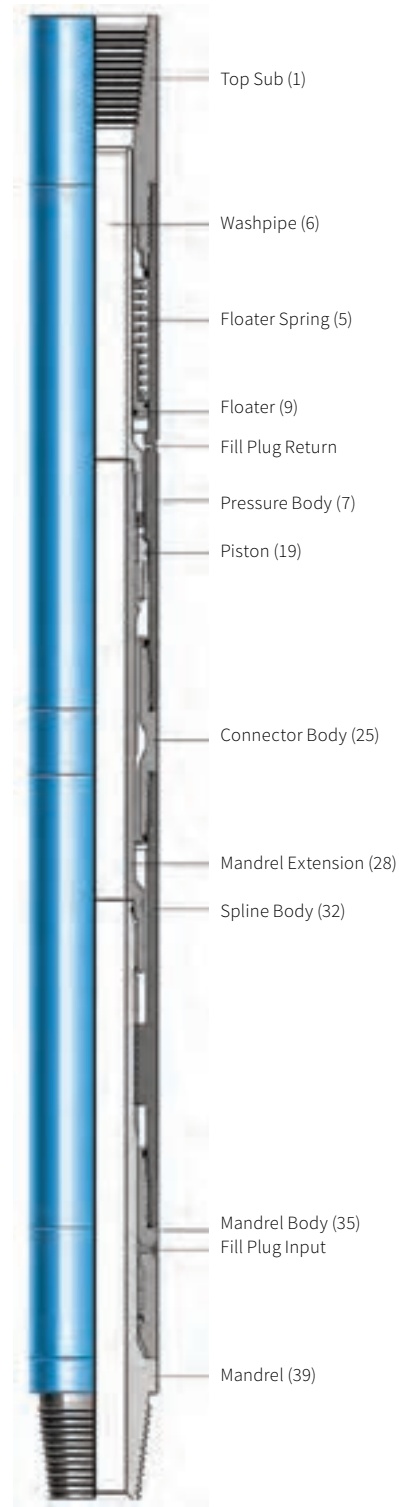
## Final Assembly

Refer to illustration Figure 6-1, which contains the item numbers of the total parts, and Figure 8-11, which labels the major components.

1. Place the spline body (32) into the vise approximately 12 in. from the stencil groove end of the spline body (32).
2. Lightly coat the connector threads of the mandrel body (35) with anti-gall grease. Make sure not to get compound on the o-ring or mandrel body seal.
3. Lubricate the mandrel body seal (35) and o-ring with a clean, light oil, insert the mandrel body (35) into the spline body (32) stencil end, and tighten to prescribed torque in Table 10-1 on page 12.
4. Lightly coat the threads of the mandrel with anti-gall grease, lubricate the o-ring, seal protector ring, and non extrusion ring, and carefully insert the mandrel into the mandrel body (35). With the mandrel mass being held up and leveled with the 2,000 lb. hoist and the mandrel slung on the belt sling, make sure the spline does not damage the mandrel body (35) packing material.
5. With the mandrel carefully started into the mandrel, it may be necessary to apply considerable pressure on the mandrel to keep it moving into the mandrel body (35). By whatever means available,

press the mandrel into the mandrel body (35) until it is flush to the mandrel body (35).

6. Sling the mandrel extension (28) in the hoist belt sling, lubricate the ID threads on the stencil end of the mandrel extension, (28) insert it into the spline body, (32) and tighten to the torque specifications identified in Table 10-1.
7. Lubricate the connector body (25) OD o-rings and gently maneuver the connector body (25) with the stencil groove end first over the mandrel extension (28). Being careful not to damage the seal surface on the mandrel extension (28), tighten the connector body (25) onto the spline body (32) to the prescribed torque as in Table 10-1.



**Figure 8-11: Super II Jar Intensifier Part Layout**

# Bowen Super II Fishing Jar Intensifier

- Place the piston (19) stencil groove end away from the connector body (25), aligned to the spline on the mandrel extension (28) and liberally apply lubricating oil to the piston (19) packing, rings, and spline.
- Lubricate the ID o-ring set of the seal body (15) and insert it with non-extrusion ring away from the piston (19). The seal body (15) is a tight fit and will be pressed on by the wash-pipe (6).
- Lightly coat the threads of the mandrel extension (28) with anti gall grease and lubricate the o-ring in the ID of the washpipe (6). Sling the washpipe (6) in the hoist belt sling and tighten the washpipe (6) on the wide part. This action will also press the seal body (15) flush to the piston (19) ledge not the piston (19).

**CAUTION: During the installation of the washpipe, DO NOT use the seal surface to torque or tighten the washpipe into position. Use only the large OD for the tool attach surface.**

- Lightly coat the threads of the connector body (25) with anti-gall grease, taking care to ensure that no grease gets on the o-ring or seal. (**DO NOT** reuse this fluid unless it is properly filtered using the Bowen silicone fluid reclamation unit, part number 80960.)

While the pressure body (7) is hanging in the hoist sling, manoeuvre the pressure body (7), with the end with approximately 4 in. of thread depth or lessor thread depth of the two ends, over the washpipe (6), piston (19) and tighten it onto the connector body (25) to the torque specifications identified in Table 10-1 on page 12.

- Lubricate the o-rings and ID of the floater (9) and install it over the washpipe (6) and into the pressure body (7). Insert the floater (9) positioning tool over the floater (9) and use the top sub (1) to press on the floater (9) by tightening the top sub (1) to the pressure body (7) until a measurement of 4 in. is reached between the top sub (1) and the lip of the pressure body (7). Remove the top sub (1) and the tool in preparation for the installation of the floater (9) spring (5).

- Lightly coat the threads of the top sub (1) with anti-gall grease, taking care to ensure that no grease gets on the o-ring. Insert the floater (9) spring (5) then the top sub (1) and tighten to the specified torque as specified in Table 10-1.

## Filling with Fluid

Proper filling of the Bowen Super II jar intensifier requires the use of both fill plugs (12): one in the mandrel body (35) and the other in the pressure body (7). Proceed as follows:

- Thoroughly clean and inspect all parts. Give special attention to the seals, replacing any that show signs of damage or wear.
- Assemble all parts except the fill plugs (12). Refer to "final assembly" in on page 10 for detailed assembly instructions.

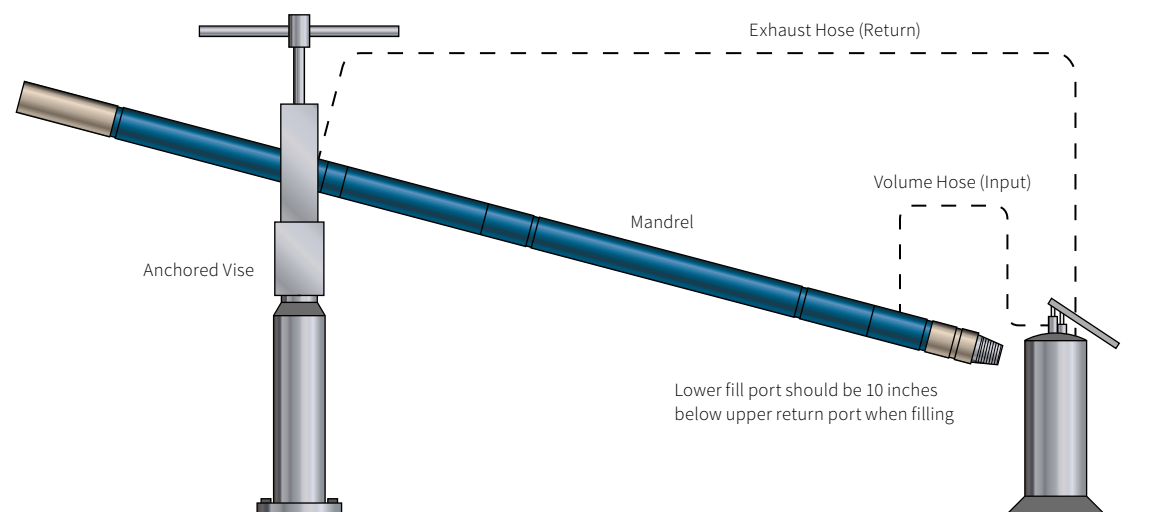


Figure 9-1: Filling the Super II Jar Intensifier Illustrated

# Bowen Super II Fishing Jar Intensifier

3. Clamp the intensifier in a vise in the horizontal position, with the mandrel body (35) fill plug (12) hole on the upper side of the tool.
4. Attach the fill hose from the fill pump to the mandrel body (35) fill plug (12).
5. Attach a second hose to the fill plug (12) located in the pressure body (7) and place the other end into the reservoir of the pump to create a return flow path. Continue to pump the fluid until such time as the fluid begins to flow, bubble free, from the return hose into the reservoir.
6. Remove the pressure body (7) fill plug (12) hose and insert the pressure body (7) fill plug (12). Tighten the fill plug (12) snugly, taking care not to overtighten.
7. After the tool is pumped full, insert the mandrel body (35) fill plug (12). Tighten it snugly, but do not over tighten.
8. Insert and tighten the fill plugs (12 & 36). Test the tool in an appropriate tester.
9. If the recommended pull load is not reached or if the tool remains open greater than the 1½ in. of stroke, repeat the procedure of filling.

Table 10-1: Super II Jar Intensifier Maximum Recommended Tightening Torques

| Make Up Torques             |                               |                                 |                          |                              |                               |
|-----------------------------|-------------------------------|---------------------------------|--------------------------|------------------------------|-------------------------------|
| Mandrel Body to Spline Body | Spline Body to Connector Body | Connector Body to Pressure Body | Pressure Body to Top Sub | Mandrel to Mandrel Extension | Mandrel Extension to Washpipe |
| 8,200 ft-lbs                | 8,200 ft-lbs                  | 7,600 ft-lbs                    | 9,100 ft-lbs             | 2,700 ft-lbs                 | 1,000 ft-lbs                  |

Note: Tightening Torque values are in ft-lb. The above make-up torques are the maximum recommended makeup torques for each connection. They are set at 50% of the calculated theoretical yield torque.

## Specifications and Strength Data

|  |              |                        |   |               |
|--|--------------|------------------------|---|---------------|
| <b>Outside diameter</b>                  | 2½ in.*      | 3¼ in.*                | 4¾ in.  | 6½ in.*       |
| <b>Inside diameter</b>                   | 1 in.        | 1½ in.                 | 2¼ in.  | 2½ in.        |
| <b>Assembly part number</b>              | 504926       | 500651                 | 153445  | 506610        |
| <b>Standard connection</b>               | 2¾ in. PAC   | 2⅞ in. PAC, 2⅝ in. EUE | Standard connection                                   | NC50 (4½ IF)  |
| <b>Length</b>                            | 10 ft 6 in.  | 12 ft 9 in.            | 13 ft 9 in.   | 20 ft 9 in.   |
| <b>Stroke</b>                            | 6 in.        | 6 in.                  | 11 in.  | 9.4 in.       |
| <b>Maximum torque @ yield</b>            | 5,000 ft-lbs | 4,300 ft-lbs           | 15,200 ft-lbs (not considering tool joint connection) | 68,750 ft-lbs |
| <b>Maximum lift load @ yield</b>         | 202,000 lbs  | 202,000 lbs            | 281,000 lbs   | 940,000 lbs   |
| <b>Maximum pull load (to fully open)</b> | 37,500 lbs   | 40,000 lbs             | 100,000 lbs   | 220,000 lbs   |

Note: All Strengths listed are calculated theoretical yield points and are accurate within 20%.

Note: The Pull Load matches the 4¾ in. x 2¼ in. Bowen Super II Jar and far exceeds the 63,000 lb. Limit of the standard 4¾ in. x 2 in. Bowen Jar Intensifier

\*Note: For more detailed specifications, refer to the tools' respective manuals:

2⅞ in. - 1000-MAN

3¼ in. - 1010-MAN

6½ in. - SM-FT-N01

# Bowen Super II Fishing Jar Intensifier

## Testing

Test the action of the Bowen Super II jar intensifier in a Bowen jar tester or other suitable test rack which has a readout for the applied pull load. The tool should be pulled open to its full stroke in the tester. The pull load required to open the tool should be within plus or minus 2,000 pounds of the load value listed in the data sheet for the specific intensifier.

**WARNING: Do not stand beside tool during tests. Extremely high pressures develop and metal body failure could cause serious injury.**

When the applied load is removed, the tool should close within 1½ in. of complete closure (measured where the mandrel

meets the mandrel body (35). If the tool does not close to within 1½ in. of travel, it is an indication that too much residual air has been entrapped in the tool, producing an undesirable air cushion. In such a case, the filling procedure should be repeated; first, however, back the mandrel body (35) insert out, by one full turn. Thus backed off, the tool will receive a slightly excessive volume of fluid. After the refilling procedure, the mandrel body (35) should be re-made completely and tightened, resulting in a slight pre-compression of the fluid. This should overcome the effects of entrained air, friction, and pre-compression of the seal assemblies. Note that no harm to the tool will result if it remains open slightly, either during service

or in the shop. The only effect is a slight loss of stroke should not be considered important unless it is greater than 1 inch.

**NOTE: Use only Bowen liquid spring intensifier fluid in the Bowen Super II jar intensifier. It is specially compounded to perform properly. Any attempt to use a substitute fluid will result in no performance and almost certain failure of the intensifier.**

The entrance of small amounts of lubricating oil into the intensifier fluid, such as might be used to oil parts of the tool, will not be harmful, but should be kept to a practical minimum.

Note that during service, the fluid will become discolored by traces

of brown or amber stain. This is caused by bleeding of the seals while under high pressure and from thread dope, where this is used on the connections. These traces of discoloration are not detrimental to the fluid or the tool unless the concentration is heavy enough to include solid particles such as small silvers of rubber.

Bowen liquid spring intensifier fluid should be kept clean and as free of contamination as possible. It is a special fluid and relatively expensive.

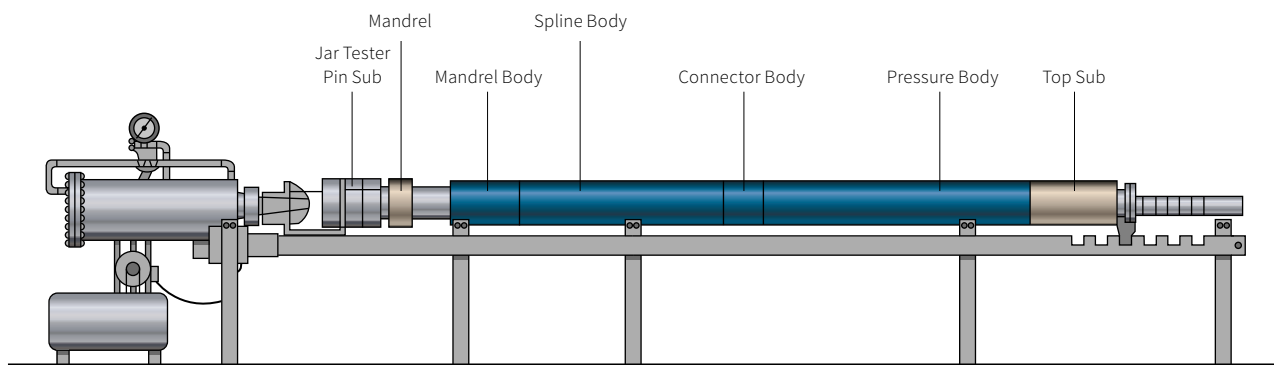
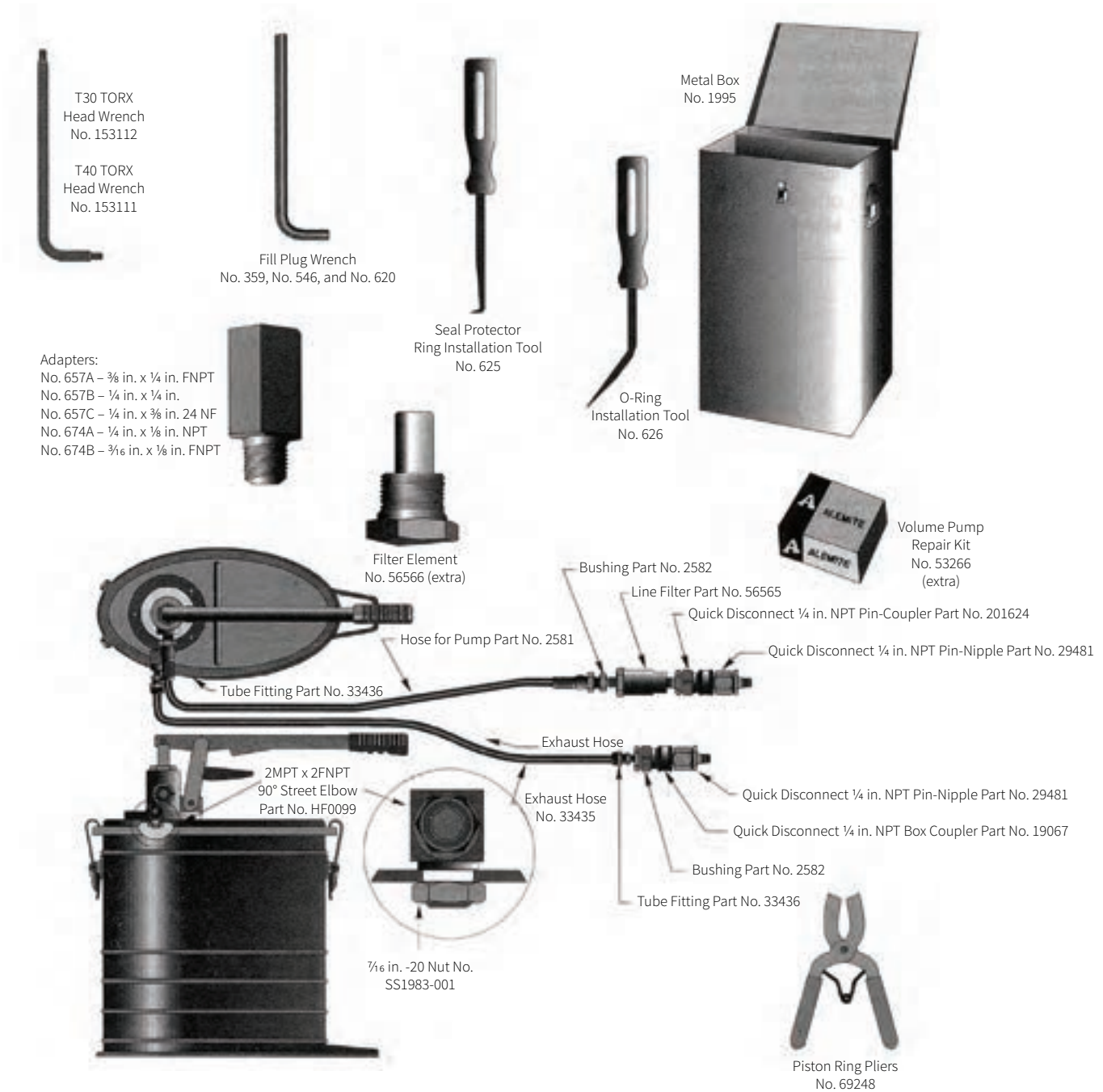


Figure 11-1: Testing the Super II Jar Intensifier Illustrated

# Bowen Super II Fishing Jar Intensifier

## Super II Fishing Jar Intensifier Service Kit (55403)

A service kit is necessary to properly service the intensifier. Because these kits are identical for every size intensifier, a single kit may be used for all intensifiers at a particular site. The kit does not include a seal setting tool, which is required for each size intensifier. This setting tool must be ordered separately. It is usually stored in the service kit metal box.





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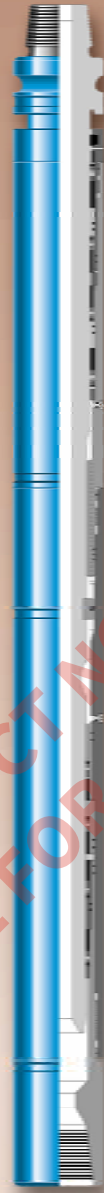
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# CUSHION SUB

Instruction Manual 4105



PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

Cushion Sub



**NATIONAL OILWELL VARCO**

One Company Unlimited Solutions



# Cushion Sub

## Cushion Sub

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Eleventh Printing, September 2005

### General Description

The **Bowen Cushion Sub** provides for the highest drilling penetration rate by virtually eliminating the variable dynamic loading conditions on the bit.

The extremely long stroke, combined with a very low spring rate, provides a soft impact energy absorption system that greatly increases penetration and extends bit life.

As a bit rotates, it tends to generate a three-lobed cutting pattern on the bottom of the hole. Three times each revolution, the bit cones must ride up over the ridges thus formed and drop back into the pattern.

If the bit is directly connected, the large mass of the drill collars must be accelerated up and down in synchronism with the motions of the bit. This causes repetitive peak forces on the bit which may be several times the static bit weight, causing bit bounce. These cyclic forces also generate large stress waves in the drill string, which shorten the life of the drill pipe and bit can cause strong vibrations and damage to the rig equipment. These factors necessitate drilling at less than optimum bit weight and rpm.

### Operation

The Bowen Cushion Sub should be located as close above the bit as possible, where it can function best to absorb these deflections with minimum variation in bit load, and minimum transmission of stress waves and vibrations up the drill string. Its function is similar to that of the spring and shock absorber on a wheel traveling over a rough road — it keeps the wheel on the ground while isolating the “bumps” from the vehicle. This is accomplished by means of a hydraulic spring.

As weight is lowered on the Cushion Sub, it will cause deflection of the hydraulic spring until the spring load balances the weight. Now, as the bit rotates and is deflected up over the ridges in the bottom hole pattern, it need not displace the massive drill collars above it; it need only deflect the spring slightly. As the bit drops back into the depressed portion of the bottom hole pattern, the hydraulic thrust follows it down, maintaining it on the bottom at all times and minimizing the variations in bit weight throughout the cycle.

The Cushion Sub adjusts automatically to any desired bit weight within its working range.

### Maintenance

The Bowen Cushion Sub should be thoroughly washed and cleaned to remove all drilling mud and other debris. All parts should be examined for wear and damage and replaced as necessary. It is recommended that the Cushion Sub be completely disassembled, cleaned, either lubricated or painted and reassembled after each use before storing.

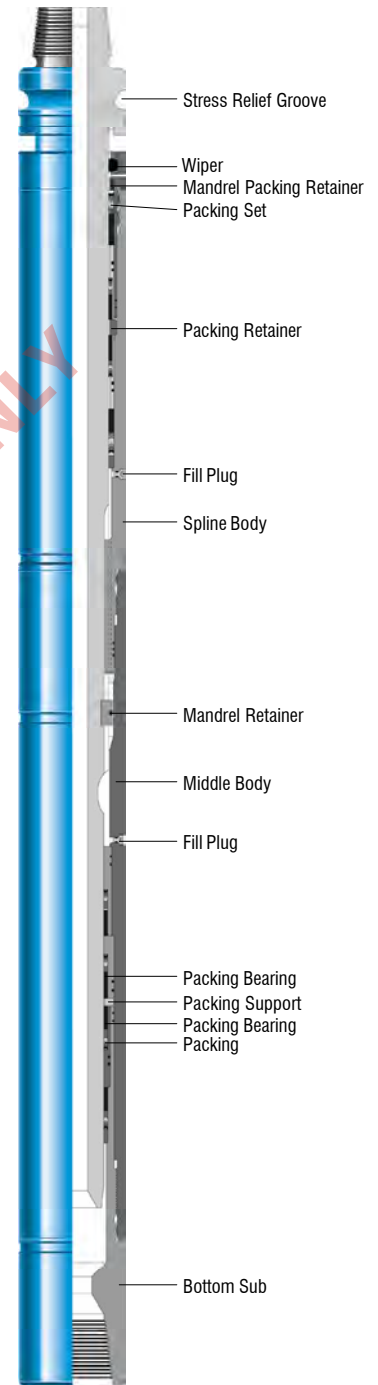


Figure 1  
Cushion Sub

### Problem Solving

1. To check the condition of the Cushion Sub after removal from the hole, stand the tool back and allow the weight of the collars above the tool to close the Cushion Sub slightly. Service the tool, if the gap is less than 1-1/2", or if the tool has been in use for the recommended number of hours.

**NOTE: The Cushion Sub will function properly until it closes completely.**

2. Excessive vibrations are sometimes encountered when drilling with the Cushion Sub. Often, the problem can be solved by changing the rpm, the weight-on-bit, the mud pump pressure, or some combination of these parameters.

Certain string length and rpm combinations can cause vibrations. There are two formulas given in the API Recommended Practice for Drill Stem Design and Operating Limits manual which are used to calculate the approximate rpms that may cause vibrations in the drill string. They are:

$$1) \text{ rpm} = 4,760,000 \times D^2 + d^2 \Rightarrow l^2$$

where:

rpm = critical speed  
(revolutions per minute)

l = length of one pipe (inches)

D = outside diameter of pipe (inches)

d = inside diameter of pipe (inches)

$$2) \text{ rpm} = 258,000 \Rightarrow L$$

where:

rpm = critical speed  
(revolutions per minute)

L = total length of string (feet)

Avoid the critical rpms if excessive string vibrations are being encountered.

### Complete Disassembly

All item numbers will coincide with the exploded view drawing on page 8. Please refer to it for location of each part during disassembly and assembly procedures of the Cushion Sub.

### USE CARE DURING DISASSEMBLY TO ASSURE NO GAS IS TRAPPED INTERNALLY.

### REMOVING COMPONENTS UNDER PRESSURE IS VERY HAZARDOUS.

When disassembling tool avoid clamping directly on a Fill Plug Hole.

Place tool in a vise and break all connections. (On 11" – 12" O.D., see Disassembly Instructions for 11"–12" Cushion Sub.) The Mandrel Body to Spline Body connection has a left hand thread.

Clamp tool in a vise around Spline Body, place an oil catch tray or other containment device under the Middle Body (15) and Spline Body (1) joint. Unscrew this joint completely and pull the section apart several inches until the oil begins to drain. After draining is completed, pull the Middle Body section back until the Mandrel Retainer (14) is exposed. Remove the O-Ring (Item No. 29) on the retainer and tap the retainer lightly until it drops free. Push the Middle Body unit back in place and make up about four turns on the Spline Body threads. Attach thread subs on ends; place in jar tester and pull Mandrel (13) completely out of the assembly with the jar tester.

Place the tool back in the vise and disassemble as before, removing the Middle Body unit. Unscrew the Mandrel Body from Spline Body (left hand threads). Remove the bearing rings, packing, and retainers from Mandrel Body either by hand or with the aid of tool, Item No. 60.

To remove packing, retainers, and bearings from Spline Body, using tool (Item No. 59-A), enter from the spline end of the Spline Body; move tool into Spline Body until beyond splines. Straighten tool from horizontal position to vertical position (See Figure 2). Push unit until engaged in the packing retainer, Item No. 2-B. Holding firmly in place, and with the aid of a mallet, hit the end of the bar lightly. It may be necessary to rotate slightly when striking the end of the bar. With the aid of disassembly tool, Item No. 59-A, the parts can be easily removed from the assembly.

Place the Middle Body and Bottom Sub Unit (23) in the vise and unscrew this joint completely.

Using disassemble tool, Item No. 57, against shoulder of Packing Retainer, Item No. 24, inside bottom sub, tap lightly with mallet while rotating tool slightly each time. Repeat this process to remove all parts from Bottom Sub. To remove optional Bottom Sub (Pin Type) Assembly, use Disassembly Tool shown in Figure 2 (Item No. 72).

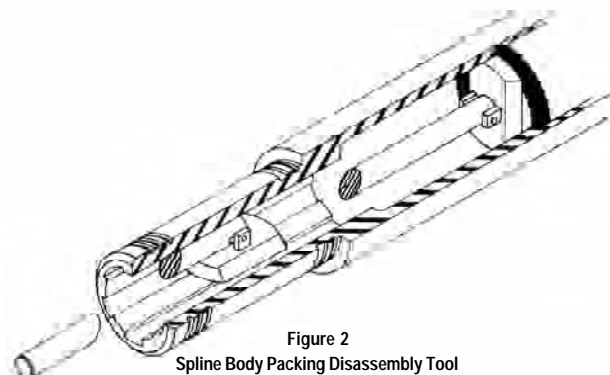


Figure 2  
Spline Body Packing Disassembly Tool

Using Disassembly Tool, Item No. 58, and an extension to clear the end of the Middle Body by about 24", insert tool into the Middle Body until it rests against shoulder of Packing Retainer, Item No. 16. Tap lightly with mallet while rotating tool slightly each time to remove all parts from Middle Body.

It is recommended that all parts be cleaned thoroughly and all O.D. bodies magnetic particle inspected prior to reassembly.

### Disassembly Instructions for 11"-12" Cushion Sub

Place tool in a suitable vise, clamping on the Middle Body. Break the Bottom Sub and unscrew several turns.

Reposition and clamp on the Spline Body. Place an oil catch tray or other containment device under the Middle Body and Spline Body. Break the Middle Body and unscrew and pull apart several inches. This is to allow the oil to drain and to release any pressure that may have become trapped in the tool. Push this connection back together and screw together several turns.

Reposition the clamp on the Middle Body and unscrew and remove the Bottom Sub. Reposition the clamp on the Spline Body and unscrew and remove the Middle Body. Break and remove the Mandrel Extension.

**NOTE: This joint is torqued to 20,000 ft/lbs.**

Turn the tool around in the vice and clamp on the Spline Body. Break and loosen the Top Sub. Push the Mandrel slightly closed and remove the Mandrel Retainers. Pull the Mandrel out until loose but still engaged in the splines and unscrew and remove the Top Sub. Remove Mandrel.

Break and unscrew the Mandrel Body from the Spline Body.

**NOTE: This connection has left-hand threads.**

Remove all O-Rings, Packing, Packing Supports, Packing Retainers, Wipers, and Bearings. Steam clean and inspect all parts for damage. Follow inspection guidelines outlined in Inspection Procedures for Cushion Subs.

### Complete Assembly

All item numbers will coincide with the exploded view drawing on page 9. Please refer to it for location of each part during disassembly and assembly procedures of the Cushion Sub.

All metal parts should be thoroughly cleaned, or washed inside out with a good grade solvent; blown dry with shop air, or wiped clean with soft cloths. The parts should then be thoroughly oiled with a good grade clean light oil.

**NOTE: Always lubricate threads with an approved thread lubricant (KOPR-KOTE.)**

When assembling tool avoid clamping directly on a Fill Plug Hole.

### 1. Mandrel Body Assembly

Assemble these parts as follows, within the Mandrel Body, Item No. 10, beginning with the Wiper, Item No. 11. Then install (1) Packing Retainer, Item No. 2-A, followed by (1) Packing Set, Item No. 4.

Refer to Packing, Ring and Seal Reassembly Guide (page 8) for packing set sealing direction. Install (2) Bearings, Item No. 12, (1 only required on 9"-9-1/2" and 4-3/4" - 5-1/4" O.D. Tool). Place (2) O-Rings, Item No. 28, on (1) Packing Support, Item No. 5; note location and direction of each from Packing, Ring and Reassembly Guide (page 8). Install this support assembly in Mandrel Body bore firmly against the previously installed bearing rings.

**NOTE: No Packing support required on 4-3/4" - 5-1/4" O.D. Tool.**

Next, install (1) Bearing, Item No. 6, (This Bearing only, not required on 9" - 9-1/2" O.D. Tool) into already installed packing support, followed by (1) Packing Set, Item No. 7. Refer to Packing, Ring and Seal Reassembly Guide (page 8) for Packing Set sealing direction. Finally, install (1) Bearing, Item No. 6, against the Packing Set.

Install (2) O-Rings, Item No. 32, noting location in the Mandrel Body external grooves. Install O-Ring, Item No. 33, in groove near shoulder.

This completes the assembly of the Mandrel Body. Set this unit aside until the Spline Body is ready for assembly with the Mandrel Body.

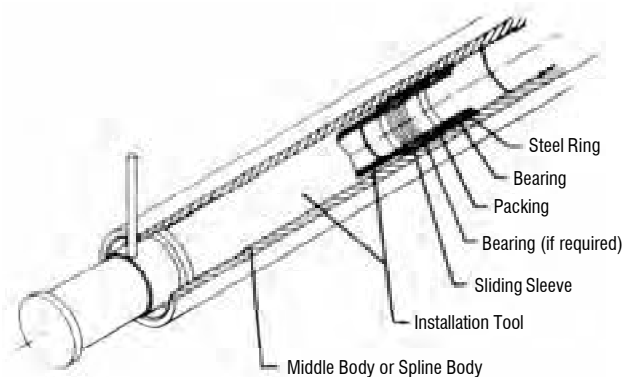


Figure 3  
Middle Body Packing or Spline Body Packing Installation Tool  
(4-3/4" to 5-1/4" OD Tool Only)

## 2. Spline Body Assembly

Install (1) Packing Retainer, Item No. 2-B, into Spline Body, Item No. 1. Using the same procedure, install (1) Bearing, Item No. 3, (This Bearing only, not required on 9" – 9-1/2" and 4-3/4" – 5-1/4" O.D. Tool), followed by (1) Packing Set, Item No. 4. Refer to Packing, Ring and Seal Reassembly Guide (page 8) for Packing Set sealing direction. Install (1) Bearing, Item No. 3, against packing. Use the Spline Body Packing Installation Tool (Item No. 59-B) to install the previously mentioned parts in the 4-3/4" – 5-1/4" O.D. Tool (See Figure 3 below).

Place (2) O-Rings, Item No. 28, on (1) Packing Support, Item No. 5; note location and direction of each from Packing, Ring and Seal Reassembly Guide (page 8). Install (1) Bearing, Item No. 6, (This Bearing only, not required on 9" – 9-1/2" and 4-3/4" – 5-1/4" O.D. Tool) into Packing Support, followed by (1) Packing Set, Item No. 7. Refer to Packing, Ring and Seal Reassembly Guide (page 8) for Packing Set sealing direction. Install (1) Bearing, Item No. 6 against the Packing Set. Install Support Assembly in Spline Body Bore followed by the Packing Retainer, Item No. 8. Pushing against the Packing Retainer with the Mandrel Body Packing Disassembly Tool, Item No. 60, or the Spline Body Packing Disassembly Tool, Item No. 59-A, install Support Assembly and Packing Retainer until shouldered against the previously installed bearings in the Spline Body Bore. For the 4-3/4" – 5-1/4" O.D. Tool only, make up an identical support assembly. Install support assembly, bearing end first, into the Spline Body until it shoulders against the packing retainer.

On the spline end of this assembly, install (3) External O-Rings, Item No. 30. Install O-Ring, Item No. 31, in groove near shoulder. Assembly of Spline Body

and Mandrel Body is now complete. (IF 11" – 12" TOOL IS BEING ASSEMBLED, PROCEED TO STEP 3. ALL OTHER SIZES GO DIRECTLY TO STEP 4.)

## 3. Assembly Procedure for Mandrel Body, Spline Body, Mandrel, and Mandrel Extension of 11" – 12" O.D. Tool Only

Pick up the Spline Body and clamp in a vise. Install Mandrel Body and make up hand tight. (This joint has left-hand threads.) Pick up Mandrel and insert into the Mandrel Body/Spline Body Sub Assembly. Mandrel may need to be rotated slightly to engage the splines. Push Mandrel thru until the mandrel Retainers can be installed. Install the two retainer halves and O-ring to hold in place.

Pick up the Top Sub and install on the large end of the mandrel hand tight.

Pick up and install the Mandrel Extension and tighten to torque specifications in manual. Remove the Sub Assembly from the vise for now.

## 4. Assembly of Mandrel Body, Spline Body, and Mandrel as a Unit

Clamp the Spline Body assembly in vise.

A light coat of cup grease should now be applied to the inside area of the packing sets and bearings on both assemblies. After applying some KOPR-KOTE on threads and shoulders, carefully insert the mandrel body in to the Spline Body and rotate counterclockwise — these are left hand threads. Make up threads almost completely until an 1/8- to 1/4-inch gap remains between the shoulders. Do not tighten. Apply a heavy coat of grease to the seal area of the Mandrel, Item No. 13, and recess behind the Mandrel Body Wiper, Item No. 11. Before insertion on mandrel, apply Moly grease

containing Molybdenum disulfide in very fine particulate or chemical form (high bearing load lubricant) to splines. Do not use KOPR-KOTE or any metallic particulate type anti-gallant. Push spline end of Mandrel, Item No. 13, through wiper end of Mandrel Body, Item No. 10, until splines engage. Push Mandrel, Item No. 13 completely through both assemblies until the Mandrel Retainer groove for the Mandrel Retainer, Item No. 14 is completely exposed at the end of Spline Body. The jar tester may be used to push the mandrel through Mandrel Body and Spline Body assemblies. The Mandrel Retainer, Item No. 14, is to be installed in two pieces. When in place, this Retainer prevents the Mandrel from being removed.

Install the two Retainer halves as shown on the Packing, Ring and Seal Reassembly Guide (page 8). Install O-Ring, Item No. 29, in the groove on the rings. This is not a seal and is used only to hold these parts in place.

This part of tool is now complete and should be held in reserve until the lower half of the tool is assembled.

## 5. Middle Body Assembly

Assemble these parts as follows, within the Assembly Tool, Item No. 56 (See Figure 3). Pull the sliding sleeve of the Assembly Tool all the way out and grease the bore at the other end with cup grease. Install (1) Bearing, Item No. 17 into the bore. Next, install Packing Set, Item No. 18 against the bearing making sure that the packing inside the assembly tool is pointing in the same direction as on the Packing, Ring and Seal Reassembly Guide (page 8). Install (1) Bearing, Item No. 17. (This Bearing ONLY, not required on 9" – 9-1/2" and 4-3/4" – 5-1/4" O.D. Tool). The last part to install in the Assembly Tool is the Packing Retainer, Item No. 16. Grease lower

end of the Middle Body, Item No. 15, with cup grease. Insert Assembly Tool into the bore of the Middle Body until it makes contact with the shoulder. Push the sliding sleeve of the Assembly Tool in (a hammer may be used if necessary) until the Packing Retainer, Item No. 16, touches the shoulder next to fill plug hole. At this point, all parts are in place inside the Middle Body and the Assembly Tool (Shown in Figure 3) can be removed and set aside.

Place (2) O-Rings, Item No. 27, on Packing Support, Item No. 19; note location and direction of each, from Packing, Ring and Seal Reassembly Guide (Page 6). Install (1) Bearing Item No. 20, (This Bearing only, not required on 9" – 9-1/2" and 4-3/4" – 5-1/4" O.D. Tool) and (1) Packing Set, Item No. 21, check assembly for sealing direction, followed by (1) Bearing, Item No. 20, into the packing support. Install complete unit into bore in proper direction followed by the Middle Body Packing Retainer. Item No. 22. Pushing against the Packing Retainer with the Middle Body Packing installation tool, Item No. 56 or the Middle Body Packing Disassembly Tool, Item No. 58, install Support Assembly and Packing Retainer until shouldered against previously installed Bearings in the Middle Body.

This completes the installation of packing and associated items in the Middle Body.

#### **6. Assembly of Bottom Sub Assembly**

Apply a light coat of cup grease to bore of Bottom Sub, Item No. 23. Install Packing Retainer, Item No. 24, followed by (1) Bearing, Item No. 20. (This Bearing ONLY not required on 9" – 9-1/2" and 4-3/4" – 5-1/4" O.D. Tool.) Next, install (1) Packing Set, Item No. 21, — noting direction of sealing rings on assembly, and (1) Bearing, Item No. 20. Place (2) O-Rings, Item No. 26, on Packing Support, Item No. 25; note location and direction of each from Packing, Ring and Seal Reassembly Guide (page 8). Install this support assembly in bottom sub bore firmly against the previously installed Bearing Rings. Next, install (1) Bearing, Item No. 20. (This Bearing ONLY, not required on 9", 9-1/2", and 4-3/4" – 5-1/4" O.D. Tool) followed by (1) Packing Set, Item No. 21, — noting direction of sealing rings on Assembly, and (1) Bearing, Item No. 20. Install (2) O-Rings, Item No. 30, noting location in Bottom Sub external grooves. Install O-Ring, Item No. 31, in groove near shoulder.

All packing and bearing should receive a light coat of grease on I.D.

#### **7. Assembling the Middle Body and Bottom Sub Assemblies (Lower Assembly)**

Clamp the middle body in the vise and apply KOPR-KOTE to threads, shoulder, and small O.D. of Bottom Sub. Make up these bodies until the shoulder standoff is about 1/8 inch. Do not tighten.

#### **8. Final Major Assembly**

Clamp the Spline Body, Mandrel Body, and Mandrel Unit in a vise. Apply a light

coat of cup grease to the lower seal area of Mandrel. (On 11" and 12" O.D., tool is the Mandrel Extension.) A hoist must be used to lift the lower assembly into place.

Slide the lower assembly over the external mandrel end. Rotate slowly to prevent any damage to the packing in the bore.

Engage threads and make up to shoulder. Make up all joints to shoulders (including Top Sub in 11" – 12" O.D. tool only). Tighten for field use. Torque data shown on chart, page 11.

#### **9. Filling the Tool with Oil**

**NOTE: (A Cushion Sub Service Kit, Part No. 81368, is required to fill tool with oil.)**

The tool must be filled with Bowen Hydraulic Oil (Part No. 49842). This oil is recommended, but any ISO Grade 22 hydraulic oil having the required properties can be used, such as Sunvis 722 or Rando HD22. Open tool until Mandrel is fully extended. Tilt the tool approximately 45° with the Bowen Sub end down. (See Figure 4 below.)

Attach the input pump line to the lower fill plug hole and the return line to the upper plug hole. Pump the tool until full and continue circulation until air bubbles disappear. Install (2) Fill Plugs, Item No. 9, each fitted with (1) O-Ring, Item No. 34, and (1) Back-Up Ring, Item No. 35. Tool is now ready for testing.

**10. Testing**

Measure distance between Mandrel shoulder and Mandrel Body shoulder in the fully open tool. Compress the tool in the jar tester to load shown on Test Load Chart, page 10.

Release the load and allow the Mandrel to extend freely as far as it will go. Repeat this step 4 to 5 times. Check for leakage at Fill Plugs. After the last test, the Mandrel should be extended by internal pressure to within 2" + 1/2" of fully extended position. Add to or remove enough oil to allow the tool to extend to this range, if necessary. Then check Fill Plugs for leakage.

Test is complete. Paint the tool and attach Bowen "Cushion Sub" stickers.

**Cushion Sub Service Kit**

A Cushion Sub Service Kit is necessary to properly service the Tool. These Kits are identical for every size Cushion Sub. Pack-ing Installation or Packing Disassembly Tools must be ordered separately.

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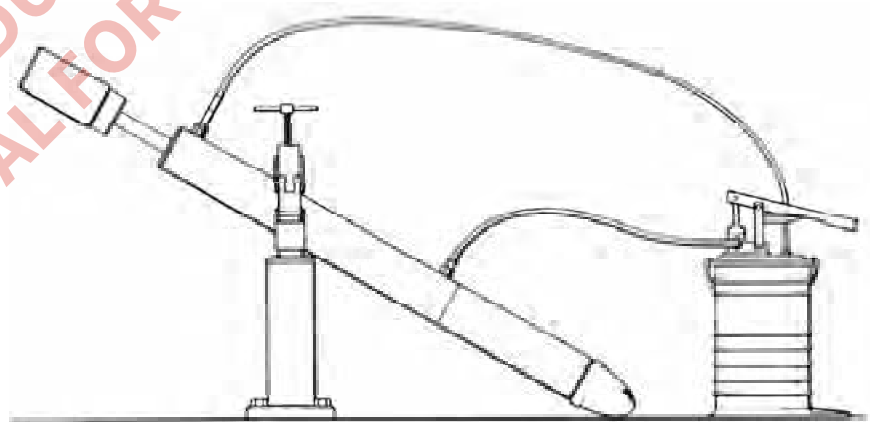
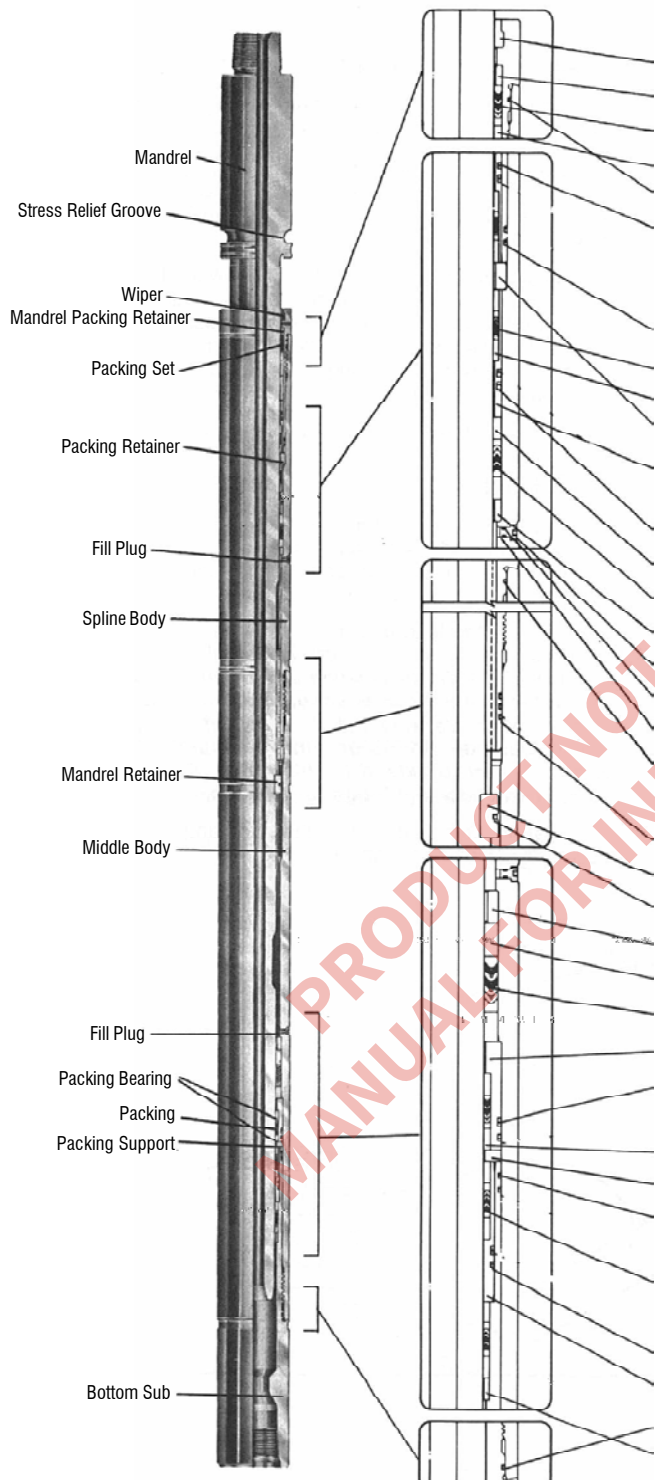


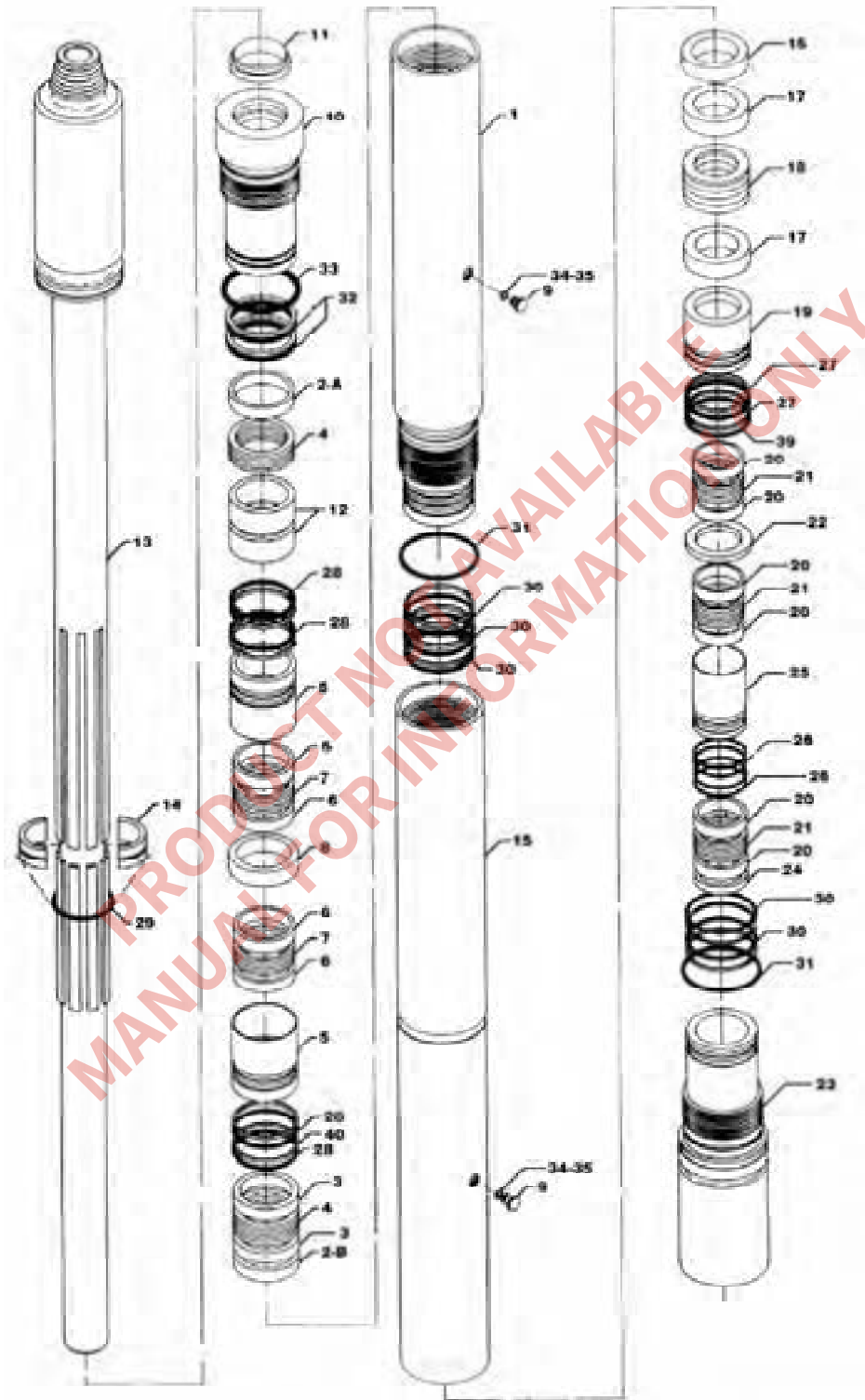
Figure 4  
Filling the Cushion Sub



| ITEM NO. | DESCRIPTION   |
|----------|---|
| 11       | Mandrel Body Wiper                                  |
| 2-A      | Mandrel/Spline Body Packing Retainer                |
| 4        | Mandrel Body and Spline Body Packing Set            |
| 12       | Mandrel Body Bearing (2)                            |
| 33       | O-Ring (Large)                                      |
| 28       | O-Ring (2)  |
| 32       | O-Ring (Small) (2)                                  |
| 7        | Mandrel & Spline Body Support Packing (1 of 2)      |
| 6        | Mandrel & Spline Body Pkg. Support Bearing (1 of 4) |
| 8        | Spline Body Packing Retainer                        |
| 5        | Mandrel & Spline Body Packing Support (1 of 2)      |
| 28       | O-Ring (2)  |
| 3        | Spline Body Packing Bearing (2)                     |
| 4        | Mandrel Body and Spline Body Packing Set            |
| 2-B      | Mandrel/Spline Body Packing Retainer                |
| 9        | Fill Plug (1 of 2)                                  |
| 34       | O-Ring (1 of 2)                                     |
| 35       | Back Up Ring (1 of 2)                               |
| 31       | O-Ring (Large)                                      |
| 30       | O-Ring (Small) (3)                                  |
| 14       | Mandrel Retainer                                    |
| 29       | O-Ring (No Seal)                                    |
| 16       | Middle Body Packing Retainer (Long)                 |
| 17       | Middle Body Packing Bearing (2)                     |
| 18       | Middle Body Packing Set                             |
| 19       | Middle Body Packing Support                         |
| 27       | O-Ring (2)  |
| 20       | Packing Bearing (1 of 6)                            |
| 22       | Middle Body Packing Retainer (Short)                |
| 30       | O-Ring (Small) (2)                                  |
| 21       | Packing Set (1 of 3)                                |
| 26       | O-Ring (2)  |
| 25       | Bottom-Sub Packing Support                          |
| 31       | O-Ring (Large)                                      |
| 24       | Bottom Sub Packing Retainer                         |

Packing, Ring, and Seal Reassembly Guide





Detailed Exploded View

**Test Load Chart**

| Cushion Sub Size - O.D. | Test Load   | Cushion Sub Size - O.D. | Test Load    |
|-------------------------|-------------|-------------------------|--------------|
| 4-3/4" - 5-1/4"         | 60,000 Lbs. | 8" - 8-1/2"             | 110,000 Lbs. |
| 6" - 6-1/4"             | 76,000 Lbs. | 9" - 10"                | 120,000 Lbs. |
| 6-1/2" - 7"             | 78,000 Lbs. | 11" - 12"               | 120,000 Lbs. |

Do not exceed the load rating in the jar tester. Overload may damage the tool.  
Do not attempt to close the tool completely when testing.

**Cushion Subs**

**Maximum Recommended Tightening Torque (Ft-lb) For Body Joints**

| Tool Sizes (Inches) |                    | Body Joints            |                            |                           | Tool Sizes (Inches) |                    | Body Joints                  |                         |                             |                            |                           |
|---------------------|--------------------|------------------------|----------------------------|---------------------------|---------------------|--------------------|------------------------------|-------------------------|-----------------------------|----------------------------|---------------------------|
| Nominal Size        | Measured Tool O.D. | Mandrel Body To Spline | Spline Body To Middle Body | Middle Body To Bottom Sub | Nominal Size        | Measured Tool O.D. | Top Sub To Mandrel Extension | Mandrel To Mandrel Body | Mandrel Body To Spline Body | Spline Body To Middle Body | Middle Body To Bottom Sub |
| 4-3/4               | 4-5/8              | 2200                   | 3900                       | 4500                      | 9                   | 8-3/4              | —                            | —                       | 12000                       | 30000                      | 30000                     |
|                     | 4-11/16            | 2200                   | 3900                       | 5000                      |                     | 8-13/16            | —                            | —                       | 14000                       | 30000                      | 31000                     |
| TO                  | 4-3/4              | 2200                   | 3900                       | 5900                      | 10                  | 8-7/8              | —                            | —                       | 16000                       | 30000                      | 33000                     |
|                     | 4-13/16            | 2200                   | 3900                       | 5900                      |                     | 8-15/16            | —                            | —                       | 18000                       | 30000                      | 35000                     |
| 5-1/4               | 4-7/8              | 2200                   | 3900                       | 5900                      | 11                  | 9                  | —                            | —                       | 18500                       | 30000                      | 36000                     |
|                     | 5-13/16            | 3700                   | 9600                       | 9600                      |                     | 9-1/16             | —                            | —                       | 18500                       | 30000                      | 38000                     |
| 6                   | 5-7/8              | 4500                   | 9600                       | 9700                      | 12                  | 9-1/8              | —                            | —                       | 18500                       | 30000                      | 40000                     |
|                     | 5-15/16            | 4500                   | 9600                       | 10000                     |                     | 9-3/16             | —                            | —                       | 18500                       | 30000                      | 42000                     |
| TO                  | 6                  | 4500                   | 9600                       | 11000                     | 13                  | 9-1/4              | —                            | —                       | 18500                       | 30000                      | 42000                     |
|                     | 6-1/16             | 4500                   | 9600                       | 12000                     |                     | 9-5/16             | —                            | —                       | 18500                       | 30000                      | 42000                     |
| 6-1/4               | 6-1/8              | 4500                   | 9600                       | 13000                     | 14                  | 9-3/8              | —                            | —                       | 18500                       | 30000                      | 42000                     |
|                     | 6-3/16             | 4500                   | 9600                       | 13000                     |                     | 9-7/16             | —                            | —                       | 18500                       | 30000                      | 42000                     |
| 6-1/2               | 6-1/4              | 4500                   | 9600                       | 13000                     | 15                  | 9-1/2              | —                            | —                       | 18500                       | 30000                      | 42000                     |
|                     | 6-1/4              | 4400                   | 9600                       | 11000                     |                     | 9-9/16             | —                            | —                       | 18500                       | 30000                      | 42000                     |
| 6-3/8               | 6-5/16             | 5400                   | 9600                       | 11500                     | 16                  | 9-5/8              | —                            | —                       | 18500                       | 30000                      | 42000                     |
|                     | 6-3/8              | 5800                   | 9600                       | 12000                     |                     | 9-11/16            | —                            | —                       | 18500                       | 30000                      | 42000                     |
| 6-7/16              | 6-7/16             | 5800                   | 9600                       | 13000                     | 17                  | 9-3/4              | —                            | —                       | 18500                       | 30000                      | 42000                     |
|                     | 6-1/2              | 5800                   | 9600                       | 14000                     |                     | 9-13/16            | —                            | —                       | 18500                       | 30000                      | 42000                     |
| TO                  | 6-9/16             | 5800                   | 9600                       | 15000                     | 18                  | 9-7/8              | —                            | —                       | 18500                       | 30000                      | 42000                     |
|                     | 6-5/8              | 5800                   | 9600                       | 15000                     |                     | 9-15/16            | —                            | —                       | 18500                       | 30000                      | 42000                     |
| 7                   | 6-11/16            | 5800                   | 9600                       | 15000                     | 19                  | 10                 | —                            | —                       | 18500                       | 30000                      | 42000                     |
|                     | 6-3/4              | 5800                   | 9600                       | 15000                     |                     | 10-1/2             | 57000                        | 20000                   | 21000                       | 56000                      | 56000                     |
| 6-13/16             | 6-7/8              | 5800                   | 9600                       | 15000                     | 20                  | 10-9/16            | 57000                        | 20000                   | 21000                       | 58000                      | 58000                     |
|                     | 6-15/16            | 5800                   | 9600                       | 15000                     |                     | 10-5/8             | 57000                        | 20000                   | 21000                       | 60000                      | 61000                     |
| 7                   | 7                  | 5800                   | 9600                       | 15000                     | 21                  | 10-11/16           | 57000                        | 20000                   | 21000                       | 60000                      | 63000                     |
| 7-9/16              | 7-9/16             | 8600                   | 16000                      | 16500                     |                     | 22                 | 10-3/4                       | 57000                   | 20000                       | 21000                      | 60000                     |
|                     | 7-5/8              | 8600                   | 16000                      | 18000                     | 10-13/16            |                    | 57000                        | 20000                   | 21000                       | 60000                      | 68000                     |
| 7-11/16             | 7-11/16            | 8600                   | 16000                      | 20000                     | 23                  | 10-7/8             | 57000                        | 20000                   | 21000                       | 60000                      | 71000                     |
|                     | 7-3/4              | 8600                   | 16000                      | 21000                     |                     | 10-15/16           | 57000                        | 20000                   | 21000                       | 60000                      | 74000                     |
| 7-13/16             | 7-13/16            | 8600                   | 16000                      | 22000                     | 24                  | 11                 | 57000                        | 20000                   | 21000                       | 60000                      | 76000                     |
|                     | 7-7/8              | 8600                   | 16000                      | 23000                     |                     | 11-1/16            | 57000                        | 20000                   | 21000                       | 60000                      | 79000                     |
| 8                   | 7-15/16            | 8600                   | 16000                      | 23000                     | 25                  | 11-1/8             | 57000                        | 20000                   | 21000                       | 60000                      | 82000                     |
|                     | 8                  | 8600                   | 16000                      | 23000                     |                     | 11-3/16            | 57000                        | 20000                   | 21000                       | 60000                      | 84000                     |
| TO                  | 8-1/16             | 8600                   | 16000                      | 23000                     | 26                  | 11-1/4             | 57000                        | 20000                   | 21000                       | 60000                      | 87000                     |
|                     | 8-1/8              | 8600                   | 16000                      | 23000                     |                     | To                 | 11-5/16                      | 57000                   | 20000                       | 21000                      | 60000                     |
| 8-1/4               | 8-3/16             | 8600                   | 16000                      | 23000                     | 27                  | 11-3/8             | 57000                        | 20000                   | 21000                       | 60000                      | 92000                     |
|                     | 8-1/4              | 8600                   | 16000                      | 23000                     |                     | 11-7/16            | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
| 8-1/2               | 8-5/16             | 8600                   | 16000                      | 23000                     | 28                  | 11-1/2             | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
|                     | 8-3/8              | 8600                   | 16000                      | 23000                     |                     | 11-9/16            | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
| 8-7/16              | 8-7/16             | 8600                   | 16000                      | 23000                     | 29                  | 11-5/8             | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
|                     | 8-1/2              | 8600                   | 16000                      | 23000                     |                     | 11-11/16           | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
| 8-1/2               | 8-1/2              | 8600                   | 16000                      | 23000                     | 30                  | 11-3/4             | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
|                     | 8-1/2              | 8600                   | 16000                      | 23000                     |                     | 11-13/16           | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
| 8-1/2               | 8-1/2              | 8600                   | 16000                      | 23000                     | 31                  | 11-7/8             | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
|                     | 8-1/2              | 8600                   | 16000                      | 23000                     |                     | 11-15/16           | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
| 8-1/2               | 8-1/2              | 8600                   | 16000                      | 23000                     | 32                  | 12                 | 57000                        | 20000                   | 21000                       | 60000                      | 95000                     |
|                     | 8-1/2              | 8600                   | 16000                      | 23000                     |                     |                    |                              |                         |                             |                            |                           |

The above make up torques are the maximum recommended make up torques for each connection. They are set at 50% of the calculated theoretical yield torque.

The chart lists the recommended safe tightening torque for each body joint. Always use the torque value listed beside the measured tool O.D.

The tightening torque values were calculated assuming Itcolube or similar zinc based grease on all threads and shoulders.

### Cushion Sub Hydraulic Charts

The following graphs (1) through (7) can be used to calculate the pump open or pump closed force on any size Cushion Sub. There are examples on each graph which show how to use them. If the graphs show that the Cushion Sub has a CLOSING force, then NO minimum bit weight is required to operate the Sub. But if the graphs show that there is an OPENING force on the Cushion Sub, the weight on bit applied by the driller must be greater than the opening force. Otherwise, the tool will be fully pumped open and will not operate properly. If the driller is unable or unwilling to put enough weight on the bit, the pumps could be cut back a little to lower the opening force on the Cushion Sub. This could allow the Sub to operate properly.

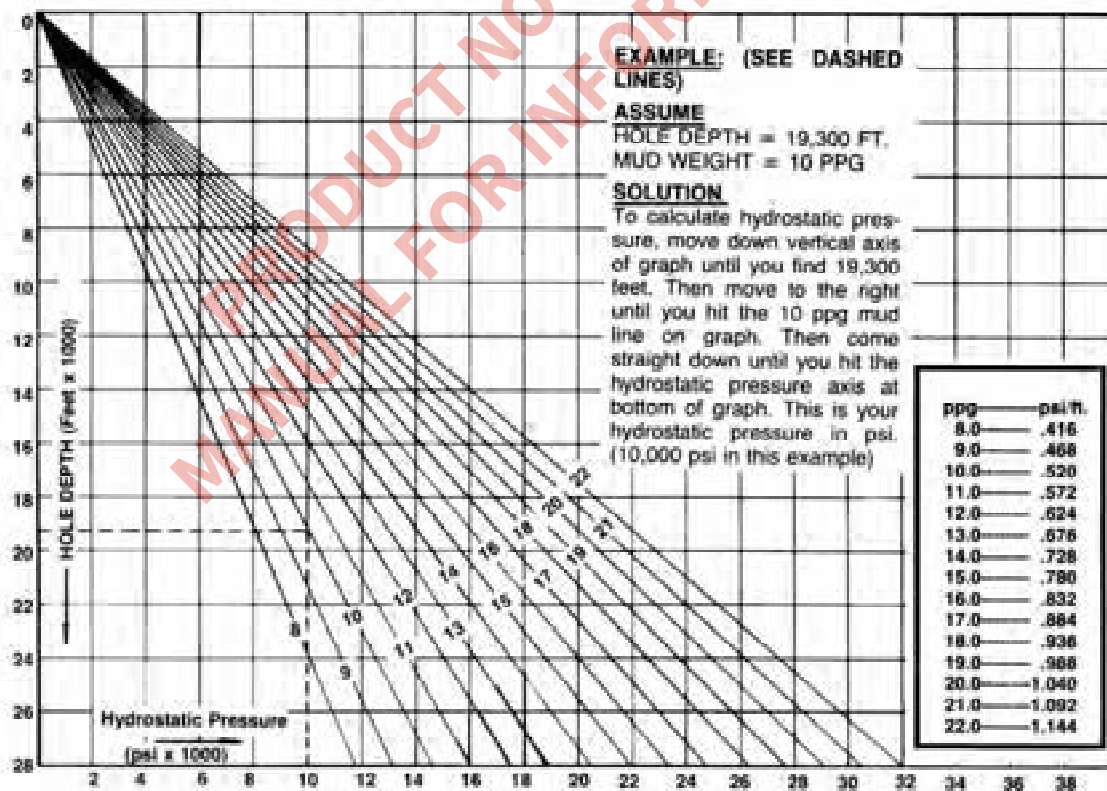
The following information is needed to use the graphs properly:

- 1) hole depth in feet
- 2) mud weight in pounds per gallon
- 3) pressure drop ACROSS the bit — NOT mud pump pressure in psi

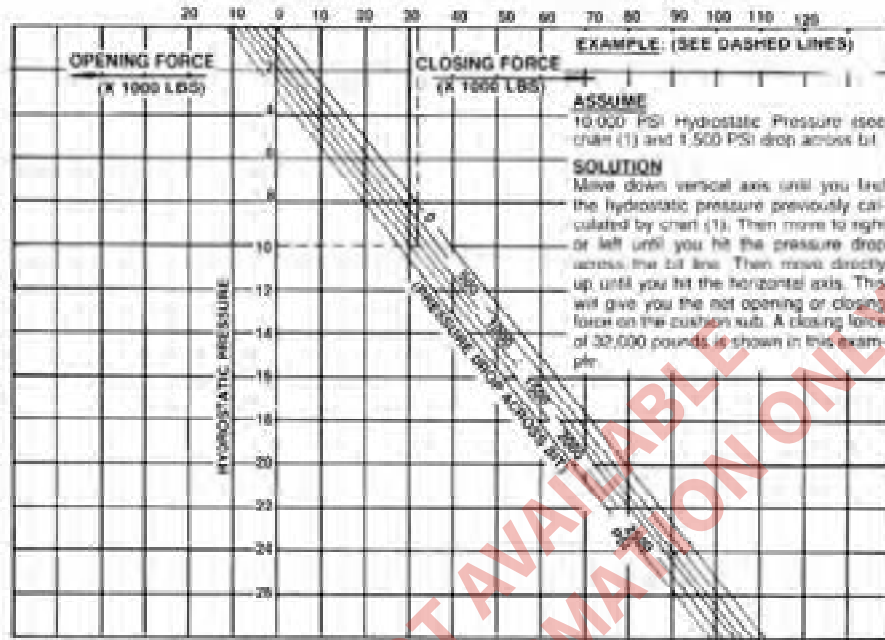
If pressure drop across the bit is unknown, then assume 50% of pump pressure for a tri-cone nozzle bit at average drilling depths.

Conversion Chart

Hole depth and mud weight to psi hydrostatic

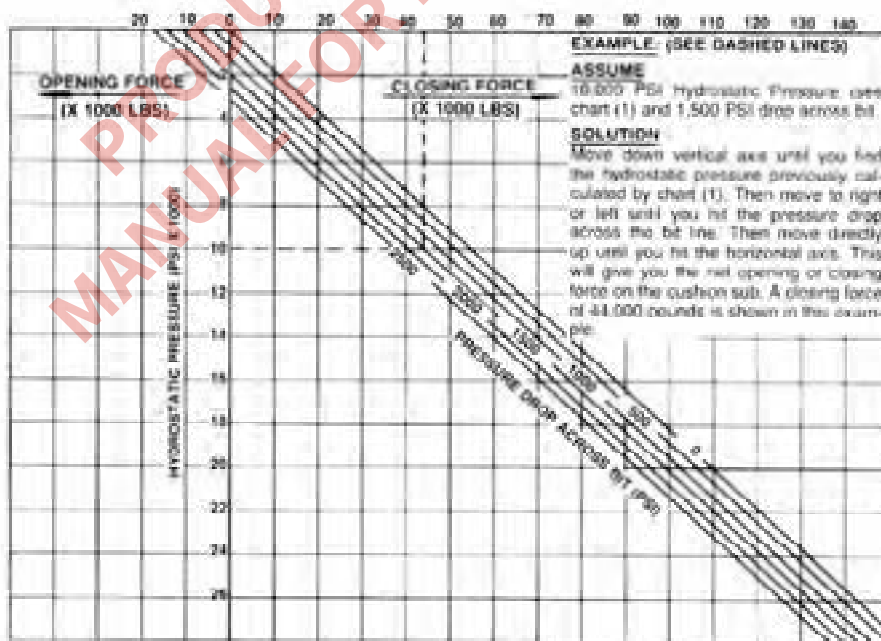


FORCE ON CUSHION SUB



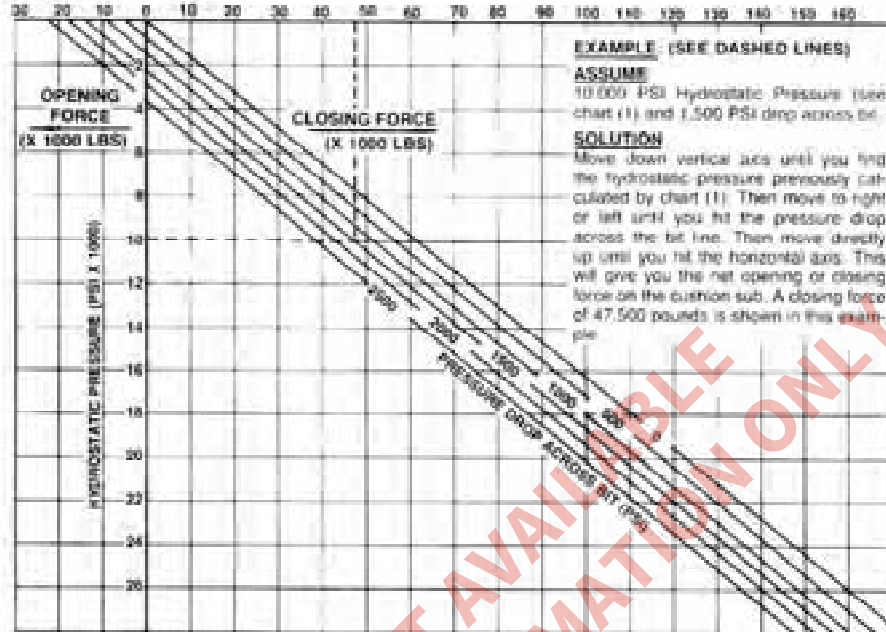
Bowen 4-3/4 to 5-1/2 Cushion Sub  
Conversion Chart of Hydrostatic Pressure and Pressure Drop Across Bit to Net Pump Force

FORCE ON CUSHION SUB



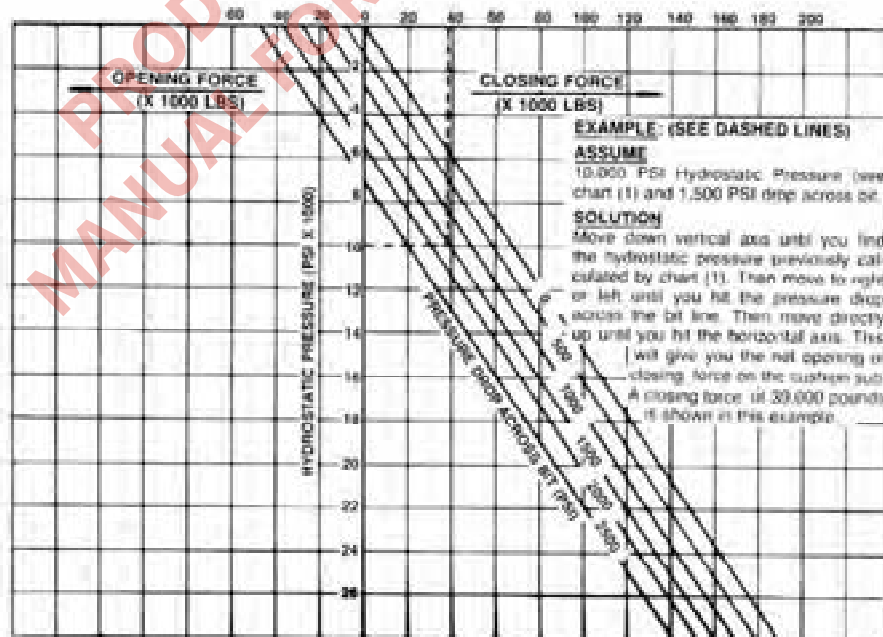
Bowen 6 to 6-1/4 Cushion Sub  
Conversion Chart of Hydrostatic Pressure and Pressure Drop Across Bit to Net Pump Force

**FORCE ON CUSHION SUB**



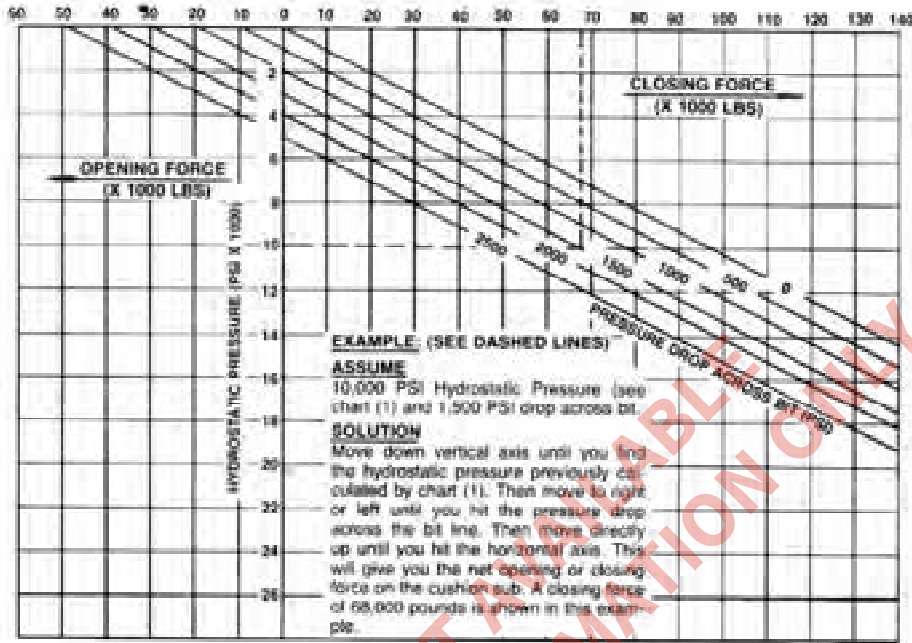
**Bowen 6-1/2 to 7 Cushion Sub**  
 Conversion Chart of Hydrostatic Pressure and Pressure Drop Across Bit to Net Pump Force

**FORCE ON CUSHION SUB**



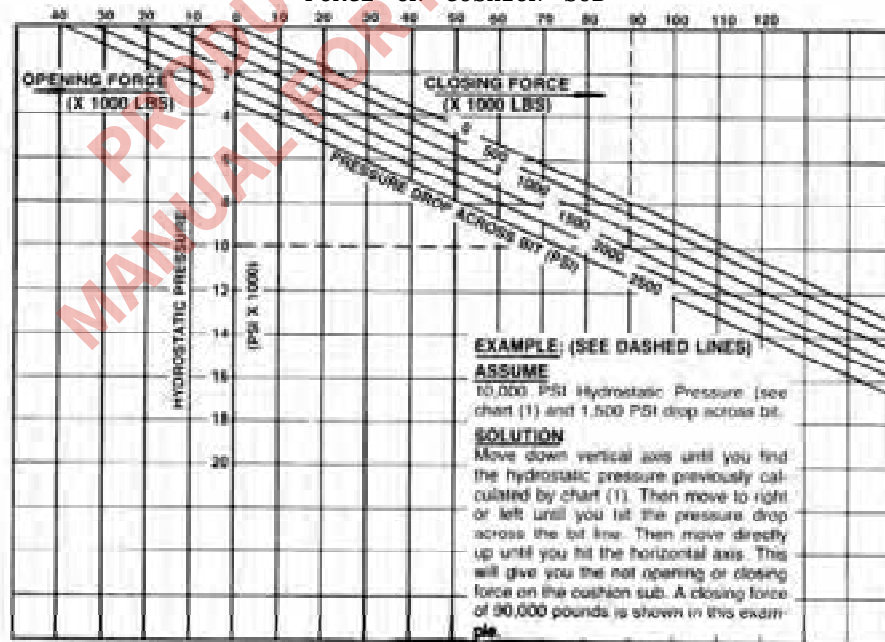
**Bowen 8 to 8-1/2 Cushion Sub**  
 Conversion Chart of Hydrostatic Pressure and Pressure Drop Across Bit to Net Pump Force

FORCE ON CUSHION SUB



Bowen 9 to 9-1/2 Cushion Sub  
 Conversion Chart of Hydrostatic Pressure and Pressure Drop Across Bit to Net Pump Force

FORCE ON CUSHION SUB



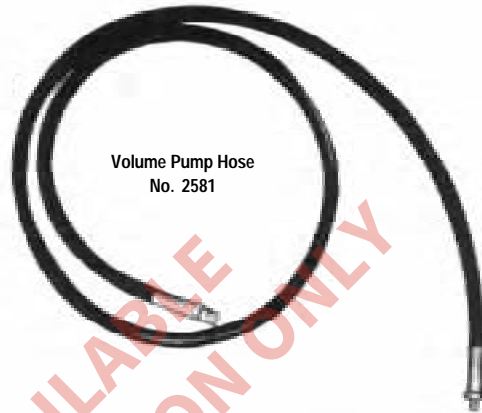
Bowen 11 to 12 Cushion Sub  
 Conversion Chart of Hydrostatic Pressure and Pressure Drop Across Bit to Net Pump Force



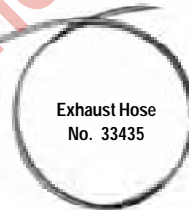
Volume Pump  
No. 2580



Metal Box No. 1995  
(Extra)



Volume Pump Hose  
No. 2581



Exhaust Hose  
No. 33435



Fill Plug Wrench  
No. 38673



Middle Body Packing  
and Spline Body Packing  
Installation Tool  
(Optional)



Middle Body Packing  
Disassembly Tool  
(Optional)



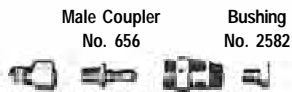
Spline Body Packing and  
Optional Pin Type Bottom Sub  
Disassembly Tool  
(Optional)



Bottom Sub Packing and  
Mandrel Body Packing  
Disassembly Tool  
(Optional)



Volume Pump Repair Kit  
No. 53266  
(Extra)



Adapter Plug  
No. 81377

Female Coupler  
No. 655



Line Filter  
No. 56565



Bushing  
No. 56563



Nipple  
No. 56423



Tube Fitting  
No. 33436

PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

### Bowen Cushion Sub

|                            |                         |                         |                         |                         |                               |                               |
|----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|
| Cushion Sub                | 4-3 4" O.D.             | 6 O.D.                  | 6-12 O.D.               | 8 O.D.                  | 9 O.D.                        | 11" O.D.                      |
| Assembly No.               | 81454                   | 81183                   | 80891                   | 80927                   | 81300                         | 102165                        |
| O.D. Range                 | 4-3 1/4" -<br>5-1 1/4"  | 6" -6-1/4"              | 6-1 1/2" -7"            | 8" -<br>8-1 1/2"        | 9" -<br>9-1 1/2"              | 11" - 12"                     |
| I.D.                       | 1-1 1/2"                | 1-3 1/4"                | 2-1 1/4"                | 2-1 1/2"                | 2-3 1/4"                      | 3-1 1/16"                     |
| Connection                 | 3-1 1/2" Reg.           | 4-1 1/2" Reg.           | 4-1 1/2" Reg.           | 6-5 8" Reg.             | 6-5 8" Reg. or<br>7-5 8" Reg. | 7-5 8" Reg. or<br>8-5 8" Reg. |
| Length                     | 14 Ft.<br>7-3/4 In.     | 14 Ft.                  | 14 Ft.                  | 15 Ft.<br>4-1/4 In.     | 15 Ft.<br>2-1/8 In.           | 18 Ft.<br>3-7/8 In.           |
| Maximum Load               | 60,000 Lb.              | 76,000 Lb.              | 78,000 Lb.              | 110,000 Lb.             | 120,000 Lb.                   | 120,000 Lb.                   |
| Stroke                     | 6.0 In.<br>Max.         | 8.0 In.<br>Max.         | 8.0 In.<br>Max.         | 8.0 In.<br>Max.         | 6.0 In.<br>Max.               | 8.0 In.<br>Max.               |
| Torque to Yield * (lb ft)  | 7,800                   | 19,200                  | 19,200                  | 32,000                  | 60,000                        | 114,000                       |
| Lift Load at Yield * (lbs) | 475,000                 | 495,000                 | 720,000                 | 1,500,000               | 1,500,000                     | 2,100,000                     |
| Working Fluid              | Bowen Jar Lube<br>49842 | Bowen Jar Lube<br>49842 | Bowen Jar Lube<br>49842 | Bowen Jar Lube<br>49842 | Bowen Jar Lube<br>49842       | Bowen Jar Lube<br>49842       |
| Fluid Volume               | 165 In. <sup>3</sup>    | 225 In. <sup>3</sup>    | 275 In. <sup>3</sup>    | 360 In. <sup>3</sup>    | 515 In. <sup>3</sup>          | 707 In. <sup>3</sup>          |
| Spring Rate (lb/in)        | 21,000                  | 28,000                  | 28,000                  | 28,000                  | 38,000                        | 38,000                        |

\* Strengths listed are calculated theoretical yield points and are accurate within 20%.

### Replacement Parts

| Item No. |   | Part No. |        |         |        |        |        |        |
|----------|---|----------|--------|---------|--------|--------|--------|--------|
| 1        | Spline Body   | Part No. | 102008 | 81184   | 80892  | 80928  | 81302  | 102178 |
|          |   | Weight   | 68     | 99      | 169    | 245    | 302    | 530    |
| 2        | Spline Body (Small) & Mandrel<br>Body Packing Retainer          | Part No. | —      | 81185   | 80903  | 80938  | —      | —      |
|          |   | Weight   | —      | 1-1 1/2 | 1-5/8  | 1-7/8  | —      | —      |
| 2        | Spline Body (Long) & Mandrel<br>Body Packing Retainer           | Part No. | —      | —       | —      | —      | 81311  | 102170 |
|          |   | Weight   | —      | —       | —      | —      | 7-1/2  | 6      |
| 2        | Mandrel Body Packing Retainer                                   | Part No. | 102004 | —       | —      | —      | —      | —      |
|          |   | Weight   | 1-1/16 | —       | —      | —      | —      | —      |
| 3        | Spline Body Packing Bearing                                     | Part No. | 102330 | 102306  | 102311 | 102316 | 102321 | 102325 |
|          |   | Weight   | 2      | 3       | 3      | 4      | 5      | 9      |
| 4        | Spline Body & Mandrel Body<br>Pressure Ring Set                 | Part No. | —      | 102390  | 102392 | 102394 | 102396 | 102207 |
|          |   | Weight   | —      | 1/4     | 1      | 1/2    | 2      | 1/2    |
| 4        | Spline Body Pressure Ring Set                                   | Part No. | 102422 | —       | —      | —      | —      | —      |
|          |   | Weight   | 9/16   | —       | —      | —      | —      | —      |
| 4a       | Spline Body Female Adapter                                      | Part No. | 102423 | —       | —      | —      | —      | —      |
|          |   | Weight   | 1/8    | —       | —      | —      | —      | —      |
| 5        | Spline Body & Mandrel Body<br>Packing Support                   | Part No. | —      | 81188   | 80896  | 80932  | 81305  | 102173 |
|          |   | Weight   | —      | 4-1/2   | 5-1/2  | 6-1/2  | 6-5/8  | 7      |
| 5        | Spline Body Packing Support                                     | Part No. | 102009 | —       | —      | —      | —      | —      |
|          |   | Weight   | 3-7/8  | —       | —      | —      | —      | —      |
| 6        | Spline Body & Mandrel Body<br>Packing Support Bearing           | Part No. | 102329 | 102305  | 102310 | 102315 | 102320 | 102324 |
|          |   | Weight   | 1-1/2  | 1-3/4   | 2      | 2-1/2  | 4      | 9      |
| 7        | Spline Body & Mandrel Body<br>Packing Support Pressure Ring Set | Part No. | 102388 | 81190   | 80898  | 80934  | 81307  | 102174 |
|          |   | Weight   | 3/16   | 3/8     | 1/2    | 3/8    | 1-1/4  | 1-1/2  |
| 7a       | Spline Body & Mandrel Body<br>Packing Support Female Adapter    | Part No. | 102389 | —       | —      | —      | —      | —      |
|          |   | Weight   | 1/8    | —       | —      | —      | —      | —      |
| 8        | Spline Body Packing Retainer<br>(Large)                         | Part No. | —      | 81191   | 80899  | 80935  | —      | —      |
|          |   | Weight   | —      | 3-1/4   | 3-1/2  | 4-3/8  | —      | —      |
| 8        | Spline Body Packing Retainer<br>(Long)                          | Part No. | 102012 | —       | —      | —      | —      | —      |
|          |   | Weight   | 1-3/8  | —       | —      | —      | —      | —      |
| 8        | Spline Body Packing Retainer<br>(Short)                         | Part No. | 102007 | —       | —      | —      | 81308  | 102176 |
|          |   | Weight   | 11/16  | —       | —      | —      | 3-1/8  | 3-1/4  |
| 9        | Fill Plug   | Part No. | 102025 | 80900   | 80900  | 80900  | 80900  | 80900  |
|          |   | Weight   | 1/16   | 1/8     | 1/8    | 1/8    | 1/8    | 1/8    |
| 10       | Mandrel Body  | Part No. | 102002 | 81192   | 80901  | 80936  | 81309  | 102168 |
|          |   | Weight   | 11     | 25      | 35     | 44     | 73     | 110    |



**Bowen Cushion Sub**

|    |  |          |        |        |        |        |        |        |
|----|--|----------|--------|--------|--------|--------|--------|--------|
| 11 | Mandrel Body Wiper   | Part No. | 102603 | 102604 | 102605 | 102606 | 102607 | 102169 |
|    |  | Weight   | 3/16   | 3/16   | 1/4    | 3/8    | 1/2    | 1/2    |
| 12 | Mandrel Body Bearing   | Part No. | —      | 102304 | 102309 | 102314 | 102319 | 102172 |
|    |  | Weight   | —      | 6      | 6      | 11     | 12     | 19     |
| 13 | Mandrel  | Part No. | 102001 | 81195  | 80906  | 80940  | 102455 | 102167 |
|    |  | Weight   | 265    | 461    | 481    | 897    | 1,192  | 1,140  |
| 14 | Mandrel Retainer   | Part No. | 102013 | 81196  | 80907  | 80941  | 81314  | 102180 |
|    |  | Weight   | 2-7/8  | 3-7/8  | 5-1/4  | 9      | 12-1/8 | 13     |
| 15 | Middle Body  | Part No. | 102014 | 81197  | 80908  | 80942  | 81315  | 102179 |
|    |  | Weight   | 167    | 281    | 325    | 445    | 556    | 1,236  |
| 16 | Middle Body Packing Retainer (Long)  | Part No. | 102015 | 81198  | 80909  | —      | 81316  | 102182 |
|    |  | Weight   | 1-7/8  | 3      | 3-3/4  | —      | 9-3/4  | 12     |
| 17 | Middle Body Packing Bearing  | Part No. | 102331 | 102307 | 102312 | —      | 102322 | 102326 |
|    |  | Weight   | 11/16  | 7      | 8      | —      | 8      | 16     |
| 18 | Middle Body Packing Set  | Part No. | 102017 | 81200  | 80911  | —      | 81318  | 102183 |
|    |  | Weight   | 1-1/16 | 1-3/4  | 2-3/4  | —      | 4-7/16 | 1-1/2  |
| 19 | Middle Body Packing Support  | Part No. | 102018 | 81201  | 80912  | 80946  | 81319  | 102185 |
|    |  | Weight   | 5      | 9-1/2  | 12     | 9-1/2  | 17     | 14     |
| 20 | Bottom Sub Packing Support Bearing   | Part No. | 102333 | —      | —      | —      | —      | —      |
|    |  | Weight   | 1      | —      | —      | —      | —      | —      |
| 20 | Middle Body & Bottom Sub Packing Support Bearing & Bottom Sub Packing Bearings | Part No. | —      | 102308 | 102313 | —      | 102323 | —      |
|    |  | Weight   | —      | 2      | 2      | —      | 4      | —      |
| 20 | Middle Body Packing Support & Bottom Sub Packing Bearing                       | Part No. | 102332 | —      | —      | —      | —      | —      |
|    |  | Weight   | 1-1/2  | —      | —      | —      | —      | —      |
| 21 | Middle Body & Bottom Sub Packing Support Packing Set & Bottom Sub Packing Set  | Part No. | —      | 81203  | 80914  | —      | 81321  | —      |
|    |  | Weight   | —      | 9/16   | 3/4    | —      | 1-1/2  | —      |
| 21 | Middle Body Packing Support & Bottom Sub Packing Set                           | Part No. | 102020 | —      | —      | —      | —      | —      |
|    |  | Weight   | 7/16   | —      | —      | —      | —      | —      |
| 21 | Bottom Sub Packing Support Packing Set   | Part No. | 102029 | —      | —      | —      | —      | —      |
|    |  | Weight   | 5/16   | —      | —      | —      | —      | —      |
| 22 | Middle Body Packing Retainer (Short)   | Part No. | 102021 | 81204  | 80915  | 80949  | 81322  | 102188 |
|    |  | Weight   | 11/16  | 1-1/4  | 1-3/4  | 2-1/8  | 3-1/4  | 3      |
| 23 | Bottom Sub   | Part No. | 102022 | 81205  | 80916  | 80950  | 81323  | 102192 |
|    |  | Weight   | 82     | 123    | 140    | 174    | 263    | 982    |
| 24 | Bottom Sub Packing Retainer  | Part No. | 102023 | 81206  | 80917  | 80951  | 81324  | 102196 |
|    |  | Weight   | 1-1/8  | 3/4    | 1      | 1-1/4  | 5      | 3-3/4  |
| 25 | Bottom Sub Packing Support   | Part No. | 102024 | 81207  | 80918  | 80952  | 81325  | 102193 |
|    |  | Weight   | 2-7/8  | 5-1/4  | 5-3/4  | 9-1/2  | 9-1/4  | 39     |
| 26 | O-Ring   | Part No. | 568234 | 568342 | 568344 | 568357 | 568361 | 568363 |
| 27 | O-Ring   | Part No. | 568238 | 568347 | 568351 | 568361 | 568364 | 568370 |
| 28 | O-Ring   | Part No. | 568241 | 568348 | 568351 | 568361 | 568364 | 568370 |
| 29 | O-Ring (Not a Seal)  | Part No. | 568142 | 568230 | 568236 | 568245 | 568249 | 568258 |
| 30 | O-Ring   | Part No. | 568238 | 568245 | 568249 | 568259 | 568264 | 568269 |
| 31 | O-Ring   | Part No. | 568240 | 568248 | 568252 | 568260 | 568263 | 568269 |
| 32 | O-Ring   | Part No. | 568155 | 568249 | 568253 | 568260 | 568265 | 568270 |
| 33 | O-Ring   | Part No. | 568243 | 568252 | 568255 | 568262 | 568266 | 568272 |
| 34 | O-Ring   | Part No. | 568010 | 568108 | 568108 | 568108 | 568108 | 568108 |
| 35 | Back-up Ring   | Part No. | 8-010  | 8-108  | 8-108  | 8-108  | 8-108  | 8-108  |
| 36 | O-Ring   | Part No. | —      | —      | —      | 568257 | —      | 568267 |
| 37 | O-Ring   | Part No. | —      | —      | —      | —      | —      | 568445 |

### Bowen Cushion Sub

|    |   |          |   |        |        |        |        |        |
|----|---|----------|---|--------|--------|--------|--------|--------|
| 38 | O-Ring  | Part No. | — | —      | —      | —      | —      | 568368 |
| 39 | O-Ring  | Part No. | — | —      | —      | —      | —      | 568251 |
| 40 | O-Ring  | Part No. | — | —      | —      | —      | —      | 568249 |
| 41 | Top Sub   | Part No. | — | —      | —      | —      | —      | 102166 |
| 42 | O-Ring  | Part No. | — | —      | —      | —      | —      | 568444 |
| 43 | O-Ring  | Part No. | — | —      | —      | —      | 568431 | 568440 |
| 44 | Spline Body & Mandrel Body<br>Female Adapter                | Part No. | — | 102391 | 102393 | 102395 | 102397 | 102208 |
|    |   | Weight   | — | 1      | 1      | 1      | —      | 2      |
| 45 | Middle Body Packing Support (Long)                          | Part No. | — | —      | —      | 102656 | —      | 102191 |
|    |   | Weight   | — | —      | —      | 15-1/2 | —      | 82     |
| 46 | Mandrel Small End Bearing                                   | Part No. | — | —      | —      | 102318 | —      | —      |
|    |   | Weight   | — | —      | —      | 3-3/4  | —      | —      |
| 47 | Mandrel Small End Packing Set                               | Part No. | — | —      | —      | 80948  | —      | —      |
|    |   | Weight   | — | —      | —      | 3/4    | —      | —      |
| 48 | Middle Body Packing Support<br>(Short) & (Long) Packing Set | Part No. | — | —      | —      | —      | —      | 102186 |
|    |   | Weight   | — | —      | —      | —      | —      | 1-1/2  |
| 49 | Middle Body Packing Support<br>(Short) & (Long) Bearing     | Part No. | — | —      | —      | —      | —      | 102327 |
|    |   | Weight   | — | —      | —      | —      | —      | 9      |
| 50 | Middle Body Pkg. Support<br>(Long) Wiper (Upper)            | Part No. | — | —      | —      | —      | —      | 102608 |
|    |   | Weight   | — | —      | —      | —      | —      | 1/2    |
| 51 | Middle Body Packing Support<br>(Long) Wiper (Lower)         | Part No. | — | —      | —      | —      | —      | 102609 |
|    |   | Weight   | — | —      | —      | —      | —      | 1/4    |
| 52 | Bottom Sub & Bottom Sub<br>Packing Support Packing Set      | Part No. | — | —      | —      | —      | —      | 102194 |
|    |   | Weight   | — | —      | —      | —      | —      | 1/2    |
| 53 | Bottom Sub Packing Support &<br>Bottom Sub Bearing          | Part No. | — | —      | —      | —      | —      | 102328 |
|    |   | Weight   | — | —      | —      | —      | —      | 5      |
| 54 | Bottom Sub Packing Retainer<br>(Long)                       | Part No. | — | —      | —      | —      | —      | 102197 |
|    |   | Weight   | — | —      | —      | —      | —      | 4-3/4  |
| 55 | Mandrel Extension   | Part No. | — | —      | —      | —      | —      | 102181 |
|    |   | Weight   | — | —      | —      | —      | —      | 305    |

### Extra

|     |                                       |          |        |        |        |        |        |        |
|-----|---------------------------------------|----------|--------|--------|--------|--------|--------|--------|
| 56  | Middle Body Packing Installation Tool | Part No. | 102034 | 81285  | 81278  | 81281  | 81331  | 102202 |
| 57  | Bottom Sub Packing Disassembly Tool   | Part No. | 102050 | 102067 | 102060 | 102063 | 102065 | 102206 |
| 58  | Middle Body Packing Disassembly Tool  | Part No. | 102036 | 81345  | 81347  | 81350  | 81334  | 102205 |
| 59a | Spline Body Packing Disassembly Tool  | Part No. | 81358  | 81357  | 81356  | 81359  | 81360  | 102204 |
| 59b | Spline Body Packing Installation Tool | Part No. | 102044 | —      | —      | —      | —      | —      |
| 60  | Mandrel Body Packing Disassembly Tool | Part No. | 102035 | 81344  | 81347  | 81349  | 81334  | 102203 |

### Optional

|    |  | 3-1/2<br>Reg.   | 4-1/2<br>Reg. | 4-1/2<br>Reg. | 6-5/8<br>Reg. | 6-5/8 7-5/8<br>Reg. Reg. | 7-5/8 8-5/8<br>Reg. Reg. |
|----|--|-----------------|---------------|---------------|---------------|--------------------------|--------------------------|
| 61 | O-Ring Packing Set   | Part No. 102026 | 81208         | 80919         | 80953         | 81326                    | 102198                   |
| 62 | Complete Packing Set                                       | Part No. 102027 | 81209         | 80920         | 80954         | 81327                    | 102199                   |
| 63 | Complete Bearing Set                                       | Part No. 102339 | 102340        | 102341        | 102342        | 102343                   | 102344                   |
| 64 | Lifting Sub Bottleneck Elevator Type<br>for Box Connection | Part No. 102032 | 81430         | 81430         | 81431         | 81431/81432              | 81432/102237             |
| 65 | Thread Protector for Pin Connection                        | Part No. 63078  | 63081         | 63081         | 63087         | 63087/65702              | 65702/102244             |
| 66 | Thread Protector for Box Connection                        | Part No. 63095  | 63100         | 63100         | 63106         | 63106/81433              | 81433/102245             |
| 67 | Lifting Sub for Pin Connection                             | Part No. 32276  | 32306         | 32306         | 32346         | 32346/81945              | 81945/102238             |
| 68 | Lifting Sub for Box Connection                             | Part No. 59589  | 59591         | 59591         | 59593         | 59593/71374              | —                        |
| 69 | Hi-temp O-ring Packing Set                                 | Part No. 102372 | 102373        | 102374        | 102375        | 102376                   | 102377                   |
| 70 | Hi-temp Complete Packing Set                               | Part No. 102584 | 102585        | 102586        | 102587        | 102588                   | 102589                   |
| 71 | Cushion Sub Service Kit                                    | Part No. 81368  | 81368         | 81368         | 81368         | 81368                    | 81368                    |
| 72 | Bottom Sub Packing Disassembly Tool<br>for Pin Connection  | Part No. 102050 | —             | —             | —             | —                        | —                        |
| 73 | Mandrel Body Wiper (Hi-temp)                               | Part No. 102610 | 102611        | 102612        | 102613        | 102614                   | 102615                   |
| 74 | Thread Lubricant (KOPR-KOTE)                               | Part No. 153823 | —             | —             | —             | —                        | —                        |
| 75 | Jar Lube   | Part No. 49842  | —             | —             | —             | —                        | —                        |

### How To Order:

Specify:

- (1) Name and Number of Assembly or Part.
- (2) Size and Type of Connections, if Other than Standard.
- (3) Outside Diameter
- (4) Any Spares or Extras desired, by Name and Number.

### Recommended Spare Parts:

- (1) 10 Complete Packing Sets
- (2) 5 Complete Bearing Sets
- (3) Spline Body and Mandrel Body Packing Support
- (4) 4 Fill Plugs
- (5) 1 Bottom Sub Packing Retainer
- (6) 6 "O" -Ring for Fill Plug

Miscellaneous O-Ring Seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing Sets, however, will always be furnished in sealed plastic bags.



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\* Denotes Manufacturing and Engineering facilities

Downhole Solutions

Drilling Solutions

Engineering and Project Management Solutions

Lifting and Handling Solutions

Production Solutions

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Tubular and Corrosion Control Solutions

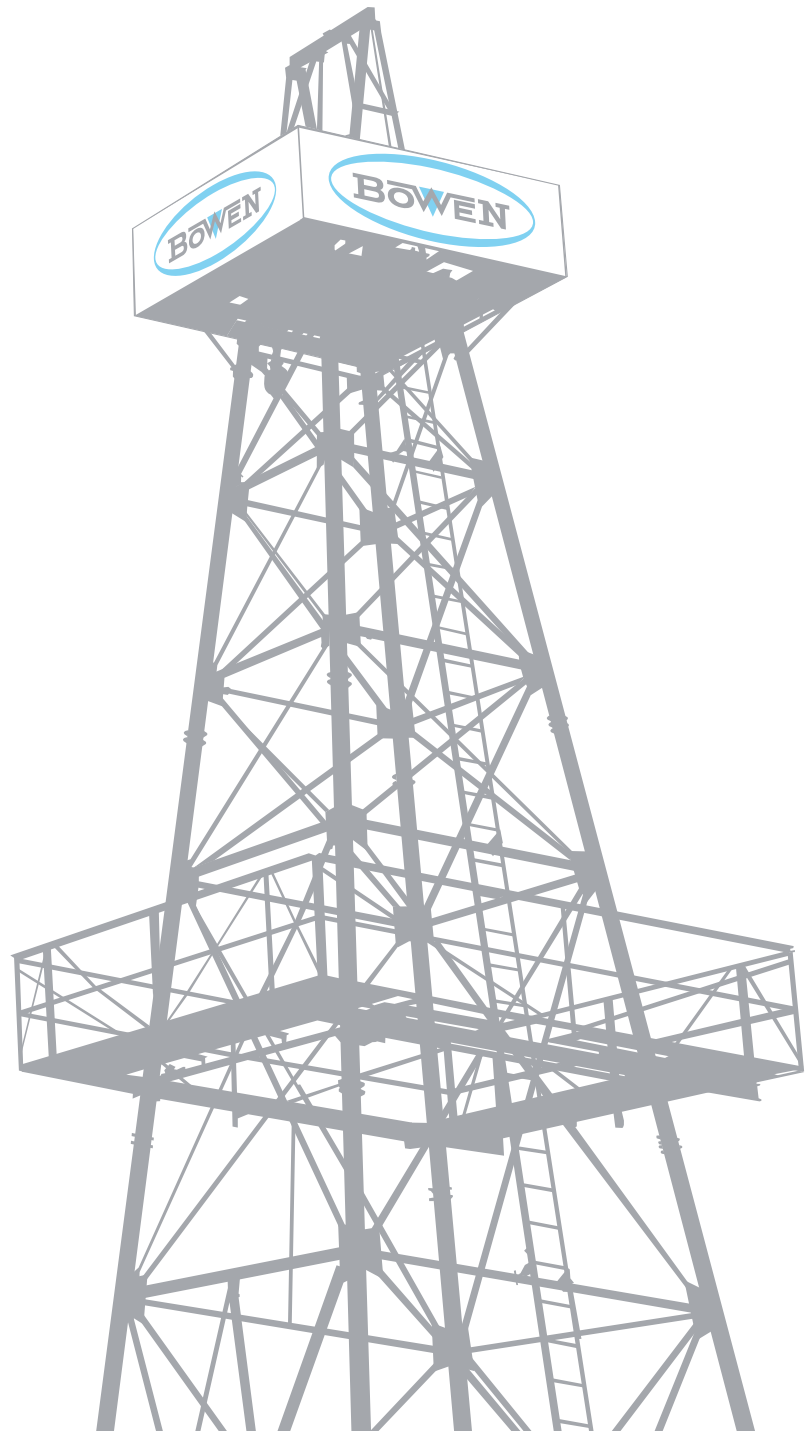
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# Bowen Lubricated Fishing Bumper Subs

Instruction Manual 4445



**Bowen | NOV**

# Bowen Lubricated Fishing Bumper Subs

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Lubricated Fishing Bumper Subs

## General Description

The Bowen lubricated fishing bumper sub withstands sustained bumping action in fishing, milling, and workover operations. The tool offers a sharp bumping action to actuate and release tools and permits a 10 to 18 inch vertical stroke whether rotating or still, making it the ideal tool for your severe fishing jobs.

The Bowen lubricated fishing bumper sub will transmit full torque at all times during rotation and during bumping operations. Adequate striking surfaces are provided at the limits of the free movement to produce the great impact so necessary to get high quality, positive bumping action in either direction.

Specially designed rugged splines provide a source of continuous torque transmission. These splines are always in engagement, whether bumping or not.

The bores permit full circulation at all times.

## Use

The Bowen lubricated fishing bumper sub is especially well-suited for use in deep, severe fishing operations or light drilling, milling, or coring operations. It permits an immediate bumping action to prevent cuttings and carvings from settling and wedging the drilling or fishing string.

The Bowen lubricated fishing bumper sub will free drill pipe and reamers, drill collars, bits and other tools which have become stuck. The tool can readily be used to bump repeatedly in either direction or to bump alternately up and down.

The Bowen lubricated fishing bumper sub is an ideal tool to be used in coring operations. The bumping action is an effective way to break cores sharply and cleanly to permit easy removal when desired.

## In Fishing Operations

Whenever a releasing type fishing tool is to be used, a properly made-up Bowen lubricated fishing bumper sub should be included in the fishing string. It is generally inserted in the string immediately above the fishing tool safety joint or unlatching joint. It ensures that you have the means available to release the fishing tool if and when it becomes impossible to pull the fish.

The Bowen lubricated fishing bumper sub delivers the sharp downward blow and transmits the torque required to break the fishing tool engagement to release it from the fish. The free-stroke also assists in controlling the weight on the fishing tool while releasing.

Likewise, the Bowen lubricated fishing bumper sub can be used to great advantage to release a fishing tool from a recovered fish at the top of the hole, once recovered. It simplifies the operation and eliminates the necessity to resort to awkward measures such as dropping the elevators or bumping down with the hook.



**Bowen Lubricated Fishing Bumper Sub**

# Bowen Lubricated Fishing Bumper Subs

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## Construction

Refer to the assembly drawing on page 5.

The Bowen lubricated fishing bumper sub is manufactured from carefully selected high grade alloy steel. Each part is processed and heat treated in accordance with the best choice of degree and type of heat treatment to suit its use in the tool.

We have carefully engineered it to eliminate a high degree of points of usual high stress concentration. This assures long dependable service from each tool.

A shoulder-type, splined mandrel fits in to a mandrel body with mating splines. The mandrel is free to move up and down, while simultaneously transmitting torque from the mandrel to the mandrel body. A suitable knocker and washpipe are made up on the lower end of the mandrel.

The knocker strikes a heavy impact blow against the lower end of the mandrel body when in use. This knocker is specially designed with three main features: its material and heat treatment are in optimum balance for use in impact loading; it reduces wear to an absolute minimum; and it has been closely fitted to allow free sliding contact with the middle body, in which it translates, while at the same time lateral movement is restricted to an absolute minimum. This prevents the high frequency lateral vibration which is present in most other tools, and which is very detrimental to the life of the tool. This is wear action commonly called chatter.

The washpipe is designed to include the same stabilizing

features at its upper end as those described above. The lower end, which moves up and down as the tool is stroked, has been specially hard-faced and ground to a high polish. This reduces frictional wear to a minimum where the washpipe is sealed in the upper end of the washpipe body.

The seal points of the mandrel at the top of the tool and the washpipe at the bottom of the tool are equipped with the well-known patented seal ring assembly, consisting of an o-ring seal, non-extrusion rings, and seal protector rings. This seal ring assembly reduces the normal diametric clearance at the seal point to near zero as hydraulic pressure is applied from either direction. This prohibits the extrusion of the seal ring as would otherwise occur. It also reduces o-ring roll" to a minimum. Two of these seal assemblies are used in tandem in the Bowen lubricated fishing bumper sub. This increases the life of both by a considerable margin.

The middle body forms a housing for the lubricating oil in which the working parts of the bumper sub function.

It is made up on the mandrel body at its upper end and on the washpipe body at its lower end. The middle body has a suitable fill plug near the lower end. It has a honed finish inside diameter which is closely fitted to the outside diameter of the knocker and washpipe upper end.

The mandrel body slips over the mandrel with the flat end up. It is made up with the middle body at its lower end. The mandrel body incorporates splines, which mate with corresponding splines on the mandrel.

The mandrel body has a suitable fill plug, which together with the similar fill plug in the middle body, allows filling the bumper sub with lubricating oil. This filling process is described in detail on page 8.

The mandrel body also has a series of straight, specially designed splines on the inside diameter and near the lower end. These splines are engaged in sliding contact with the mandrel to transmit the torque imparted by the running string through the middle body, washpipe body, and the attached tool.

The washpipe body, the lowermost part of the tool, forms the lower closure for the middle body (oil chamber) and transmits torque.

The Bowen lubricated fishing bumper sub is furnished standard with a tool joint box top connection and a tool joint pin bottom connection. These may be reversed or special connections furnished on request.

The Bowen lubricated fishing bumper sub is designed to have a 10 in. to 18 in. stroke standard, depending on size. Special longer strokes can be furnished up to 60 in. or greater, depending on size. Contact NOV engineering for information regarding a specific requirement.

# Bowen Lubricated Fishing Bumper Subs



**Bowen Lubricated Fishing Bumper Sub**



# Bowen Lubricated Fishing Bumper Subs

## Operation

### When Used in Light Drilling, Milling, or Coring Operations

The Bowen lubricated fishing bumper sub is usually installed in the drill string immediately above the drill collars. It is an excellent safety device, particularly when working in sticky formations, deep holes, when drilling out cement in heavy mud, or in coring jobs.

### When Used in Fishing Operations

The Bowen lubricated fishing bumper sub is usually installed in the fishing string immediately above the fishing tool, safety joint or unlatching joint.

The primary purpose of the Bowen lubricated fishing bumper sub is to enable you to release the fishing tool in the event that it becomes impossible to pull the fish. The tool delivers the necessary impact and imparts the required torque that is required to release the tool from the fish. It also assists you in controlling the weight on the fishing tool while releasing.

There are a number of secondary uses for the bumper sub:

### To Release the Recovered Fish at the Top of the Hole

You may release the recovered fish at the top of the hole by gripping the fish immediately below the fishing tool and, after opening the Bowen lubricated fishing bumper sub, dropping a stand of drill pipe heavily down against the bumper sub. This will cause a sharp enough downward blow against the fishing tool to break the freeze after which the fish may readily be removed. In the event that insufficient impact may be produced by the stand of drill pipe, one or more drill collars may be inserted in place of the drill pipe, and the process repeated with more effect.

### To “Bump Down” in the Hole

Elevate the fishing string sufficiently to open the bumper sub the full length of its stroke and take a strain on the pipe. This will require 10 in. to 18 in. to open the tool. Add enough pull to put a permissible amount of stretch in the drill or fishing string. The permissible stretch will depend on the size of the pipe and its length above the bumper sub.

Drop the string sharply for a distance equal to the stretch in the string plus 9 ½ in. to 12 in., depending on the size of the tool; and stop it abruptly with the break. If sufficient stretch has been taken in the string, this will cause the lower end of the fishing string, i.e., immediately above the tool, to spring downward, closing the bumper sub. Due to the elasticity of the string, coupled with the natural rebound from the striking surfaces in the tool, a rapid series of resonant blows will be delivered to the tool below the bumper sub.

### To Bump a Solid Downward Blow in the Hole

Elevate the string to open the bumper sub completely and take a moderate strain or stretch in the string. This will require 15 in. to 20 in. at the tool plus stretch in the string.

Drop the running string sharply this full combined length without any braking action. This will cause the bumper sub to close quickly. The shoulder of the mandrel will strike the mandrel body shoulder, transmitting a single, solid downward blow to the tool below the bumper sub.

### To “Jar Up” in the Hole

Elevate the running string sufficiently to stretch it moderately. Then drop the string a distance equal to the stretch in the string

and stop it sharply with the brake. This will cause the lower end of the string to spring downward, causing the bumper sub to partly close, after which the string will rebound. This will cause the bumper sub to re-open quickly and the knocker will strike the lower end of the mandrel body a solid upward blow.

## Complete Disassembly

1. Place the bumper sub in a chain pipe vice, clamping the tool at the mandrel body (4). This has two advantages: the main mandrel body is thick walled and will withstand greater forces exerted upon it, and the entire disassembly can be accomplished with this single clamping.
2. Remove middle body fill plug (8) so that oil may start draining from the tool.

**Note: Place a suitable open mouthed receptacle below the tool so that it will catch the oil as it drains.**

3. With chain tongs break the wash-pipe body (6) from the middle body (5). Uncouple and lay aside.
4. With chain tongs, break the middle body (5) from the mandrel body (4). Uncouple, slide over the washpipe (3) and lay aside.

**Caution: Do not scratch or dent washpipe seal surface.**

5. Break washpipe from mandrel (1) and lay aside.
6. Slide the mandrel (1) out through the top of the

mandrel body (4). Due to the tight grip of the seal assembly, it is sometimes necessary to strike the mandrel to start it out. If so, the mandrel end should be protected with a block of hardwood or lead hammer head. Place the block against the end of the mandrel and strike the block forceful blows with a sledge hammer until the mandrel begins to slide.

7. When the mandrel is free, attach a soft line or wire rope sling just below the shoulder and support the weight while removing the mandrel.
8. Remove the mandrel and lay it aside.
9. Remove the mandrel body (4) from the vise and lay it aside.
10. Examine the mandrel seal assembly consisting of the seal (10), seal protector ring (11) and seal non extrusion ring (12). There are two of these seal assemblies in tandem: one pair in the upper end of the mandrel body (4) and a pair in the washpipe body (6). Check this seal assembly for wear or damage. Remove the o-ring seals (10), seal protector rings (11) and non-extrusion rings (12) that show signs of wear or have deteriorated.

To remove these rings, proceed as follows:

Using either tool no. 626 or no. 625, carefully insert the tip of the blade between the o-ring and the seal

# Bowen Lubricated Fishing Bumper Subs

protector ring. Then lift out the o-ring, taking care not to damage or mar the seal protector rings or non extrusion rings. Do not run the tool around the groove under the rings. Avoid damage by scratching the ring grooves. Refer to Figure 1.

11. With the o-ring removed from the above-named assemblies, examine visually for any distortion or damage. Carefully feel the seal protector and non-extrusion rings for damage or burrs.
12. Remove all damaged rings.
13. Carefully wash and clean all disassembled parts in solvent. Wipe dry with a clean cloth, then thoroughly oil with a good grade of light clean oil.
14. Check all parts for defects. Inspect polished seal surfaces for pits, scratches, and flaking and seal grooves for fluid erosion, burrs, mushroomed lands, and other deformities. Repair if possible. Using a seal pick, fingernail, or other pointed object, feel the entire width and depth of the grooves. Repair any steps or surface interruptions. Any abrasions on these surfaces will damage the seals, causing a loss of fluid during operation. Parts with major damage must be replaced.

## Reassembly

**Note:** The two fill plug seals (9) should be replaced before the fill plugs (7 and 8) are

**reassembled. Seals and oil, once removed, should never be reused.**

1. All metal parts should be thoroughly steam cleaned or washed inside and out with a good grade solvent; blown dry with shop air, or wiped clean with soft cloths. The parts should then be thoroughly oiled with a good grade, clean light oil.



Figure 1  
O-Ring Removal with Tool No.625

Insert lip of tool under O-Ring and force O-Ring out of the groove. Be careful not to damage or distort Seal Protector Rings of Non-Extrusion Rings. Many operators prefer to use O-Ring Tool No. 625 for O-Ring removal due to its configuration.

**Note:** Always lubricate the threads with an approved thread lubricant.

2. Prior to the main reassembly, install the *Bowen* non-extrusion seal assemblies in the mandrel body (4) and washpipe body (6). This may be done in the following manner. (Refer to Figures 2 through 16 for step-by-step illustrations).

Install non-extrusion rings first with their beveled

surfaces conforming to the beveled surfaces of the groove. Next, install the seal protector rings, deform them slightly to permit entry into the body, then straighten and flatten them by use of Tool #625. After non-extrusion rings and seal protector rings are in place, insert the rubber o-ring in the middle of the assembly between the two seal protector rings. Then properly set the complete assembly with a ring setting tool.

3. Repeat the sequence as shown in Figures 2-9 on pages 9 and 10 for the upper main mandrel seal.
4. With both seal assemblies in place and pressed into the grooves as best as possible with your hands and the installation tool #626, use the seal assembly setting tool to set the seals properly.
5. After the non-extrusion seal assemblies have been installed in both mandrel body and washpipe body as outlined in 2 through 4 above, use the setting tool, Figure 14, to conform the seal rings to the proper bore size. Refer to figures 14, 15, and 16.
6. Secure the mandrel body (4) horizontally in a vice. Coat the polished surface thoroughly with a good clean lightweight oil.
7. Install the washpipe seal (16) on the lower end of the mandrel (1).
8. Insert the splined end of the

mandrel (1) through the top of the mandrel body (4); and, aligning the splines, shove it through the splines in the mandrel body (4). Push it gently through until the mandrel (1) bumps against the mandrel body. This will bring the polished portion of the mandrel through the seal ring assemblies previously described. The mandrel should slide freely back and forth. If any unusual resistance is encountered, remove the mandrel and reset the seal assemblies or remove any foreign matter. Do not force the mandrel, as damage may result to the seal surface.

9. Install the large middle body seal (14) and small middle body seal (15).
10. Oil and install the knocker (2) on the lower mandrel end. Buck up tightly.

**CAUTION:** The knocker is designed with appropriate wrench flats, usually six. Use them. **DO NOT** wrench on the hard-faced bands between the flats, or gouge into them with the sides of the wrench jaws. These hard-faced bands are engineered to lend lateral stabilization to the knocker when in service. They are manufactured to close grinding tolerances, and should never be upset or otherwise damaged. In the event that they are inadvertently upset in handling, remove the upset or burr with a hand file or fine emery cloth, then clean and re-oil.

11. Screw the washpipe (3) onto the mandrel. Buck up tightly. Use the same care

# Bowen Lubricated Fishing Bumper Subs

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with the washpipe as described for the knocker. It also is designed with stabilizer bands.

12. Coat the washpipe (3) thoroughly with light oil.
13. Slide the middle body (5) over the washpipe and lower mandrel end, and mate it up with the mandrel body. Make up tightly.
14. Assemble the large middle body seal (14) and the small middle body seal (15) on the upper end of the washpipe body (6).
15. Slip the washpipe body over the washpipe (3). Use the same care as described in (9) for the mandrel. Buck up tightly in lower end of middle body (5).
16. Any good grade medium weight lubricating oil will serve the lubricated bumper sub. Best results are obtained from SAE 70 weight, non-foaming lubricating oil; and this is recommended.

This recommendation may be modified to allow a lighter weight oil in small subs used in relatively low temperature and heavier weight oil in very deep holes, high temperature conditions or very large subs.

**Note: Bowen Tools offers a special viscosity index oil which is particularly well suited to service in very high well temperatures. This oil is available at extra cost on request.**

The oil used to fill the lubricated fishing bumper sub should be

completely clean and free from foreign matter. Never reuse oil or seals when assembling a bumper sub.

## To Fill the Lubricated Fishing Bumper Sub

Prop the assembled tool up at approximately a 30° angle with the mandrel end up. Have both the middle body fill plug (8) and mandrel body fill plug (7) at the top, if possible. Attach the exhaust hose assembly (33435) to the mandrel body fill plug hole, and the volume pump hose (2581) to the middle body fill plug hole. Place the free end of the exhaust hose into a receptacle. Fill the volume pump (2580) with oil and connect it to the volume pump hose.

Pump into the tool at a moderate speed to allow uniform smooth flow of oil.

As the tool fills, oil will begin to flow out the exhaust hose. Air bubbles will be observed in the exhaust oil. Continue to pump until all air bubbles cease to appear in the outflowing oil.

When air bubbles cease, immediately detach the exhaust hose, and insert the fill plug (7) in mandrel body (4). Tighten this fill plug good and snug, but not excessively tight. Detach the volume pump hose and install fill plug (8).

The tool will now be ready for service.

Before the tool is actually put in service, it should be worked back and forth several times to assure that it is functioning properly and that all seals are leak-proof.

If the tool is to be stored for future service, the tool joints should have

a good grade thread dope applied and thread protectors installed. The outside of the tool should be cleaned and painted or a good heavy coat of grease applied prior to storage. If the climate is very damp or salty, the bore should be thoroughly greased.

# Bowen Lubricated Fishing Bumper Subs

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## Installation of Non-Extrusion Rings

a. Carefully examine each non-extrusion ring before installation and remove any burrs or rough edges with a small hand file.



Figure 2

b. Hold non-extrusion ring between thumbs and forefingers.



Figure 3

c. Overlap ends until diameter is small enough to fit inside body.



Figure 4

d. Place edge of ring opposite the split into the lower groove and spread from center toward ends. Be sure beveled side of ring matches beveled groove side.



Figure 5

e. Using thumbs, press ring into groove until ends match up and ring is firmly seated in groove.

# Bowen Lubricated Fishing Bumper Subs

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## Installation of Seal Protector Rings



Figure 6

f. Figure 6 shows Ring before being bent. It will look like this after it is properly installed in the groove.



Figure 7

g. Bend the Ring until it is small enough to allow entry into bore



Figure 8

h. Insert one edge in groove. Then insert the opposite edge and press down until entire ring is in place.



Figure 9

i. Use seal protector ring installation tool to straighten and flatten ring by pressing against ring as shown.

## Installation of O-Ring Packing



Figure 10  
j. Figure 10 shows o-ring packing before installation.



Figure 11  
k. Bend o-ring as shown to insert in groove.



Figure 12  
l. Insert o-ring between seal protection rings in each groove.

# Bowen Lubricated Fishing Bumper Subs

## Setting Seal Ring Assemblies



Figure 13  
Use this setting tool from the service accessory kit (See page 14) to seat the ring seal assemblies after installation.

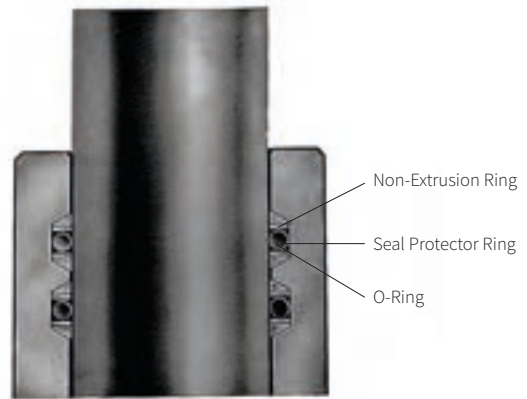


Figure 14  
This illustration shows the location of parts of the patented *Bowen* seal ring assembly.



Figure 15  
b. Insert the setting tool as shown, using any convenient rod or bar to hold tool.



Figure 16  
c. Tap several times around periphery of tool as shown to set rings. Continue until both ring assemblies are seated. Then remove tool and continue assembly.

# Bowen Lubricated Fishing Bumper Subs

## Strength Data

| Assembly Number | O.D.      | I.D.        | Connection            | Tensile Strength Yield | Yield Torque  |                       |
|-----------------|-----------|-------------|-----------------------|------------------------|---------------|-----------------------|
|                 |           |             |                       |                        | Bumper Sub    | Max. Operating Torque |
| 54781           | 1 13/16   | 3/8 in.     | 1 13/16 in. Wilson FJ | 75,400 lbs             | 480 ft-lbs    | 240 ft-lbs            |
| 41490           | 2 1/4 in. | 3/8 in.     | 1 1/4 in. API Reg.    | 116,415 lbs            | 1,740 ft-lbs  | 870 ft-lbs            |
| 43501           | 3 1/8 in. | 1 in.       | 2 3/8 in. API Reg.    | 239,070 lbs            | 3,400 ft-lbs  | 1,700 ft-lbs          |
| 39712           | 3 3/8 in. | 7/8 in.     | 2 3/8 in. API IF      | 321,000 lbs            | 6,060 ft-lbs  | 3,030 ft-lbs          |
| 43470           | 3 3/4 in. | 1 1/2 in.   | 2 3/8 in. API IF      | 300,750 lbs            | 7,100 ft-lbs  | 3,550 ft-lbs          |
| 43521           | 3 3/4 in. | 1 7/8 in.   | 2 3/8 in. EUE         | 291,735 lbs            | 4,920 ft-lbs  | 2,460 ft-lbs          |
| 43509           | 3 3/4 in. | 1 1/4 in.   | 2 3/8 in. API Reg.    | 363,780 lbs            | 7,100 ft-lbs  | 3,550 ft-lbs          |
| 43531           | 4 1/4 in. | 1 13/16 in. | 2 7/8 in. API IF      | 397,650 lbs            | 9,260 ft-lbs  | 4,630 ft-lbs          |
| 42700           | 4 1/2 in. | 2 3/8 in.   | 2 7/8 in. EUE         | 388,650 lbs            | 7,100 ft-lbs  | 3,550 ft-lbs          |
| 39727           | 4 3/8 in. | 2 in.       | 3 1/2 in. API FH      | 484,650 lbs            | 11,030 ft-lbs | 5,518 ft-lbs          |
| 39727           | 4 3/8 in. | 2 in.       | 3 1/2 in. API FH      | 484,650 lbs            | 15,000 ft-lbs | 7,500 ft-lbs          |
| 152719          | 4 3/4 in. | 2 1/4 in.   | 3 1/2 in. API IF      | 433,000 lbs            | 15,000 ft-lbs | 7,500 ft-lbs          |
| 39732           | 5 3/4 in. | 2 13/16 in. | 4 1/2 in. API FH      | 622,295 lbs            | 23,000 ft-lbs | 11,500 ft-lbs         |
| 39732           | 6 in.     | 2 13/16 in. | 4 1/2 in. API FH      | 622,295 lbs            | 23,000 ft-lbs | 11,500 ft-lbs         |
| 39737           | 1/4 in.   | 3 1/8 in.   | 4 1/2 in. API IF      | 777,150 lbs            | 32,600 ft-lbs | 16,300 ft-lbs         |
| 39778           | 6 3/4 in. | 2 3/4 in.   | 5 1/2 in. API Reg.    | 1,130,400 lbs          | 43,200 ft-lbs | 21,600 ft-lbs         |
| 39752           | 7 3/4 in. | 3 1/2 in.   | 6 3/8 in. API Reg.    | 1,276,950 lbs          | 62,400 ft-lbs | 31,200 ft-lbs         |

The above tensile strengths are calculated theoretical yield strengths and are considered accurate to ±20%.

The above operating torque is set at 50% of the calculated theoretical yield torque and is the maximum recommended operating torque.

The figures do not constitute a guarantee, actual or implied; they are meant to serve as a guide only, and appropriate allowance must be made in use, as a safety factor.

## Maximum Recommended Tightening Torque for Threaded Connections

| Jar Assembly No. | Jar O.D. X I.D.         | Top Sub to Mandrel | Knocker to Mandrel | Mandrel to Washpipe | Mandrel Body to Middle Body | Middle Body to Washpipe Body |
|------------------|-------------------------|--------------------|--------------------|---------------------|-----------------------------|------------------------------|
| 54781            | 1 13/16 in. x 3/8 in.   | 240 ft-lbs         | —                  | —                   | 370 ft-lbs                  | 370 ft-lbs                   |
| 41490            | 2 1/4 in. x 3/8 in.     | —                  | 90 ft-lbs          | 140 ft-lbs          | 870 ft-lbs                  | 870 ft-lbs                   |
| 39712            | 3 3/8 in. x 7/8 in.     | —                  | 460 ft-lbs         | 530 ft-lbs          | 3,030 ft-lbs                | 3,170 ft-lbs                 |
| 43501            | 3 1/8 in. x 1 in.       | —                  | 430 ft-lbs         | 660 ft-lbs          | 1,700 ft-lbs                | 1,700 ft-lbs                 |
| 43509            | 3 3/4 in. x 1 1/4 in.   | —                  | 580 ft-lbs         | 500 ft-lbs          | 3,550 ft-lbs                | 3,550 ft-lbs                 |
| 43470            | 3 3/4 in. x 1 1/2 in.   | —                  | 410 ft-lbs         | 490 ft-lbs          | 3,550 ft-lbs                | 3,550 ft-lbs                 |
| 43521            | 3 3/4 in. x 1 7/8 in.   | —                  | 330 ft-lbs         | 1,220 ft-lbs        | 2,460 ft-lbs                | 2,460 ft-lbs                 |
| 43531            | 4 1/4 in. x 1 13/16 in. | —                  | 670 ft-lbs         | 730 ft-lbs          | 4,630 ft-lbs                | 4,630 ft-lbs                 |
| 42713            | 4 1/4 in. x 2 in.       | —                  | 650 ft-lbs         | 1,440 ft-lbs        | 3,160 ft-lbs                | 3,160 ft-lbs                 |
| 42700            | 4 1/2 in. x 2 3/8 in.   | —                  | 370 ft-lbs         | 1,450 ft-lbs        | 3,550 ft-lbs                | 3,550 ft-lbs                 |
| 39727            | 4 3/8 in. x 2 in.       | —                  | 1,100 ft-lbs       | 1,690 ft-lbs        | 5,518 ft-lbs                | 5,518 ft-lbs                 |
| 39727            | 4 3/8 in. x 2 in.       | —                  | 1,100 ft-lbs       | 1,690 ft-lbs        | 7,500 ft-lbs                | 7,500 ft-lbs                 |
| 152719           | 4 3/4 in. x 2 1/4 in.   | —                  | 1,000 ft-lbs       | 1,500 ft-lbs        | 7,500 ft-lbs                | 7,500 ft-lbs                 |
| 39732            | 5 3/4 in. x 2 13/16 in. | —                  | 2,270 ft-lbs       | 3,800 ft-lbs        | 11,500 ft-lbs               | 11,500 ft-lbs                |
| 39732            | 6 in. x 2 13/16 in.     | —                  | 2,270 ft-lbs       | 3,800 ft-lbs        | 11,500 ft-lbs               | 13,500 ft-lbs                |
| 39737            | 6 1/4 in. x 3 1/8 in.   | —                  | 3,120 ft-lbs       | 9,750 ft-lbs        | 16,300 ft-lbs               | 16,300 ft-lbs                |
| 39778            | 6 3/4 in. x 2 3/4 in.   | —                  | 3,000 ft-lbs       | 13,300 ft-lbs       | 21,600 ft-lbs               | 22,600 ft-lbs                |
| 39752            | 7 3/4 in. x 3 1/2 in.   | —                  | 7,690 ft-lbs       | 21,000 ft-lbs       | 31,200 ft-lbs               | 31,200 ft-lbs                |

The above makeup torques are the maximum recommended makeup torques for each connection. They are set at 50% of the calculated theoretical yield torque. Torques this high are not required for all fishing jobs, and lower values will result in less wear and tear to the threads.

The tightening torque values were calculated assuming Itcolube or similar zinc based grease on all threads and shoulders.



# Bowen Lubricated Fishing Bumper Subs

## Service Kit

A bumper sub service kit is necessary to properly service the bumper sub. These kits are identical for every size of bumper sub, so one kit may be used for any number of subs. The kit does not include any seal setting tool, two of which are required for each size bumper sub. These tools must be ordered separately. They are usually stored in the service kit.



# Bowen Lubricated Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Lubricated Fishing Bumper Subs Specifications

|                          |                 |                       |                    |                    |                  |                    |                  |               |                  |
|--------------------------|-----------------|-----------------------|--------------------|--------------------|------------------|--------------------|------------------|---------------|------------------|
| <b>Size Connections</b>  |                 | 1 13/16 in. Wilson FJ | 1 1/4 in. API Reg. | 2 3/8 in. API Reg. | 2 3/8 in. API IF | 2 7/8 in. API Reg. | 2 3/8 in. API IF | 2 3/8 in. EUE | 2 7/8 in. API IF |
| <b>Outside Diameter</b>  |                 | 1 13/16 in.           | 2 1/4 in.          | 3 1/8 in.          | 3 3/8 in.        | 3 3/4 in.          | 3 3/4 in.        | 3 3/4 in.     | 4 1/4 in.        |
| <b>Inside Diameter</b>   |                 | 3/8 in.               | 3/8 in.            | 1 in.              | 7/8 in.          | 1 1/4 in.          | 1 1/2 in.        | 1 7/8 in.     | 1 15/16 in.      |
| <b>Stroke</b>            |                 | 10 in.                | 10 in.             | 15 1/2 in.         | 15 1/2 in.       | 15 1/2 in.         | 15 1/2 in.       | 15 1/2 in.    | 15 1/2 in.       |
| <b>Full Bore</b>         |                 | No                    | No                 | Yes                | No               | Yes                | Yes              | Yes           | Yes              |
| <b>Complete Assembly</b> | <b>Part No.</b> | 54781                 | 41490              | 43501              | 39712            | 43509              | 43470            | 43521         | 43531            |
|                          | <b>Weight</b>   | 50 lbs                | 70 lbs             | 209 lbs            | 180 lbs          | 254 lbs            | 250 lbs          | 294 lbs       | 294 lbs          |

### Replacement Parts

|                               |                  |        |        |        |          |            |        |          |        |
|-------------------------------|------------------|--------|--------|--------|----------|------------|--------|----------|--------|
| <b>Top Sub</b>                | <b>Part No.</b>  | 36811  | —      | —      | —        | —          | —      | —        | —      |
|                               | <b>Weight</b>    | 3 lbs  | —      | —      | —        | —          | —      | —        | —      |
| <b>Mandrel Body</b>           | <b>Part No.</b>  | 36742  | 41491  | 43502  | 39060    | 43510      | 43471  | 43522    | 43532  |
|                               | <b>Weight</b>    | 9 lbs  | 12 lbs | 33 lbs | 41 lbs   | 38 lbs     | 51 lbs | 56 lbs   | 45 lbs |
| <b>Middle Body</b>            | <b>Part No.</b>  | 36744  | 41492  | 43503  | 39061    | 43511      | 43472  | 43523    | 43533  |
|                               | <b>Weight</b>    | 10 lbs | 13 lbs | 30 lbs | 31 lbs   | 35 lbs     | 37 lbs | 42 lbs   | 40 lbs |
| <b>Washpipe Body</b>          | <b>Part No.</b>  | 54783  | 41493  | 43504  | 39713    | 43512      | 43473  | 43524    | 43534  |
|                               | <b>Weight</b>    | 18 lbs | 23 lbs | 50 lbs | 43 lbs   | 55 lbs     | 58 lbs | 63 lbs   | 67 lbs |
| <b>Mandrel</b>                | <b>Part No.</b>  | 53721  | 41520  | 43506  | 39064    | 43514      | 43475  | 43526    | 43536  |
|                               | <b>Weight</b>    | 10 lbs | 14 lbs | 63 lbs | 30 lbs   | 77 1/2 lbs | 69 lbs | 78 lbs   | 88 lbs |
| <b>Washpipe</b>               | <b>Part No.</b>  | *      | 41495  | 43505  | 39714    | 43513      | 43474  | 43525    | 43535  |
|                               | <b>Weight</b>    | —      | 8 lbs  | 25 lbs | 22 lbs   | 30 lbs     | 30 lbs | 48 lbs   | 48 lbs |
| <b>Non-Extrusion Ring</b>     | <b>Part No.</b>  | 365-19 | 365-24 | 365-32 | 365-33   | 365-35     | 365-36 | 365-37.5 | 365-40 |
|                               | <b>Weight</b>    | 1/8 lb | 1/8 lb | 1/8 lb | 1/8 lb   | 1/8 lb     | 1/8 lb | 1/8 lb   | 1/8 lb |
|                               | <b>No. Req'd</b> | 4      | 8      | 8      | 8        | 8          | 8      | 8        | 8      |
| <b>Seal Protector Ring</b>    | <b>Part No.</b>  | 375-19 | 375-24 | 375-32 | 375-33   | 375-35     | 375-36 | 375-37.5 | 375-40 |
|                               | <b>Weight</b>    | 1/8 lb | 1/8 lb | 1/8 lb | 1/8 lb   | 1/8 lb     | 1/8 lb | 1/8 lb   | 1/8 lb |
|                               | <b>No. Req'd</b> | 4      | 8      | 8      | 8        | 8          | 8      | 8        | 8      |
| <b>Mandrel Body Fill Plug</b> | <b>Part No.</b>  | 617    | 329    | 329    | 329      | 329        | 329    | 329      | 329    |
|                               | <b>Weight</b>    | 1/8    | 1/8    | 1/8    | 1/8      | 1/8        | 1/8    | 1/8      | 1/8    |
| <b>Middle Body Fill Plug</b>  | <b>Part No.</b>  | 617    | 617    | 10641  | 689      | 617        | 617    | 617      | 617    |
|                               | <b>Weight</b>    | 1/8 lb | 1/8 lb | 1/8 lb | 1/8 lb   | 1/8 lb     | 1/8 lb | 1/8 lb   | 1/8 lb |
| <b>Knocker</b>                | <b>Part No.</b>  | —      | 41845  | 43508  | 39066    | 43516      | 39845  | 43528    | 43538  |
|                               | <b>Weight</b>    | —      | 1/2 lb | 5 lb   | 3 1/2 lb | 5 lb       | 5 lb   | 6 lb     | 6 lb   |
| <b>Seal Packing Set</b>       | <b>Part No.</b>  | 54784  | 41846  | 43519  | 39715    | 43517      | 39720  | 43529    | 43539  |
|                               | <b>Weight</b>    | 1/2 lb | 1/2 lb | 1 lb   | 1 lb     | 1 lb       | 1 lb   | 1 lb     | 1 lb   |

### Required Accessories – Extra

|                     |                 |          |  |          |          |          |          |            |          |
|---------------------|-----------------|----------|--|----------|----------|----------|----------|------------|----------|
| <b>Service Kit</b>  | <b>Part No.</b> | 21279    | Same Service Kit (55403) is required to service all sizes of tools.  |          |          |          |          |            |          |
|                     | <b>Weight</b>   | 75       | It does <b>NOT</b> include any seal setting tool, which must be ordered separately as required for each tool, at extra cost. |          |          |          |          |            |          |
| <b>Setting Tool</b> | <b>Part No.</b> | 22709-19 | 22709-24   | 22709-32 | 22709-33 | 22709-35 | 22709-36 | 22709-37.5 | 22709-40 |

\* Mandrel and Washpipe are a one-piece Assembly.

# Bowen Lubricated Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Lubricated Fishing Bumper Subs Specifications (Continued)

|                          |                 |        |        |         |         |         |         |         |         |
|--------------------------|-----------------|--------|--------|---------|---------|---------|---------|---------|---------|
| <b>Complete Assembly</b> | <b>Part No.</b> | 54781  | 41490* | 43501   | 39712   | 43509   | 43470   | 43521   | 43531   |
|                          | <b>Weight</b>   | 50 lbs | 70 lbs | 209 lbs | 180 lbs | 254 lbs | 250 lbs | 294 lbs | 294 lbs |

### Replacement Parts (Continued)

|   |                 |                 |        |        |        |        |        |        |        |
|---|-----------------|-----------------|--------|--------|--------|--------|--------|--------|--------|
| <b>Seal Packing Set</b><br><b>Consists of:</b>        | <b>Part No.</b> | 54784           | 41846  | 43519  | 39715  | 43517  | 39720  | 43529  | 43539  |
|   | <b>Weight</b>   | ½ lb            | ½ lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   | 1 lb   |
| <b>Main Mandrel and Washpipe Body Seal (4 Req'd.)</b> | <b>Part No.</b> | 568211 2 Req'd. | 568219 | 568329 | 568330 | 568332 | 568333 | 568334 | 568337 |
| <b>Middle Body Seal (Large) (2 Req'd.)</b>            | <b>Part No.</b> | 568029          | 568224 | 568231 | 568232 | 568235 | 568235 | 568236 | 568239 |
| <b>Middle Body Seal (Small) (2 Req'd.)</b>            | <b>Part No.</b> | 568027          | 568222 | 568229 | 568230 | 568233 | 568233 | 568233 | 568237 |
| <b>Washpipe Seal</b>                                  | <b>Part No.</b> | —               | 568210 | 568220 | 568218 | 568222 | 568223 | 568229 | 568227 |
| <b>Middle Body Fill Plug Seal</b>                     | <b>Part No.</b> | 568005          | 568005 | —      | 568005 | 568005 | 568005 | 568005 | 568005 |
| <b>Mandrel Body Fill Plug Seal</b>                    | <b>Part No.</b> | 568005          | 568006 | 568006 | 568006 | 568006 | 568006 | 568006 | 568006 |

\* 41490 Assembly does not use a Mandrel Ring or Mandrel Assembly



### How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Size and type of connection, if other than standard
- (3) Outside diameter, if other than standard
- (4) Any spares, optional or extra parts, by name and number



### Recommended Spare Parts:

- (1) 1 service kit
- (2) 6 seal packing sets
- (3) 4 middle body fill plugs
- (4) 4 mandrel body fill plugs
- (5) 16 main mandrel non-extrusion rings
- (6) 16 main mandrel seal protector rings
- (7) 1 seal ring setting tool

# Bowen Lubricated Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Lubricated Fishing Bumper Subs Specifications (Continued)

|                          |                 |               |                         |                   |                   |                         |                    |                    |
|--------------------------|-----------------|---------------|-------------------------|-------------------|-------------------|-------------------------|--------------------|--------------------|
| <b>Size Connections</b>  |                 | 2 7/8 in. EUE | 3 1/2 in. API, FH or IF | 3 1/2 in. API, IF | 4 1/2 in. API, FH | 4 1/2 in. API, FH or IF | 5 1/2 in. API Reg. | 6 3/8 in. API Reg. |
| <b>Outside Diameter</b>  |                 | 4 1/2 in.     | 4 3/4 in.               | 4 3/4 in.         | 6 in.             | 6 1/4 in.               | 6 3/4 in.          | 7 3/4 in.          |
| <b>Inside Diameter</b>   |                 | 2 3/8 in.     | 2 in.                   | 2 1/4 in.         | 2 13/16 in.       | 3 1/8 in.               | 2 3/4 in.          | 3 1/2 in.          |
| <b>Stroke</b>            |                 | 15 1/2 in.    | 15 1/2 in.              | 11 in.            | 18 in.            | 18 in.                  | 18 in.             | 18 in.             |
| <b>Full Bore</b>         |                 | Yes           | No                      | —                 | Yes               | No                      | No                 | No                 |
| <b>Complete Assembly</b> | <b>Part No.</b> | 42700         | 39727                   | 152719            | 39732             | 39737                   | 39778              | 39752              |
|                          | <b>Weight</b>   | 304 lbs       | 333 lbs                 | 300 lbs           | 560 lbs           | 565 lbs                 | 700 lbs            | 816 lbs            |

### Replacement Parts (Continued)

|                                       |                 |         |           |           |           |           |         |         |
|---------------------------------------|-----------------|---------|-----------|-----------|-----------|-----------|---------|---------|
| <b>Top Sub</b>                        | <b>Part No.</b> | —       | —         | —         | —         | —         | —       | —       |
|                                       | <b>Weight</b>   | —       | —         | —         | —         | —         | —       | —       |
| <b>Mandrel Body</b>                   | <b>Part No.</b> | 42701   | 39861     | 39861     | 30541     | 34966     | 33244   | 34992   |
|                                       | <b>Weight</b>   | 40 lbs  | 62 lbs    | 62 lbs    | 100 lbs   | 77 lbs    | 99 lbs  | 140 lbs |
| <b>Middle Body</b>                    | <b>Part No.</b> | 42702   | 33156     | 33156     | 30542     | 34967     | 33245   | 34993   |
|                                       | <b>Weight</b>   | 44 lbs  | 50 lbs    | 50 lbs    | 84 lbs    | 88 lbs    | 103 lbs | 113 lbs |
| <b>Washpipe Body</b>                  | <b>Part No.</b> | 42703   | 39728     | 152720    | 39733     | 39738     | 39779   | 39753   |
|                                       | <b>Weight</b>   | 70 lbs  | 74 lbs    | 75 lbs    | 117 lbs   | 126 lbs   | 148 lbs | 161 lbs |
| <b>Mandrel</b>                        | <b>Part No.</b> | 42705   | 39860     | 152722    | 30545     | 34970     | 33248   | 34996   |
|                                       | <b>Weight</b>   | 92 lbs  | 105 lbs   | 95 lbs    | 181 lbs   | 191 lbs   | 250 lbs | 292 lbs |
| <b>Washpipe</b>                       | <b>Part No.</b> | 42704   | 39729     | 152721    | 39734     | 39739     | 39780   | 39754   |
|                                       | <b>Weight</b>   | 50 lbs  | 40 lbs    | 40 lbs    | 69 lbs    | 75 lbs    | 90 lbs  | 100 lbs |
| <b>Non-Extrusion Ring</b>             | <b>Part No.</b> | 365-43  | 365-42    | 365-42    | 365-50.25 | 365-53    | 365-54  | 365-61  |
|                                       | <b>Weight</b>   | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | 1/8 lb  |
| <b>Seal Protector Ring (8 Req'd.)</b> | <b>Part No.</b> | 375-43  | 375-42    | 375-42    | 375-50.25 | 375-53    | 375-54  | 375-61  |
|                                       | <b>Weight</b>   | 1/16 lb | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb | 1/16 lb |
| <b>Mandrel Body Fill Plug</b>         | <b>Part No.</b> | 329     | 329       | 329       | 329       | 329       | 329     | 329     |
|                                       | <b>Weight</b>   | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | 1/8 lb  |
| <b>Middle Body Fill Plug</b>          | <b>Part No.</b> | 617     | 617       | 617       | 617       | 617       | 617     | 617     |
|                                       | <b>Weight</b>   | 1/8 lb  | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb  | 1/8 lb  |
| <b>Knocker</b>                        | <b>Part No.</b> | 42708   | 39863     | 39863     | 30546     | 34972     | 33250   | 34998   |
|                                       | <b>Weight</b>   | 6 lbs   | 6 1/2 lbs | 6 1/2 lbs | 7 lbs     | 7 lbs     | 8 lbs   | 8 lbs   |
| <b>Seal Packing Set</b>               | <b>Part No.</b> | 42709   | 39730     | 153074    | 39735     | 39740     | 39781   | 39755   |
|                                       | <b>Weight</b>   | 1 lb    | 1 lb      | 1 lb      | 1 lb      | 1 1/2 lbs | 2 lbs   | 2 lbs   |

### Required Accessories - Extra (Continued)

|                     |                 |          |  |          |       |          |          |          |
|---------------------|-----------------|----------|--|----------|-------|----------|----------|----------|
| <b>Service Kit</b>  | <b>Part No.</b> | 55403    | Same Service Kit (55403) is required to service all sizes of tools.  |          |       |          |          |          |
|                     | <b>Weight</b>   | 75       | It does <b>NOT</b> include any seal setting tool, which must be ordered separately as required for each tool, at extra cost. |          |       |          |          |          |
| <b>Setting Tool</b> | <b>Part No.</b> | 22709-43 | 22709-42   | 22709-42 | 10572 | 22709-53 | 22709-54 | 22709-61 |

# Bowen Lubricated Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Lubricated Fishing Bumper Subs Specifications (Continued)

|                          |                 |         |         |         |         |         |         |         |
|--------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|
| <b>Complete Assembly</b> | <b>Part No.</b> | 42700   | 39727   | 152719  | 39732   | 39737   | 39778   | 39752   |
|                          | <b>Weight</b>   | 304 lbs | 333 lbs | 300 lbs | 560 lbs | 565 lbs | 700 lbs | 816 lbs |

### Replacement Parts (Continued)

|   |                 |        |        |        |        |         |        |        |
|---|-----------------|--------|--------|--------|--------|---------|--------|--------|
| <b>Seal Packing Set</b>                               | <b>Part No.</b> | 42709  | 39730  | 153074 | 39735  | 39740   | 39781  | 39755  |
| <b>Consists of:</b>                                   | <b>Weight</b>   | 1 lbs  | 1 lbs  | 1 lbs  | 1 lbs  | 1 ½ lbs | 2 lbs  | 2 lbs  |
| <b>Main Mandrel and Washpipe Body Seal (4 Req'd.)</b> | <b>Part No.</b> | 568340 | 568339 | 568339 | 568347 | 568426  | 568427 | 568434 |
| <b>Middle Body Seal (Large) (2 Req'd.)</b>            | <b>Part No.</b> | 568242 | 568242 | 568242 | 568250 | 568253  | 568256 | 568261 |
| <b>Middle Body Seal (Small) (2 Req'd.)</b>            | <b>Part No.</b> | 568239 | 568239 | 568239 | 568247 | 568251  | 568254 | 568260 |
| <b>Washpipe Seal</b>                                  | <b>Part No.</b> | 568231 | 568229 | 568231 | 568236 | 568239  | 568238 | 568246 |
| <b>Middle Body Fill Plug Seal</b>                     | <b>Part No.</b> | 568005 | 568005 | 568005 | 568005 | 568005  | 568005 | 568005 |
| <b>Mandrel Body Fill Plug Seal</b>                    | <b>Part No.</b> | 568006 | 568006 | 568006 | 568006 | 568006  | 568006 | 568006 |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and type of connection, if other than standard
  - (3) Any spares, optional or extra parts, by name and number



### Recommended Spare Parts:

- (1) 1 service kit
- (2) 6 seal packing sets
- (3) 4 middle body fill plugs
- (4) 4 mandrel body fill plugs
- (5) 16 main mandrel non-extrusion rings
- (6) 16 main mandrel seal protector rings
- (7) 1 seal ring setting tool



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# BALANCED BUMPER SUBS

Instruction Manual 4455



PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

Balanced Bumper Subs





# Balanced Bumper Subs

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*The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.*

*Sixth Printing, April 2004*



**NATIONAL OILWELL**



### **General Description**

The **Bowen Balanced Bumper Sub** is engineered to withstand sustained bumping action in fishing, light milling, and workover operations. The tool is designed to permit a 10" to 18" vertical stroke, either upward or downward.

This stroke is always available to the operator, whether rotating or not. Strokes greater than 18" can be furnished on special request. The Bowen Balanced Bumper Sub will transmit full torque at all times during rotation and bumping operations.

Adequate striking surfaces are provided at the limits of the free movement to produce the great impact so necessary to get high quality, positive bumping action in either direction.

Specially designed rugged splines provide a source of continuous torque transmission. These splines are always in engagement, whether bumping or not.

The bores permit full circulation at all times.

The balance feature which is composed of the Floater in a suitable Floater Body surrounding the Washpipe, serves a double purpose. It balances the external pressure with the circulating fluid pressure; and it serves to allow for volumetric expansion of the tool working fluid, due to temperature. This results in freer operation under extreme conditions of pressure differential or of temperature, or both. It also results in longer tool life.

Under such adverse conditions the Bowen Balanced Bumper Sub will perform where other tools fail.

### **Use**

The Bowen Balanced Bumper Sub is especially well-suited for use in deep, severe fishing operations, or for light milling or coring operations. It permits an immediate bumping action to prevent cuttings and cavings from settling and wedging the drilling or fishing string.

The Bowen Balanced Bumper Sub will free drill pipe and reamers, drill collars, bits and other tools which have become stuck, lodged or keyseated. The tool can readily be used to bump repeatedly in either direction or to bump alternately up and down.

The Bowen Balanced Bumper Sub is an ideal tool to be used in coring operations. The bumping action is an effective way to break cores sharply and cleanly to permit easy removal when desired.

### **In Fishing Operations**

Whenever a releasing type fishing tool is to be used, a properly made-up Bowen Balanced Bumper Sub should be included in the fishing string. It is usually inserted in the string immediately above the fishing tool safety joint or unlatching joint. It insures that the operator has the means available to release the fishing tool if and when it becomes impossible to pull the fish.

The Bowen Balanced Bumper Sub will deliver the sharp downward blow and transmit the torque required to break the fishing tool engagement to release it from the fish. The freestroke also assists in controlling the weight on the fishing tool while releasing.

Likewise, the Bowen Balanced Bumper Sub can be used to great advantage to release a fishing tool from a recovered fish at the top of the hole, once recovered. It simplifies the operation and eliminates the necessity to resort to awkward measures such as dropping the elevators or bumping down with the hook.



**Bowen Balanced Bumper Sub**



### Construction

Refer to the assembly drawing on page 5.

The Bowen Balanced Bumper Sub is manufactured from carefully selected high grader alloy steel. Each part is processed and heat treated in accordance with best choice of degree and type of heat treatment, to suit its use in the tool. The freestroke also assists in controlling the weight on the fishing tool while releasing.

Careful engineering has eliminated to a high degree points of usual high stress concentration. This assures long dependable service from each tool.

A shoulder type, splined Mandrel fits into a Mandrel Body with mating splines. The Mandrel is free to move up and down, while simultaneously transmitting torque from the Mandrel to the Mandrel Body. A suitable Knocker and Washpipe are made up on the lower end of the Mandrel.

The Knocker strikes a heavy impact blow against the lower end of the Mandrel Body when in use. This Knocker is specially designed with three main features: its material and heat treatment are designed to be in optimum balance for use in impact loading; it is designed to reduce wear to an absolute minimum; and it has been closely fitted to allow free sliding contact with the Middle Body, in which it slides, while at the same time lateral movement is restricted to an absolute minimum. This prevents the high frequency lateral vibration which is present in most other tools, and which is very detrimental to the life of the tool. This is wear action, commonly called "chatter."

The Washpipe is designed to include the same stabilizing features at its upper end as those described previously. The lower end, which moves up and down as the tool is stroked, has been specially

hardfaced and ground to a high polish. This reduces frictional wear to a minimum where the Washpipe is sealed as it passes through the Floater, and also the close fitting stabilizer grooves which are located in the Floater Body. The seal points of the Mandrel at the top of the tool and the Washpipe at the bottom of the tool are equipped with the well-known Bowen patented Seal Ring Assembly, consisting of an O-Ring Seal, Non-Extrusion Rings, and Seal Protector Rings. This Seal Ring Assembly reduces the normal diametral clearance at the seal point to near zero as hydraulic pressure is applied from either direction. This prohibits the extrusion of the Seal Ring as would otherwise occur. It also reduces O-Ring "roll" to a minimum. Two of these Seal Assemblies are used in tandem in the Bowen Balanced Bumper Sub. This increases the life of both by a considerable margin.

The Middle Body forms a housing for the lubricating oil in which the working parts of the Balanced Bumper Sub function.

It is made up on the Mandrel Body at its upper end, and to the Floater Body at its lower end.

The Middle Body has a suitable Fill Plug near the lower end. It has a honed finish inside diameter which is closely fitted to the outside diameter of the Knocker and Washpipe upper end.

**NOTE: The Fill Plug in the lower end of the Middle Body is not ordinarily used; it is there because the Middle Body is interchangeable with other tools, which do require use of the Fill Plug.**

The Mandrel Body slips over the Mandrel with the flat end up. It is made up with the Middle Body at its lower end. The Mandrel Body incorporates splines, which mate with corresponding splines on the Mandrel.

The Mandrel Body has a suitable Fill Plug, which, together with the similar Fill Plug in Floater Body, allow filling the Balanced Bumper Sub with lubricating oil. This filling process is described in detail on page 8.

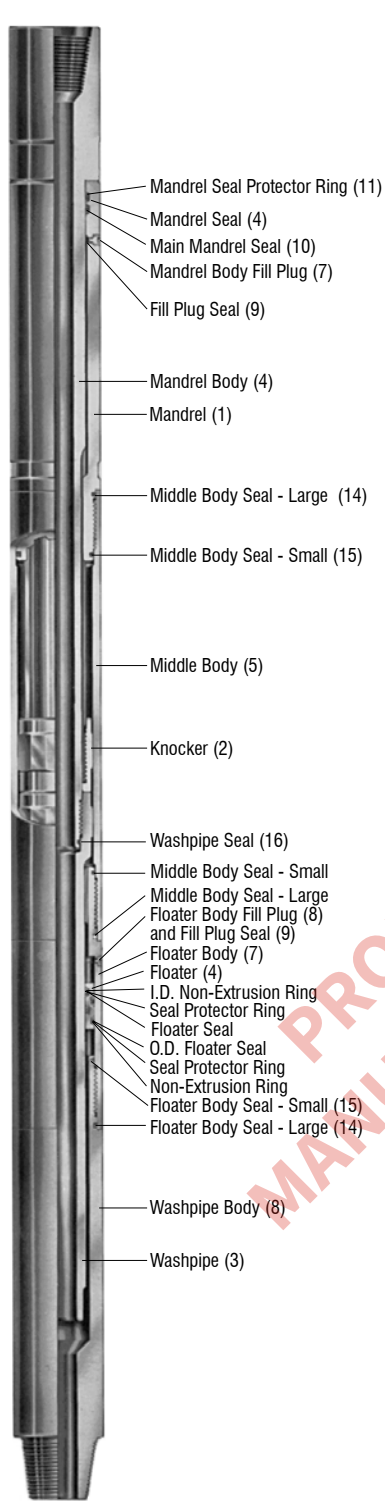
The Mandrel Body also has a series of straight, specially designed splines on its inside diameter and near the lower end. These splines are engaged in sliding contact with the Mandrel to transmit the torque imparted by the running string through the Middle Body, Floater Body, Washpipe Body, and the attached tool, that is being operated.

The Floater Body is located between the Middle Body at its upper end, and the Washpipe Body at its lower end. It houses the Floater which is located in such a way by the setting tool at assembly, as to allow it to move up or down as required, during operation. It has an appropriate Fill Plug, to allow filling the tool with operating fluid. A series of splines are located in the upper inside diameter. These splines serve as a fluid passage and as a lateral stabilizer for the Washpipe. The inside diameter has a honed finish, in which the Floater works.

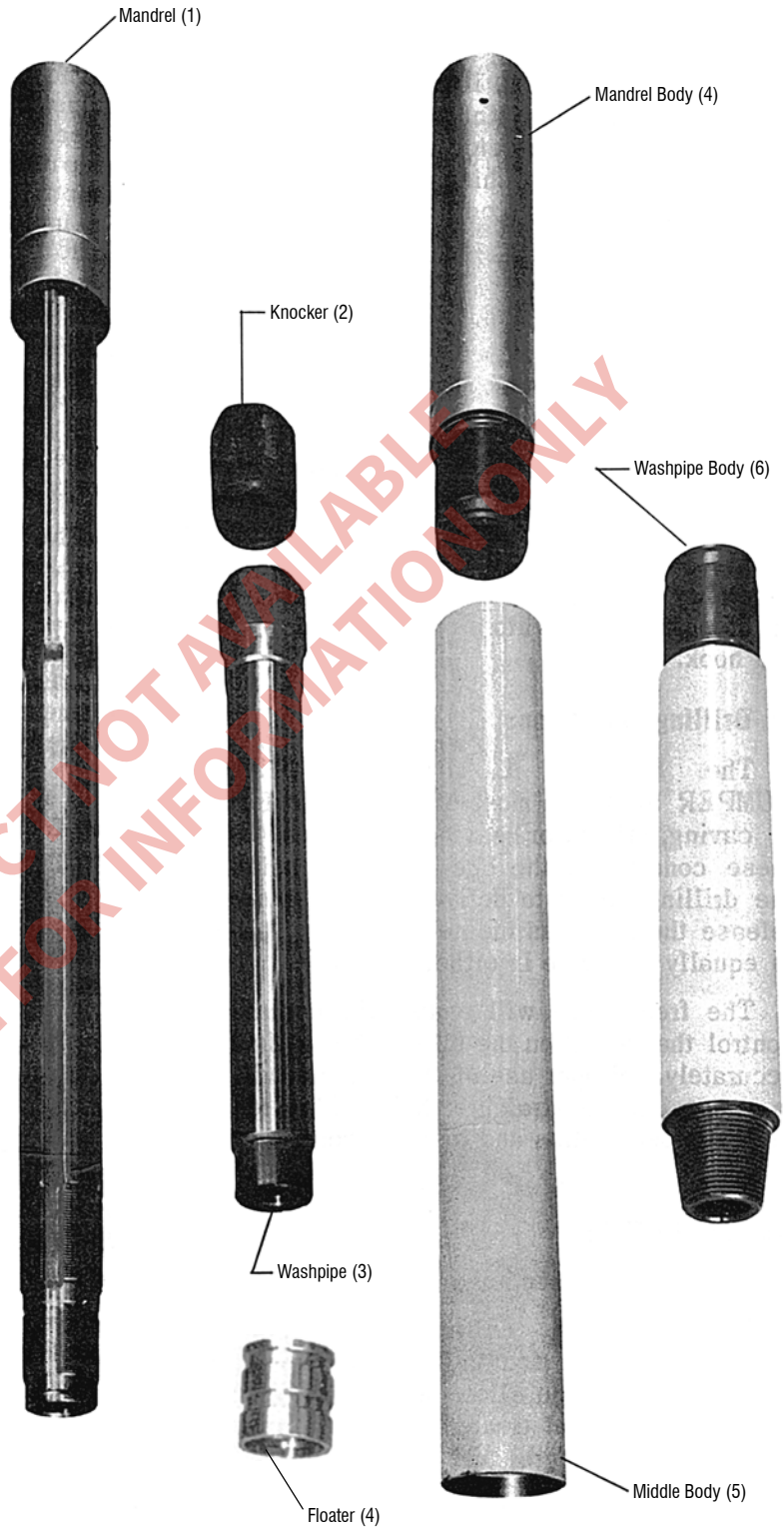
The Floater is a cylinder in form, which has seals at its outside and inside diameters. The seals are used in conjunction with the exclusive Bowen Non-Extrusion and Seal Protector Rings.

During operations, the Floater is free to move upward if the differential pressure between the circulating fluid and the internal pressure in the Middle Body is put in imbalance.

It is free to move downward if the temperature is great enough to cause an increase in the volume of the Middle Body operating fluid, thus accommodating the volumetric change.



**Bowen  
Balanced Bumper Sub  
Assembly**



**Exploded View  
Main Parts of Balanced Bumper Sub**



The Washpipe Body is the lowermost part of the tool. It transmits torque from the Floater Body to the running string and tools located below the Balanced Bumper Sub.

The Bowen Balanced Bumper Sub is furnished standard with a tool joint box top connection and a tool joint pin bottom connection. These may be reversed or special connections furnished on request.

The Bowen Balanced Bumper Sub is designed to have a 10" to 18" stroke standard, depending on size. Special longer strokes can be furnished up to 60" or greater, depending on size. Contact National Oilwell, Downhole Tools Division engineering for information regarding a specific requirement.

**Operation**  
**When Used in Light Drilling, Milling, or Coring Operations**

The Bowen Balanced Bumper Sub is usually installed in the drilling string immediately above the drill collars. The Bumper Sub serves several purposes, as mentioned in "USE." It is an excellent safety device, particularly when working in sticky formations, deep holes, when drilling out cement in heavy mud, or in coring jobs.

**When Used in Fishing Operations**

The Bowen Balanced Bumper Sub is usually installed in the fishing string immediately above the fishing tool, safety joint or unlatching joint.

The Bowen Balanced Bumper Sub's primary purpose is to enable the operator to release the fishing tool in the event it becomes impossible to pull the fish. It will deliver the necessary impact and impart the required torque that is required to release the tool from the fish. It will also assist in controlling the weight on the fishing tool while releasing.

There are a number of secondary uses for the Bumper Sub.

**To Release the Recovered Fish at the Top of the Hole**

This is accomplished by gripping the fish immediately below the fishing tool and, after opening the Bowen Balanced Bumper Sub, dropping a stand of drill pipe heavily down against the Balanced Bumper Sub. This will cause a sharp enough downward blow against the fishing tool to break the "freeze," after which the fish may readily be removed. In the event that insufficient impact may be produced by the stand of drill pipe, one or more drill collars may be inserted in place of the drill pipe, and the process repeated with more effect.

**To Bump Down in the Hole**

Elevate the fishing string sufficiently to open the Balanced Bumper Sub the full length of its stroke and take a strain on the pipe. This will require 10" to 18" to open the tool. Add enough pull to put a permissible amount of stretch in the drill or fishing string. The permissible stretch will depend on the size of the pipe and its length above the Bumper Sub.

Drop the string sharply for a distance equal to the stretch in the string plus 9-1/2" to 12", depending on the size of the tool; and stop it abruptly with the brake. If sufficient stretch has been taken in the string, this will cause the lower end of the fishing string, i.e., immediately above the tool, to spring downward, closing the Balanced Bumper Sub. Due to the elasticity of the string, coupled with the natural rebound from the striking surfaces in the tool, a rapid series of resonant blows will be delivered to the tool below the Balanced Bumper Sub.

**To Bump a Solid Downward Blow in the Hole**

Elevate the string to open the Balanced Bumper Sub completely, and take a moderate strain or stretch in the string, plus a permissible stretch in the string. This will require 10" to 18" at the tool plus stretch in the string.

Drop the running string sharply this full combined length without any braking action. This will cause the Balanced Bumper Sub to close quickly. This shoulder of the Mandrel will strike the Mandrel Body shoulder, transmitting a single, solid downward blow to the tool below the Bumper Sub.

**To Jar Up in the Hole**

Elevate the running string sufficiently to stretch it moderately. Then drop the string a distance equal to the stretch in the string and stop it sharply with the brake. This will cause the lower end of the string to spring downward, causing the Balanced Bumper Sub to partly close, after which the string will rebound. This will cause the Bumper Sub to re-open quickly and the Knocker will strike the lower end of the Mandrel Body a solid upward blow.

**Complete Disassembly**

1. Place the Bumper Sub in a chain pipe vise, clamping the tool at the Mandrel Body (5). This has two advantages: the main Mandrel Body is thick walled and will withstand greater forces exerted upon it, and the entire disassembly can be accomplished with this single clamping.
2. Remove the Floater Body Fill Plug (16) so that oil may start draining from the tool.

**Note: Place a suitable open mouthed receptacle below the tool so that it will catch the oil as it drains.**



3. With chain tongs break the Washpipe Body (8) from the Floater Body (7). Uncouple and lay aside.

Back up the Floater Body with a second wrench, when removing the Washpipe Body.

4. In like manner, break the Floater Body (7) out, and lay it aside.

5. With chain tongs, break the Middle Body (6) from the Mandrel Body (5). Uncouple, slide over the Washpipe (3) and lay it aside.

**CAUTION: Do not scratch or dent the Washpipe seal surface.**

6. Break Washpipe from Mandrel (1) and lay aside. Remove Knecker (2) from Mandrel. Do not damage finished surfaces.

7. Slide the Mandrel (1) out through the top of the Mandrel Body (5). Due to the tight grip of the Seal Assembly, it is sometimes necessary to strike the Mandrel to start it out. If so, the Mandrel end should be protected with a block of hardwood or lead hammer head. Place the block against the end of the Mandrel and strike the block forceful blows with a sledge hammer until the Mandrel begins to slide.

8. When the Mandrel is free, attach a soft line or wire rope sling just below the shoulder, and support the weight, as the Mandrel is removed.

9. Remove the Mandrel and lay it aside.

10. Remove the Mandrel Body (5) from the vise, and lay it aside.

11. Examine the Mandrel Seal Assembly, consisting of the Seal (10), Seal Protector Ring (11) and Seal Non-Extrusion Ring (12). There are two of these Seal assemblies in tandem: one pair in the upper end of the Mandrel Body (5) and a pair in the Floater (4). Check this Seal assembly for wear or damage. Remove the O-Ring Seals (10), Seal Protector Rings (11) and Non-Extrusion Rings (12) that show signs of wear or have become mis-shapen.

To remove these rings, proceed as follows:

Using either tool No. 626 or No. 625, carefully insert the tip of the blade between the O-Ring and the Seal Protector Ring. Then lift out the O-Ring, taking care not to damage or mar the Seal Protector Rings or Non-Extrusion Rings. Do not run the tool around the groove under the Rings.



**Figure 1**  
**O-Ring Removal with Tool No.625**

Insert lip of tool under O-Ring and force O-Ring out of the groove. Be careful not to damage or distort Seal Protector Rings or Non-Extrusion Rings. Many operators prefer to use O-Ring Tool No. 625 for O-Ring removal due to its configuration.

Avoid damage by scratching the Ring grooves. (Refer to illustration, Figure 1.)

12. Clamp the Floater Body in the vise and remove the Floater. This may be done by utilizing a piece of rod with its end bent to form a hook. The hook may be passed through the Floater I.D. and hooked over the end of the Floater to pull it out of the Floater Body. Remove Fill Plug (16) from Floater Body (7).

13. Remove the O-Ring Seals, Non-Extrusion Rings and Seal Protector Rings from the Floater I.D. and O.D.

14. With the O-Ring removed from the above named assemblies, examine visually for any distortion or damage. With the forefinger carefully feel the Seal Protector and Non-Extrusion Rings for damage or burrs.

15. Remove all damaged rings.

16. Carefully wash and clean all disassembled parts in solvent. Wipe dry with a clean cloth, then thoroughly oil with a good grade of light clean oil.

17. Check all parts for defects. Examine the polished surfaces for pits and/or scratches. Any abrasions on these surfaces will damage the O-Ring Seals, resulting in a loss of fluid during the operation of the tool. Mandrel or Washpipe polished surfaces that have become pitted or abraded must be replaced with new parts before reassembly.

18. Check splines on the bottom of the Mandrel Body for upset. Upsets may be ground off with a grinder or with a small hand file.



**Reassembly**

**NOTE: The two Fill Plug Seals (9) should be replaced before the Fill Plugs (16) are reassembled. Seals and oil, once removed, should never be reused.**

1. All metal parts should be thoroughly steam cleaned, or washed inside and out with a good grade solvent; blown dry with shop air, or wiped clean with soft cloths. The parts should then be thoroughly oiled with a good grade, clean light oil.

**NOTE: Always lubricate the threads with an approved thread lubricant (KOPR-KOTE).**

2. Prior to the main reassembly, the Bowen Non-Extrusion Seal Assemblies should be installed in the Mandrel Body (5) and Floater (4). This may be done in the following manner. (Refer to figures 2 through 16 for step by step illustrations.)

Non-Extrusion Rings are installed first with their beveled surfaces conforming to the beveled surfaces of the groove. The Seal Protector Rings are installed next, deformed slightly to permit entry into the body, then straightened and flattened by use of Tool #625. After Non-Extrusion Rings and Seal Protector Rings are in place, the rubber O-Ring is inserted in the middle of the assembly between the two Seal Protector Rings. The complete assembly is then properly set with a Ring Setting Tool.

3. Repeat the sequence in (2a) above through (2l) for the upper Main Mandrel Seal.
4. With both seal Assemblies in place and pressed into the grooves as best as possible with your hands and the Installation Tool #626, use the Seal Assembly Setting Tool to set the Seal properly.

5. After the Non-Extrusion Seal Assemblies have been installed in both Mandrel Body and Floater as outlined in 2 through 4 above, use the Setting Tool, Figure 14, to conform the Seal Rings to proper bore size. Refer to Figures 14, 15, and 16.

6. Secure the Mandrel Body (5) horizontally in a vise. Coat the inside surface thoroughly with a good clean lightweight oil.

7. Install the Washpipe Seal (18) on the lower end of the Mandrel (1).

8. Insert the splined end of the Mandrel (1) through the top of the Mandrel Body (5); and, aligning the splines, shove it through the splines in the Mandrel Body (5). Push it gently through until the Mandrel bumps against the Mandrel Body. This will bring the polished portion of the Mandrel through the Seal Ring assemblies previously described. The Mandrel should slide freely back and forth. If any unusual resistance is encountered, remove the Mandrel and reset the Seal Assemblies or remove any foreign matter. Do not force the Mandrel, as damage may result to the Seal surface.

9. Install the Large Middle Body Seal (14) and Small Middle Body Seal (15).

10. Oil and install the Kocker (2) on the Lower Mandrel end. Buck up tight.

**CAUTION: The Kocker is designed with appropriate wrench flats, usually 6. Use them. DO NOT wrench on the hardfaced bands between the flats, or gouge them with the sides of the wrench jaws. These hardfaced bands are engineered to lend lateral stabilization to the Kocker when in service. They are manufactured to close ground tolerances, and should never be**

**upset or otherwise damaged. In the event that they are inadvertently upset in handling, remove the upset or burr with a hand file or fine emery cloth, clean and re-oil.**

11. Screw the Washpipe (3) onto the Mandrel. Buck up tight. Use the same care with the Washpipe as described for the Kocker. It also is designed with stabilizer bands.

12. Coat the Washpipe (3) thoroughly with light oil.

13. Slide the Middle Body (6) over the Washpipe and lower Mandrel end, and make it up with the Mandrel Body. Make it up tight.

14. Assemble the Large (14) and Small (15) Floater Body Seals on the Floater Body (7). Screw the Floater Body (7) into the lower end of the Middle Body (6), and buck it up tight.

15. With new seal assemblies in place, slip the Floater (4) into the Floater Body (7).

16. Using the Floater Setting Tool, position the Floater (4), by screwing the threaded portion of the Floater Setting Tool into the lower end of the Floater Body (7), allowing the Floater (4) to be shoved into position ahead of the setting tool.

Leave the Floater Setting Tool in position while filling the Balanced Bumper Sub. The Sub should be filled prior to completing the assembly.

**To Fill the Balanced Bumper Sub**

Prop the assembled tool up at approximately a 30° angle with the Mandrel end up. Have both the Floater Body Fill Plug (16) and Mandrel Body Fill Plug (9) at the top, if possible. Attach the Exhaust Hose Assembly (Part No. 671) to the Mandrel Body Fill Plug hole, and the Volume Pump Hose (Part No. 2581) to



the Floater Body Fill Plug hole. Place the free end of the Exhaust Hose into a receptacle. Fill the Volume Pump (Part No. 2580) with oil and connect it to the Volume Pump Hose.

Pump into the tool at a moderate speed to allow uniform smooth flow of oil.

As the tool fills, oil will begin to flow out the Exhaust Hose. Air bubbles will be observed in the exhaust oil. Continue to pump until all air bubbles cease to appear in the outflowing oil.

When air bubbles cease, immediately detach the Exhaust Hose, and insert the Fill Plug (16) in the Mandrel Body (5). Tighten this Fill Plug good and snug, but not excessively tight. It is good practice to pump up a moderate pressure into the tool several times, allowing it to bleed back into the Volume Pump. This is an effective way to bleed off any residual air.

**NOTE: To assure that the Floater has been caused to seat against the Floater Setting Tool, with the Mandrel Body Fill Plug (16) in place, pump up the pressure as much as can be conveniently produced by hand pumping. The remainder of the parts may now be assembled.**

18. Remove the Floater Setting Tool from the Floater Body.
19. Assemble the Large Floater Body Seal (14) and Small Floater Body Seal (15) on the upper end of the Washpipe Body (5).
20. Slip the Washpipe Body over the Washpipe (3). Use the same care as described in (9) for the Mandrel. Buck up tight in lower end of the Floater Body (7).

The tool will now be ready for service.

Before the tool is actually put in service, it should be worked back and forth several times to assure that it is functioning properly and that all seals are leak-proof.

If the tool is to be stored for future service, the tool joints should have a good grade thread dope applied and thread protectors installed. The outside of the tool should be cleaned and painted or a good heavy coat of grease applied prior to storage. If the climate is very damp or salty, the bore should be thoroughly greased.

**NOTE: Any good grade medium weight lubricating oil will serve the Balanced Bumper Sub. Best results are obtained from SAE 70 weight, non-foaming lubricating oil; and this is recommended.**

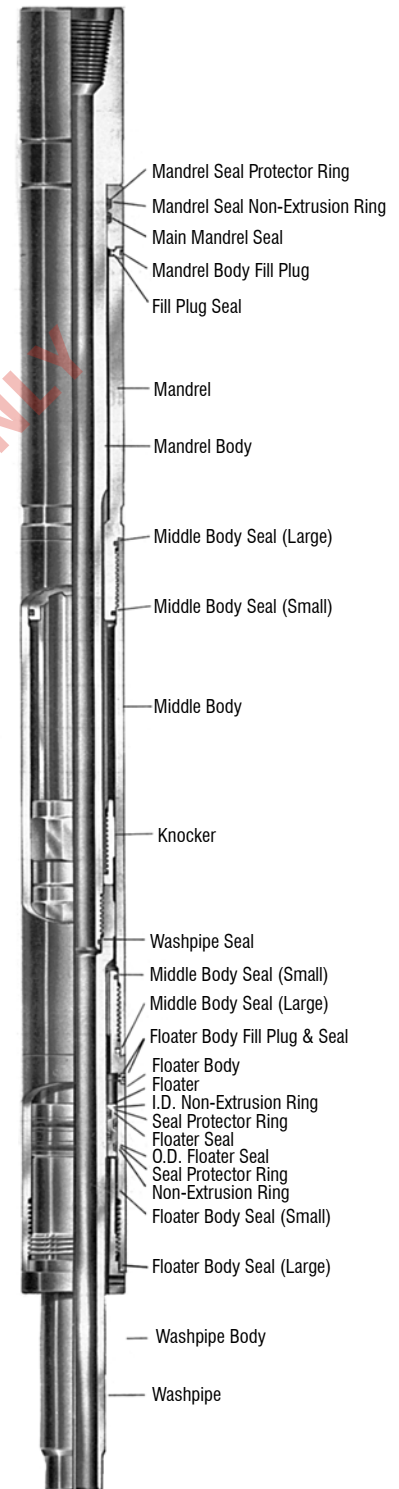
This recommendation may be modified to allow a lighter weight oil in small Subs used in relatively low temperature and heavier weight oil in very deep holes, high temperature conditions or very large Subs.

**NOTE: National Oilwell has available a special viscosity index oil which is particularly well suited to service in very high well temperatures. This oil is available at extra cost on request.**

The oil used to fill the Balanced Bumper Sub should be completely clean and free from foreign matter. **Never** reuse oil or seals when assembling a Bumper Sub.



**Floater Setting Tool for Bowen Balanced Bumper Sub**



**Bowen Balanced Bumper Sub During Assembly with Floater Setting Tool in Position**

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**Installation of Non-Extrusion Rings**

a. Carefully examine each Non-Extrusion Ring before installation and remove any burrs or rough edges with a small hand file.



Figure 2



Figure 3

b. Hold Non-Extrusion Ring between thumbs and forefingers.

c. Overlap ends until diameter is small enough to fit inside body.



Figure 4



Figure 5

d. Place edge of Ring opposite the split into the lower groove and spread from center toward ends. Be sure beveled side of Ring matches beveled groove side.

e. Using thumbs, press Ring into groove until ends match up and Ring is firmly seated in groove.



**Installation of Seal Protector Rings**



**Figure 6**

f. Figure 6 shows Ring before being bent. It will look like this after it is properly installed in the groove.



**Figure 7**

g. Bend the Ring until it is small enough to allow entry into bore.



**Figure 8**

h. Insert one edge in groove. Then insert the opposite edge and press down until entire Ring is in place.



**Figure 9**

i. Use Seal Protector Ring installation tool to straighten and flatten Ring by pressing against Ring as shown.



**Installation of O-Ring Packing**



Figure 10

j. Figure 10 shows O-Ring packing before installation.



Figure 11

k. Bend O-Ring as shown to insert in groove

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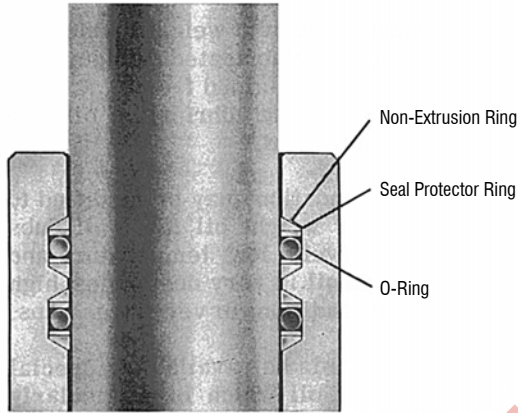


Figure 12

l. Insert O-Ring between Seal Protector Rings in each groove.



**Setting Seal Ring Assemblies**



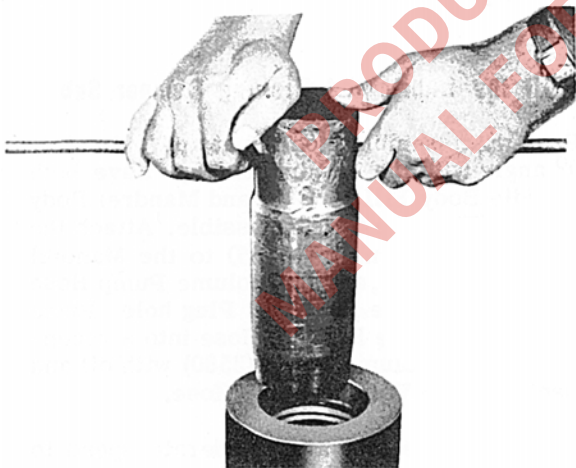
**Figure 13**

This illustration shows the location of parts of the patented Bowen Seal Ring Assembly.



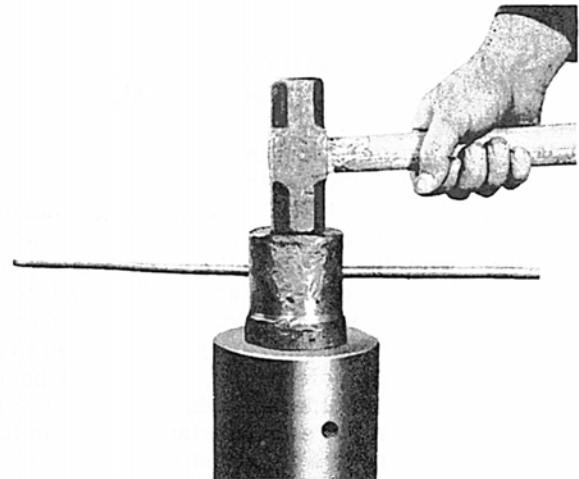
**Figure 14**

a. Use the Setting Tool from the Service Kit (see page 14) to seat the Seal Ring Assemblies after installation.



**Figure 15**

b. Insert the Setting Tool as shown, using any convenient rod or bar to hold tool.



**Figure 16**

c. Tap several times around periphery of tool as shown to set Rings. Continue until both Ring Assemblies are seated. Then remove tool and continue assembly.

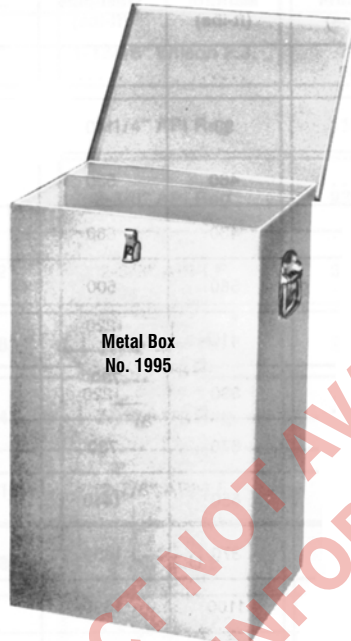


**Bowen Balanced Bumper Sub Service Kit**

A Bumper Sub Service Kit is necessary to properly service the Bumper Sub. These Kits are identical for every size of Bumper Sub, so one kit may be used for any number of subs. The kit does not include any Seal Setting Tool, two of which are required for each size Bumper Sub. These tools must be ordered separately. They are usually stored in the Service Kit.



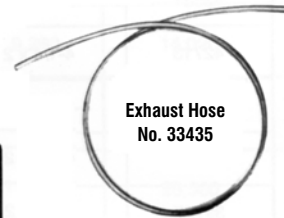
Volume Pump  
No. 2580



Metal Box  
No. 1995



Volume Pump Hose  
No. 2581



Exhaust Hose  
No. 33435



Mandrel Body  
Setting Tool  
(extra)

**NOT INCLUDED IN SERVICE KIT**



Seal Protector Ring  
Installation Tool  
No. 625



O-Ring  
Installation Tool  
No. 626



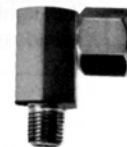
Mandrel Body  
Fill Plug Wrench  
No. 359



Middle Body  
Fill Plug Wrench  
No. 620



Nipple  
No. 36953

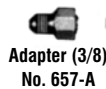


Reducing  
Right-Angle Adapter  
No. 56564

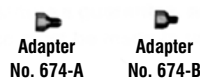


Volume Pump  
Repair Kit  
No. 53266  
(extra)

Male Coupler  
No. 656



Sub  
No. 2582



Line Filter  
No. 56565



Bushing  
No. 56563



Filter Element  
No. 56566 (extra)



Tube Fitting  
No. 33436



**Strength Data - Bowen Balanced Bumper Sub**

| Assembly No. | Tool OD x ID (in) | Connection     | Tensile Strength @ Yield (lb) | Torque @ Yield (ft-lb) | Max. Operating Torque (ft-lb) |
|--------------|-------------------|----------------|-------------------------------|------------------------|-------------------------------|
| 44252        | 4-1/4 x 1-15/16   | 2-7/8 API I.F. | 397,650                       | 9,280                  | 4,640                         |
| 41228        | 4-5/8 x 2         | 3-1/2 API F.H. | 484,650                       | 11,060                 | 5,530                         |
| 41228        | 4-3/4 x 2         | 3-1/2 API F.H. | 484,650                       | 15,000                 | 7,500                         |
| 42042        | 6-1/4 x 3-1/8     | 4-1/2 API I.F. | 777,150                       | 29,220                 | 14,610                        |
| 39975        | 6-3/4 x 2-3/4     | 5-1/2 API Reg. | 1,130,400                     | 35,380                 | 17,690                        |
| 42126        | 7-3/4 x 3-1/2     | 6-5/8 API Reg. | 1,276,950                     | 50,040                 | 25,020                        |

The above tensile strengths are calculated theoretical yield strengths and are accurate to ± 20%. The above operating torque is set at 50% of the calculated theoretical yield torque and is the maximum recommended operating torque.

These figures do not constitute a guarantee, actual or implied; they are meant to serve as a guide only, and appropriate allowance must be made in use as a safety factor.

**Maximum Recommended Tightening Torque for Threaded Connections**

| Assembly No. | Tool O.D. X I.D. (in) | Mandrel Body to Middle Body (ft-lbs) | Floater Body to Middle Body (ft-lbs) | Floater Body to Washpipe Body (ft-lbs) | Mandrel to Knocker (ft-lbs) | Mandrel to Washpipe (ft-lbs) |
|--------------|-----------------------|--------------------------------------|--------------------------------------|--|-----------------------------|------------------------------|
| 44252        | 4-1/4 x 1-15/16       | 4,640                                | 4,640                                | 4,640                                  | 670                         | 730                          |
| 41228        | 4-5/8 x 2             | 5,530                                | 5,530                                | 5,530                                  | 1,100                       | 1,790                        |
| 41228        | 4-3/4 x 2             | 7,500                                | 7,500                                | 7,500                                  | 1,100                       | 1,790                        |
| 42042        | 6-1/4 x 3-1/8         | 16,330                               | 14,610                               | 15,280                                 | 3,120                       | 8,300                        |
| 39975        | 6-3/4 x 2-3/4         | 22,660                               | 20,630                               | 17,690                                 | 3,000                       | 9,200                        |
| 42126        | 7-3/4 x 3-1/2         | 29,190                               | 29,190                               | 25,020                                 | 7,690                       | 21,000                       |

The above makeup torques are the maximum recommended makeup torques for each connection. They are set at 50% of the calculated theoretical yield torque. Torques this high are not required for all fishing jobs, and lower values will result in less wear and tear to the threads.

The tightening torque values were calculated assuming Itcolube or similar zinc based grease on all threads and shoulders.

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**Bowen Balanced Bumper Subs**

|                           |          | 2-7/8   | 3-1/2  | 4-1/2  | 5-1/2  | 6-5/8  |
|---------------------------|----------|---------|--------|--------|--------|--------|
| Size Connection           | A.P.I.   | A.P.I.  | A.P.I. | A.P.I. | A.P.I. | A.P.I. |
|                           | I.F.     | F.H.    | I.F.   | Reg.   | Reg.   |        |
| Outside Diameter - Inches |          | 4-1/4   | 4-3/4  | 6-1/4  | 6-3/4  | 7-3/4  |
| Inside Diameter - Inches  |          | 1-15/16 | 2      | 3-1/8  | 2-3/4  | 3-1/2  |
| Stroke - Inches           |          | 15-1/2  | 15-1/2 | 18     | 18     | 18     |
| Full Bore*                |          |         | *      |        |        |        |
| Complete Assembly         | Part No. | 44252   | 41228  | 42042  | 39975  | 42126  |
|                           | Weight   | 297     | 410    | 684    | 786    | 1179   |

**Replacement Parts**

|   |          |        |        |         |        |        |
|---|----------|--------|--------|---------|--------|--------|
| Mandrel Body                                | Part No. | 43532  | 39861  | 34966   | 33244  | 34992  |
|   | Weight   | 45     | 62     | 77      | 99     | 140    |
| Middle Body                                 | Part No. | 43533  | 33156  | 34967   | 33245  | 34993  |
|   | Weight   | 40     | 50     | 88      | 103    | 113    |
| Floater Body                                | Part No. | 44253  | 41231  | 42045   | 39977  | 42127  |
|   | Weight   | 20     | 33     | 48      | 57     | 80     |
| Washpipe Body                               | Part No. | 44256  | 41234  | 42048   | 39978  | 42128  |
|   | Weight   | 67     | 74     | 126     | 148    | 161    |
| Mandrel                                     | Part No. | 43536  | 39860  | 34970   | 33248  | 34996  |
|   | Weight   | 88     | 105    | 191-1/2 | 250    | 292    |
| Floater                                     | Part No. | 44255  | 41233  | 42047   | 39976  | 42129  |
|   | Weight   | 3-1/2  | 4      | 4-1/2   | 5      | 6      |
| Washpipe                                    | Part No. | 44254  | 41232  | 42046   | 39979  | 42130  |
|   | Weight   | 50     | 60     | 110     | 157    | 230    |
| Knocker                                     | Part No. | 43538  | 39863  | 34972   | 33250  | 34998  |
|   | Weight   | 6      | 6-1/2  | 7       | 8      | 8      |
| Main Mandrel Non-Extrusion Ring (4 Req'd.)  | Part No. | 365-40 | 365-42 | 365-53  | 365-54 | 365-61 |
| Main Mandrel Seal Protector Ring (4 Req'd.) | Part No. | 375-40 | 375-42 | 375-53  | 375-54 | 375-61 |
| Floater O.D. Non-Extrusion Ring (4 Req'd.)  | Part No. | 216-42 | 216-44 | 216-55  | 216-58 | 216-65 |
| Floater O.D. Seal Protector Ring (4 Req'd.) | Part No. | 227-42 | 227-44 | 227-55  | 227-58 | 227-65 |
| Floater I.D. Non-Extrusion Ring (4 Req'd.)  | Part No. | 365-42 | 365-42 | 365-53  | 365-54 | 365-61 |
| Floater I.D. Seal Protector Ring (4 Req'd.) | Part No. | 375-42 | 375-42 | 375-53  | 375-54 | 375-61 |
| Seal Packing Set                            | Part No. | 44258  | 41235  | 42049   | 39988  | 42133  |
|   | Weight   | 1      | 1      | 1-1/2   | 2      | 2      |
| Mandrel Body Fill Plug                      | Part No. | 329    | 329    | 329     | 329    | 329    |
|   | Weight   | 1/8    | 1/8    | 1/8     | 1/8    | 1/8    |
| Middle Body Fill Plug (2 Req'd.)            | Part No. | 617    | 617    | 617     | 617    | 617    |
|   | Weight   | 1/8    | 1/8    | 1/8     | 1/8    | 1/8    |

Many other sizes available upon request.



**Bowen Balanced Bumper Subs**

|                   |          |       |       |       |       |       |
|-------------------|----------|-------|-------|-------|-------|-------|
| Complete Assembly | Part No. | 44252 | 41228 | 42042 | 39975 | 42126 |
|                   | Weight   | 297   | 410   | 684   | 786   | 1179  |

**Required Accessories - Extra**

|                                     |          |   |          |          |          |          |
|-------------------------------------|----------|---|----------|----------|----------|----------|
| Service Kit                         | Part No. | Only One Service Kit Required To Service All Sizes of Tools —   |          |          |          |          |
|                                     | Weight   | <b>Does Not</b> Include Any Seal Setting Tool, Which Must be Ordered Separately As Required for Each Tool, at Extra Cost. |          |          |          |          |
| Main Mandrel Setting Tool           | Part No. | 22709-40  | 22709-42 | 22709-53 | 22709-54 | 22709-61 |
| Floater Setting Tool                | Part No. | 44261   | 41237    | 42051    | 39987    | 42132    |
|                                     | Weight   | 8   | 9        | 13       | 20       | 35       |
| Thread Lubricant (KOPR-KOTE)        | Part No. | 153823  |          |          |          |          |
| Seal Packing Set                    | Part No. | 44258   | 41235    | 42049    | 39988    | 42133    |
| Consists of:                        | Weight   | 1   | 1        | 1-1/2    | 2        | 2        |
| Main Mandrel Seal (2 Req'd.)        | Part No. | 568337  | 568339   | 568426   | 568427   | 568434   |
| Floater O.D. Seal (2 Req'd.)        | Part No. | 568339  | 568341   | 568428   | 568431   | 568438   |
| Floater I.D. Seal (2 Req'd.)        | Part No. | 568337  | 568339   | 568426   | 568427   | 568434   |
| Middle Body Seal - Large (2 Req'd.) | Part No. | 568239  | 568242   | 568253   | 568256   | 568261   |
| Middle Body Seal - Small (2 Req'd.) | Part No. | 568237  | 568239   | 568251   | 568254   | 568260   |
| Floater Body Seal - Large           | Part No. | 568239  | 568242   | 568253   | 568256   | 568261   |
| Floater Body Seal - Small           | Part No. | 568237  | 568239   | 568251   | 568254   | 568260   |
| Middle Body F.P. Seal (2 Req'd.)    | Part No. | 568005  | 568005   | 568005   | 568005   | 568005   |
| Mandrel Body F.P. Seal              | Part No. | 568006  | 568006   | 568006   | 568006   | 568006   |
| Washpipe Seal                       | Part No. | 568227  | 568229   | 568239   | 568238   | 568246   |

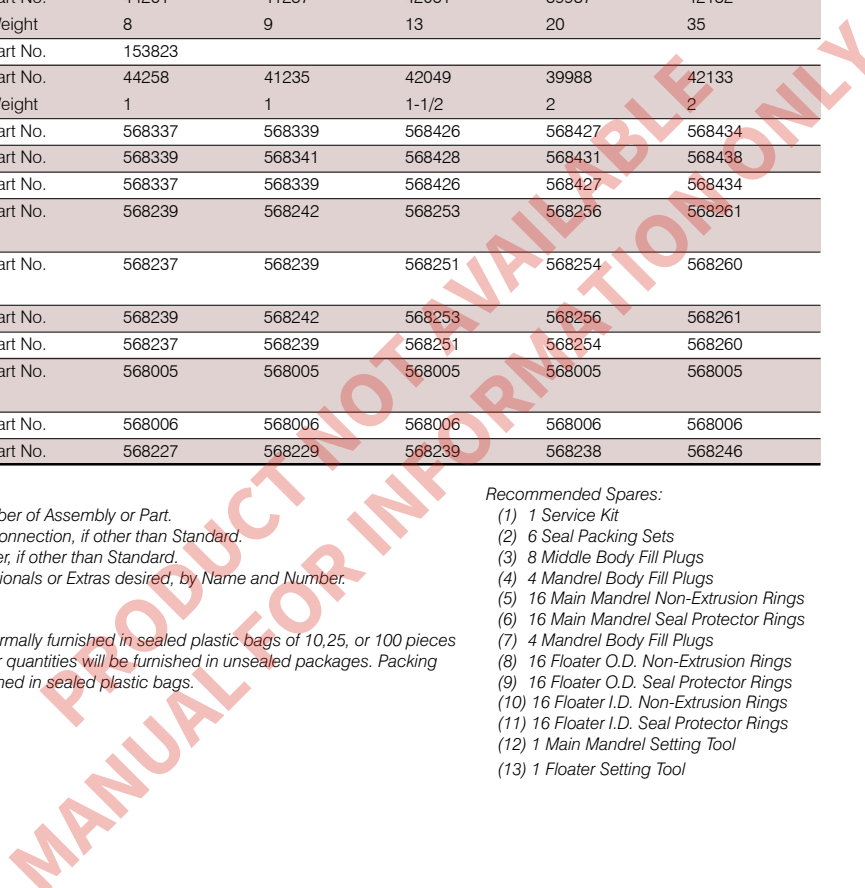
**How to Order**

- Specify:
- (1) Name and Number of Assembly or Part.
  - (2) Size and Type Connection, if other than Standard.
  - (3) Outside Diameter, if other than Standard.
  - (4) Any Spares, Optionals or Extras desired, by Name and Number.

Miscellaneous O-Ring Seals are normally furnished in sealed plastic bags of 10,25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing Sets, however, will always be furnished in sealed plastic bags.

**Recommended Spares:**

- (1) 1 Service Kit
- (2) 6 Seal Packing Sets
- (3) 8 Middle Body Fill Plugs
- (4) 4 Mandrel Body Fill Plugs
- (5) 16 Main Mandrel Non-Extrusion Rings
- (6) 16 Main Mandrel Seal Protector Rings
- (7) 4 Mandrel Body Fill Plugs
- (8) 16 Floater O.D. Non-Extrusion Rings
- (9) 16 Floater O.D. Seal Protector Rings
- (10) 16 Floater I.D. Non-Extrusion Rings
- (11) 16 Floater I.D. Seal Protector Rings
- (12) 1 Main Mandrel Setting Tool
- (13) 1 Floater Setting Tool







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10000 Richmond Avenue  
Houston, TX 77042 USA  
Tel: 713-346-7500  
Fax: 713-346-7959

## Alaska

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Anchorage, AK 99509 USA  
4111 Ingra  
Anchorage, AK 99503-6117 USA  
Tel: 907-563-5253  
Fax: 907-561-0071

## California

4117 Atlas Court  
Bakersfield, CA 93308 USA  
Tel: 661-395-0165  
Fax: 661-328-1827

2875 Junipero Avnue  
Signal Hill, CA 90755 USA  
Tel: 562-988-0200  
Fax: 562-988-0350

## Louisiana

108 Nova Drive  
Broussard, LA 70518-4120 USA  
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Broussard, LA 70518-0446 USA  
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Fax: 337-839-2211

190 Thompson Road  
Houma, LA 70363 USA  
Tel: 504-851-1111  
Fax: 504-851-1117

## Mississippi

5349 Highway 11 North Ellisville  
Ellisville, MS 39437 USA  
Tel: 601-428-0646  
Fax: 601-428-0617

## New Mexico

Box 383  
Farmington, NM 87499 USA  
#14 CR 5860  
Farmington, NM 87401 USA  
Tel: 505-326-4303  
Fax: 505-326-4304

## North Dakota

Box 731  
Williston, ND 58801 USA  
3202 1st Avenue West  
Williston, ND 58801 USA  
Tel: 701-774-0091  
Fax: 701-774-0092

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3800 Thomas Road  
Oklahoma City, OK 73179 USA  
Toll Free: 877-760-1711  
Tel: 405-677-2484  
Fax: 405-677-2457

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Box 801  
Alice, TX 78333 USA  
1249 Commerce Road  
Alice, TX 78332 USA  
Tel: 361-664-8013  
Fax: 361-664-0462

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8411 Irvington Boulevard  
Houston, TX 77022 USA  
Tel: 713-691-7800  
Fax: 713-691-7807

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2810 Highway 135 North  
Kilgore, TX 75662 USA  
Tel: 903-984-2553  
Fax: 903-984-7170

10720 West I-20 East  
Odessa, TX 79765 USA  
Tel: 915-563-1173  
Fax: 915-563-1182

Box 1595  
30444 Southwest Freeway  
Rosenberg, TX 77471 USA  
Tel: 281-341-5365  
Fax: 281-344-1986

### Utah

Box 482  
1553 East Highway 40  
Vernal, UT 84078 USA  
Tel: 435-789-0670  
Fax: 435-789-6568

### West Virginia

Box 927  
Route 2, Murphy Run Road  
Clarksburg, WV 26301 USA  
Tel: 304-622-4303  
Fax: 304-623-2174

### Wyoming

1283 N. Derrick Drive  
Unit 1, Box 2  
Casper, WY 82604-1887 USA  
Tel: 307-237-3100  
Fax: 307-237-2546

## Canada

9118 - 34A Avenue  
Edmonton, Alberta T6E 5P4  
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Tel: 780-702-5209  
Fax: 780-463-2348

## Dubai

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Round About No. 8  
Bldg. No. TA-06  
Jebel Ali, Dubai  
United Arab Emirates  
Tel: 971-4-833-8776  
Fax: 971-4-883-8795

## Germany

Eddesser Straße 1  
31234 Edemissen Berkhöpen  
Postfach 31232  
Germany  
Tel: 49-5176-90326  
Fax: 49-5176-90532

## Indonesia

Cilandak Commercial Estate  
Unit 105  
Jl. Raya Cilandak KKO  
P.O. Box 7541  
Jakarta 12560, Indonesia  
Tel: 62-21-782-6088  
Fax: 62-21-782-6086

## Scotland

Kirkton Avenue  
Pitmedden Road Industrial Estate  
Dyce, Aberdeen AB21 0BF  
Scotland  
Tel: 441-224-334800  
Fax: 441-224-723034

## Singapore

Unit 1 Block 323  
Terrace Warehouse  
Until Jan. 2003  
Loyang Offshore Supply Base  
Box 5014  
Loyang Crescent,  
Singapore 508988  
Tel: 65-6542-5211  
Fax: 65-6542-8127

Drilling Solutions

Lifting and Handling Solutions

Well Service and Completion Solutions

Downhole Solutions

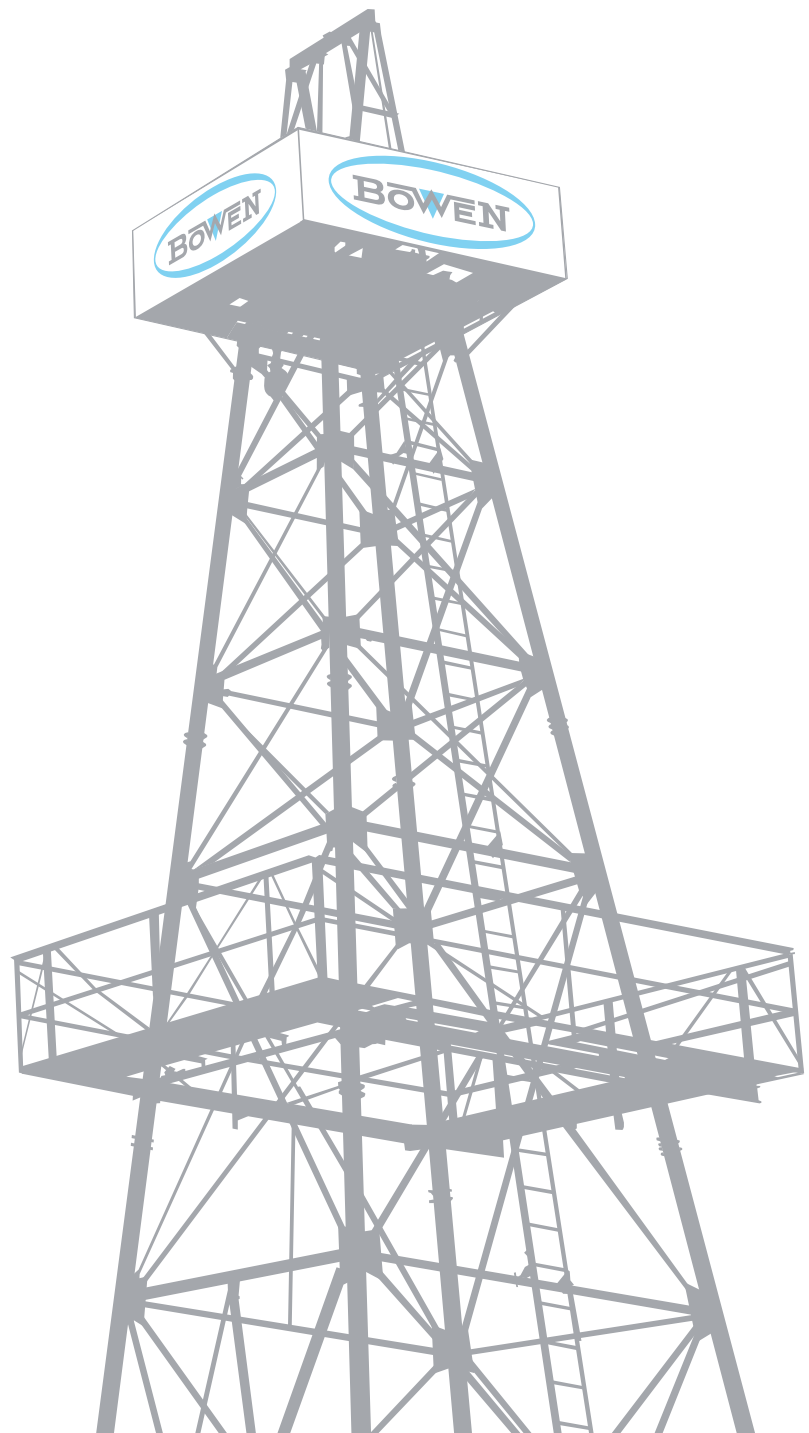
Production Solutions

Supply Chain Management

Engineering and Project Management

# Bowen Fishing Bumper Subs

Instruction Manual 4460



**Bowen | NOV**

# Bowen Fishing Bumper Subs

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Fishing Bumper Subs

## General Description

The Bowen™ fishing bumper sub withstands sustained bumping action in severe fishing and deep workover operations. The tool offers a sharp bumping action to actuate and release tools and permits a 10- to 18-inch vertical stroke whether rotating or still, making it the ideal tool for your severe fishing jobs.

## Use

The Bowen fishing bumper sub is used in all types of fishing operations. Normally made up in the string just above the fishing tool and /or safety joint, the Bowen fishing bumper sub can, at your will, deliver solid downward blows or solid upward blows.

The Bowen fishing bumper sub may be used as a “feed-off” tool in the “predeter-mined weight” method of internal pipe cutting described in the Bowen Internal Cutter Instruction Manual No. 5600.

## Construction

The Bowen fishing bumper sub consists of a mandrel, a mandrel body, middle body, knocker, top sub and seal assembly. All principal parts are manufactured from high strength, heat-treated alloy steel, enabling the tool to withstand the severe bumping, tension and torque to which it will be subjected.

The hexagon-shaped mandrel fits into a correspondingly shaped mandrel body, where it is free to move up and down over its stroke while continuously capable of transmitting torque. The mandrel body joins the cylindrical middle body. The knocker, containing the packing rings, screws onto the top of the mandrel.

**Note: Some sizes are available with optional Chevron packing. See parts list.**

The packing rings seal between the middle body and the mandrel. The lower pin connection is on the mandrel.

## Operation

Examine the Bowen Fishing Bumper Sub to be sure that it is properly assembled, that all threaded connections are made up tightly and that it is the proper size for the hole diameter and the fishing string with which it is to be run. (See the Specification Table for dimensions, specifications and parts numbers, beginning on page 6.)

### In Fishing Operations

The Bowen fishing bumper sub is installed in the fishing string immediately above the fishing tool or safety joint. Its presence in the string enables you to release the fishing tool in the event it becomes impossible to pull the fish. The Bowen fishing bumper sub will deliver the sharp downward blow (and transmit the torque) that is required to release it from the fish.

### To Bump Down in the Hole

Elevate the fishing string sufficiently to open the Bowen fishing bumper sub completely and to take a strain or stretch in the string. This will be the length of the stroke plus the permissible stretch in the fishing string. Drop the fishing string sharply (to within 6 inches of the closed position of the sub) and stop it abruptly with the brake. If sufficient stretch has been taken in the fishing string, this will cause the lower end of the fishing string to spring downward, closing the Bowen fishing bumper sub and, due to the elasticity of the string,

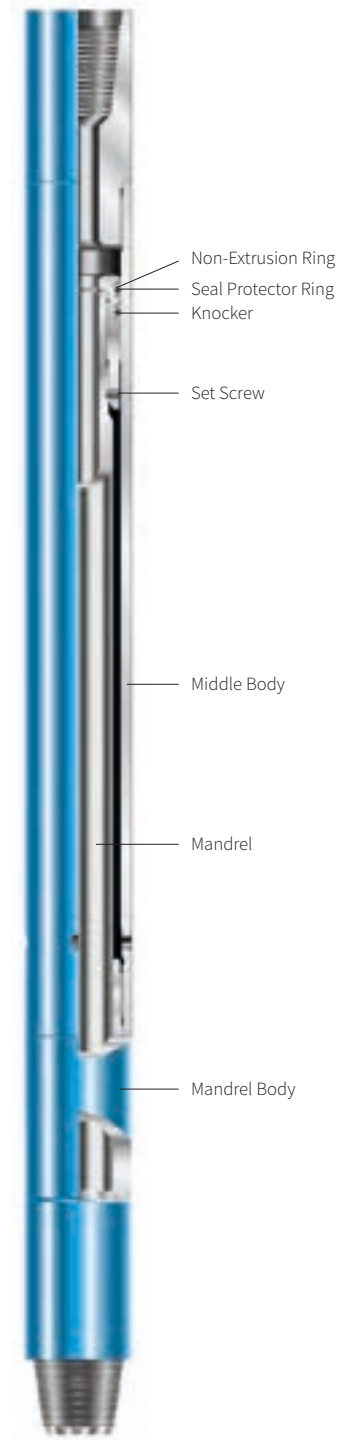
deliver a series of downward blows to the tool below the sub.

### To Bump a Solid Downward Blow in the Hole

Elevate the fishing string to open the Bowen fishing bumper sub completely plus a moderate strain or stretch in the string. This will be the length of the stroke plus the permissible stretch of the string.

Drop the fishing string sharply this full length without braking. This will cause the Bowen fishing bumper sub to close quickly. The lower end of the mandrel body will strike the shoulder on the lower end of the mandrel, transmitting a single solid downward blow to the tool below.

### To Jar Up in the Hole



**Bowen Fishing Bumper Sub**

# Bowen Fishing Bumper Subs

Elevate the fishing string sufficiently to stretch it moderately. Then drop the fishing string a distance equal to the stretch taken only and stop it abruptly with the brake. This will cause the lower end of the string to spring downward, causing the Bowen fishing bumper sub to close slightly, and then the string will rebound, causing the bumper sub to open quickly and the upper end of the mandrel body to strike the knocker a solid upward blow.

## To Bump a Solid Blow at the Surface in Order to Disengage a Fishing Tool

Leave a single or a drill collar above the Bowen fishing bumper sub. Open the bumper sub sufficiently to install the head of sledge hammer between the mandrel body and the shoulder on the mandrel. Slack off the elevators. Pull the sledge from between the mandrel body and the mandrel shoulder. This will cause the Bowen fishing bumper sub to close quickly and the lower end of the mandrel body to strike the shoulder of the mandrel, delivering a solid, downward blow to the fishing tool and effecting a release of the fishing tool.

## As a Feed-Off Tool

The Bowen fishing bumper sub may be employed as a feed-off tool. In this operation, the Bowen fishing bumper sub is installed in a cutting string a number of joints above a Bowen internal cutter. Since the bumper sub has a 20-inch stroke, the cutting string is picked up only 10 inches after the cutter is set, thus only the predetermined weight of the pipe between the cutter and the bumper sub is applied to the cutter, assuring a smooth operation of the cutter. (For more details, see Bowen internal cutter, Instruction Manual No. 5600.

## Maintenance

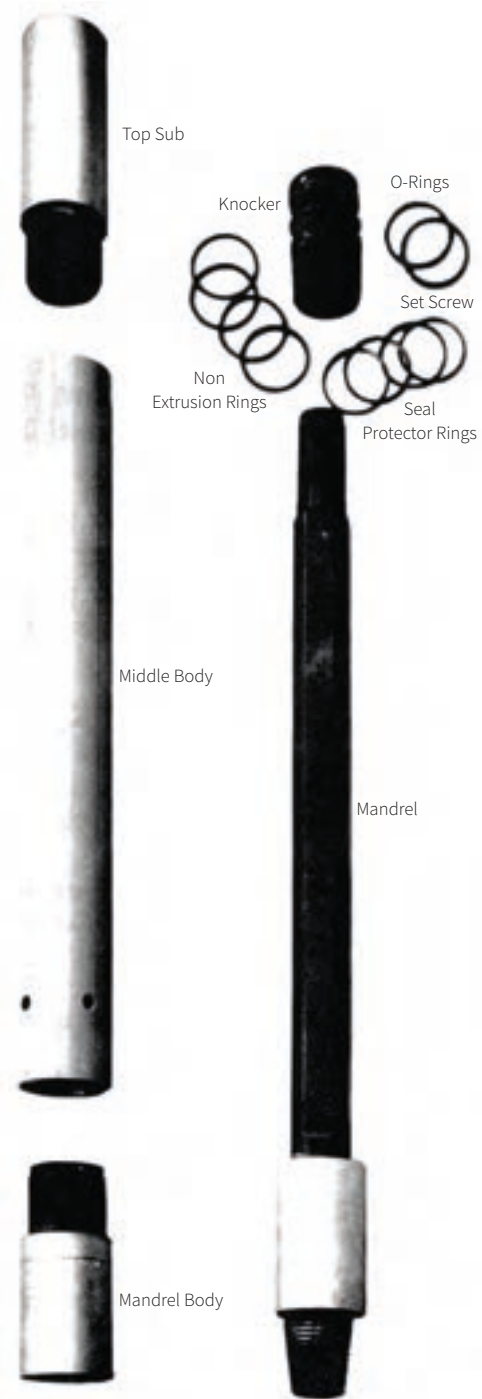
Due to its strong wear-resistant construction, only a minimum of maintenance is required; however, after each use, wash the Bowen fishing bumper clean of all drilling mud or other debris and then lubricate it thoroughly to prevent deterioration. Examine seal rings after each use for wear and damage. When damage is evident, disassemble the tool and replace the rings.

## Disassembly

1. Secure the Bowen fishing bumper sub in a suitable vise, approximately in the middle of the mandrel body.
2. Remove the top sub.
3. Remove middle body from the mandrel body and remove knocker locking screw.

**CAUTION: Make sure locking screw is removed or backed-off prior to removing knocker to prevent damage to mandrel.**

4. Remove knocker from the mandrel.
5. Remove mandrel from the mandrel body.
6. Thoroughly clean all parts.
7. Inspect knocker seals, non extrusion rings and seal protector rings; (or optional Chevron packing by removing retainer ring and packing ring, see diagram on page 5); replace if worn or damaged.
8. Examine all metal parts for mars, scratches and upsets. Minor mars or scratches may be removed by hand filing or polishing



# Bowen Fishing Bumper Subs

with emery cloth. Badly damaged or badly upset parts must be replaced.

9. Examine all seal glands and grooves. Look for fluid erosion, burrs, mushroomed lands, and other deformities. Repair if possible. Using a seal pick, finger nail, or other pointed object, feel the entire width of the groove diameter and depth of the groove walls. If possible, repair any steps or other surface interruptions.

## Reassembly

**NOTE: Always lubricate the threads with an approved lubricant.**

After all parts have been thoroughly cleaned and lubricated, all damaged parts repaired or replaced, the Bowen fishing bumper sub may be reassembled as follows:

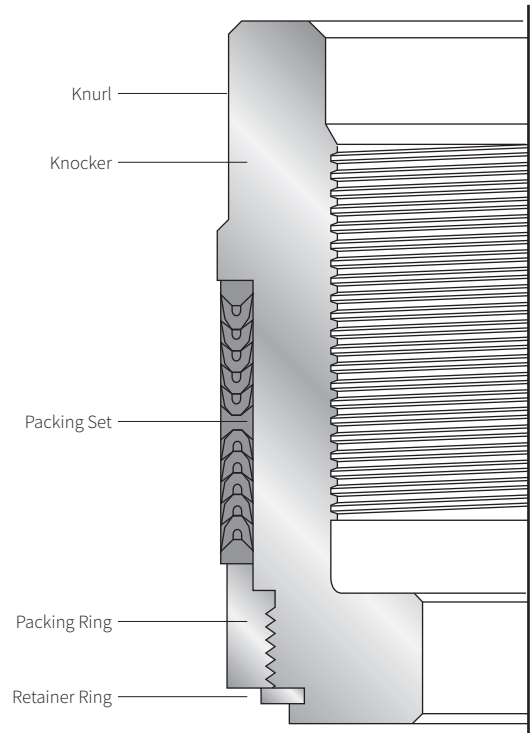
1. A. Replace knocker seals, starting with the lower groove.
  - a. Clean the grooves thoroughly, smoothing out any nicks or scratches with emery cloth.
  - b. Slide non-extrusion ring over the knocker with the bevel of the ring matching the bevel of the groove. Do NOT expand the ring more than absolutely necessary to pass over the knocker O.D. non extrusion rings are heat-treated steel and will take an oversize set if expanded too far.

- c. Install seal protector ring in groove, next to the non-extrusion ring.
- d. Install o-ring.
- e. Install another seal protector ring.
- f. Install other non-extrusion ring.
- g. Repeat procedure on upper groove.

1. B. If packing is optional Chevron type, install as shown in a diagram on page 5. Then reinstall the packing ring and retainer ring.

**Reminder: Lubricate all threads with Kopr-kote.**

2. Secure the mandrel body in a vise.
3. Slide the mandrel through the mandrel body.
4. Install knocker on mandrel and tighten. Install locking screw into knocker, making sure it bears on undercut provided in mandrel.
5. Slide middle body over mandrel and knocker, taking care not to damage seals; then make up tightly to mandrel body.
6. Install top sub on the middle body. Make up all connections tightly.
7. Lubricate or paint all exterior surfaces before storing.



Optional Packing Arrangement

# Bowen Fishing Bumper Subs

## Strength Data

| Maximum Recommended Tightening Torque for Threaded Connections |             |             |                         |                             |                    | Strength Data            |                |
|--|-------------|-------------|-------------------------|-----------------------------|--------------------|--------------------------|----------------|
| Assembly Number  | O.D.        | I.D.        | Sub Body to Middle Body | Mandrel Body to Middle Body | Knocker to Mandrel | Tensile Strength @ Yield | Torque @ Yield |
| 10120  | 1 13/16 in. | 3/8 in.     | 510 ft-lbs              | 510 ft-lbs                  | 220 ft-lbs         | 68,720 lbs               | 1,020 ft-lbs   |
| 21230  | 1 29/32 in. | 3/8 in.     | 485 ft-lbs              | 425 ft-lbs                  | 275 ft-lbs         | 78,620 lbs               | 850 ft-lbs     |
| 18785  | 2 1/4 in.   | 1/2 in.     | 665 ft-lbs              | 1,220 ft-lbs                | 785 ft-lbs         | 172,900 lbs              | 2,440 ft-lbs   |
| 10175  | 2 1/2 in.   | 1/2 in.     | 2,770 ft-lbs            | 970 ft-lbs                  | 740 ft-lbs         | 160,600 lbs              | 1,940 ft-lbs   |
| 42592  | 3 1/8 in.   | 1 1/2 in.   | 1,650 ft-lbs            | 1,650 ft-lbs                | 1,160 ft-lbs       | 158,600 lbs              | 3,300 ft-lbs   |
| 10105  | 3 1/8 in.   | 1 in.       | 2,500 ft-lbs            | 2,100 ft-lbs                | 1,200 ft-lbs       | 224,900 lbs              | 4,200 ft-lbs   |
| 10190  | 3 3/8 in.   | 1 in.       | 2,870 ft-lbs            | 2,870 ft-lbs                | 1,770 ft-lbs       | 256,000 lbs              | 5,740 ft-lbs   |
| 39887  | 3 3/4 in.   | 1 1/2 in.   | 4,300 ft-lbs            | 3,000 ft-lbs                | 1,100 ft-lbs       | 316,200 lbs              | 6,000 ft-lbs   |
| 10090  | 3 3/4 in.   | 1 1/4 in.   | 4,705 ft-lbs            | 4,705 ft-lbs                | 1,875 ft-lbs       | 268,500 lbs              | 9,400 ft-lbs   |
| 39893  | 3 3/4 in.   | 1 7/8 in.   | 3,405 ft-lbs            | 3,405 ft-lbs                | 625 ft-lbs         | 231,000 lbs              | 6,810 ft-lbs   |
| 10210  | 4 1/8 in.   | 1 1/2 in.   | 5,600 ft-lbs            | 4,635 ft-lbs                | 2,060 ft-lbs       | 370,200 lbs              | 9,270 ft-lbs   |
| 36794  | 4 1/2 in.   | 2 3/8 in.   | 5,120 ft-lbs            | 5,120 ft-lbs                | 3,500 ft-lbs       | 336,600 lbs              | 10,240 ft-lbs  |
| 41824  | 4 1/4 in.   | 1 15/16 in. | 6,010 ft-lbs            | 4,600 ft-lbs                | 2,700 ft-lbs       | 305,000 lbs              | 9,200 ft-lbs   |
| 10155  | 4 1/4 in.   | 1 1/2 in.   | 6,010 ft-lbs            | 4,580 ft-lbs                | 4,050 ft-lbs       | 439,000 lbs              | 9,160 ft-lbs   |
| 29556  | 4 5/8 in.   | 1 7/8 in.   | 7,265 ft-lbs            | 6,720 ft-lbs                | 4,160 ft-lbs       | 442,000 lbs              | 13,440 ft-lbs  |
| 10225  | 4 3/4 in.   | 1 1/2 in.   | 9,300 ft-lbs            | 6,900 ft-lbs                | 4,100 ft-lbs       | 581,100 lbs              | 13,800 ft-lbs  |
| 39905  | 4 3/4 in.   | 2 in.       | 7,600 ft-lbs            | 4,100 ft-lbs                | 4,500 ft-lbs       | 465,900 lbs              | 8,200 ft-lbs   |
| 39905  | 4 5/8 in.   | 2 in.       | 7,060 ft-lbs            | 6,140 ft-lbs                | 4,500 ft-lbs       | 465,900 lbs              | 12,280 ft-lbs  |
| 10235  | 5 1/2 in.   | 2 in.       | 11,035 ft-lbs           | 11,035 ft-lbs               | 8,550 ft-lbs       | 613,400 lbs              | 22,070 ft-lbs  |
| 10135  | 5 3/4 in.   | 2 in.       | 13,425 ft-lbs           | 13,425 ft-lbs               | 8,565 ft-lbs       | 723,600 lbs              | 26,850 ft-lbs  |
| 10135  | 6 in.       | 2 in.       | 19,675 ft-lbs           | 14,745 ft-lbs               | 8,565 ft-lbs       | 767,000 lbs              | 29,490 ft-lbs  |
| 10257  | 6 1/8 in.   | 2 1/4 in.   | 15,420 ft-lbs           | 15,420 ft-lbs               | 11,000 ft-lbs      | 768,600 lbs              | 30,840 ft-lbs  |
| 10257  | 6 1/4 in.   | 2 1/4 in.   | 19,000 ft-lbs           | 19,000 ft-lbs               | 11,000 ft-lbs      | 864,400 lbs              | 38,000 ft-lbs  |
| 10257  | 6 1/2 in.   | 2 1/4 in.   | 26,000 ft-lbs           | 21,000 ft-lbs               | 11,000 ft-lbs      | 864,400 lbs              | 42,000 ft-lbs  |
| 10690  | 6 3/4 in.   | 2 3/4 in.   | 18,800 ft-lbs           | 18,800 ft-lbs               | 10,000 ft-lbs      | 871,000 lbs              | 37,600 ft-lbs  |
| 26595  | 7 3/4 in.   | 3 1/2 in.   | 25,200 ft-lbs           | 25,200 ft-lbs               | 18,000 ft-lbs      | 1,060,000 lbs            | 50,400 ft-lbs  |
| 26595  | 8 in.       | 3 1/2 in.   | 34,800 ft-lbs           | 27,300 ft-lbs               | 18,000 ft-lbs      | 1,060,000 lbs            | 54,600 ft-lbs  |
| 61596  | 9 in.       | 4 in.       | 42,295 ft-lbs           | 32,055 ft-lbs               | 31,000 ft-lbs      | 1,600,000 lbs            | 64,110 ft-lbs  |

The above makeup torque values are the maximum recommended makeup torque for each connection. They are set at 50% of the calculated theoretical yield torque.

The tightening torque values were calculated assuming KOPR-KOTE, Itcolube, or similar zinc-based grease on all threads and shoulders.

The above tensile strengths are calculated theoretical yield strengths and should be considered accurate to ±20%.

NOTE: The above tightening torques and strength values will typically apply for the same size tool with a different stroke. The standard stroke for bumper subs is 20 inches.

The figures do not constitute a guarantee, actual or implied; they are meant to serve as a guide only and appropriate allowance must be made in use as a safety factor.

# Bowen Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Fishing Bumper Subs Specifications

|                          |                      |                       |                        |                      |                   |                        |                         |                         |                        |                   |         |
|--------------------------|----------------------|-----------------------|------------------------|----------------------|-------------------|------------------------|-------------------------|-------------------------|------------------------|-------------------|---------|
| <b>Size Connections</b>  | 1 ¼ in.<br>EXT., FL. | 1 in.<br>E.U.E., TBG. | 1 ¼ in.<br>A.P.I. REG. | 2 ¾ in.<br>EXT., FL. | 2 ¾ in.<br>E.U.E. | 2 ¾ in.<br>A.P.I. REG. | 2 ¾ in.<br>A.P.I., I.F. | 2 ¾ in.<br>A.P.I., I.F. | 2 ¾ in.<br>A.P.I. REG. | 2 ¾ in.<br>E.U.E. |         |
| <b>Outside Diameter</b>  | 1 13/16 in.          | 1 29/32 in.           | 2 ¼ in.                | 2 ½ in.              | 3 ½ in.           | 3 9/16 in.             | 3 ¾ in.                 | 3 ¾ in.                 | 3 ¾ in.                | 3 ¾ in.           |         |
| <b>Inside Diameter</b>   | ¾ in.                | ¾ in.                 | ½ in.                  | ½ in.                | 1 ½ in.           | 1 in.                  | 1 in.                   | 1 ½ in.                 | 1 ¼ in.                | 1 7/8 in.         |         |
| <b>Stroke</b>            | 20 in.               | 20 in.                | 20 in.                 | 20 in.               | 20 in.            | 20 in.                 | 20 in.                  | 20 in.                  | 20 in.                 | 20 in.            |         |
| <b>Complete Assembly</b> | <b>Part No.</b>      | 10120                 | 21230                  | 18785                | 10175             | 42592                  | 10105                   | 10190                   | 39887                  | 10090             | 39893   |
| <b>20 in. Stroke</b>     | <b>Weight</b>        | 25 lbs                | 25 lbs                 | 35 lbs               | 40 lbs            | 72 lbs                 | 80 lbs                  | 90 lbs                  | 119 lbs                | 110 lbs           | 127 lbs |

### Replacement Parts

|                                       |                 |        |        |        |        |        |        |        |         |        |        |
|---------------------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| <b>Top Sub</b>                        | <b>Part No.</b> | 10121  | 21231  | 18786  | 10176  | 42593  | 10106  | 10191  | 39888   | 10091  | 39894  |
|                                       | <b>Weight</b>   | 4 lbs  | 4 lbs  | 5 lbs  | 6 lbs  | 12 lbs | 13 lbs | 15 lbs | 18 lbs  | 18 lbs | 20 lbs |
| <b>Mandrel Body</b>                   | <b>Part No.</b> | 10123  | 21233  | 18788  | 10178  | 42596  | 10108  | 10193  | 39890   | 10093  | 39896  |
|                                       | <b>Weight</b>   | 3 lbs  | 3 lbs  | 3 lbs  | 4 lbs  | 8 lbs  | 9 lbs  | 11 lbs | 14 lbs  | 13 lbs | 14 lbs |
| <b>Middle Body</b>                    | <b>Part No.</b> | 10122  | 21232  | 18787  | 10177  | 42594  | 10107  | 10192  | 39889   | 10092  | 39895  |
| <b>20 in. Stroke</b>                  | <b>Weight</b>   | 7 lbs  | 7 lbs  | 10 lbs | 12 lbs | 21 lbs | 32 lbs | 24 lbs | 31 lbs  | 30 lbs | 32 lbs |
| <b>Mandrel</b>                        | <b>Part No.</b> | 10125  | 21234  | 18789  | 10180  | 42597  | 10110  | 10194  | 39891   | 10095  | 39897  |
| <b>20 in. Stroke</b>                  | <b>Weight</b>   | 10 lbs | 10 lbs | 15 lbs | 17 lbs | 30 lbs | 22 lbs | 36 lbs | 50      | 44 lbs | 55 lbs |
| <b>Knocker</b>                        | <b>Part No.</b> | 10126  | 21235  | 18790  | 10181  | 42595  | 10111  | 10195  | 39892   | 10096  | 39898  |
|                                       | <b>Weight</b>   | 2 lbs  | 2 lbs  | 2 lbs  | 2 lbs  | 3 lbs  | 4 lbs  | 4 lbs  | 5 ½ lbs | 5 lbs  | 6 lbs  |
| <b>Non-Extrusion Ring (4 Req'd.)</b>  | <b>Part No.</b> | 385-22 | 385-22 | 385-27 | 387-2  | 216-34 | 387-6  | 385-35 | 216-38  | 385-37 | 216-38 |
| <b>Seal Protector Ring (4 Req'd.)</b> | <b>Part No.</b> | 386-22 | 386-22 | 386-27 | 388-2  | 227-34 | 388-6  | 386-35 | 272-38  | 386-37 | 227-38 |
| <b>Knocker Seal Ring (2 Req'd.)</b>   | <b>Part No.</b> | 568217 | 568217 | 568222 | 568224 | 568331 | 568228 | 568332 | 568335  | 568334 | 568335 |
| <b>Knocker Lock Screw</b>             | <b>Part No.</b> | —      | —      | —      | 54775  | —      | 48879  | 48879  | 48879   | 54769  | 54775  |
|                                       | <b>Weight</b>   | —      | —      | —      | ½ lbs  | —      | ½ lbs  | ½ lbs  | ½ lbs   | ½ lbs  | ½ lbs  |

### Optional - Extra

|   |                   |   |   |   |   |   |   |   |   |       |   |
|---|-------------------|---|---|---|---|---|---|---|---|-------|---|
| <b>Knocker Assembly W/ Chevron Packing (Fits All Strokes)</b> | <b>Part No.</b>   | — | — | — | — | — | — | — | — | 30910 | — |
|   | <b>Weight</b>     | — | — | — | — | — | — | — | — | —     | — |
| <b>Knocker</b>  | <b>Part No.</b>   | — | — | — | — | — | — | — | — | 30911 | — |
|   | <b>Weight</b>     | — | — | — | — | — | — | — | — | —     | — |
| <b>Packing Ring</b>   | <b>Part No.</b>   | — | — | — | — | — | — | — | — | 30912 | — |
|   | <b>Weight</b>     | — | — | — | — | — | — | — | — | —     | — |
| <b>Center Ring</b>  | <b>Part No.</b>   | — | — | — | — | — | — | — | — | 30913 | — |
|   | <b>Weight</b>     | — | — | — | — | — | — | — | — | —     | — |
| <b>Chevron Packing Set</b>                                    | <b>Part No.</b>   | — | — | — | — | — | — | — | — | 30914 | — |
|   | <b>Weight</b>     | — | — | — | — | — | — | — | — | —     | — |
| <b>Retaining Ring</b>   | <b>Part No.</b>   | — | — | — | — | — | — | — | — | 19812 | — |
|   | <b>Weight</b>     | — | — | — | — | — | — | — | — | —     | — |
| <b>Packing Retainer (2 Req'd.)</b>                            | <b>Gals. Req.</b> | — | — | — | — | — | — | — | — | 62345 | — |
|   | <b>Weight</b>     | — | — | — | — | — | — | — | — | —     | — |



### How to Order

- Specify:
- (1) Complete assembly and part number
  - (2) Size connection
  - (3) Length of stroke



### Recommended Spare Parts:

- (1) 8 non-extrusion rings
- (2) 8 seal protector rings
- (3) 16 knocker seals



### Special Notes:

Standard Stroke for Bumper Subs is 20 inches.  
See pages 8, 10, and 12 for strokes greater than 20 inches.



# Bowen Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Fishing Bumper Sub (Continued) – Long Stroke (Greater Than 20 in.) Assemblies

| Size Connections                    | 1 ¼ in.<br>EXT., FL. | 1 in.<br>E.U.E., TBG. | 1 ¼ in.<br>A.P.I. REG. | 2 ¾ in.<br>EXT., FL. | 2 ¾ in.<br>E.U.E. | 2 ¾ in.<br>A.P.I. REG. | 2 ¾ in.<br>A.P.I., I.F. | 2 ¾ in.<br>A.P.I., I.F. | 2 ¾ in.<br>A.P.I. REG. | 2 ¾ in.<br>E.U.E. |         |
|-------------------------------------|----------------------|-----------------------|------------------------|----------------------|-------------------|------------------------|-------------------------|-------------------------|------------------------|-------------------|---------|
| Outside Diameter                    | 1 13/16 in.          | 1 7/8 in.             | 2 ¼ in.                | 2 ½ in.              | 3 ½ in.           | 3 1/2 in.              | 3 ¾ in.                 | 3 ¾ in.                 | 3 ¾ in.                | 3 ¾ in.           |         |
| Inside Diameter                     | ¾ in.                | ¾ in.                 | ½ in.                  | ½ in.                | 1 ½ in.           | 1 in.                  | 1 in.                   | 1 ½ in.                 | 1 ¼ in.                | 1 7/8 in.         |         |
| Complete Assembly<br>30 in. Stroke* | Part No.             | 29523                 | 29526                  | 29529                | 29532             | 46881                  | 29535                   | 29538                   | 46863                  | 29541             | 46866   |
|                                     | Weight               | 33 ½ lbs              | 33 ½ lbs               | 47 ½ lbs             | 54 ½ lbs          | 101 lbs                | 107 lbs                 | 120 lbs                 | 160 lbs                | 147 lbs           | 171 lbs |
| Mandrel<br>30 in. Stroke*           | Part No.             | 29524                 | 29527                  | 29530                | 29533             | 46882                  | 29536                   | 29539                   | 46864                  | 29542             | 46867   |
|                                     | Weight               | 15 lbs                | 15 lbs                 | 22 lbs               | 25 lbs            | 45 lbs                 | 33 lbs                  | 54 lbs                  | 75 lbs                 | 66 lbs            | 83 lbs  |
| Middle Body<br>30 in. Stroke*       | Part No.             | 29525                 | 29528                  | 29531                | 29534             | 46883                  | 29537                   | 29540                   | 46865                  | 29543             | 46868   |
|                                     | Weight               | 10 lbs                | 10 lbs                 | 15 lbs               | 18 lbs            | 32 lbs                 | 48 lbs                  | 38 lbs                  | 46 lbs                 | 45 lbs            | 47 lbs  |
| Complete Assembly<br>36 in. Stroke  | Part No.             | 29574                 | 29577                  | 29580                | 29583             | 46908                  | 29586                   | 29589                   | 46890                  | 25180             | 46893   |
|                                     | Weight               | 44 lbs                | 44 lbs                 | 65 lbs               | 75 lbs            | 117 lbs                | 140 lbs                 | 159 lbs                 | 184 lbs                | 192 lbs           | 196 lbs |
| Mandrel<br>36 in. Stroke            | Part No.             | 29575                 | 29578                  | 29581                | 29584             | 46909                  | 29587                   | 29590                   | 46891                  | 25182             | 46894   |
|                                     | Weight               | 18 lbs                | 18 lbs                 | 27 lbs               | 30 lbs            | 54 lbs                 | 40 lbs                  | 65 lbs                  | 90 lbs                 | 79 lbs            | 99 lbs  |
| Middle Body<br>36 in. Stroke        | Part No.             | 29576                 | 29579                  | 29582                | 29585             | 46910                  | 29588                   | 29591                   | 46892                  | 25181             | 46895   |
|                                     | Weight               | 12 lbs                | 13 lbs                 | 18 lbs               | 22 lbs            | 39 lbs                 | 58 lbs                  | 45 lbs                  | 55 lbs                 | 54 lbs            | 56 lbs  |
| Complete Assembly<br>42 in. Stroke  | Part No.             | 29619                 | 29622                  | 29625                | 29628             | 46935                  | 16933                   | 29643                   | 46917                  | 29646             | 46920   |
|                                     | Weight               | 44 lbs                | 44 lbs                 | 63 lbs               | 72 lbs            | 129 lbs                | 139 lbs                 | 157 lbs                 | 208 lbs                | 191 lbs           | 221 lbs |
| Mandrel<br>42 in. Stroke            | Part No.             | 29620                 | 29623                  | 29626                | 29629             | 46936                  | 16935                   | 29644                   | 46918                  | 29647             | 46921   |
|                                     | Weight               | 21 lbs                | 21 lbs                 | 31 lbs               | 36 lbs            | 60 lbs                 | 46 lbs                  | 75 lbs                  | 105 lbs                | 92 lbs            | 115 lbs |
| Middle Body<br>42 in. Stroke        | Part No.             | 29621                 | 29624                  | 29627                | 29642             | 46937                  | 16934                   | 29645                   | 46919                  | 29648             | 46922   |
|                                     | Weight               | 15 lbs                | 15 lbs                 | 21 lbs               | 25 lbs            | 45 lbs                 | 67 lbs                  | 52 lbs                  | 64 lbs                 | 63 lbs            | 65 lbs  |
| Complete Assembly<br>48 in. Stroke  | Part No.             | 29682                 | 29685                  | 29688                | 29691             | 46962                  | 16936                   | 29694                   | 46944                  | 29697             | 46947   |
|                                     | Weight               | 49 lbs                | 49 lbs                 | 70 lbs               | 81 lbs            | 148 lbs                | 156 lbs                 | 175 lbs                 | 236 lbs                | 214 lbs           | 247 lbs |
| Mandrel<br>48 in. Stroke            | Part No.             | 29683                 | 29686                  | 29689                | 29692             | 46963                  | 16938                   | 29695                   | 46945                  | 29698             | 46948   |
|                                     | Weight               | 24 lbs                | 24 lbs                 | 36 lbs               | 41 lbs            | 72 lbs                 | 53 lbs                  | 86 lbs                  | 124 lbs                | 106 lbs           | 132 lbs |
| Middle Body<br>48 in. Stroke        | Part No.             | 29684                 | 29687                  | 29690                | 29693             | 46964                  | 16937                   | 29696                   | 46946                  | 29699             | 46949   |
|                                     | Weight               | 17 lbs                | 17 lbs                 | 24 lbs               | 29 lbs            | 52 lbs                 | 77 lbs                  | 60 lbs                  | 73 lbs                 | 72 lbs            | 74 lbs  |
| Complete Assembly<br>60 in. Stroke  | Part No.             | 29748                 | 29751                  | 29754                | 29757             | 46989                  | 29760                   | 29763                   | 46971                  | 29766             | 46974   |
|                                     | Weight               | 59 lbs                | 59 lbs                 | 85 lbs               | 98 lbs            | 174 lbs                | 188 lbs                 | 212 lbs                 | 280 lbs                | 258 lbs           | 299 lbs |
| Mandrel<br>60 in. Stroke            | Part No.             | 29749                 | 29752                  | 29755                | 29758             | 46990                  | 29761                   | 29764                   | 46972                  | 29767             | 46975   |
|                                     | Weight               | 30 lbs                | 30 lbs                 | 45 lbs               | 51 lbs            | 90 lbs                 | 66 lbs                  | 108 lbs                 | 150 lbs                | 132 lbs           | 166 lbs |
| Middle Body<br>60 in. Stroke        | Part No.             | 29750                 | 29753                  | 29756                | 29759             | 46991                  | 29762                   | 29765                   | 46973                  | 29768             | 46976   |
|                                     | Weight               | 21 lbs                | 21 lbs                 | 30 lbs               | 36 lbs            | 65 lbs                 | 46 lbs                  | 75 lbs                  | 91 lbs                 | 90 lbs            | 92 lbs  |



### How to Order

- Specify:
- (1) Complete assembly and part number
  - (2) Size connection
  - (3) Length of stroke



### Recommended Spare Parts:

- (1) 8 non-extrusion rings
- (2) 8 seal protector rings
- (3) 16 knocker seals



### Special Notes:

Standard Stroke for Bumper Subs is 20 inches.

\*Only the mandrel and middle body need be ordered to convert a standard 20 in. stroke assembly to one of greater stroke. All other parts inter change, for a given size. When a long stroke assembly is ordered by assembly number, the entire tool is ordered. To convert, order only the mandrel and middle body, by number.

# Bowen Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Fishing Bumper Subs Specifications (Continued)

|                          |                           |                     |                           |                         |                          |                           |                           |                          |         |
|--------------------------|---------------------------|---------------------|---------------------------|-------------------------|--------------------------|---------------------------|---------------------------|--------------------------|---------|
| <b>Size Connections</b>  | 2 7/8 in.<br>A.P.I., I.F. | 2 7/8 in.<br>E.U.E. | 2 7/8 in.<br>A.P.I., I.F. | 3 1/2 in.<br>A.P.I REG. | 3 1/2 in.<br>A.P.I, F.H. | 3 1/2 in.<br>A.P.I., F.H. | 3 1/2 in.<br>A.P.I., I.F. | 4 1/2 in.<br>A.P.I. REG. |         |
| <b>Outside Diameter</b>  | 4 1/2 in.                 | 4 1/2 in.           | 4 1/2 in.                 | 4 1/2 in.               | 4 3/4 in.                | 4 3/4 in.                 | 4 3/4 in.                 | 5 1/2 in.                |         |
| <b>Inside Diameter</b>   | 1 1/2 in.                 | 2 3/8 in.           | 1 15/16 in.               | 1 1/2 in.               | 1 7/8 in.                | 2 in.                     | 1 1/2 in.                 | 2 in.                    |         |
| <b>Stroke</b>            | 20 in.                    | 20 in.              | 20 in.                    | 20 in.                  | 20 in.                   | 20 in.                    | 20 in.                    | 20 in.                   |         |
| <b>Complete Assembly</b> | <b>Part No.</b>           | 10210               | 36794                     | 41824                   | 10155                    | 29556                     | 39905                     | 10225                    | 10235   |
| <b>20 in. Stroke</b>     | <b>Weight</b>             | 140 lbs             | 152 lbs                   | 140 lbs                 | 165 lbs                  | 190 lbs                   | 200 lbs                   | 210 lbs                  | 270 lbs |

### Replacement Parts

|                                       |                 |        |          |           |        |        |        |         |         |
|---------------------------------------|-----------------|--------|----------|-----------|--------|--------|--------|---------|---------|
| <b>Top Sub</b>                        | <b>Part No.</b> | 10211  | 36795    | 41825     | 10156  | 25274  | 39906  | 10226   | 10236   |
|                                       | <b>Weight</b>   | 22 lbs | 30 lbs   | 25 lbs    | 28 lbs | 32 lbs | 35 lbs | 34 lbs  | 44 lbs  |
| <b>Mandrel Body</b>                   | <b>Part No.</b> | 10213  | 36797    | 10158     | 10158  | 25275  | 39908  | 10228   | 10238   |
|                                       | <b>Weight</b>   | 16 lbs | 16 lbs   | 15 lbs    | 18 lbs | 22 lbs | 25 lbs | 26 lbs  | 33 lbs  |
| <b>Middle Body</b>                    | <b>Part No.</b> | 10212  | 36796    | 10157     | 10157  | 29558  | 39907  | 10227   | 10237   |
| <b>20 in. Stroke</b>                  | <b>Weight</b>   | 38 lbs | 34 lbs   | 33 lbs    | 35 lbs | 40 lbs | 40 lbs | 42 lbs  | 54 lbs  |
| <b>Mandrel</b>                        | <b>Part No.</b> | 10214  | 36798    | 41828     | 10160  | 29557  | 39909  | 10229   | 10239   |
| <b>20 in. Stroke</b>                  | <b>Weight</b>   | 54 lbs | 65 lbs   | 60 lbs    | 78 lbs | 95 lbs | 80 lbs | 100 lbs | 128 lbs |
| <b>Knocker</b>                        | <b>Part No.</b> | 10215  | 36799    | 41829     | 10161  | 25273  | 39910  | 10230   | 10240   |
|                                       | <b>Weight</b>   | 6 lbs  | 7 lbs    | 6 1/2 lbs | 7 lbs  | 9 lbs  | 9 lbs  | 9 lbs   | 12 lbs  |
| <b>Non-Extrusion Ring (4 Req'd.)</b>  | <b>Part No.</b> | 385-40 | 216-44.5 | 385-41    | 385-41 | 385-44 | 216-44 | 385-44  | 385-51  |
| <b>Seal Protector Ring (4 Req'd.)</b> | <b>Part No.</b> | 386-40 | 227-44.5 | 386-41    | 386-41 | 386-44 | 227-44 | 386-44  | 386-51  |
| <b>Knocker Seal Ring (2 Req'd.)</b>   | <b>Part No.</b> | 568337 | 568341   | 568338    | 568338 | 568341 | 568341 | 568341  | 568348  |
| <b>Knocker Lock Screw</b>             | <b>Part No.</b> | 48879  | 48879    | 48879     | 48879  | 54769  | 48879  | 54769   | 43304   |
|                                       | <b>Weight</b>   | 1/8 lb | 1/8 lb   | 1/8 lb    | 1/8 lb | 1/8 lb | 1/8 lb | 1/8 lb  | 1/4 lb  |

### Optional - Extra

|   |                   |   |   |       |       |   |       |   |   |
|---|-------------------|---|---|-------|-------|---|-------|---|---|
| <b>Knocker Assembly W/ Chevron Packing (Fits All Strokes)</b> | <b>Part No.</b>   | — | — | 62774 | 59191 | — | 59177 | — | — |
|   | <b>Weight</b>     | — | — | —     | —     | — | —     | — | — |
| <b>Knocker</b>  | <b>Part No.</b>   | — | — | 62775 | 59192 | — | 59178 | — | — |
|   | <b>Weight</b>     | — | — | —     | —     | — | —     | — | — |
| <b>Packing Ring</b>   | <b>Part No.</b>   | — | — | 62776 | 59193 | — | 59179 | — | — |
|   | <b>Weight</b>     | — | — | —     | —     | — | —     | — | — |
| <b>Center Ring</b>  | <b>Part No.</b>   | — | — | 62777 | 59194 | — | 59180 | — | — |
|   | <b>Weight</b>     | — | — | —     | —     | — | —     | — | — |
| <b>Chevron Packing Set</b>                                    | <b>Part No.</b>   | — | — | 62778 | 59195 | — | 59181 | — | — |
|   | <b>Weight</b>     | — | — | —     | —     | — | —     | — | — |
| <b>Retaining Ring</b>   | <b>Part No.</b>   | — | — | 59182 | 59196 | — | 59182 | — | — |
|   | <b>Weight</b>     | — | — | —     | —     | — | —     | — | — |
| <b>Packing Retainer (2 Req'd.)</b>                            | <b>Gals. Req.</b> | — | — | 62780 | 59197 | — | 59183 | — | — |
|   | <b>Weight</b>     | — | — | —     | —     | — | —     | — | — |



### How to Order

- Specify:
- (1) Complete assembly and part number
  - (2) Size connection
  - (3) Length of stroke



### Recommended Spare Parts:

- (1) 8 non-extrusion rings
- (2) 8 seal protector rings
- (3) 16 knocker seals



### Special Notes:

Standard Stroke for Bumper Subs is 20 inches.  
See pages 8, 10, and 12 for strokes greater than 20 inches.

# Bowen Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Fishing Bumper Sub (Continued) – Long Stroke (Greater Than 20 in.) Assemblies

| Size Connections                    |          | 2 7/8 in.<br>A.P.I., I.F. | 2 1/2 in.<br>E.U.E. | 2 1/8 in.<br>A.P.I., I.F. | 3 1/2 in.<br>A.P.I REG. | 3 1/2 in.<br>A.P.I, F.H. | 3 1/2 in.<br>A.P.I., F.H. | 3 1/2 in.<br>A.P.I., I.F. | 4 1/2 in.<br>A.P.I. REG. |
|-------------------------------------|----------|---------------------------|---------------------|---------------------------|-------------------------|--------------------------|---------------------------|---------------------------|--------------------------|
| Outside Diameter                    |          | 4 1/8 in.                 | 4 1/2 in.           | 4 1/4 in.                 | 4 1/4 in.               | 4 3/8 in.                | 4 3/4 in.                 | 4 3/4 in.                 | 5 1/2 in.                |
| Inside Diameter                     |          | 1 1/2 in.                 | 2 3/8 in.           | 1 15/16 in.               | 1 1/2 in.               | 1 7/8 in.                | 2 in.                     | 1 1/2 in.                 | 2 in.                    |
| Complete Assembly<br>30 in. Stroke* | Part No. | 29547                     | 46875               | 46872                     | 29553                   | 29559                    | 46878                     | 29562                     | 29571                    |
|                                     | Weight   | 186 lbs                   | 200 lbs             | 186 lbs                   | 222 lbs                 | 258 lbs                  | 250 lbs                   | 281 lbs                   | 361 lbs                  |
| Mandrel<br>30 in. Stroke*           | Part No. | 29548                     | 46876               | 46873                     | 29554                   | 29560                    | 46879                     | 29563                     | 29572                    |
|                                     | Weight   | 81 lbs                    | 97 lbs              | 90 lbs                    | 117 lbs                 | 143 lbs                  | 120 lbs                   | 150 lbs                   | 192 lbs                  |
| Middle Body<br>30 in. Stroke*       | Part No. | 29549                     | 46877               | 46874                     | 29555                   | 29561                    | 46880                     | 29564                     | 29573                    |
|                                     | Weight   | 57 lbs                    | 49 lbs              | 48 lbs                    | 53 lbs                  | 60 lbs                   | 60 lbs                    | 63 lbs                    | 81 lbs                   |
| Complete Assembly<br>36 in. Stroke  | Part No. | 29595                     | 46902               | 46899                     | 25185                   | 29601                    | 46905                     | 29604                     | 29607                    |
|                                     | Weight   | 213 lbs                   | 229 lbs             | 23 lbs                    | 257 lbs                 | 298 lbs                  | 286 lbs                   | 324 lbs                   | 415 lbs                  |
| Mandrel<br>36 in. Stroke            | Part No. | 29596                     | 46903               | 46900                     | 25187                   | 29602                    | 46906                     | 29605                     | 29608                    |
|                                     | Weight   | 97 lbs                    | 117 lbs             | 108 lbs                   | 142 lbs                 | 171 lbs                  | 144 lbs                   | 180 lbs                   | 230 lbs                  |
| Middle Body<br>36 in. Stroke        | Part No. | 29597                     | 46904               | 46901                     | 25186                   | 29603                    | 46907                     | 29606                     | 29609                    |
|                                     | Weight   | 68 lbs                    | 58 lbs              | 57 lbs                    | 63 lbs                  | 72 lbs                   | 72 lbs                    | 76 lbs                    | 97 lbs                   |
| Complete Assembly<br>42 in. Stroke  | Part No. | 29652                     | 46929               | 46926                     | 29658                   | 25270                    | 46932                     | 29661                     | 29664                    |
|                                     | Weight   | 242 lbs                   | 258 lbs             | 240 lbs                   | 290 lbs                 | 339 lbs                  | 322 lbs                   | 466 lbs                   | 471 lbs                  |
| Mandrel<br>42 in. Stroke            | Part No. | 29653                     | 46930               | 46927                     | 29659                   | 25272                    | 46933                     | 29662                     | 29665                    |
|                                     | Weight   | 114 lbs                   | 137 lbs             | 126 lbs                   | 164 lbs                 | 200 lbs                  | 168 lbs                   | 210 lbs                   | 269 lbs                  |
| Middle Body<br>42 in. Stroke        | Part No. | 29654                     | 46931               | 46928                     | 29660                   | 25271                    | 46934                     | 29663                     | 29666                    |
|                                     | Weight   | 80 lbs                    | 67 lbs              | 66 lbs                    | 74 lbs                  | 84 lbs                   | 84 lbs                    | 188 lbs                   | 114 lbs                  |
| Complete Assembly<br>48 in. Stroke  | Part No. | 29703                     | 46956               | 46953                     | 29709                   | 29712                    | 46959                     | 29715                     | 29718                    |
|                                     | Weight   | 269 lbs                   | 286 lbs             | 267 lbs                   | 323 lbs                 | 379 lbs                  | 358 lbs                   | 409 lbs                   | 523 lbs                  |
| Mandrel<br>48 in. Stroke            | Part No. | 29704                     | 46957               | 46954                     | 29710                   | 29713                    | 46960                     | 29716                     | 29719                    |
|                                     | Weight   | 130 lbs                   | 156 lbs             | 144 lbs                   | 187 lbs                 | 228 lbs                  | 192 lbs                   | 240 lbs                   | 307 lbs                  |
| Middle Body<br>48 in. Stroke        | Part No. | 29705                     | 46958               | 46955                     | 39711                   | 29714                    | 46961                     | 29717                     | 29735                    |
|                                     | Weight   | 91 lbs                    | 76 lbs              | 75 lbs                    | 84 lbs                  | 96 lbs                   | 96 lbs                    | 101 lbs                   | 130 lbs                  |
| Complete Assembly<br>60 in. Stroke  | Part No. | 29772                     | 46983               | 46980                     | 29778                   | 29781                    | 46986                     | 29781                     | 29787                    |
|                                     | Weight   | 324 lbs                   | 343 lbs             | 321 lbs                   | 391 lbs                 | 460 lbs                  | 430 lbs                   | 494 lbs                   | 634 lbs                  |
| Mandrel<br>60 in. Stroke            | Part No. | 29773                     | 46984               | 46981                     | 29779                   | 29782                    | 46987                     | 29782                     | 29788                    |
|                                     | Weight   | 162 lbs                   | 195 lbs             | 180 lbs                   | 234 lbs                 | 285 lbs                  | 240 lbs                   | 300 lbs                   | 384 lbs                  |
| Middle Body<br>60 in. Stroke        | Part No. | 29774                     | 46985               | 46982                     | 29780                   | 29783                    | 46988                     | 29783                     | 29789                    |
|                                     | Weight   | 114 lbs                   | 94 lbs              | 93 lbs                    | 105 lbs                 | 120 lbs                  | 120 lbs                   | 126 lbs                   | 162 lbs                  |



### How to Order

- Specify:
- (1) Complete assembly and part number
  - (2) Size connection
  - (3) Length of stroke



### Recommended Spare Parts:

- (1) 8 non-extrusion rings
- (2) 8 seal protector rings
- (3) 16 knocker seals



### Special Notes:

Standard Stroke for Bumper Subs is 20 inches.

\*Only the mandrel and middle body need be ordered to convert a standard 20 in. stroke assembly to one of greater stroke. All other parts inter change, for a given size. When a long stroke assembly is ordered by assembly number, the entire tool is ordered. To convert, order only the mandrel and middle body, by number.

# Bowen Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Fishing Bumper Subs Specifications (Continued)

|                          |                     |                     |                     |                     |                     |                         |                         |                         |       |
|--------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------------|-------------------------|-------------------------|-------|
| <b>Size Connections</b>  | 4 ½<br>A.P.I., F.H. | 4 ½<br>A.P.I., F.H. | 4 ½<br>A.P.I., I.F. | 4 ½<br>A.P.I., I.F. | 5 ½<br>A.P.I., REG. | 6 ½ in.<br>A.P.I., REG. | 6 ½ in.<br>A.P.I., REG. | 7 ½ in.<br>A.P.I., REG. |       |
| <b>Outside Diameter</b>  | 5 ¾ in.             | 6 in.               | 6 ½ in.             | 6 ½ in.             | 6 ¾ in.             | 7 ¾ in.                 | 8 in.                   | 9 in.                   |       |
| <b>Inside Diameter</b>   | 2 in.               | 2 in.               | 2 ¼ in.             | 2 ¼ in.             | 2 ¾ in.             | 3 ½ in.                 | 3 ½ in.                 | 4 in.                   |       |
| <b>Stroke</b>            | 20 in.              | 20 in.              | 20 in.              | 20 in.              | 20 in.              | 20 in.                  | 20 in.                  | 20 in.                  |       |
| <b>Complete Assembly</b> | <b>Part No.</b>     | 10135               | 10135               | 10257               | 10257               | 10690                   | 26595                   | 26595                   | 61596 |
| <b>20 in. Stroke</b>     | <b>Weight</b>       | 295 lbs             | 334 lbs             | 355 lbs             | 370 lbs             | 455 lbs                 | 620 lbs                 | 913 lbs                 | —     |

### Replacement Parts

|  |                 |         |         |         |         |         |         |         |          |
|--|-----------------|---------|---------|---------|---------|---------|---------|---------|----------|
| <b>Top Sub</b>                             | <b>Part No.</b> | 10136   | 10136   | 10258   | 10258   | 10691   | 26596   | 26596   | 61597    |
|  | <b>Weight</b>   | 51 lbs  | 54 lbs  | 56 lbs  | 60 lbs  | 74 lbs  | 90 lbs  | 98 lbs  | 185 lbs  |
| <b>Mandrel Body</b>                        | <b>Part No.</b> | 10138   | 10138   | 10267   | 10267   | 10693   | 26598   | 26598   | 61599    |
|  | <b>Weight</b>   | 36 lbs  | 39 lbs  | 44 lbs  | 50 lbs  | 57 lbs  | 83 lbs  | 91 lbs  | 80 lbs   |
| <b>Middle Body</b><br><b>20 in. Stroke</b> | <b>Part No.</b> | 10137   | 10137   | 10262   | 10262   | 10692   | 26597   | 26597   | 61598    |
|  | <b>Weight</b>   | 60 lbs  | 80 lbs  | 80 lbs  | 76 lbs  | 88 lbs  | 115 lbs | 125 lbs | 185 lbs  |
| <b>Mandrel</b><br><b>20 in. Stroke</b>     | <b>Part No.</b> | 10140   | 10140   | 10268   | 10268   | 10694   | 26599   | 26599   | 61600    |
|  | <b>Weight</b>   | 138 lbs | 135 lbs | 155 lbs | 168 lbs | 210 lbs | 300 lbs | 330 lbs | 420 lbs  |
| <b>Knocker</b>                             | <b>Part No.</b> | 10141   | 10141   | 10250   | 10250   | 10695   | 26594   | 26594   | 61601    |
|  | <b>Weight</b>   | 13 lbs  | 13 lbs  | 15 lbs  | 15 lbs  | 22 lbs  | 30 lbs  | 30 lbs  | 42 lbs   |
| <b>Non-Extrusion Ring (4 Req'd.)</b>       | <b>Part No.</b> | 385-52  | 385-52  | 385-54  | 385-54  | 385-58  | 385-65  | 385-65  | 216-68.5 |
|  | <b>Weight</b>   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb     |
| <b>Seal Protector Ring (4 Req'd.)</b>      | <b>Part No.</b> | 386-52  | 386-52  | 386-54  | 386-54  | 386-58  | 386-65  | 386-65  | 227-68.5 |
|  | <b>Weight</b>   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb     |
| <b>Knocker Seal Ring (2 Req'd.)</b>        | <b>Part No.</b> | 568349  | 568349  | 568427  | 568427  | 568431  | 568438  | 568438  | 568441   |
|  | <b>Weight</b>   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb     |
| <b>Knocker Lock Screw</b>                  | <b>Part No.</b> | 43305   | 43305   | 43305   | 43305   | 43305   | 43305   | 43305   | 54770    |
|  | <b>Weight</b>   | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb     |

### Optional - Extra

|   |                   |       |   |   |       |       |       |   |   |
|---|-------------------|-------|---|---|-------|-------|-------|---|---|
| <b>Knocker Assembly W/ Chevron Packing (Fits All Strokes)</b> | <b>Part No.</b>   | 50321 | — | — | 62205 | 57013 | 61103 | — | — |
|   | <b>Weight</b>     | —     | — | — | —     | —     | —     | — | — |
| <b>Knocker</b>  | <b>Part No.</b>   | 50322 | — | — | 62206 | 57014 | 61104 | — | — |
|   | <b>Weight</b>     | —     | — | — | —     | —     | —     | — | — |
| <b>Packing Ring</b>   | <b>Part No.</b>   | 50323 | — | — | 62207 | 57015 | 61105 | — | — |
|   | <b>Weight</b>     | —     | — | — | —     | —     | —     | — | — |
| <b>Center Ring</b>  | <b>Part No.</b>   | 50324 | — | — | 62208 | 62374 | 62378 | — | — |
|   | <b>Weight</b>     | —     | — | — | —     | —     | —     | — | — |
| <b>Chevron Packing Set</b>                                    | <b>Part No.</b>   | 50325 | — | — | 62209 | 57016 | 61106 | — | — |
|   | <b>Weight</b>     | —     | — | — | —     | —     | —     | — | — |
| <b>Retaining Ring</b>   | <b>Part No.</b>   | 50326 | — | — | 13177 | 57017 | 59907 | — | — |
|   | <b>Weight</b>     | —     | — | — | —     | —     | —     | — | — |
| <b>Packing Retainer (2 Req'd.)</b>                            | <b>Gals. Req.</b> | 50009 | — | — | 62210 | 62375 | 62379 | — | — |
|   | <b>Weight</b>     | —     | — | — | —     | —     | —     | — | — |



### How to Order

- Specify:
- (1) Complete assembly and part number
  - (2) Size connection
  - (3) Length of stroke



### Recommended Spare Parts:

- (1) 8 non-extrusion rings
- (2) 8 seal protector rings
- (3) 16 knocker seals



### Special Notes:

Standard Stroke for Bumper Subs is 20 inches.  
See pages 8, 10, and 12 for strokes greater than 20 inches.

# Bowen Fishing Bumper Subs

## Specifications and Replacement Parts

### Bowen Fishing Bumper Sub (Continued) – Long Stroke (Greater Than 20 in.) Assemblies

| Size Connections                    | 4 ½ in.<br>A.P.I., F.H. | 4 ½ in.<br>A.P.I., F.H. | 4 ½ in.<br>A.P.I., I.F. | 4 ½ in.<br>A.P.I., I.F. | 5 ½ in.<br>A.P.I. REG. | 6 ½ in.<br>A.P.I. REG. | 6 ½ in.<br>A.P.I. REG. | 7 ½ in.<br>A.P.I. REG. |          |
|-------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|------------------------|----------|
| Outside Diameter                    | 5 ¾ in.                 | 6 in.                   | 6 ¼ in.                 | 6 ¼ in.                 | 6 ¾ in.                | 7 ¾ in.                | 8 in.                  | 9 in.                  |          |
| Inside Diameter                     | 2 in.                   | 2 in.                   | 2 ¼ in.                 | 2 ¼ in.                 | 2 ¾ in.                | 3 ½ in.                | 3 ½ in.                | 4 in.                  |          |
| Complete Assembly<br>30 in. Stroke* | Part No.                | 16150                   | 16150                   | 20005                   | 20005                  | 14520                  | 29568                  | 29568                  | 70408    |
|                                     | Weight                  | 394 lbs                 | 400 lbs                 | 473 lbs                 | 443 lbs                | 606 lbs                | 805 lbs                | 860 lbs                | 1178 lbs |
| Mandrel<br>30 in. Stroke*           | Part No.                | 16151                   | 16151                   | 20007                   | 20007                  | 14522                  | 29569                  | 29569                  | 70410    |
|                                     | Weight                  | 207 lbs                 | 158 lbs                 | 233 lbs                 | 196 lbs                | 315 lbs                | 450 lbs                | 480 lbs                | 611 lbs  |
| Middle Body<br>30 in. Stroke*       | Part No.                | 16152                   | 16152                   | 20006                   | 20006                  | 14521                  | 29570                  | 29570                  | 70409    |
|                                     | Weight                  | 90 lbs                  | 122 lbs                 | 120 lbs                 | 101 lbs                | 134 lbs                | 165 lbs                | 175 lbs                | 259 lbs  |
| Complete Assembly<br>36 in. Stroke  | Part No.                | 10147                   | 10147                   | 29610                   | 29610                  | 13590                  | 26916                  | 29616                  | 70411    |
|                                     | Weight                  | 454 lbs                 | 442 lbs                 | 543 lbs                 | 475 lbs                | 693 lbs                | 928 lbs                | 983 lbs                | 1341 lbs |
| Mandrel<br>36 in. Stroke            | Part No.                | 10149                   | 10149                   | 29611                   | 29611                  | 13592                  | 29617                  | 29617                  | 70413    |
|                                     | Weight                  | 249 lbs                 | 175 lbs                 | 279 lbs                 | 213 lbs                | 378 lbs                | 540 lbs                | 570 lbs                | 725 lbs  |
| Middle Body<br>36 in. Stroke        | Part No.                | 10148                   | 10148                   | 29612                   | 29612                  | 13591                  | 29618                  | 29618                  | 70412    |
|                                     | Weight                  | 108 lbs                 | 148 lbs                 | 144 lbs                 | 116 lbs                | 158 lbs                | 198 lbs                | 208 lbs                | 308 lbs  |
| Complete Assembly<br>42 in. Stroke  | Part No.                | 29667                   | 29667                   | 29670                   | 29670                  | 29676                  | 29679                  | 29679                  | 70414    |
|                                     | Weight                  | 513 lbs                 | 483 lbs                 | 613 lbs                 | 508 lbs                | 783 lbs                | 1051 lbs               | 1106 lbs               | 1505 lbs |
| Mandrel<br>42 in. Stroke            | Part No.                | 29668                   | 29668                   | 29671                   | 29671                  | 29677                  | 29680                  | 29680                  | 70416    |
|                                     | Weight                  | 290 lbs                 | 191 lbs                 | 325 lbs                 | 230 lbs                | 420 lbs                | 630 lbs                | 660 lbs                | 840 lbs  |
| Middle Body<br>42 in. Stroke        | Part No.                | 29669                   | 29669                   | 29672                   | 29672                  | 29678                  | 29681                  | 29681                  | 70415    |
|                                     | Weight                  | 126 lbs                 | 173 lbs                 | 168 lbs                 | 132 lbs                | 185 lbs                | 231 lbs                | 241 lbs                | 357 lbs  |
| Complete Assembly<br>48 in. Stroke  | Part No.                | 19880                   | 19880                   | 29736                   | 29736                  | 29742                  | 29745                  | 29745                  | 70417    |
|                                     | Weight                  | 572 lbs                 | 525 lbs                 | 684 lbs                 | 555 lbs                | 871 lbs                | 1174 lbs               | 1229 lbs               | 1643 lbs |
| Mandrel<br>48 in. Stroke            | Part No.                | 19881                   | 19881                   | 29737                   | 29737                  | 29743                  | 29746                  | 29746                  | 70419    |
|                                     | Weight                  | 331 lbs                 | 206 lbs                 | 372 lbs                 | 247 lbs                | 503 lbs                | 720 lbs                | 730 lbs                | 929 lbs  |
| Middle Body<br>48 in. Stroke        | Part No.                | 19882                   | 19882                   | 29738                   | 29738                  | 29744                  | 29747                  | 29747                  | 70418    |
|                                     | Weight                  | 144 lbs                 | 200 lbs                 | 192 lbs                 | 132 lbs                | 211 lbs                | 264 lbs                | 274 lbs                | 406 lbs  |
| Complete Assembly<br>60 in. Stroke  | Part No.                | 29790                   | 29790                   | 25385                   | 25385                  | 29796                  | 29799                  | 29799                  | 70420    |
|                                     | Weight                  | 691 lbs                 | 606 lbs                 | 825 lbs                 | 705 lbs                | 1081 lbs               | 1420 lbs               | 1475 lbs               | 1995 lbs |
| Mandrel<br>60 in. Stroke            | Part No.                | 29791                   | 29791                   | 25387                   | 25387                  | 29797                  | 29800                  | 29800                  | 70422    |
|                                     | Weight                  | 414 lbs                 | 237 lbs                 | 465 lbs                 | 281 lbs                | 660 lbs                | 900 lbs                | 930 lbs                | 1184 lbs |
| Middle Body<br>60 in. Stroke        | Part No.                | 29792                   | 29792                   | 25386                   | 25386                  | 29798                  | 29801                  | 29801                  | 70421    |
|                                     | Weight                  | 180 lbs                 | 250 lbs                 | 240 lbs                 | 178 lbs                | 264 lbs                | 330 lbs                | 340 lbs                | 503 lbs  |



### How to Order

- Specify:
- (1) Complete assembly and part number
  - (2) Size connection
  - (3) Length of stroke



### Recommended Spare Parts:

- (1) 8 non-extrusion rings
- (2) 8 seal protector rings
- (3) 16 knocker seals



### Special Notes:

Standard Stroke for Bumper Subs is 20 inches.

\*Only the mandrel and middle body need be ordered to convert a standard 20 in. stroke assembly to one of greater stroke. All other parts inter change, for a given size. When a long stroke assembly is ordered by assembly number, the entire tool is ordered. To convert, order only the mandrel and middle body, by number.

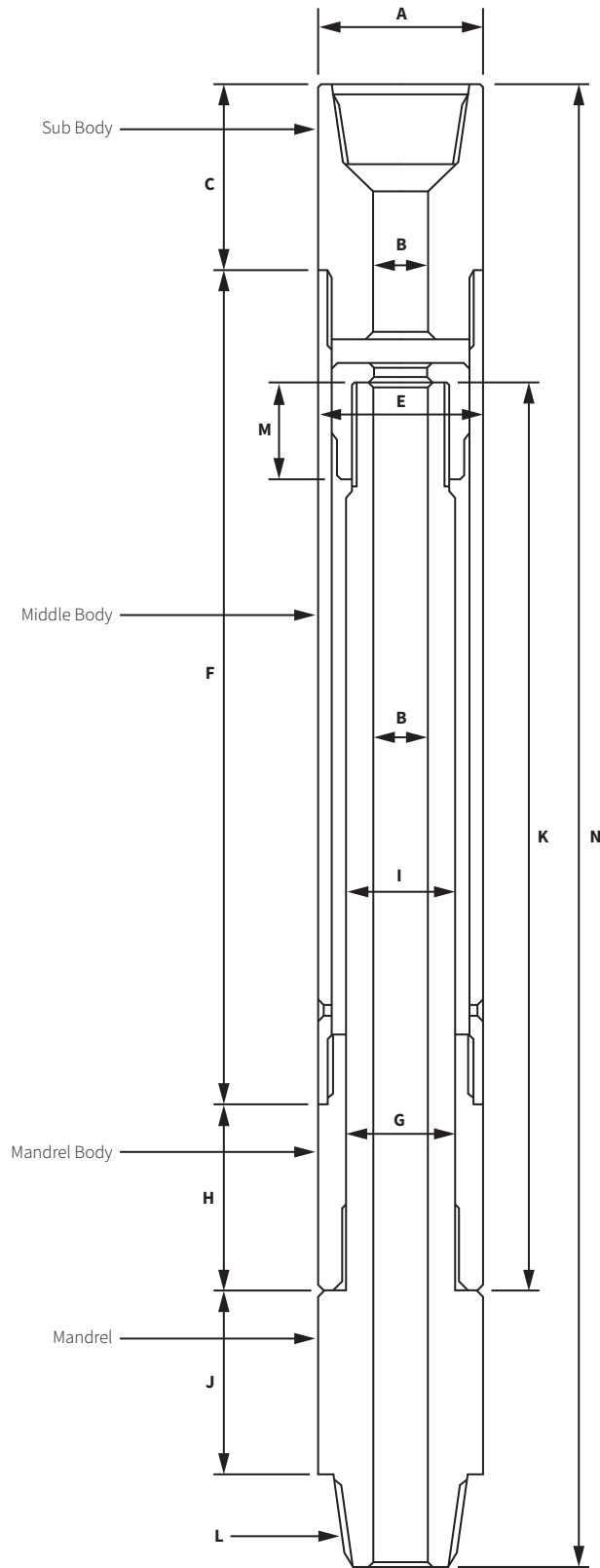
# Bowen Fishing Bumper Subs

## Bowen Fishing Bumper Sub – Principal Dimensions

| Part<br>Key                                | Sub Body   |           |                |                        | Middle Body |             |                | Mandrel Body |             |                | Mandrel     |           |                |              |                        | Knocker     |           |            |             |
|--|------------|-----------|----------------|------------------------|-------------|-------------|----------------|--------------|-------------|----------------|-------------|-----------|----------------|--------------|------------------------|-------------|-----------|------------|-------------|
|  | A          | B         | C              | D                      | A           | E           | F              | A            | G           | H              | I           | B         | J              | K            | L                      | E           | B         | M          | N           |
| Name                                       | O.D.       | I.D. Hole | Outside Length | Con-<br>nection        | O.D.        | I.D.        | Outside Length | O.D.         | I.D. (Hex)  | Outside Length | O.D. (Hex)  | I.D. Hole | Outside Length | Length (Hex) | Con-<br>nection        | O.D.        | I.D. Hole | Length     | Overall     |
| Symbol No. 10120<br>1 ¼ in.<br>Ext. Flush  | 1 1/16 in. | 3/8 in.   | 4 in.          | 1 ¼ in.<br>Ext. Flush  | 1 1/16 in.  | 1 1/32 in.  | 28 ½ in.       | 1 1/16 in.   | 1 1/32 in.  | 3 in.          | 1 3/32 in.  | 3/8 in.   | 3 5/16 in.     | 28 1/8 in.   | 1 ¼ in.<br>Ext. Flush  | 1 7/16 in.  | 3/8 in.   | 4 9/16 in. | 41 ¾ in.    |
| Symbol No. 18785<br>1 ¼ in.<br>API-REG.    | 2 ¼ in.    | ½ in.     | 5 11/16 in.    | 1 ¼ in.<br>API-REG.    | 2 ¼ in.     | 1 ¾ in.     | 27 3/16 in.    | 2 ¼ in.      | 1 3/16 in.  | 2 ¾ in.        | 1 29/64 in. | ½ in.     | 5 ½ in.        | 26 3/16 in.  | 1 ¼ in.<br>API-REG.    | 1 47/64     | ½ in.     | 3 ¼ in.    | 43 9/16 in. |
| Symbol No. 10175<br>2 ¾ in.<br>Ext. flush  | 2 ½ in.    | ½ in.     | 4 in.          | 2 ¾ in.<br>Ext. flush  | 2 ½ in.     | 2 in.       | 28 ½ in.       | 2 ½ in.      | 1 1/32 in.  | 3 in.          | 1 21/32 in. | ½ in.     | 4 in.          | 28 ½ in.     | 2 ¾ in.<br>Ext. flush  | 1 63/64 in. | ½ in.     | 4 9/16 in. | 42 in.      |
| Symbol No. 10105<br>2 ¾ in.<br>API-REG.    | 3 3/32 in. | 1 in.     | 6 in.          | 2 ¾ in.<br>API-REG.    | 3 3/32 in.  | 2 39/64 in. | 31 ¾ in.       | 3 3/32 in.   | 1 29/32 in. | 6 in.          | 2 3/32 in.  | 1 in.     | 6 in.          | 33 ¾ in.     | 2 ¾ in.<br>API-REG.    | 2 37/64 in. | 1 in.     | 5 ½ in.    | 52 ¾ in.    |
| Symbol No. 10190<br>2 ¾ in.<br>API-I.F.    | 3 ¾ in.    | 1 in.     | 6 in.          | 2 ¾ in.<br>API-I.F.    | 3 ¾ in.     | 2 13/16 in. | 31 ¾ in.       | 3 ¾ in.      | 2 1/2 in.   | 6 in.          | 2 1/16 in.  | 1 in.     | 6 in.          | 33 ¾ in.     | 2 ¾ in.<br>API-I.F.    | 2 51/64 in. | 1 in.     | 5 ½ in.    | 52 ¾ in.    |
| Symbol No. 10090<br>2 ¾ in.<br>API-REG.    | 3 ¾ in.    | 1 ¼ in.   | 6 in.          | 2 ¾ in.<br>API-REG.    | 3 ¾ in.     | 3 3/32 in.  | 31 ¾ in.       | 3 ¾ in.      | 2 3/32 in.  | 6 in.          | 2 29/64 in. | 1 ¼ in.   | 6 in.          | 33 ¾ in.     | 2 ¾ in.<br>API-REG.    | 3 5/64 in.  | 1 ¼ in.   | 5 ½ in.    | 52 ¾ in.    |
| Symbol No. 10210<br>2 ¾ in.<br>in.API-I.F. | 4 ¼ in.    | 1 ½ in.   | 6 in.          | 2 ¾ in.<br>in.API-I.F. | 4 ¼ in.     | 3 7/16 in.  | 31 ¾ in.       | 4 ¼ in.      | 2 17/32 in. | 6 in.          | 2 57/64 in. | 1 ½ in.   | 6 in.          | 33 ¾ in.     | 2 ¾ in.<br>in.API-I.F. | 3 27/64 in. | 1 ½ in.   | 5 ½ in.    | 52 ¾ in.    |
| Symbol No. 10155<br>3 ½ in.<br>API-REG.    | 4 ¼ in.    | 1 ½ in.   | 8 in.          | 3 ½ in.<br>API-REG.    | 4 ¼ in.     | 3 39/64 in. | 31 ¾ in.       | 4 ¼ in.      | 2 23/32 in. | 8 in.          | 3 7/64 in.  | 1 ½ in.   | 8 in.          | 35 ½ in.     | 3 ½ in.<br>API-REG.    | 3 37/64 in. | 1 ½ in.   | 4 7/8 in.  | 59 ½ in.    |
| Symbol No. 10170<br>3 ½ in.<br>API-F.H.    | 4 ¾ in.    | 1 ½ in.   | 8 in.          | 3 ½ in.<br>API-F.H.    | 4 ¾ in.     | 3 39/64 in. | 31 ¾ in.       | 4 ¾ in.      | 2 23/32 in. | 8 in.          | 3 7/64 in.  | 1 ½ in.   | 8 in.          | 35 ½ in.     | 3 ½ in.<br>API-F.H.    | 3 37/64 in. | 1 ½ in.   | 4 7/8 in.  | 59 ½ in.    |
| Symbol No. 10225<br>3 ½ in.<br>API-I.F.    | 4 ¾ in.    | 1 ½ in.   | 8 in.          | 3 ½ in.<br>API-I.F.    | 4 ¾ in.     | 3 15/16 in. | 31 ¾ in.       | 4 ¾ in.      | 2 27/32 in. | 8 in.          | 3 3/16 in.  | 1 ½ in.   | 8 in.          | 35 ½ in.     | 3 ½ in.<br>API-I.F.    | 3 59/64 in. | 1 ½ in.   | 5 ½ in.    | 59 ¾ in.    |
| Symbol No. 39905<br>3 ½ in.<br>API-I.F.    | 4 ¾ in.    | 2 in.     | 8 ½ in.        | 3 ½ in.<br>API-I.F.    | 4 ¾ in.     | 3 7/64 in.  | 32 15/16 in.   | 4 ¾ in.      | 3 ½ in.     | 8 in.          | 3 ½ in.     | 2 in.     | 8 in.          | 34 7/8 in.   | 3 ½ in.<br>API-I.F.    | 3 7/8 in.   | 2 in.     | 6 1/8 in.  | 61 7/16 in. |
| Symbol No. 10235<br>4 ½ in.<br>API-REG.    | 5 ½ in.    | 2 in.     | 8 in.          | 4 ½ in.<br>API-REG.    | 5 ½ in.     | 4 25/32 in. | 31 ¾ in.       | 5 ½ in.      | 3 17/32 in. | 8 in.          | 4 3/64 in.  | 2 in.     | 8 in.          | 35 ½ in.     | 4 ½ in.<br>API-REG.    | 4 49/64 in. | 2 in.     | 5 ½ in.    | 59 ¾ in.    |
| Symbol No. 10135<br>4 ½ in.<br>API-F.H.    | 5 ¾ in.    | 2 in.     | 8 in.          | 4 ½ in.<br>API-F.H.    | 5 ¾ in.     | 4 63/64 in. | 31 ¾ in.       | 5 ¾ in.      | 3 17/32 in. | 8 in.          | 4 3/64 in.  | 2 in.     | 8 in.          | 35 ½ in.     | 4 ½ in.<br>API-F.H.    | 4 61/64 in. | 2 in.     | 5 ½ in.    | 59 ¾ in.    |
| Symbol No. 10257<br>4 ½ in.<br>API-I.F.    | 6 1/8 in.  | 2 ¼ in.   | 8 in.          | 4 ½ in.<br>API-I.F.    | 6 1/8 in.   | 5 5/32 in.  | 31 ¾ in.       | 6 1/8 in.    | 3 29/32 in. | 8 in.          | 4 21/64 in. | 2 ¼ in.   | 8 in.          | 38 1/8 in.   | 4 ½ in.<br>API-I.F.    | 5 ¼ in.     | 2 ¼ in.   | 5 ½ in.    | 59 ¾ in.    |
| Symbol No. 10690<br>5 ½ in.<br>API-REG.    | 6 ¾ in.    | 2 ¾ in.   | 10 in.         | 5 ½ in.<br>API-REG.    | 6 ¾ in.     | 5 ¾ in.     | 34 ¾ in.       | 6 ¾ in.      | 4 5/32 in.  | 8 in.          | 4 49/64 in. | 2 ¾ in.   | 10 in.         | 36 1/8 in.   | 5 ½ in.<br>API-REG.    | 5 47/64 in. | 2 ¾ in.   | 5 ½ in.    | 67 ¾ in.    |
| Symbol No. 26595<br>6 ¾ in.<br>API-REG.    | 7 ¾ in.    | 3 ½ in.   | 9 29/32 in.    | 6 ¾ in.<br>API-REG.    | 7 ¾ in.     | 6 ¾ in.     | 35 ½ in.       | 7 ¾ in.      | 5 11/64 in. | 7 13/32 in.    | 5 ½ in.     | 3 ½ in.   | 9 ¾ in.        | 36 7/8 in.   | 6 ¾ in.<br>API-REG.    | 6 47/64 in. | 3 ½ in.   | 5 ½ in.    | 67 3/16 in. |
| Symbol No. 61596<br>7 ¾ in.<br>API-REG.    | 9 in.      | 4 in.     | 11 ½ in.       | 7 ¾ in.<br>API-REG.    | 9 in.       | 7 ¾ in.     | 36 ¾ in.       | 9 in.        | 5 63/64 in. | 7 ½ in.        | 5 15/16 in. | 4 in.     | 12 in.         | 37 ¾ in.     | 7 ¾ in.<br>API-REG.    | 7 39/66 in. | 4 in.     | 6 ¼ in.    | 73 in.      |

# Bowen Fishing Bumper Subs

## Bowen Fishing Bumper Sub – Principal Dimensions



Bowen Fishing  
Bumper Sub Principal Dimensions





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# SURFACE BUMPER JAR

Instruction Manual 4300



Surface Bumper Jar

One Company Unlimited Solutions



**NATIONAL OILWELL**

# Surface Bumper Jar

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*The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.*

*Eighteenth Printing, November 2003*



**NATIONAL OILWELL**



**General Description**

The **Bowen Surface Bumper Jar** is especially designed and engineered to be installed in the drilling string at the surface. Its presence permits the operator to deliver sharp descending impacts or (downward) jarring blows against the fish at its stuck-point. By a simple adjustment, the Bowen Surface Bumper Jar may be set to deliver very light blows of very high impact.

**Use**

The Bowen Surface Bumper Jar may be used to great advantage in any situation where the downhole running string (drilling, fishing or washover) becomes stuck, and a heavy downward blow is required to release it. The Bowen Surface Bumper Jar is often used to free key seated drill pipe and drill collars.

It is also used to initiate abrupt jarring blows down the string to actuate Drilling Bumper Subs, Bumper Safety Joints and other similar downhole bumping tools.

The Bowen Surface Bumper Jar is particularly useful for transmitting very heavy downward blows to effect the release of grappling tools such as Overshots or Spears, in situations where the grapples or slips have become imbedded in the fish, or become fouled due to repeated and prolonged downhole jarring.

In many instances, the Bowen Surface Bumper Jar has been successfully utilized, where all previous methods failed.

**Construction**

Basically, the Bowen Surface Bumper Jar is composed of a Mandrel Assembly which works in conjunction with a Bowl Assembly.

The Mandrel Assembly is composed of a Top Sub, Mandrel and Friction Mandrel.

The Bowl Assembly consists of a Bowl, Bowl Extension, Bottom Sub, Knocker Sub, Friction Slip Spacer, Control Ring, Control Ring Plug, Seal Insert and Washpipe.

The Washpipe, which is connected to the Bottom Sub and moves inside of the Main Mandrel, is sealed from the Main Mandrel by the Seal Insert confining the well fluids within the Washpipe and out of the restraining mechanism within the Bowl.

The Main Mandrel, which is hexagon in shape, fits into a correspondingly shaped bore in the Knocker Sub, where it is continuously capable of transmitting torque, while also free to move up and down over its entire 48" stroke.

Control of the Bowen Surface Bumper Jar is exercised by the action of the restraining mechanism of the Friction Mandrel, the Friction Slip, the Friction Slip Spacer and the Control Ring. The Tonnage (the striking force of the jar) is adjusted by setting the Control Ring.

Top and Bottom Subs are furnished with a 5-1/2" F.H. connection. The Top Sub is a box connection and the Bottom Sub is a pin connection. A lifting sub is provided for the top connection for the purpose of transporting and/or lifting the Surface Jar.



**Bowen Surface Bumper Jar**



### **Explanation of Mechanism**

Referring to the illustration on page 5, it can be seen that the Friction Slip is restricted within the tapered bowl by the Control Ring. Turning the Control Ring to the right or to the left moves the Friction Slip up or down the taper, thereby either increasing or decreasing its ability to expand. There are internal Rings (raised areas) within the Friction Slip which must pass over the external Rings (raised areas) of the Friction Mandrel in order to pull the Jar into its open position and to produce the jarring blow.

When the Surface Bumper Jar is being opened or tripped, the Friction Mandrel pulls the Friction Slip into a reduced section of the taper in the Bowl and against the bottom of the Control Ring. Hence, depending upon the position of the Control Ring, only a slight pull or a pull of many tons is required to open the jar.

When the Surface Bumper Jar is installed at the surface and a straight upward pull is exerted against it, the Friction Slip frictions upon the enclosed friction Mandrel and arrests upward movement while the drill pipe is being stretched. When the upward pull reaches the pre-set tripping tonnage, the Friction Mandrel is pulled through the Friction Slip. The resultant downward surge of the drill pipe in returning to its normal length causes a sudden separation of the Main Mandrel and Bowl assemblies which are free to move apart for the length of its 48-inch stroke and drive the weight of the free pipe against the point where the fish is stuck.

When the Surface Bumper Jar is being closed, the Friction Mandrel pushes the Friction Slip into the enlarged section of the taper in the Bowl and then slides easily through it.

The Control Ring Plug has a projection on its inner end which engages a slot in the Control Ring and prevents it from turning. Removing the Control Ring Plug from the Bowl exposes a port through which the Control Ring may be turned with a Control Ring wrench.

Turning the Control Ring to the right moves it upwardly, in turn, moving the Friction Slip into the smaller diameter of the tapered bowl, therefore constricting the rings more and requiring more tons to open the jar. The words "More Tons" are stamped on the right side of the Control Ring Port.

Turning the Control Ring to the left moves it downwardly, in turn, moving the Friction Slip into the larger diameter of the tapered bowl, therefore expanding the rings more and requiring less tons to open the jar. The words "Less Tons" are stamped on the left side of the Control Ring Port.

**NOTE: The Surface Bumper Jar should be pulled open at the rig site before it is brought from the field to be serviced.**

### **Operation**

In all types of jarring operations, the Bowen Surface Bumper Jar is installed in the drilling string or fishing string just above the rotary table, or at the joint nearest the table. If circulation is desired, connect the kelly to the top the jar. If circulation is not required, connect a single joint of pipe above the jar. Sufficient weight (300 to 400 lbs.) should be run above the jar to close and re-set it.

Always begin jarring operation with a LIGHT tonnage, gradually increasing the tonnage as the operation proceeds. Set the restraining mechanism to light tonnage by adjusting the Control Ring as indicated by the stencil on the Bowl at the Control Ring Plug.

**To adjust the Control Ring, remove the Control Ring Plug and then, using the Control Wrench, rotate the Control Ring to the RIGHT to increase the tripping tonnage or to the LEFT to decrease the tripping tonnage.**

Take an upward strain on the Bowen Surface Bumper Jar. When the upward strain is equal to the previously set tonnage, the restraining mechanism will release and allow the Bowl Assembly to descend rapidly with respect to the Mandrel Assembly for 48 inches. This will cause the weight of the stretched pipe to fall downward against the stuck fish.

### **To Free a Stuck Drill String**

Drill Strings frequently stick on the trip out of the hole by pulling into a keyseat. Install the Bowen Surface Bumper Jar in the drill string as explained above. Set the Jar for light tonnage and begin jarring operations, gradually increasing the tonnage as jarring proceeds, until the drill pipe is free.

**CAUTION: Do not set the tripping tonnage of the Jar higher than the weight between the surface and the point where it is stuck. If the tripping tonnage is set higher than the weight of the amount of free pipe above the stuck point, it will result in the pipe being pulled tighter into the keyseat.**

**Do not use a load setting that will create a stretch in the drill string that is greater than the stroke of the jar. This could cause an impact within the jar and possibly damage the hook or other rig components.**

**Be aware that a sudden freeing of a heavy fish will allow the fish to drop and strike a jarring blow with the jar. This could also damage the rig.**

A similar procedure is observed in all cases of stuck pipe.



### To Actuate a Bumper Sub

Many drilling operators employ Drilling Bumper Subs in the drilling string. Also, almost all fishing operators install a Bumper Sub above engaging tool in a fishing string. When the String, in either case, becomes stuck and the Bumper Sub is ineffective, install a Bowen Surface Bumper Jar in the string as explained above.

Set the Surface Bumper Jar for light tonnage, just enough to open the Bumper Sub. Thereafter, gradually increase tonnage but observe the precaution cited above and do not set the tripping tonnage so high that it exceeds the weight of the free pipe above the stuck point. Continue jarring with the Surface Bumper Jar until the stuck string is free.

### To Release a Fishing Tool

Occasionally, fishing tools or grappling tools such as Overshots or Speaks cannot be released by the normal procedure of bumping down with the weight of the fishing string. This is usually the result of the Grapple or the Slips having become imbedded in the fish or having become fouled due to repeated and prolonged bumping and jarring on the fish.

In such cases, install a Bowen Surface Bumper Jar in the fishing string as explained above. Set the tonnage at a medium tonnage but do not exceed the weight of the free pipe below the Surface Bumper Jar. If there is a Bumper Sub in the string, set the tonnage high enough to insure that the Bumper Sub is pulled into its fully open position. Open the Surface Bumper Jar to effect the release of the Grappling tool. This will usually require only one or two blows.

### Precautions

Always begin Surface Bumper Jar operations with the Jar set for LIGHT jarring, gradually increasing tonnage as jarring operations proceed.

Avoid setting the tonnage of the Surface Bumper Jar to exceed the weight of the free pipe between the Jar and the stuck point. This will usually result in defeating the purpose of the Jar and may stick the pipe tighter.

Occasionally, the Bowen Surface Bumper Jar may become “half-cocked” — where the Jar is neither fully opened nor fully closed. This situation results from having set the tripping tonnage so high that there is insufficient pulling power to trip the Jar and the weight of the pipe above the Jar is insufficient to close it.

It is then necessary to break the Jar out of the string, protect the pin connection thread on the bottom, and strike the Jar sharply against some solid object until the Jar is closed. Then, the Control Ring may be adjusted for less tripping tonnage and the operation resumed.

**NOTE: It is important that the Surface Bumper Jar be opened at the rig site before it is brought in from the field for servicing.**

### Maintenance

The Bowen Surface Bumper Jar normally requires very little maintenance. After each use, it should be thoroughly rinsed out with clear water to remove any drilling fluid that may have been circulated through it. The Jar should be opened so that the surface of the hexagon Main Mandrel may be lubricated with a good grade of heavy weight oil or grease. After lubricating the Main Mandrel, the Jar should be set to minimum tonnage and then closed. The exterior surface may be painted or lubricated to prevent any rust or deterioration.

### Disassembly

Complete disassembly of the Bowen Surface Bumper Jar should proceed as follows:

1. Secure the tool in a suitable vise, clamping it at the Bowl. Do not clamp on the Control Ring Plug.
2. Loosen the Bottom Sub in the Bowl. Remove the Bottom Sub and Washpipe as a unit and lay them aside. Since the Washpipe is tightened into the Bottom Sub, they will remain attached.
3. Remove the Friction Slip spacer from the lower end of the Bowl.
4. Remove the Control Ring Plug and rotate the Control Ring to minimum tonnage position as far as it will go, if this has not previously been done.
5. Slide the Mandrel out far enough to partially open the Jar, releasing the Friction Mandrel from the Friction Slip.
6. Remove the Friction Slip from the inside of the Bowl.
7. Re-clamp the tool, clamping on the Bowl Extension.
8. Break loose and remove the Friction Mandrel from the Main Mandrel. Use the wrench Flats provided on the lower end of the Friction Mandrel to remove it. **DO NOT APPLY A WRENCH TO THE FINISHED SLIP SURFACE!**
9. Remove the Packing Set from the inside, lower end of the Main Mandrel. A screwdriver with a bent end will aid the operator to reach through the bore of the Packing Set and pull it out.
10. Break out and remove the Top Sub.



11. Slide the Mandrel down through the Knocker Sub and Bowl Extension to remove it. Lay it aside.
12. Thoroughly clean and examine all the parts. Replace any damaged or badly worn parts that are found. Examine the Seals or Packing for evidence of damage or too much "permanent set." If they are not in good condition, replace them.

In particular, examine the Washpipe for nicks, scratches or abrasions. Small, superficial scratches and abrasions may be polished out by use of crocus cloth. If the Washpipe includes any severe gouges or scratches, it must be replaced.

To replace the Washpipe, clamp the Bottom Sub in a vise horizontally, supporting the Washpipe end farthest from the Bottom Sub, with a wood timber or other support. Unscrew and remove the damaged Washpipe. Assemble the new Washpipe into the Bottom Sub, taking care to support the free end, to avoid bending the Washpipe.

Clean, good quality thread dope should be applied to each connection as it is made up. All parts should be lubricated with good quality grease or heavyweight oil as they are assembled.

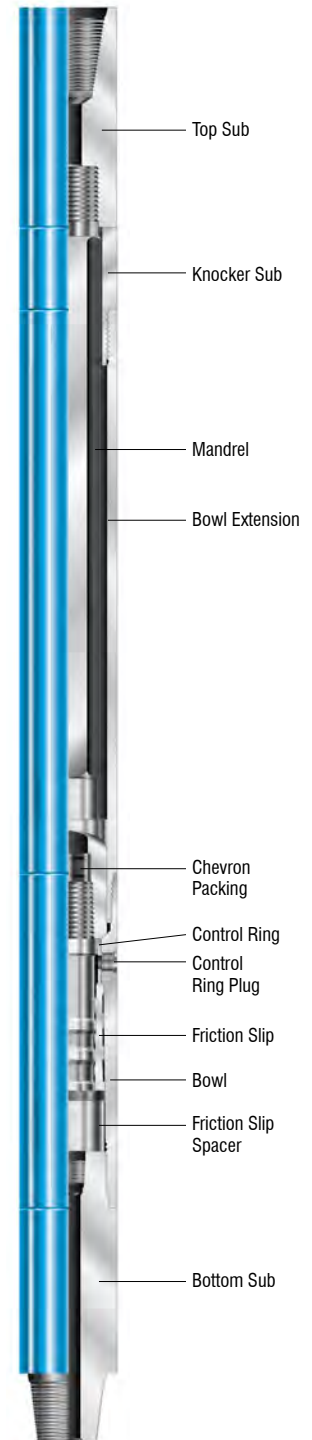
### Assembly

Before assembling the Bowen Surface Bumper Jar, make sure that all of the parts are thoroughly cleaned, lubricated and in good condition. Replace all damaged or badly worn parts.

1. Install the Packing Set into the Seal Insert.
2. Install the two O-Ring Seals on the O.D. of the Seal Insert in the grooves provided. Set the Seal Insert aside for later use.

**NOTE: In the following operations, make sure that thread dope is thoroughly applied to all threads before making them up.**

3. Clamp the Bottom Sub in a suitable vise.
4. Make the Washpipe up to the Bottom Sub. Support the free end of the Washpipe, and do not wrench on the sealing surface of the Washpipe.
5. Remove the Bottom Sub-Washpipe Sub-Assembly from the vise and lay it aside.
6. Clamp the Bowl Extension in the vise.
7. Assemble the Knocker Sub in the Bowl Extension. Wrench it up tight.
8. Insert the threaded end of the Main Mandrel through the Bowl Extension and Knocker Sub.
9. Make the Top Sub up to the end of the Main Mandrel and tighten it.
10. Lubricate the Packing Set and install it into the recess provided in the lower end of the mandrel, seating it securely against the shoulder. It may be necessary to seat the Insert, by placing a hardwood block against it and striking the block a sharp blow with a hammer.



Bowen Surface Bumper Jar



- 11. Insert the Friction Mandrel into the Main Mandrel and Wrench it up tight. Wrench only on the wrench flats provided.
- 12. Install the Control Ring inside the Bowl in the threads provided. In making the setting, the Control Ring is turned back to the lowest point; then, the Slip Setting Gauge is used to achieve the proper low tripping tonnage setting. (The Slip Setting Gauge is a rigid tube of the same outside dimensions and appearance as that of the Friction Slip, except that it does not have the vertical slots cut in it. In addition, a rod is provided which, when screwed into the top edge, serves as a handle for inserting the slip setting gauge into the Bowl of the tool.) The Slip Setting Gauge is placed in the taper of the Bowl and held securely as far into the Bowl as possible. The Control Ring should then be screwed until it moves toward the slip setting gauge and touches the bottom of the slip setting gauge. To screw the Control Ring up until it touches the bottom of the slip setting gauge, the Control Plug should be removed from the Bowl. A screwdriver can be inserted to engage with the adjusting slots in the Control Ring and easily permit screwing the Control Ring toward the Slip Setting Gauge.

Assembly. This piece was assembled in Steps 4 and 5. Grease the Washpipe to cut down Friction on Packing. Insert Washpipe carefully inside the Main Mandrel to avoid damaging the Packing. Make up Bottom Sub to the Bowl.

- 16. Place assembled Tool in tester and adjust control ring to desired tripping load.
- 17. Install the Control Ring Plug into the Control Ring port located on the Bowl.

**Bowen Surface Bumper Jar  
Calculated Strength Data**

|                                   |               |
|-----------------------------------|---------------|
| Maximum Torque at Yield           | 33,800 ft-lbs |
| Maximum Tensile Load at Yield     | 845,000 lbs   |
| Maximum Allowable Pump Pressure   | 8,000 psi     |
| Setting Load * (Tripping Tonnage) | 0 to 50 Tons  |

*\* 0 to 100 tons with optional 9" O.D. Bowl*

*The above tensile strengths are calculated theoretical yield strengths and are considered accurate to ± 20%.*

These figures do not constitute a guarantee, actual or implied. They are meant to serve as a guide only. Appropriate allowance must be made in use as a safety factor.

- 13. Insert the Friction Slip inside the Bowl.
- 14. Insert the Friction Slip Spacer inside the Bowl and up against the Friction Slip.
- 15. Install the Washpipe-Bottom Sub

**Maximum Recommended Tightening Torque for Threaded Connections**

| Assembly No. | Tool O.D. X I.D. (in) | Top Sub to Main Mandrel (ft-lbs) | Knocker Sub to Bowl Extension (ft-lbs) | Bowl Extension to Bowl (ft-lbs) | Bowl to Bottom Sub (ft-lbs) | Main Mandrel to Friction Mandrel | Bottom Sub to Washpipe (ft-lbs) |
|--------------|-----------------------|----------------------------------|--|---------------------------------|-----------------------------|----------------------------------|---------------------------------|
| 74520        | 7 x 1-7/8             | 16,900                           | 16,900                                 | 17,900                          | 17,900                      | 2,700                            | 2,700                           |

*The above makeup torques are the maximum recommended make up torques for each connection. They are set at 50% of the calculated theoretical yield torque.*





**Bowen Surface Bumper Jar**

|                   |          |       |                             |         |
|-------------------|----------|-------|-----------------------------|---------|
|                   |          | 5-1/2 | OBSOLETE<br>(FOR REF. ONLY) | 5-1/2   |
| Connection        |          | F.H.  |                             | F.H.    |
| O.D.              |          | 7     |                             | 7       |
| I.D.              |          | 1-7/8 |                             | 1-7/8   |
| Stroke            |          | 48    |                             | 48      |
| Complete Assembly | Part No. | 74520 |                             | **14770 |
|                   | Weight   | 1160  | 1160                        |         |

**Replacement Parts**

|                |          |       |       |
|----------------|----------|-------|-------|
| Top Sub        | Part No. | 13587 | 13587 |
|                | Weight   | 265   | 265   |
| Knocker Sub    | Part No. | 74522 | 13586 |
|                | Weight   | 50    | 50    |
| Bowl Extension | Part No. | 74523 | 13585 |
|                | Weight   | 455   | 455   |
| Bowl           | Part No. | 74524 | 13582 |
|                | Weight   | 220   | 220   |
| Bottom Sub     | Part No. | 74525 | 13581 |
|                | Weight   | 215   | 215   |
| Main Mandrel   | Part No. | 78609 | 14771 |
|                | Weight   | 298   | 298   |

**How to Order:**

Specify:

- (1) Name and Number of Assembly or Part
- (2) Size and Type of Top and Bottom Connection

Sold Export Only

\*\* Old Design with Tapered Part Connections.

† For optional O-ring seal configuration

**Replacement Parts (Continued)**

|                  |          |       |       |
|------------------|----------|-------|-------|
| Washpipe         | Part No. | 13588 | 13588 |
|                  | Weight   | 58    | 58    |
| Packing Set      | Part No. | 66816 | 13694 |
|                  | Weight   | 4     | 4     |
| Friction Mandrel | Part No. | 78610 | 14772 |
|                  | Weight   | 28    | 28    |
| Control Ring     | Part No. | 844   | 844   |
|                  | Weight   | 3     | 3     |
| Friction Slip    | Part No. | B236  | B236  |
|                  | Weight   | 17    | 17    |
| Friction Slip    | Part No. | 13594 | 13594 |
| Spacer           | Weight   | 4     | 4     |
| Control          | Part No. | 4144  | 4144  |
| Ring Plug        | Weight   | 1/4   | 1/4   |

**Accessories**

|                  |          |        |        |
|------------------|----------|--------|--------|
| Friction Mandrel | Part No. | 14773  | 14773  |
| Socket Wrench    | Weight   | 27-1/2 | 27-1/2 |
|                  | Part No. | 242    | 242    |
| Lifting Sub      | Weight   | 50     | 50     |
| Plug & Control   | Part No. | 86     | 86     |
| Ring Wrench      | Weight   | 1/2    | 1/2    |

**Extra**

|                              |          |        |
|------------------------------|----------|--------|
| Jar Service Kit              | Part No. | 13693  |
| Thread Lubricant (KOPR-KOTE) | Part No. | 153823 |
| Test Sub (Pin)               | Part No. | 13592  |
| Test Sub (Box)               | Part No. | 237-2  |

**Optional**

|                            |          |                   |
|----------------------------|----------|-------------------|
| Seal Insert †              | Part No. | 13665             |
| Non-Extrusion Ring †       | Part No. | 365-37 (2 req'd.) |
| Seal Protector Ring †      | Part No. | 375-37 (2 req'd.) |
| Washpipe Seal †            | Part No. | 568334            |
| Insert Seal †              | Part No. | 568235 (2 req'd.) |
| Seal Insert Removal Tool † | Part No. | 59331             |

**Recommended Spares:**

- (1) 2 Washpipes
- (2) 1 Seal Insert †
- (3) 1 Friction Mandrel
- (4) 1 Control Ring
- (5) 1 Friction Slip
- (6) 1 Control Ring Plug
- (7) 4 Non-Extrusion Rings †
- (8) 4 Seal Protector Rings †
- (9) 6 Packing Sets



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Loyang Crescent,  
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Tel: 65-6542-5211  
Fax: 65-6542-8127

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# ITCOLOY AND MILLING TOOLS

Instruction Manual 5100



**Itcoloy and Milling Tools**

One Company Unlimited Solutions



**NATIONAL OILWELL**

# Itcoloy and Milling Tools

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*The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.*

*Fourteenth Printing, August 2003*



**NATIONAL OILWELL**



## General Description

**Bowen Itcoloy** is a special hardfacing material made of crushed sintered tungsten carbide particles compounded with a resilient matrix of nickel-silver alloy. Bowen Itcoloy is made in rod form for convenience of application wherever oxygen acetylene welding equipment is available.

In oilwell milling, when an Itcoloy hardfaced tool is rotated and lowered against an object (that is, a fish, cement or formation), a multiplicity of small tungsten carbide particles imbed themselves into the object. Each tungsten carbide particle develops a small chip along the edge as it is moved across the object, cutting the object. As a particle's cutting edge becomes dulled, pressures and strains increase within the particle, causing a fracture to occur. Such fractures then create new cutting edges along the fracture plane. This process is repeated with each tungsten carbide particle, continuously renewing the cutting edges until the entire content of tungsten carbide particles is exhausted.

Tungsten carbide particles, with a hardness nearly that of diamonds, retain their hardness at high temperatures and are not affected by the heat generated from the cutting operation. The tough, resilient, nickel-silver alloy matrix securely holds the tungsten carbide particles in place and cushions the particles against severe impact.



*A macro-photograph of a portion of an Itcoloy Rod showing the concentration of tungsten carbide particles imbedded in the nickel-silver alloy matrix.*

## Use of Itcoloy

Bowen Itcoloy is used to form the cutting or milling surfaces on milling shoes, rotary shoes, junk mills, section mills, milling stabilizers, piloted liner mills, or any tool that may be subjected to high abrasive wear and severe impact.

Tools dressed with Itcoloy are used to mill away all kinds of junk, including drill pipe, drill collars, bits, cones, casing, liners, and liner hangers. This advancement in metallurgy — which suspends fragmented tungsten carbide particles in a resilient matrix — provides milling tools requiring minimum torque, that have high-speed cutting ability, and that have increased life or wearing ability.

## Construction of Itcoloy Rod

Bowen Itcoloy consists of selected grades of crushed sintered tungsten carbide particles imbedded in a resilient nickel-silver alloy matrix.

Itcoloy uses only the hardest steel cutting sintered carbides. The sintered tungsten carbides are crushed, then sifted and graded to appropriate screen mesh sizes. After screening, each particle is hand selected to assure sharp, full bodied particles and to eliminate all slivers and splinters that may have passed through the screen mesh.

After screening and grading, the crushed sintered tungsten carbide particles are made into a rod form with a maximum concentration of particles imbedded in a matrix of nickel-silver alloy that holds the particles in suspension. The matrix material has an ultimate shear strength of 100,000 psi.

Bowen Itcoloy is made in rod form so that it may be applied in the field or any shop wherever oxygen acetylene welding equipment is available. For best application, described later in the text, Bowen recommends the use of Bowen Brazing Flux and Bowen Tinning Rod.

## Milling Shoes and Rotary Shoes

**Bowen Milling Shoes** or **Bowen Rotary Shoes** are designed in various sizes and styles to meet the various conditions encountered in oil well fishing and wash-over operations. Illustrated herein are many of the styles with an explanation of their intended service.

**Overshot Milling Shoe** is used to mill away jagged metal from the top of the fish so that the fish will pass easily into the Overshot Bowl.

**Packet Retriever Milling Shoe** is used to mill away the slips of a production packer without damage to the casing so that the remainder of the packer can be retrieved.

**Junk Basket Milling Shoe** is used to mill away jagged edges from small junk or bit cones so that the junk will pass into the basket and be retrieved, or for formation cutting to cut small cores.

**Type A Rotary Shoe** is used to cut metal on the fish without cutting the casing. Cuts on the inside diameter and the bottom. Does not cut on the outside diameter.

**Type B Rotary Shoe** is used for washing over a fish and cutting metal or formation in the open hole. Cuts on the outside diameter and the bottom. Does not cut on the inside diameter.

**Type C Rotary Shoe** is used for washing over and cutting metal, formation or cement. Cuts freely on the inside diameter, the outside diameter, and the bottom.

**Type D Rotary Shoe** is used to cut metal on the fish without cutting the casing where clearances are limited. Cuts on the inside diameter, and the bottom. Does not cut on the outside diameter.



**Overshot Milling Shoe**



**Packer Retriever Milling Shoe**



**Junk Basket Milling Shoe**



**Type A Rotary Shoe**



**Type B Rotary Shoe**



**Type C Rotary Shoe**



**Type D Rotary Shoe**

**Type E Rotary Shoe** is used for washing over a fish and cutting metal, formation or cement in the open hole where clearances are limited. Cuts on the outside diameter and the bottom. Does not cut on the inside diameter.

**Type G Rotary Shoe** is used for washing over and cutting metal, formation or cement in the open hole with limited inside clearances. Cuts on the inside diameter, the outside diameter, and the bottom.

**Type H Rotary Shoe** is used for washing over and cutting metal in the open hole with limited clearance on the outside diameter. Cuts on the inside diameter, the outside diameter, and the bottom.

**Type I Rotary Shoe** is used for washing over and cutting formation only. Saw-tooth design permits maximum circulation. Cuts on the bottom only. Does not cut on the outside diameter or inside diameter.

**Type J Rotary Shoe** is used for washing over and cutting formation only. Saw-tooth design with side wings permits maximum circulation. Cuts on the bottom and on the outside diameter. Does not cut on the inside diameter.

**Type K Rotary Shoe** is used for washing over and cutting on the bottom face only. Does not cut on the outside diameter or the inside diameter.

**Type F Rotary Shoe** is used to size and dress the top of a fish inside the casing. Makes a tapered cut on the inside diameter, and cuts on the bottom. Does not cut on the outside diameter.

Bowen Milling Shoes and Bowen Rotary Shoes hardfaced with Bowen Itcoloy are recommended for all types of washover operations. The increased speed of cutting and penetration makes an Itcoloy hardfaced shoe more economical to use than a conventional hard metal shoe.

Bowen Milling Shoes are used to mill over and free stuck packers, spears, stabilizers, string reamers, rock bits or any metal objects which cannot be removed from the well bore with conventional fishing procedures and fishing tools.

Bowen Rotary Shoes are excellent for washing over stuck pipe to cut away shales, clay, sand, salt, limestone, cement, anhydrite, red beds and other formations.

Graded particle size of Bowen Itcoloy hardfacing for Milling Shoes and Rotary Shoes is determined by the dimensional limitations of the shoe itself, the dimensional limitations of the fish and the well bore, and, finally, the work to be done.

Generally speaking, coarse grades ( $3/8"$  to  $3/16"$ ) of Itcoloy are utilized for metal cutting, and medium grades ( $3/16"$  to  $1/16"$ ) are utilized for formation and cement cutting. The fine grades (10–18 mesh), or smaller, are used to prevent abrasive wear on such items as tool joints, stabilizer subs, etc.

### **Operation of Milling Shoes and Rotary Shoes**

Milling Shoes and Rotary Shoes are used primarily to dress a stuck fish so that a grappling or retrieving tool may engage the fish.

In operation, the penetration rate is affected by the hole condition, the rotary speed, the weight of the drill string upon the milling shoe, the weight and viscosity of the drilling fluid, the dimensional size of the milling shoe, and finally, the size and hardness of the material to be milled. It is apparent from all of these variables that a concise applied weight and revolutions per minute cannot be stated to obtain the most efficient penetration rate expressed in feet per hour.

Therefore, the optimum weight and rotary speed must be determined under actual operating conditions. Revolutions per minute (rpm) may vary from 60 rpm to 175 rpm. Washover or milling operations should begin with moderate speed and low weight. Increase both weight and speed until the desired, or optimum, penetration rate is attained.



**Type E**  
Rotary Shoe



**Type F**  
Rotary Shoe



**Type G**  
Rotary Shoe



**Type H**  
Rotary Shoe



**Type I**  
Rotary Shoe



**Type J**  
Rotary Shoe



**Type K**  
Rotary Shoe

Lower the washover string into the well until the milling shoe is a few feet above the top of the fish. Start the pumps and circulate the hole until the top of the fish is clean. Either conventional or reverse circulation may be used. Reverse circulation is often recommended because the velocity of the returns is greater.

Normal pump pressures are recommended with the mud weight and viscosity being sufficient to circulate the cuttings out of the hole. If metal cuttings in great volume are anticipated, which is not usually the case in washover operations, consideration should be given to removing the metal cuttings from the mud stream to prevent damage to the pumping equipment.

The volume and characteristics of the returned cuttings should be checked frequently since they will provide a great deal of information on the washover progress. Metal cuttings being returned will vary in shape and size due to the Itcoloy particle size being used and the material being milled. Chip size is primarily a function of the quality of the steel being milled.

In the event that the penetration rate declines, it is advisable to change the weight or the rotary speed and, in some cases, to spud lightly to re-establish the desired rate of progress.

### **Milling Tools**

Milling tools are designed to mill away a stuck fish that cannot be retrieved by conventional fishing methods.

Since milling is usually a follow-up operation (after several fishing attempts), the fish to be milled away should be familiar to the operator and therefore the selection of the milling tools should be relatively easy to determine, since the dimensional restrictions of the well bore or casing, and the work to be accomplished are known.

The Milling Tool selected should provide maximum exposure of the milling edge to the material to be milled, maximum replacement of the milling edge as wear occurs, and maximum circulation to remove the cuttings. Examples of Milling Tools are described below.

***NOTE: Conditions that might make an Itcoloy hardfaced pilot undesirable are when the inside of the pipe to be milled is badly damaged, collapsed or contains junk. An Itcoloy hardfaced pilot is not recommended because of the danger of the pilot "side-tracking" through the damaged pipe. In these cases, it is recommended that a Taper Mill be run to restore the inside diameter of the pipe so that the pilot is free to align the pipe.***

### **Operation of Milling Tools**

**Bowen Milling Tools** are simple to operate. For best results, relatively fast rotary speeds should be available as well as drill collars and drill pipe.

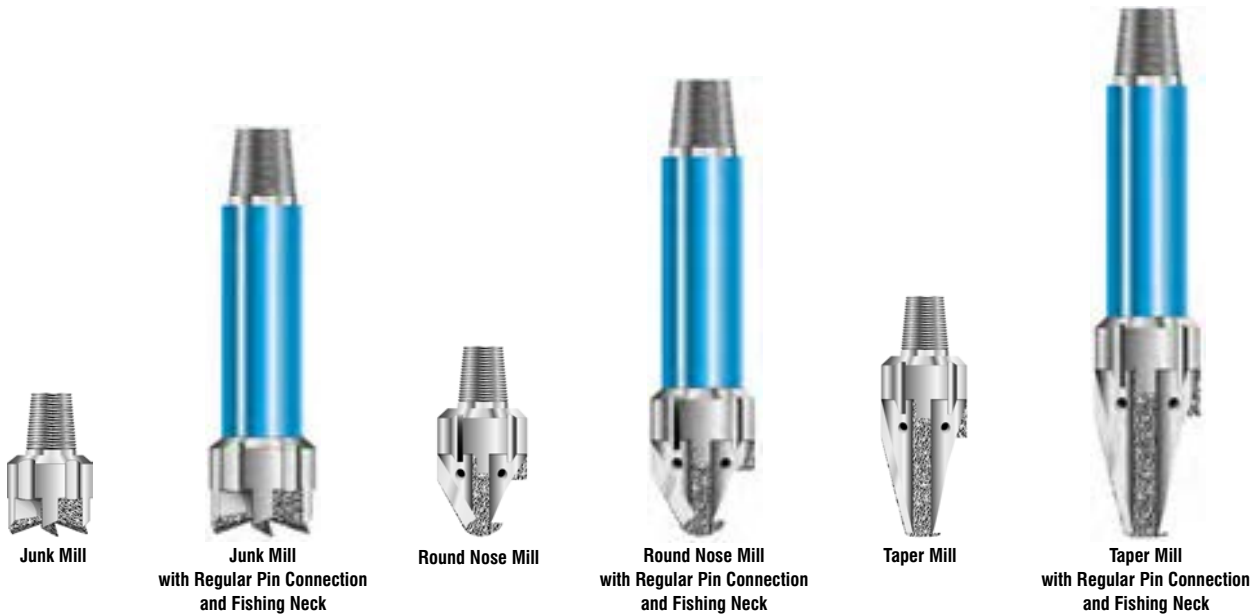
**Junk Mills** are used to mill away metal objects in the hole that cannot be retrieved with grappling tools or junk baskets.

The blade forms of all Junk Mills are designed so that they hold the junk to be milled under the milling face. The mill thus cuts continually rather than sweeping the junk ahead of the blades.

The Junk Mills selected should be 1/8 to 1/4 inch less than the minimum inside diameter of the casing or open hole through which it is to run.

**Round Nose Mills** are used primarily to mill out the bottom of liners or casing which have been set with a bull plug during original completion. Round Nose Mills cut on the leading edge or nose, along the taper but not the full circumference or periphery of the mill.

**Taper Mills** are used primarily to mill out collapsed pipe, to restore elliptical pipe to full bore, and to remove restrictions from the inside diameter such as landing seats, bushings, and any other metal objects that might restrict the well bore. Taper Mills have cutting faces along the taper.



For maximum results, the mill should be run on the bottom of a string of drill collars weighing any where from 10,000 to 15,000 pounds, depending upon the size (OD) of the mill. Actual weight applied to the mill will necessarily vary due to the size and type of mill, hole condition and depth, and the material to be milled.

The volume and characteristics of the cuttings should be checked frequently since they will provide a great deal of information about the milling progress. The metal cuttings being returned will vary in size and shape due to the Itcoloy particle size and, more importantly, the material being milled. Chip size is primarily a function of the quality of the steel being milled.

High volume pumps will give the best results since high circulation rates will both flush and cool the milling surfaces and circulate the metal cuttings to the surface. The mud weight and viscosity should be adequate to lift the metal cuttings to the surface. A mud viscosity of 50 to 80 centipoises will carry most cuttings to the surface. Consideration should be given to removing the metal cuttings from the mud stream to avoid any damage to the pumping equipment.

With consideration having been given to all of the above, lower the drilling string to within a few feet of the object to be milled. Start the pumps and circulate freely to remove any sand or cuttings before starting to mill.

Rotate with a moderate speed and slowly lower the drill string until the mill makes contact with the object to be milled. Increase rotation and gradually increase weight until the desired or optimum penetration rate is obtained. Suggested speeds are as follows:

| OD of Mill     | Speed in RPM |
|----------------|--------------|
| 3-7/8 to 4-1/4 | 175          |
| 4-3/8 to 4-7/8 | 150          |
| 5 to 5-7/8     | 125          |
| 6 to 6-7/8     | 100          |
| 7 to 7-7/8     | 90           |
| 8 to 8-7/8     | 80           |
| 9 to 9-7/8     | 75           |
| 10 to 10-7/8   | 70           |
| 11 to 11-7/8   | 65           |
| 12 to 12-7/8   | 60           |

For ideal penetration rates, it will generally be necessary to try different rotary speeds, weights and pump pressures. Whenever the penetration rate declines, it may be necessary to vary any one or all of these factors to re-establish an efficient penetration rate. Occasional spudding may also help.

Whenever the penetration rate cannot be re-established by varying the factors above or by light spudding, remove the mill from the well, as the Itcoloy hard-facing has probably been worn away.





**Maintenance of Milling Tools**

All Bowen Milling Tools are of uncomplicated construction and are therefore economical to maintain. They should be cleaned thoroughly after each run, with particular attention to the threads. If the tool is to be stored for a period of time, either paint the surfaces or apply a rust inhibitor. The threads should be coated with a zinc base lubricant.

If the Itcoloy hardfacing has been worn away or is under gauge, it should be built up or restored to full gauge with Itcoloy. This service is available at the Bowen Houston Plant, or it may be applied by a qualified welder wherever oxygen acetylene equipment is available by following the Application procedure.

**Application of Itcoloy To New Tools**

Itcoloy tungsten carbide hardfacing is relatively easy to apply. Any qualified welder familiar with brazing techniques can successfully apply Itcoloy by observing the following procedures and precautions.

Oxygen acetylene equipment is used throughout the various stages of the procedure, generally with a low pressure or soft flame. It is best to use a larger tip than is used for welding mild steel. Adjust the torch for a low pressure neutral flame. (A neutral flame is composed of equal parts of oxygen and acetylene.) Heat is localized by working with the blue inner cone close to, but not actually touching, the surface to be hardfaced.

Keep the cone of the flame away from the tungsten carbide particles as much as possible and avoid overheating the working surface. **It is important not to overheat.**

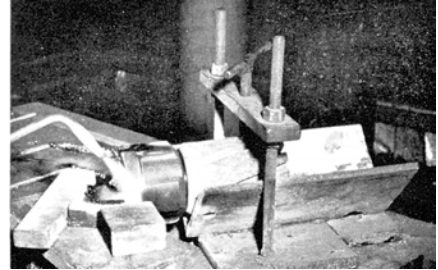
Arrange the working area so that the item to be hardfaced is positioned for downhand welding and secure the item in a suitable turning jig, if possible.

**PRECAUTION: Make certain that the working area is well ventilated so that the gases generated during the procedure are carried off and away from the welder. The gases generated are toxic and prolonged inhalation may produce nausea and sickness.**

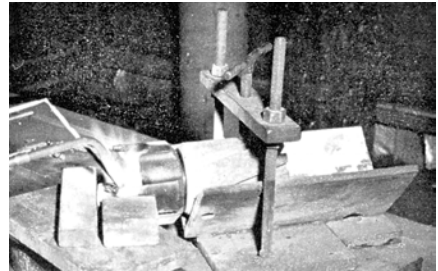
1. Thoroughly clean and brighten the base metal to be hardfaced.
2. Secure the item or tool to be hardfaced in a suitable turning jig and position it for downhand welding. Clamp a carbon mold block in position to define the hardface deposit section or weld a steel rod to the work piece of the diameter or extension required.

*For example, if the job is to build a rotary washover shoe with four equally spaced tungsten carbide cutting surfaces 3/16" thick, leaving four equidistant fluid circulation courses, then cut eight equal length 3/16" steel rods and weld these rods to the body to confine and define the tungsten carbide hardfacing. When-ever the required tungsten carbide build-up is relatively small, the carbon mold block or the procedure described above need not be used, as the buildup can be controlled entirely by manipulation of the particles.*

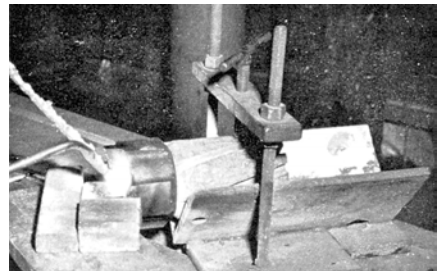
3. Preheat the entire area to be hardfaced as well as the adjacent areas. On small pieces, use the torch heat (neutral flame), playing the flame back and forth over the working area and rotating the piece. Preheat temperatures will vary some what, depending upon the thickness of the metal to be hardfaced. On thin sections the temperature will be 700° to 750°F, while on thicker sections the temperature required will be 900° or more. In brief, the thicker the section, the higher the temperature. Visually, the base metal will be a dull cherry red.



*Preheating Junk Mill preparatory to applying Itcoloy. Note carbon block mold shaped to blade form in the lower left corner.*



*Applying the Bowen Tinning Rod to the Junk Mill. Note that the shaped carbon block is now in position against the Junk Mill.*



*Applying Bowen Itcoloy to the Junk Mill. The shaped carbon block mold conforms the Itcoloy to the desired shape and buildup.*



*The Junk Mill has been removed from the fixture and is positioned for finishing the bottom face of the mill with Itcoloy. Note that all of the cutting faces conform to the shape of the carbon block mold.*



On larger pieces, it is advisable to have a gas jet directed upon the work piece. This has the advantage of assisting in the preheating procedure and maintaining the work piece at a high temperature, therefore saving the welder considerable time and reducing the amount of oxygen and acetylene consumed.

4. When the work piece is preheated to the proper temperature, apply Bowen Brazing Flux. Use a spoon or spatula to dust or sprinkle the Bowen Brazing Flux over the entire surface to be hardfaced. The Bowen Brazing Flux will bubble and boil if the work piece is properly preheated. Any oxides that may be present on the surface of the base metal or that may be formed during the welding operation will be removed by the Bowen Brazing Flux in the form of fusible slag. Continue preheating until the Flux is clear and fluid.
5. Pick up a Bowen Tinning Rod and, using a soft neutral flame, add the tip of the rod to the puddle of the flux. As the rod melts, the draw of the heat will cause the alloy to flow and follow the heat. Keep the torch in motion. The rate of the travel with the torch should be just as fast as the rod will bond, making sure that the flux is kept on the surfaces. By continually playing the heat of the torch into the base metal, the tinning process will be accomplished quickly and smoothly. When completed, the tinning alloy will measure about 1/16" thick.

**NOTE: If the preheat temperature is not sufficient, the molten alloy will not flow smoothly but will form in small balls on the base metal.**

Bowen Tinning Rod is a specially compounded nickel-silver brazing alloy particularly suited as a base for Bowen Itcoloy. Bowen Tinning Rod has a working temperature of 1,400° – 1,600° F and produces a corrosion-resistant weld deposit with a hardness of 160-170 Brinell, with a tensile strength of 100,000 psi.

6. Pick up a Bowen Itcoloy Rod and supply to the desired thickness over the tinned surface, keeping the soft neutral flame moving evenly and smoothly over the entire surface. Since Bowen Itcoloy is available in a number of graded fragment thicknesses, the desired buildup can usually be made in one pass by using the correct particle size.

For example, if a thickness of 1/4" is desired, use a Bowen Itcoloy Rod containing 1/4" graded tungsten carbide particles.

While the matrix is still molten, the tungsten carbide particles may be positioned. Use a carbon rod to manipulate the particles into the molten matrix — packing, overlapping, and positioning before the matrix solidifies. Proper manipulation during the application will reduce the need for grinding and shaping to size.

If a carbon rod is not available for manipulating the particles, then a tinning rod may be used.

**NOTE: Avoid directing the cone of the flame upon the tungsten carbide particles and avoid overheating. Overheating and burning the tungsten carbide particles will result in embrittlement of the particles or the dissolution of some particles, causing them to lose their cutting ability.**

7. Upon completion of the hardfacing procedure, set the work piece aside away from drafts to cool slowly.  
**Do not quench!** It is recommended that the workpiece be covered with an asbestos blanket or wrapped in

aluminum foil to retard the cooling process. This will result in a tool with better cutting ability, or high abrasive quality with high impact strength.

8. After the tool has cooled to room temperature, it may be ground to the correct size and shape. Use a coarse grit grinder and rough grind the hardfaced area to the correct I.D., O.D., and shape for the service intended.
9. Clean off the tool, removing all weld spatter, slag, etc., especially noting that the threads are clean. If the tool is to be stored for any length of time before use, either paint the tool or apply a good rust inhibitor.

### To Rework Tools

Milling tools, junk mills, rotary shoes, and milling shoes that have been used in hard service in the field can be restored to their original size and usefulness by redressing them with Bowen Itcoloy tungsten carbide hardfacing. It is important to redress such tools to their original size and shape since there is a definite relationship between the tool's size and shape and its intended service.

1. Clean the complete tool thoroughly. Pay particular attention to the threads on the tool because the heat generated during redressing will cause mud to cake and harden in the threads.
2. Using a coarse grinder, rough grind and remove any burrs or irregularities developed from previous use.
3. Examine the tool thoroughly to determine if the base metal or steel support backing has been worn away in previous use. If it has, build up the base metal or steel support with AWS-ASTM E-6010 electrode or equivalent to the diameter or extension required.



Figure a



Figure b



Figure c

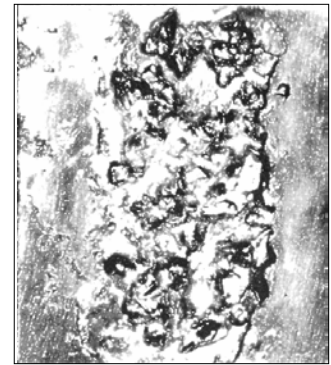


Figure d

Unretouched Photographs of Itcoloy Application

**NOTE:** The base metal or steel blade backing must support the Itcoloy hardfacing to within the fragment size being used. For example, if 1/8" fragment size tungsten carbide hardfacing is to be used, the steel support must be to 1/8" of the finished extension.

4. Apply the Bowen Itcoloy tungsten carbide hardfacing in accordance with the procedure as outlined in the preceding pages.

**Itcoloy Application**

Refer to the unretouched photographs of samples above.

- (a) **Correct Application** — This sample shows the correct application at proper heat. The matrix is well bonded to the base metal. The tungsten carbide particles are compactly spaced and securely imbedded in the matrix material. The resulting application, when cool, has a slightly golden hue.
- (b) **Improper Application** — This sample shows the result of too much heat. The heat has dissolved the matrix material. The tungsten carbide particles are burned and charred. The resulting application, when cool, has a black and burned appearance.

- (c) **Improper Application** — This sample shows the result of too little heat. The matrix is not bonded to the base metal. Although the tungsten carbide particles are imbedded in the matrix, the material will chip and break away from the base metal when milling. The resulting application has a dull silver appearance.

- (d) **Improper Application** — This sample shows the result of improper manipulation and spacing of the tungsten carbide particles. Although applied with proper heat and well bonded, large vacancies exist and the result would be an inefficient milling surface. In appearance, the resulting application would have the slightly golden hue as sample (a), but the vacancies or cavities would be very apparent.



Bowen Itcoloy



Bowen Tinning Rod



Bowen Brazing Flux

**Bowen Itcoloy, Tinning Rod, and Brazing Flux**

Bowen Itcoloy contains the maximum desired concentration of fragmented sintered Tungsten carbides interspersed in a tough resilient matrix. The carbide used are all steel cutting grades with a hardness of 91 to 93 Rockwell "A". The matrix is a special nickel-silver alloy with a tensile strength of 100,000 psi. Bowen Itcoloy is packed in cartons of approximately ten pounds each and is available in the following graded sizes:

| Nominal Size | Graded Particle Size | Rod Size            | Approximate Weight Per Rod |
|--------------|----------------------|---------------------|----------------------------|
| 3/8          | 3/8" to 1/4"         | 3/8" x 3/8" x 18"   | 14-7/8 oz.                 |
| 5/16         | 5/16" to 1/4"        | 5/16" x 5/16" x 18" | 12 oz.                     |
| 3/16         | 3/16" to 1/8"        | 1/4" x 3/16" x 18"  | 10-5/8 oz.                 |
| 1/8          | 1/8" to 1/16"        | 1/4" x 3/16" x 18"  | 9-1/2 oz.                  |
| 10 - 18      | 10 to 18 Screen Mesh | 1/4" x 3/16" x 18"  | 7-1/4 oz.                  |
| 18 - 30      | 18 to 30 Screen Mesh | 3/16" x 3/16" x 18" | 5-1/2 oz.                  |
| 30 - 45      | 30 to 45 Screen Mesh | 3/16" x 3/16" x 18" | 5-1/4 oz.                  |



**Bowen Rotary Shoe Blanks**

| No. of Teeth | Connection          | Standard OD of Body | Minimum ID of Body | Length | Weight lbs |
|--------------|---------------------|---------------------|--------------------|--------|------------|
| 6            | 4" F.J.             | 4"                  | 3-1/4"             | 16"    | 18         |
| 6            | 4-1/2" API Casing   | 5-1/8"              | 3-3/4"             | 16"    | 42         |
| 6            | 4-1/2" F.J.         | 4-1/2"              | 3-3/4"             | 16"    | 20         |
| 6            | 4-1/2" E.U. or E.L. | 4-7/8"              | 3-3/4"             | 16"    | 32         |
| 6            | 4-3/4" API Casing   | 5-1/2"              | 4-1/16"            | 16"    | 45         |
| 6            | 4-3/4" F.J.         | 4-3/4"              | 4-1/16"            | 16"    | 28         |
| 6            | 4-3/4" E.U. or E.L. | 5-1/8"              | 4-1/16"            | 16"    | 34         |
| 6            | 5" API Casing       | 5-7/8"              | 4-3/16"            | 16"    | 47         |
| 6            | 5" F.J.             | 5"                  | 4-3/16"            | 16"    | 23         |
| 6            | 5" E.U. or E.L.     | 5-3/8"              | 4-3/16"            | 16"    | 39         |
| 6            | 5-1/2" API Casing   | 6-3/8"              | 4-5/8"             | 16"    | 50         |
| 6            | 5-1/2" F.J.         | 5-1/2"              | 4-5/8"             | 16"    | 30         |
| 6            | 5-1/2" E.U. or E.L. | 5-7/8"              | 4-9/16"            | 16"    | 47         |
| 6            | 5-3/4" API Casing   | 6-5/8"              | 5"                 | 16"    | 52         |
| 6            | 5-3/4" F.J.         | 5-3/4"              | 5"                 | 16"    | 26         |
| 6            | 5-3/4" E.U. or E.L. | 6-1/8"              | 5"                 | 16"    | 30         |
| 6            | 6" API Casing       | 6-3/4"              | 5-3/16"            | 16"    | 53         |
| 6            | 6" F.J.             | 6"                  | 5-3/16"            | 16"    | 28         |
| 6            | 6" E.U. or E.L.     | 6-3/8"              | 5-3/16"            | 16"    | 48         |
| 6            | 6-5/8" API Casing   | 7-1/2"              | 5-11/16"           | 16"    | 70         |
| 6            | 6-5/8" F.J.         | 6-5/8"              | 5-11/16"           | 16"    | 41         |
| 6            | 6-5/8" E.U. or E.L. | 7"                  | 5-5/8"             | 16"    | 65         |
| 6            | 7" API Casing       | 7-7/8"              | 5-13/16"           | 16"    | 75         |
| 6            | 7" F.J.             | 7"                  | 5-13/16"           | 16"    | 47         |
| 6            | 7" E.U. or E.L.     | 7-1/2"              | 5-13/16"           | 16"    | 72         |
| 8            | 7-5/8" API Casing   | 8-5/8"              | 6-5/8"             | 16"    | 85         |
| 8            | 7-5/8" F.J.         | 7-5/8"              | 6-5/8"             | 16"    | 47         |
| 8            | 7-5/8" E.U. or E.L. | 8-1/16"             | 6-9/16"            | 16"    | 76         |
| 8            | 8-1/8" API Casing   | 9-1/8"              | 7-1/8"             | 16"    | 92         |
| 8            | 8-1/8" F.J.         | 8-1/8"              | 7-1/8"             | 16"    | 50         |
| 8            | 8-5/8" API Casing   | 9-3/4"              | 7-1/2"             | 16"    | 100        |
| 8            | 8-5/8" F.J.         | 8-5/8"              | 7-1/2"             | 16"    | 60         |
| 8            | 8-5/8" E.U. or E.L. | 9-1/8"              | 7-7/16"            | 16"    | 97         |
| 10           | 9" API Casing       | 10-1/8"             | 7-13/16"           | 16"    | 120        |
| 10           | 9" F.J.             | 9"                  | 7-13/16"           | 16"    | 56         |
| 10           | 9" E.U. or E.L.     | 9-1/2"              | 7-3/4"             | 16"    | 78         |
| 10           | 9-5/8" API Casing   | 10-3/4"             | 8-1/2"             | 16"    | 128        |
| 10           | 9-5/8" F.J.         | 9-5/8"              | 8-1/2"             | 16"    | 68         |
| 10           | 9-5/8" E.U. or E.L. | 10-1/8"             | 8-7/16"            | 16"    | 118        |
| 10           | 10-3/4" API Casing  | 12"                 | 9-3/4"             | 16"    | 140        |
| 10           | 10-3/4" F.J.        | 10-3/4"             | 9-3/4"             | 16"    | 68         |
| 10           | 11-3/4" F.J.        | 11-3/4"             | 10-3/4"            | 16"    | 160        |
| 10           | 11-3/4" API Casing  | 12-7/8"             | 10-3/4"            | 16"    | 160        |
| 10           | 13-3/8" API Casing  | 14-1/2"             | 12-1/4"            | 16"    | 190        |
| 10           | 16" API Casing      | 17"                 | 15-1/4"            | 16"    | 190        |

**Special Notes:**

1. Unless otherwise specified, Shoes will be furnished with same ID as washover string.
2. Any specified ID larger than standard, can be furnished with no additional charge.
3. All Rotary Shoes listed above are available also dressed with crushed tungsten carbide hardfacing.



**Bowen Milling Tools**

|  |                 |                           |                         |                         |                         |                         |                         |                         |                         |                         |                         |
|--|-----------------|---------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| <b>Mill Size (OD)</b>                    |                 | 2-1/4 – 2-1/2             | 2-5/8 – 2-3/4           | 2-7/8 – 3-1/8           | 3-1/4 – 3-5/8           | 3-1/4 – 4-1/4           | 4-3/8 – 4-1/2           | 4-5/8 – 4-3/4           | 4-7/8 – 5               | 5-1/8 – 5-1/4           | 5-3/8 – 5-1/2           |
| <b>Top Connection – Pin</b>              |                 | 1-13/16<br>Wilson<br>F.J. | 1-1/4<br>A.P.I.<br>Reg. | 1-1/4<br>A.P.I.<br>Reg. | 2-3/8<br>A.P.I.<br>Reg. | 2-3/8<br>A.P.I.<br>Reg. | 2-7/8<br>A.P.I.<br>Reg. | 2-7/8<br>A.P.I.<br>Reg. | 2-7/8<br>A.P.I.<br>Reg. | 3-1/2<br>A.P.I.<br>Reg. | 3-1/2<br>A.P.I.<br>Reg. |
| <b>Catalog Standard ‡</b>                |                 | ‡                         |                         |                         |                         | ‡                       |                         |                         |                         | ‡                       |                         |
| <b>Junk Mill</b>                         | <b>Part No.</b> | 41618                     | 41621                   | 41623                   | 41626                   | 41630                   | 41635                   | 41635                   | 41635                   | 41641                   | 41641                   |
|  | <b>Weight</b>   | 5                         | 6                       | 7                       | 8                       | 9                       | 15                      | 16                      | 17                      | 20                      | 21                      |
| <b>Round Nose Mill (60° Incl. Angle)</b> | <b>Part No.</b> | 41918                     | 41921                   | 41923                   | 41926                   | 41930                   | 41935                   | 41935                   | 41935                   | 41941                   | 41941                   |
|  | <b>Weight</b>   | 8                         | 9                       | 11                      | 13                      | 15                      | 25                      | 25                      | 25                      | 32                      | 33                      |
| <b>Taper Mill (30° Incl. Angle)</b>      | <b>Part No.</b> | —                         | —                       | —                       | —                       | 41999                   | 42000                   | 42000                   | 42000                   | 42001                   | 42001                   |
|  | <b>Weight</b>   | —                         | —                       | —                       | —                       | 16                      | 33                      | 33                      | 33                      | 42                      | 42                      |
| <b>10" Fishing Neck for Above Mills</b>  | <b>Part No.</b> | —                         | —                       | —                       | —                       | 42027                   | 42028                   | 42028                   | 42028                   | 42029                   | 42029                   |
| <b>Extra Charge</b>                      | <b>Weight</b>   | —                         | —                       | —                       | —                       | 16                      | 28                      | 28                      | 28                      | 35                      | 35                      |
| <b>Fishing Neck OD – Inches</b>          |                 | —                         | —                       | —                       | —                       | 3-1/8                   | 3-3/4                   | 3-3/4                   | 3-3/4                   | 4-1/4                   | 4-1/4                   |

|  |                 |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |
|--|-----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| <b>Mill Size (OD)</b>                    |                 | 5-5/8 – 5-3/4           | 5-7/8 – 6               | 6-1/8 – 6-1/4           | 6-3/8 – 6-1/2           | 6-5/8 – 6-3/4           | 6-7/8 – 7               | 7-1/8 – 7-1/4           | 7-3/8 – 7-1/2           | 7-5/8 – 7-3/4           | 7-7/8 – 8               |
| <b>Top Connection – Pin</b>              |                 | 3-1/2<br>A.P.I.<br>Reg. | 3-1/2<br>A.P.I.<br>Reg. | 3-1/2<br>A.P.I.<br>Reg. | 3-1/2<br>A.P.I.<br>Reg. | 3-1/2<br>A.P.I.<br>Reg. | 3-1/2<br>A.P.I.<br>Reg. | 3-1/2<br>A.P.I.<br>Reg. | 4-1/2<br>A.P.I.<br>Reg. | 4-1/2<br>A.P.I.<br>Reg. | 4-1/2<br>A.P.I.<br>Reg. |
| <b>Catalog Standard ‡</b>                |                 | ‡                       |                         |                         |                         | ‡                       |                         |                         |                         | ‡                       |                         |
| <b>Junk Mill</b>                         | <b>Part No.</b> | 41641                   | 41647                   | 41647                   | 41647                   | 41653                   | 41653                   | 41653                   | 41659                   | 41659                   | 41659                   |
|  | <b>Weight</b>   | 22                      | 25                      | 26                      | 27                      | 31                      | 32                      | 33                      | 39                      | 40                      | 41                      |
| <b>Round Nose Mill (60° Incl. Angle)</b> | <b>Part No.</b> | 41941                   | 41947                   | 41947                   | 41947                   | 41953                   | 41953                   | 41953                   | 41959                   | 41959                   | 41959                   |
|  | <b>Weight</b>   | 34                      | 39                      | 38                      | 39                      | 49                      | 50                      | 51                      | 79                      | 80                      | 81                      |
| <b>Taper Mill (30° Incl. Angle)</b>      | <b>Part No.</b> | 42001                   | 42002                   | 42002                   | 42002                   | 42003                   | 42003                   | 42003                   | 42004                   | 42004                   | 42004                   |
|  | <b>Weight</b>   | 42                      | 52                      | 52                      | 53                      | 65                      | 65                      | 65                      | 108                     | 110                     | 112                     |
| <b>10" Fishing Neck for Above Mills</b>  | <b>Part No.</b> | 42029                   | 42029                   | 42029                   | 42029                   | 42029                   | 42029                   | 42029                   | 42030                   | 42030                   | 42030                   |
| <b>Extra Charge</b>                      | <b>Weight</b>   | 35                      | 35                      | 35                      | 35                      | 35                      | 35                      | 35                      | 62                      | 62                      | 62                      |
| <b>Fishing Neck OD – Inches</b>          |                 | 4-1/4                   | 4-1/4                   | 4-1/4                   | 4-1/4                   | 4-1/4                   | 4-1/4                   | 4-1/4                   | 5-3/4                   | 5-3/4                   | 5-3/4                   |

|  |                 |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |
|--|-----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| <b>Mill Size (OD)</b>                    |                 | 8-1/8 – 8-1/4           | 8-3/8 – 8-1/2           | 8-5/8 – 8-3/4           | 8-7/8 – 9               | 9-1/8 – 9-1/4           | 9-3/8 – 9-1/2           | 9-5/8 – 9-3/4           | 9-7/8 – 10              | 10-1/8 – 10-1/4         | 10-3/8 – 10-1/2         |
| <b>Top Connection – Pin</b>              |                 | 4-1/2<br>A.P.I.<br>Reg. | 4-1/2<br>A.P.I.<br>Reg. | 4-1/2<br>A.P.I.<br>Reg. | 4-1/2<br>A.P.I.<br>Reg. | 4-1/2<br>A.P.I.<br>Reg. | 4-1/2<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. |
| <b>Catalog Standard ‡</b>                |                 | ‡                       |                         |                         |                         | ‡                       |                         |                         |                         | ‡                       |                         |
| <b>Junk Mill</b>                         | <b>Part No.</b> | 41665                   | 41665                   | 41665                   | 41671                   | 41671                   | 41671                   | 41677                   | 41677                   | 41677                   | 41683                   |
|  | <b>Weight</b>   | 54                      | 55                      | 56                      | 68                      | 70                      | 72                      | 107                     | 115                     | 121                     | 128                     |
| <b>Round Nose Mill (60° Incl. Angle)</b> | <b>Part No.</b> | 41965                   | 41965                   | 41965                   | 41971                   | 41971                   | 41971                   | 41977                   | 41977                   | 41977                   | 41983                   |
|  | <b>Weight</b>   | 84                      | 85                      | 86                      | 118                     | 120                     | 122                     | 175                     | 181                     | 187                     | 218                     |
| <b>Taper Mill (30° Incl. Angle)</b>      | <b>Part No.</b> | 42005                   | 42005                   | 42005                   | 42006                   | 42006                   | 42006                   | 42007                   | 42007                   | 42007                   | 42008                   |
|  | <b>Weight</b>   | 116                     | 118                     | 120                     | 160                     | 168                     | 174                     | 233                     | 239                     | 245                     | 290                     |
| <b>10" Fishing Neck for Above Mills</b>  | <b>Part No.</b> | 42030                   | 42030                   | 42030                   | 42030                   | 42030                   | 42030                   | 42031                   | 42031                   | 42031                   | 42031                   |
| <b>Extra Charge</b>                      | <b>Weight</b>   | 62                      | 62                      | 62                      | 62                      | 62                      | 62                      | 105                     | 105                     | 105                     | 105                     |
| <b>Fishing Neck OD – Inches</b>          |                 | 5-3/4                   | 5-3/4                   | 5-3/4                   | 5-3/4                   | 5-3/4                   | 5-3/4                   | 7-3/4                   | 7-3/4                   | 7-3/4                   | 7-3/4                   |

|  |                 |                         |                         |                         |                         |                         |                         |                         |                         |                         |                         |
|--|-----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| <b>Mill Size (OD)</b>                    |                 | 10-5/8 – 10-3/4         | 10-7/8 – 11             | 11-1/8 – 11-1/4         | 11-3/8 – 11-1/2         | 11-5/8 – 11-3/4         | 11-7/8 – 12             | 12-1/8 – 12-1/4         | 12-1/2 – 14             | 14-1/8 – 17-1/4         | 17-3/8 – Up             |
| <b>Top Connection – Pin</b>              |                 | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 6-5/8<br>A.P.I.<br>Reg. | 7-5/8<br>A.P.I.<br>Reg. | 7-5/8<br>A.P.I.<br>Reg. |
| <b>Catalog Standard ‡</b>                |                 | ‡                       |                         |                         |                         | ‡                       |                         |                         |                         | ‡                       |                         |
| <b>Junk Mill</b>                         | <b>Part No.</b> | 41683                   | 41683                   | 41689                   | 41689                   | 41695                   | 41695                   | 41695                   | 41695                   | 68807                   | 152359                  |
|  | <b>Weight</b>   | 134                     | 139                     | 143                     | 149                     | 155                     | 162                     | 168                     | 174                     | —                       | —                       |
| <b>Round Nose Mill (60° Incl. Angle)</b> | <b>Part No.</b> | 41983                   | 41983                   | 41989                   | 41989                   | 41989                   | 41995                   | 41995                   | 41995                   | —                       | —                       |
|  | <b>Weight</b>   | 220                     | 226                     | 229                     | 235                     | 241                     | 280                     | 284                     | 288                     | —                       | —                       |
| <b>Taper Mill (30° Incl. Angle)</b>      | <b>Part No.</b> | 42008                   | 42008                   | 42009                   | 42009                   | 42009                   | 42010                   | 42010                   | 42010                   | 152517                  | 152518                  |
|  | <b>Weight</b>   | 296                     | 302                     | 298                     | 304                     | 310                     | 370                     | 376                     | 382                     | —                       | —                       |
| <b>10" Fishing Neck for Above Mills</b>  | <b>Part No.</b> | 42031                   | 42031                   | 42031                   | 42031                   | 42031                   | 42031                   | 42031                   | 42031                   | —                       | —                       |
| <b>Extra Charge</b>                      | <b>Weight</b>   | 105                     | 105                     | 105                     | 105                     | 105                     | 105                     | 105                     | 105                     | —                       | —                       |
| <b>Fishing Neck OD – Inches</b>          |                 | 7-3/4                   | 7-3/4                   | 7-3/4                   | 7-3/4                   | 7-3/4                   | 7-3/4                   | 7-3/4                   | 7-3/4                   | —                       | —                       |

**How to Order**

Specify:

- (1) Name and part number of Mill
- (2) O.D. of Mill
- (3) Top connection, if other than standard
- (4) If Fishing Neck is desired, order Mill and Fishing Neck by number

**Recommended for Redressing Mills:**

- (1) Bowen Itcoloy
- (2) Bowen Tinning Rod
- (3) Bowen Brazing Flux



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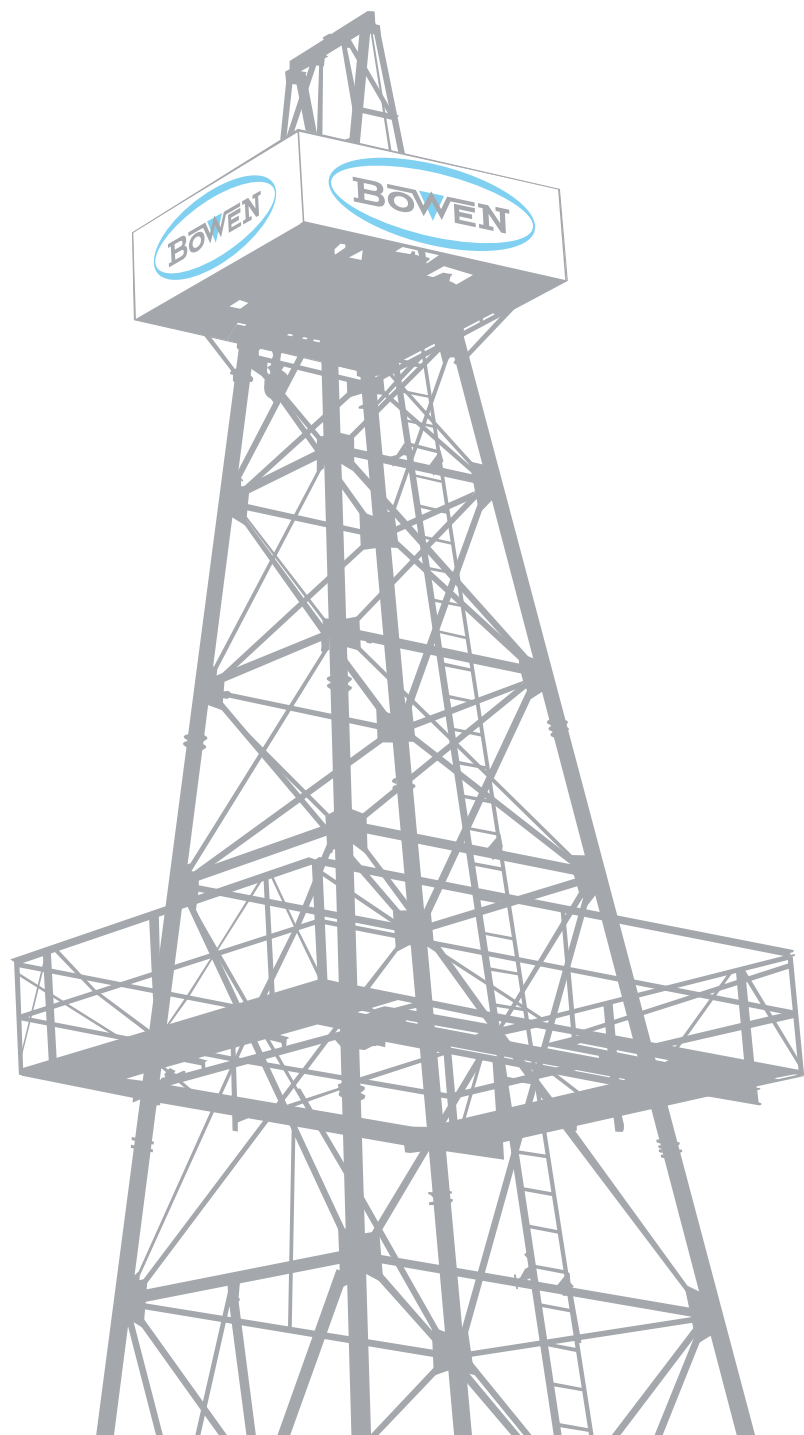
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# Bowen External Cutters

Instruction Manual 5500



**Bowen | NOV**

# Bowen External Cutters

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.



## General Description

The Bowen™ external cutter is an automatic spring-fed pipe cutter that provides fast, efficient external cutting and recovery of long sections of pipe. The automatic spring-fed feature eliminates the inadvertent application of excessive strain being applied from the rig floor, preventing the knives from becoming burned or broken before the cut is made.

## Use

The Bowen external cutter cuts and removes stuck pipe in long undamaged sections. Used in conjunction with a washover string, it makes a well placed cut to remove the stuck pipe. Bowen external cutters are capable of cutting all types of struck drill pipe, tubing or casing. The interchangeable spring dog, ratchet pawl, or slip assemblies adapt the Bowen external cutter to any type of drill pipe or tubing to be cut.

## Construction

The Bowen external cutter consists of a top sub, body, guide, knives, spring dog assembly thrust washer, thrust bearing, preload sleeve, feed ring, main spring, and shear pins.

The top sub is threaded into the body and has a suitable running string connection at its upper end. It maintains the inner parts of the external cutter in position.

The body has knife slots in the lower end, threaded connections top and bottom to accept the top sub and guide, and a shoulder in the inside diameter which acts as a stop for the thrust washer and the parts above the thrust washer to stop against during operation. The knife slots incorporate cross-

holes for the knife pins. Two drilled holes are arranged diametrically opposite each other in the body for the shear pins.

The guide is threaded into the bottom of the body and helps guide the fish into the cutter. The guide is usually cut-lipped. An alternate guide such as an extra-long wall hook or mill-toothed guide may be substituted if required.

The knives are made from tool steel, shaped at the cutting end for most efficient cutting action, and tempered for strength and toughness. The shank end is radius-formed to match the concave bearing face against which it rests in the cutter body. (These bearing blocks are an integral part of the body). The shank end of each knife has a hole to accept the knife pin. Set screws maintain the knife pins in the body.

The spring dog assembly is the standard collar catcher assembly and will be furnished with the cutter unless another type is requested. Use the spring dog if the pipe or tubing has squared shoulder tool joints, couplings or collars.

The dog springs catch under the coupling to actuate the cutter and to retain the cut-off section of the pipe or tubing.

The spring dog assembly consists of a cylinder, six rectangular vertically mounted springs, and twelve rivets. The springs are so arranged as to rest at their lower end on a shoulder so that force applied to the springs will be transmitted to the spring dog body rather than the rivets.

The springs are closed in at the top in a regular pattern to form a

small opening. This arrangement allows the spring dog assembly to effectively pass collars or couplings by deflecting outwardly, but close in around the pipe or tubing so that they will always be in position to butt up against the bottom of the collar or coupling when raised. The springs are closed in sufficiently to effectively catch any size pipe or tubing which the cutter is designed to cut.



# Bowen External Cutters

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When using the optional ratchet pawl assembly, use a single pawl spacer with it. The purpose of the single pawl spacer is to add extra length to the ratchet pawl assembly sufficient to make their combined length the same as a standard spring dog assembly. The length of a ratchet pawl assembly is half the length of the spring dog assembly so that if two ratchet pawl assemblies are run in tandem, no single pawl spacer need be used, and is omitted.

Use the optional slip assembly with an adaptor. Located between the cutter top sub and body, the adaptor forms an extra length housing for the slip assembly. The upper end of the adaptor screws onto the top sub, and the lower end into the cutter body. The slip spring pushes against an internal shoulder situated just below the thread at the upper end. The shoulder formed by the lower pin end of the adaptor maintains the slip retainer bowl in position when assembled for service.

The thrust washer and thrust bearing are situated between the main spring and spring dog assembly (or ratchet pawl or slip assembly). Their purpose is to allow the entire cutter assembly except the spring dog assembly to rotate during operation while the spring dog assembly remains rotationally motionless.

The preload sleeve is a steel cylinder in form. It is located between the thrust washer and the top of the main spring. The purpose of the preload sleeve is to maintain sufficient preload on the feed ring to effect a cut at any point on the fish without the necessity of applying a pull load from the surface. If you prefer, you may remove the preload sleeve. When removed, it relieves all

preload on the main spring so that the knives must be manually fed from the surface.

The preload sleeve is used with all three catcher assemblies: spring dog, ratchet pawl and slip assembly. The only time it is not used is when you wish to manually feed the knives.

The feed ring is a cylinder in form and has two shear pin holes situated diametrically opposite. The lower face of the feed ring is beveled to nest below the knife-cutting ends.

In operation, the feed ring forces the knives inward against the fish in the most efficient manner to effect the cut. The shear pins maintain the feed ring in running-in position until the force exerted against them by the pull from the rig floor shears the pins, releasing the feed ring.

The main spring is a large spring wound from rectangular cross-section spring steel. It is tempered to give long, trouble-free service. In operation, it is preloaded by a predetermined amount calculated to exert the best cutting load to each knife, which is transmitted through the feed ring. The main spring is situated between the thrust washer (or spring seat) and feed ring. Once the shear pins have been sheared, no load need be applied to the cutter from the rig floor to effect a cut. The cutter may be moved down to any point between the two collars or joints where shearing was effected for the actual cut. This is made possible by the calculated preload on the main spring.

The shear pin is manufactured from clean shearing brass rod. The size of the shear pin varies with the size of the cutter. The shear

strength of each shear pin is listed in the specification table on pages 9 and 10.

The ratchet pawl assembly catches tapered upset integral tool joints.

The ratchet pawl assembly is a thick-walled cylinder which contains a number of pawls (5 to 8) depending on size). These pawls are arranged so that they form a circle around the pipe. They are spring-loaded to allow them to be deflected by passing a coupling or collar, then returned to their horizontal position after passing the coupling. In operation, they catch against the underside of the taper, transmitting the load from the pawls, through the pawl body, and to the main spring.

The ratchet pawl assembly will effectively catch only one size pipe or tubing joint. A separate ratchet pawl assembly must be used for each size or the ratchet pawl assembly may be redressed with pawls of the proper length for each size with which it is used.

An advantage of the ratchet pawl assembly is that by repeatedly jarring it up against the collar or taper, you may succeed in shearing the pawl pins, thus effecting release of the cutter if you do not wish to cut the pipe once cutting position is reached. This allows you to bring the cutter out of the hole without making a cut.

The slip assembly is used where the pipe or tubing has semi-flush or external flush tool joints. The slips grip the pipe or tubing at any random point to actuate the cutter and to retain the cut-off section of pipe or tubing.

The slip assembly consists of a slip bowl, slips, slip spring, slip bowl

retainer, slip bowl shear pins, and slip adaptor.

Shear pins provide a method of releasing from the fish downhole if necessary. The shear strength of each slip bowl shear pin is listed in the specification tables on pages 9 and 10.

## Operation

### Wash Over

Before running the Bowen external cutter, a washover operation is first necessary to free the stuck pipe from the formations. The washpipe is equipped with a washover shoe with an outside diameter slightly larger and an inside diameter slightly smaller than the Bowen external cutter to be used. (We recommend a Bowen rotary washover shoe.) This is to establish adequate clearance so that the Bowen external cutter may be lowered over the stuck pipe. We further recommend washing over the stuck pipe for at least one full joint below where the cut is to be made so that the stuck pipe will be centralized in the hole at the point of the cut.

After washing over the stuck pipe for the desired distance, withdraw the washover string from the well and remove the wash-over shoe from the bottom of the string. Install the Bowen external cutter in its place.

### Running the Cutter

Make certain that the Bowen external cutter has been properly assembled with the appropriate assembly (spring dog, ratchet pawl or slip assembly as dictated by the tool joints or couplings of the stuck pipe). Also check the Bowen external cutter to ascertain that it is the proper size for the pipe to be cut; refer to the specification table for dimensions and part numbers.

# Bowen External Cutters

Make up the Bowen external cutter to the bottom of the washover string and tighten all connections with the tongs. Avoid placing tongs directly over the knife slots. At this time, we recommend wedging the knives into the knife slots to prevent their falling toward the inside of the cutter and being damaged while moving down hole. You may accomplish this by passing a strand of string or cord around the knife and pulling it toward the outside of the body. The string binds the knife in the slot.

The cutting string is lowered into the well and the guide lip on the Bowen external cutter contacts and passes over the top of the fish. Lower the tool to the depth previously washed free.

The amount of pipe passed over should not exceed the weight shown in the chart on page 14.

## Making the Cut

When the desired depth is reached, raise the cutting string until the spring dog assembly (or ratchet pawl assembly) engages the tool joint. A strain compresses the main spring and shears the feed ring shear pin. The shearing of the pins is clearly apparent by a quick movement of the weight indicator.

After shearing the pins, the cut may be made at any point on the tubing. The spring will provide the force to feed the knives into the pipe at a predetermined rate. It is not necessary to maintain an upstrain against the collar or upset unless the preload sleeve has been removed. Note, however, that maintaining an upstrain will help provide an indication when the cut is complete.

The cut is made by rotating the cutting string to the right at a

uniform rate of speed. When the pipe is severed, there will be a noticeable movement of the weight indicator. The cut-off section withdraws from the well, and the above procedure is repeated until all of the stuck pipe is removed.

## Running-In Precautions

1. Upon reaching the top of the fish, circulate to condition the mud and to flush all mud cake or debris from the tool.

2. Be careful when going over the top of the fish. Whenever possible, rotate the Bowen external cutter to the right while going over. After the fish has entered the cutter, the cutter must not be raised more than absolutely necessary. When pulling the table slips on the rig the cutting string should be lifted only high enough to free the table slips. If one table slip segment is free and the others are tight, the table should be turned to free the tight ones. The cutting string must not be pulled higher than needed to release the table slips in order to ensure that upward movement will not shear the shear pins and force the knives into contact with the fish. If this should happen, it will be necessary to cut the fish at this point, as the cutter will not pass over the next lower tool joint or coupling without breaking knives.

## Cutting Precautions

1. Make the cut one joint above the lowest position to which the rotary washover shoe was run.

This will leave one joint of free pipe which will spring away from the wall and align itself in the cutter.

2. After the kelly is made up in the string, and with circulation established at normal rate, rotate the cutting string to determine the amount of torque required to run the cutter when the knives are not in contact with the fish. After the hole has been washed sufficiently and the cutter is rotating freely, the circulation and rotation must be stopped and the cutting string raised until the dog springs contact the next higher tool joint or coupling. In cutters using the slip sub-assembly, the slips contact the pipe at all times. Raising the cutter will shear the brass pins between the feed ring and the body above the knives and force the knives in against the fish.
3. Be careful not to run the circulation pumps so that pulsations are transmitted to the cutting string, as this will cause the knives to move up and down synchronous to the pulsations, resulting in an uneven cutting action.
4. When starting rotation, apply only a small amount of torque. If free rotation is not established at this point, lower the cutter slightly until the string can be turned with a minimum of torque. Allow the cutter to rotate freely for a few minutes. Then stop the rotation, pick up the cutting string about 1/4 in. and again

try rotation. If raising 1/4 in does not change the amount of torque required, repeat the raising and rotating until increased torque is evident. This will tell you that the knives are cutting the pipe. From this time until the cut is complete, take every precaution against excessive torque.

5. Sometimes, when the coupling or tool joint under which the dog springs are engaged is quite thin, the dog springs may rotate off the coupling shoulder before the cut is complete.

**Caution: If there is an indication that the dog springs have rotated off the coupling shoulder, stop rotation before continuing to prevent damage to the knives.**

If the pipe is not raised carefully, the knives may catch beneath the collar or tool joint and break. Should the dog springs rotate off the shoulder, back down the pipe until the dog springs are again engaged under the coupling or tool joint, and cutting operations resumed. Be careful not to exceed the maximum load ratings to prevent damage to the knives.

## Proving the Cut

Normally, when the pipe is severed by the Bowen external cutter, there will be a noticeable movement on the weight indicator.

To prove a cut, raise the drill pipe string first 1 in. to 2 in. or until two to three points of additional load appear on the indicator. This will be sufficient to lift the cut portion of the fish. The raising helps you avoid pinching the knives between the portion of the fish that has

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been cut and the fish remaining in the hole. After raising, rotate the string. If the string rotates freely, it is almost conclusive proof that the cut has been successfully made. Raise the pipe again carefully, and if no additional obstacles are encountered, hoist all of the string and remove the fish from the hole.

Several different changes in the cutter action may indicate that a cut is complete. These changes will become more noticeable and familiar with experience. For example, if a short fish is being cut, the speed of rotation may increase and the cutter run free immediately after the cut is completed. If a long fish is being cut, the portion of the fish above the cutter may be heavy enough to pinch the knives against the lower portion of the fish just before the cut is completed, and make forward rotation impossible. The cutter may continue to rotate smoothly, although the knives are slightly pinched, but will require additional torque to rotate. The weight indicator may suddenly, while rotating, rise slightly, indicating the cut to be complete and the cutter carrying a portion of the weight of the severed piece. None of these indications should, however, be taken as positive proof of a completed cut, and the drill pipe should not be withdrawn from the hole until the proof test as described above has been made.

## Coming Out of the Hole

When you are convinced the cut is complete, you may begin hoisting very slowly. Continue this slow hoisting for one or two joints to assure that the cut is actually made and to prevent striking a collar with excessive force. If the cut has not been made, there is usually no alternative to shearing the knife pins, spring dogs, or

ratchet pawls in order to retrieve the cutter. Then bring the cutter to the surface and completely redress it.

When the washpipe has reached the surface, you should be able to tell where the top of the fish will be in relation to the top of the washpipe. Therefore, you may lay down the required number of joints of washpipe to allow the fish to extend above the top of the washpipe. This will permit you to hoist the fish, with the aid of two elevators, from the washpipe while the same is being held in the table with the slips. When there is no coupling on the top of the fish, place a safety clamp around the fish and use a drill pipe elevator under the clamp to raise the top section of the fish.

After the fish has been laid down, pull the washpipe from the hole and unscrew the cutter from the bottom joint. At this time, supervise the breaking loose of the cutter. Tongs should be placed in the same manner as when making up. For ease of servicing the cutter, loosen the threaded connection between the top sub and the body to hand-tight.

## Maintenance

Thoroughly clean the Bowen external cutter to remove all drilling mud and other debris. Examine all parts, particularly the knives, for wear and damage and replace them as necessary. Completely disassemble, clean, lubricate or paint the *Bowen* external cutter and reassemble it before storing.

## Disassembly

1. At the rig, when the Bowen external cutter is removed from the well, thoroughly wash it down with clean

water to remove all excess drilling mud, etc. At this time, break the top sub from the body with the rig tongs to a point where it may be uncoupled by hand.

2. Remove the entire assembly to a place that is clean and convenient for disassembly.
3. Clamp the cutter in a suitable vise near the center of its length.
4. Loosen and remove the top sub.

**CAUTION: The top sub will be under considerable tension load exerted by the main spring, so be careful to avoid causing injury to yourself or damage to the top sub.**

5. Lift out the spring dog assembly.
6. Remove the thrust bearing and thrust washer.
7. Remove the preload sleeve.
8. Remove the main spring.
9. Slide out and remove the feed ring.
10. Using a suitable punch, remove the sheared halves of the shear pins from the body.
11. With a socket head wrench, remove the several (usually 5) set screws which lock the knife pins in place.
12. Remove the knife pins by pushing them out with a small brass rod or punch.

**CAUTION: These knife pins have shoulders, so they must be removed from the end of their hole which has the set screw**

**holes. They cannot be removed from the other end. The knives will fall free when the knife pins are removed.**

13. Loosen and remove the guide from the lower end of the body.
14. With a suitable punch, remove the sheared halves of the shear pins from the feed ring.

**CAUTION: When removing sheared pins from the body and the feed ring, be careful not to distort or otherwise damage the shear pin holes.**

After disassembly, thoroughly clean and examine each part for any sign of advanced wear or damage. The interior of the body should be free of marks or scratches, bits of shear pin and other loose debris.

The feed ring should be free of marks and scratches. Any distortion at edges should be dressed down with a hand file.

All knives should be in perfect condition for re-use. If they are not, replace them. Very minor wear or damage may sometimes be repaired by skillfully regrinding, but it is important that the proper contour and the overall length of each knife be maintained without loss.

Check the spring dog assembly to assure that all dog springs are in place and their rivets tight.

When using the ratchet pawl assembly, check it to assure that pawls, pawl pins and torque springs are in usable condition and that the pawls swing freely on the pawl pins.

# Bowen External Cutters

## Reassembly

1. Clamp the body in a vise near the center of its length.
2. Assemble the knives in the body. Set a knife in position in the body with the cutting face facing the inside. Slip a knife pin through the hole provided in the body, through the knife and into the remainder of the pin hole. Insert a set screw and tighten. Wedge the knife in place using a strand of soft rope or a piece of hemp string. This will maintain the knife in position while the remaining knives are assembled and during subsequent handling and operation.
3. After all knives have been assembled, insert the feed ring through the top of the body with the beveled face toward the knives. Position the feed ring so that the two shear pin holes in the feed ring align with the two shear pin holes in the body.
4. Insert the two shear pins into the holes in the body and in the feed ring.

**NOTE:** The ends of the shear pins may be upset slightly with a small hammer to cause them to fit the shear pin holes more snugly.

5. Insert the main spring in the body. Slide it down until it seats against the feed ring.
6. Slide the preload sleeve into the body until it seats against the main spring.
7. Assemble the thrust washer in the body, followed by the thrust bearing.

8. Insert the spring dog assembly in the body.

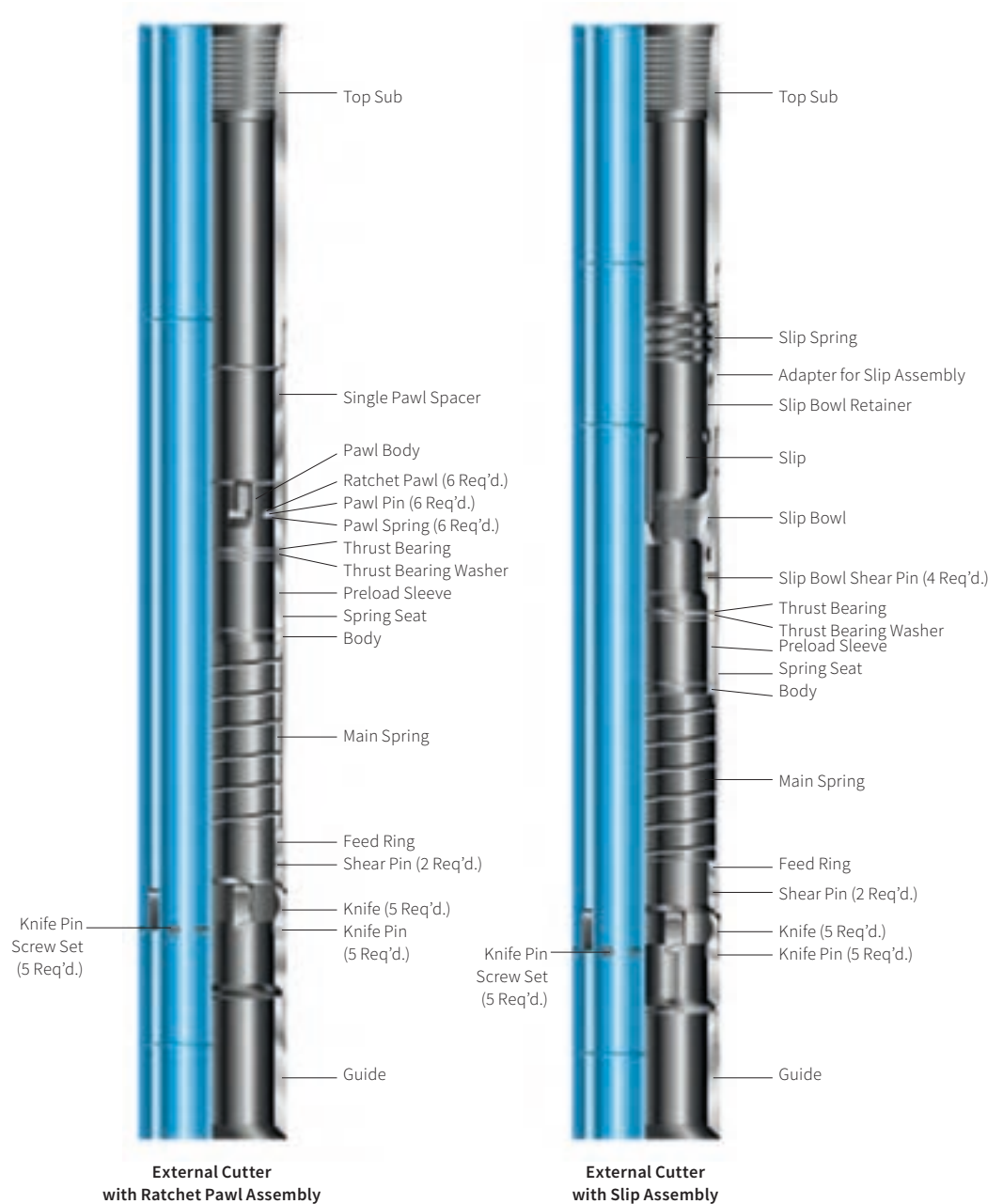
**CAUTION:** Be sure that the dog springs in the spring dog assembly point toward the upper end of the body. These must deflect and pass collars going in-hole.

9. Insert the top sub in the body and make it up tightly.

**NOTE:** Since the main spring must be partially compressed by the entering top sub, you will feel considerable resistance as the top sub is made up.

10. Assemble the guide in the lower end of the body.

Be sure to use a good quality clean thread dope on the top sub and guide connections.



# Bowen External Cutters

## Cutters Exploded View



## Specifications and Replacement Parts

### Bowen Standard External Cutters

|                                    |                          |                |                                     |                                     |                                     |                                      |                                 |                                 |  |                                 |         |
|------------------------------------|--------------------------|----------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------|---------------------------------|--|---------------------------------|---------|
| <b>Size pipe to cut</b>            | 1.050 Tub.<br>1.315 Tub. | 1.660 in. Tub. | 1.315 in.<br>Thru<br>2 3/8 in. Tub. | 1.660 in.<br>Thru<br>2 3/8 in. Tub. | 1 1/2 in.<br>Thru<br>2 1/8 in. Tub. | 2 1/16 in.<br>Thru<br>3 1/2 in. Tub. | 2 3/8 in.<br>Thru<br>4 in. Tub. | 2 3/8 in.<br>Thru<br>4 in. Tub. | 3 1/2 in. D.P.<br>4 in. D.P.<br>4 1/2 in. D.P.<br>5 in. D.P. | 4 in.<br>Thru<br>5 3/4 in. Csg. |         |
| <b>Maximum size will pass over</b> | 1.552 in.                | 2 1/16 in.     | 3 1/16 in.                          | 3 3/8 in.                           | 3 3/4 in.                           | 4 1/4 in.                            | 4 1/2 in.                       | 4 3/4 in.                       | 6 1/4 in.  | 6 1/2 in.                       |         |
| <b>Cutter ID</b>                   | 1 3/8 in.                | 2 3/4 in.      | 3 3/8 in.                           | 3 3/4 in.                           | 3 7/8 in.                           | 4 3/8 in.                            | 4 3/4 in.                       | 4 7/8 in.                       | 6 3/8 in.  | 6 3/4 in.                       |         |
| <b>Cutter OD</b>                   | 2 7/16 in.               | 3 1/2 in.      | 3 7/8 in.                           | 4 1/2 in.                           | 4 11/16 in.                         | 5 in.                                | 5 1/8 in.                       | 5 3/4 in.                       | 6 1/4 in.  | 6 7/8 in.                       |         |
| <b>Minimum size hole to run in</b> | 2 7/16 in.               | 3 3/4 in.      | 4 1/8 in.                           | 4 3/4 in.                           | 4 15/16 in.                         | 5 3/8 in.                            | 6 in.                           | 6 1/4 in.                       | 8 1/4 in.  | 8 3/8 in.                       |         |
| <b>Complete assembly</b>           | <b>Part No.</b>          | 32848          | 150365                              | 47127                               | 47167                               | 47210                                | 47309                           | 47264                           | 47360  | 47422                           | 47541   |
|                                    | <b>Weight</b>            | 30 lbs         | 51 lbs                              | 51 lbs                              | 108 lbs                             | 78 lbs                               | 181 lbs                         | 144 lbs                         | 154 lbs  | 293 lbs                         | 281 lbs |

### Replacement Parts

|   |                 |           |           |           |           |           |           |           |           |         |           |
|---|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|-----------|
| <b>Top sub</b>                          | <b>Part No.</b> | 13626     | 150374    | 47128     | 47168     | 47211     | 33574     | 47265     | 33648     | 33885   | 33959     |
|   | <b>Weight</b>   | 5 lbs     | 7 lbs     | 7 lbs     | 18 lbs    | 12 lbs    | 28 lbs    | 26 lbs    | 28 lbs    | 55 lbs  | 60 lbs    |
| <b>Body</b>                             | <b>Part No.</b> | 13627     | 150375    | 47129     | 47169     | 47212     | 47310     | 47266     | 47361     | 47423   | 47542     |
|   | <b>Weight</b>   | 7 lbs     | 25 lbs    | 25 lbs    | 48 lbs    | 27 lbs    | 90 lbs    | 57 lbs    | 61 lbs    | 115 lbs | 90 lbs    |
| <b>Thrust washer</b>                    | <b>Part No.</b> | 13633     | 153069    | 32904     | 47171     | 33083     | 36484     | 47268     | 33650     | 33887   | 33961     |
|   | <b>Weight</b>   | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb    | 3/4 lb  | 7/8 lb    |
| <b>Thrust bearing</b>                   | <b>Part No.</b> | 32852     | 153070    | 32905     | 47172     | 33084     | 33595     | 47269     | 33651     | 33888   | 33962     |
|   | <b>Weight</b>   | 1/16 lb   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/4 lb    | 1/4 lb  | 3/8 lb    |
| <b>Preload sleeve</b>                   | <b>Part No.</b> | 32891     | 150373    | 45844     | 47173     | 47214     | 33582     | 47270     | 47362     | 47424   | 47543     |
|   | <b>Weight</b>   | 2 lbs     | 2 lbs     | 2 lbs     | 2 1/2 lbs | 2 3/4 lbs | 5 1/2 lbs | 4 lbs     | 6 lbs     | 9 lbs   | 11 lbs    |
| <b>Spring seat</b>                      | <b>Part No.</b> | 80149     | 150367    | 14209     | 47174     | 47215     | 33583     | 49254     | 47363     | 49255   | 49258     |
|   | <b>Weight</b>   | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/2 lb    | 1 1/4 lbs | 2 lbs     | 3/4 lb    | 1 lb      | 1 lb    | 1 lb      |
| <b>Main spring</b>                      | <b>Part No.</b> | 13634     | 150368    | 14217     | 33020     | 33085     | 9994      | 39164     | 33652     | 33889   | 33963     |
|   | <b>Weight</b>   | 1 lb      | 1 1/4 lbs | 1 1/4 lbs | 1 1/2 lbs | 1 1/4 lbs | 1 1/2 lbs | 1 1/2 lbs | 1 1/2 lbs | 4 lbs   | 3 1/2 lbs |
| <b>Feed ring</b>                        | <b>Part No.</b> | 13635     | 150371    | 32907     | 47175     | 33086     | 33579     | 47577     | 33653     | 33890   | 33964     |
|   | <b>Weight</b>   | 1/8 lb    | 1 1/8 lbs | 1 1/8 lbs | 2 lbs     | 4 lbs     | 4 1/2 lbs | 3 lbs     | 4 1/2 lbs | 7 lbs   | 7 lbs     |
| <b>Shear pin* (2 req'd.)</b>            | <b>Part No.</b> | 14205     | 14205     | 14205     | 33891     | 33891     | 33891     | 33891     | 33891     | 33891   | 33891     |
|   | <b>Weight</b>   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/16 lb   | 1/32 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb | 1/16 lb   |
| <b>Knife (5 req'd.)</b>                 | <b>Part No.</b> | 13637     | 32909     | 32909     | 33023     | 33088     | 34553     | 34553     | 33655     | 34553   | 44802     |
|   | <b>Weight</b>   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/4 lb    | 1/4 lb    | 3/4 lb  | 3/4 lb    |
| <b>Knife pin (5 req'd.)</b>             | <b>Part No.</b> | 37015     | 150372    | 32910     | 33024     | 33089     | 34554     | 34554     | 33656     | 34554   | 33966     |
|   | <b>Weight</b>   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/16 lb | 1/16 lb   |
| <b>Knife pin set screw (5 req'd.)</b>   | <b>Part No.</b> | —         | 32911     | 32911     | 23687     | 23664     | 8574      | 8574      | 23685     | 23703   | 23705     |
|   | <b>Weight</b>   | —         | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb | 1/16 lb   |
| <b>Guide</b>                            | <b>Part No.</b> | 13628     | 150366    | 14203     | 47176     | 33093     | 33584     | 39169     | 33660     | 33897   | 33969     |
|   | <b>Weight</b>   | 5 lbs     | 9 lbs     | 9 lbs     | 21 lbs    | 27 lbs    | 30 lbs    | 32 lbs    | 30 lbs    | 69 lbs  | 72 lbs    |
| <b>Spring dog assembly consists of:</b> | <b>Part No.</b> | 13629     | 150376    | 47131     | 47177     | 47216     | 47313     | 47271     | 47365     | 33949   | 47545     |
|   | <b>Weight</b>   | 3 lbs     | 3 3/8 lbs | 3 3/8 lbs | 4 7/8 lbs | 3 3/4 lbs | 6 lbs     | 7 3/4 lbs | 9 1/4 lbs | 11 lbs  | 24 lbs    |
| <b>Spring dog body</b>                  | <b>Part No.</b> | 13630     | 150377    | 47132     | 47178     | 47217     | 47314     | 47272     | 47366     | 33950   | 47546     |
|   | <b>Weight</b>   | 1 1/2 lbs | 2 1/2 lbs | 2 1/2 lbs | 3 lbs     | 3 3/4 lbs | 4 1/4 lbs | 6 lbs     | 8 lbs     | 9 lbs   | 22 lbs    |
| <b>Spring dog (6 req'd.)</b>            | <b>Part No.</b> | 13631     | 32917     | 32917     | 47179     | 33103     | 33644     | 33644     | 33663     | 50192   | 50192     |
|   | <b>Weight</b>   | 1/16 lb   | 1/8 lb    | 1/8 lb    | 1/4 lb    | 1/8 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb  | 1/4 lb    |
| <b>Rivet (12 req'd.)</b>                | <b>Part No.</b> | 13632     | 45626     | 45626     | 47180     | 45842     | 44803     | 47180     | 44803     | 44803   | 50191     |
|   | <b>Weight</b>   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb | 1/32 lb   |

### Optional

|   |                 |       |           |           |           |           |        |        |            |            |            |
|---|-----------------|-------|-----------|-----------|-----------|-----------|--------|--------|------------|------------|------------|
| <b>Ratchet Pawl Assembly consists of:</b> | <b>Part No.</b> | 13666 | 150405    | 47138     | 47181     | 47218     | 47315  | 47275  | 47367      | 47426      | 47547      |
|   | <b>Weight</b>   | 3 lbs | 3 lbs     | 3 lbs     | 2 1/4 lbs | 9 1/4 lbs | 13 lbs | 13 lbs | 15 lbs     | 15 lbs     | 26 3/4 lbs |
| <b>Pawl Body</b>                          | <b>Part No.</b> | 13667 | 150407    | 47139     | 47182     | 47219     | 47316  | 47276  | 47368      | 47427      | 47548      |
|   | <b>Weight</b>   | 2 lbs | 2 1/4 lbs | 2 1/4 lbs | 1 1/2 lbs | 8 1/2 lbs | 12 lbs | 12 lbs | 13 1/2 lbs | 13 1/2 lbs | 24 lbs     |

\*See Load Required to Shear Each Shear Pin and Double Shear Strengths on page 13.

# Bowen External Cutters

## Specifications and Replacement Parts

### Bowen Standard External Cutters

|                                    |                 |                          |                |                                     |                                     |                                     |                                     |                                     |                                 |  |                                 |
|------------------------------------|-----------------|--------------------------|----------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---------------------------------|--|---------------------------------|
| <b>Size pipe to cut</b>            |                 | 1.050 Tub.<br>1.315 Tub. | 1.660 in. Tub. | 1.315 in.<br>Thru<br>2 3/8 in. Tub. | 1.660 in.<br>Thru<br>2 3/8 in. Tub. | 1 1/2 in.<br>Thru<br>2 7/8 in. Tub. | 2 1/8 in.<br>Thru<br>3 1/2 in. Tub. | 2 3/8 in.<br>Thru<br>3 1/2 in. Tub. | 2 3/8 in.<br>Thru<br>4 in. Tub. | 3 1/2 in. D.P.<br>4 in. D.P.<br>4 1/2 in. D.P.<br>5 in. D.P. | 4 in.<br>Thru<br>5 3/4 in. Csg. |
| <b>Maximum size will pass over</b> |                 | 1.552 in.                | 2 1/16 in.     | 3 1/8 in.                           | 3 1/8 in.                           | 3 3/4 in.                           | 4 1/4 in.                           | 4 1/2 in.                           | 4 3/4 in.                       | 6 1/4 in.  | 6 1/2 in.                       |
| <b>Cutter ID</b>                   |                 | 1 3/8 in.                | 2 3/4 in.      | 3 3/8 in.                           | 3 3/4 in.                           | 3 7/8 in.                           | 4 3/8 in.                           | 4 3/8 in.                           | 4 7/8 in.                       | 6 3/8 in.  | 6 3/8 in.                       |
| <b>Cutter OD</b>                   |                 | 2 3/16 in.               | 3 1/2 in.      | 3 7/8 in.                           | 4 1/2 in.                           | 4 1 1/16 in.                        | 5 in.                               | 5 in.                               | 6 1/16 in.                      | 7 in.  | 8 1/8 in.                       |
| <b>Minimum size hole to run in</b> |                 | 2 7/16 in.               | 3 3/4 in.      | 4 1/8 in.                           | 4 3/4 in.                           | 4 1 1/16 in.                        | 5 7/8 in.                           | 6 in.                               | 6 1/4 in.                       | 8 1/4 in.  | 8 3/8 in.                       |
| <b>Complete assembly</b>           | <b>Part No.</b> | 32848                    | 150365         | 47127                               | 47167                               | 47210                               | 47309                               | 47264                               | 47360                           | 47422  | 47541                           |
|                                    | <b>Weight</b>   | 30 lbs                   | 51 lbs         | 51 lbs                              | 108 lbs                             | 78 lbs                              | 181 lbs                             | 144 lbs                             | 154 lbs                         | 293 lbs  | 281 lbs                         |

### Optional (Continued)

|  |                 |          |         |            |            |            |            |            |            |            |            |
|--|-----------------|----------|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Ratchet pawl (6 req'd.)</b>                         | <b>Part No.</b> | 13668    | 150406  | 32946      | 47183      | 47220      | 47317      | 47277      | 47369      | 47428      | 47549      |
|  | <b>Weight</b>   | 5 Req'd  | 1/16 lb | 1/16 lb    | 1/16 lb    | 1/16 lb    | 3/32 lb    | 3/32 lb    | 3/32 lb    | 3/32 lb    | 3/32 lb    |
| <b>Pawl spring (6 req'd.)</b>                          | <b>Part No.</b> | 14213    | 15656   | 15656      | 14829      | 18729      | 14829      | 14829      | 14829      | 14829      | 47443      |
|  | <b>Weight</b>   | 5 Req'd. | 1/32 lb | 1/32 lb    | 1/32 lb    | 1/32 lb    | 1/32 lb    | 1/32 lb    | 1/32 lb    | 1/32 lb    | 1/32 lb    |
| <b>Pawl pin (6 req'd.)</b>                             | <b>Part No.</b> | 37011    | 33128   | 33128      | 37019      | 33128      | 37031      | 47253      | 39174      | 37031      | 47550      |
|  | <b>Weight</b>   | 5 Req'd. | 1/32 lb | 1/32 lb    | 1/32 lb    | 1/32 lb    | 1/8 lb     | 1/8 lb     | 1/8 lb     | 1/8 lb     | 1/8 lb     |
| <b>Single pawl spacer *</b>                            | <b>Part No.</b> | 32890    | 150468  | 47141      | 47190      | 47227      | 47326      | 47286      | 47378      | 47437      | 47557      |
|  | <b>Weight</b>   | 2 lbs    | 3 lbs   | 4 lbs      | 7 lbs      | 8 1/2 lbs  | 14 1/2 lbs | 7 1/2 lbs  | 22 lbs     | 35 lbs     | 60 lbs     |
| <b>Slip assembly **<br/>consists of:</b>               | <b>Part No.</b> | —        | —       | 47133      | 47185      | 47221      | 47319      | 47279      | 47371      | 47430      | 47551      |
|  | <b>Weight</b>   | —        | —       | 9 1/8 lbs  | 11 1/8 lbs | 12 lbs     | 19 lbs     | 21 1/4 lbs | 31 3/4 lbs | 46 3/4 lbs | 73 lbs     |
| <b>Slip</b>  | <b>Part No.</b> | —        | —       | 47134      | 47186      | 47222      | 47320      | 47280      | 47372      | 47431      | 47552      |
|  | <b>Weight</b>   | —        | —       | 3 1/2 lbs  | 1 1/8 lbs  | 4 1/4 lbs  | 5 1/2 lbs  | 6 lbs      | 13 lbs     | 17 lbs     | 19 lbs     |
| <b>Slip bowl</b>                                       | <b>Part No.</b> | —        | —       | 47135      | 47187      | 47223      | 47321      | 47281      | 47373      | 47432      | 47553      |
|  | <b>Weight</b>   | —        | —       | 1 lb lbs   | 1 1/8 lbs  | 1 lb       | 1 lb       | 1 1/4 lbs  | 1 3/4 lbs  | 4 1/4 lbs  | 6 1/2 lbs  |
| <b>Slip bowl retainer</b>                              | <b>Part No.</b> | —        | —       | 47136      | 47188      | 47224      | 47322      | 47282      | 47374      | 47433      | 47554      |
|  | <b>Weight</b>   | —        | —       | 4 1/4 lbs  | 8 1/2 lbs  | 6 1/4 lbs  | 12 lbs     | 13 1/2 lbs | 16 1/2 lbs | 25 lbs     | 47 lbs     |
| <b>Slip spring</b>                                     | <b>Part No.</b> | —        | —       | 47137      | 47189      | 47225      | 47323      | 47283      | 47375      | 47434      | 47556      |
|  | <b>Weight</b>   | —        | —       | 1/8 lb     | 1/8 lb     | 1/4 lb     | 1/4 lb     | 1/4 lb     | 1/4 lb     | 1/4 lb     | 1/4 lb     |
| <b>Slip bowl shear pin (4 req'd.)</b>                  | <b>Part No.</b> | —        | —       | 47208      | 47208      | 47208      | 47324      | 47324      | 47324      | 47435      | 47555      |
|  | <b>Weight</b>   | —        | —       | 1/16 lb    | 1/16 lb    | 1/16 lb    | 1/16 lb    | 1/16 lb    | 1/16 lb    | 1/8 lb     | 1/8 lb     |
| <b>Slip adaptor</b>                                    | <b>Part No.</b> | —        | —       | 47130      | 47170      | 47213      | 47311      | 47267      | 47364      | 47425      | 47544      |
|  | <b>Weight</b>   | —        | —       | 12 lbs     | 11 lbs     | 14 lbs     | 15 lbs     | 17 lbs     | 18 lbs     | 19 lbs     | 20 lbs     |
| <b>Load required to shear each shear pin</b>           |                 | 377 lbs  | 377 lbs | 377 lbs    | 805 lbs    | 377 lbs    | 805 lbs    | 805 lbs    | 805        | 805 lbs    | 805 lbs    |
| <b>Double shear strength</b>                           |                 | 754 lbs  | 754 lbs | 754 lbs    | 1,610 lbs  | 754 lbs    | 1,610 lbs  | 1,610 lbs  | 1,610 lbs  | 1,610 lbs  | 1,610 lbs  |
| <b>Load required to shear each slip bowl shear pin</b> |                 | —        | —       | 4,125 lbs  | 4,125 lbs  | 4,125 lbs  | 8,285 lbs  | 8,285 lbs  | 8,285 lbs  | 8,285 lbs  | 8,285 lbs  |
| <b>Quadruple shear strength</b>                        |                 |          |         | 16,500 lbs | 16,500 lbs | 16,500 lbs | 33,150 lbs | 33,150 lbs | 33,150 lbs | 33,150 lbs | 33,150 lbs |

\* Used with ratchet pawl assembly.

\*\* See load required to shear each slip bowl shear pin and quadruple shear strengths at the bottom of this table.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size, weight and type of washpipe top connection
  - (3) Any desired options by name and number
  - (4) Any desired spares by name and number



### Recommended Spares

- (1) 2 spring dog, ratchet pawl, or slip assemblies
- (2) 1 feed ring
- (3) 24 shear pins
- (4) 6 sets knives
- (5) 2 sets knife pins
- (6) 1 set knife pin screws



## Specifications and Replacement Parts

### Maximum Length and Load of Tubing or Drill Pipe to be Picked up

| External Cutter Knives    |            |           |            | Ratchet Pawls |            |             |           |
|---------------------------|------------|-----------|------------|---------------|------------|-------------|-----------|
| Tubing or Drill Pipe Size | Cutter No. | Length    | Load       | Length        | Load       | OD          | ID        |
| 1.050 in. Tbg.            | 32848      | 1,650 ft. | 1,985 lbs  | 1,700 ft.     | 2,000 lbs  | 2 5/16 in.  | 1 5/8 in. |
| 1.315 in. Tbg.            | 32848      | 1,500 ft. | 2,800 lbs  | 2,000 ft.     | 3,600 lbs  |             |           |
| 1.315 in. Tbg.            | 47127      | 666 ft.   | 1,200 lbs  | 888 ft.       | 1,600 lbs  | 3 7/8 in.   | 3 3/8 in. |
| 1.660 in. Tbg.            | 47127      | 583 ft.   | 1,400 lbs  | 875 ft.       | 2,100 lbs  |             |           |
| 1.900 in. Tbg.            | 47127      | 552 ft.   | 1,600 lbs  | 965 ft.       | 2,800 lbs  |             |           |
| 2 1/16 in. Tbg.           | 47127      | 500 ft.   | 1,700 lbs  | 1,029 ft.     | 3,500 lbs  |             |           |
| 2 3/8 in. Tbg.            | 47127      | 468 ft.   | 2,200 lbs  | 1,400 ft.     | 6,600 lbs  |             |           |
| 1.660 in. Tbg.            | 47167      | 2,420 ft. | 5,800 lbs  | 3,630 ft.     | 8,740 lbs  | 4 1/2 in.   | 3 3/4 in. |
| 1.900 in. Tbg.            | 47167      | 2,275 ft. | 6,600 lbs  | 3,430 ft.     | 9,940 lbs  |             |           |
| 2 1/16 in. Tbg.           | 47167      | 2,088 ft. | 7,100 lbs  | 3,150 ft.     | 10,725 lbs |             |           |
| 2 3/8 in. Tbg.            | 47167      | 1,830 ft. | 8,600 lbs  | 2,804 ft.     | 12,900 lbs |             |           |
| 1.900 in. Tbg.            | 47210      | 379 ft.   | 1,100 lbs  | 420 ft.       | 1,225 lbs  | 4 11/16 in. | 3 3/8 in. |
| 2 1/16 in. Tbg.           | 47210      | 347 ft.   | 1,180 lbs  | 375 ft.       | 1,275 lbs  |             |           |
| 2 3/8 in. Tbg.            | 47210      | 276 ft.   | 1,300 lbs  | 275 ft.       | 1,290 lbs  |             |           |
| 2 7/8 in. Tbg.            | 47210      | 260 ft.   | 1,700 lbs  | 300 ft.       | 1,930 lbs  |             |           |
| 2 7/8 in. Tbg.            | 47309      | 1,307 ft. | 8,500 lbs  | 1,965 ft.     | 12,750 lbs | 5 5/8 in.   | 4 3/8 in. |
| 3 1/2 in. Tbg.            | 47309      | 1,258 ft. | 11,700 lbs | 1,905 ft.     | 17,700 lbs |             |           |
| 2 3/8 in. Tbg.            | 47309      | 1,210 ft. | 5,700 lbs  | 2,020 ft.     | 9,500 lbs  |             |           |
| 2 1/16 in. Tbg.           | 47309      | 1,290 ft. | 4,400 lbs  | 2,350 ft.     | 8,000 lbs  |             |           |
| 2 1/16 in. Tbg.           | 47264      | 1,545 ft. | 5,250 lbs  | 2,320 ft.     | 7,875 lbs  | 5 7/8 in.   | 4 5/8 in. |
| 2 3/8 in. Tbg.            | 47264      | 1,212 ft. | 5,700 lbs  | 1,850 ft.     | 8,735 lbs  |             |           |
| 2 7/8 in. Tbg.            | 47264      | 1,061 ft. | 6,900 lbs  | 1,610 ft.     | 10,500 lbs |             |           |
| 3 1/2 in. Tbg.            | 47264      | 1,000 ft. | 9,300 lbs  | 1,515 ft.     | 14,100 lbs |             |           |
| 2 3/8 in. Tbg.            | 47360      | 500 ft.   | 2,350 lbs  | 750 ft.       | 3,525 lbs  | 6 1/16 in.  | 4 3/4 in. |
| 2 7/8 in. Tbg.            | 47360      | 415 ft.   | 2,700 lbs  | 625 ft.       | 4,070 lbs  |             |           |
| 3 1/2 in. Tbg.            | 47360      | 387 ft.   | 3,600 lbs  | 570 ft.       | 4,555 lbs  |             |           |
| 4 in. Tbg.                | 47360      | 436 ft.   | 4,800 lbs  | 655 ft.       | 7,200 lbs  |             |           |
| 3 1/2 in. D.P.            | 47422      | 315 ft.   | 4,790 lbs  | 470 ft.       | 7,180 lbs  | 7 5/8 in.   | 6 1/4 in. |
| 4 in. D.P.                | 47422      | 325 ft.   | 5,100 lbs  | 500 ft.       | 7,750 lbs  |             |           |
| 4 1/2 in. D.P.            | 47422      | 295 ft.   | 5,900 lbs  | 450 ft.       | 8,925 lbs  |             |           |
| 5 in. D.P.                | 47422      | 395 ft.   | 7,700 lbs  | 600 ft.       | 11,625 lbs |             |           |
| 3 1/2 in. D.P.            | 47541      | 350 ft.   | 5,400 lbs  | 525 ft.       | 8,100 lbs  | 8 1/8 in.   | 6 1/2 in. |
| 4 in. D.P.                | 47541      | 380 ft.   | 5,950 lbs  | 570 ft.       | 8,925 lbs  |             |           |
| 4 1/2 in. O.D.            | 47541      | 335 ft.   | 6,700 lbs  | 500 ft.       | 10,125 lbs |             |           |
| 5 in. D.P.                | 47541      | 446 ft.   | 8,700 lbs  | 745 ft.       | 13,090 lbs |             |           |
| 5 1/2 in. D.P.            | 47541      | 412 ft.   | 10,400 lbs | 640 ft.       | 15,640 lbs |             |           |
| 5 3/4 in. Csg.            | 47541      | 550 ft.   | 12,400 lbs | 830 ft.       | 18,640 lbs |             |           |

NOTE: These are maximum static loads. If shock loaded, reduce values 50%.

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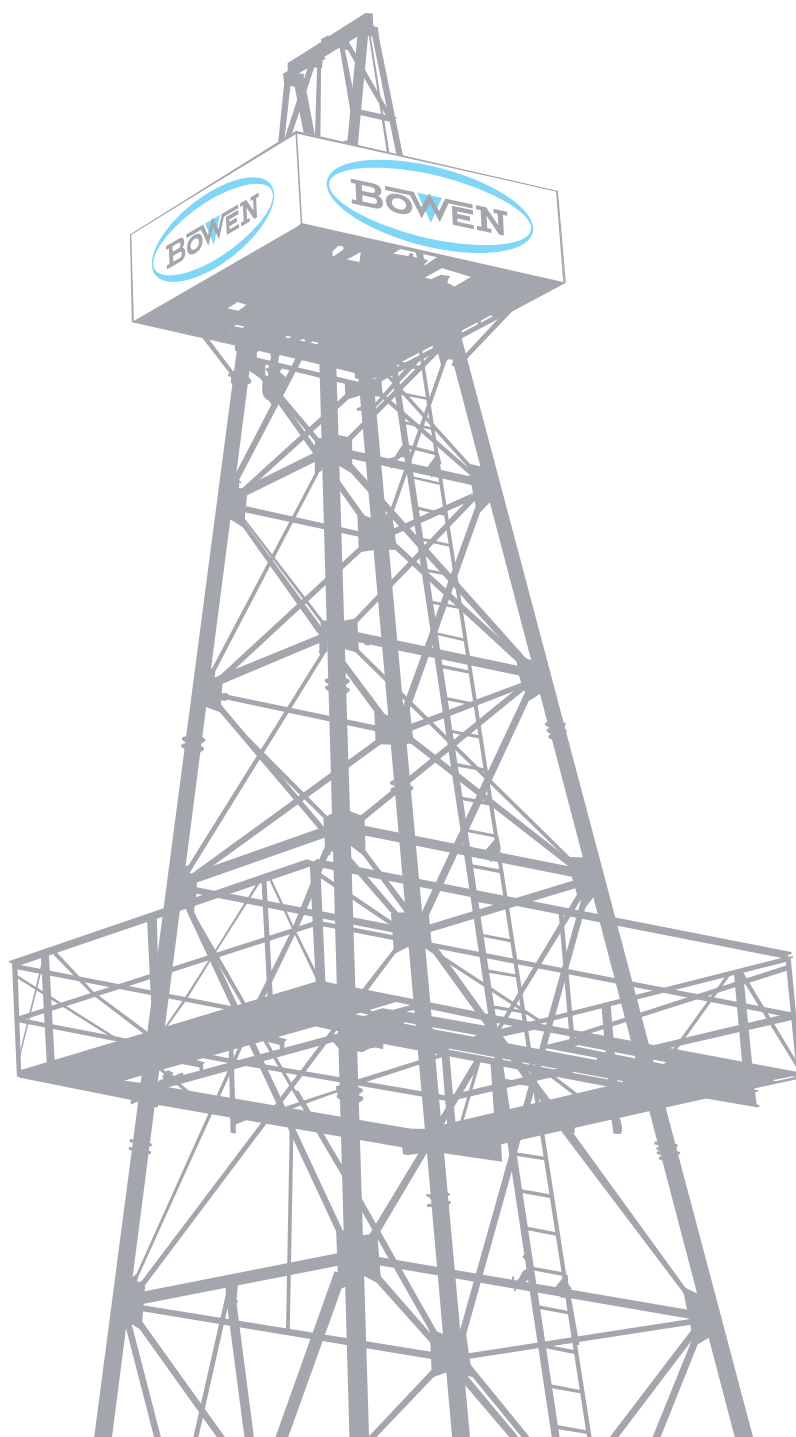
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# Bowen Hydraulic External Cutters

Instruction Manual 5550



# Bowen Hydraulic External Cutters

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# Bowen Hydraulic External Cutters

## General Description

Bowen™ Hydraulic External Cutters are hydraulically actuated mechanical tubing and drill pipe cutters. The cutters are fast, efficient, smooth cutting, and are capable of cutting and recovering strings of tubing or drill pipe. The cutter knives are fed entirely by pump pressure, giving you sensitive control.

## Use

Used in conjunction with a washover string, the Bowen Hydraulic External Cutter may be used to cut and remove stuck pipe and is capable of cutting all types of drill pipe or tubing, regardless of tool joint style.

## Construction

Simple yet rugged, Bowen Hydraulic External Cutters are composed of a top sub, body, guide, a set of knives, and a segmented piston assembly. Two shear pins hold the piston in a "running in" position until they are sheared to begin the cut.

The piston assembly is composed of a rubber ring and a set of interlocking, conical piston segments. The segments are held in a contracted position by a tough rubber ring stretched around the end of the segments in a suitable groove. Each piston segment has a fluid passage engineered to simultaneously pass fluid for flushing, cooling, and restricting the fluid flow for ample pump-down force on the knives to effect the cut.

The top sub is threaded into the body. It has a suitable running string connection on the top end. The inner parts of the external cutter are maintained in position by the top sub.

The body has knife slots on its lower end and threaded connections top and bottom to accept the top sub and guide. The knife slots incorporate crossholes for the knife pins. Two drilled holes are arranged diametrically opposite each other in the body for the shear pins.

The guide is threaded into the bottom of the body. Its purpose is to guide the fish into the cutter. The guide is usually cut-lipped. An alternate guide such as an extra-long wall hook or mill-toothed guide may be substituted if required.

The knives are made from tool steel, shaped at the cutting end for most efficient cutting action, and tempered for strength and toughness. The shank end is radius formed to match the concave bearing face against which it rests in the cutter body. These bearing blocks are an integral part of the body.

## Operation

Before running the Bowen hydraulic external cutter, a washover operation is necessary to free the stuck pipe from the formations. The washpipe is equipped with a washover shoe with an outside diameter slightly larger and an inside diameter slightly smaller than the Bowen hydraulic external cutter to be used. (A Bowen rotary washover shoe is recommended.) This is to establish adequate clearance so that the cutter may be lowered over the stuck pipe. Wash over the stuck pipe for at least one full joint below where the cut is to be made so that the stuck pipe will be centralized in the hole at the point of the cut.

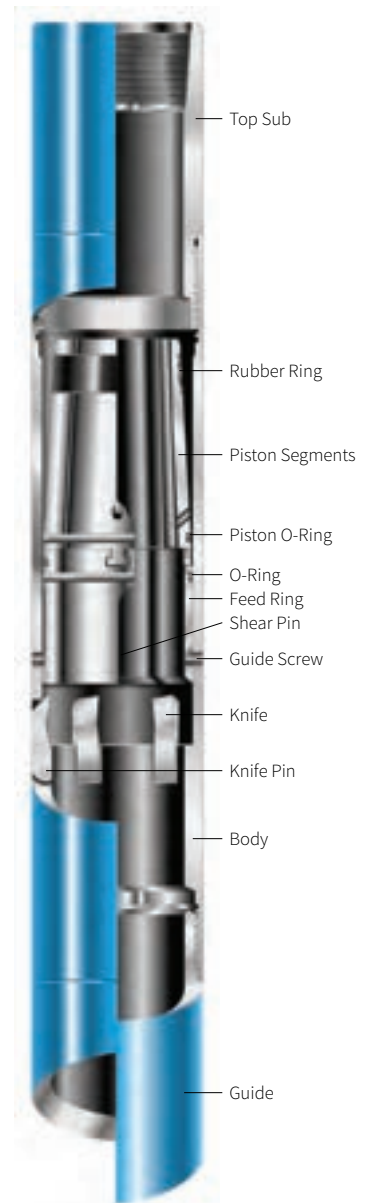
After washing over the stuck pipe for the desired distance, the washover string is withdrawn from the well and the wash-over shoe is removed from the bottom of the string. The washover shoe is then replaced with the Bowen Hydraulic External Cutter.

Assemble the cutter using the proper size piston assembly and run in the hole. When desired depth is reached, start the mud pump with all lines open to be sure no pressure is pumped down hole. With the pump at an idle, slowly close the bypass valve to pump fluid through the working string until the pressure reaches approximately 145 psi, which will shear the pins. Open the bypass valve to release the pressure from the working string.

Begin slow rotation at 15 to 25 rpm; slowly close the bypass valve again to pump fluid down the working string. This will begin feeding the knives to start the cut. The amount of pressure and gallons per minute required depends on the size cutter and piston assembly being used. See page 6.

Use extreme caution to avoid surging of pump pressure when starting a cut. Pressure surging causes the string length to expand and contract, moving the cutter up and down. This motion prevents the knives from remaining in one position when making a cut and may easily break a knife tip.

Another method for shearing the pins is to raise the string until the piston assembly shoulders under a collar. Approximately 377 lbs. pull will then shear one pin and 754 lbs. pull will shear two pins.



---

## Running-In Precautions

1. Be careful when going over the top of the fish. Whenever possible, rotate the cutter to the right to feed the fish into the guide.
2. After the fish has entered the cutter, do not raise the cutter more than absolutely necessary. When pulling the rotary slips on the rig, lift the cutting string only high enough to free them. If the cutter is lifted against a collar, the pins will be sheared, allowing the feed ring to force the knives against the pipe. Should this occur, make a cut to avoid passing another collar and damaging the knives.
3. Once the piston segments are run past a collar, it may not be pulled back. Special piston segments with a threaded front edge are available if this is a concern. They may be walked over a coupling with right-hand torque.

## Cutting Precautions

1. Make the cut one joint above the lowest position to which the rotary washover shoe was run. This will leave one joint of free pipe below the cutter, which will spring away from the wall and align itself in the cutter.
2. After the kelly, Bowen power sub, or Bowen power swivel is attached to the drill pipe, the cutting string rotates to a free position. The pumps should then be turned on at a slow rate, allowing the pipe to be cut with a minimum torque.

## Proving the Cut

Normally, when the pipe is severed by the Bowen Hydraulic External Cutter, torque will drop and there will be a noticeable increase on the weight indicator.

To prove a cut, raise the drill pipe string 1 in. to 2 in. or until the indicator shows there is from two to three points of additional load sufficient to lift the cut portion of the fish. The raising is done to avoid pinching the knives between the portion of the fish that has been cut and the fish remaining in the hole.

After raising, the string should be rotated. If the string rotates freely, it is almost conclusive proof that the cut has been successfully made. The pipe should again be raised carefully, and if no additional obstacles are encountered, all of the string may be hoisted and the fish removed from the hole.

Several other changes in the cutter's action may indicate that a cut has been completed. For example: If a short fish is being cut, the speed of rotation may increase and the cutter will run free immediately after the cut is completed. If a long fish is being cut, the portion of the fish above the cutter may be heavy enough to pinch the knives against the lower portion of the fish, making forward rotation impossible. The cutter may rotate smoothly, although the knives are slightly pinched, but additional torque is required to rotate. Finally, the weight indicator may suddenly rise while rotating, indicating completion of the cut.

## Coming Out of the Hole

After completing the cut, carefully withdraw the cutter for two or

three joints. Then proceed with normal withdrawing operations.

## Maintenance

Thoroughly clean the Bowen hydraulic external cutter to remove all drilling mud and other debris. Examine all parts, particularly the knives, for wear and damage and replace them as necessary. We recommend completely disassembling, cleaning, lubricating, painting, and reassembling the Bowen hydraulic external cutter before storing.

## Disassembly

1. At the rig, when the Bowen hydraulic external cutter is removed from the well, thoroughly wash it down with clean water to remove all excess drilling mud, etc. At this time, break the top sub from the body with the rig tongs to point where it may be uncoupled by hand.
2. Remove the entire assembly to a place that is clean and convenient for disassembly.
3. Clamp the cutter in a suitable vise near the center of its length.

**CAUTION: Do not over tighten on thin wall section.**

4. Loosen and remove the top sub.
5. Remove piston assembly.
6. Slide out and remove the feed ring.
7. Using a suitable punch, remove the sheared halves of the shear pins from the body.
8. With a socket head set

screw wrench, remove the several (usually 5) set screws which lock the knife pins in place.

9. Remove the knife pins by pushing them out with a small brass rod or punch.

**CAUTION: These knife pins have shoulders and must be removed from the end of their hole which has the set screw holes. They cannot be removed from the other end. The knives will fall free when the knife pins are removed.**

10. Loosen and remove the guide from the lower end of the body.
11. With a suitable punch, remove the sheared halves of the shear pins from the feed ring.

**CAUTION: When removing sheared pins from the body and the feed ring, be careful not to distort or otherwise damage the shear pin holes.**

After disassembly, thoroughly clean all parts and examine them for signs of advanced wear or damage. The interior of the body should be free of marks or scratches, bits of shear pin or other loose debris.

The feed rings should also be free of marks and scratches. Dress down any distortion on the edges with a hand file.

All knives should be in perfect condition for reuse. If they are not, replace them. Very minor wear or damage may sometimes be repaired by skillfully regrinding, but it is important that the proper contour and the overall length of each knife be maintained.

# Bowen Hydraulic External Cutters

## Reassembly

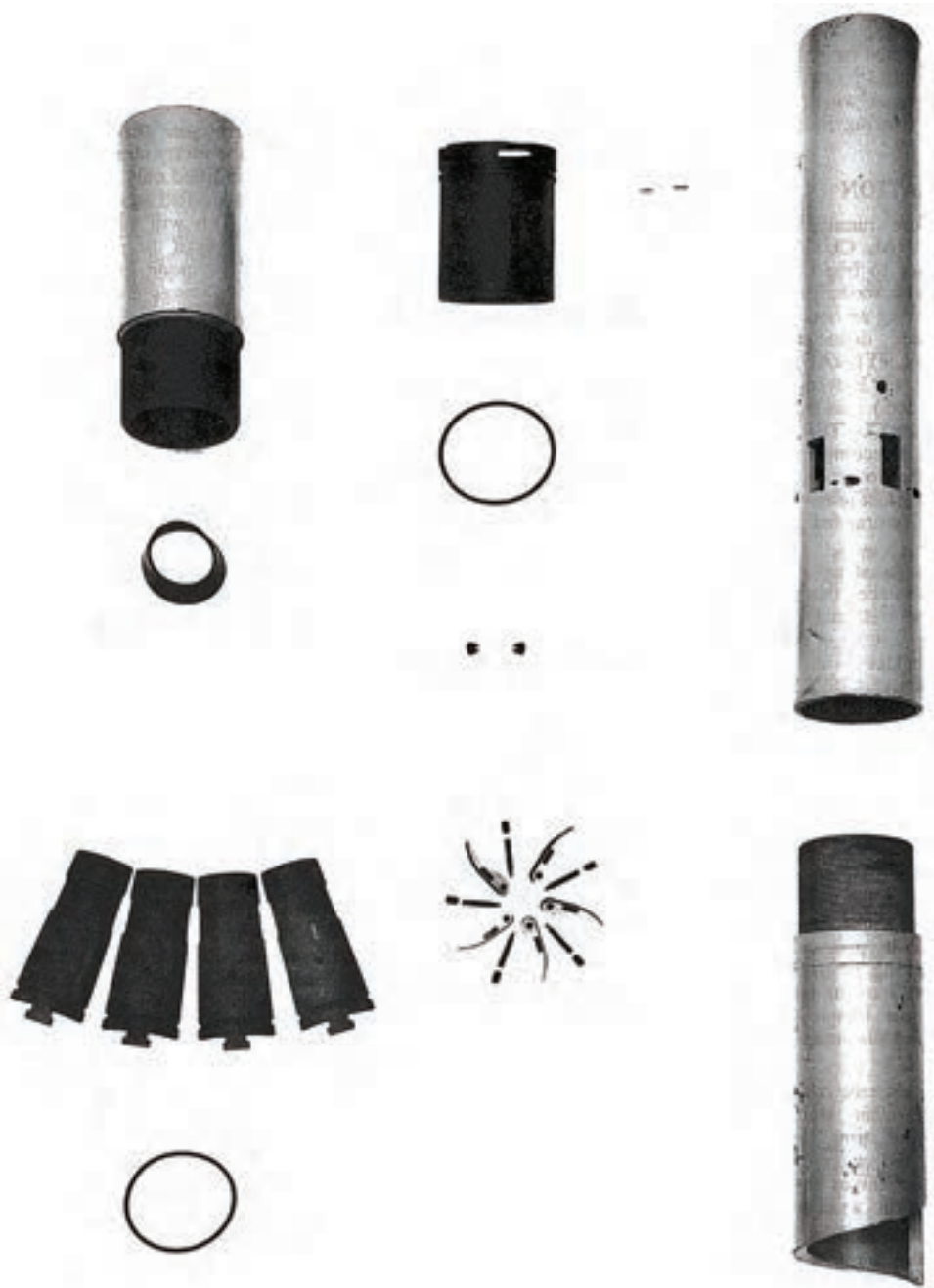
1. Clamp the body in a vise near the center of its length.
2. Assemble the knives in the body. Position a knife in the body with the cutting face toward the inside. Slip a knife pin through the hole provided in the body, through the knife and into the remainder of the pin hole. Insert a set screw and tighten. Wedge the knife in place by using a strand of soft rope or a piece of hemp string. This will maintain the knife in position while the remaining knives are assembled and during subsequent handling and operation.
3. After all knives have been assembled, attach the piston assembly to the feed ring.
4. Insert feed ring and piston assembly into body so that the two shear pin holes on the feed ring align with the two shear pin holes on the body.
5. Insert the two shear pins in the holes on the body and on the feed ring.
6. Insert the top sub in the body and make it up tightly.
7. Assemble the guide on the lower end of the body.

**NOTE: Do NOT use brass welding rod for shear pins. Use only quality tested and proven brass pins from an NOV/ Bowen dealer.**

Be sure to use a good quality clean thread dope on the top sub and guide connections.

**NOTE: The ends of the shear pins may be upset slightly with a small hammer, causing them to fit the shear pin holes more snugly.**

## Exploded View



# Bowen Hydraulic External Cutters

## Maximum Loads and Lengths

### Maximum Length and Load of Tubing and Drill Pipe Approximate Pressure and GPM Required to Make Cut

| Tubing and Drill Pipe Size | Cutter No. | Length   | Load       | Approximate psi | Approximate gpm |
|----------------------------|------------|----------|------------|-----------------|-----------------|
| 2 1/16 in. Tbg.            | 70086      | 1,979 ft | 7,910 lbs  | 30 psi – 40 psi | 200 gpm         |
| 1.900 in. Tbg.             |            | 1,400 ft | 4,060 lbs  | 25 psi – 35 psi | 220 gpm         |
| 1.600 in. Tbg.             |            | 1,293 ft | 3,100 lbs  | 20 psi – 30 psi | 125 gpm         |
| 1.315 in. Tbg.             |            | 1,409 ft | 2,530 lbs  | 20 psi – 30 psi | 120 gpm         |
| 2 3/16 in. Tbg.            | 34415      | 710 ft   | 3,340 lbs  | 35 psi – 45 psi | 200 gpm         |
| 2 1/16 in. Tbg.            |            | 785 ft   | 2,670 lbs  | 30 psi – 40 psi | 200 gpm         |
| 1.900 in. Tbg.             |            | 862 ft   | 2,500 lbs  | 25 psi – 35 psi | 220 gpm         |
| 1.660 in. Tbg.             |            | 916 ft   | 2,200 lbs  | 20 psi – 30 psi | 125 gpm         |
| 1.315 in. Tbg.             | 70209      | 1,033 ft | 1,860 lbs  | 20 psi – 30 psi | 120 gpm         |
| 2 7/8 in. Tbg.             |            | 410 ft   | 3,570 lbs  | 15 psi – 25 psi | 145 gpm         |
| 2 3/8 in. Tbg.             |            | 360 ft   | 2,140 lbs  | 15 psi – 25 psi | 135 gpm         |
| 2 1/8 in. Tbg.             |            | 536 ft   | 2,140 lbs  | 15 psi – 25 psi | 120 gpm         |
| 1.900 in. Tbg.             | 41727      | 534 ft   | 1,550 lbs  | 10 psi – 20 psi | 125 gpm         |
| 2 7/8 in. D.P.             |            | 142 ft   | 1,480 lbs  | 20 psi – 30 psi | 200 gpm         |
| 2 3/8 in. D.P.             |            | 186 ft   | 1,240 lbs  | 20 psi – 30 psi | 180 gpm         |
| 2 7/8 in. Tbg.             |            | 275 ft   | 1,780 lbs  | 15 psi – 25 psi | 130 gpm         |
| 2 3/8 in. Tbg.             | 34551      | 290 ft   | 1,360 lbs  | 15 psi – 25 psi | 120 gpm         |
| 2 1/8 in. Tbg.             |            | 345 ft   | 1,140 lbs  | 10 psi – 20 psi | 100 gpm         |
| 1.900 in. Tbg.             |            | 388 ft   | 1,128 lbs  | 10 psi – 20 psi | 125 gpm         |
| 3 1/2 in. D.P.             |            | 814 ft   | 12,620 lbs | 45 psi – 55 psi | 230 gpm         |
| 3 1/2 in. Tbg.             | 51148      | 1,650 ft | 16,800 lbs | 30 psi – 40 psi | 180 gpm         |
| 2 7/8 in. Tbg.             |            | 1,320 ft | 8,586 lbs  | 20 psi – 30 psi | 220 gpm         |
| 2 3/8 in. Tbg.             |            | 1,470 ft | 6,900 lbs  | 15 psi – 25 psi | 225 gpm         |
| 2 1/8 in. Tbg.             |            | 1,794 ft | 6,100 lbs  | 15 psi – 25 psi | 210 gpm         |
| 4 in. Tbg.                 | 35957      | 436 ft   | 4,800 lbs  | 30 psi – 40 psi | 200 gpm         |
| 3 1/2 in. Tbg.             |            | 387 ft   | 3,600 lbs  | 20 psi – 30 psi | 160 gpm         |
| 2 7/8 in. Tbg.             |            | 415 ft   | 2,700 lbs  | 15 psi – 25 psi | 125 gpm         |
| 2 3/8 in. Tbg.             |            | 500 ft   | 2,350 lbs  | 15 psi – 25 psi | 135 gpm         |
| 5 in. D.P.                 |            | 460 ft   | 9,040 lbs  | 10 psi – 20 psi | 180 gpm         |
| 4 1/2 in. D.P.             |            | 350 ft   | 7,030 lbs  | 10 psi – 15 psi | 160 gpm         |
| 4 in. D.P.                 |            | 393 ft   | 6,170 lbs  | 10 psi – 15 psi | 160 gpm         |
| 3 1/2 in. D.P.             |            | 330 ft   | 5,160 lbs  | 10 psi – 15 psi | 140 gpm         |

NOTE: These are maximum static loads. If shock loaded, reduce values 50%.

## Piston Assembly Sizes

### Hydraulic External Cutters

| Assembly No. | O.D.       | I.D.       | Piston Segment |            | Maximum O.D. Piston Segment Will Pass |
|--------------|------------|------------|----------------|------------|---------------------------------------|
|              |            |            | Assembly No.   | Size       |                                       |
| 70086        | 3 3/4 in.  | 2 7/8 in.  | 70091          | 2 1/16 in. | 2 3/4 in.                             |
|              |            |            | 70094          | 1.900 in.  | 2 7/8 in.                             |
|              |            |            | 70097          | 1.600 in.  | 2 3/8 in.                             |
|              |            |            | 70100          | 1.315 in.  | 2 3/16 in.                            |
| 34415        | 4 1/16 in. | 3 3/16 in. | 34425          | 2 3/8 in.  | 3 1/16 in.                            |
|              |            |            | 34427          | 2 1/16 in. | 2 7/8 in.                             |
|              |            |            | 34429          | 1.900 in.  | 2 13/16 in.                           |
|              |            |            | 34432          | 1.660 in.  | 2 11/16 in.                           |
| 70209        | 4 7/16 in. | 3 3/8 in.  | 34434          | 1.315 in.  | 2 7/8 in.                             |
|              |            |            | 70232          | 2 7/8 in.  | 3 1/16 in.                            |
|              |            |            | 70214          | 2 3/8 in.  | 3 3/8 in.                             |
|              |            |            | 70217          | 2 1/16 in. | 3 1/8 in.                             |
| 41727        | 4 1/16 in. | 3 7/8 in.  | 70219          | 1.900 in.  | 3 1/16 in.                            |
|              |            |            | 41733          | 2 7/8 in.  | 3 3/4 in.                             |
|              |            |            | 41736          | 2 3/8 in.  | 3 9/16 in.                            |
|              |            |            | 41738          | 2 1/16 in. | 3 3/8 in.                             |
| 34551        | 5 in.      | 4 3/16 in. | 41740          | 1.900 in.  | 3 3/8 in.                             |
|              |            |            | 53881          | 4 in.      | 4 3/16 in.                            |
|              |            |            | 34559          | 3 1/2 in.  | 4 1/8 in.                             |
|              |            |            | 34562          | 2 7/8 in.  | 4 1/16 in.                            |
| 51148        | 6 1/16 in. | 4 7/8 in.  | 34565          | 2 3/8 in.  | 4 in.                                 |
|              |            |            | 34568          | 2 1/16 in. | 4 in.                                 |
|              |            |            | 51151          | 4 in.      | 4 13/16 in.                           |
|              |            |            | 51230          | 3 1/2 in.  | 4 3/4 in.                             |
| 35957        | 8 in.      | 6 1/2 in.  | 51345          | 2 7/8 in.  | 4 3/8 in.                             |
|              |            |            | 51344          | 2 3/8 in.  | 4 1/2 in.                             |
|              |            |            | 35963          | 5 in.      | 6 3/8 in.                             |
|              |            |            | 35966          | 4 1/2 in.  | 6 1/4 in.                             |
|              |            |            | 35968          | 4 in.      | 5 7/8 in.                             |
|              |            |            | 35971          | 3 1/2 in.  | 5 7/8 in.                             |



# Bowen Hydraulic External Cutters

## Specifications and Replacement Parts

### Bowen Hydraulic External Cutters

|  |                 |                        |                       |                       |                       |                    |                   |                   |
|--|-----------------|------------------------|-----------------------|-----------------------|-----------------------|--------------------|-------------------|-------------------|
| <b>Size pipe to cut</b>                      |                 | 1.315 in. – 2 1/16 in. | 1.315 in. – 2 3/8 in. | 1.900 in. – 2 7/8 in. | 1.900 in. – 2 7/8 in. | 2 1/16 in. – 4 in. | 2 3/8 in. – 4 in. | 3 1/2 in. – 5 in. |
| <b>Maximum size cutter will pass over</b>    |                 | 2 3/4 in.              | 3 1/16 in.            | 3 1/2 in.             | 3 3/4 in.             | 4 3/16 in.         | 4 13/16 in.       | 6 3/8 in.         |
| <b>When dressed with largest size piston</b> |                 |                        |                       |                       |                       |                    |                   |                   |
| <b>Cutter ID</b>                             |                 | 2 7/8 in.              | 3 3/16 in.            | 3 9/16 in.            | 3 7/8 in.             | 4 5/16 in.         | 4 7/8 in.         | 6 1/2 in.         |
| <b>Cutter OD</b>                             |                 | 3 3/4 in.              | 4 1/16 in.            | 4 7/16 in.            | 4 11/16 in.           | 5 5/16 in.         | 6 1/16 in.        | 8 in.             |
| <b>Minimum size hole to run in</b>           |                 | 4 in.                  | 4 3/16 in.            | 4 11/16 in.           | 4 13/16 in.           | 5 7/16 in.         | 6 1/4 in.         | 8 1/2 in.         |
| <b>Complete assembly</b>                     | <b>Part No.</b> | 70086                  | 34415                 | 70209                 | 41727                 | 34551              | 51148             | 35957             |
|  | <b>Weight</b>   | 55 lbs                 | 60 lbs                | 73 lbs                | 85 lbs                | 95 lbs             | 105 lbs           | 230 lbs           |

### Replacement Parts

|   |                   |            |           |           |           |           |        |        |
|---|-------------------|------------|-----------|-----------|-----------|-----------|--------|--------|
| <b>Top sub</b>                            | <b>Part No.</b>   | 70087      | 34416     | 70210     | 33081     | 33574     | 13177  | 35958  |
|   | <b>Weight</b>     | 21 lbs     | 23 lbs    | 24 lbs    | 25 lbs    | 28 lbs    | 31 lbs | 60 lbs |
| <b>Body</b>                               | <b>Part No.</b>   | 70088      | 34417     | 70211     | 41728     | 34552     | 56992  | 35959  |
|   | <b>Weight</b>     | 16 lbs     | 20 lbs    | 23 lbs    | 26 lbs    | 31 lbs    | 29 lbs | 73 lbs |
| <b>Feed ring</b>                          | <b>Part No.</b>   | 70089      | 49819     | 70212     | 49824     | 49829     | 51150  | 49834  |
|   | <b>Weight</b>     | 1 lb       | 1 lb      | 1 lb      | 4 lbs     | 5 lbs     | 5 lbs  | 7 lbs  |
| <b>Shear pin</b>                          | <b>Part No.</b>   | 14205      | 14205     | 14205     | 14205     | 34555     | 7227   | 34555  |
|   | <b>No. Req'd.</b> | 2          | 2         | 2         | 2         | 2         | 2      | 2      |
| <b>Knife</b>                              | <b>Part No.</b>   | 80147      | 34421     | 33088     | 33088     | 34553     | 12382  | 35960  |
|   | <b>No. Req'd.</b> | 5          | 5         | 5         | 5         | 5         | 5      | 5      |
| <b>Knife pin</b>                          | <b>Part No.</b>   | 80148      | 34422     | 33089     | 33089     | 34554     | 37022  | 34554  |
|   | <b>No. Req'd.</b> | 5          | 5         | 5         | 5         | 5         | 5      | 5      |
| <b>Knife pin set screw</b>                | <b>Part No.</b>   | 23654      | 23666     | 23666     | 23666     | 23703     | —      | 23703  |
|   | <b>No. Req'd.</b> | 5          | 5         | 5         | 5         | 5         | —      | 5      |
| <b>Feed ring o-ring</b>                   | <b>Part No.</b>   | 568235     | 568237    | 568241    | 568243    | 568247    | 568251 | 568438 |
| <b>Guide screw</b>                        | <b>Part No.</b>   | 70090      | 34424     | 70213     | 33093     | 187       | 13412  | 35962  |
| <b>Piston assembly</b>                    | <b>Part No.</b>   | 70091      | 34425     | 70232     | 41733     | 34559     | 51151  | 35963  |
|   | <b>Size</b>       | 2 1/16 in. | 2 3/8 in. | 2 7/8 in. | 2 7/8 in. | 3 1/2 in. | 4 in.  | 5 in.  |
| <b>Piston segment set</b>                 | <b>Part No.</b>   | 70092      | 49814     | 70233     | 49825     | 49830     | 51152  | 49821  |
| <b>Rubber ring</b>                        | <b>Part No.</b>   | 70093      | 34564     | 34564     | 34564     | 34561     | 51153  | 35965  |
| <b>Piston o-ring — for all assemblies</b> | <b>Part No.</b>   | 568234     | 568236    | 568235    | 568237    | 568246    | 568250 | 568259 |

### Optional

|                                 |                 |           |           |            |            |           |           |       |
|---------------------------------|-----------------|-----------|-----------|------------|------------|-----------|-----------|-------|
| <b>Optional piston assembly</b> | <b>Part No.</b> | 70094     | 34427     | 70214      | 41736      | 34562     | 51230     | 35966 |
|                                 | <b>Size</b>     | 1.900     | 2-1/16    | 2-3/8      | 2-3/8      | 2-7/8     | 3-1/2     | 4-1/2 |
| <b>Piston segments</b>          | <b>Part No.</b> | 70095     | 49817     | 70215      | 49828      | 49831     | 51231     | 49823 |
| <b>Rubber ring</b>              | <b>Part No.</b> | 70096     | 34567     | 34567      | 34567      | 34564     | 34561     | 35965 |
| <b>Optional piston assembly</b> | <b>Part No.</b> | 70097     | 34429     | 70217      | 41738      | 34565     | 51345*    | 35968 |
|                                 | <b>Size</b>     | 1.660 in. | 1.900 in. | 2 1/16 in. | 2 1/16 in. | 2 3/8 in. | 2 7/8 in. | 4 in. |
| <b>Piston segments</b>          | <b>Part No.</b> | 70098     | 49818     | 70218      | 49826      | 49832     | 51346     | 49822 |
| <b>Rubber ring</b>              | <b>Part No.</b> | 70096     | 34567     | 34567      | 34567      | 34564     | 34564     | 35970 |
| <b>Optional piston assembly</b> | <b>Part No.</b> | 70100     | 34434     | —          | —          | 53881     | —         | —     |
|                                 | <b>Size</b>     | 1.315 in. | 1.315 in. | —          | —          | 4 in.     | —         | —     |
| <b>Piston segments</b>          | <b>Part No.</b> | 70101     | 49816     | —          | —          | 53880     | —         | —     |
| <b>Rubber ring</b>              | <b>Part No.</b> | 70102     | 34436     | —          | —          | 51153     | —         | —     |

\*Use O-Ring 568249

Miscellaneous O-Ring Seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing Sets, however, will always be furnished in sealed plastic bags.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and types of pipe to cut
  - (3) Connection size and type



### Recommended Spares

- (1) 1 Set Piston Segments
- (2) 1 Feed Ring
- (3) 24 Shear Pins
- (4) 6 Sets Knives
- (5) 2 Sets of Knife Pins
- (6) 1 Set Knife Pin Screws
- (7) 6 Rubber Rings
- (8) 6 Piston O-Rings
- (9) 6 Feed Rig O-Rings

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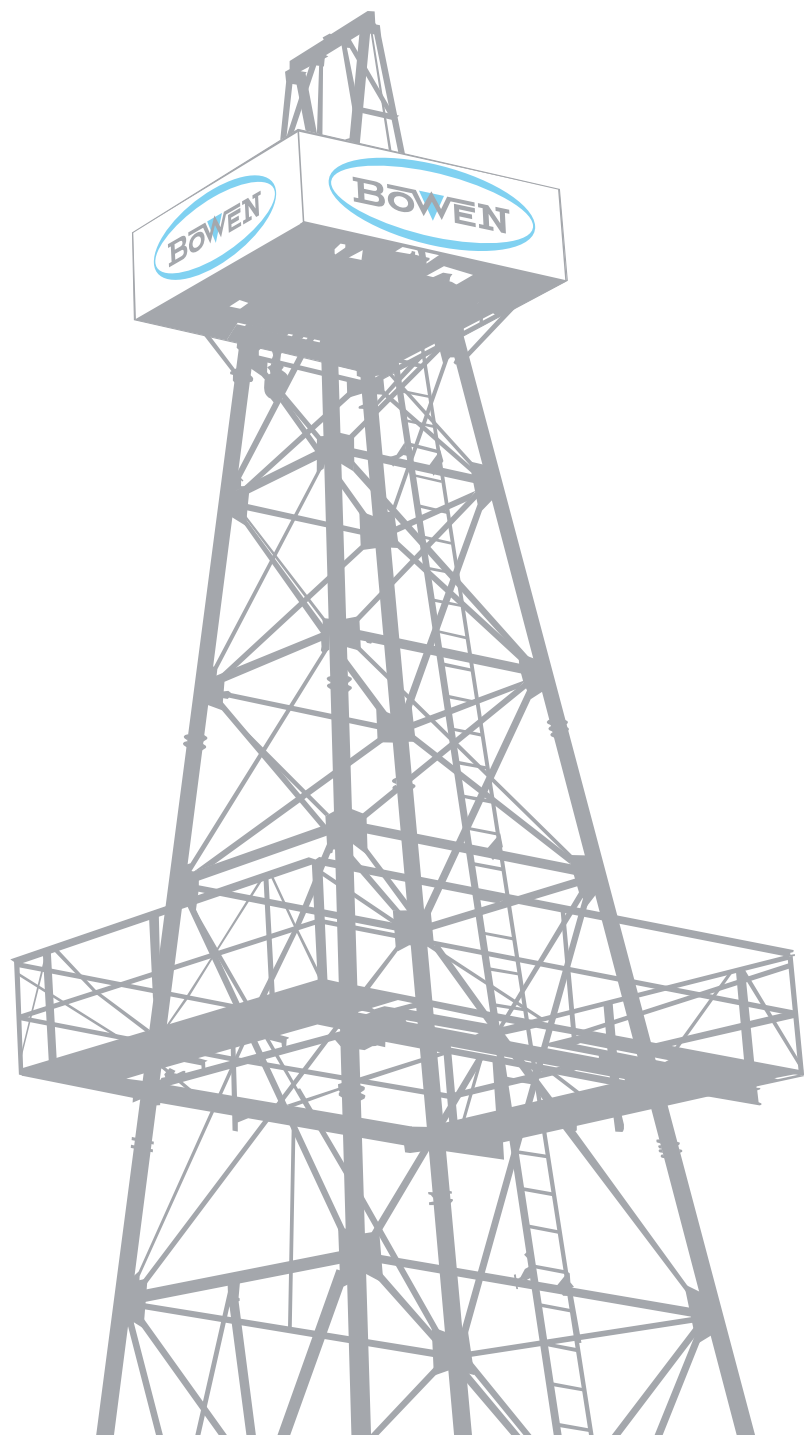
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# Bowen Internal Cutters

Instruction Manual 5600



**Bowen | NOV**

# Bowen Internal Cutters

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

## General Description

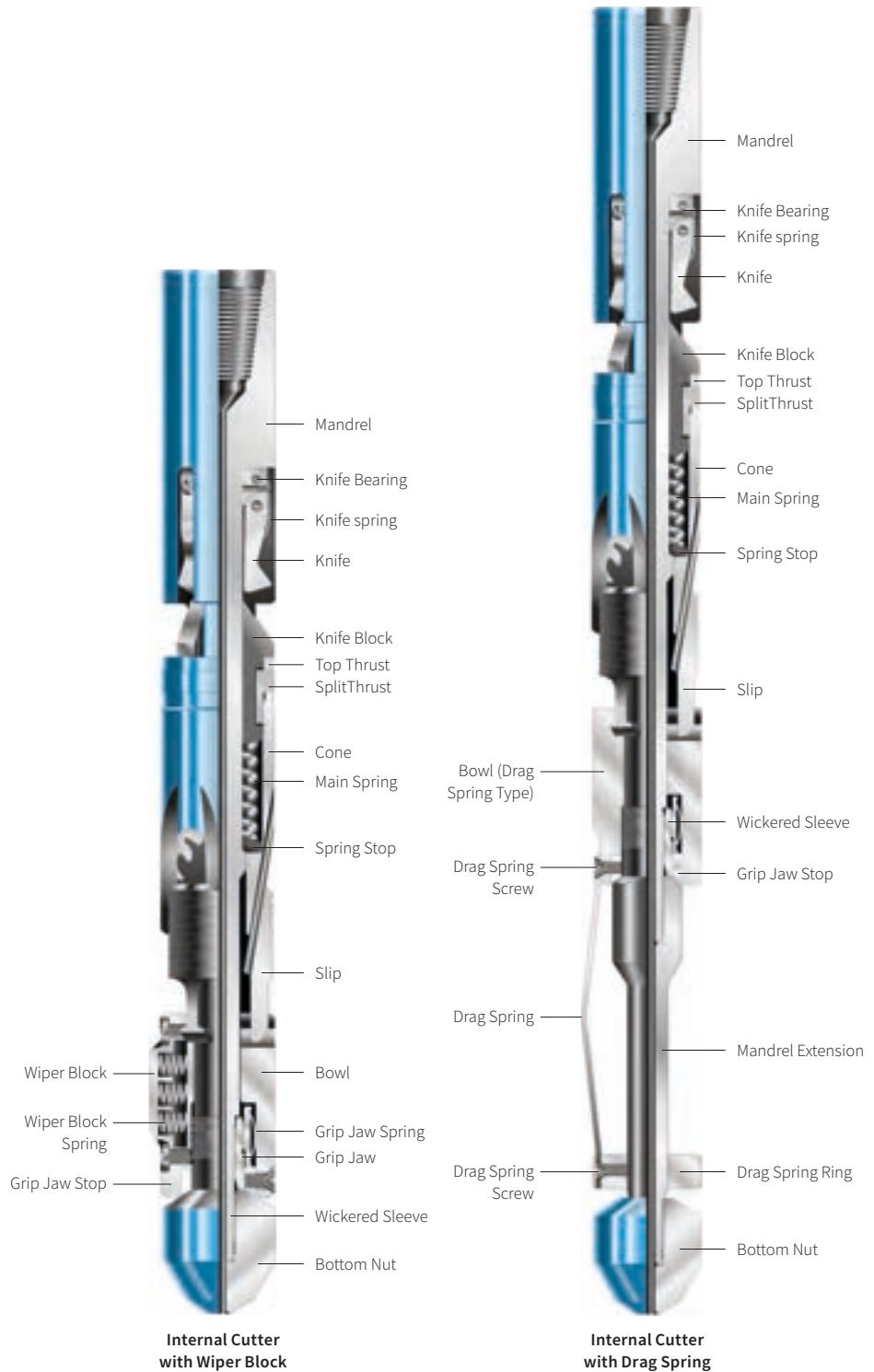
Bowen internal cutters are ruggedly built, efficient tools for cutting tubing, casing or drill pipe. Sizes ranging from 1.900 in. tubing up to 20 3/4 in. casing are available. Bowen internal cutters are manufactured to exacting standards of interchangeability, permitting relative ease of maintenance after use and the redressing of a basic assembly to cut alternate sizes of pipe. (See specification table for sizes, part numbers and “can be dressed to cut” sizes.)

## Use

The Bowen internal cutter cuts tubing, casing or drill pipe. It may be run on macaroni tubing, tubing or drill pipe, depending upon the diameter of the pipe to be cut.

## Construction

The Bowen internal cutter consists of a wiper block (or a drag spring assembly) to accomplish setting in the pipe, slips and cone assembly to anchor the tool, a main spring to assist in maintaining uniform feed to the knives, wedge-like knife blocks to drive the knives upward and outward to engage the pipe, and especially hardened and ground knives for easy, efficient pipe cutting. A feature of the Bowen internal cutter is the automatic bottom, which allows you to set the cutter easily at any desired depth, to release the tool by simply pulling upward, and to reset at another depth all without coming out of the hole.



# Bowen Internal Cutters

## Operation

Examine the Bowen internal cutter thoroughly to assure that it is properly assembled, all threaded connections are made up tightly and that it is properly dressed for the size pipe to be cut. Refer to the reassembly procedure and the specification chart on the following pages for the correct assembly, part numbers and dimensions.

The Bowen internal cutter is made up on the bottom of the cutting string. The cutting string may be macaroni tubing or drill pipe, as the diameter of the pipe to be cut and the circumstances dictate.

### Running In

Before lowering in the well, check the Bowen internal cutter to be sure that the automatic bottom is fully engaged. This engagement holds the cutter in a released position with the slips and knives retracted while running into or out of the well.

**CAUTION: As the Bowen internal cutter is lowered into the well, avoid right-hand rotation, as this will release the automatic bottom and set the cutter in operating position. If this should occur, slowly raise the cutting string and the wickered sleeve will be reengaged by the grip jaws to reset the cutter in running position.**

### Conventional Cutting Procedure

Upon reaching the desired cutting depth, the Bowen internal cutter anchors by slowly rotating to the right while slowly lowering the run-in string. The wiper blocks (or drag springs) resist rotation and lowering by maintaining friction on the pipe. This disengages the automatic bottom from the grip jaws. Continued lowering

or creeping of the run-in string causes the cone to move the slips upward and outward to anchor the cutter in the pipe. The mandrel is free to travel downward under the knife blocks, forcing the knives upward and outward to start the cut. Slight additional weight is applied while slowly rotating to the right. The main spring in the upper part of the cutter partially compresses by the applied weight and assists in maintaining a uniform feed to the knives.

Cutting is accomplished by slow rotation to the right (10 to 18 rpm) with just enough weight being applied gradually to feed the knives into the metal. Be careful not to rush the cutting operation, as excess weight will cause the knives to dig into the pipe burning the knife points.

For best operation, the run-in string is lowered in  $\frac{1}{16}$  in. intervals — never more than  $\frac{1}{8}$  in. — a total lowering of  $1\frac{1}{4}$  in. will complete the cut.

Free rotation, with little or no reverse torque, indicates that the cut is completed. To prove the cut, increase the rotating speed; if no increase in torque is noted, it will indicate that the cut has been successfully completed.

The Bowen internal cutter may now be released for removal from the hole or reset to make as many additional cuts as desired. Raise the run-in string one foot. This will cause the grip jaws to engage the wickered sleeve, and now the tool is ready to be raised or lowered as desired.

For maximum control and efficiency in making cuts, use a Bowen power swivel.



Running In



Cutting

## Operating Precautions

Maintain careful measurements while running in to assure that the cut or cuts are made at the desired depth or depths. Take all measurements with the knives as the reference point.

If the pipe to be cut is a full string, see Nomograph on page 8 to determine the lowest point at which it is loose.

If you wish to locate a collar at the cutting depth, install a *Bowen* collar finder on the bottom of the cutter.

At great depths, in crooked holes and where existing rig equipment makes it very difficult to control the amount of weight applied to the *Bowen* internal cutter, make up a fishing bumper sub and stabilizer above the cutter.

The stabilizer is usually made up one joint above the cutter. It tends to centralize and minimize any swaying action which might interfere with the smooth operation of the cutter.

The fishing bumper sub is run a number of joints above the cutter and stabilizer. This tool consists of two telescoping members, a mandrel in a body, free to slide with relation to each other, but provided with mating splines for transmitting torque.

In operation, the *Bowen* internal cutter is set in the pipe as explained in Operation. In this position, the fishing bumper sub is in the fully closed position. Since the tool is provided with a 20 in. stroke, the cutting string is then picked up 10 in. so that the only weight on the cutter is the predetermined weight of the pipe between the cutter and the bumper sub. In this manner, the

variables of rig equipment and the inadvertent application of too much weight is eliminated and a smooth cut is made.

We recommend the following tools for this operation:

- Bowen fishing bumper sub
- Bowen stabilizer

A complete description of *Bowen* fishing bumper subs is presented in Instruction Manual 4460, available on request.

## Maintenance

For best performance and to prolong the life of *Bowen* internal cutter, thoroughly clean, service and either lubricate or paint it after each use and before storing.

## Disassembly

1. Secure the *Bowen* internal cutter in an appropriate vise at the upper end of the mandrel.
2. Unscrew the bottom nut from the mandrel.
3. Rotate the wiper block three full revolutions to the right, then move the bowl upward against the slip cone.
4. Back the slip cone off the split thrust and remove with slips and bowl.
5. Withdraw the bowl and slips from the mandrel.
6. Remove the wiper blocks from the bowl by removing the wiper block screws.
7. Remove the three grip jaw screws at the lower end of the bowl, then withdraw the grip jaw stop from the lower end of the bowl.

8. Remove the grip jaws and springs from the inside of the bowl.
9. Unscrew the cone from the split thrust and remove from the mandrel.
10. Remove the split thrust (two halves) from the mandrel.
11. Remove the slotted main spring stop from the mandrel, then withdraw the main spring.
12. Remove knife spring screws and springs.
13. Remove knife pin screws; then with a pin punch, drive out knife pins and withdraw the knives.
14. Remove knife bearing screws, then withdraw knife bearings.
15. Slide the knife blocks to the top of the grooves on the mandrel, then remove the top thrust by withdrawing thrust against lugs on the mandrel, rotating one sixth turn to allow the thrust passage over the mandrel.
16. Withdraw the knife blocks.
17. Carefully clean, then inspect all parts for wear and damage. Replace all worn and damaged parts with new parts.

## Reassembly

All parts should be thoroughly cleaned, then greased with a good grade of lightweight grease. All parts damaged or worn by previous runs should be replaced.

1. Secure the mandrel in suitable vise, clamping it near the upper end.
2. Insert knife bearings in the top of the groove in the mandrel and install the bearing screws.
3. Insert knives in the mandrel grooves, then install knife pins and screws.
4. Insert knife blocks, sliding them upward to the extreme top position under the knives.
5. Install the top thrust on the mandrel with the hardened and ground surface facing the bottom of the mandrel. With the top thrust positioned and passed over the mandrel lugs, rotate one-sixth turn to permit the top thrust to pass over the knife blocks.
6. Slide knife blocks to position at the lower end of the mandrel grooves.
7. Install the knife springs on the knife blocks.
8. Install main spring on mandrel, resting on the mandrel lugs.
9. Compress the main spring, then install the spring stop.
10. Install the split thrust (two halves) between face of the top thrust and the lugs of the mandrel.
11. Install cone on the mandrel, threading it up tightly onto the top thrust.

# Bowen Internal Cutters

12. Install grip jaws with a grip jaw spring positioned behind each into the grooves at the lower end of the bowl. (Grip jaws are installed clockwise in numerical order with the number facing out.)

13. Install grip jaw stop with the bevel toward the bottom of the bowl, securing in position with the three grip jaw stop screws.

14. Place the slips in the slots of the bowl and position on slip cone, aligning the slips into the dovetail grooves of the cone. Slide assembly upward on the mandrel and thread onto the split thrust.

15. Screw the wickered sleeve onto the mandrel, making up tightly. Use wrench flats provided.

16. Install the bottom nut on the mandrel, making it up securely with a large wrench.

17. Thread the bowl into position on the wickered sleeve to its lower position, retracting the slips.

18. Install the wiper blocks in the provided slots in the bowl, with the long (60 degree) bevel facing the lower end. Make certain that all wiper block springs are placed in their respective positions under the wiper blocks and that the wiper block screws are made up securely.

block assembly as in Steps 1 through 14 above; thereafter, the assembly differs as follows:

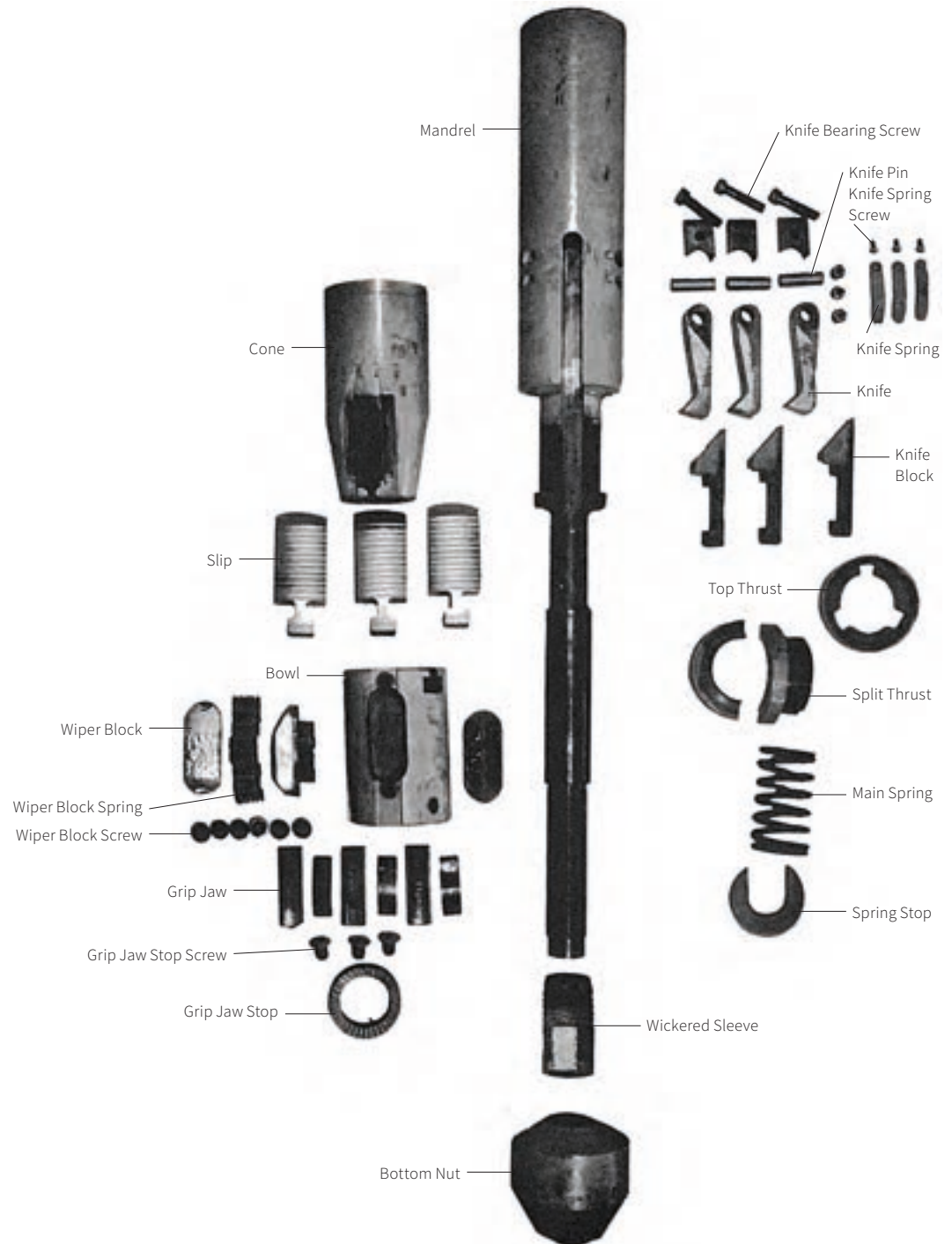
15. Screw the wickered sleeve or mandrel extension onto the mandrel securely, using the wrench flats provided.

16. Attach one end of the three drag springs to the bowl with the drag spring screws.

17. Slide the drag spring ring onto the wickered sleeve, then attach bottom end of drag springs to the drag

spring ring with the drag spring screws.

18. Make up bottom nut.

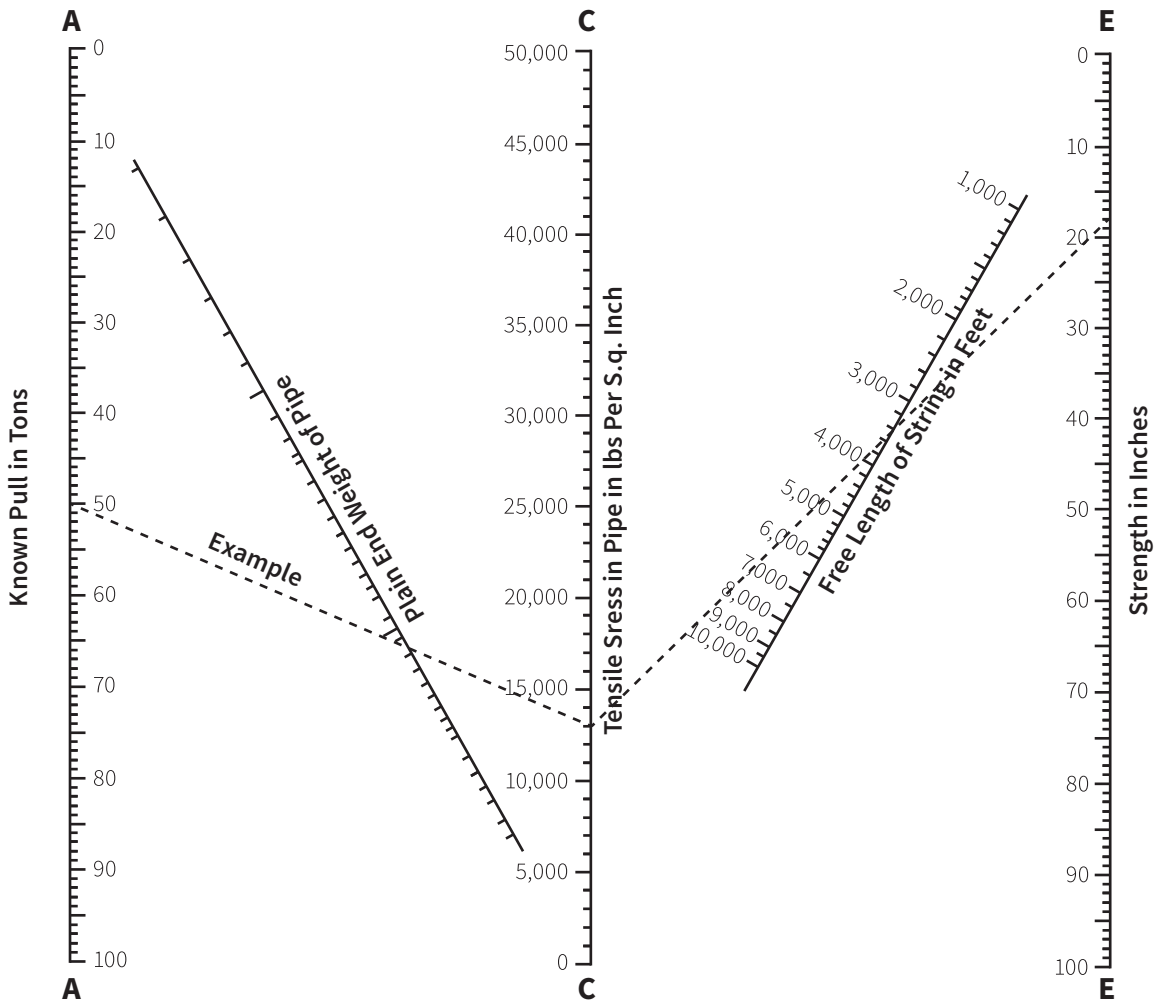


## Drag Spring Assembly

The Bowen internal cutter with a drag spring assembly is assembled the same as a wiper



## Nomograph for Determining Free Length of Pipe



### Use of Chart

- Determine plain end weight of pipe.
  - Pick up dead weight of string of pipe.
  - Mark pipe with respect to a stationary object.
  - Take a known pull on pipe.
  - Remark pipe with respect to same stationary object.
  - Measure distance between marks. This gives stretch in inches.
  - Place straight edge on scale A thru known pull and on scale B thru plain end weight, on scale C read stress.
  - Pivot straight edge on scale C until it passes thru stretch on scale E, on scale D read free length.
- tons and remarked. The distance between the marks was 18 in., and the known pull was 50 tons (the difference between the two pulls). From the chart, this gives a free length of 3,350 feet.

### Example

Given 6 3/8 to 26 lbs. casing (plain end wt. 25.65 lbs.) The pipe was picked up to 20 tons to overcome the dead weight and then marked, after which it was picked up to 70

# Bowen Internal Cutters

## Accessories

### Bowen Collar Finder

Bowen Collar Finders are available for all sizes of Bowen internal cutters. They enable you to locate the nearest collar at the cutting depth. With this information, you can then set the cutter above or below the located collar and thus avoid the possibility of attempting to cut within a collar. Furthermore, by making the cut either immediately above or below the located collar, it is possible to salvage the pipe in more usable lengths.

Bowen collar finders assemble in the bottom of the bottom nut of the cutter. A bottom nut with a threaded plug substitutes for the standard nut. The collar locator springs press the collar locators outward at angles that permit free lowering into pipe. However, when the assembly is elevated, the upper ends of the collar locators will engage in the first encountered space between two joints of pipe and thus locate the exact position of the joint. After the joint is located, the collar finder may be released by exerting sufficient upward pull to break the shear pin. When the shear pin is sheared, the collar locators drop into the sleeve and are retained therein. To prepare the collar finder for the next run, it is necessary simply to replace the shear pin.

During the running in of the string, it is necessary at intervals to elevate the string slightly in order to remove the rig table slips or spider slips. All *Bowen* collar finders are, therefore, equipped with a spring, and this spring will absorb over eight inches of elevation before any pressure is exerted directly on the shear pin. Thus the possibility of snapping the shear pin during the running in of the string is eliminated.

### Collar Location

At the cutting depth, elevate the cutting string slowly until a slight but noticeable jarring reaction occurs in the string. Mark the string at this point. The Bowen collar finder is now within a located collar. From this point, locate the knives of the cutter at the desired point either above or below the located collar.

### Bowen Collar Finder Maintenance

To guard against failures and to prolong the life of the tool, thoroughly service the collar finder after each group of runs.

#### A. To dismantle the collar finder:

1. Remove the broken shear pin.
2. Unscrew the body from the bowl.
3. Slide the mandrel and the mandrel spring from the bowl.

#### B. Clean and carefully check all parts and replace worn or damaged parts with new ones.

#### C. Grease all working parts.

#### D. To reassemble the collar finder:

1. Insert the mandrel spring and mandrel in the bowl.
2. Screw the body into the bowl.
3. If a new collar locator spring or collar locator is required:
  - a. Insert the end of the collar locator spring from the unnotched side through the small hole in the collar locator.
  - b. Bend the end of the collar locator spring into the

notch on the side of the collar locator.

4. Install new shear pin. See page 17.
5. Paint or grease the exterior of the tool to prevent rust between jobs.

### Bowen Stabilizers

Bowen stabilizers assemble one single joint above the *Bowen* internal cutter. They are box-to-pin substitutes consisting of a body and a set of three friction springs which are free to re-rotate. The friction springs absorb any swaying motion of the cutting string, centralizing the cutter, equalizing pressure on the knives and eliminating any possibility of creeping on the part of the slips.

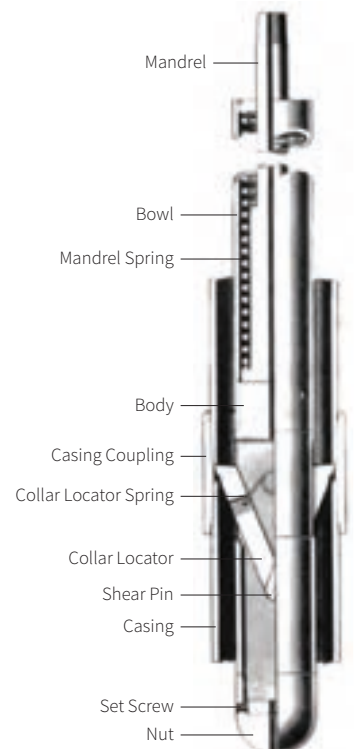
### Bowen Stabilizer Maintenance

To guard against failures and to prolong the life of the tool, the stabilizer should be thoroughly serviced after each group of runs.

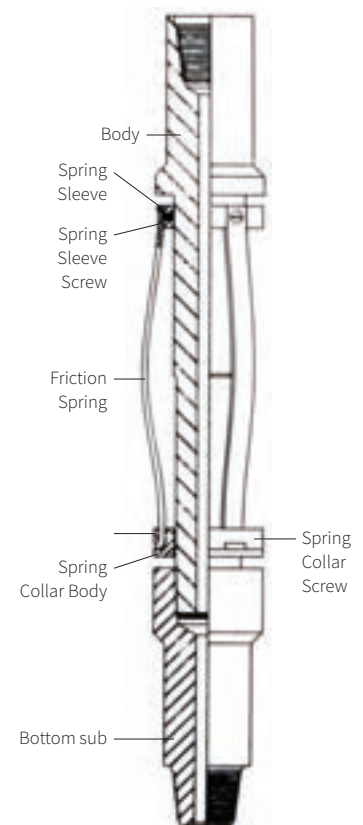
#### A. To dismantle the stabilizer

1. Unscrew the three spring sleeve screws.
2. Unscrew the three springs collar screws.
3. Slip the spring collar sleeve from the spring collar body and remove the friction springs.
4. Unscrew the bottom sub from the body and slip off the spring collar body, spring collar sleeve and spring sleeve.

#### B. Clean and carefully check all parts and replace worn or damaged parts with new ones.



**Bowen Collar Finder**



**Bowen Stabilizer**

## Specifications and Replacement Parts

### Bowen Internal Cutter - Itco Type

| Principal parts of all cutters are shown in the column under an assembly no. and may be adapted to cut all other sizes in its range by substituting the parts shown under a given "can be dressed to cut" table. This includes the "extra" parts. |              |                                      |                |                    |                              |                                      |  |                |        |
|---|--------------|--------------------------------------|----------------|--------------------|------------------------------|--------------------------------------|--|----------------|--------|
| Designed to cut   | 1.9 in. Tub. | 2 3/8 in. Tub.                       | 2 7/8 in. Tub. | 2 7/8 in. Tub.     | 3 1/2 in. O.D. Tub.          | 4 1/2 in. F.H.D.P.                   | 4 1/2 in. I.F. D.P.                            | 5 in. I.U.D.P. |        |
| Can be dressed to cut - See table on pages 14 and 15  | —            | 2 7/8 in. I.F.D.P.<br>2 7/8 in. Tub. | —              | 3 1/2 in. I.F.D.P. | 4 in. Tub.<br>4 1/2 in. Tub. | 4 1/2 in. F.H.D.P.<br>4 1/2 in. Csg. | 4 1/2 in. Csg.<br>4 3/4 in. Csg.<br>5 in. Csg. | —              |        |
| Minimum O.D.  | 1 1/2 in.    | 1 3/16 in.                           | 2 1/4 in.      | 2 1/4 in.          | 2 5/8 in.                    | 2 1/2 in.                            | 3 5/8 in.                                      | 3 5/8 in.      |        |
| I.D.  | Solid        | Solid                                | Solid          | Solid              | 1/2 in.                      | Solid                                | Solid  | Solid          |        |
| Standard assembly with drag spring or wiper block   | D.S.         | D.S.                                 | D.S.           | D.S.               | W.B.                         | D.S.                                 | W.B.   | D.S.           |        |
| Complete assembly   | Part No.     | 25940                                | 2174           | 8505               | 9176                         | 8570                                 | 9465   | 8844           | 9081   |
|   | Weight       | 15 lbs                               | 16 1/2 lbs     | 22 lbs             | 28 1/2 lbs                   | 39 lbs                               | 39 lbs   | 54 lbs         | 71 lbs |

### Optional (Continued)

|                                |          |           |           |           |           |           |          |           |           |
|--------------------------------|----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|
| Mandrel                        | Part No. | 25941     | 2175      | 8506      | 9177      | 8571      | 9466     | 8845      | 9082      |
|                                | Weight   | 6 lbs     | 7 lbs     | 10 lbs    | 11 lbs    | 17 lbs    | 15 lbs   | 33 lbs    | 33 lbs    |
| Knife bearing (3 Req'd.)       | Part No. | 25942     | 8433      | 8433      | 8575      | 8575      | 8575     | 8575      | 8575      |
|                                | Weight   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/8 lb    | 1/8 lb    | 1/8 lb   | 1/8 lb    | 1/8 lb    |
| Knife spring screw (3 Req'd.)  | Part No. | 13834     | 8181      | 8181      | 8181      | 8181      | 8181     | 8181      | 8181      |
|                                | Weight   | 1/64 lb   | 1/64 lb   | 1/64 lb   | 1/64 lb   | 1/64 lb   | 1/64 lb  | 1/64 lb   | 1/64 lb   |
| Knife spring (3 Req'd.)        | Part No. | 25959     | 8434      | 8434      | 8629      | 8629      | 8629     | 8629      | 8629      |
|                                | Weight   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb  | 1/32 lb   | 1/32 lb   |
| Knife (3 Req'd.)               | Part No. | 25943     | 8432      | 8432      | 8572      | 8572      | 6807     | 8572      | 9042      |
|                                | Weight   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb   | 1/4 lb    | 3/4 lb    |
| Knife bearing screw (3 Req'd.) | Part No. | 23501     | 8529      | 8567      | 9189      | 8576      | 8576     | 8576      | 8576      |
|                                | Weight   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb  | 1/32 lb   | 1/32 lb   |
| Knife pin (3 Req'd.)           | Part No. | 25944     | 8501      | 8501      | 8573      | 8573      | 9467     | 8573      | 8573      |
|                                | Weight   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb  | 1/32 lb   | 1/32 lb   |
| Knife pin screw (3 Req'd.)     | Part No. | 12484     | 8445      | 8445      | 8574      | 8574      | 8445     | 8574      | 8574      |
|                                | Weight   | 1/64 lb   | 1/64 lb   | 1/64 lb   | 1/64 lb   | 1/64 lb   | 1/64 lb  | 1/64 lb   | 1/64 lb   |
| Knife block (3 Req'd.)         | Part No. | 25945     | 8436      | 8507      | 8580      | 8580      | 6809     | 8846      | 8846      |
|                                | Weight   | 1/4 lb    | 1/8 lb    | 1/8 lb    | 1/4 lb    | 1/4 lb    | 1/4 lb   | 1/2 lb    | 1/2 lb    |
| Top thrust                     | Part No. | 25946     | 9421      | 8508      | 9422      | 8612      | 6810     | 8931      | 8847      |
|                                | Weight   | 1/8 lb    | 1/4 lb    | 1/4 lb    | 3/8 lb    | 1/2 lb    | 1/2 lb   | 3/8 lb    | 1/2 lb    |
| Split thrust                   | Part No. | 25947     | 8438      | 8509      | 9179      | 8582      | 7496     | 8848      | 8848      |
|                                | Weight   | 3/8 lb    | 3/8 lb    | 1/2 lb    | 5/8 lb    | 3/4 lb    | 1 lb     | 1 1/4 lbs | 1 1/4 lbs |
| Cone                           | Part No. | 25948     | 2177      | 8510      | 9180      | 8583      | 9468     | 8849      | 9083      |
|                                | Weight   | 3/4 lb    | 1 1/4 lbs | 1 3/4 lbs | 2 3/4 lbs | 4 lbs     | 5 lbs    | 6 1/2 lbs | 6 1/2 lbs |
| Main spring                    | Part No. | 25949     | 8440      | 8440      | 9191      | 8584      | 9469     | 8850      | 9084      |
|                                | Weight   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/4 lb    | 1/4 lb   | 1/4 lb    | 3/8 lb    |
| Spring stop                    | Part No. | 25950     | 8442      | 8442      | 9192      | 8585      | 8585     | 8851      | 8851      |
|                                | Weight   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb  | 1/8 lb    | 1/8 lb    |
| Slip (3 Req'd.)                | Part No. | 30059     | 2180      | 4005      | 2178      | 8586      | 7201     | 8852      | 9043      |
|                                | Weight   | 1/8 lb    | 1/8 lb    | 1/4 lb    | 1/8 lb    | 1/2 lb    | 2 Req'd. | 3/4 lb    | 1 lbs     |
| Grip jaw (set)                 | Part No. | 25951     | 8443      | 8443      | 8443      | 8588      | 8588     | 8588      | —         |
|                                | Weight   | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb    | 1/8 lb   | 1/8 lb    | —         |
| Grip jaw spring (3 Req'd.)     | Part No. | 8444      | 8444      | 8444      | 8444      | 8589      | 8589     | 8589      | —         |
|                                | Weight   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb   | 1/32 lb  | 1/32 lb   | —         |
| Bowl                           | Part No. | 25952     | 8521      | 8520      | 9181      | 8597      | 9470     | 8853      | 9044      |
|                                | Weight   | 1 1/4 lbs | 1 1/4 lbs | 1 1/2 lbs | 1 1/2 lbs | 3 1/2 lbs | 5 lbs    | 6 lbs     | 7 lbs     |

# Bowen Internal Cutters

## Specifications and Replacement Parts

### Bowen Internal Cutter - Ico Type (continued)

| Designed to cut                                      | 1.9 in. Tub. | 2 3/8 in. Tub.                       | 2 7/8 in. Tub. | 2 7/8 in. Tub.     | 3 1/2 in. O.D. Tub.          | 4 1/2 in. F.H.D.P.                   | 4 1/2 in. I.F.D.P.                             | 5 in. I.U.D.P. |
|--|--------------|--------------------------------------|----------------|--------------------|------------------------------|--------------------------------------|--|----------------|
| Can be dressed to cut - See table on pages 14 and 15 | —            | 2 7/8 in. I.F.D.P.<br>2 7/8 in. Tub. | —              | 3 1/2 in. I.F.D.P. | 4 in. Tub.<br>4 1/2 in. Tub. | 4 1/2 in. F.H.D.P.<br>4 1/2 in. Csg. | 4 1/2 in. Csg.<br>4 3/4 in. Csg.<br>5 in. Csg. | —              |
| Grip jaw stop  | Part No.     | 25953                                | 8446           | 8515               | 9182                         | 8590                                 | 9471   | 8590           |
|  | Weight       | 1/6 lb                               | 1/6 lb         | 1/8 lb             | 1/8 lb                       | 1/4 lb                               | 1/4 lb   | 1/4 lb         |
| Grip jaw screw (3 req'd.)                            | Part No.     | 23096                                | 62517          | 62517              | 62517                        | 62681                                | 62681  | 62681          |
|  | Weight       | 1/64 lb                              | 1/64 lb        | 1/64 lb            | 1/64 lb                      | 1/64 lb                              | 1/64 lb  | 1/64 lb        |
| Wickered sleeve long                                 | Part No.     | 25954                                | 8568           | 8568               | 9185                         | 8591                                 | 9475   | 8591           |
|  | Weight       | 3 1/2 lbs                            | 3 1/2 lbs      | 3 1/2 lbs          | 1/2 lb                       | 1/2 lb                               | 1/2 lb   | 1/2 lb         |
| Bottom nut   | Part No.     | 25955                                | 8565           | 8566               | 8566                         | 8596                                 | 9476   | 8857           |
|  | Weight       | 1 lbs                                | 1 1/8 lbs      | 2 lbs              | 2 lbs                        | 2 3/4 lbs                            | 3 lbs  | 6 lbs          |
| Wiper block* (3 req'd.)                              | Part No.     | —                                    | —              | —                  | —                            | 8598                                 | —  | 8854           |
|  | Weight       | —                                    | —              | —                  | —                            | 1/4 lb                               | —  | 3/8 lb         |
| Wiper block spring* (9 req'd.)                       | Part No.     | —                                    | —              | —                  | —                            | 8599                                 | —  | 8863           |
|  | Weight       | —                                    | —              | —                  | —                            | 1/2 lb                               | —  | 1/2 lb         |
| Wiper block screw* (6 req'd.)                        | Part No.     | —                                    | —              | —                  | —                            | 8856                                 | —  | 8856           |
|  | Weight       | —                                    | —              | —                  | —                            | 1/64 lb                              | —  | 1/64 lb        |
| Bowl drag spring type*                               | Part No.     | —                                    | —              | —                  | —                            | —                                    | —  | —              |
|  | Weight       | —                                    | —              | —                  | —                            | —                                    | —  | —              |
| Mandrel extension*                                   | Part No.     | —                                    | **             | —                  | 9183                         | 8595                                 | 9472   | 8595†          |
|  | Weight       | —                                    | —              | —                  | 3 lbs                        | 3 lbs                                | 3 lbs  | 3 lbs          |
| Drag spring* (3 req'd.)                              | Part No.     | 25956                                | 8569           | 8569               | 8569                         | 8592                                 | 8592   | 8592†          |
|  | Weight       | 1/6 lb                               | 1/6 lb         | 1/6 lb             | 1/6 lb                       | 1/8 lb                               | 1/8 lb   | 1/8 lb         |
| Drag spring ring*                                    | Part No.     | 25957                                | 8500           | 8518               | 8518                         | 8594                                 | 9473   | 8855†          |
|  | Weight       | 1/8 lb                               | 1/8 lb         | 1/4 lb             | 1/4 lb                       | 3/4 lb                               | 1 1/4 lbs                                      | 1 1/2 lbs      |
| Drag spring screw* (6 req'd.)                        | Part No.     | 23096                                | 62517          | 62517              | 62517                        | 62734                                | 62681  | 8593†          |
|  | Weight       | 1/64 lb                              | 1/64 lb        | 1/64 lb            | 1/64 lb                      | 1/64 lb                              | 1/64 lb  | 1/64 lb        |
| Wickered sleeve short                                | Part No.     | —                                    | 8568           | 8564               | —                            | —                                    | —  | —              |
|  | Weight       | —                                    | 2 1/4 lbs      | 2 1/4 lbs          | —                            | —                                    | —  | —              |
| Drag spring short (3 req'd.)                         | Part No.     | —                                    | —              | 8449               | —                            | —                                    | —  | —              |
|  | Weight       | —                                    | —              | 1/6 lb             | —                            | —                                    | —  | —              |
| Rod knife  | Part No.     | —                                    | —              | 9423               | —                            | —                                    | —  | —              |
|  | Weight       | —                                    | —              | 1 lb               | —                            | —                                    | —  | —              |
| Top thrust to cut coupling                           | Part No.     | —                                    | —              | —                  | —                            | —                                    | —  | —              |
|  | Weight       | —                                    | —              | —                  | —                            | —                                    | —  | —              |
| Complete assembly w/ drag spring*                    | Part No.     | —                                    | —              | —                  | —                            | —                                    | —  | —              |
|  | Weight       | —                                    | —              | —                  | —                            | —                                    | —  | —              |



### How to Order

- Specify:
- (1) Name and Number of Assembly or Part.
  - (2) Size of Pipe to be cut.
  - (3) Whether or not Bottom Nut is to be Fitted for a Bowen Collar Finder.



### Recommended Spares

- (1) 6 sets of knives.
- (2) 2 sets of knife pins.
- (3) 6 sets of knife springs.
- (4) 2 sets of knife spring screws.
- (5) 1 set of slips.
- (6) 1 set of wiper blocks.
- (7) 1 set of wiper block springs.
- (8) 1 set of wiper block screws.
- (9) 1 set of grip jaws.
- (10) 1 set of grip jaw springs.
- (11) 1 wickered sleeve.
- (12) 1 set of drag springs.
- (13) 1 set of drag spring screws.



### Special Notes:

- (1) \* Where both wiper block and drag spring parts are shown, the cutter can be ordered with either. If not specified, wiper block parts will be furnished.
- (2) † These parts are not required when parts for optional sizes on page 14 are ordered.
- (3) \*\* Wicker sleeve and mandrel extension combined.

## Specifications and Replacement Parts

### Bowen Internal Cutter - Itco Type

| Principal parts of all cutters are shown in the column under an assembly no. and may be adapted to cut all other sizes in its range by substituting the parts shown under a given "can be dressed to cut" table. This includes the "extra" parts. |                 |                         |                                      |                 |                             |                   |               |                             |               |             |
|---|-----------------|-------------------------|--------------------------------------|-----------------|-----------------------------|-------------------|---------------|-----------------------------|---------------|-------------|
| Designed to cut   | 5 in. O.D. Csg. | 6 in. O.D. Csg.         | 7 in. O.D. Csg.                      | 8 in. O.D. Csg. | 8 ½ in. & 9 in. O.D. Csg.   | 9 ¾ in. O.D. Csg. | 11 ¾ in. Csg. | 13 in. & 13 ¾ in. O.D. Csg. | 16 in. Csg.   | 20 in. Csg. |
| Can be dressed to cut - See table on pages 14 and 15  | 5 ½ in. Csg.    | 6 ¾ in. Csg. 7 in. Csg. | 7 ¾ in. Csg. 8 in. Csg. 8 ½ in. Csg. | 9 in. Csg.      | 10 ¾ in. Csg. 11 ¾ in. Csg. | 12 in. L.P.       | —             | 18 ¾ in. Csg.               | 20 ¾ in. Csg. |             |
| Minimum O.D.  | 4 in.           | 5 in.                   | 5 ¼ in.                              | 7 ¼ in.         | 8 ¼ in.                     |                   |               | 11 ¾ in.                    | 14 ½ in.      | 18 ¾ in.    |
| I.D.  | ¾ in.           | 1 in.                   | 1 ½ in.                              | 2 in.           | 2 ¼ in.                     | 3 ¼ in.           | 3 ¾ in.       | 5 in.                       | 5 in.         |             |
| Standard assembly with drag spring or wiper block   | W.B.            | W.B.                    | W.B.                                 | W.B.            | W.B.                        | W.B.              | W.B.          | W.B.                        | W.B.          | W.B.        |
| Complete assembly   | Part No.        | 8200                    | 14785                                | 8745            | 15532                       | 15080             | 41876         | 19525                       | 21240         | 19760       |
|   | Weight          | 130 lbs                 | 180 lbs                              | 251 lbs         | 410 lbs                     | 680 lbs           | 900 lbs       | 1,120 lbs                   | 1,150 lbs     | 1,200 lbs   |

### Optional (Continued)

|                                |          |         |         |         |          |          |          |          |          |          |
|--------------------------------|----------|---------|---------|---------|----------|----------|----------|----------|----------|----------|
| Mandrel                        | Part No. | 8176    | 14786   | 8746    | 15533    | 15081    | 41877    | 19526    | 21241    | 19761    |
|                                | Weight   | 75 lbs  | 100 lbs | 110 lbs | 250 lbs  | 400 lbs  | 500 lbs  | 600 lbs  | 625 lbs  | 650 lbs  |
| Knife Bearing (3 Req'd.)       | Part No. | 8179    | 8179    | 8179    | 15110    | 15110    | 15110    | 15110    | 15110    | 15110    |
|                                | Weight   | ¼ lb    | ¼ lb    | ¼ lb    | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. |
| Knife Spring Screw (3 Req'd.)  | Part No. | 8181    | 8181    | 8181    | 9558     | 9558     | 9558     | 9558     | 9558     | 9558     |
|                                | Weight   | ¼ lb    | ¼ lb    | ¼ lb    | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. |
| Knife Spring (3 Req'd.)        | Part No. | 8180    | 8180    | 8180    | 15111    | 15111    | 15111    | 15111    | 15111    | 15111    |
|                                | Weight   | ½ lb    | ½ lb    | ½ lb    | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. |
| Knife (3 Req'd.)               | Part No. | 8177    | 8177    | 8177    | 15102-c  | 15102-c  | 15102-c  | 15102-c  | 15102-c  | 15102-c  |
|                                | Weight   | ½ lb    | ½ lb    | ½ lb    | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. |
| Knife Bearing Screw (3 Req'd.) | Part No. | 8229    | 8229    | 8229    | 15553    | 15112    | 15112    | 23003    | 15112    | 15112    |
|                                | Weight   | ¼ lb    | ¼ lb    | ¼ lb    | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. |
| Knife Pin (3 Req'd.)           | Part No. | 8178    | 8178    | 8178    | 15558    | 15113    | 15113    | 39231    | 15113    | 15113    |
|                                | Weight   | ¼ lb    | ¼ lb    | ¼ lb    | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. |
| Knife Pin Screw (3 Req'd.)     | Part No. | 23371   | 23371   | 23371   | 15114    | 15114    | 15114    | 15114    | 15114    | 15114    |
|                                | Weight   | ¼ lb    | ¼ lb    | ¼ lb    | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. |
| Knife Block (3 Req'd.)         | Part No. | 8183    | 8183    | 8183    | 15115    | 15115    | 15115    | 15115    | 15115    | 15115    |
|                                | Weight   | ¾ lb    | ¾ lb    | ¾ lb    | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. | 5 Req'd. |
| Top Thrust                     | Part No. | 8241    | 14787   | 8748    | 15534    | 15099    | 41878    | 19527    | 21242    | 19762    |
|                                | Weight   | 1 lb    | 2 lbs   | 2 lbs   | 3 ½ lbs  | 4 lbs    | 6 lbs    | 7 lbs    | 10 lbs   | 14 lbs   |
| Split Thrust                   | Part No. | 8185    | 14788   | 8750    | 15535    | 15084    | 41879    | 19528    | 21243    | 19763    |
|                                | Weight   | 2 lbs   | 6 lbs   | 8 lbs   | 10 lbs   | 11 lbs   | 13 lbs   | 14 lbs   | 20 lbs   | 26 lbs   |
| Cone                           | Part No. | 8186    | 14789   | 8751    | 15536    | 15085    | 41880    | 19529    | 21244    | 19764    |
|                                | Weight   | 8 lbs   | 10 lbs  | 25 lbs  | 34 lbs   | 46 ½ lbs | 48 lbs   | 50 lbs   | 55 lbs   | 60 lbs   |
| Main Spring                    | Part No. | 8187    | 14790   | 8752    | 15537    | 15086    | 41881    | 19530    | 21245    | 19765    |
|                                | Weight   | ½ lb    | 1 ½ lbs | 3 lbs   | 3 lbs    | 3 lbs    | 3 ½ lbs  | 4 lbs    | 5 lbs    | 6 lbs    |
| Spring Stop                    | Part No. | 8209    | 14791   | 8753    | 15538    | 15087    | 41882    | 19531    | 21246    | 19766    |
|                                | Weight   | ¾ lb    | ½ lb    | ½ lb    | ¾ lb     | 1 lb     | 1 ½ lbs  | 2 lbs    | 3 lbs    | 4 lbs    |
| Slip (3 Req'd.)                | Part No. | 19244   | 14792   | 8754    | 15539    | 15275    | 41883    | 19532    | 21247    | 19767    |
|                                | Weight   | 1 ½ lbs | 3 lb    | 3 ¾ lbs | 4 lb     | 4 ¾ lbs  | 5 lbs    | 6 ¾ lbs  | —        | 12 lbs   |
| Grip Jaw (Set)                 | Part No. | 8193    | 14793   | 8755    | 15540    | 15089    | 41884    | 19533    | 21248    | 19768    |
|                                | Weight   | ¼ lb    | ½ lb    | ½ lb    | 1 lb     | 1 lb     | 1 ½ lbs  | 1 ½ lbs  | 2 lb     | 3 lb     |
| Grip Jaw Spring (3 Req'd.)     | Part No. | 8194    | 14797   | 8756    | 15108    | 15108    | 15108    | 19534    | 21249    | 19769    |
|                                | Weight   | ½ lb    | ½ lb    | ½ lb    | ½ lb     | ½ lb     | ½ lb     | 4 Req'd. | 4 Req'd. | 4 Req'd. |
| Bowl                           | Part No. | 8190    | 14794   | 8761    | 15542    | 15090    | 41885    | 19535    | 21250    | 19770    |
|                                | Weight   | 8 lb    | 16 lb   | 36 lb   | 48 lb    | 58 lb    | 65 lb    | 70 lb    | 75 lb    | 80 lb    |

# Bowen Internal Cutters

## Specifications and Replacement Parts

### Bowen Internal Cutter - Ico Type (continued)

|   |                    |                            |  |                              |                                |                  |                                |                  |                   |                  |
|---|--------------------|----------------------------|--|------------------------------|--------------------------------|------------------|--------------------------------|------------------|-------------------|------------------|
| <b>Designed to cut</b>  | 5 in.<br>O.D. Csg. | 6 in.<br>O.D. Csg.         | 7 in.<br>O.D. Csg.                         | 8 ½ in. & 9 in.<br>O.D. Csg. | 9 ½ in.<br>O.D. Csg.           | 11 ¾ in.<br>Csg. | 13 in. & 13 ½ in.<br>O.D. Csg. | 16 in.<br>Csg.   | 20 in.<br>Csg.    |                  |
| <b>Can be dressed to cut -<br/>See table on pages 14 and 15</b> | 5 ½ in. Csg.       | 6 ½ in. Csg.<br>7 in. Csg. | 7 ½ in. Csg.<br>8 in. Csg.<br>8 ½ in. Csg. | 9 ½ in. Csg.                 | 10 ¾ in. Csg.<br>11 ¾ in. Csg. | 12 in. L.P.      | —                              | 18 ½ in. Csg.    | 20 ¾ in. Csg.     |                  |
| <b>Grip jaw stop</b>  | <b>Part No.</b>    | 8202                       | 14795                                      | 8757                         | 15543                          | 15091            | 41886                          | 19536            | 21251             | 19771            |
|   | <b>Weight</b>      | 2 lbs                      | 2 lbs                                      | 2 lbs                        | 3 lbs                          | 3 ½ lbs          | 7 lbs                          | 9 lbs            | 8 lbs             | 7 lbs            |
| <b>Grip jaw screw<br/>(3 req'd.)</b>                            | <b>Part No.</b>    | 25221                      | 8251                                       | 8251                         | 8251                           | 8251             | 8251                           | 41871            | 21679             | 8251             |
|   | <b>Weight</b>      | ¼ lb                       | ¼ lb                                       | ¼ lb                         | ¼ lb                           | ¼ lb             | ¼ lb                           | ¼ lb             | ¼ lb              | ¼ lb             |
| <b>Wickered sleeve long</b>                                     | <b>Part No.</b>    | 8236                       | 14799                                      | 8762                         | 15546                          | 15096            | 41888                          | 19540            | 21253             | 19778            |
|   | <b>Weight</b>      | 1 lb                       | 1 ¼ lbs                                    | 2 lbs                        | 4 lbs                          | 5 ½ lbs          | 7 lbs                          | 9 lbs            | 15 lbs            | 17 lbs           |
| <b>Bottom nut</b>   | <b>Part No.</b>    | 8196                       | 14800                                      | 8763                         | 15547                          | 15097            | 41889                          | 19541            | 21254             | 19779            |
|   | <b>Weight</b>      | 11 lbs                     | 16 lbs                                     | 24 lbs                       | 48 lbs                         | 61 lbs           | 70 lbs                         | 75 lbs           | 80 lbs            | 110 lbs          |
| <b>Wiper block*<br/>(3 req'd.)</b>                              | <b>Part No.</b>    | 8191                       | 14801                                      | 8758                         | 15548                          | 15098            | 41887                          | 19542            | 21252             | 19772            |
|   | <b>Weight</b>      | ½ lb                       | 2 lbs                                      | 2 ½ lbs                      | 3 lbs                          | 4 lbs            | 4 ½ lbs                        | 6 Req'd.         | 8 Req'd.          | 6 Req'd.         |
| <b>Wiper block spring*</b>                                      | <b>Part No.</b>    | 8599                       | 8759                                       | 8759                         | 15276                          | 15276            | 15276                          | 15276            | 15276             | 15276            |
|   | <b>Weight</b>      | 24 Req'd.                  | 24 Req'd.                                  | 24 Req'd.                    | 36 Req'd.                      | 36 Req'd.        | 36 Req'd.                      | 72 Req'd.        | 54 Req'd.         | 48 Req'd.        |
| <b>Wiper block screw*</b>                                       | <b>Part No.</b>    | 8856                       | 8760                                       | 8760                         | 8760                           | 8760             | 8760                           | 8760             | 21678             | 8760             |
|   | <b>Weight</b>      | ¼ lb<br>6 Req'd.           | ½ lb<br>6 Req'd.                           | ½ lb<br>6 Req'd.             | ½ lb<br>6 Req'd.               | ½ lb<br>6 Req'd. | ½ lb<br>6 Req'd.               | ½ lb<br>6 Req'd. | ½ lb<br>12 Req'd. | ½ lb<br>6 Req'd. |
| <b>Bowl drag spring type*</b>                                   | <b>Part No.</b>    | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |
|   | <b>Weight</b>      | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |
| <b>Mandrel extension*</b>                                       | <b>Part No.</b>    | 8237†                      | 14796†                                     | 8246†                        | 15544†                         | 15092†           | 41892†                         | 19537            | 21255             | 19773†           |
|   | <b>Weight</b>      | 8 lbs                      | 9 lbs                                      | 10 lbs                       | 12 lbs                         | 14 lbs           | 15 lbs                         | 16 lbs           | 17 lbs            | 18 lbs           |
| <b>Drag spring*<br/>(3 req'd.)</b>                              | <b>Part No.</b>    | 8203†                      | 8247†                                      | 8247†                        | 15093†                         | 15093†           | 41890†                         | 19538            | 21256             | 19774†           |
|   | <b>Weight</b>      | ¾ lb                       | ¾ lb                                       | ¾ lb                         | 1 lb                           | 1 lb             | 1 lb                           | 6 Req'd.         | 6 Req'd.          | 6 Req'd.         |
| <b>Drag spring ring*</b>  | <b>Part No.</b>    | 8205†                      | 14798†                                     | 8248†                        | 15545†                         | 15095†           | 41891†                         | 19539            | 21257             | 19799†           |
|   | <b>Weight</b>      | 2 ¼ lbs                    | 4 lbs                                      | 6 ½ lbs                      | 7 lbs                          | 8 lbs            | 10 lbs                         | 12 lbs           | 15 lbs            | 20 lbs           |
| <b>Drag spring screw*<br/>(6 Req'd.)</b>                        | <b>Part No.</b>    | 25221                      | 8251†                                      | 8251†                        | 8251†                          | 8251†            | 8251†                          | 8251†            | 8251†             | 8251†            |
|   | <b>Weight</b>      | 3 Req'd.                   | 3 Req'd.                                   | 3 Req'd.                     | 3 Req'd.                       | 3 Req'd.         | 3 Req'd.                       | 6 Req'd.         | 6 Req'd.          | 6 Req'd.         |
| <b>Wickered sleeve short</b>                                    | <b>Part No.</b>    | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |
|   | <b>Weight</b>      | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |
| <b>Drag spring short<br/>(3 req'd.)</b>                         | <b>Part No.</b>    | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |
|   | <b>Weight</b>      | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |
| <b>Rod knife</b>  | <b>Part No.</b>    | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |
|   | <b>Weight</b>      | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |
| <b>Top thrust to cut coupling</b>                               | <b>Part No.</b>    | 8242                       | 14802                                      | 8749                         | 15541†                         | 15083            | 41896                          | —                | —                 | —                |
|   | <b>Weight</b>      | ¼ lb                       | 1 lb                                       | 1 ¼ lbs                      | 2 ½ lbs                        | 3 lb             | 4 lb                           | —                | —                 | —                |
| <b>Complete assembly<br/>w/ drag spring*</b>                    | <b>Part No.</b>    | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |
|   | <b>Weight</b>      | —                          | —  | —                            | —                              | —                | —                              | —                | —                 | —                |



### How to Order

- Specify:
- (1) Name and number of assembly or part.
  - (2) Size of pipe to be cut.
  - (3) Whether or not bottom nut is to be fitted for a *Bowen* collar finder.



### Recommended Spares

- (1) 6 sets of knives.
- (2) 2 sets of knife pins.
- (3) 6 sets of knife springs.
- (4) 2 sets of knife spring screws.
- (5) 1 set of slips.
- (6) 1 set of wiper blocks.
- (7) 1 set of wiper block springs.
- (8) 1 set of wiper block screws.
- (9) 1 set of grip jaws.
- (10) 1 set of grip jaw springs.
- (11) 1 wickered sleeve.
- (12) 1 set of drag springs.
- (13) 1 set of drag spring screws.



### Special Notes:

- (1) \* Where both wiper block and drag spring parts are shown, the cutter can be ordered with either.
- (2) † These parts are not required when parts for optional sizes on page 14 are ordered.

## Specifications and Replacement Parts

### Bowen Internal Cutter - Itco Type

| Internal Cutter Conversion Table To Convert Cutters To An Additional Size Parts Listed Must be Changed to Adapt Listed Assembly to "Can Be Dressed To Cut" Size |                      |                     |                |                       |                     |                                 |                          |                     |                |
|---|----------------------|---------------------|----------------|-----------------------|---------------------|---------------------------------|--------------------------|---------------------|----------------|
| Assembly number   | 2174                 | 2174                | 2174           | 25940                 | 25940               | 25940                           | 9176                     | 9176                | 9176           |
| Can be dressed to cut additional sizes by changing parts listed below   | 1 1/16 in. I.D. Pipe | 2 7/8 in. I.F. D.P. | 2 7/8 in. Tub. | 2 1/16 in. 3.25# Tub. | 2 3/8 in. O.D. Pipe | 1.806 in. I.D. X 2 3/8 in. O.D. | 2 3/4 in. I.D. Drill Rod | 3 1/2 in. I.F. D.P. | 3 1/2 in. D.P. |

### Replacement Parts

|                              |          |       |      |      |       |       |       |       |      |       |
|------------------------------|----------|-------|------|------|-------|-------|-------|-------|------|-------|
| Top thrust                   | Part No. | —     | 8437 | 8437 | —     | —     | —     | —     | 9178 | 9178  |
| Slip (3 req'd.)              | Part No. | 28894 | —    | 2181 | 25958 | 33432 | 61735 | 61406 | —    | 2181  |
| Wiper block (3 req'd.)       | Part No. | —     | —    | —    | —     | —     | —     | —     | —    | —     |
| Drag spring (3 req'd.)       | Part No. | —     | —    | —    | —     | —     | —     | —     | —    | 58211 |
| Bottom nut†                  | Part No. | —     | —    | —    | —     | 33433 | 33433 | —     | —    | —     |
| Knife block (3 req'd.)       | Part No. | —     | —    | —    | —     | —     | —     | —     | —    | —     |
| Top thrust to cut coupling   | Part No. | —     | —    | —    | —     | —     | —     | —     | —    | —     |
| Knife (3 req'd.)             | Part No. | —     | —    | —    | —     | 33431 | 33431 | —     | —    | —     |
| Knife (5 req'd.)             | Part No. | —     | —    | —    | —     | —     | —     | —     | —    | —     |
| Knife (3 req'd.)             | Part No. | —     | —    | —    | —     | —     | —     | —     | —    | —     |
| Drag spring screw (3 req'd.) | Part No. | —     | —    | —    | —     | —     | —     | —     | —    | —     |
| Mandrel extension            | Part No. | —     | —    | —    | —     | —     | —     | —     | —    | —     |
| Drag spring ring             | Part No. | —     | —    | —    | —     | —     | —     | —     | —    | —     |

|   |   |                     |                                |                   |                     |                       |                     |                            |                     |
|---|---|---------------------|--------------------------------|-------------------|---------------------|-----------------------|---------------------|----------------------------|---------------------|
| Assembly number   | 9176                                      | 8570                | 8570                           | 8570              | 8570                | 9465                  | 9465                | 8844                       | 8844                |
| Can be dressed to cut additional sizes by changing parts listed below | 3 1/2 in. O.D. X 3 1/8 in. I.D. Drill Rod | 3 1/2 in. O.D. Tub. | 3 1/2 in. O.D. 13.3 in. # D.P. | 4.0 in. O.D. Tub. | 4 1/2 in. O.D. Tub. | 4 1/2 in. X-hole D.P. | 4 1/2 in. O.D. Csg. | 4 1/2 in. O.D. Csg. & Tub. | 4 3/4 in. O.D. Csg. |

### Replacement Parts

|                              |          |       |       |       |      |       |      |       |      |       |
|------------------------------|----------|-------|-------|-------|------|-------|------|-------|------|-------|
| Top thrust                   | Part No. | 9178  | —     | —     | 8613 | 8581  | —    | —     | —    | 8847  |
| Slip (3 req'd.)              | Part No. | 61407 | —     | 26515 | 8577 | 8587  | —    | 23945 | 8932 | 8932  |
| Wiper block (3 req'd.)       | Part No. | —     | —     | 26516 | 8614 | 8605  | —    | —     | 8933 | 8933  |
| Drag spring (3 req'd.)       | Part No. | 58211 | 8592  | —     | —    | —     | 8611 | 23946 | —    | 8611† |
| Bottom nut†                  | Part No. | —     | —     | —     | 8602 | 8634  | 9457 | —     | 8934 | 8934  |
| Knife block (3 req'd.)       | Part No. | —     | —     | —     | —    | 22278 | —    | —     | —    | —     |
| Top thrust to cut coupling   | Part No. | —     | —     | —     | —    | —     | —    | —     | —    | —     |
| Knife (3 req'd.)             | Part No. | —     | —     | —     | —    | —     | —    | —     | —    | —     |
| Knife (5 req'd.)             | Part No. | —     | —     | —     | —    | —     | —    | —     | —    | —     |
| Knife (3 req'd.)             | Part No. | —     | —     | —     | —    | —     | —    | —     | —    | —     |
| Drag spring screw (3 req'd.) | Part No. | —     | 62734 | —     | —    | —     | —    | —     | —    | —     |
| Mandrel extension            | Part No. | —     | 8595  | —     | —    | —     | —    | —     | —    | —     |
| Drag spring ring             | Part No. | —     | 8594  | —     | —    | —     | —    | —     | —    | —     |

# Bowen Internal Cutters

## Specifications and Replacement Parts

### Bowen Internal Cutter - Itco Type

| Internal Cutter Conversion Table To Convert Cutters To An Additional Size Parts Listed Must be Changed to Adapt Listed Assembly to "Can Be Dressed To Cut" Size |                   |                   |              |                             |                           |                   |                 |                   |                   |
|---|-------------------|-------------------|--------------|-----------------------------|---------------------------|-------------------|-----------------|-------------------|-------------------|
| <b>Assembly number</b>  | 8844              | 8844              | 8200         | 8200                        | 8200                      | 8200              | 14785           | 14785             | 14785             |
| <b>Can be dressed to cut additional sizes by changing parts listed below</b>  | 5.0 in. O.D. Csg. | 5 ½ in. O.D. Csg. | 5.0 in. Csg. | 5 ½ in. O.D. Csg. 13# - 15# | 5 ½ in. O.D. Csg. 17#-25# | 5 ¾ in. O.D. Csg. | 6 in. O.D. Csg. | 7.0 in. O.D. Csg. | 7 ¾ in. O.D. Csg. |

### Replacement Parts

|                                     |                 |       |       |       |       |       |        |       |        |       |
|-------------------------------------|-----------------|-------|-------|-------|-------|-------|--------|-------|--------|-------|
| <b>Top thrust</b>                   | <b>Part No.</b> | 8847  | 8847  | —     | 8242  | 8242  | 54550  | 14802 | 14816  | 14816 |
| <b>Slip (3 req'd.)</b>              | <b>Part No.</b> | 14004 | 53055 | 28863 | 8407  | 8405  | 54551  | 14803 | 29499  | 52812 |
| <b>Wiper block (3 req'd.)</b>       | <b>Part No.</b> | 14001 | 53056 | —     | 8219  | 8219  | 54552  | 14818 | 20982  | 52813 |
| <b>Drag spring (3 req'd.)</b>       | <b>Part No.</b> | 8611† | 8611† | —     | 8207‡ | 8207‡ | 54553‡ | 8249‡ | 36499‡ | —     |
| <b>Bottom nut†</b>                  | <b>Part No.</b> | 14002 | 14002 | —     | 8234  | 8234  | 8234   | 14817 | 36498  | 36498 |
| <b>Knife block (3 req'd.)</b>       | <b>Part No.</b> | 14003 | 53057 | —     | —     | —     | —      | —     | —      | —     |
| <b>Top thrust to cut coupling</b>   | <b>Part No.</b> | —     | —     | —     | —     | —     | —      | 14816 | —      | —     |
| <b>Knife (3 req'd.)</b>             | <b>Part No.</b> | —     | 9042  | —     | —     | —     | —      | —     | —      | 52814 |
| <b>Knife (5 req'd.)</b>             | <b>Part No.</b> | —     | —     | —     | —     | —     | —      | —     | —      | —     |
| <b>Drag spring screw (3 req'd.)</b> | <b>Part No.</b> | —     | —     | —     | 8207  | 8207  | —      | —     | —      | —     |
| <b>Mandrel extension</b>            | <b>Part No.</b> | —     | —     | —     | —     | —     | —      | —     | —      | —     |
| <b>Drag spring ring</b>             | <b>Part No.</b> | —     | —     | —     | —     | —     | —      | —     | —      | —     |

|  |                   |                   |                                  |                                  |                |  |             |                  |                    |
|--|-------------------|-------------------|----------------------------------|----------------------------------|----------------|--|-------------|------------------|--------------------|
| <b>Assembly number</b>   | 8745              | 8745              | 15532                            | 15532                            | 15532          | 15080                                  | 41876       | 21240            | 19760              |
| <b>Can be dressed to cut additional sizes by changing parts listed below</b> | 7 ¾ in. O.D. Csg. | 8 ½ in. O.D. Csg. | 9 in. Coupling & 9 in. O.D. Csg. | 9 in. O.D. Csg. & 8 in. Coupling | 9 in. Coupling | 10 ¾ in. O.D. Csg. & 10 ¾ in. Coupling | 12 in. L.P. | 18 in. O.D. Csg. | 20 ¾ in. O.D. Csg. |

### Replacement Parts

|                                     |                 |      |       |        |        |        |        |       |        |        |
|-------------------------------------|-----------------|------|-------|--------|--------|--------|--------|-------|--------|--------|
| <b>Top thrust</b>                   | <b>Part no.</b> | 8749 | 8749  | 15541  | 15541  | 15541  | 15083  | 41896 | —      | 19776  |
| <b>Slip (3 req'd.)</b>              | <b>Part no.</b> | 8764 | 15408 | 15551  | 15551  | 15551  | 15088  | 41894 | 21672  | 19777  |
| <b>Wiper block (3 req'd.)</b>       | <b>Part no.</b> | 8770 | 15407 | 15554  | 15554  | 15554  | 15101  | 41893 | 21671* | 19775* |
| <b>Drag spring (3 req'd.)</b>       | <b>Part no.</b> | —    | 8249‡ | 15109‡ | 15109‡ | 15109‡ | 15109‡ | —     | —      | —      |
| <b>Bottom nut†</b>                  | <b>Part no.</b> | 8774 | 15405 | 15552  | 15552  | 15552‡ | 15268  | 41895 | 21674  | —      |
| <b>Knife block (3 req'd.)</b>       | <b>Part no.</b> | —    | —     | —      | —      | —      | —      | —     | —      | —      |
| <b>Top thrust to cut coupling</b>   | <b>Part no.</b> | —    | —     | 15550  | 15549  | 15549  | 15116  | —     | —      | —      |
| <b>Knife (3 req'd.)</b>             | <b>Part no.</b> | 8177 | 15406 | —      | —      | —      | —      | —     | —      | —      |
| <b>Knife (5 req'd.)</b>             | <b>Part no.</b> | —    | —     | —      | —      | —      | —      | —     | 21673  | —      |
| <b>Knife (3 req'd.)</b>             | <b>Part no.</b> | —    | —     | —      | —      | —      | —      | —     | —      | —      |
| <b>Drag spring screw (3 req'd.)</b> | <b>Part no.</b> | —    | —     | —      | —      | —      | —      | —     | —      | —      |
| <b>Mandrel extension</b>            | <b>Part no.</b> | —    | —     | —      | —      | —      | —      | —     | —      | —      |
| <b>Drag spring ring</b>             | <b>Part no.</b> | —    | —     | —      | —      | —      | —      | —     | —      | —      |



### Special Notes:

- (1) \*6 Req'd. for assemblies 21240 and 19760.
- (2) †These oversize bottom nuts are available where centralizing is required.
- (3) ‡Use when drag spring required.



## Specifications and Replacement Parts

### Bowen Internal Cutter Accessories – Collar Finders

| Size (Body O.D.)                         |                 | 1 ¾ in.      | 2 ¼ in.      | 2 ½ in.       | 3 ⅜ in.       | 4 ⅝ in.      | 5 in.        | 6 in.        | 7 in.        | 8 ⅝ in.       |
|--|-----------------|--------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|---------------|
| <b>For Use With Nominal Size Cutter</b>  |                 | 2 ⅝ in. TBG. | 2 ⅞ in. TBG. | 4 ½ in. IU DP | 4 ½ in. IF DP | 5 ½ in. CSG. | 6 ⅝ in. CSG. | 7 ⅝ in. CSG. | 8 ⅝ in. CSG. | 10 ¾ in. CSG. |
| <b>Max. Expansion of Collar Locators</b> |                 | 2 ⅞ in.      | 3 ½ in.      | 4 ½ in.       | 5 ½ in.       | 6 ⅝ in.      | 7 ⅝ in.      | 8 ⅝ in.      | 9 ⅝ in.      | 12 ¼ in.      |
| <b>Complete assembly</b>                 | <b>Part No.</b> | 5007         | 5015         | 5022          | 3758          | 5030         | 5040         | 5047         | 5052         | 5057          |
|  | <b>Weight</b>   | 17 lbs       | 25 lbs       | 38 lbs        | 70 lbs        | 123 lbs      | 156 lbs      | 182 lbs      | 316 lbs      | 373 lbs       |
| <b>Bowl</b>                              | <b>Part No.</b> | 5008         | 5016         | 5023          | 3759          | 5031         | 5041         | 5041         | 5062         | 5062          |
|  | <b>Weight</b>   | 5 lbs        | 7 lbs        | 11 lbs        | 16 lbs        | 26 lbs       | 35 lbs       | 35 lbs       | 57 lbs       | 57 lbs        |
| <b>Mandrel</b>                           | <b>Part No.</b> | 5009         | 5017         | 5024          | 3760          | 5032         | 5042         | 5042         | 5063         | 5063          |
|  | <b>Weight</b>   | 3 lbs        | 5 lbs        | 6 lbs         | 11 lbs        | 23 lbs       | 34 lbs       | 34 lbs       | 59 lbs       | 59 lbs        |
| <b>Mandrel Spring</b>                    | <b>Part No.</b> | 5010         | 5018         | 5025          | 5465          | 5033         | 5043         | 5043         | 5064         | 5064          |
|  | <b>Weight</b>   | 1 lb         | 2 lbs        | 3 lbs         | 5 lbs         | 7 lbs        | 9 lbs        | 9 lbs        | 23 lbs       | 23 lbs        |
| <b>Body</b>                              | <b>Part No.</b> | 5011         | 5019         | 5026          | 3761          | 5034         | 5044         | 5048         | 5053         | 5058          |
|  | <b>Weight</b>   | 5 lbs        | 8 lbs        | 12 lbs        | 29 lbs        | 51 lbs       | 48 lbs       | 78 lbs       | 136 lbs      | 181 lbs       |
| <b>Collar Locator (2 Req'd.)</b>         | <b>Part No.</b> | 5012         | 5012         | 5027          | 3762          | 5035         | 4187         | 5049         | 5054         | *5059-1       |
|  | <b>Weight</b>   | ¼ lb         | ¼ lb         | ½ lb          | ¾ lb          | 1 ½ lbs      | 2 ½ lbs      | 3 lbs        | 3 ½ lbs      | 4 lbs         |
| <b>Collar Locator Spring</b>             | <b>Part No.</b> | 5012-2       | 5012-2       | 5027-2        | 3762-2        | 5035-2       | 4187-2       | 5049-2       | 5054-2       | 5054-2        |
|  | <b>Weight</b>   | ⅝ lb         | ⅝ lb         | ⅞ lb          | ⅞ lb          | ⅞ lb         | ⅞ lb         | ⅞ lb         | ⅞ lb         | ⅞ lb          |
| <b>Shear Pin</b>                         | <b>Part No.</b> | 5013         | 5020         | 5028          | 5466          | 5036         | 5036         | 5050         | 5055         | 5060          |
|  | <b>Weight</b>   | ½ lb         | ½ lb         | ½ lb          | ½ lb          | ⅞ lb         | ⅞ lb         | ⅞ lb         | ⅞ lb         | ⅞ lb          |
| <b>Sleeve</b>                            | <b>Part No.</b> | 5014         | 5021         | 5029          | 3763          | 5037         | 5046         | 5051         | 5056         | 5061          |
|  | <b>Weight</b>   | 1 lb         | 1 ¼ lbs      | 2 ¼ lbs       | 3 lbs         | 7 lbs        | 14 lbs       | 17 ½ lbs     | 29 lbs       | 40 lbs        |
| <b>Sleeve Retainer Nut</b>               | <b>Part No.</b> | 5014-1       | 5021-1       | 5029-1        | 3763-1        | 5037-1       | 5046-1       | 5051-1       | 5056-1       | 5061-1        |
|  | <b>Weight</b>   | 1 ¼ lbs      | 1 ½ lbs      | 2 ½ lbs       | 5 lbs         | 7 lbs        | 13 lbs       | 5 ½ lbs      | 8 lbs        | 8 ½ lbs       |
| <b>Sleeve Retainer Nut Set Screw</b>     | <b>Part No.</b> | 5014-2       | 5021-2       | 5029-2        | 3763-2        | 5037-2       | 5046-2       | 5051-2       | 5056-2       | 5061-2        |
|  | <b>Weight</b>   | ⅞ lb         | ⅞ lb         | ⅞ lb          | ⅞ lb          | ⅞ lb         | ⅞ lb         | ⅞ lb         | ⅞ lb         | ⅞ lb          |

\* Collar locator for 13 in. & 13 ⅜ in. casing part no. 5059 weight 4 ½

### Stabilizers

| Size (Body O.D.)                      |                 | 1 ¾ in. | 2 ¼ in. | 2 ½ in. | 3 ⅜ in. | 4 ⅝ in. | 5 in.   | 6 in.   | 7 ¼ in. | 9 ¼ in. |
|---------------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Overall Length (Inches)</b>        |                 | 22 in.  | 22 in.  | 32 in.  | 39 in.  | 41 in.  | 45 in.  | 46 in.  | 51 in.  | 54 in.  |
| <b>Complete Assembly</b>              | <b>Part No.</b> | 4981    | 2812    | 4985    | 4989    | 2933    | 4993    | 4997    | 2937    | 2941    |
|                                       | <b>Weight</b>   | 12 lbs  | 15 lbs  | 25 lbs  | 54 lbs  | 88 lbs  | 136 lbs | 197 lbs | 269 lbs | 568 lbs |
| <b>Body</b>                           | <b>Part No.</b> | 4982    | 2813    | 4986    | 4990    | 2934    | 4994    | 4998    | 2938    | 2942    |
|                                       | <b>Weight</b>   | 8 lbs   | 10 lbs  | 15 lbs  | 29 lbs  | 43 lbs  | 75 lbs  | 115 lbs | 170 lbs | 375 lbs |
| <b>Bottom Sub</b>                     | <b>Part No.</b> | 4983    | 2814    | 4987    | 4991    | 2935    | 4995    | 4999    | 2939    | 2943    |
|                                       | <b>Weight</b>   | 3 lbs   | 4 lbs   | 8 lbs   | 21 lbs  | 37 lbs  | 48 lbs  | 65 lbs  | 77 lbs  | 154 lbs |
| <b>Spring Collar Body</b>             | <b>Part No.</b> | 4984    | 2815    | 4988    | 4992    | 2936    | 4996    | 5000    | 2940    | 2944    |
|                                       | <b>Weight</b>   | ½ lb    | ½ lb    | ¾ lb    | 1 ½ lbs | 3 lbs   | 5 lbs   | 7 lbs   | 9 lbs   | 16 lbs  |
| <b>Spring Collar Sleeve</b>           | <b>Part No.</b> | 4984-1  | 2815-1  | 4988-1  | 4992-1  | 2936-1  | 4996-1  | 5000-1  | 2940-1  | 2944-1  |
|                                       | <b>Weight</b>   | ⅞ lb    | ⅞ lb    | ¼ lb    | ½ lb    | ⅞ lb    | 1 lb    | 1 ½ lbs | 2 lbs   | 3 ½ lbs |
| <b>Spring Collar Screw (3 Req'd.)</b> | <b>Part No.</b> | 4984-2  | 2815-2  | 4988-2  | 4992-2  | 2936-2  | 4996-2  | 5000-2  | 2940-2  | 2944-2  |
|                                       | <b>Weight</b>   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    |
| <b>Friction Spring (3 Req'd.)</b>     | <b>Part No.</b> | 3658    | 2809    | 3425    | 2846    | 2343    | 3246    | 3449    | 2890    | 2904    |
|                                       | <b>Weight</b>   | ¼ lb    | ⅓ lb    | ⅓ lb    | 1 lb    | 1 lb    | 2 lbs   | 2 lbs   | 3 ½ lbs | 6 lbs   |
| <b>Spring Sleeve</b>                  | <b>Part No.</b> | 3658-A  | 2809-A  | 3425-A  | 2846-A  | 2343-A  | 3246-A  | 3449-A  | 2890-A  | 2904-A  |
|                                       | <b>Weight</b>   | ¼ lb    | ⅓ lb    | ½ lb    | 1 lb    | 2 ½ lbs | 4 ½ lbs | 6 lbs   | 7 ½ lbs | 14 lbs  |
| <b>Spring Sleeve Screw (3 Req'd.)</b> | <b>Part No.</b> | 3658-B  | 2809-B  | 3425-B  | 2846-B  | 2343-B  | 3246-B  | 3449-B  | 2890-B  | 2904-B  |
|                                       | <b>Weight</b>   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | 1½ lb   | ½ lb    | ½ lb    | ½ lb    | ½ lb    |

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# PRESSURE PIPE CUTTER

Instruction Manual 5680



Pressure Pipe Cutter

One Company Unlimited Solutions



**NATIONAL OILWELL**

# Pressure Pipe Cutter

|  |        |
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*The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.*

*Fourth Printing, January 2004*





### **General Description**

The **Bowen Pressure Pipe Cutter** is designed to cut single and multiple strings of pipe from 4" O.D. to 36" O.D., using pump pressure to actuate three (3) Itcoloy coated Knives. Different lengths of Knives are used, depending on the size of pipe to be cut. The Cutter works on the principle of flow restriction across an orifice while cutting, and pressure drop when the pre-set diameter of the Knives is reached. This tells the operator that the pipe has been severed.

### **Operation**

A drill bit is attached to the bottom of the Cutter for stabilizing purposes, if desired, and the Cutter is then attached to the Drill Pipe or Tubing. Use bailing wire in the O.D. grooves provided on the Body to keep the Knives in a closed position while the Cutter is lowered to the desired depth. Begin rotation *before* mud pump is turned on.

The continued downward movement of the Piston reacting to the pump pressure forces the Knives to pivot about their pins. When the Knives reach their pre-set diameter, the Piston will separate from the Bit Jet Retainer Stem, causing an increase in mud flow through the tool. This, in turn will cause a decrease in pump pressure, indicating the Knives have severed the pipe.

### **Complete Disassembly**

*Refer to page 4 for proper location of parts.*

*National Oilwell recommends an assembly drawing of the size Pressure Pipe Cutter being serviced be available when disassembling and reassembling.*

Secure the Bowen Pressure Pipe Cutter in an appropriate vise on the Body just above the Knives. Using a pipe wrench and V-Belt Pulley Assembly, break Top Sub connection and remove Top Sub. Using a screwdriver, remove Top Sub O-Ring.

After the Top Sub is removed, reach inside the Body and remove Valve Assembly. The Valve Assembly consists mainly of Bit Jet, Bit Jet Retainer, Bit Jet Retainer Stem and Stop Spider. Lay Valve Assembly on clean shop table. Using retainer ring pliers, remove retainer ring from Bit Jet Retainer. Insert drill rod or brass bar through Bit Jet Retainer Stem and remove Bit Jet by tapping it out. Remove I.D. O-Ring from Bit Jet Retainer.

Remove three (3) set screws from Stop Spider. Remove Bit Jet Retainer Stem from Bit Jet Retainer. Remove Bit Jet Retainer from Stop Spider. Next, remove the three (3) Knives from Body by first, removing the three (3) retaining screws at the head of each knife pin. Using a screwdriver or metal punch, remove the three (3) Knife Pins. Remove Knives from Body.

Insert pipe or brass bar into one of the Knife grooves on Body and tap out Piston. Remove Piston Spring from Body also. Lay Piston on clean shop table and remove Piston I.D. Retainer Ring with retainer ring pliers. Remove Piston Bushing with a screwdriver and also the I.D. O-Ring inside Piston Bushing bore. Secure Piston in a bench vise on small diameter using soft jaws (brass or copper).

**NOTE: Do not score or mark any O.D. surface on piston.**

With a screwdriver, remove O.D. seal Retainer Ring, Plate and O.D. seal (on 3<sup>5</sup>/<sub>8</sub>" O.D. and 5<sup>9</sup>/<sub>16</sub>" O.D. tools, Piston O.D. seal consists of an O-Ring only). The Bowen Pressure Pipe Cutter is now completely disassembled.

Carefully clean and inspect all parts for wear and damage. Replace all worn and damaged parts with new parts.

### **Complete Reassembly and Knife Cutting Diameter Adjustment**

*Refer to page 4 for proper location of parts.*

*National Oilwell recommends an assembly drawing of the size Pressure Pipe Cutter being serviced be available when disassembling and reassembling.*

The Bowen Pressure Pipe Cutter is easy to reassemble. The Body is dressed with the appropriate length of Knives, Knife Pins and set screws. The Knives are inserted into the three (3) Knife slots with the Itcoloy surfaces facing outward and holes in Knives and Body aligned. The Knife Pins are inserted into each of the through drilled holes on the Body. With the head of the Knife Pin inserted into the slot on the Body, the three (3) retaining screws are then installed to hold the Knife Pin in place. The Knives are then checked, assuring they hinge freely.

The Piston O.D. Seal is fitted, then Plate and Retainer Ring installed, (install appropriate Piston O.D. O-Ring on 3<sup>5</sup>/<sub>8</sub>" and 5<sup>9</sup>/<sub>16</sub>" O.D. tools). Install Piston I.D. O-Ring inside Piston bore and insert Piston Bushing until it rests on the shoulder of the Piston. The Retainer Ring is inserted in the groove, locking the Piston Bushing into the I.D. of the Piston. The Piston Assembly is inserted into the Body until it touches the Knives.

**NOTE: Piston spring is not installed at this time.**

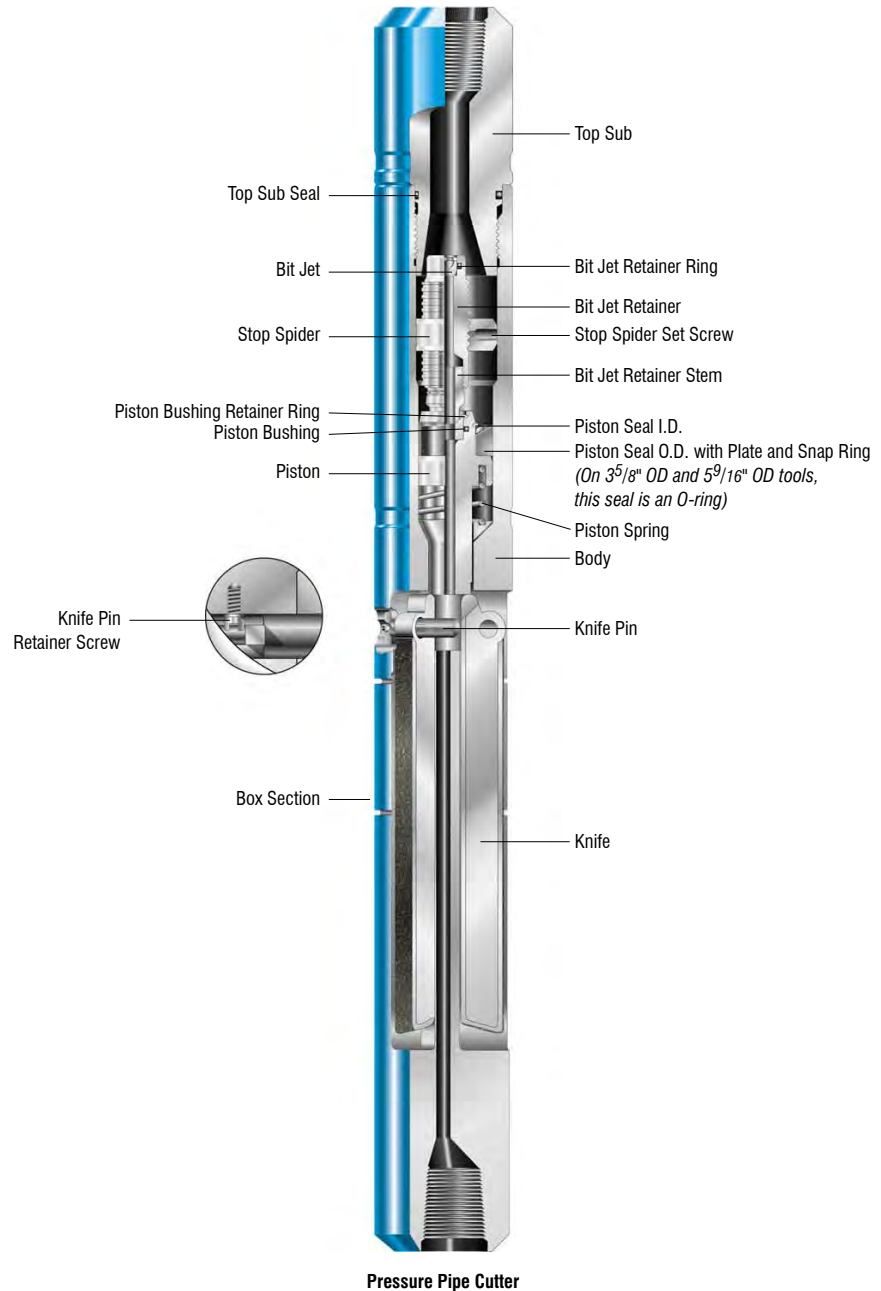
The Bit Jet Retainer Stem is screwed and tightened securely to the Bit Jet Retainer. Next, install I.D. O-Ring inside the Bit Jet Retainer, followed by the Bit Jet and Retainer Ring in that order. The Stop Spider is then threaded onto the Bit Jet Retainer.

At this point, Knife cutting diameter should be pre-set before completing reassembly. As stated earlier, the correct length of Knives are chosen depending on the O.D. of pipe to be cut. Consult pages 9 and 10 for this information. Extend one (1) of the Knives to maximum diameter desired and with a tape, measure the distance from tip of Knife to center of tool. With Knife held in this position, insert Valve Assembly into Body and push down on Piston until it touches the top of the extended Knife. Adjust the Stop Spider so that it comes to rest on the shoulder in the upper end of the Body. The Bit Jet Retainer Stem with its ground surface should come to rest on the ground seat of the Piston Bushing at the same time. Remove the Valve Assembly from the Body and align set screw holes on Stop Spider with three (3) flats on the Bit Jet Retainer. Install three (3) set screws and tighten securely. Remove Piston Assembly from Body and install Piston Spring. The Piston Assembly is then reinstalled into the Body until it comes to rest on the Piston Spring. Install Valve Assembly inside Body. Fit Top Sub with O-Ring and thread Top Sub to Body. Wrap wire around the Body in the groove over the Knife slots in order to keep the Knives in the closed position as the tool is lowered into the casing.

The Bowen Pressure Pipe Cutter is now ready for use.

### Maintenance

The Bowen Pressure Pipe Cutter should be thoroughly washed and cleaned to remove all drilling mud and other debris. All parts, particularly the Knives, should be examined for wear and damage and replaced as necessary. It is recommended that the Bowen Pressure Pipe Cutter be completely disassembled, cleaned, lubricated, painted, and reassembled before storing.



### **Single Cut Operation from a Fixed Platform**

**NOTE:** See tables on pages 9 and 10 for proper cutting sequence rpm and mud pump pressure.

#### **Make-Up**

To make a successful cut using the Bowen Pressure Pipe Cutter, first, determine proper Knife length for pipe to be cut and dress Pipe Cutter accordingly. (Directions for adjusting cutting diameter of Knives can be found in Pressure Pipe Cutter Assembly Instructions.) Second, set correct R.P.M. of rotary table. Third, select mud pump pressure necessary for cut.

By running a drill bit or stabilizer in the bottom of the Cutter and a stabilizer directly above the Cutter, a smoother and more efficient cut can be achieved. In extreme cases cut may not be made without a stabilizer.

#### **Cutting Procedure**

Before starting the actual cut, be sure Knives are not located at a casing coupling location. This will only complicate and prolong the cut. Once the tool is in cutting position, mark the Kelly so that Knives can be relocated if needed.

After Knife location has been established, begin the cutting operation by starting the rotary and achieving recommended rpm. Zero weight indicator and note free torque of cutter string. Start mud pump and increase pressure as recommended in the tables on pages 9 and 10. Continue cutting until Knives reach the pre-set diameter, which will be indicated by a sharp drop in pump pressure. After the pipe is cut, release pump pressure and simply raise the string to remove the Cutter from the hole.

### **Single Cut Operation from a Floating Platform**

To cut pipe from a floating platform, follow the same make-up procedure as that from a fixed platform.

In addition, an underwater swivel is needed with a Bumper Sub to prevent wave motion from affecting the position of the Pipe Cutter. The swivel should be allowed to seat in the subsea wellhead system at the proper distance from the Pipe Cutter. Lower the string one half the stroke of the Bumper Sub and mark the Kelly for possible relocation of the Bumper Sub assuring the underwater swivel is not disturbed and remains seated on the well head or riser.

Start the rotary, achieve recommended rpm, zero weight indicator, and note free torque of Cutter String. Start mud pump and increase pressure to that as recommended in the tables on pages 9 and 10. Continue cutting until Knives reach their pre-set diameter, which will be indicated by a sharp drop in pump pressure. After completing cut, release pump pressure and raise the string to remove the Cutter.

### **Multiple Cut Operation from a Fixed Platform**

**NOTE:** See table on page 11 for cutting sequence.

Multiple cuts using the Bowen Pressure Pipe Cutter can be made efficiently by following the guidelines, determining Knife length, run sequence, rotary speed and pump pressure. A drill bit should be attached to the bottom of the Cutter, if desired, and a stabilizer connected directly above the Cutter to insure a smooth cut. Successive trips may require changing of the drill bit and modification of the stabilizer to accommodate the larger casing I.D. if casing is pulled after a run.

Before making initial cut, be sure Knives are not located at a casing coupling location. Lower the Cutter and mark the Kelly so that Knives can be repositioned in the right location for successive cuts.

#### **Cutting Operation**

**First Run:** To begin the first cut, start rotation and bring mud pump up to recommended pressure, as shown in the tables on pages 9 and 10. Run the Cutter until the Knives reach their pre-set diameter (directions for setting Knife cutting diameter can be found in Pipe Cutter Assembly Instructions). The drop in mud pump pressure indicates to the operator that this diameter has been reached. Stop pump pressure and remove the Cutter from the hole.

**Second Run:** Dress the Cutter with the appropriate length of Knives needed for the second run and measure the difference in length of Knives. Raise the Kelly to compensate for the difference, assuring the longer Knives will clear the bottom of the cut. Start rotary and increase mud pump pressure to setting recommended in chart. Continue to cut until Knives reach their preset diameter which will be indicated by a pressure drop. Stop pressure and trip out of the hole.

This procedure should be followed until all sizes of pipe have been cut.

### Multiple Cut Operation from a Floating Platform

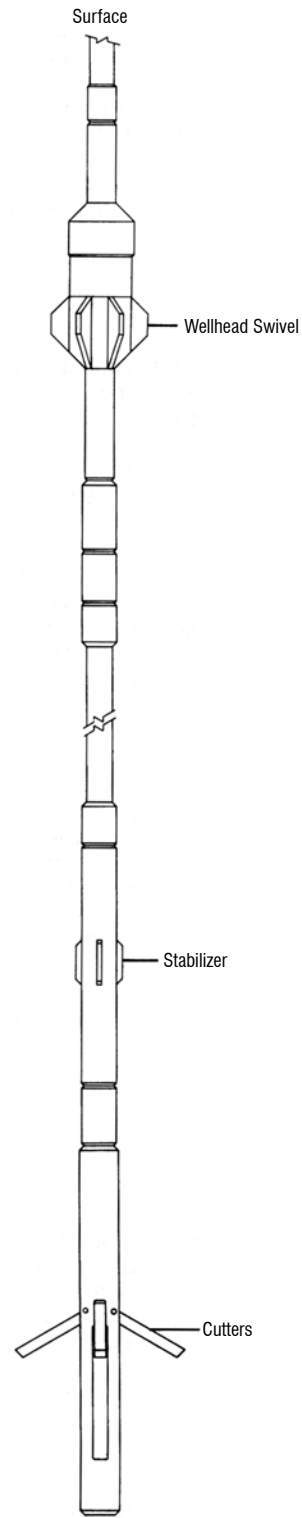
Multiple sizes of pipe can be cut from a floating platform using the underwater swivel added to the Cutter string.

*See figure at right for typical set up from a floating platform.*

An underwater swivel must be added to the Cutter string along with a Bumper Sub with the latter being used to offset wave motion and to keep the Pipe Cutter stable while cutting the pipe.

The swivel should be landed on the subsea well head or riser. Spacer Subs should be located between the swivel and Stabilizer. The string should be lowered half the stroke of the Bumper Sub. Mark the Kelly, start the rotary, note free torque and increase pump pressure to recommended level. Continue cut until Knives are fully extended, which will be indicated by a pressure drop. Stop pressure and remove the Cutter from the hole.

Refer to the run chart on page 11 for all information required for additional trips into the hole.

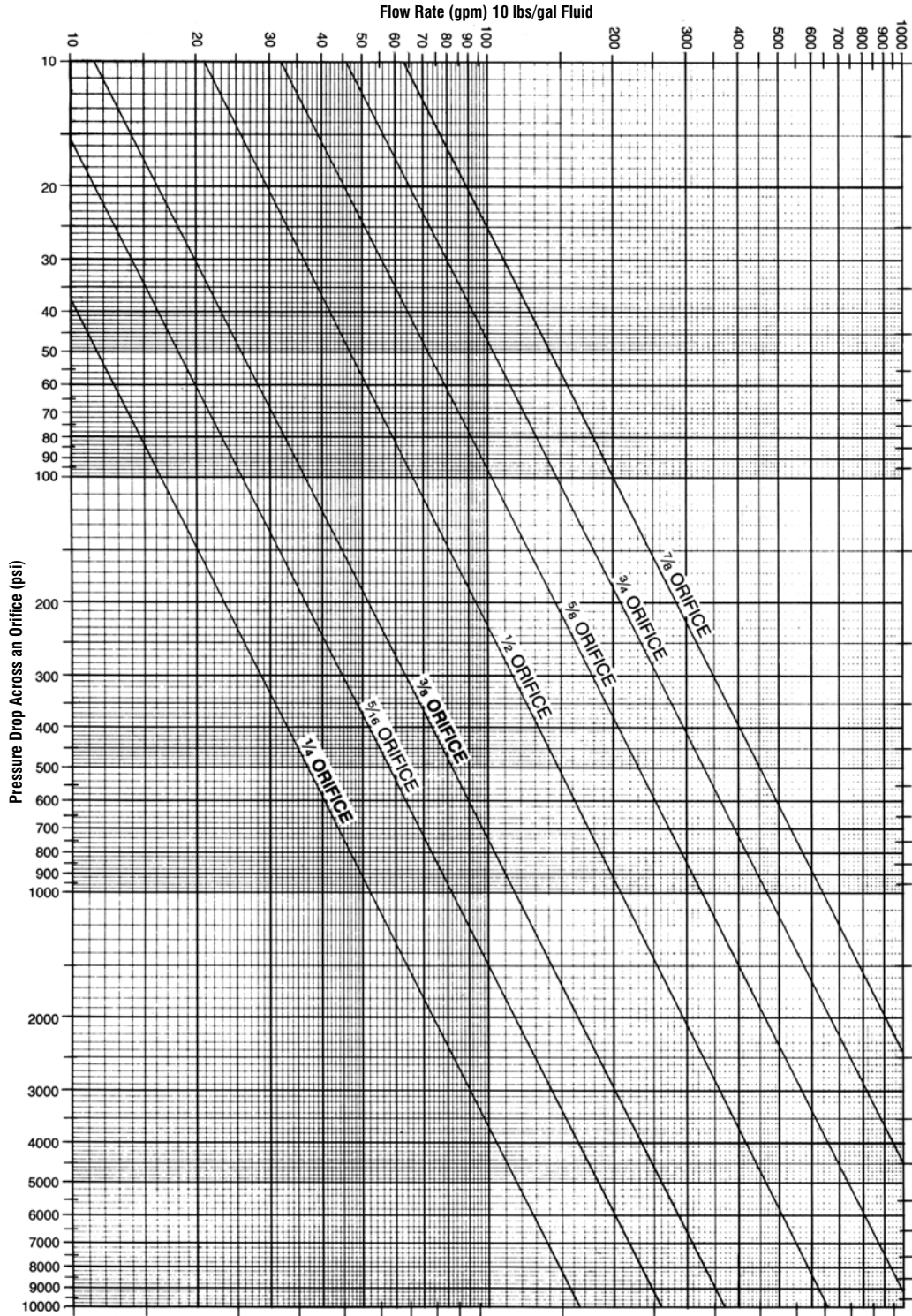


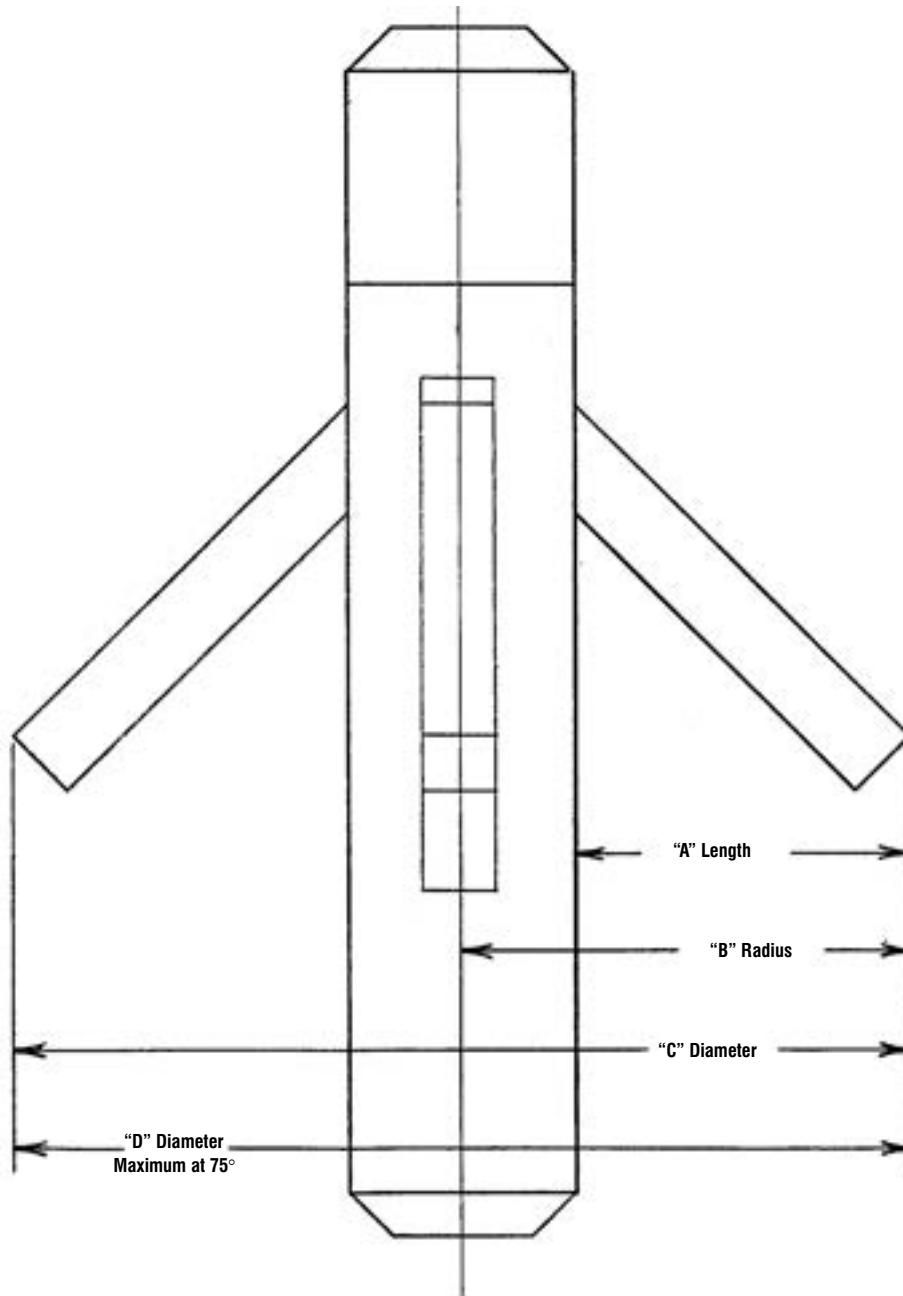
Typical Set Up from Floating Platform





**Pressure Drop Across an Orifice**







**Single Cut Operation Running Chart**

**3-1/4" (83 mm) O.D. Pressure Pipe Cutter**

| Casing or<br>Pipe Size | Part No. | Knife        |               |                |                                       | Rotary<br>Speed | Orifice<br>Pressure Differential | Orifice<br>I.D.<br>Std. |
|------------------------|----------|--------------|---------------|----------------|---------------------------------------|-----------------|----------------------------------|-------------------------|
|                        |          | "A" Length   | "B" Radius    | "C" Diameter   | "D" Max. Diameter @ 75 <sup>o</sup> * |                 |                                  |                         |
| 4 O.D. Pipe            | 150446   | .625 (16 mm) | 2-1/4 (57 mm) | 4-1/2 (114 mm) | 5-3/8 (136 mm)                        | 80              | 180 psi (13 Kg/cm <sup>2</sup> ) | 1/4                     |

**3-5/8" (92 mm) O.D. Pressure Pipe Cutter**

| Casing or<br>Pipe Size | Part No. | Knife         |               |                |                                       | Rotary<br>Speed | Orifice<br>Pressure Differential | Orifice<br>I.D.<br>Std. |
|------------------------|----------|---------------|---------------|----------------|---------------------------------------|-----------------|----------------------------------|-------------------------|
|                        |          | "A" Length*   | "B" Radius*   | "C" Diameter*  | "D" Max. Diameter @ 75 <sup>o</sup> * |                 |                                  |                         |
| 4-1/2 (114 mm)         | 80357    | 9/16 (14 mm)  | 2-3/8 (60 mm) | 4-3/4 (121 mm) | 6-1/2 (165 mm)                        | 80              | 180 psi (13 kg/cm <sup>2</sup> ) |                         |
| 5 (127 mm)             | 80357    | 13/16 (21 mm) | 2-5/8 (67 mm) | 5-1/2 (133 mm) | 6-1/2 (165 mm)                        | 80              | 180 psi (13 kg/cm <sup>2</sup> ) |                         |
| 5-1/2 (140 mm)         | 80357    | 11/16 (27 mm) | 2-7/8 (73 mm) | 5-3/4 (146 mm) | 6-1/2 (165 mm)                        | 80              | 240 psi (17 kg/cm <sup>2</sup> ) | 1/4                     |
| 6 (152 mm)             | 80357    | 15/16 (33 mm) | 3-1/8 (79 mm) | 6-1/4 (159 mm) | 6-1/2 (165 mm)                        | 80              | 240 psi (17 kg/cm <sup>2</sup> ) |                         |

**5-9/16" (141 mm) O.D. Pressure Pipe Cutter**

| Casing or<br>Pipe Size | Part No. | Knife         |                  |                |                                       | Rotary<br>Speed | Orifice<br>Pressure Differential  | Orifice<br>I.D.<br>Std. |
|------------------------|----------|---------------|------------------|----------------|---------------------------------------|-----------------|-----------------------------------|-------------------------|
|                        |          | "A" Length*   | "B" Radius*      | "C" Diameter*  | "D" Max. Diameter @ 75 <sup>o</sup> * |                 |                                   |                         |
| 6-5/8 (168 mm)         | 80717    | 5/8 (17 mm)   | 3-7/16 (87 mm)   | 6-7/8 (175 mm) | 8-3/4 (222 mm)                        | 80              | 750 psi ( 53 kg/cm <sup>2</sup> ) |                         |
| 7 (178 mm)             | 80717    | 13/16 (21 mm) | 3-5/8 (92 mm)    | 7-1/4 (184 mm) | 8-3/4 (222 mm)                        | 80              | 750 psi ( 53 kg/cm <sup>2</sup> ) |                         |
| 7-5/8 (194 mm)         | 81896    | 1-1/8 (29 mm) | 3-15/16 (100 mm) | 7-7/8 (200 mm) | 10-1/2 (267 mm)                       | 70              | 800 psi ( 56 kg/cm <sup>2</sup> ) | 1/4                     |
| 8-5/8 (219 mm)         | 81896    | 1-5/8 (42 mm) | 4-7/16 (113 mm)  | 8-7/8 (225 mm) | 10-1/2 (267 mm)                       | 60              | 900 psi ( 63 kg/cm <sup>2</sup> ) |                         |
| 9-5/8 (244 mm)         | 81896    | 2-1/8 (55 mm) | 4-15/16 (125 mm) | 9-7/8 (251 mm) | 10-1/2 (267 mm)                       | 60              | 900 psi ( 63 kg/cm <sup>2</sup> ) |                         |

**7-3/8" (187 mm) O.D. Pressure Pipe Cutter**

| Casing or<br>Pipe Size | Part No. | Knife          |                  |                 |                                       | Rotary<br>Speed | Orifice<br>Pressure Differential | Orifice<br>I.D.<br>Std. |
|------------------------|----------|----------------|------------------|-----------------|---------------------------------------|-----------------|----------------------------------|-------------------------|
|                        |          | "A" Length     | "B" Radius       | "C" Diameter    | "D" Max. Diameter @ 75 <sup>o</sup> * |                 |                                  |                         |
| 8-5/8 (219 mm)         | 151023   | 7/8 (22 mm)    | 4-9/16 (115 mm)  | 9-1/8 (231 mm)  | 10-9/16 (268 mm)                      | 70              | 450 psi (32 kg/cm <sup>2</sup> ) |                         |
| 9-5/8 (244 mm)         | 151023   | 1-3/8 (34 mm)  | 5-9/16 (128 mm)  | 10-1/8 (257 mm) | 10-9/16 (268 mm)                      | 70              | 450 psi (32 kg/cm <sup>2</sup> ) |                         |
| 10-3/4 (273 mm)        | 151029   | 1-15/16 (49mm) | 5-5/8 (142 mm)   | 11-1/4 (285 mm) | 19-1/2 (495 mm)                       | 60              | 450 psi (32 kg/cm <sup>2</sup> ) | 3/8                     |
| 11-3/4 (298 mm)        | 151029   | 2-7/16 (61 mm) | 6 1/8 (155 mm)   | 12-1/4 (311 mm) | 19-1/2 (495 mm)                       | 60              | 500 psi (35 kg/cm <sup>2</sup> ) |                         |
| 13-3/8 (340 mm)        | 151029   | 3-1/4 (82 mm)  | 6-15/16 (176 mm) | 13-1/8 (333 mm) | 19-1/2 (495 mm)                       | 60              | 600 psi (42 kg/cm <sup>2</sup> ) |                         |

\* See drawing on page 8.



**Single Cut Operation Running Charts (Continued)**

**8-1/4" (210 mm) O.D. Pressure Pipe Cutter**

| Casing<br>Pipe Size | Knife    |                 |                  |                 |                          | Rotary<br>Speed | Orifice<br>Pressure Differential | Orifice<br>I.D.<br>Std. |
|---------------------|----------|-----------------|------------------|-----------------|--------------------------|-----------------|----------------------------------|-------------------------|
|                     | Part No. | "A" Length*     | "B" Radius*      | "C" Diameter*   | "D" Max. Diameter @ 75°* |                 |                                  |                         |
| 9-5/8 (244 mm)      | 147008   | 7/8 (22 mm)     | 5 (127 mm)       | 10 (254 mm)     | 13-1/2 (343 mm)          | 70              | 450 psi (32 kg/cm <sup>2</sup> ) | 3/8                     |
| 10-3/4 (273 mm)     | 147021   | 1-1/2 (38 mm)   | 5-5/8 (143 mm)   | 11-1/4 (286 mm) | 16-1/2 (419 mm)          | 70              | 450 psi (32 kg/cm <sup>2</sup> ) |                         |
| 13-3/8 (340 mm)     | 147022   | 2-13/16 (71 mm) | 6-15/16 (176 mm) | 13-7/8 (352 mm) | 23-1/4 (591 mm)          | 60              | 600 psi (42 kg/cm <sup>2</sup> ) |                         |
| 16 (406 mm)         | 147022   | 4-1/8 (105 mm)  | 8-1/4 (210 mm)   | 16-1/2 (419 mm) | 23-1/4 (591 mm)          | 60              | 600 psi (42 kg/cm <sup>2</sup> ) |                         |
| 20 (508 mm)         | 147023   | 6-1/8 (156 mm)  | 10-1/4 (260 mm)  | 20-1/2 (521 mm) | 39-1/2 (1003 mm)         | 50              | 750 psi (53 kg/cm <sup>2</sup> ) |                         |
| 24 (610 mm)         | 147024   | 8-1/8 (206 mm)  | 12-1/4 (311 mm)  | 24-1/2 (622 mm) | 50-1/4 (1276 mm)         | 40              | 850 psi (60 kg/cm <sup>2</sup> ) |                         |
| 30 (762 mm)         | 147024   | 11-1/8 (283 mm) | 15-1/4 (387 mm)  | 30-1/2 (775 mm) | 50-1/4 (1276 mm)         | 30              | 950 psi (67 kg/cm <sup>2</sup> ) |                         |
| 30 (762 mm)         | 147025   | 11-1/8 (283 mm) | 15-1/4 (387 mm)  | 30-1/2 (775 mm) | 60 (1524 mm)             | 30              | 950 psi (67 kg/cm <sup>2</sup> ) |                         |
| 34 (864 mm)         | 147025   | 13-1/8 (333 mm) | 17-1/4 (438 mm)  | 34-1/2 (876 mm) | 60 (1524 mm)             | 25              | 950 psi (67 kg/cm <sup>2</sup> ) |                         |
| 34 (864 mm)         | 147026   | 13-1/8 (333 mm) | 17-1/4 (438 mm)  | 34-1/2 (876 mm) | 64 (1626 mm)             | 25              | 950 psi (67 kg/cm <sup>2</sup> ) |                         |
| 36 (914 mm)         | 147026   | 14-1/8 (359 mm) | 18-1/4 (464 mm)  | 36-1/2 (927 mm) | 64 (1626 mm)             | 20              | 950 psi (67 kg/cm <sup>2</sup> ) |                         |

**9-1/2" (241 mm) O.D. Pressure Pipe Cutter**

Information available upon request.

**11-3/4" (298 mm) O.D. Pressure Pipe Cutter**

| Casing or<br>Pipe Size | Knife    |                 |                  |                 |                          | Rotary<br>Speed | Orifice<br>Pressure Differential | Orifice<br>I.D.<br>Std. |
|------------------------|----------|-----------------|------------------|-----------------|--------------------------|-----------------|----------------------------------|-------------------------|
|                        | Part No. | "A" Length*     | "B" Radius*      | "C" Diameter*   | "D" Max. Diameter @ 75°* |                 |                                  |                         |
| 13-3/8 (340 mm)        | 147357   | 1-1/16 (27 mm)  | 6-15/16 (176 mm) | 13-7/8 (352 mm) | 18-3/4 (476 mm)          | 70              | 150 psi (11 kg/cm <sup>2</sup> ) | 3/8                     |
| 13-3/4 (349 mm)        | 147358   | 1-1/4 (32 mm)   | 7-1/8 (181 mm)   | 14-1/4 (362 mm) | 21-1/2 (546 mm)          | 60              | 275 psi (19 kg/cm <sup>2</sup> ) |                         |
| 16 (406 mm)            | 147358   | 2-3/8 (60 mm)   | 8-1/4 (210 mm)   | 16-1/2 (419 mm) | 21-1/2 (546 mm)          | 60              | 275 psi (19 kg/cm <sup>2</sup> ) |                         |
| 16 (406 mm)            | 147359   | 2-3/8 (60 mm)   | 8-1/4 (210 mm)   | 16-1/2 (449 mm) | 29-1/4 (743 mm)          | 50              | 400 psi (28 kg/cm <sup>2</sup> ) |                         |
| 18-5/8 (473 mm)        | 147359   | 3-11/16 (94 mm) | 9-9/16 (243 mm)  | 19-1/8 (486 mm) | 29-1/4 (743 mm)          | 50              | 400 psi (28 kg/cm <sup>2</sup> ) |                         |
| 18-5/8 (473 mm)        | 147360   | 3-11/16 (94 mm) | 9-9/16 (243 mm)  | 19-1/8 (486 mm) | 42-3/4 (1086 mm)         | 45              | 400 psi (28 kg/cm <sup>2</sup> ) |                         |
| 24 (610 mm)            | 147360   | 6-3/8 (162 mm)  | 12-1/4 (311 mm)  | 24-1/2 (622 mm) | 42-3/4 (1086 mm)         | 40              | 500 psi (35 kg/cm <sup>2</sup> ) |                         |
| 26 (660 mm)            | 147361   | 7-3/8 (187 mm)  | 13-1/4 (337 mm)  | 26-1/2 (673 mm) | 54 (686 mm)              | 35              | 600 psi (42 kg/cm <sup>2</sup> ) |                         |
| 30 (762 mm)            | 147361   | 9-3/8 (238 mm)  | 15-1/4 (387 mm)  | 30-1/2 (775 mm) | 54 (686 mm)              | 30              | 600 psi (42 kg/cm <sup>2</sup> ) |                         |
| 34 (864 mm)            | 147362   | 11-3/8 (289 mm) | 17-1/4 (438 mm)  | 34-1/2 (876 mm) | 64-1/2 (819 mm)          | 25              | 800 psi (56 kg/cm <sup>2</sup> ) |                         |
| 36 (914 mm)            | 147362   | 12-3/8 (314 mm) | 18-1/4 (464 mm)  | 36-1/2 (927 mm) | 64-1/2 (819 mm)          | 25              | 800 psi (56 kg/cm <sup>2</sup> ) |                         |

\* See drawing on page 8.



**Running Chart to Cut Multiple Sizes of Pipe**

**8-1/4" Pressure Pipe Cutter**

|         | Pipe Size<br>O.D.<br>(inches) | Knife<br>Length<br>(inches) | Spacer<br>Sub Length<br>(inches) | Spacer<br>Sub Length<br>(inches) | Spacer Sub<br>Total Length<br>(inches) | Cutter<br>Tip Raised<br>(inches) |
|---------|-------------------------------|-----------------------------|----------------------------------|----------------------------------|--|----------------------------------|
| 1st Run | 9-5/8                         | 4                           | 40                               | 31                               | 71                                     | 0                                |
| 2nd Run | 10-3/4                        | 5-1/2                       | 40                               | 29                               | 68                                     | 1/2                              |
| 3rd Run | 13-3/8 to 16                  | 9                           | 40                               | 24                               | 64                                     | 1-1/2                            |
| 4th Run | 20                            | 17-1/2                      | 31                               | 24                               | 55                                     | 1/2                              |
| 5th Run | 24 to 30                      | 23                          | 31                               | 15                               | 46                                     | 3-1/2                            |
| 6th Run | 30 to 34                      | 28                          | 0                                | 40                               | 40                                     | 1                                |
| 7th Run | 34 to 36                      | 30                          | 24                               | 11                               | 35                                     | 3                                |

**11-3/4" Pressure Pipe Cutter**

|         | Pipe Size<br>O.D.<br>(inches) | Knife<br>Length<br>(inches) | Spacer<br>Sub Length<br>(inches) | Spacer<br>Sub Length<br>(inches) | Spacer<br>Sub Length<br>(inches) | Spacer Sub<br>Total Length<br>(inches) | Cutter<br>Tip Raised<br>(inches) |
|---------|-------------------------------|-----------------------------|----------------------------------|----------------------------------|----------------------------------|--|----------------------------------|
| 1st Run | 13-3/8 to 13-3/4              | 4-1/2                       | 40                               | 31                               | 11                               | 82                                     | 0                                |
| 2nd Run | 13-3/4 to 16                  | 6-1/2                       | 40                               | 24                               | 15                               | 79                                     | 1                                |
| 3rd Run | 16-18 to 5/8                  | 10-1/2                      | 40                               | 24                               | 11                               | 75                                     | 0                                |
| 4th Run | 18-5/8 to 24                  | 17-1/2                      | 40                               | 15                               | 11                               | 66                                     | 2                                |
| 5th Run | 26 to 30                      | 23                          | 31                               | 15                               | 11                               | 57                                     | 3-1/2                            |
| 6th Run | 34 to 36                      | 30                          | 0                                | 31                               | 15                               | 46                                     | 4                                |



**Bowen Pressure Pipe Cutter — Specification Table**

|                                 |          |            |                |                |                 |             |         |              |
|---------------------------------|----------|------------|----------------|----------------|-----------------|-------------|---------|--------------|
| O.D. or Cutter – inches         |          | 3-1/4      | 3-5/8          | 5-9/16         | 7-3/8           | 8-1/4       | 9-1/2** | 11-3/4       |
| Size Connection (Box Up)        |          | 2-3/8 Reg. | 2-3/8 I.F.     | 3-1/2 I.F.     | —               | *           | —       | *            |
| Size Connection (Box Down)      |          | 2-3/8 Reg. | 2-3/8 Reg.     | 3-12 Reg.      | *               | *           | —       | *            |
| Size Pipe to Cut (O.D. of Pipe) |          | 4          | 4-1/2 to 6-1/8 | 6-5/8 to 7-5/8 | 8-5/8 to 11-3/4 | 9-5/8 to 36 | —       | 13-3/8 to 36 |
| Complete Assembly               | Part No. | 150444     | 147483         | 147489         | 150959          | 147495***   | —       | 147369       |

**Replacement Parts**

|                                     |          |        |        |        |        |        |   |        |
|-------------------------------------|----------|--------|--------|--------|--------|--------|---|--------|
| Body                                | Part No. | 150445 | 147484 | 147490 | 151022 | 147496 | — | 147370 |
| Knife (3 Req'd.)                    | Part No. | 150446 | 80357  | 80717  | 151023 | 147008 | — | 147357 |
| Knife Pin (3 Req'd.)                | Part No. | 80359  | 80359  | 80719  | 151024 | 147009 | — | 147371 |
| Knife Pin Retainer Screw (3 Req'd.) | Part No. | 23508  | 23508  | 13847  | 148526 | 148526 | — | 148256 |
| Spring Sleeve                       | Part No. | —      | 147487 | 147493 | —      | 147499 | — | —      |
| Spring                              | Part No. | 150499 | 147488 | 147494 | 147500 | 147500 | — | 147384 |
| Piston                              | Part No. | 150450 | 147485 | 147491 | 151025 | 147497 | — | 147373 |
| Piston O.D. Seal                    | Part No. | 27-33  | 27-36  | 27-49  | 151026 | 147012 | — | 147374 |
| Piston I.D. Seal                    | Part No. | 27-25  | 27-25  | 27-25  | 568228 | 27-34  | — | 27-34  |
| Piston Bushing                      | Part No. | 80356  | 80356  | 80356  | 147013 | 147013 | — | 147013 |
| Piston Bushing Retainer Ring        | Part No. | 21116  | 21116  | 21116  | 147014 | 147014 | — | 147014 |
| Bit Jet Retainer                    | Part No. | 80352  | 80352  | 80714  | 147015 | 147015 | — | 147377 |
| Bit Jet Retainer Seal               | Part No. | 568117 | 568117 | 568117 | 27-24  | 27-24  | — | 27-24  |
| Bit Jet                             | Part No. | 150682 | 80453  | 80453  | 147016 | 147016 | — | 147016 |
| Bit Jet Retainer Ring               | Part No. | 54131  | 54131  | 54131  | 33788  | 33788  | — | 33788  |
| Bit Jet Retainer Stem               | Part No. | 80354  | 80354  | 80354  | 147017 | 147017 | — | 147017 |
| Stop Spider                         | Part No. | 150451 | 80353  | 80715  | 151027 | 145168 | — | 147381 |
| Stop Spider Set Screw (3 Req'd.)    | Part No. | 23705  | 23706  | 23709  | 145165 | 145165 | — | 23384  |
| Top Sub                             | Part No. | 150452 | 80351  | 80713  | 151028 | 147018 | — | 147383 |
| Top Sub Seal                        | Part No. | 30-9   | 30-12  | 30-27  | 568359 | 27-65  | — | 27-74  |
| Stop Spider Seal                    | Part No. | —      | —      | —      | —      | 27-64  | — | —      |

**Optional**

|                                   |          |        |        |        |        |        |   |        |
|-----------------------------------|----------|--------|--------|--------|--------|--------|---|--------|
| Top Sub (to Cut 5" O.D. Pipe)     | Part No. | —      | 80566  | —      | —      | —      | — | —      |
| Top Sub (to Cut 5-1/2" O.D. Pipe) | Part No. | —      | 80567  | —      | —      | —      | — | —      |
| Top Sub (to Cut 7" O.D. Pipe)     | Part No. | —      | —      | 80720  | —      | —      | — | —      |
| Top Sub (to Cut 7-5/8" O.D. Pipe) | Part No. | —      | —      | 80721  | —      | —      | — | —      |
| Complete Packing Set              | Part No. | —      | —      | —      | 151030 | 147019 | — | 147390 |
| O-Ring Packing Set                | Part No. | 150765 | 148102 | 148103 | 151031 | 147020 | — | 147391 |
| Knife to Cut:                     |          |        |        |        |        |        |   |        |
| 7-5/8" to 9-5/8" O.D. Pipe        | Part No. | —      | —      | 81896  | —      | —      | — | —      |
| 10-3/4" O.D. Pipe                 | Part No. | —      | —      | —      | 151029 | 147021 | — | —      |
| 11-3/4" to 13-3/8 O.D. Pipe       | Part No. | —      | —      | —      | 151029 | —      | — | —      |
| 13-3/8" to 16" O.D. Pipe          | Part No. | —      | —      | —      | —      | 147022 | — | 147358 |
| 16" to 18-5/8" O.D. Pipe          | Part No. | —      | —      | —      | —      | —      | — | 147359 |
| 18" to 20" O.D. Pipe              | Part No. | —      | —      | —      | —      | 147023 | — | —      |
| 18-5/8" to 24" O.D. Pipe          | Part No. | —      | —      | —      | —      | —      | — | 147360 |
| 24" to 30" O.D. Pipe              | Part No. | —      | —      | —      | —      | 147024 | — | —      |
| 26" to 30" O.D. Pipe              | Part No. | —      | —      | —      | —      | —      | — | 147361 |
| 30" to 34" O.D. Pipe              | Part No. | —      | —      | —      | —      | 147025 | — | —      |
| 34" to 36" O.D. Pipe              | Part No. | —      | —      | —      | —      | 147026 | — | 147362 |

\* Blank connections

\*\* Information available upon request

\*\*\* Not recommended for use in casing exceeding 24" O.D.

**How to Order**

Specify:

- (1) Size connection
- (2) O.D. of pipe
- (3) Length of knives (when making multiple cuts, please specify all knife lengths to be used)
- (4) Quantity and length of spacer subs (spacer subs used only on floating platform operations)



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# PACKER TYPE CASING PATCHES

Instruction Manual 6300



Packer Type Casing Patches

One Company Unlimited Solutions



**NATIONAL OILWELL**



# Packer Type Casing Patches

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*The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.*

*Sixteenth Printing, January 2004*



**NATIONAL OILWELL**

### General Description

The **Bowen Packer Type Casing Patch** is an external catch tool, designed to engage a previously prepared fish, pack it off, and become a permanent part of the repaired casing, pipe or tubing.

The same dependable method of engagement and release which is utilized for Bowen Overshots is employed in the Bowen Packer Type Casing Patch. This method assures positive engagement and positive seal-off from either direction. The Patch provides a permanent connection which remains rigid and leak-proof for many years, yet is positively releasable if ever the need arises.

Bowen Packer Type Casing Patches will not restrict the bore of the casing or tubing in any manner.

The Bowen Packer Type Casing Patch is composed of three outside parts and five internal parts. This simplicity of design is matched by the simple positive operation.

### Use

The Bowen Packer Type Casing Patch as indicated, is used to repair a damaged casing string by replacement of the damaged section, without having to remove the entire string of casing from the hole.

Where the upper portion of a casing string becomes ruptured or disoriented from the lower portion such as by faulting or caving of the formation, crushing, rupture, or backing off, the upper portion must be removed. New casing is then replaced, the Bowen Packer Type Casing Patch forming the patching means between the old and new strings.

### Construction

The Bowen Packer Type Casing Patch is constructed in the most basic manner to perform the functions of engaging the fish, sealing off the fish, or releasing, either during or after setting operations, should this become advisable.

The TOP SUB, BOWL and GUIDE from the outer assembly.

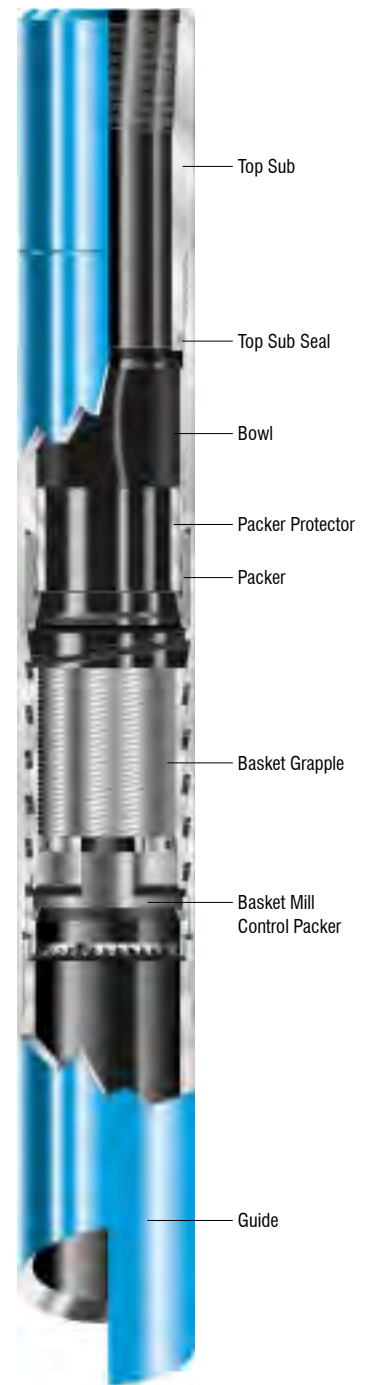
The TOP SUB has an upper connection to match the running string, and a lower connection to mate with the Bowl. A Top Sub Seal is located immediately below the lower thread of the Top Sub.

The BOWL has an upper connection for the Top Sub, an area of length into which the PACKER PROTECTOR slides during operation, a spiraled section which contains the engaging GRAPPLE, a space for the MILL CONTROL PACKER, and a lower connection to accept the GUIDE.

The GUIDE is usually flush with the outside diameter of the Casing Patch, and cut lipped. The primary purpose of the Guide is to assist smooth entry of the fish into the catch area of the patch. A secondary function is to maintain the inner working parts in position.

The inner working parts of the Bowen Packer Type Casing Patch are the GRAPPLE, PACKER, MILL CONTROL PACKER AND PACKER PROTECTOR.

The GRAPPLE is essentially a cylinder with wickers in its inside diameter for engaging the fish, and spirals on its outside diameter to mate with the spirals in the Bowl. Both the wickers and the spirals are made with a left-hand lead, which allow release by right-hand rotation. The Grapple has a series of longitudinal slots which allow the Grapple to flex diametrically during operation.



**Bowen Packer Type Casing Patch**



The PACKER is a double lipped sleeve type packer, molded in one piece from synthetic rubber compound. The material is chosen to include the best combination of properties for general oil well service. It withstands most well fluids; has good resistance to gas invasion, and abrasion.

In service, the outside of the Packer seals against the inside of the Bowl. The upper lip is protected from damage by the Packer Protector, until the entering fish pushes the Packer Protector up out of the way.

The MILL CONTROL PACKER serves the dual purpose of milling off burrs from the outside of the fish as it enters the assembly and serving as a special key to key the Grapple to the Bowl. The Grapple is free to move up and down sufficiently to engage or release the fish, but is prevented by the Control Finger from rotating. Thus, the torque required to release the assembly may be transmitted from the running string through the Top Sub, Bowl, Control Packer and on to the Grapple.

**Operation**

Prior to running the Casing Patch, the fish should be prepared. This usually includes washing over and cleaning the upper end of the fish of splits and burrs, and “sizing” the fish.

The tool should be assembled in accordance with the “Complete Assembly” instructions found on this page.

Assemble the tool to the running string and buck it up tight.

**CAUTION: Use tongs on Top Sub only. If undue pressure is exerted on the Bowl, crushing or distortion may result.**

Lower the tool into the hole until the fish depth is reached. As the fish is reached the running string should be slowly

rotated to the right while lowering it slowly. This combined slow rotation and lowering is important to the operation of the tool.

This should be continued until the fish has entered the tool and “bottomed” the Packer Protector against the lower end of the Top Sub. This can be determined by watching the rig weight indicator. Allow 15,000 to 20,000 pounds of weight to be supported by the Casing Patch, to assure good and complete engagement.

At this point, pick up the running string to remove the weight from the Casing Patch, while allowing the torque to slack from the running string.

**CAUTION: Avoid any backlash.**

The effectiveness of the Packer may be checked at this point, by application of mud pressure.

**CAUTION: Care should be exercised during application of pressure to increase the Pressure gradually, allowing the Packer to seat smoothly. In no case should the Casing Patch be “slugged” or shock loaded unnecessarily by the mud pumps.**

Pick up the running string and apply sufficient pull to remove any slack from the string, and set the slips. No load is required to maintain engagement nor is any load required to effect or maintain a seal; any excessive pull should therefore be avoided, as excessive pull reduces the allowable hydrostatic pressure capacity of the assembly. See strength charts beginning page 7.

Once the fish enters the Casing Patch and dislodges the Packer Protector, and the tool is subsequently disengaged from the fish, no attempt should be made to re-engage the tool without first bringing it to the surface to reset the Packer Protector. If the Packer Protector is not in position, there is danger of rupturing the upper lip of the Packer, rendering it useless.

**NOTE: The BOWEN PACKER TYPE CASING PATCH is relatively unaffected by ordinary corrosion, etc., so that it may be released years after initial setting. If the Casing Patch is cemented in place, however, so that the internal working parts are invaded by cement; the patch may not release. In such cases, its removal may require milling it away or cutting the string below the patch and removing the patch with a portion of the milled over and retrieved string.**

If for any reason it is desired to release and remove the Casing Patch from the tubing or casing string, proceed as follows:

**To Release the Bowen Packer Type Casing Patch**

Bump down firmly, until the top of the fish “bottoms” against the Top Sub. This will break the “freeze” between the Grapple and the fish. After bumping down, slowly elevate the running string, while simultaneously rotating slowly to the right. Continue this slow elevation and rotation until the Casing Patch is clear of the fish. This combined slow rotation and elevation is important to the proper function of the Casing Patch.

**Complete Assembly**

Before actual assembly begins, the parts should be thoroughly checked to assure that they are in good condition and of the proper size for the operation. The Packer, Grapple, and Mill Control Packer are all stenciled with the part number and catch size.

Clean all parts thoroughly, and lubricate them with grease or lubricating oil. If the tool is to be stored for any length of time, it is preferable to not grease the Packer or that portion of the body which houses the Packer. Petroleum products are detrimental to rubber products, particularly when stored in the open atmosphere.



Actual assembly should proceed as follows:

1. Clamp the BOWL in a suitable vise, horizontally.
2. Collapse the PACKER by squeezing one side in toward the center. This will make the Packer small enough to be passed through the top end of the Bowl and be inserted into the space provided, immediately above the spiralled section. Note that both ends of the Packer are identical, so that either end may be assembled on top.
3. Assemble the PACKER PROTECTOR in position in the Packer. This part should be slid into the top end of the Bowl and into the upper portion of the Packer, so that it comes to rest with its lower end immediately above the lower lip of the Packer. It is designed to keep the upper seal lip of the Packer deflected until the fish pushes the Packer Protector out of the Packer. This prevents the upper lip of the Packer from being damaged during the setting operation. Once the fish is in proper catch position, the Packer will seal the fish in place.

**CAUTION:** *Once the fish enters the Casing Patch and unseats the Packer Protector the Casing Patch may be released as previously described. No attempt should be made to re-engage the fish however, once it is disengaged; a second engagement would very likely rupture the upper lip of the seal, rendering it useless. If a second engagement is necessary, the tool must be brought to the surface and the Seal Protector reseated as described in "Complete Assembly." A second run may then be made with safety.*

4. Assemble the GRAPPLE in the Bowl. This may be done by grasping the Grapple by its lower end, and screwing it into the Bowl from the Bowl lower end. Left-hand rotation is required, as the spiralled outside diameter is a left-

hand lead spiral. This design allows the tool to be released by right-hand rotation, when required. The lower end of the Grapple can be distinguished from the upper end by the single large slot in the lower end of the Grapple.

Insert the Grapple deep enough into the Bowl to allow the single large slot to line up with the similar slot in the bottom portion of the Bowl spiral. The bottom of the Grapple should be just above the lowest part of the spiral in the Bowl, when in proper position.

5. Insert the MILL CONTROL PACKER into the Bowl so that the protruding control finger rests in the slot in the lower end of the bowl spiral and simultaneously in the grapple slot.
6. Apply thread dope to the threads of the GUIDE and assemble the Guide to the Bowl, and tighten.
7. Assemble the TOP SUB SEAL in the groove provided in the lower end of the Top Sub.
8. Apply thread dope to the threads (and seal) on the TOP SUB, and assemble the Top Sub in the Bowl, and tighten.

The assembly is now complete and ready for service.

**Complete Disassembly**

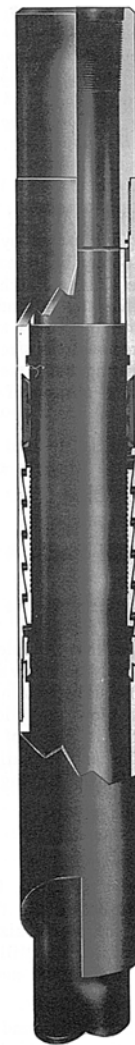
To completely disassemble the Casing Patch, proceed as follows:

1. Clamp the assembly in a suitable vise horizontally. Clamp immediately below the top connection, just below the threaded joint.
2. Break loose and remove the Top Sub.
3. Remove the Top Sub Seal.
4. Break loose and remove the Guide.
5. Lift out the Mill Control Packer.
6. Remove the Grapple. This may be

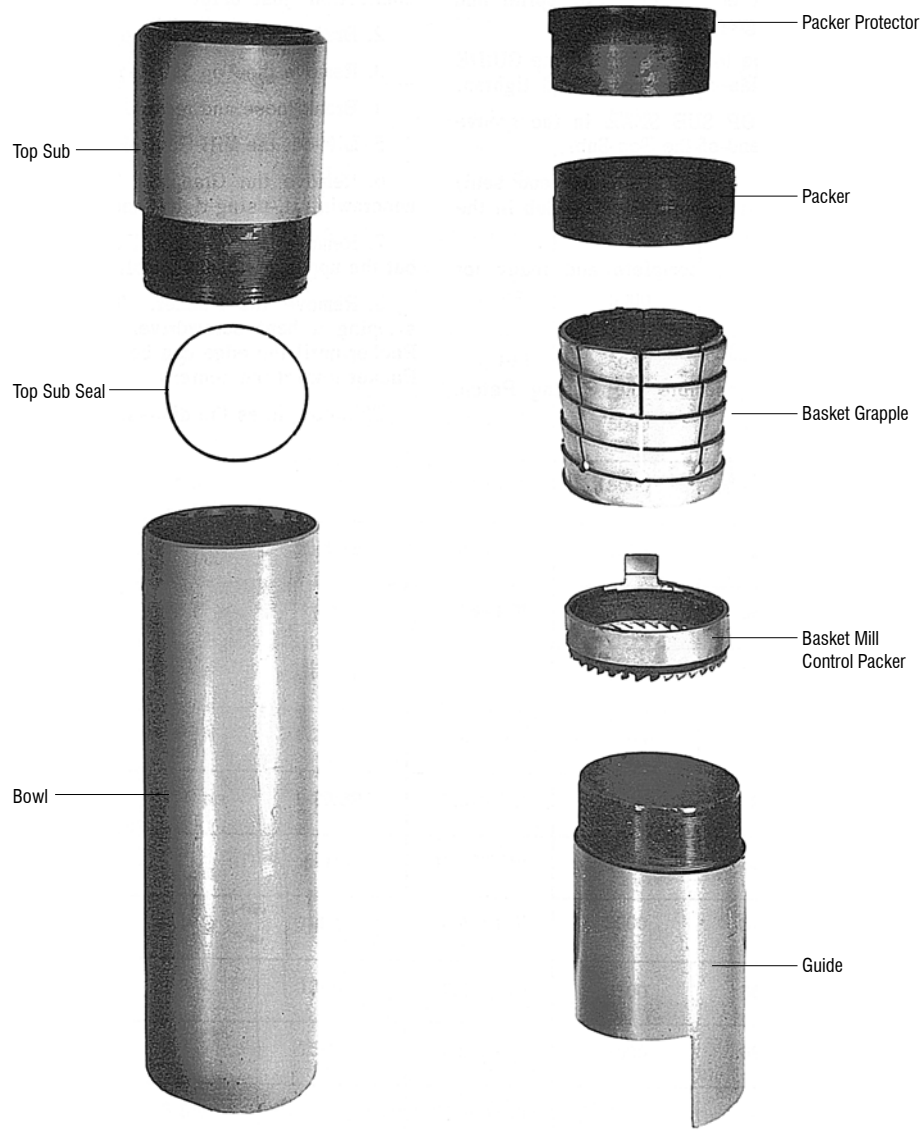
done by unscrewing it, using right-hand rotation.

7. Remove the Packer Protector by sliding it out the upper end of the Bowl.
8. Remove the Packer. This may be done by slipping a bent screwdriver under one end of the Packer until the edge can be grasped. Collapse the Packer toward the center and remove it.

This completes the disassembly of the tool.



**Bowen Packer Type Casing Patch  
Shown in Set Position**



**Exploded View**  
**Bowen Packer Type Casing Patch**



**Calculated Tensile and Burst Strengths - Bowen Packer Type Casing Patches**

See graphs on pages 9 - 12 for combined loading

| Assembly No. | Casing O.D. | Patch O.D. | Maximum Internal Burst (Fluid) Press - P.S.I. * | Maximum Recommended Pressure Across Packers * | Tensile Strength At Yield with 0 P.S.I. * | Maximum Recommended Pull Load In LBS. with 0 P.S.I. * |
|--------------|-------------|------------|---|---|---|---|
| 11215        | 4-1/2"      | 5-3/4"     | 10,600 PSI                                      | 5000  | 398,600#                                  | 299,000   |
| 11220        | 5"          | 6-1/4"     | 9,800 PSI                                       | 5000  | 436,700#                                  | 327,500   |
| 11225        | 5-1/2"      | 6-13/16"   | 10,300 PSI                                      | 5000  | 481,900#                                  | 361,400   |
| 11230        | 6"          | 7-7/16"    | 9,067 PSI                                       | 5000  | 451,300#                                  | 338,500   |
| 11235        | 6-5/8"      | 7-15/16"   | 7,558 PSI                                       | 5000  | 378,600#                                  | 284,000   |
| 11240        | 7"          | 8-3/8"     | 8,052 PSI                                       | 5000  | 415,300#                                  | 311,500   |
| 11245        | 7-5/8"      | 9"         | 7,493 PSI                                       | 5000  | 414,900#                                  | 311,200   |
| 11250        | 8-5/8"      | 10-1/16"   | 7,450 PSI                                       | 5000  | 525,800#                                  | 394,400   |
| 11255        | 9-5/8"      | 11-1/8"    | 7,399 PSI                                       | 5000  | 568,400#                                  | 426,300   |
| 11260        | 10-3/4"     | 12-5/16"   | 7,309 PSI                                       | 5000  | 624,200#                                  | 468,100   |
| 17025        | 1" Pipe     | 1-29/32"   | 7,870 PSI                                       | 4000  | 27,700#                                   | 20,800  |
| 17033        | 3/4" Pipe   | 1-29/32"   | 7,870 PSI                                       | 4000  | 27,700#                                   | 20,800  |
| 22420        | 4"          | 5-1/4"     | 11,700 PSI                                      | 5000  | 362,600#                                  | 272,000   |
| 22430        | 5-3/4"      | 7-1/16"    | 8,496 PSI                                       | 5000  | 378,700#                                  | 284,000   |
| 39136        | 11-3/4"     | 13-3/8"    | 7,290 PSI                                       | 3500  | 667,200#                                  | 500,400   |
| 41042        | 13-3/8"     | 15-1/8"    | 6,200 PSI                                       | 3500  | 686,700#                                  | 515,000   |
| 80669        | 13-5/8"     | 16"        | 10,500 PSI                                      | 3000  | 1,700,000#                                | 1,276,000   |
| 149790       | 20"         | 24"        | 7,500 PSI                                       | 4500  | 2,333,000#                                | 1,750,000   |

\* See the charts on pages 9 - 12 for the combined loading of burst pressure and tensile.

Note: The above burst figures apply to the bowl only. In no case should more than maximum packer pressure be applied to the Casing Patch.



**Bowen Casing Patches - Packer Type - Basket Grapple**

|             |          |             |            |       |       |       |         |        |        |
|-------------|----------|-------------|------------|-------|-------|-------|---------|--------|--------|
| Casing O.D. |          | 3/4<br>Pipe | 1"<br>Pipe | 4     | 4-1/2 | 5     | 5-1/2   | 5-3/4  | 6      |
| Patch O.D.  |          | 1-29/32     | 1-29/32    | 5-1/4 | 5-3/4 | 6-1/4 | 6-13/16 | 7-1/16 | 7-5/16 |
| Complete    | Part No. | 17033       | 17025      | 22420 | 11215 | 11220 | 11225   | 22430  | 11230  |
| Assembly    | Weight   | 22          | 22         | 100   | 116   | 134   | 145     | 150    | 158    |

**Replacement Parts**

|                     |          |        |        |       |       |       |       |       |       |
|---------------------|----------|--------|--------|-------|-------|-------|-------|-------|-------|
| Top Sub             | Part No. | 17034  | 17026  | 22421 | 5186  | 4866  | 4886  | 22431 | 4966  |
|                     | Weight   | 10     | 10     | 30    | 35    | 37    | 40    | 42    | 45    |
| Top Sub Seal        | Part No. | 30-2   | 30-2   | 30-21 | 30-25 | 30-29 | 30-33 | 30-35 | 30-37 |
|                     | Weight   | ≡      | ≡      | ≡     | 1/16  | 1/16  | 1/16  | ≡     | 1/16  |
| Bowl                | Part No. | 9342   | 9342   | 22422 | 11217 | 11222 | 11227 | 22432 | 11232 |
|                     | Weight   | 6      | 6      | 35    | 40    | 50    | 54    | 58    | 60    |
| Packer Protector    | Part No. | 17036  | 17028  | 22423 | 5188  | 4868  | 4888  | 22433 | 4968  |
|                     | Weight   | 1/8    | 1/8    | 3     | 3-1/2 | 3-1/2 | 3-1/2 | 3-1/2 | 3-1/2 |
| Packer              | Part No. | 17029  | 17029  | 22424 | 11216 | 11221 | 11226 | 22434 | 11231 |
|                     | Weight   | 1/8    | 1/8    | 1/2   | 1/2   | 3/4   | 1     | 1     | 1     |
| Grapple             | Part No. | 9343   | 9343   | 22426 | 11218 | 11233 | 11228 | 22436 | 11233 |
|                     | Weight   | 1/2    | 1/2    | 6     | 7     | 7-1/2 | 8-1/2 | 9     | 9     |
| Mill Control Packer | Part No. | *17030 | *17030 | 22425 | 11459 | 11461 | 11463 | 22435 | 11465 |
|                     | Weight   | 1/8    | 1/8    | 2     | 2-1/2 | 2-1/2 | 2-1/2 | 3-1/2 | 3-1/2 |
| Guide               | Part No. | 9345   | 9345   | 22428 | 11219 | 11224 | 11229 | 22438 | 11234 |
|                     | Weight   | 5      | 5      | 25    | 28    | 33    | 35    | 35    | 35    |
| Packer Body         | Part No. | 17035  | 17027  | ≡     | ≡     | ≡     | ≡     | ≡     | ≡     |
|                     | Weight   | 1/4    | 1/4    | ≡     | ≡     | ≡     | ≡     | ≡     | ≡     |

**Bowen Casing Patches - Packer Type - Basket Grapple - [Continued]**

|             |          |         |       |       |         |        |         |        |        |        |        |
|-------------|----------|---------|-------|-------|---------|--------|---------|--------|--------|--------|--------|
| Casing O.D. |          | 6-5/8   | 7     | 7-5/8 | 8-5/8   | 9-5/8  | 10-3/4  | 11-3/4 | 13-3/8 | 13-5/8 | 20     |
| Patch O.D.  |          | 7-15/16 | 8-3/8 | 9     | 10-1/16 | 11-1/8 | 12-5/16 | 13-3/8 | 15-1/8 | 16     | 24     |
| Complete    | Part No. | 11235   | 11240 | 11245 | 11250   | 11255  | 11260   | 39136  | 41042  | 80669  | 149790 |
| Assembly    | Weight   | 171     | 187   | 203   | 242     | 296    | 369     | 450    | 600    | 820    |        |

**Replacement Parts - [Continued]**

|                     |          |       |       |       |       |       |        |         |       |       |         |
|---------------------|----------|-------|-------|-------|-------|-------|--------|---------|-------|-------|---------|
| Top Sub             | Part No. | 4986  | 5026  | 5046  | 5151  | 5206  | 5162   | 39137   | 40399 | 80670 | 149796  |
|                     | Weight   | 50    | 55    | 62    | 69    | 80    | 105    | 135     | 200   | 275   |         |
| Top Sub Seal        | Part No. | 30-39 | 30-40 | 30-43 | 30-47 | 30-51 | 30-52  | 568-278 | 27-83 | 27-84 | 568-470 |
|                     | Weight   | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16   | 1/16    | 1/16  | 1/16  |         |
| Bowl                | Part No. | 11237 | 11242 | 11247 | 11252 | 11257 | 11262  | 39138   | 41044 | 80672 | 149791  |
|                     | Weight   | 67    | 75    | 80    | 94    | 118   | 140    | 170     | 200   | 215   |         |
| Packer Protector    | Part No. | 4988  | 5028  | 5048  | 5153  | 5208  | 5164   | 39139   | 41045 | 80673 | 149794  |
|                     | Weight   | 4     | 4-1/2 | 5-1/2 | 7     | 8-1/2 | 10-1/2 | 13      | 15    | 90    |         |
| Packer              | Part No. | 11236 | 11241 | 11246 | 11251 | 11256 | 11261  | 39140   | 41061 | 80674 | 148884  |
|                     | Weight   | 1     | 1     | 1-1/2 | 1-1/2 | 1-1/2 | 1-1/2  | 2       | 2     | 2     |         |
| Grapple             | Part No. | 11238 | 11243 | 11248 | 11253 | 11258 | 11263  | 39142   | 41037 | 80676 | 149792  |
|                     | Weight   | 9     | 10    | 11    | 13    | 15    | 17     | 19      | 24    | 30    |         |
| Mill Control Packer | Part No. | 11467 | 11469 | 11471 | 11473 | 11475 | 11477  | 39141   | 41039 | 80675 | 149793  |
|                     | Weight   | 3-1/2 | 4     | 4     | 4-1/2 | 4-1/2 | 5      | 6       | 10    | 12    |         |
| Guide               | Part No. | 11239 | 11244 | 11249 | 11254 | 11259 | 11264  | 39144   | 41040 | 80678 | 149795  |
|                     | Weight   | 36    | 37    | 39    | 53    | 78    | 90     | 105     | 120   | 195   |         |
| Parbak              | Part No. | ≡     | ≡     | ≡     | ≡     | ≡     | ≡      | ≡       | ≡     | ≡     | 8-470   |
|                     | Weight   | ≡     | ≡     | ≡     | ≡     | ≡     | ≡      | ≡       | ≡     | ≡     | ≡       |

\* Mill Control Without Packer.

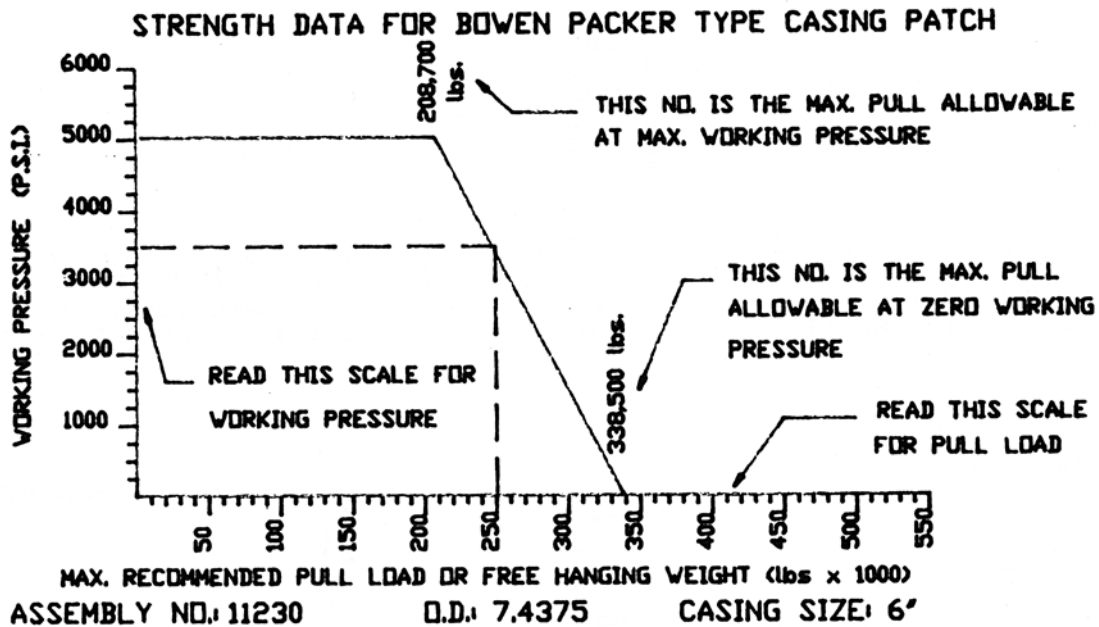
If Sub, Bowl, Guide or Packer Body is left oversize, add 10% for each 1/4" or portion to standard price of Sub, Bowl, Guide or Packer Body.

**How to Order:**

- Specify: (1) Name and Number of Assembly or Part.  
 (2) Casing O.D.  
 (3) Size and Type of Top Connection.



**How to Use the Bowen Strength Data Chart**



**For example only:** For 6" diameter casing with 3,500 psi, the maximum pull load is approximately 250,000 lbs.

All data assumes full engagement of a round smooth fish and a straight steady pull. Most pressure ratings in these charts are arbitrarily chosen as 5,000 psi. Higher ratings are available with special seals and larger patch diameters.

The following information is intended to be used for reference purposes only. The minimum and maximum figures published herein are accurate within ± 20% and are based upon what are considered to be optimum operating conditions, i.e. good condition casing in a non-deviated hole, first-time engagement of the casing patch, etc.

National Oilwell reserves the right to change or alter any of the information contained herein without prior notification.

Some of the following data may conflict with previously published strength data pertaining to this product. This is largely due to improved product knowledge and advancements in methods of calculating these strengths.

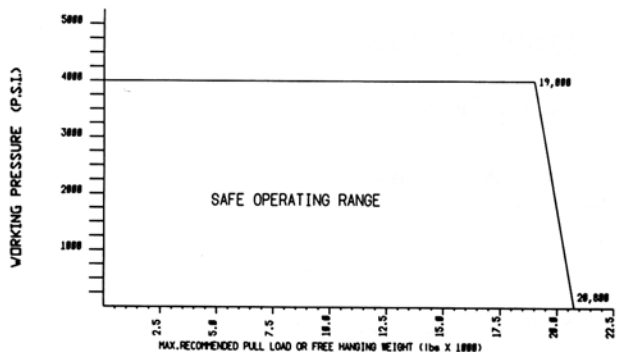
National Oilwell, November 1992





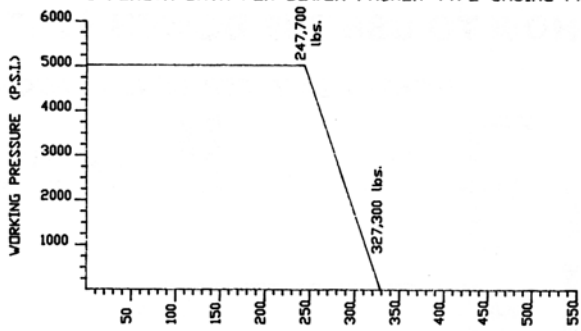
Strength Data

STRENGTH DATA FOR BOWEN PACKER TYPE CASING PATCH



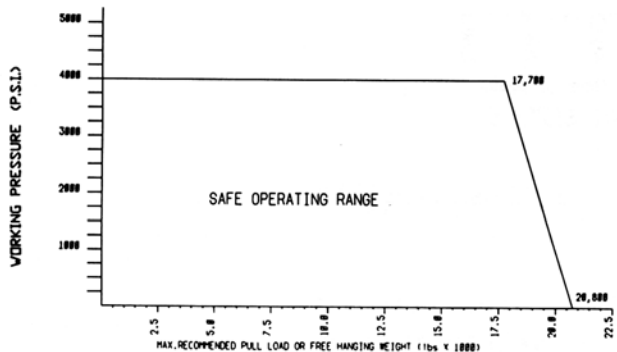
ASSEMBLY NO.: 17033 O.D.: 1-29/32 CASING SIZE: 3/4" PIPE

STRENGTH DATA FOR BOWEN PACKER TYPE CASING PATCH



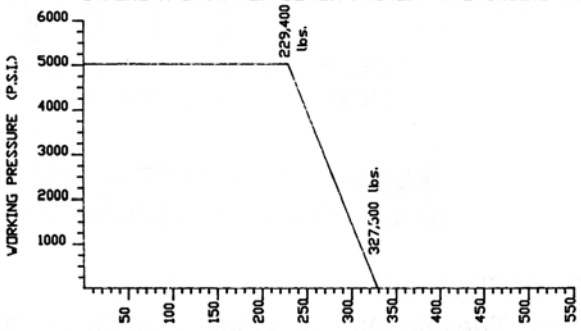
ASSEMBLY NO.: 11215 O.D.: 5.75 CASING SIZE: 4-1/2"

STRENGTH DATA FOR BOWEN PACKER TYPE CASING PATCH



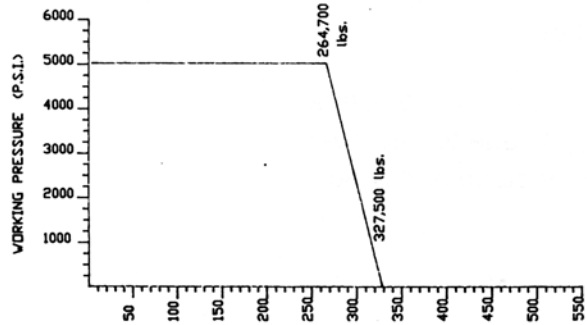
ASSEMBLY NO.: 17025 O.D.: 1-29/32 CASING SIZE: 1" PIPE

STRENGTH DATA FOR BOWEN PACKER TYPE CASING PATCH



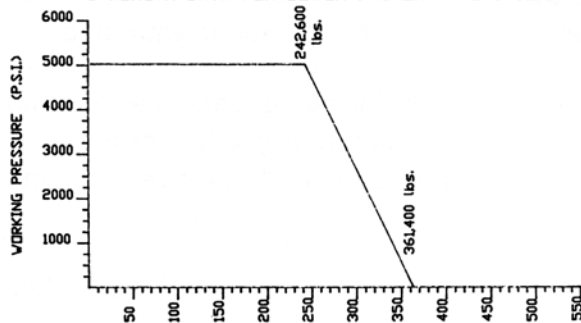
ASSEMBLY NO.: 11220 O.D.: 6.25 CASING SIZE: 5"

STRENGTH DATA FOR BOWEN PACKER TYPE CASING PATCH



ASSEMBLY NO.: 22420 O.D.: 5.25 CASING SIZE: 4"

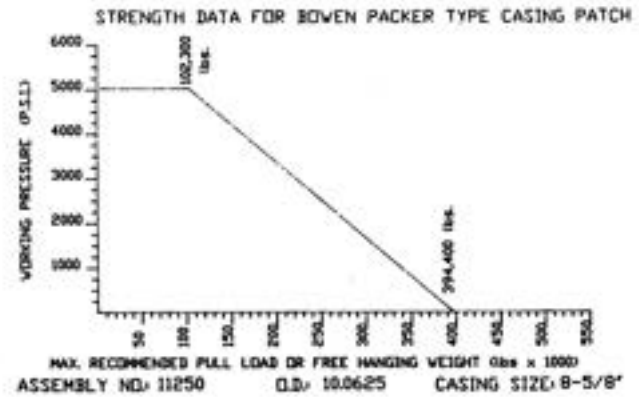
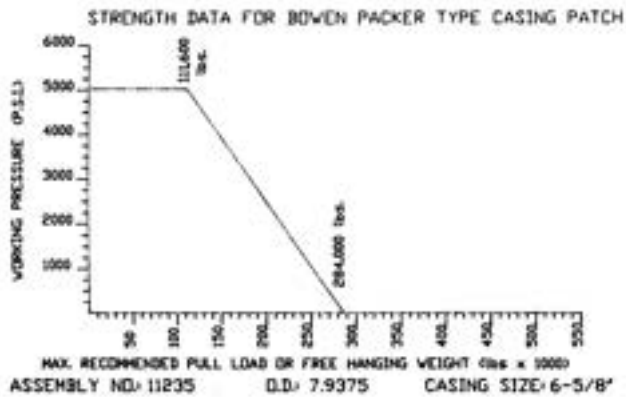
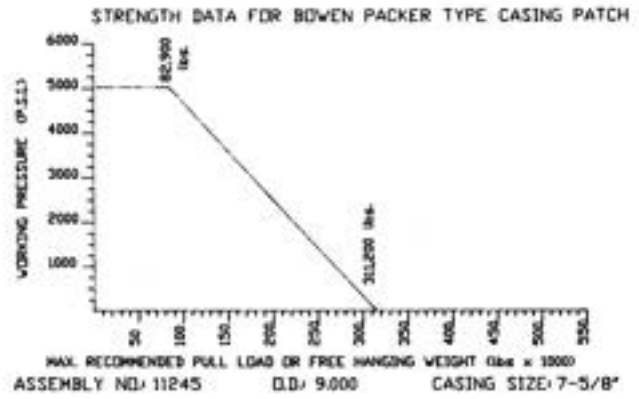
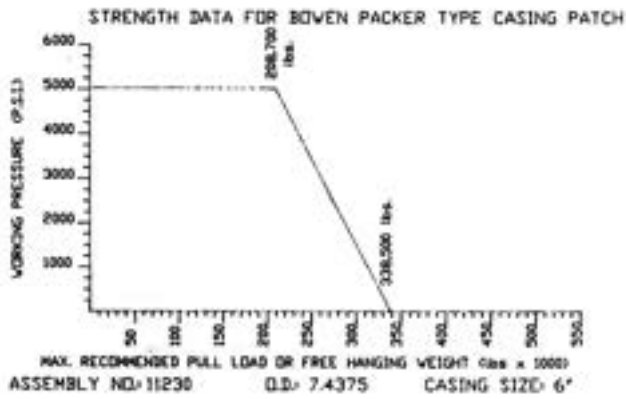
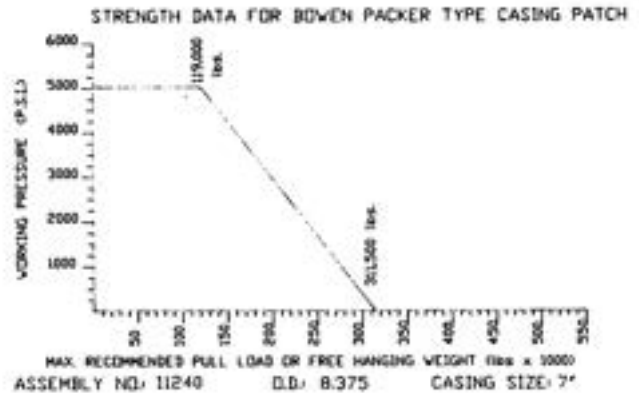
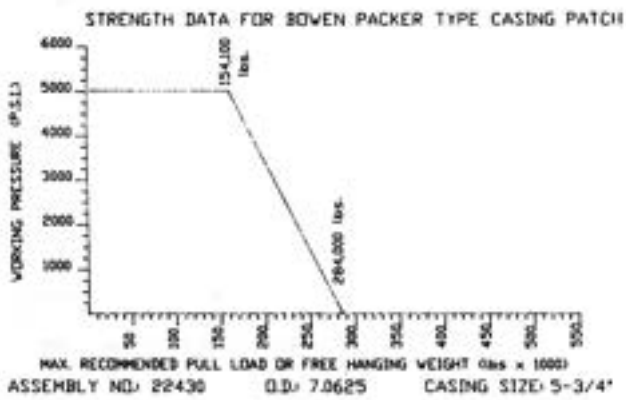
STRENGTH DATA FOR BOWEN PACKER TYPE CASING PATCH



ASSEMBLY NO.: 11225 O.D.: 6.8125 CASING SIZE: 5-1/2"

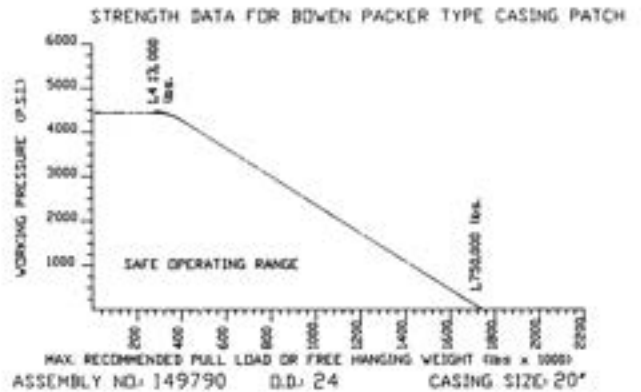
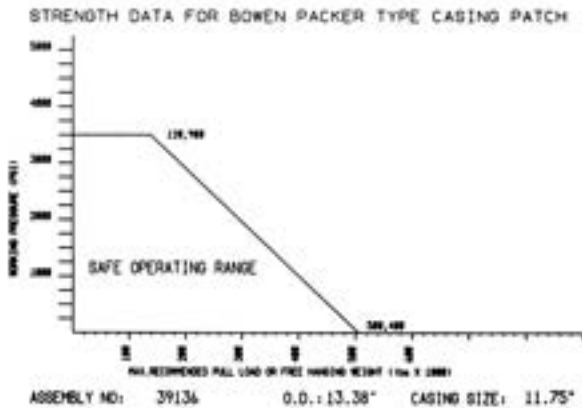
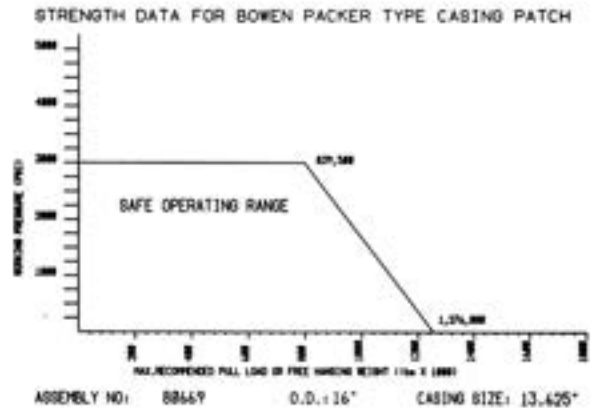
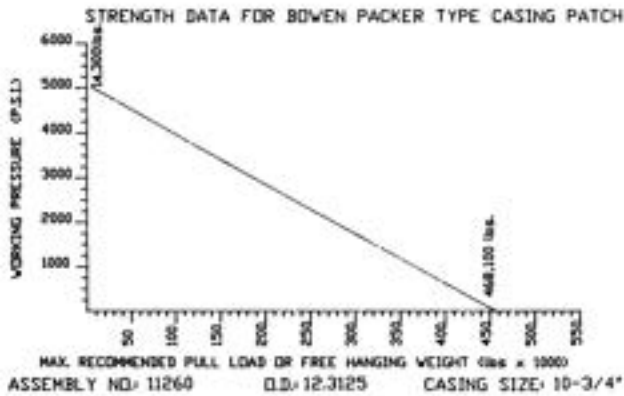
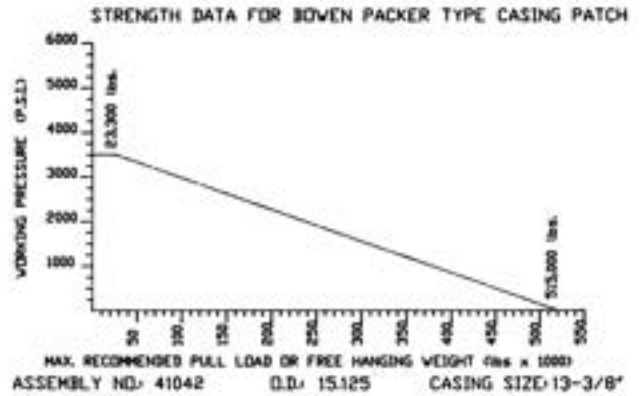
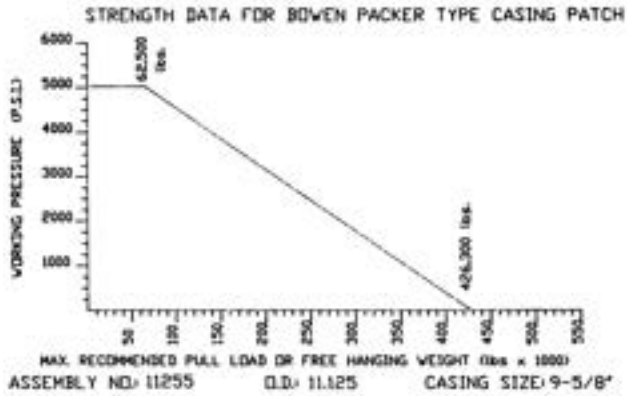


Strength Data





**Strength Data**




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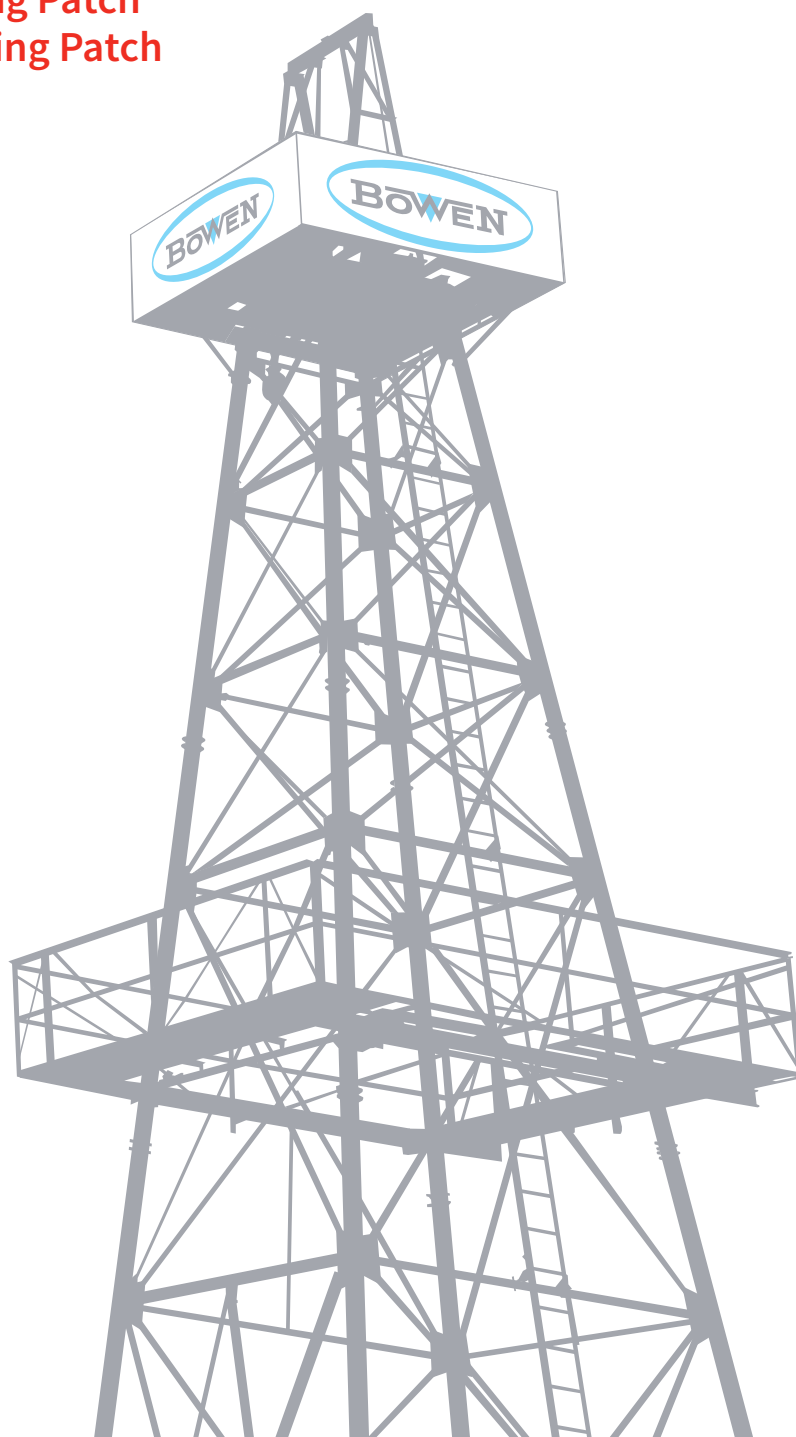
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Terrace Warehouse  
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# Bowen Packer Type High Pressure Casing Patch

Instruction Manual 6350

Assembly 152280 - 9 <sup>5</sup>/<sub>8</sub> in. Casing Patch  
Assembly 153401 - 13 <sup>3</sup>/<sub>8</sub> in. Casing Patch



# Bowen Packer Type High Pressure Casing Patch

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# Bowen Packer Type High Pressure Casing Patch

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## General Description

The *Bowen*™ packer type high pressure casing patch is an external catch tool that engages a previously prepared fish, packs it off, and becomes a permanent part of the repaired casing, pipe or tubing.

The *Bowen* packer type high pressure casing patch uses the same dependable method of engagement and release as *Bowen* overshots. This method assures positive engagement and positive seal-off from either direction. The patch provides a permanent connection which remains rigid and leak-proof for many years yet is positively resealable if needed.

The *Bowen* packer type high pressure casing patch is composed of three outside parts and five internal parts.

This patch is rated to 300°F.

## Use

The *Bowen* high pressure casing patch allows you to repair a damaged casing string by replacing the damaged section without removing the entire string of casing from the hole. Where the upper portion of a casing string becomes ruptured or disoriented from the lower portion by faulting or caving of the formation, crushing, rupture, or backing off, the upper portion must be removed. New casing is then replaced, and the *Bowen* high pressure casing patch forms the patching means between the old and new strings.

## Construction

The top sub, extensions, bowl, and guide form the outer assembly.

The top sub has an upper connection to match the running string and a lower connection to mate with the bowl or optional extensions. Extensions are primarily used in underwater operations. The top sub and extensions have seals which are located immediately above and below the pin connection threads.

The bowl has an upper connection for the top sub or optional extension and an area for the packer protector to slide during operation. The spiraled section contains the grapple, a space for the mill control, and a lower connection to accept the guide. The guide is usually flush with the outside diameter of the casing patch and cut-lipped. The primary purpose of the guide is to assist in smooth entry of the fish into the catch area of the patch. A secondary function is to maintain the position of the inner working components.

The inner working parts of the *Bowen* packer type high pressure casing patch are the grapple, packer, back-up ring, mill control, and packer protector.

The grapple is a cylinder with wickers in its inside diameter for engaging the fish and spirals on its outside diameter to mate with the spirals in the bowl. Both the wickers and the spirals are made with a left-hand lead, allowing the tool to be released by right-hand rotation.

The grapple has a series of longitudinal slots which allow the grapple to flex diametrically during operation.

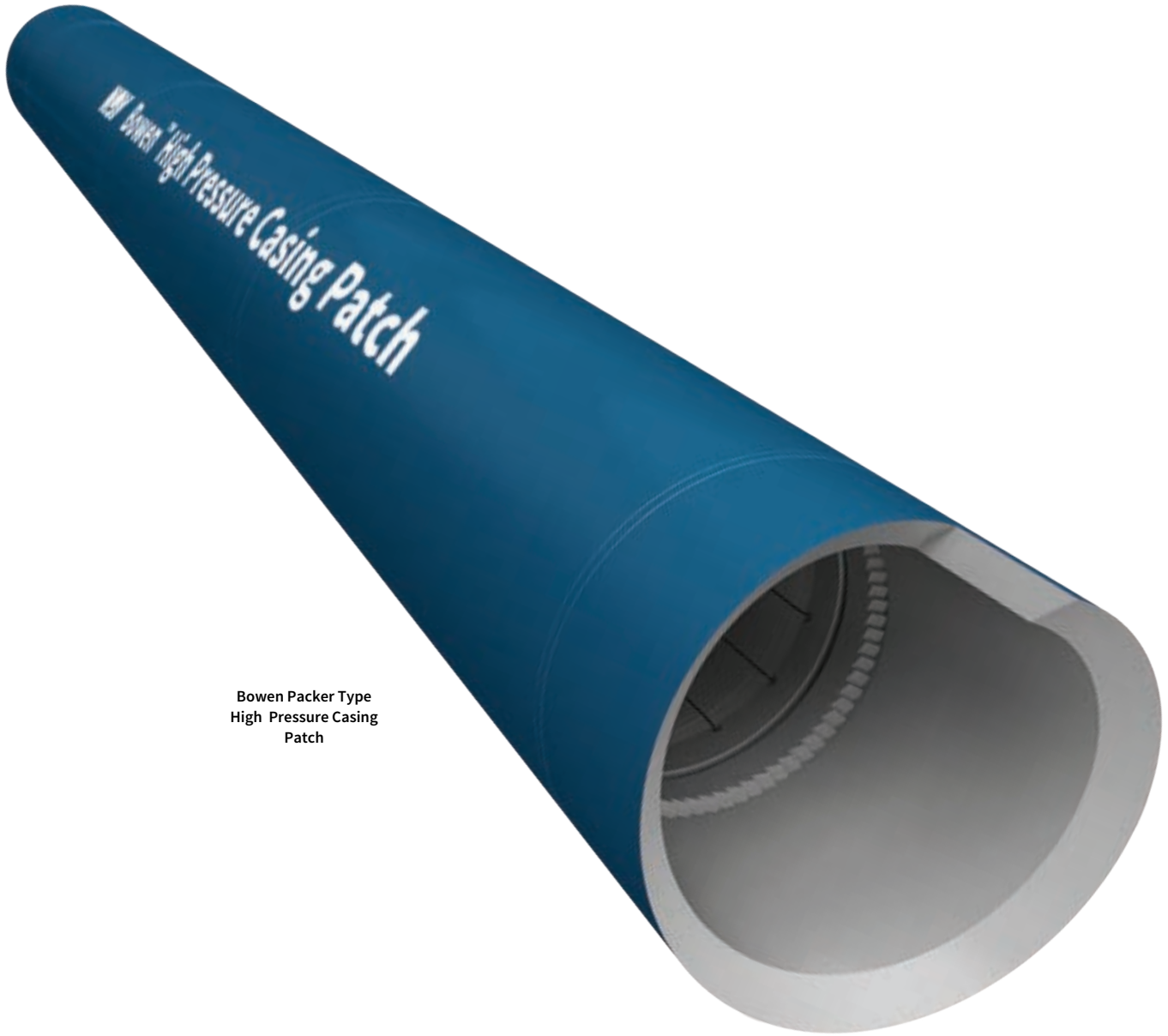
The packer has a single oversized lip on the ID to seal on the casing and a small lip on the OD to seal on the inside of the bowl seal grooves. The packers are molded in one piece from synthetic rubber compounds to include the best combination of properties for all fishing operations. This compound has been engineered to withstand most well fluids and has good resistance to gas invasion and abrasion.

In service, the outside of the packer seals against the inside of the bowl. The oversized lip on the ID is protected from damage by the packer protector until the entering fish pushes the packer protector up and out of the way.

The mill control serves the dual purpose of milling off burrs from the outside of the fish as it enters the assembly and keying the grapple to the bowl with a control finger. The grapple is free to move up and down sufficiently to engage or release the fish, but the control finger prevents it from rotating. Thus, the torque required to release the assembly may be transmitted from the running string through the top sub, extensions, bowl, mill control, and on to the grapple.

# Bowen Packer Type High Pressure Casing Patch

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Bowen Packer Type  
High Pressure Casing  
Patch



# Bowen Packer Type High Pressure Casing Patch

## Operation

**NOTE: Prepare the fish prior to running the casing patch. This usually includes washing and cleaning the upper end of the fish of splits and burrs and properly sizing the fish.**

1. Assemble the tool to the running string and buck it up tightly.  
**CAUTION: Use tongs on the top sub only. If pressure is exerted on the bowl, crushing or distortion may result.**
2. Lower the tool into the hole until the fish depth is reached. As the fish is reached, slowly rotate the running string to the right while lowering it slowly. This combined slow rotation and lowering is important to the operation of the tool. Continue this until the fish has entered the tool and bottomed the packer protector against the lower end of the top sub, which can be determined by watching the rig weight indicator. Allow the casing patch to support 15,000 to 20,000 pounds of weight to assure good and complete engagement.
3. Pick up the running string to remove the weight from the casing patch while allowing the torque to slack from the running string.  
**CAUTION: Avoid any backlash.**
4. Check the effectiveness of the packer by applying mud pressure.  
**CAUTION: Increase the pressure gradually, allowing the packer to seat smoothly. In no case should the casing patch be slugged or shock loaded unnecessarily by the mud pumps.**

5. Pick up the running string, apply sufficient pull to remove any slack from the string, and set the slips. No load is required to maintain engagement, nor is any load required to effect or maintain a seal. Excessive pull should be avoided, because it reduces the allowable hydrostatic pressure capacity of the assembly. Refer to strength charts on page 7.
6. Once the fish enters the casing patch, dislodges the packer protector, and the tool is subsequently disengaged from the fish, do not attempt to re-engage the tool without first bringing it to the surface to reset the packer protector. If the packer protector is not in position, there is danger of rupturing the upper lip of the packer, rendering it useless.

**NOTE: The Bowen high pressure casing patch is relatively unaffected by ordinary corrosion, so it may be released years after initial setting. However, the patch may not release if the casing patch is cemented in place and the internal working parts are invaded by cement. In such cases, its removal may require milling or cutting the string below the patch and removing the patch with a portion of the milled over and retrieved string.**

If for any reason you wish to release and remove the casing patch from the tubing or casing string, proceed as follows:

## To Release the High Pressure Type Casing Patch

1. Bump down firmly until the top of the fish bottoms against the top sub. This will break the freeze between the grapple and the fish.
2. After bumping down, slowly elevate the running string while simultaneously rotating slowly to the right.
3. Continue this slow elevation and rotation until the casing patch is clear of the fish. This combined slow rotation and elevation is important to the proper function of the casing patch.

## Disassembly

1. Break out and remove the top sub from the extension(s).
2. Remove the extensions from the bowl.
3. If two extensions are present, break out and remove the top extension from the lower extension, taking care to not chuck over the box threads.
4. Remove the shear pin plug and shear pin from the bowl.
5. Remove the packer protector from the bowl.
6. Remove the packers near the upper end of the bowl.
7. Loosen and remove the guide from the bowl.
8. Remove the mill control.
9. Using right-hand rotation, unscrew the grapple from the lower end of the bowl.
10. Remove the O-rings from the top sub and extensions.

## Reassembly

1. Screw the grapple into the lower end of the bowl using left-hand rotation. The slot in the grapple should land in line with the slot in the bowl.
2. Insert the mill control. Fit the finger of the control packer into the slots of the bowl and the grapple. This keys the bowl and the grapple together.
3. Screw the guide into the lower end of the bowl.
4. Fold the packers in and insert them one at a time, starting with the one in the back first, into the space provided near the upper end of the bowl.
5. Insert the packer protector into the bowl, stinger end first.
6. Install the O-rings onto the top sub pin and extension pins.
7. Clamp the tool in a pipe vise and tighten the bowl and guide.
8. Insert the shear pin through the bowl and follow it with the shear pin plug.
9. Assemble the extensions and top sub and buck them up tightly.

Thoroughly grease all parts before assembling. If the tool is to be stored for some time before being used, paint or grease the outside to prevent rust or deterioration.

# Bowen Packer Type High Pressure Casing Patch

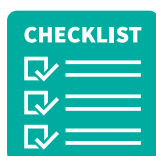
## Bowen Packer Type High Pressure Casing Patch Specifications

| Casing size | Assembly part number | Maximum OD   | Minimum ID | Maximum pressure rating @ maximum OD | Maximum recommended pull load @ 0 pressure | Maximum recommended pull load @ max pressure |
|-------------|----------------------|--------------|------------|--------------------------------------|--|--|
| 9 5/8 in.   | 152280               | 11 25/32 in. | 9.760 in.  | 10,000 psi                           | 915,000 lbs                                | 187,000 lbs                                  |
| 13 3/8 in.  | 153401               | 16 in.       | 13.515 in. | 9,000 psi                            | 1,860,000 lbs                              | 596,000 lbs                                  |

NOTE: The pressure ratings and pull loads listed above are for the maximum OD tools with smaller ODs and corresponding lower pressure ratings and pull loads are available upon request. Contact your local sales representative or e-mail us at wt-bowentools@nov.com for additional sizes that may not be represented in this manual.

## Bowen Packer Type High Pressure Casing Patch Replacement Parts

| Casing OD                  |          | 9 5/8 in.    | 13 3/8 in. |
|----------------------------|----------|--------------|------------|
| <b>Maximum patch OD</b>    |          | 11 25/32 in. | 16 in.     |
| <b>Complete assembly</b>   | Part No. | 152280       | 153401     |
| <b>Cutlip guide</b>        | Part No. | 152285       | 152429     |
|                            | Qty      | 1            | 1          |
| <b>Mill control</b>        | part No. | 152284       | 152426     |
|                            | Qty      | 1            | 1          |
| <b>Bowl</b>                | Part No. | 152281       | 153402     |
|                            | Qty      | 1            | 1          |
| <b>Basket grapple</b>      | Part No. | 152283       | 152427     |
|                            | Qty      | 1            | 1          |
| <b>Packer</b>              | Part No. | 152282       | 153403     |
|                            | Qty      | 2            | 4          |
| <b>Shear pin</b>           | Part No. | 148704       | 148710     |
|                            | Qty      | 4            | 4          |
| <b>Packer protector</b>    | Part No. | 148703       | 148709     |
|                            | Qty      | 1            | 1          |
| <b>Extension (5 ft)</b>    | Part No. | 152286       | 152423     |
|                            | Qty      | 2            | 2          |
| <b>Top sub</b>             | Part No. | 148701       | 152425     |
|                            | Qty      | 1            | 1          |
| <b>O - Ring</b>            | Part No. | 568274/020   | 568457/020 |
|                            | Qty      | 3            | 3          |
| <b>Seal protector ring</b> | Part No. | 2250/023     | 227/330    |
|                            | Qty      | 3            | 6          |
| <b>Backup ring</b>         | Part No. | N/A          | 153399/005 |
|                            | Qty      | N/A          | 4          |
| <b>Shear pin plug</b>      | Part No. | 10641/005    | 36478/015  |
|                            | Qty      | 4            | 4          |



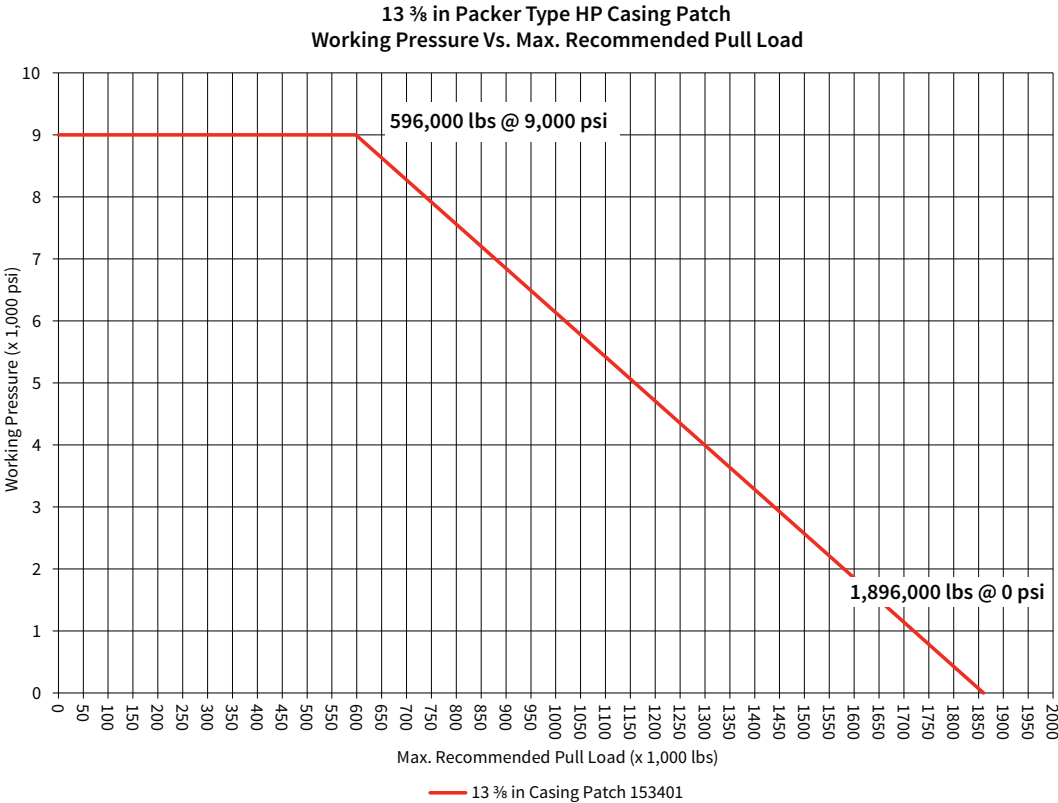
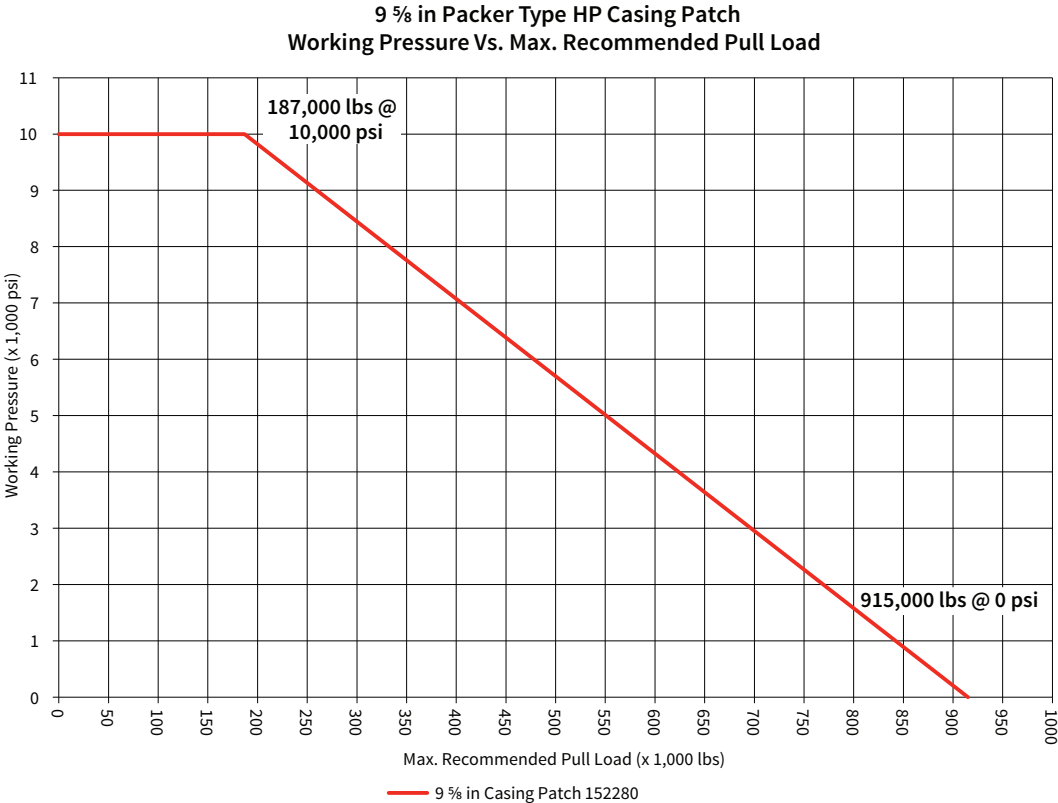
### How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Casing OD
- (3) Size and type of top connection

# Bowen Packer Type High Pressure Casing Patch

## Strength Data



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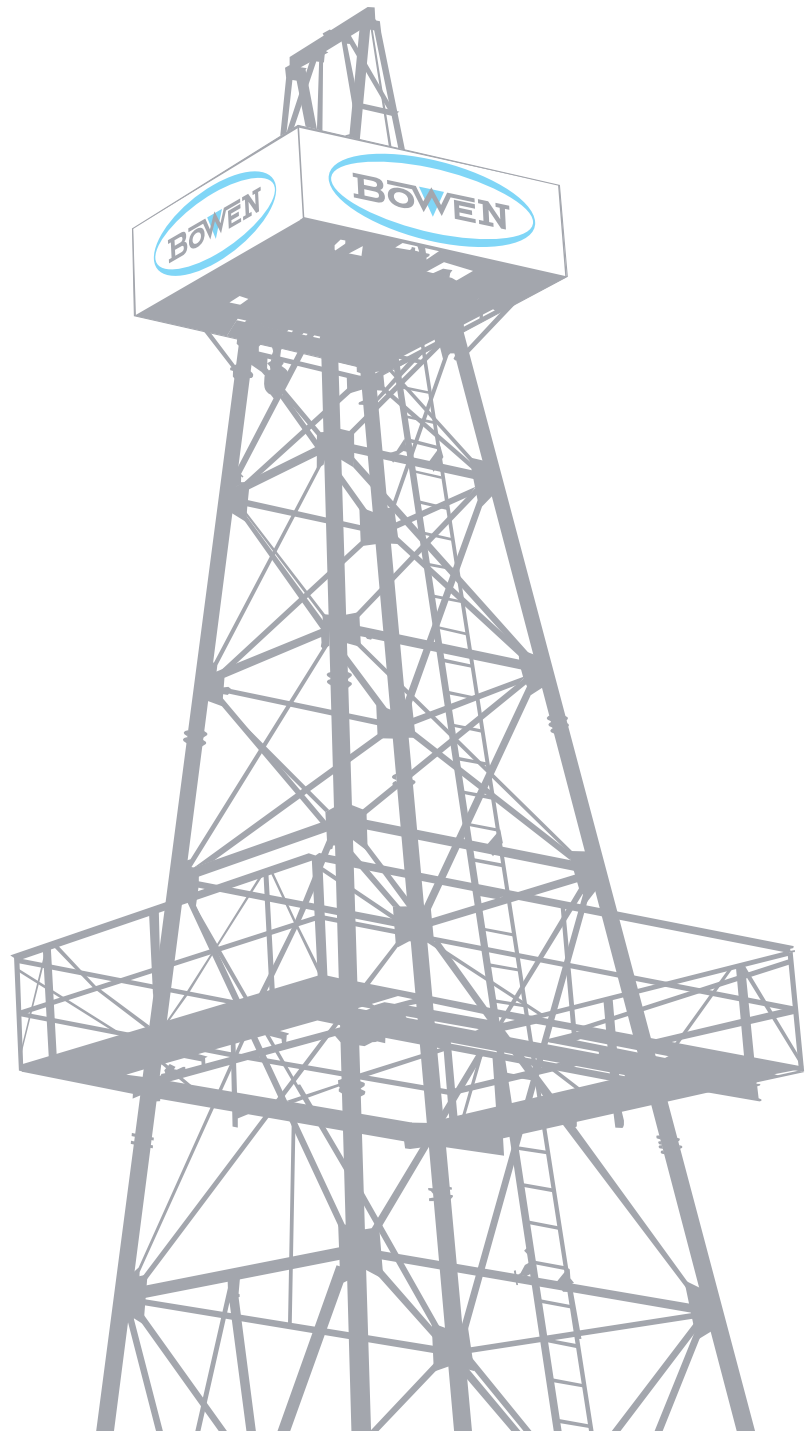
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# Bowen Lead Seal Casing Patches

Instruction Manual 6400



# Bowen Lead Seal Casing Patches

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# Bowen Lead Seal Casing Patches

## General Description

The Bowen Lead Seal Casing Patch is an external catch tool that engages a previously prepared fish, packs it off permanently and becomes a part of the repaired casing or tubing.

It consists of two body parts and nine internal parts. All parts are manufactured from carefully chosen materials of the most suitable type and grade for each part.

Bowen Lead Seal Casing Patches will not restrict the bore of the casing or tubing which is being repaired. They are available in two types: sizes for standard service and sizes for H<sub>2</sub>S (hydrogen sulfide) service.

## Use

After the Lead Seal Casing Patch has been set in position, it ordinarily becomes a permanent part of the string and is usually cemented in place.

Remove the upper portion of a casing string if it becomes ruptured or disoriented from the lower portion by faulting of the formation, caving of the formation, crushing, or rupture. New casing replaces the old, and the Lead Seal Casing Patch forms the patching means between the old and new strings.

## Construction

The Lead Seal Casing Patch is constructed in the most basic manner to perform the functions of engaging the fish, setting the seals, or releasing during operations should this become advisable.

The working parts of the Lead Seal Casing Patch are a grapple carrier, grapple, grapple control, control set screws, lead seals, center seal ring and end seal rings.

The lead seals are composed of commercially pure (unalloyed) lead. This lead is fully annealed to obtain uniformity of flow and to reduce the required setting load to a minimum when in service.

## Operation

Before running the Lead Seal Casing Patch prepare the fish by washing over and cleaning the upper end of burrs and splits, then sizing the fish.

Assemble the tool to the running string and back it up tightly.

Refer to instructions on page 4 of this manual.

**CAUTION: Use tongs on the upper portion of the bowl adjacent to the threaded connection for backup. The main length of the bowl is comparatively thin-walled. If crushed or badly distorted, it will not function properly.**

Lower the tool into the hole. As you reach the fish depth, slowly rotate the running string to the right while lowering it slowly. This combined slow rotation and lowering is important to the proper operation of the tool.

Continue this until the fish has entered the casing patch and bottomed against the upper shoulder of the grapple carrier provided for this purpose. This can be determined by watching the rig weight indicator. Allow 15,000 to 20,000 pounds of weight to be supported by the casing patch to assure good and complete engagement.

At this point, pick up the running string to remove the weight from the casing patch while allowing torque to slack from the running string.

**CAUTION: Avoid any backlash.**

Set the lead seal by elevating the running string. The setting load will vary from 10,000 pounds to an excess of 100,000 pounds, depending on the size of the casing patch.

Refer to page 5 of this manual for an appropriate setting load table.

At this point, check the effectiveness of the lead seal by the application of pump pressure. See page 5 for maximum allowed pressure differential. Before applying any appreciable pressure, first reduce the setting load to 40% of setting load. See page 5 for the appropriate load and maximum pressure differential at that load.

Once the lead seals are set, they will require only a minimum load to maintain them in proper sealing position. Usually the tensile load required to set the slips to maintain the pipe is more than adequate. Avoid any unnecessary pull load.

## Special Notes:

- 1. Be careful during all stages of operation, making sure not to slug or shock load the formation and the casing patch by pressure from the mud pumps.**
- 2. If you wish to release and remove the casing patch from the casing or tubing string, proceed as follows: Bump down firmly until the top of the grapple carrier bottoms against the top sub. This will break the freeze between the outside of the grapple and the grapple carrier. After bumping down, slowly elevate the tubing**

**string, while simultaneously rotating to the right. Continue this slow elevation and rotation until the casing patch is clear of the casing.**

- 3. The connection furnished will be the appropriate box connection to match the casing being patched unless ordered special. Special connections will be furnished to meet requirements on request.**
- 4. Left-hand connections or a completely left-hand tool will be furnished on special order. Prices will be quoted on request.**
- 5. In cases where the casing patch is to be cemented in place, Bowen offers a lead seal cementing casing patch specifically designed for situations where the casing patch must be cemented in place. Reference Instruction Manual 6460 for full particulars.**
- 6. The standard lead seal assembly is rated for 400°F but may be replaced by a special high temperature seal assembly for use in wells whose temperature ranges from over 400°F to 750°F.**
- 7. Where hydrogen sulfide (H<sub>2</sub>S) is suspected or known to exist, the lead seal casing patch should be ordered specifying the assembly number and the note "Special for Hydrogen Sulfide Service."**

## Complete Assembly

Refer to illustrations below for proper location of parts.

The proper procedure for assembly of the Bowen lead seal casing patch is as follows:

1. Clean all parts thoroughly.
2. Begin with the inner sub-assembly composed of the grapple carrier (3), grapple (4), grapple control (5) and two control set screws.
3. Take the grapple carrier (3) and clamp it horizontally in a suitable vise near its center. Be cautious not to clamp it too tight. It should not be distorted or gouged.
4. Assemble the grapple (4) into the grapple carrier (3). Grasp the grapple by the control end, which is tanged, and screw it into the grapple carrier. Use left hand rotation, as the grapple is made on left hand lead spiral. This allows the tool to be released by right-hand rotation when required.
5. Follow the grapple (4) with the grapple control (5) inserted into the carrier (3) with its finger up (toward the grapple).

Insert the grapple deep enough into the grapple carrier to allow the tang to come to rest in the slot provided for this purpose near its lower end.

Allow the control finger to lay along-side the grapple tang at the left side when viewed from the lower

end. This control finger functions as a special key. This allows for the transmission of torque from the bowl and grapple carrier to the grapple to effect release when required while the vertical movement of the grapple is left unhampered.

Seat the upper face of the control (5) against the lower spiral in the carrier (3).

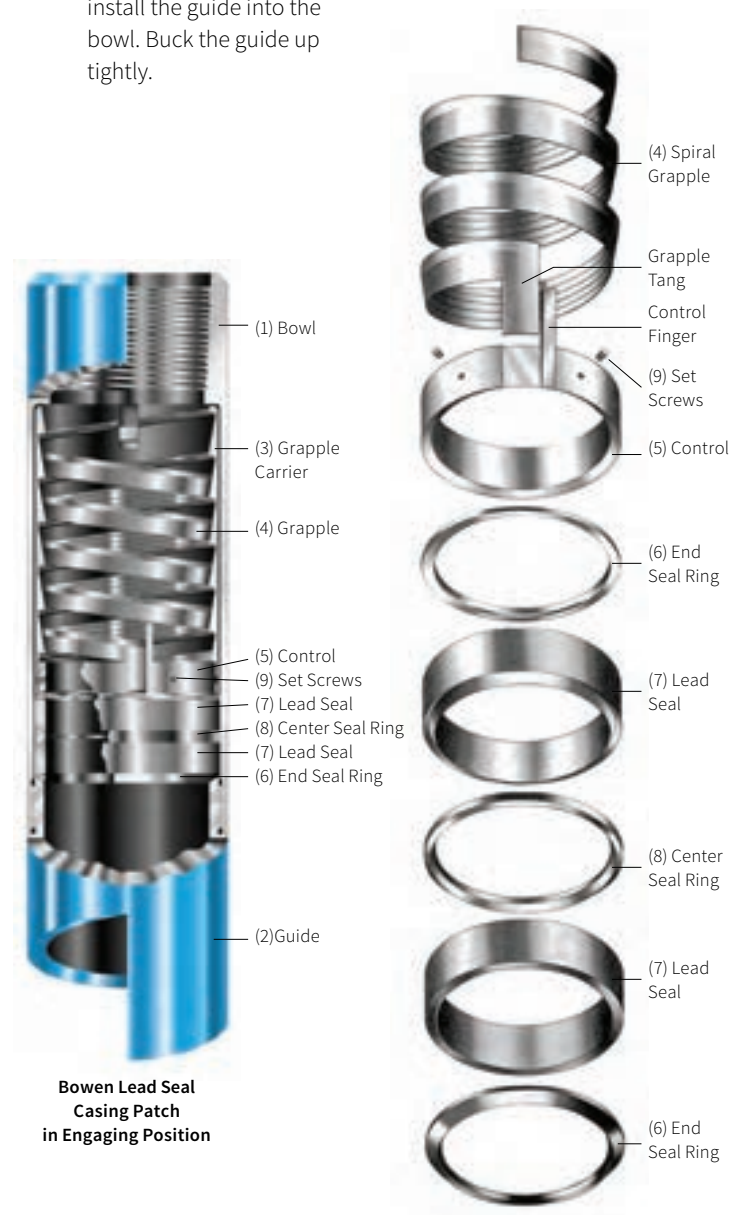
6. Insert the two control set screws (9) into the control in the tapped holes provided and tighten them.
7. Remove the carrier sub assembly from the vise and remove any burrs which may have been created in handling.
8. Clamp the bowl (1) in the vise horizontally.
9. Take the carrier sub assembly and slide it into the bowl (1) with the slot end in it first and the grapple control end last.

Turn the carrier after it is bottomed in the bowl until it mates with the lug and slide it on up until the lug rests in the slot.

10. Insert on end seal ring (6) into the bowl (1) with the beveled face up against the matching beveled face of the grapple control and carrier.
11. Follow this with one lead seal (7). Insert the lead seal with the flat face up and the double lipped face down.

12. Insert the center seal ring (8), which will nest with the end seal ring (6).
13. Install the second lead seal (7) with the double lipped face up.
14. Follow the second lead seal with the second end seal ring (6). Its flat face should rest against the lead seal (7).
15. Apply thread dope to the threads of the guide (2) and install the guide into the bowl. Buck the guide up tightly.

**ASSEMBLY NOTE:** The lead seals may be slightly distorted by handling. If so, take a soft piece of wood and a small hammer and lightly tap the inside wall of the seals to set them. After the seals have been seated in successive stages, the guide should be carefully but firmly tightened.





# Bowen Lead Seal Casing Patches

## Specifications and Replacement Parts

### Calculated Strength Data – Lead Seal Casing Patches Standard Type

| Assembly Number | Casing Size | Patch O.D.  | Setting Load | Working Load (40% Setting Load) | Well Pressure to Burst with Setting Load Applied | Well Pressure to Burst with Working Load Applied | Pull to Burst Patch (No Well Pressure) |
|-----------------|-------------|-------------|--------------|---------------------------------|--|--|--|
| 17258           | 2 3/8 in.   | 3 7/16 in.  | 10,800 lbs   | 4,300 lbs                       | 9,550  | 10,200   | 107,300                                |
| 16140           | 2 7/8 in.   | 4 in.       | 13,000 lbs   | 5,200 lbs                       | 8,400  | 9,000  | 124,250                                |
| 26525           | 3 1/2 in.   | 4 3/4 in.   | 20,000 lbs   | 8,000 lbs                       | 6,550  | 7,150  | 151,400                                |
| 22400           | 4 in.       | 5 1/4 in.   | 22,550 lbs   | 9,000 lbs                       | 5,400  | 6,000  | 154,600                                |
| 13270           | 4 1/2 in.   | 5 3/4 in.   | 25,100 lbs   | 10,050 lbs                      | 3,750  | 4,300  | 134,800                                |
| 13280           | 5 in.       | 6 1/4 in.   | 27,700 lbs   | 11,050 lbs                      | 3,850  | 4,350  | 159,600                                |
| 12315           | 5 1/2 in.   | 6 13/16 in. | 30,200 lbs   | 12,100 lbs                      | 3,150  | 3,600  | 154,500                                |
| 22410           | 5 3/4 in.   | 7 1/16 in.  | 31,250 lbs   | 12,500 lbs                      | 2,950  | 3,400  | 155,900                                |
| 13290           | 6 in.       | 7 9/16 in.  | 32,500 lbs   | 13,000 lbs                      | 2,750  | 3,150  | 156,600                                |
| 13300           | 6 5/8 in.   | 7 5/16 in.  | 37,600 lbs   | 15,050 lbs                      | 2,400  | 2,800  | 167,000                                |
| 12500           | 7 in.       | 8 3/8 in.   | 39,600 lbs   | 15,800 lbs                      | 2,250  | 2,650  | 173,900                                |
| 13070           | 7 5/8 in.   | 9 in.       | 43,000 lbs   | 17,200 lbs                      | 1,950  | 2,300  | 175,500                                |
| 13310           | 8 5/8 in.   | 10 5/8 in.  | 54,400 lbs   | 21,750 lbs                      | 1,550  | 1,950  | 190,400                                |
| 12475           | 9 5/8 in.   | 11 1/8 in.  | 58,200 lbs   | 23,200 lbs                      | 1,500  | 1,850  | 212,500                                |
| 13320           | 10 3/4 in.  | 12 5/16 in. | 64,700 lbs   | 25,850 lbs                      | 1,350  | 1,650  | 234,100                                |
| 20855           | 11 3/4 in.  | 13 1/2 in.  | 70,500 lbs   | 28,200 lbs                      | 1,600  | 1,880  | 298,000                                |
| 18445           | 13 3/8 in.  | 15 1/2 in.  | 116,700 lbs  | 46,650 lbs                      | 1,500  | 1,850  | 423,700                                |

These strength calculations are considered accurate within plus or minus 20% and are intended only as a guide. They do not constitute a guarantee, actual or implied. In use, appropriate allowance should be made as a safety factor.

### Calculated Strength Data – Lead Seal Casing Patches H<sub>2</sub>S Type

| Assembly Number | Casing Size | Patch O.D.  | Setting Load | Working Load (40% Setting Load) | Well Pressure to Burst with Setting Load Applied | Well Pressure to Burst with Working Load Applied | Pull to Burst Patch (No Well Pressure) |
|-----------------|-------------|-------------|--------------|---------------------------------|--|--|--|
| 42757           | 2 3/8 in.   | 3 7/16 in.  | 10,800 lbs   | 4,300 lbs                       | 5,000  | 5,650  | 61,300                                 |
| 42760           | 2 7/8 in.   | 4 in.       | 13,000 lbs   | 5,200 lbs                       | 4,350  | 4,950  | 70,900                                 |
| 42763           | 3 1/2 in.   | 4 3/4 in.   | 20,000 lbs   | 8,000 lbs                       | 3,300  | 3,900  | 86,500                                 |
| 42766           | 4 in.       | 5 1/4 in.   | 22,550 lbs   | 9,000 lbs                       | 2,700  | 3,250  | 88,300                                 |
| 42769           | 4 1/2 in.   | 5 3/4 in.   | 25,100 lbs   | 10,050 lbs                      | 2,200  | 2,750  | 89,800                                 |
| 42775           | 5 in.       | 6 1/4 in.   | 27,700 lbs   | 11,050 lbs                      | 1,850  | 2,340  | 91,180                                 |
| 42754           | 5 1/2 in.   | 6 13/16 in. | 30,200 lbs   | 12,100 lbs                      | 1,850  | 2,300  | 103,000                                |
| 42778           | 5 3/4 in.   | 7 1/16 in.  | 31,250 lbs   | 12,500 lbs                      | 1,700  | 2,150  | 103,900                                |
| 42781           | 6 in.       | 7 9/16 in.  | 32,500 lbs   | 13,000 lbs                      | 1,600  | 2,000  | 104,450                                |
| 42784           | 6 5/8 in.   | 7 5/16 in.  | 37,600 lbs   | 15,050 lbs                      | 1,350  | 1,750  | 111,400                                |
| 42787           | 7 in.       | 8 3/8 in.   | 39,600 lbs   | 15,800 lbs                      | 1,300  | 1,700  | 115,900                                |
| 42790           | 7 5/8 in.   | 9 in.       | 43,000 lbs   | 17,200 lbs                      | 1,180  | 1,450  | 117,000                                |
| 42793           | 8 5/8 in.   | 10 5/8 in.  | 54,400 lbs   | 21,750 lbs                      | 800  | 1,200  | 126,900                                |
| 42796           | 9 5/8 in.   | 11 1/8 in.  | 58,200 lbs   | 23,200 lbs                      | 800  | 1,150  | 141,700                                |
| 42799           | 10 3/4 in.  | 12 5/16 in. | 64,700 lbs   | 25,900 lbs                      | 700  | 1,050  | 156,070                                |
| 42802           | 11 3/4 in.  | 13 1/2 in.  | 70,500 lbs   | 28,200 lbs                      | 850  | 1,150  | 195,960                                |
| 42808           | 13 3/8 in.  | 15 1/2 in.  | 116,700 lbs  | 46,650 lbs                      | 820  | 1,170  | 282,500                                |

These strength calculations are considered accurate within plus or minus 20% and are intended only as a guide. They do not constitute a guarantee, actual or implied. In use, appropriate allowance should be made as a safety factor.

# Bowen Lead Seal Casing Patches

## Specifications and Replacement Parts

### Bowen Lead Seal Casing Patches – Standard Type

|                          |                 |            |           |           |           |           |           |             |            |            |
|--------------------------|-----------------|------------|-----------|-----------|-----------|-----------|-----------|-------------|------------|------------|
| <b>Casing OD</b>         |                 | 2 3/8 in.  | 2 7/8 in. | 3 1/2 in. | 4 in.     | 4 1/2 in. | 5 in.     | 5 1/2 in.   | 5 3/4 in.  | 6 in.      |
| <b>Patch OD</b>          |                 | 3 3/16 in. | 4 in.     | 4 3/4 in. | 5 1/4 in. | 5 3/4 in. | 6 1/4 in. | 6 13/16 in. | 7 1/16 in. | 7 5/16 in. |
| <b>Complete assembly</b> | <b>Part No.</b> | 17258      | 16140     | 26525     | 22400     | 13270     | 13280     | 12315       | 22410      | 13290      |
|                          | <b>Weight</b>   | 30 lbs     | 31 lbs    | —         | 44 lbs    | 51 lbs    | 76 lbs    | 82 lbs      | 84 lbs     | 90 lbs     |

### Replacement Parts

|                                     |                 |         |         |         |         |         |           |            |            |            |
|-------------------------------------|-----------------|---------|---------|---------|---------|---------|-----------|------------|------------|------------|
| <b>Bowl</b>                         | <b>Part No.</b> | 17259   | 16141   | 26526   | 22401   | 13271   | 13281     | 12316      | 22411      | 13291      |
|                                     | <b>Weight</b>   | 19 lbs  | 20 lbs  | 23 lbs  | 25 lbs  | 30 lbs  | 41 lbs    | 44 lbs     | 45 lbs     | 47 lbs     |
| <b>Grapple carrier</b>              | <b>Part No.</b> | 17260   | 16142   | 26527   | 22402   | 13272   | 13282     | 12317      | 22412      | 13292      |
|                                     | <b>Weight</b>   | 2 lbs   | 3 lbs   | 7 lbs   | 7 lbs   | 9 lbs   | 10 lbs    | 10 lbs     | 10 1/2 lbs | 10 1/2 lbs |
| <b>Grapple</b>                      | <b>Part No.</b> | 17261   | 16143   | 26528   | 22403   | 13273   | 13283     | 12318      | 22413      | 13293      |
|                                     | <b>Weight</b>   | 3/4 lb  | 3/4 lb  | 1 lb    | 1 lb    | 2 lbs   | 2 lbs     | 2 1/4 lbs  | 2 1/2 lbs  | 2 1/2 lbs  |
| <b>Grapple control</b>              | <b>Part No.</b> | 17262   | 16144   | 26529   | 22404   | 13274   | 13284     | 12319      | 22414      | 13294      |
|                                     | <b>Weight</b>   | 3/8 lb  | 3/8 lb  | 3/4 lb  | 3/4 lb  | 3/4 lb  | 1 lb      | 1 lb       | 1 lb       | 1 lb       |
| <b>Guide</b>                        | <b>Part No.</b> | 17263   | 16145   | 26530   | 22405   | 13275   | 13285     | 12320      | 22415      | 13295      |
|                                     | <b>Weight</b>   | 5 lbs   | 5 lbs   | 8 lbs   | 8 lbs   | 14 lbs  | 17 lbs    | 19 1/2 lbs | 21 lbs     | 23 lbs     |
| <b>Lead seal (2 req'd.)</b>         | <b>Part No.</b> | 17264   | 16146   | 26531   | 22406   | 13276   | 13286     | 12324      | 22416      | 13296      |
|                                     | <b>Weight</b>   | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 2 lbs   | 2 1/4 lbs | 2 1/4 lbs  | 2 1/2 lbs  | 2 1/2 lbs  |
| <b>End seal ring (2 req'd.)</b>     | <b>Part No.</b> | 17265   | 16147   | 26532   | 22407   | 13277   | 13287     | 12322      | 22417      | 13297      |
|                                     | <b>Weight</b>   | —       | 1/8 lb  | 1/4 lb  | 1/4 lb  | 1/4 lb  | 1/4 lb    | 1/4 lb     | 1/2 lb     | 1/2 lb     |
| <b>Center seal ring</b>             | <b>Part No.</b> | 17266   | 16148   | 26533   | 22408   | 13278   | 13288     | 12323      | 22418      | 13298      |
|                                     | <b>Weight</b>   | —       | 1/4 lb  | 1/2 lb  | 1/2 lb  | 1/2 lb  | 1/2 lb    | 1/2 lb     | 3/4 lb     | 3/4 lb     |
| <b>Control set screw (2 req'd.)</b> | <b>Part No.</b> | 12329   | 12329   | 12329   | 12329   | 12329   | 23306     | 12329      | 12329      | 12329      |
|                                     | <b>Weight</b>   | 1/16 lb | 1/16 lb | 1/16 lb | 1/16 lb | 1/16 lb | 1/16 lb   | 1/16 lb    | 1/16 lb    | 1/16 lb    |

### Bowen Lead Seal Casing Patches – Standard Type (Continued)

|                          |                 |             |           |           |             |            |             |            |            |   |
|--------------------------|-----------------|-------------|-----------|-----------|-------------|------------|-------------|------------|------------|---|
| <b>Casing OD</b>         |                 | 6 3/8 in.   | 7 in.     | 7 3/8 in. | 8 3/8 in.   | 9 3/8 in.  | 10 3/4 in.  | 11 3/4 in. | 13 3/8 in. | — |
| <b>Patch OD</b>          |                 | 7 15/16 in. | 8 3/8 in. | 9 in.     | 10 1/16 in. | 11 1/8 in. | 12 3/16 in. | 13 1/2 in. | 15 1/2 in. | — |
| <b>Complete assembly</b> | <b>Part No.</b> | 13301       | 12500     | 13070     | 13310       | 12475      | 13320       | 20855      | 18445      | — |
|                          | <b>Weight</b>   | 98 lbs      | 109 lbs   | 141 lbs   | 149 lbs     | 175 lbs    | 203 lbs     | 226 lbs    | 250 lbs    | — |

### Replacement Parts (Continued)

|                                     |                 |            |            |            |           |           |           |         |         |   |
|-------------------------------------|-----------------|------------|------------|------------|-----------|-----------|-----------|---------|---------|---|
| <b>Bowl</b>                         | <b>Part No.</b> | 13301      | 12501      | 13071      | 13311     | 12476     | 13321     | 20856   | 18446   | — |
|                                     | <b>Weight</b>   | 50 lbs     | 55 lbs     | 59 lbs     | 76 lbs    | 87 lbs    | 98 lbs    | 110 lbs | 125 lbs | — |
| <b>Grapple carrier</b>              | <b>Part No.</b> | 13302      | 12502      | 13072      | 13312     | 12477     | 13322     | 20857   | 18447   | — |
|                                     | <b>Weight</b>   | 10 1/2 lbs | 11 1/4 lbs | 13 1/2 lbs | 17 lbs    | 20 lbs    | 28 lbs    | 30 lbs  | 35 lbs  | — |
| <b>Grapple</b>                      | <b>Part No.</b> | 13303      | 12503      | 13073      | 13313     | 12478     | 13323     | 20858   | 18448   | — |
|                                     | <b>Weight</b>   | 2 1/2 lbs  | 2 3/4 lbs  | 3 lbs      | 4 lbs     | 5 1/2 lbs | 7 1/2 lbs | 8 lbs   | 9 lbs   | — |
| <b>Grapple control</b>              | <b>Part No.</b> | 13304      | 12504      | 13074      | 13314     | 12479     | 13324     | 20859   | 18449   | — |
|                                     | <b>Weight</b>   | 1 lb       | 1 1/2 lbs  | 1 1/2 lbs  | 2 1/2 lbs | 2 1/2 lbs | 3 lbs     | 4 lbs   | 4 lbs   | — |
| <b>Guide</b>                        | <b>Part No.</b> | 13305      | 12505      | 13075      | 13315     | 12480     | 13325     | 20860   | 18450   | — |
|                                     | <b>Weight</b>   | 26 lbs     | 29 lbs     | 32 lbs     | 43 lbs    | 54 lbs    | 61 lbs    | 65 lbs  | 75 lbs  | — |
| <b>Lead seal (2 req'd.)</b>         | <b>Part No.</b> | 13306      | 12506      | 13076      | 13316     | 12481     | 13326     | 20861   | 18451   | — |
|                                     | <b>Weight</b>   | 3 lbs      | 3 1/2 lbs  | 3 3/4 lbs  | 4 1/4 lbs | 4 1/2 lbs | 5 lbs     | 6 lbs   | 6 lbs   | — |
| <b>End seal ring (2 req'd.)</b>     | <b>Part No.</b> | 13307      | 12507      | 13077      | 13317     | 12482     | 13327     | 20862   | 18452   | — |
|                                     | <b>Weight</b>   | 1/2 lb     | 1/2 lb     | 1/2 lb     | 3/4 lb    | 3/4 lb    | 3/4 lb    | 1 lb    | 1 lb    | — |
| <b>Center seal ring</b>             | <b>Part No.</b> | 13308      | 12508      | 13078      | 13318     | 12483     | 13328     | 20863   | 18453   | — |
|                                     | <b>Weight</b>   | 3/4 lb     | 1 lb       | 1 lb       | 1 1/4 lbs | 1 1/4 lbs | 1 1/4 lbs | 2 lbs   | 2 lbs   | — |
| <b>Control set screw (2 req'd.)</b> | <b>Part No.</b> | 12329      | 12329      | 12329      | 12484     | 12484     | 12484     | 12484   | 12484   | — |
|                                     | <b>Weight</b>   | 1/16 lb    | 1/16 lb    | 1/16 lb    | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb | 1/16 lb | — |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Casing O.D.
  - (3) Size and type of thread

# Bowen Lead Seal Casing Patches

## Specifications and Replacement Parts

### Bowen Lead Seal Casing Patches – H<sub>2</sub>S Type

|                          |                 |            |           |           |           |           |           |             |            |            |
|--------------------------|-----------------|------------|-----------|-----------|-----------|-----------|-----------|-------------|------------|------------|
| <b>Casing OD</b>         |                 | 2 3/8 in.  | 2 7/8 in. | 3 1/2 in. | 4 in.     | 4 1/2 in. | 5 in.     | 5 1/2 in.   | 5 3/4 in.  | 6 in.      |
| <b>Patch OD</b>          |                 | 3 7/16 in. | 4 in.     | 4 3/4 in. | 5 1/4 in. | 5 3/4 in. | 6 1/4 in. | 6 13/16 in. | 7 1/16 in. | 7 5/16 in. |
| <b>Complete assembly</b> | <b>Part No.</b> | 42757      | 42760     | 42763     | 42766     | 42769     | 42775     | 42754       | 42778      | 42781      |
|                          | <b>Weight</b>   | 30 lbs     | 31 lbs    | —         | 44 lbs    | 51 lbs    | 76 lbs    | 82 lbs      | 84 lbs     | 90 lbs     |

### Replacement Parts

|                                     |                 |         |         |         |         |         |           |            |            |            |
|-------------------------------------|-----------------|---------|---------|---------|---------|---------|-----------|------------|------------|------------|
| <b>Bowl</b>                         | <b>Part No.</b> | 42758   | 42761   | 42764   | 42767   | 42770   | 42776     | 42755      | 42779      | 42782      |
|                                     | <b>Weight</b>   | 19 lbs  | 20 lbs  | 23 lbs  | 25 lbs  | 30 lbs  | 41 lbs    | 44 lbs     | 45 lbs     | 47 lbs     |
| <b>Grapple carrier</b>              | <b>Part No.</b> | 42759   | 42762   | 42765   | 42768   | 42771   | 42777     | 42756      | 42780      | 42783      |
|                                     | <b>Weight</b>   | 2 lbs   | 3 lbs   | 7 lbs   | 7 lbs   | 9 lbs   | 10 lbs    | 10 lbs     | 10 1/2 lbs | 10 1/2 lbs |
| <b>Grapple</b>                      | <b>Part No.</b> | 17261   | 16143   | 26528   | 22403   | 13273   | 13283     | 12318      | 22413      | 13293      |
|                                     | <b>Weight</b>   | 3/4 lb  | 3/4 lb  | 1 lb    | 1 lb    | 2 lbs   | 2 lbs     | 2 1/4 lbs  | 2 1/2 lbs  | 2 1/2 lbs  |
| <b>Grapple control</b>              | <b>Part No.</b> | 17262   | 16144   | 26529   | 22404   | 13274   | 13284     | 12319      | 22414      | 13294      |
|                                     | <b>Weight</b>   | 3/8 lb  | 3/8 lb  | 3/4 lb  | 3/4 lb  | 3/4 lb  | 1 lb      | 1 lb       | 1 lb       | 1 lb       |
| <b>Guide</b>                        | <b>Part No.</b> | 17263   | 16145   | 26530   | 22405   | 13275   | 13285     | 12320      | 22415      | 13295      |
|                                     | <b>Weight</b>   | 5 lbs   | 5 lbs   | 8 lbs   | 8 lbs   | 14 lbs  | 17 lbs    | 19 1/2 lbs | 21 lbs     | 23 lbs     |
| <b>Lead seal (2 req'd.)</b>         | <b>Part No.</b> | 17264   | 16146   | 26531   | 22406   | 13276   | 13286     | 12324      | 22416      | 13296      |
|                                     | <b>Weight</b>   | 1 lb    | 1 lb    | 1 lb    | 1 lb    | 2 lbs   | 2 1/4 lbs | 2 1/4 lbs  | 2 1/2 lbs  | 2 1/2 lbs  |
| <b>End seal ring (2 req'd.)</b>     | <b>Part No.</b> | 17265   | 16147   | 26532   | 22407   | 13277   | 13287     | 12322      | 22417      | 13297      |
|                                     | <b>Weight</b>   | —       | 1/8 lb  | 1/4 lb  | 1/4 lb  | 1/4 lb  | 1/4 lb    | 1/4 lb     | 1/2 lb     | 1/2 lb     |
| <b>Center seal ring</b>             | <b>Part No.</b> | 17266   | 16148   | 26533   | 22408   | 13278   | 13288     | 12323      | 22418      | 13298      |
|                                     | <b>Weight</b>   | —       | 1/4 lb  | 1/2 lb  | 1/2 lb  | 1/2 lb  | 1/2 lb    | 1/2 lb     | 3/4 lb     | 3/4 lb     |
| <b>Control set screw (2 req'd.)</b> | <b>Part No.</b> | 12329   | 12329   | 12329   | 12329   | 12329   | 12329     | 12329      | 12329      | 12329      |
|                                     | <b>Weight</b>   | 1/16 lb | 1/16 lb | 1/16 lb | 1/16 lb | 1/16 lb | 1/16 lb   | 1/16 lb    | 1/16 lb    | 1/16 lb    |

### Bowen Lead Seal Casing Patches – H<sub>2</sub>S Type (Continued)

|                          |                 |             |           |           |             |            |             |            |            |   |
|--------------------------|-----------------|-------------|-----------|-----------|-------------|------------|-------------|------------|------------|---|
| <b>Casing OD</b>         |                 | 6 5/8 in.   | 7 in.     | 7 5/8 in. | 8 5/8 in.   | 9 5/8 in.  | 10 3/4 in.  | 11 3/4 in. | 13 3/8 in. | — |
| <b>Patch OD</b>          |                 | 7 13/16 in. | 8 3/8 in. | 9 in.     | 10 1/16 in. | 11 1/8 in. | 12 1/16 in. | 13 1/2 in. | 15 1/2 in. | — |
| <b>Complete assembly</b> | <b>Part No.</b> | 42784       | 42787     | 42790     | 42793       | 42796      | 42799       | 42802      | 42808      | — |
|                          | <b>Weight</b>   | 98 lbs      | 109 lbs   | 141 lbs   | 149 lbs     | 175 lbs    | 203 lbs     | 226 lbs    | 250 lbs    | — |

### Replacement Parts (Continued)

|                                     |                 |            |            |            |           |           |           |         |         |   |
|-------------------------------------|-----------------|------------|------------|------------|-----------|-----------|-----------|---------|---------|---|
| <b>Bowl</b>                         | <b>Part No.</b> | 42785      | 42788      | 42791      | 42794     | 42797     | 42800     | 42803   | 42809   | — |
|                                     | <b>Weight</b>   | 50 lbs     | 55 lbs     | 59 lbs     | 76 lbs    | 87 lbs    | 98 lbs    | 110 lbs | 125 lbs | — |
| <b>Grapple carrier</b>              | <b>Part No.</b> | 42786      | 42789      | 42792      | 42795     | 42798     | 42801     | 42804   | 42810   | — |
|                                     | <b>Weight</b>   | 10 1/2 lbs | 11 1/4 lbs | 13 1/2 lbs | 17 lbs    | 20 lbs    | 28 lbs    | 30 lbs  | 35 lbs  | — |
| <b>Grapple</b>                      | <b>Part No.</b> | 13303      | 12503      | 13073      | 13313     | 12478     | 13323     | 20858   | 18448   | — |
|                                     | <b>Weight</b>   | 2 1/2 lbs  | 2 3/4 lbs  | 3 lbs      | 4 lbs     | 5 1/2 lbs | 7 1/2 lbs | 8 lbs   | 9 lbs   | — |
| <b>Grapple control</b>              | <b>Part No.</b> | 13304      | 12504      | 13074      | 13314     | 12479     | 13324     | 20859   | 18449   | — |
|                                     | <b>Weight</b>   | 1 lb       | 1 1/2 lbs  | 1 1/2 lbs  | 2 1/2 lbs | 2 1/2 lbs | 3 lbs     | 4 lbs   | 4 lbs   | — |
| <b>Guide</b>                        | <b>Part No.</b> | 13305      | 12505      | 13075      | 13315     | 12480     | 13325     | 20860   | 18450   | — |
|                                     | <b>Weight</b>   | 26 lbs     | 29 lbs     | 32 lbs     | 43 lbs    | 54 lbs    | 61 lbs    | 65 lbs  | 75 lbs  | — |
| <b>Lead seal (2 req'd.)</b>         | <b>Part No.</b> | 13306      | 12506      | 13076      | 13316     | 12481     | 13326     | 20861   | 18451   | — |
|                                     | <b>Weight</b>   | 3 lbs      | 3 1/2 lbs  | 3 3/4 lbs  | 4 1/4 lbs | 4 1/2 lbs | 5 lbs     | 6 lbs   | 6 lbs   | — |
| <b>End seal ring (2 req'd.)</b>     | <b>Part No.</b> | 13307      | 12507      | 13077      | 13317     | 12482     | 13327     | 20862   | 18452   | — |
|                                     | <b>Weight</b>   | 1/2 lb     | 1/2 lb     | 1/2 lb     | 3/4 lb    | 3/4 lb    | 3/4 lb    | 1 lb    | 1 lb    | — |
| <b>Center seal ring</b>             | <b>Part No.</b> | 13308      | 12508      | 13078      | 13318     | 12483     | 13328     | 20863   | 18453   | — |
|                                     | <b>Weight</b>   | 3/4 lb     | 1 lb       | 1 lb       | 1 1/4 lbs | 1 1/4 lbs | 1 1/4 lbs | 2 lbs   | 2 lbs   | — |
| <b>Control set screw (2 req'd.)</b> | <b>Part No.</b> | 12329      | 12329      | 12329      | 12484     | 12484     | 12484     | 12484   | 12484   | — |
|                                     | <b>Weight</b>   | 1/16 lb    | 1/16 lb    | 1/16 lb    | 1/16 lb   | 1/16 lb   | 1/16 lb   | 1/16 lb | 1/16 lb | — |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Casing O.D.
  - (3) Size and type of thread

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# LEAD SEAL CEMENTING TYPE CASING PATCH

Instruction Manual 6460



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Lead Seal Cementing Type Casing Patch



**NATIONAL OILWELL VARCO**

# Lead Seal Cementing Type Casing Patch

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## **Lead Seal Cementing Type Casing Patch**

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Fifteenth Printing, September 2005

### General Description

The **Bowen Lead Seal Cementing Type Casing Patch** is a tool which is made up to the upper casing string and permanently seals and cements to the lower string of tubing or casing in a single run. It incorporates the proven Bowen compression type multiple lead seal, combined with a cement valving feature which allows cementing in place immediately after the Patch is set. It eliminates the need for a circulating cementing valve or perforations near the Patch since the Valve is incorporated into the tool. The Patch becomes a permanent part of the well casing.

### Use

The tool is used for replacing the upper portion of casing that has been previously cemented in place. It is suitable for wells which contain fluids or gases which are harmful to synthetic rubber seals. It is also useful because it combines the sealing and cementing operation, eliminating the time and inconvenience of doing the operation in two separate trips.

### Construction

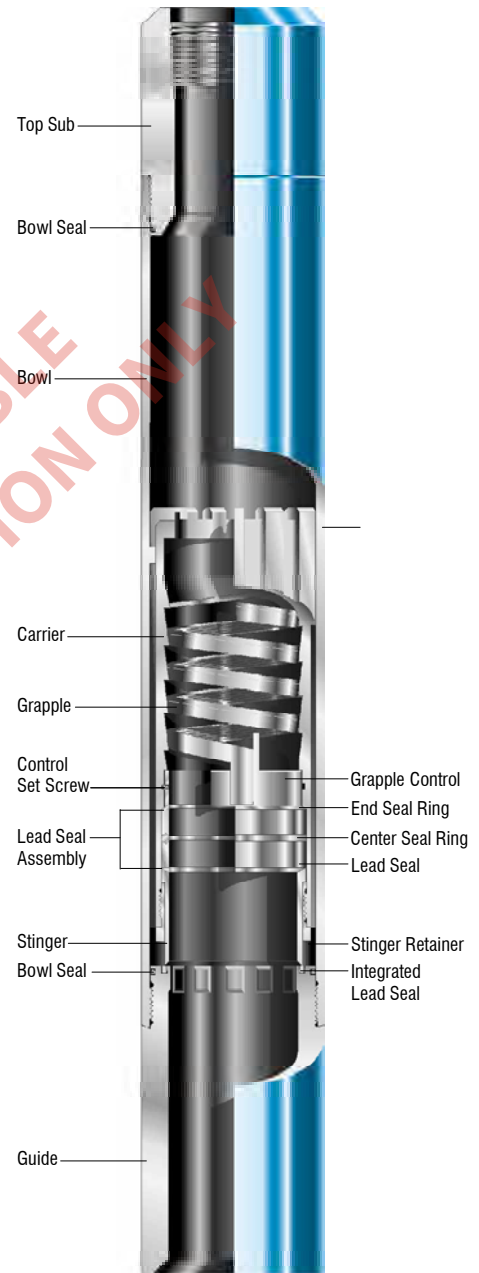
The tool's main parts consist of Top Sub, Bowl, Carrier, Grapple, Grapple Control with set screw, Lead Seal Assembly, Stinger, Stinger Retainer, Integral Lead Seal and Guide. Two Bowl Seals are installed at the threads of the Bowl where the Top Sub and Guide are made up. The Lead Seal Assembly consists of two Lead Seals separated by a Center Seal Ring with an End Seal Ring on each end. The Internal Lead Seal is installed in a groove on the top end of the Guide.

### Explanation of Mechanism

The casing or tubing which is to be engaged in a lead sealing and cementing operation is referred to as the fish. The Carrier has external grooves for cement flow, a shoulder on the I.D. at the top, and threads at the bottom for the Stinger Retainer which is installed to retain the Grapple, Grapple Control, Lead Seal Assembly and Stinger. When the fish contacts the Carrier shoulder as the Patch is lowered, it moves up to the Top Sub as the fish is engaged. When the Patch is raised, the Top Sub, Bowl and Guide move up until the Stinger imbeds into the Integral Lead Seal in the Guide. This produces the pressure through the Stinger which collapses the Lead Seal Assembly onto the O.D. of the fish. By lowering the string then, the Stinger will move away from the Integral Lead Seal for circulation. The string is raised and the Stinger to Integral Lead Seal set again before cementing.

### Operation

Prior to running the Lead Seal Cementing Type Casing Patch, the hole and the fish should be prepared, for patching operation. This is usually done by use of a suitable washover shoe and washover string. The main twofold purpose is to remove any existing cement, and resize the hole around the upper end of the fish; while simultaneously removing any burrs from the outside of the fish, and resize it as required. In addition to preparing the hole and fish O.D., a suitable bridgeplug or packer is usually set in the fish, near its upper end. This forms a temporary bridge to stop the cement. The bridgeplug or packer may be removed and the casing reamed after completion of patching and cementing operations.



**Bowen Lead Seal  
Cementing Type Casing Patch**

The tool as assembled as outlined below. Check it over. Assemble the tool to the running string, and buck up tight.

**CAUTION: Use tongs on Top Sub only; excessive crushing effort on Bowl will distort it, rendering it inoperative. Lower tool in hole until fish depth is reached. As the fish is reached, the running string should be slowly rotated to the right while lowering slowly. This combined lowering and rotational action is important to good operation. This should be continued until the fish contacts the shoulder at the upper end of the Carrier, and pushes it up till it "bottoms" against the Top Sub (Step 1, page 5). This can be determined by watching the weight indicator. Allow 15,000 to 20,000 pounds of weight to be supported by the Patch to assure good and complete engagement.**

At this point pick string up to remove weight from Patch, while allowing torque to slack from running string.

**CAUTION: Avoid any backlash.**

Set the Lead Seals by elevating the running string (Step 2, page 5). The load required to set the Patch depends on size, and will vary from 10,000 pounds to 100,000 pounds or more. See accompanying setting load column of Calculated Strength Table on page 7.

At this point the Patch may be pressure checked with the mud pumps. Caution should be exercised, however, not to exceed a nominal 500 to 1,000 psi. Before applying any appreciable pressure, it is preferable to first reduce the setting load to a nominal 10,000 to 15,000 lb. load, or approximately one-fourth the original setting load, whichever is smaller.

Having set the Lead Seals, and pressure checked them as described, the Casing Patch is again opened to circulation by lowering the running string slowly until all

string weight is equalized and approximately 15,000 to 20,000 lb. of weight is resting on the Casing Patch. This will again telescope the Carrier up against the Top Sub, while at the same time pulling the Stinger up off the Integral Lead Seal at the face of the Guide. Circulation through the Casting Patch may then be resumed.

After good circulation is established, the cementing cycle may be made (Step 3, page 5). When sufficient time has elapsed to position the cement column, stop circulation and again establish the seal by elevating the string until a pull load equal to the initial setting load is reached. The slips should be set and the applied load maintained during curing time required for the cement.

After the cement has cured, the excess cement may be drilled out, the plug removed, and the hole conditioned.

**NOTES:**

1. Care should be exercised during all stages of operation that the formation and Patch not be "slugged" or shock loaded with the mud pumps. This could be harmful to the formation and damaging to the tool.
2. If for any reason during operation it is desired to release and remove the Patch from the fish, proceed as follows: Bump down firmly until the top of the Carrier strikes the Top Sub. This will break the "freeze" between the Grapple and its fish, and also between the outside of the Grapple and the Carrier. After bumping down, slowly elevate the string while simultaneously rotating to the right. Continue this until the Patch is clear of the fish. It is important to elevate and rotate slowly simultaneously.

3. These Patches are designed to withstand pressures equal to the capacity of the running string, in most cases, and greater after cementing. Caution should be exercised, however, never to exceed the actual required pressures to perform necessary functions, until permanently cemented.

4. Extra long Guides are available on request to run, if more stabilizing length and greater cementing area are desired.

5. Spare parts are not normally required, since the Casing Patch becomes a permanent part of the well casing. Seals may be damaged in some cases, due to misrun or damage from a ragged fish, or change of plan after having been set. It is therefore recommended that one or two sets of Lead Seals be ordered extra, when the Casing Patch is to be used in remote locations.

**Assembly**

Refer to illustration on page 6.

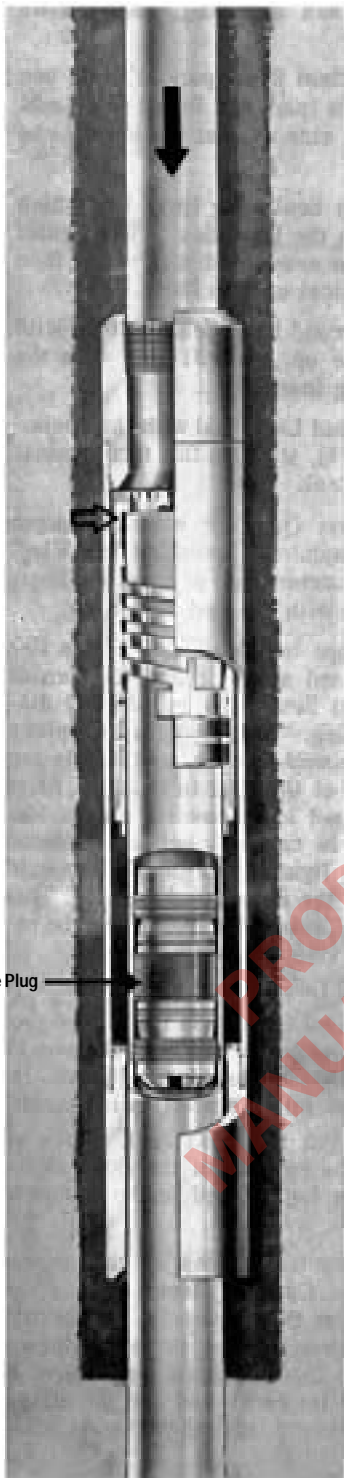
The proper procedure for assembly is as follows:

1. Begin with the Inner Sub Assembly, consisting of parts 3, 4, 5, 6, 7, 9, 10, 11 and 13. Clean all these parts thoroughly.
2. Take the Carrier (part 3) and clamp it in a pipe vise, near the center of its length.

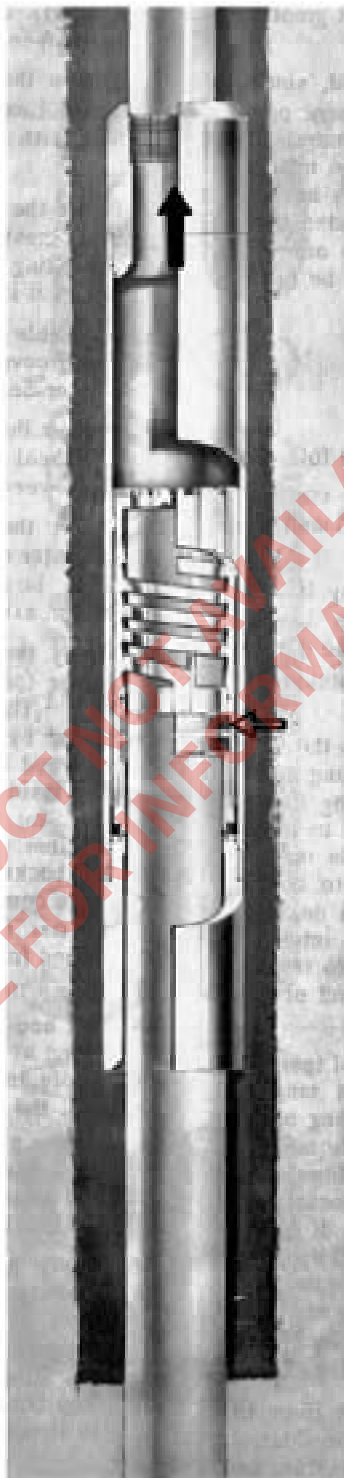
**CAUTION: Do not tighten enough to distort the Carrier or the slots on its outside diameter.**

3. Assemble the Grapple (part 4), into the Carrier. This may be done by grasping it by the tanged control end, and screwing it into the Carrier. Left hand rotation must be used, as the spiral and Grapple are made on left hand

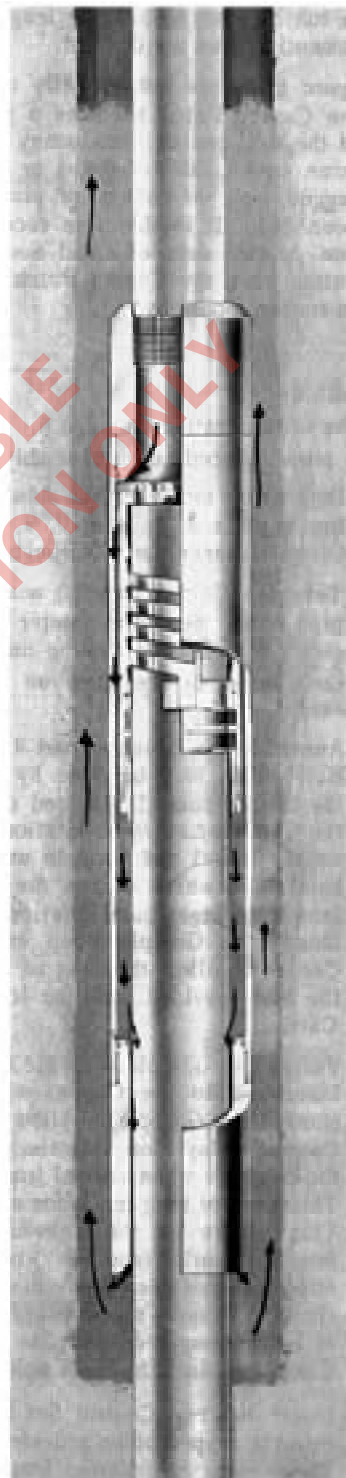




Step 1  
Engage Fish and Bottom



Step 2  
Set Lead Seal



Step 3  
Lower to Open and Cement

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lead which allows the tool to be released by right hand rotation when desired. Insert the Grapple deep enough into the Carrier to allow the tang to come to rest in the slot provided near the lower end of the Carrier.

4. Follow the Grapple with the Control (part 5), inserted into the Carrier with its tang up (toward the Grapple). Allow the tang of the Control to lay alongside the Grapple tang, at the left side when viewed from the lower end. This Control tang functions as a special key. This allows for the transmission of torque from the Carrier (and body) to the Grapple, to effect release when desired, while at the same time the Grapple's necessary linear movement is left unhampered. Seat the upper face of the Control against the lower spiral in the Carrier.

5. Insert the two Control Set Screws (part 13) into the tapped holes provided in the Control. These must be inserted from the inside, and tightened down against the wall of the Carrier.

6. Insert one End Seal Ring (part 11) into the Carrier with the bevelled face against the Control, which has a mating bevel on its lower face.

7. Follow the End Seal Ring (part 11) with one of the Lead Seals (part 9). Insert this Lead Seal with its flat side against the lower Lead Seal.

8. Insert the Center Seal Ring (part 10), which will "nest" with the Lead Seal. The Center Seal Ring may be assembled with either face up, as it is identical on both faces.

9. Assemble the second Lead Seal (part 9), with the grooved side up. It will nest with the Center Seal Ring (part 10).

10. Follow this second Lead Seal with the second End Seal (part 11), with its flat face against the lower Lead Seal.

11. Insert the Stinger (part 7), with the larger diameter end against the lower End Seal Ring. This larger diameter has a bevelled face, which will mate with the End Seal Ring.

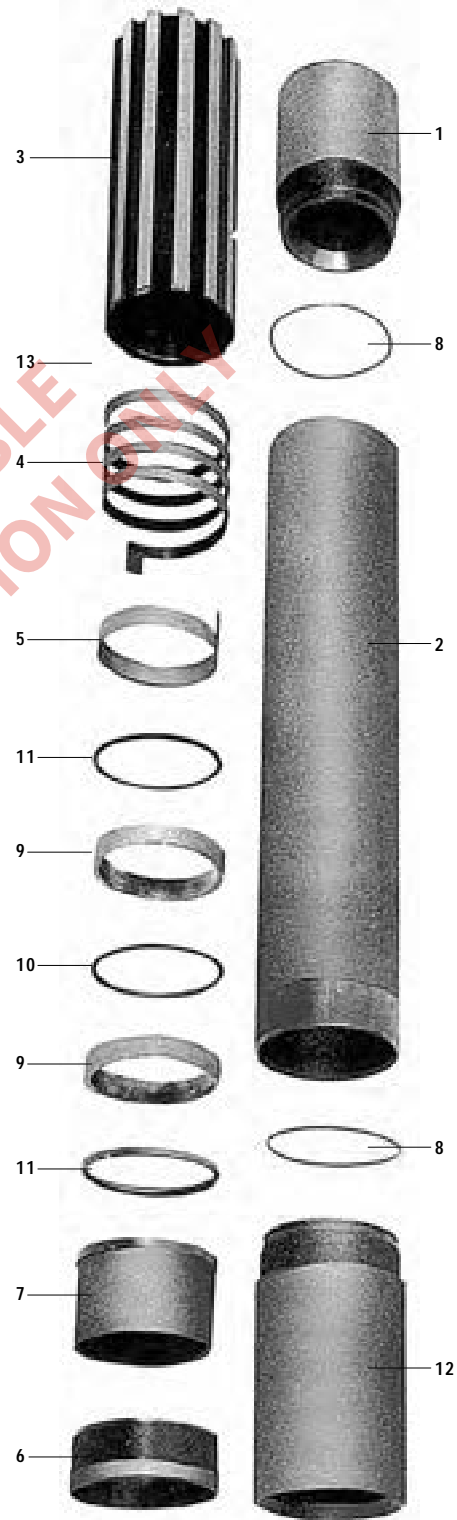
12. Apply thread dope to the threads of the Retainer (part 6) and screw it into the Carrier end. The Lead Seals may be slightly distorted by handling. If so, take a soft piece of wood and a small hammer, and lightly tap the inside wall of the Seal to seat it. After the Seal is seated in successive stages, the retainer should be carefully but firmly seated by bucking up lightly with a pipe wrench. This completes the inner Sub Assembly. This Carrier and its assembled parts may be removed from the vise and laid aside.

13. Clamp the Bowl (part 2) in the pipe vise.

14. Put one Bowl Seal (part 8) in the groove provided at the lower end of the Top Sub (part 1). Apply thread dope to threads (and Seal). Insert the Top Sub into the Bowl, being careful not to nick or cut the Bowl Seal. Make up until snug. The top end of the Bowl is the end nearest the lug located in the inside of the Bowl.

15. Apply grease to the splines on the outside diameter of the Carrier. Insert the Carrier (part 3) into the Bowl (part 2).

**CAUTION: Be sure the cross-slots at the end opposite the Stinger are inserted toward the upper or Top Sub end of the Bowl, and that the Stinger is directed downward, toward the Guide.**



**NOTE: The Bowl has an integral lug type key in its I.D. One of the female splines at random, will mate with this key. The balance of these splines, collectively form adequate passage for the cement slurry. Before assembling the Guide (part 12) with the Bowl (part 2), reach into the Carrier, grasp it, and slide it back and forth, to assure that the Carrier is free to telescope up and down between the Guide and Top Sub, during operation.**

16. The Guide (part 12) may then be assembled with the second Bowl Seal (part 8), and the Guide inserted into the lower end of the Bowl, and made up until shouldered.
17. Buck up Top Sub and Guide tight.
18. Assemble the tool to the running string. It is ready to run.

**Calculated Strength Table - Lead Seal Cementing Casing Patches**

| Assembly No. | Casing Size | Lead Seal  |                     | Well Pressure                          | Well Pressure                     |                                   | Pull To Burst Patch (No Well Pressure) |
|--------------|-------------|------------|---------------------|--|-----------------------------------|-----------------------------------|--|
|              |             | Patch O.D. | Setting Load (Lbs.) | Working Load (40% Setting Load) (Lbs.) | To Burst W / Setting Load Applied | To Burst W / Working Load Applied |  |
| 40514        | 2-3/8       | 4-1/8      | 9,141               | 3,656                                  | 12,094                            | 12,691                            | 120,391                                |
| 41209        | 2-7/8       | 4-5/8      | 10,869              | 4,347                                  | 9,416                             | 9,952                             | 125,396                                |
| 41210        | 3-1/2       | 5-1/4      | 15,839              | 6,336                                  | 6,673                             | 7,205                             | 135,165                                |
| 40596        | 4           | 5-3/4      | 17,853              | 7,141                                  | 5,482                             | 5,972                             | 137,795                                |
| 40619        | 4-1/2       | 6-1/2      | 19,871              | 7,948                                  | 4,418                             | 4,872                             | 135,943                                |
| 40649        | 5           | 6-3/4      | 21,888              | 8,755                                  | 3,863                             | 4,286                             | 141,840                                |
| 38179        | 5-1/2       | 7-7/16     | 23,912              | 9,565                                  | 3,033                             | 3,429                             | 133,786                                |
| 41088        | 5-3/4       | 7-3/4      | 24,916              | 9,966                                  | 2,966                             | 3,350                             | 140,469                                |
| 40679        | 6           | 8          | 25,929              | 10,372                                 | 2,758                             | 3,130                             | 141,217                                |
| 40858        | 6-5/8       | 8-5/8      | 30,022              | 12,009                                 | 2,326                             | 2,686                             | 146,662                                |
| 40859        | 7           | 9-1/8      | 31,620              | 12,648                                 | 2,362                             | 2,707                             | 161,482                                |
| 40869        | 7-5/8       | 9-7/8      | 34,273              | 13,709                                 | 2,237                             | 2,561                             | 176,429                                |
| 41004        | 8-5/8       | 11-1/8     | 44,549              | 17,820                                 | 2,202                             | 2,529                             | 224,349                                |
| 41085        | 9-5/8       | 11-15/16   | 47,195              | 18,878                                 | 1,550                             | 1,841                             | 198,140                                |
| 41086        | 10-3/4      | 13-5/8     | 52,450              | 20,980                                 | 1,835                             | 2,101                             | 269,178                                |
| 41089        | 11-3/4      | 14-3/4     | 56,938              | 22,775                                 | 1,656                             | 1,903                             | 285,670                                |
| 41087        | 13-3/8      | 16-5/8     | 95,652              | 38,261                                 | 1,580                             | 2,550                             | 396,488                                |

### Bowen Lead Seal Cementing Casing Patch

| O.D. of Casing    | 2-3/8  | 2-7/8 | 3-1/2 | 4     | 4-1/2 | 5     | 5-1/2  | 5-3/4 | 6     |     |
|-------------------|--------|-------|-------|-------|-------|-------|--------|-------|-------|-----|
| O.D. of Patch     | 4-1/8  | 4-5/8 | 5-1/4 | 5-3/4 | 6-1/2 | 6-3/4 | 7-7/16 | 7-3/4 | 8     |     |
| Part No.          | 40514  | 41209 | 41210 | 40596 | 40619 | 40649 | 38179  | 41088 | 40679 |     |
| Complete Assembly | Weight | 102   | 131   | 143   | 156   | 217   | 224    | 261   | 258   | 273 |

### Replacement Parts

|                                 |          |       |       |       |       |       |       |       |       |       |
|---------------------------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Top Sub                         | Part No. | 41092 | 41098 | 41104 | 41110 | 41116 | 41122 | 38415 | 41128 | 41134 |
|                                 | Weight   | 28    | 35    | 40    | 44    | 58    | 60    | 64    | 65    | 67    |
| Bowl                            | Part No. | 41093 | 41099 | 41105 | 41111 | 41117 | 41123 | 38416 | 41129 | 41135 |
|                                 | Weight   | 27    | 37    | 39    | 41    | 56    | 57    | 67    | 62    | 64    |
| Guide                           | Part No. | 41094 | 41100 | 41106 | 41112 | 41118 | 41124 | 38421 | 41130 | 41136 |
|                                 | Weight   | 27    | 34    | 36    | 38    | 50    | 51    | 64    | 68    | 71    |
| Grapple Carrier                 | Part No. | 41095 | 41101 | 41107 | 41113 | 41119 | 41125 | 38417 | 41131 | 41137 |
|                                 | Weight   | 12    | 17    | 19    | 21    | 40    | 41    | 50    | 51    | 53    |
| Grapple                         | Part No. | 17261 | 16143 | 26528 | 22403 | 13273 | 13283 | 12318 | 22413 | 13293 |
|                                 | Weight   | 3/4   | 1     | 1-1/4 | 1-1/2 | 1-3/4 | 2     | 2-1/4 | 2-3/8 | 2-1/2 |
| Grapple Control                 | Part No. | 17262 | 16144 | 26529 | 22404 | 13274 | 13284 | 12319 | 22414 | 13294 |
|                                 | Weight   | 3/8   | 7/16  | 1/2   | 5/8   | 3/4   | 7/8   | 1     | 1-1/8 | 1-1/4 |
| End Seal Ring<br>(2 Req'd.)     | Part No. | 17265 | 16147 | 26532 | 22407 | 13277 | 13287 | 12322 | 22417 | 13297 |
|                                 | Weight   | 1/8   | 3/16  | 1/4   | 5/16  | 3/8   | 11/16 | 1/2   | 1/2   | 9/16  |
| Center Seal Ring                | Part No. | 17266 | 16148 | 26533 | 22408 | 13278 | 13288 | 12323 | 22418 | 13298 |
|                                 | Weight   | 1/8   | 3/16  | 1/4   | 5/16  | 3/8   | 7/16  | 1/2   | 1/2   | 5/8   |
| Packer Stinger                  | Part No. | 41096 | 41102 | 41108 | 41114 | 41120 | 41126 | 38420 | 41132 | 41138 |
|                                 | Weight   | 2     | 2-1/4 | 2-1/2 | 2-3/4 | 3     | 3     | 3-1/2 | 3-1/2 | 4-3/4 |
| Stinger Retainer                | Part No. | 41097 | 41103 | 41109 | 41115 | 41121 | 41127 | 38419 | 41133 | 41139 |
|                                 | Weight   | 2-1/2 | 2-3/4 | 3     | 3-1/4 | 3-1/2 | 3-1/2 | 4     | 4     | 4-1/4 |
| Control Set Screw<br>(2 Req'd.) | Part No. | 12329 | 12329 | 12329 | 12329 | 12329 | 12329 | 12329 | 12329 | 12329 |
|                                 | Weight   | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  |
| Lead Seal<br>(2 Req'd.)         | Part No. | 17264 | 16146 | 26531 | 22406 | 13276 | 13286 | 12324 | 22416 | 13296 |
|                                 | Weight   | 1     | 1     | 1-1/4 | 1-1/2 | 1-3/4 | 2     | 2-1/4 | 2-3/8 | 2-5/8 |
| Bowl Seal<br>(2 Req'd.)         | Part No. | 30-15 | 30-18 | 30-24 | 30-28 | 30-33 | 30-36 | 30-38 | 30-40 | 30-41 |
|                                 | Weight   | 1/50  | 1/50  | 1/50  | 1/50  | 1/50  | 1/50  | 1/50  | 1/50  | 1/50  |

**How To Order:**

- Specify: (1) Name & Number of Assembly or Part.  
 (2) Casing O.D.  
 (3) Size & Type of Thread.

Prices will be quoted on request.

Completely "left hand" tools or tools with left hand threads are available on request.

Seal Assemblies suitable for service from 550°F. to 750° F temperature range are available, where required.

**Bowen Lead Seal Cementing Casing Patch (Continued)**

|                   |          |       |       |       |        |          |        |        |        |
|-------------------|----------|-------|-------|-------|--------|----------|--------|--------|--------|
| O.D. of Casing    |          | 6-5/8 | 7     | 7-5/8 | 8-5/8  | 9-5/8    | 10-3/4 | 11-3/4 | 13-3/8 |
| O.D. of Patch     |          | 8-5/8 | 9-1/8 | 9-7/8 | 11-1/8 | 11-15/16 | 13-5/8 | 14-3/4 | 16-5/8 |
|                   | Part No. | 40858 | 40859 | 40869 | 41004  | 41085    | 41086  | 41089  | 41087  |
| Complete Assembly | Weight   | 285   | 337   | 379   | 507    | 717      | 816    | 956    | 1363   |

**Replacement Parts (Continued)**

|                                 |          |       |       |        |       |       |       |       |       |
|---------------------------------|----------|-------|-------|--------|-------|-------|-------|-------|-------|
| Top Sub                         | Part No. | 41140 | 41146 | 41152  | 41158 | 41164 | 41170 | 41176 | 41185 |
|                                 | Weight   | 71    | 88    | 98     | 150   | 220   | 195   | 240   | 280   |
| Bowl                            | Part No. | 41141 | 41147 | 41153  | 41159 | 41165 | 41171 | 41177 | 41182 |
|                                 | Weight   | 67    | 82    | 98     | 112   | 187   | 235   | 260   | 310   |
| Guide                           | Part No. | 41142 | 41148 | 41154  | 41160 | 41166 | 41172 | 41178 | 41184 |
|                                 | Weight   | 72    | 75    | 80     | 125   | 165   | 208   | 255   | 360   |
| Grapple Carrier                 | Part No. | 41143 | 41149 | 41155  | 41161 | 41167 | 41173 | 41179 | 41183 |
|                                 | Weight   | 55    | 70    | 78     | 90    | 105   | 130   | 175   | 350   |
| Grapple                         | Part No. | 13303 | 12503 | 13073  | 13313 | 12478 | 13323 | 20858 | 18448 |
|                                 | Weight   | 2-5/8 | 2-3/4 | 3      | 4     | 5-1/8 | 6-1/2 | 7-3/4 | 9     |
| Grapple Control                 | Part No. | 13304 | 12504 | 13074  | 13314 | 12479 | 13324 | 20859 | 18449 |
|                                 | Weight   | 1-3/8 | 1-1/2 | 1-7/8  | 2-1/4 | 2-5/8 | 3     | 3-1/2 | 4     |
| End Seal<br>(2 Req'd.)          | Part No. | 13307 | 12507 | 13077  | 13317 | 12482 | 13327 | 20862 | 18452 |
|                                 | Weight   | 9/16  | 5/8   | 5/8    | 3/4   | 13/16 | 7/8   | 15/16 | 1     |
| Center Seal Ring                | Part No. | 13308 | 12508 | 13078  | 13318 | 12483 | 13328 | 20863 | 18453 |
|                                 | Weight   | 3/4   | 1     | 1-3/16 | 1-1/2 | 1-5/8 | 1-3/4 | 1-7/8 | 2     |
| Packer Stinger                  | Part No. | 41144 | 41150 | 41156  | 41162 | 41168 | 41174 | 41180 | 41186 |
|                                 | Weight   | 4     | 4-1/4 | 5      | 8     | 11    | 15    | 19    | 21    |
| Stinger Retainer                | Part No. | 41145 | 41151 | 41157  | 41163 | 41169 | 41175 | 41181 | 41187 |
|                                 | Weight   | 4-1/2 | 4-3/4 | 5-1/2  | 9     | 10    | 11    | 12    | 14    |
| Control Set Screw<br>(2 Req'd.) | Part No. | 12329 | 12329 | 12329  | 12484 | 12484 | 12484 | 12484 | 12484 |
|                                 | Weight   | 1/16  | 1/16  | 1/16   | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  |
| Lead Seal<br>(2 Req'd.)         | Part No. | 13306 | 12506 | 13076  | 13316 | 12481 | 13326 | 20861 | 18451 |
|                                 | Weight   | 3     | 3-1/2 | 3-3/4  | 4-1/8 | 4-1/2 | 4-7/8 | 5-3/8 | 6     |
| Bowl Seal<br>(2 Req'd.)         | Part No. | 30-43 | 30-45 | 30-48  | 27-76 | 27-77 | 27-82 | 27-80 | 27-86 |
|                                 | Weight   | 1/50  | 1/50  | 1/50   | 1/25  | 1/25  | 1/25  | 1/25  | 1/25  |

**How To Order:**

- Specify: (1) Name & Number of Assembly or Part.  
 (2) Casing O.D.  
 (3) Size & Type of Thread.

Prices will be quoted on request.

Completely "left hand" tools or tools with left hand threads are available on request.

Seal Assemblies suitable for service from 550°F. to 750° F temperature range are available, where required.



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# UNDERWATER WELLHEAD CASING PATCH

Instruction Manual 6480



Underwater Wellhead Casing Patch

# Underwater Wellhead Casing Patch

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PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Seventh Printing, September 2005



### General Description

Bowen Casing Patches for Underwater Wellhead Service are engineered to allow casing to be salvaged during landing operations, which would otherwise necessitate expensive underwater washover and pulling operations.

Bowen Casing Patches for Underwater Wellhead Service are essentially the same as the well known standard Bowen Packer Type Casing Patch, with the added feature of a long Top extension. This Extension allows sufficient length to catch the casing by pulling additional length into the Casing Patch.

These Casing Patches are available in a complete range of sizes from 5-1/2" thru 13-3/8" casing. Additional sizes to meet specific requirements will be made on special order.

The Top Extension is manufactured from casing where practical to reduce cost to a minimum. Where this is not practical, alloy tubing is used. Extensions are available, in most cases, of any required length.

Operation of these Casing Patches is identical to operation of the standard Bowen Packer Type Casing Patch.

### Use

Bowen Underwater Casing Patches may be used to patch any string of casing, but are specifically intended for use in casing landing operations on offshore installations, in sub-surface wellheads.

### Construction

Bowen Underwater Casing Patches are composed of a Bowl, Grapple, Packer (Upper), Control Packer (lower), Packer Protector, Adaptor Sub, Extension Sub, Top Sub, and Guide.

### Expansion of Mechanism

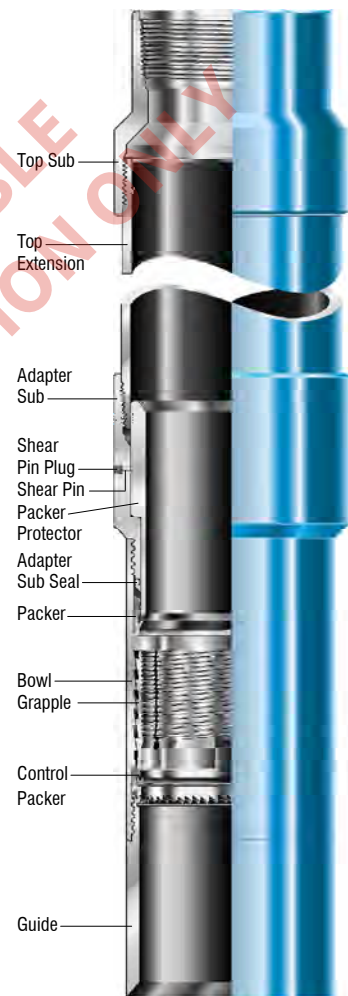
The Casing which is to be engaged during a casing landing operation is referred to as The Fish. The Bowl contains and supports the load-bearing Grapple. The Grapple is free to open sufficiently to admit the Fish and securely engage it by means of the hardened wickers in its inside diameter.

The Bowl contains and supports the load-bearing Grapple. The Grapple is free to open sufficiently to admit the fish (casing), and securely engage it by means of the hardened wickers in its inside diameter. The spirals between the Bowl and the Grapple o.d. will cause the Grapple to engage the Fish tighter over a large area as tensile load is applied and increased on the Bowl.

The Control Packer has hardened milling teeth which will remove burrs from the Fish and pack it off when in place around the Fish. After the Fish is engaged and passes into the Extension, the (upper) Packer will provide a second lip type seal around the Fish.

Top extensions are available in either casing or alloy material. Casing is more economical as far as cost, but usually requires larger o.d.'s. Alloy extensions provide greater strength with their flush o.d.'s.

The Packer Protector prevents the upper lip of the Packer from being damaged when the Fish enters the Packer. The Fish will bear against the Packer Protector, causing it to slide upward as the Fish enters. A suitable Shear Pin maintains the Packer Protector in place until it is displaced by the Fish.



Underwater Wellhead Casing Patch with Casing Type Extension

### Operation

Sometimes, during landing operations, the Casing being landed gets stuck off bottom. If this happens while the casing is being floated down in cement, an expensive and time consuming fishing job could result.

In place of conventional fishing, the operation may be salvaged by using a Bowen Casing Patch in the following manner:

The first collar below the wellhead may be located and the casing cut with a Bowen Hydraulic Internal Cutter, immediately below this collar. The upper portion of the casing is removed from the well. The remaining portion of the casing is picked up with the Bowen Casing Patch, pulled up into the wellhead, and locked in position.

After the cement cures, additional tension may be applied to the cemented string by catching it with a Bowen Releasing Spear, and pulling the upper end of the cemented string several feet into the Extension of the Casing Patch, provided for the purpose.

Prior to operation, check the Casing Patch to assure that it is complete and properly assembled.

Assemble a length of casing between the casing hanger and the Top Sub. The length required must be determined by the operator such that when the Casing Patch is engaged, the casing hanger will be seated in the casing head.

**CAUTION:** Use tongs on Top Sub only. If undue pressure is exerted on the Bowl, crushing or distortion may result.

### To Engage the Fish

Lower the tool into the hole until the fish depth is reached. As the fish is reached, the running string should be slowly rotated to the right while lowering it slowly. This combined slow rotation and lowering is important to the operation of the tool.

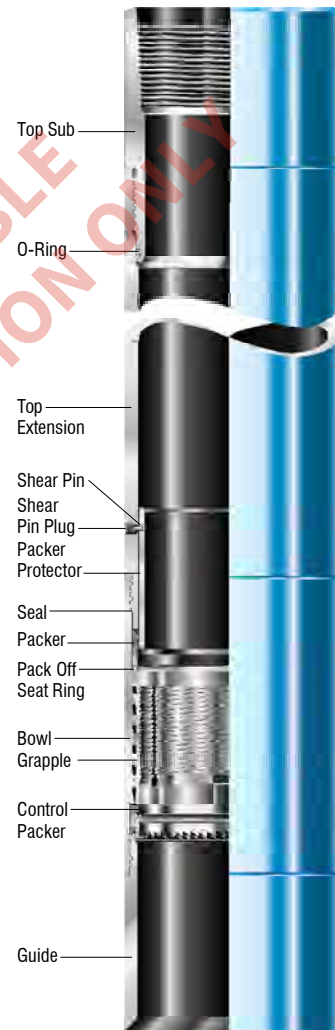
This should be continued until the fish enters the Casing Patch far enough to displace the Packer Protector and enter the Packer area. Simultaneously, the casing hanger should seat in the wellhead.

Proper engagement may be proved by picking up on the hanger, and pressure tested by the application of pump pressure. Allow any torque to slack from the running string, but avoid any backlash.

**CAUTION:** Care should be exercised during application of pressure to increase the pressure gradually, allowing the Packer to seat smoothly. In no case should the Casing Patch be "slugged" or shock loaded unnecessarily by the mud pumps.

Once the fish enters the Casing Patch and dislodges the Packer Protector, and the tool is subsequently disengaged from the fish, no attempt should be made to re-engage the tool without first bringing it to the surface to reset the Packer Protector. If the Packer Protector is not in position, there is danger of rupturing the upper lip of the Packer, rendering it useless.

**NOTE:** The Casing Patch may be released with ease any time prior to cementing. Once it is cemented in place however, the internal parts may no longer function and the Patch fail to release. In such cases, its removal may require milling it away or cutting the casing string below the Patch, whichever is simpler.



Underwater Wellhead Casing Patch with Alloy Type Extension

If for any reason it is desired to release the Casing Patch from the casing string, proceed as follows:

#### **To Release from the Fish**

Bump down firmly to break the “freeze” between the Grapple and the fish. After bumping down, slowly elevate the running string while simultaneously rotating slowly to the right. Continue this slow rotation and elevation until the Casing Patch is clear of the fish. The combined slow rotation and elevation is important to the proper release of the Casing Patch.

#### **Maintenance**

Since the Underwater Casing Patch is not ordinarily reused, usual maintenance does not apply. Preservative methods should be employed however, especially if the patch is to be stored for some period of time before its use. Before storage the tool should be disassembled, cleaned, greased and reassembled ready for service.

#### **Disassembly**

1. Break out and remove the top sub from the top extension.
2. Remove the Shear Pin Plug and Shear Pin from the Adaptor Sub.
3. Clamp the tool in a pipe vise and loosen the Adaptor Sub and Guide. Clamp on the Adaptor Sub rather than the Bowl, to avoid any crushing or distortion to the Bowl.
4. Remove the Packer Protector from the Adaptor Sub.
5. Loosen and remove the Adaptor Sub from the Bowl.
6. Remove the Packer near the upper end of the Bowl.
7. Loosen and remove the Guide from the Bowl.
8. Remove the Control Packer.

9. Using right-hand rotation, unscrew the Grapple from the lower end of the Bowl.

#### **Reassembly**

1. Screw the Grapple into the lower end of the Bowl, using left-hand rotation. The slot in the Grapple should land in line with the slot in the Bowl.
2. Insert the Control Packer. Fit the finger of the Control Packer into the slots of the Bowl and the Grapple. This keys the Bowl and the Grapple together.
3. Screw the Guide into the lower end of the Bowl.
4. Fold the Packer in and insert it in the space provided near the upper end of the Bowl.
5. Screw the Adaptor Sub into the top of the Bowl.
6. Insert the Packer Protector into the Adaptor Sub, stinger end first.
7. Clamp the tool in a pipe vise and tighten the Adaptor Sub and Guide. Clamp on the Sub rather than the Bowl, to avoid any crushing or distortion to the Bowl.
8. Insert the Shear Pin through the Adaptor Sub and follow it with the Shear Pin Plug.
9. Assemble the Extension and Top Sub and buck them up tight.
10. If required for spacing, insert a short length of casing into the upper connection of the Top Sub and connect the assembly to the casing hanger.

All parts should be thoroughly greased before being assembled. If the tool is to be stored for some time before being used, the outside should be painted or greased to prevent rust or deterioration.

### Bowen Underwater Wellhead Casing Patches

|                            |                |         |        |        |        |        |
|----------------------------|----------------|---------|--------|--------|--------|--------|
| Casing Size (Inches)       | 5-1/2          | 5-1/2   | 7      | 7      | 9-5/8  | 9-5/8  |
| Casing Patch O.D. (Inches) | 7-21/32        | 6-13/16 | 8-5/16 | 8-5/16 | 11-1/8 | 11-1/8 |
| Extension O.D. (Inches)    | 7              | 6       | 8-3/8  | 8-3/8  | 11-1/8 | 11-3/4 |
| Type Of Extension          | Casing         | Alloy   | Casing | Alloy  | Alloy  | Casing |
| Length Of Extension        | 10'            | 10'     | 10'    | 10'    | 10'    | 10'    |
| Complete Assembly          | Part No. 47778 | 47772   | 44960  | 47767  | 47972* | 45000  |
|                            | Weight         | 500     | 455    | 400    | 730    | 1290   |
|                            |                |         |        |        |        | 645    |

### Replacement Parts

|                              |          |       |       |       |       |        |         |
|------------------------------|----------|-------|-------|-------|-------|--------|---------|
| Top Sub                      | Part No. | 47779 | 47773 | 44961 | 44961 | 46509  | 45001   |
|                              | Weight   | 40    | 40    | 62    | 62    | 145    | 100     |
| Top Sub Seal                 | Part No. | —     | 30-45 | 30-42 | 30-42 | 30-52  | 568-275 |
|                              | Weight   | —     | 1/32  | 1/32  | 1/32  | 1/32   | 1/32    |
| Top Extension                | Part No. | 47780 | 47774 | 44962 | 47769 | 46508  | 45002   |
|                              | Weight   | 347   | 290   | 130   | 500   | 1000   | 250     |
| Adapter Sub                  | Part No. | 47781 | —     | 44966 | —     | —      | 45005   |
|                              | Weight   | 50    | —     | 55    | —     | —      | 40      |
| Adapter Sub Seal             | Part No. | 30-35 | —     | 30-42 | —     | —      | 30-52   |
|                              | Weight   | 1/32  | —     | 1/32  | —     | —      | 1/32    |
| Packer                       | Part No. | 11226 | 11226 | 11241 | 11241 | 11256* | 11256   |
|                              | Weight   | 1/4   | 1/4   | 1/4   | 1/4   | 1/4    | 1/4     |
| Packer Protector             | Part No. | 47782 | 47776 | 44964 | 47770 | 47973  | 45004   |
|                              | Weight   | 30    | 35    | 37    | 45    | 44     | 52      |
| Shear Pin<br>(4 Req'd.)      | Part No. | 47783 | 46088 | 46088 | 46088 | 47975  | 46097   |
|                              | Weight   | 1/16  | 1/16  | 1/16  | 1/16  | 1/8    | 1/8     |
| Shear Pin Plug<br>(4 Req'd.) | Part No. | 10641 | 36478 | 36478 | 36478 | 10641  | 36478   |
|                              | Weight   | 1/16  | 1/16  | 1/16  | 1/16  | 1/8    | 1/8     |
| Control Packer               | Part No. | 11463 | 11463 | 11469 | 11469 | 11475  | 11475   |
|                              | Weight   | 3     | 3     | 4     | 4     | 8      | 8       |
| Grapple                      | Part No. | 11228 | 11228 | 11243 | 11243 | 11258  | 11258   |
|                              | Weight   | 12    | 12    | 15    | 15    | 20     | 20      |
| Bowl                         | Part No. | 47775 | 47775 | 44963 | 44963 | 47974  | 45003   |
|                              | Weight   | 40    | 40    | 47    | 47    | 75     | 79      |
| Guide                        | Part No. | 11229 | 11229 | 11244 | 11244 | 11259  | 11259   |
|                              | Weight   | 40    | 40    | 50    | 50    | 90     | 90      |
| Top Extension Seal           | Part No. | —     | 30-35 | —     | 30-42 | 30-52  | 568-275 |
|                              | Weight   | —     | 1/16  | —     | 1/16  | 1/16   | 1/16    |

\* Special 2 Packers Required for these Assemblies.

#### How To Order:

- Specify: (1) Name and number of assembly or part.  
 (2) Connection size and type.  
 (3) Type of casing patch.  
 (4) Casing size to be patched.  
 (5) Length and o.d. of extension if other than standard.

**Bowen Underwater Wellhead Casing Patches (Continued)**

|                            |          |        |        |         |        |        |        |
|----------------------------|----------|--------|--------|---------|--------|--------|--------|
| Casing Size (Inches)       |          | 9-5/8  | 10-3/4 | 10-3/4  | 13-3/8 | 13-3/8 | 13-3/8 |
| Casing Patch O.D. (Inches) |          | 11-1/8 | 14-3/8 | 12-5/16 | 17     | 15-1/8 | 17     |
| Extension O.D. (Inches)    |          | 11-1/8 | 13-3/8 | 12-3/8  | 16     | 15-1/8 | 16     |
| Type Of Extension          |          | Alloy  | Casing | Alloy   | Casing | Alloy  | Casing |
| Length Of Extension        |          | 10'    | 10'    | 10'     | 10'    | 10'    | 10'    |
| Complete Assembly          | Part No. | 47758  | 47736  | 47730   | 43379  | 40398  | 47966* |
|                            | Weight   | 1145   | 1625   | 1325    | 1300   | 1980   | 1400   |

**Replacement Parts**

|                              |          |       |         |         |       |       |        |
|------------------------------|----------|-------|---------|---------|-------|-------|--------|
| Top Sub                      | Part No. | 47759 | 47737   | 47731   | 43378 | 40399 | 43378  |
|                              | Weight   | 130   | 160     | 120     | 230   | 175   | 230    |
| Top Sub Seal                 | Part No. | 30-52 | —       | 568-276 | —     | 27-83 | —      |
|                              | Weight   | 1/32  | —       | 1/16    | —     | 1/16  | —      |
| Top Extension                | Part No. | 47760 | 47738   | 47732   | 43377 | 48311 | 43377  |
|                              | Weight   | 770   | 1060    | 920     | 390   | 1440  | 390    |
| Adapter Sub                  | Part No. | —     | 47739   | —       | 43380 | —     | 43380  |
|                              | Weight   | —     | 115     | —       | 210   | —     | 210    |
| Adapter Sub Seal             | Part No. | —     | 568-276 | —       | 27-83 | —     | 27-83  |
|                              | Weight   | —     | 1/16    | —       | 1/16  | —     | 1/16   |
| Packer                       | Part No. | 11256 | 11261   | 11261   | 41061 | 41061 | 41061* |
|                              | Weight   | 1/4   | 1/2     | 1/2     | 1/2   | 1/2   | 1/2    |
| Packer Protector             | Part No. | 47761 | 47740   | 47734   | 41060 | 48337 | 47968  |
|                              | Weight   | 44    | 60      | 25      | 145   | 145   | 170    |
| Shear Pin<br>(4 Req'd.)      | Part No. | 47762 | 47741   | 47733   | 43383 | 27671 | 43383  |
|                              | Weight   | 1/8   | 1/4     | 1/4     | 1/4   | 1/4   | 1/8    |
| Shear Pin Plug<br>(4 Req'd.) | Part No. | 10641 | 10641   | 10641   | 36478 | 36478 | 36478  |
|                              | Weight   | 1/8   | 1/4     | 1/4     | 1/4   | 1/4   | 1/4    |
| Control Packer               | Part No. | 11475 | 11477   | 11477   | 41039 | 41039 | 41039  |
|                              | Weight   | 8     | 10      | 10      | 20    | 20    | 20     |
| Grapple                      | Part No. | 11258 | 11263   | 11263   | 41037 | 41037 | 41037  |
|                              | Weight   | 20    | 30      | 30      | 25    | 25    | 25     |
| Bowl                         | Part No. | 45003 | 47735   | 47735   | 41036 | 41036 | 47967  |
|                              | Weight   | 79    | 90      | 125     | 125   | 125   | 185    |
| Guide                        | Part No. | 11259 | 11264   | 11264   | 41040 | 41040 | 47969  |
|                              | Weight   | 90    | 90      | 90      | 130   | 130   | 170    |
| Top Extension Seal           | Part No. | 30-52 | —       | 568-276 | —     | 27-83 | —      |
|                              | Weight   | 1/16  | —       | 1/16    | —     | 1/16  | —      |

\* Special 2 Packers Required for these Assemblies.

How To Order:

- Specify: (1) Name and number of assembly or part.  
 (2) Connection size and type.  
 (3) Type of casing patch.  
 (4) Casing size to be patched.  
 (5) Length and o.d. of extension if other than standard.



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# HIGH PRESSURE CASING PATCHES

Instruction Manual



High Pressure Casing Patches

One Company Unlimited Solutions

**NOV** NATIONAL OILWELL VARCO

# HIGH PRESSURE CASING PATCHES

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*The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.*

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## General Description

The Bowen® High Pressure Casing Patch is an external catch tool, designed to engage a previously prepared fish, pack it off, and become a permanent part of the repaired casing, pipe or tubing.

The same dependable method of engagement and release which is utilized for Bowen Overshots is employed in the Bowen High Pressure Casing Patch. This method assures positive engagement and positive seal-off from either direction. The Patch provides a permanent connection which remains rigid and leak-proof for many years, yet is positively releasable if ever the need arises.

Bowen High Pressure Casing Patches will not restrict the bore of the casing or tubing in any manner.

The Bowen High Pressure Casing Patch is composed of four outside parts and six internal parts. This simplicity of design is matched by the simple positive operation.

## Use

The Bowen High Pressure Casing Patch as indicated is used to repair a damaged casing string by replacement of the damaged section, without having to remove the entire string of casing from the hole. Where the upper portion of a casing string becomes ruptured or disoriented from the lower portion such as by faulting or caving of the formation, crushing, rupture, or backing off, the upper portion must be removed. New casing is then replaced, the Bowen High Pressure Casing Patch forming the patching means between the old and new strings.

## Construction

The Bowen High Pressure Casing Patch is constructed in the most basic manner to perform the functions of engaging the fish, sealing off the fish, or releasing, either during or after setting operations, should this become advisable.

The TOP SUB, EXTENSIONS, BOWL, and GUIDE form the outer assembly.

The TOP SUB has an upper connection to match the running string, and a lower connection to mate with the Bowl or Optional EXTENSIONS as used for underwater operations. Top Sub and Extensions have seals, which are located immediately above and below the pin connection threads of the Top Sub and Extensions.

The BOWL has an upper connection for the Top Sub or Optional Extension, an area of length into which the PACKER PROTECTOR slides during operation, a spiraled section which contains the engaging GRAPPLE, a space for the MILL CONTROL, and a lower connection to accept the GUIDE.

The GUIDE is usually flush with the outside diameter of the Casing Patch, and cut lipped. The primary purpose of the Guide is to assist smooth entry of the fish into the catch area of the patch. A secondary function is to maintain the inner working parts in position.

The inner working parts of the Bowen High Pressure Casing Patch are the GRAPPLE, PACKER, NON-EXTRUSION RING, MILL CONTROL, SHEAR RING, and PACKER PROTECTOR.

The GRAPPLE is essentially a cylinder with wickers in its inside diameter for engaging the fish, and spirals on its outside diameter to mate with the spirals in the Bowl. Both the wickers and the spirals are made with a left-hand lead, which allow release by right-hand rotation. The Grapple has a series of longitudinal slots which allow the Grapple to flex diametrically during operation.

The PACKER has a single oversized lip on the ID to seal on the casing and a small lip to seal on the inside of the bowl seal groves. Molded in one piece from Synthetic rubber compounds to include the best combination of properties for general oil well service. It withstands most well fluids; has good resistance to gas invasion, and abrasion.

The NON-EXTRUSION Rings serve as backup rings to the packers as to prevent the packers from extruding between the casing and the bowl. Made from various materials, the non-extrusion rings are very important to the performance of the packers and if they fail to perform, the packers alone will not be capable of containing a high working pressure.

In service, the outside of the Packer seals against the inside of the Bowl but the Oversized lip on the ID is protected from damage by the PACKER PROTECTOR, until the entering fish pushes the Packer Protector up out of the way. This packer protector has a SHEAR RING which includes holes for optional shear pins which are not required but can be used to ensure proper position of the Packer Protector until engagement of casing and prevent premature exposure of the packers and possible damage to Packers.

The MILL CONTROL serves the dual purpose of milling off burrs from the outside of the fish as it enters the assembly and has a Control Finger that keys the Grapple to the Bowl. The Grapple is free to move up and down sufficiently to engage or release the fish, but is prevented by the Control Finger from rotating. Thus, the torque required to release the assembly may be transmitted from the running string through the Top Sub, Extensions, Bowl, Mill Control, and on to the Grapple.



**Figure 1.**  
**High Pressure**  
**Casing Patch**

## Operation

**NOTE:** Prior to running the Casing Patch, the fish should be prepared. This usually includes washing over and cleaning the upper end of the fish of splits and burrs, and “sizing” the fish.

**NOTE:** The tool should be assembled in accordance with the “Complete Assembly” instructions found on this page.

1. Assemble the tool to the running string and buck it up tight.

**CAUTION:** Use tongs on Top Sub only. If undue pressure is exerted on the Bowl, crushing or distortion may result.

2. Lower the tool into the hole until the fish depth is reached. As the fish is reached, the running string should be slowly rotated to the right while lowering it slowly. This combined slow rotation and lowering is important to the operation of the tool.

This should be continued until the fish has entered the tool and “bottomed” the Packer Protector against the lower end of the Top Sub. This can be determined by watching the rig weight indicator. Allow 15,000 to 20,000 pounds of weight to be supported by the Casing Patch, to assure good and complete engagement.

3. At this point, pick up the running string to remove the weight from the Casing Patch, while allowing the torque to slack from the running string.

**CAUTION:** Avoid any backlash.

4. The effectiveness of the Packer may be checked at this point, by application of mud pressure.

**CAUTION:** Care should be exercised during application of pressure to increase the Pressure gradually, allowing the Packer to seat smoothly. In no case should the Casing Patch be “slugged” or shock loaded unnecessarily by the mud pumps.

5. Pick up the running string and apply sufficient pull to remove any slack from the string, and set the slips. No load is required to maintain engagement nor is any load required to effect or maintain a seal; any excessive pull should therefore be avoided, as excessive pull reduces the allowable hydrostatic pressure capacity of the assembly. See strength charts in this manual.

6. Once the fish enters the Casing Patch and dislodges the Packer Protector, and the tool is subsequently disengaged from the fish, no attempt should be made to re-engage the tool without first bringing it to the surface to reset the Packer Protector. If the Packer Protector is not in position, there is danger of rupturing the upper lip of the Packer, rendering it useless.

**NOTE:** The BOWEN HIGH PRESSURE CASING PATCH is relatively unaffected by ordinary corrosion, etc., so that it may be released years after initial setting. If the Casing Patch is cemented in place, however, so that the internal working parts are invaded by cement; the patch may not release. In such cases, its removal may require milling it away or cutting the string below the patch and removing the patch with a portion of the milled over and retrieved string.

If for any reason it is desired to release and remove the Casing Patch from the tubing or casing string, proceed as follows:

### To Release the High Pressure Type Casing Patch

1. Bump down firmly, until the top of the fish “bottoms” against the Top Sub. This will break the “freeze” between the Grapple and the fish.
2. After bumping down, slowly elevate the running string, while simultaneously rotating slowly to the right.
3. Continue this slow elevation and rotation until the Casing Patch is clear of the fish. This combined slow rotation and elevation is important to the proper function of the Casing Patch.

## Complete Assembly

**NOTE:** Before actual assembly begins, the parts should be thoroughly checked to assure that they are in good condition and of the proper size for the operation. The Packer, Grapple, and Mill Control are all stenciled with the part number and catch size.

**NOTE:** Clean all parts thoroughly, and lubricate them with grease or lubricating oil. If the tool is to be stored for any length of time, it is preferable to not grease the Packer or that portion of the body which houses the Packer. Petroleum products are detrimental to rubber products, particularly when stored in the open atmosphere.

Actual assembly should proceed as follows:

1. Clamp the BOWL in a suitable vise, horizontally.

**NOTE:** For 7" tool and below, follow instructions 2A. For 7½" tool and above, follow instructions 2B

- 2A I. Install the O-Rings and Backup Rings onto Bowl and Connecting Sub Seal Grooves. Each Backup Ring should be installed with their face of curvature lined up with the corresponding O-Ring Curvature. Refer to Assembly drawing for details.
  - II. Install packers and non-extrusion rings onto seal body as shown in the assembly drawing. The two packers in the seal body closest to the bowl should be oriented with their lip facing upward (opposing downward flow). The corresponding non-extrusion rings should be set up just underneath the packers. The upper packers and non-extrusion ring in the seal body are oriented in the opposite direction. Refer to assembly drawing
  - III. Make the subsequent thread connections. Bowl to Seal Body, Seal Body to Connecting Sub and Connecting Sub to Seal Body.
- 2B Collapse the PACKER by squeezing one side in toward the center. This will make the Packer small enough to be passed through the top end of the Bowl and be inserted into the space provided, immediately above the spiraled section. Each packer requires a non-extrusion ring. Reference the assembly drawing for position and direction of packer.
2. **Sub Assembly** — Install shear ring onto the packer protector by using shear pins to hold it in place.
  3. Assemble the PACKER PROTECTOR in position by sliding it into the top end of the Bowl. The packer protector will slide in and keep the lips of the all the packers deflected. Unlike the top two, the bottom two packers face the opposite direction to the way in which

the packer protector is being inserted. As such, the bottom packers will need to be physically maneuvered and worked to ensure their lips are deflected the correct way as the packer protector is being inserted. The packer protector is slid in until it comes to rest with its lower end immediately above the grapple. The packer protector is designed to keep the lips of the packers deflected until the fish pushes the Packer Protector out of the Packers. The packer protector prevents the lip of the Packers from being damaged during the setting operation. Once the fish is in proper catch position, the Packers will seal the fish in place.

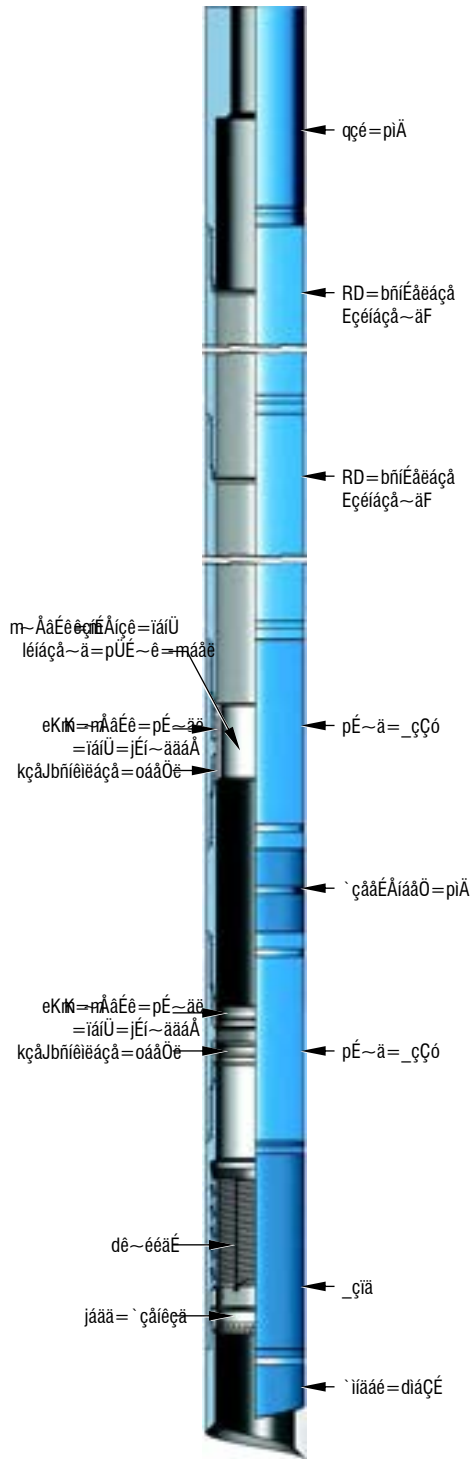
**CAUTION:** Once the fish enters the Casing Patch and unseats the Packer Protector the Casing Patch may be released as previously described. No attempt should be made to re-engage the fish however, once it is disengaged; a second engagement would very likely rupture the upper lip of the seal, rendering it useless. If a second engagement is necessary, the tool must be brought to the surface and the Seal Protector reseated as described in "Complete Assembly." A second run may then be made with safety.

4. Assemble the GRAPPLE in the Bowl. This may be done by grasping the Grapple by its lower end, and screwing it into the Bowl from the Bowl lower end. Left-hand rotation is required, as the spiraled outside diameter is a left hand lead spiral. This design allows the tool to be released by right-hand rotation, when required. The lower end of the Grapple can be distinguished from the upper end by the single large slot in the lower end of the Grapple. Insert the Grapple deep enough into the Bowl to allow the single large slot to line up with the similar slot in the bottom portion of the Bowl spiral. The bottom of the Grapple should be just above the lowest part of the spiral in the Bowl, when in proper position.
5. Insert the MILL CONTROL into the Bowl so that the protruding control finger rests in the slot in the lower end of the bowl spiral and simultaneously in the grapple slot.
6. Apply thread dope to the threads of the GUIDE and assemble the Guide to the Bowl, and tighten.
7. Assemble the TOP SUB SEAL in the groove provided in the lower end of the Top Sub. Assemble the 2 EXTENSIONS (optional) between the top sub and the bowl. Assemble the O-Rings and Backup rings in between the
8. Apply thread dope to the threads (and seal) on the TOP SUB, and assemble the Top Sub in the Bowl, and tighten. The assembly is now complete and ready for service.

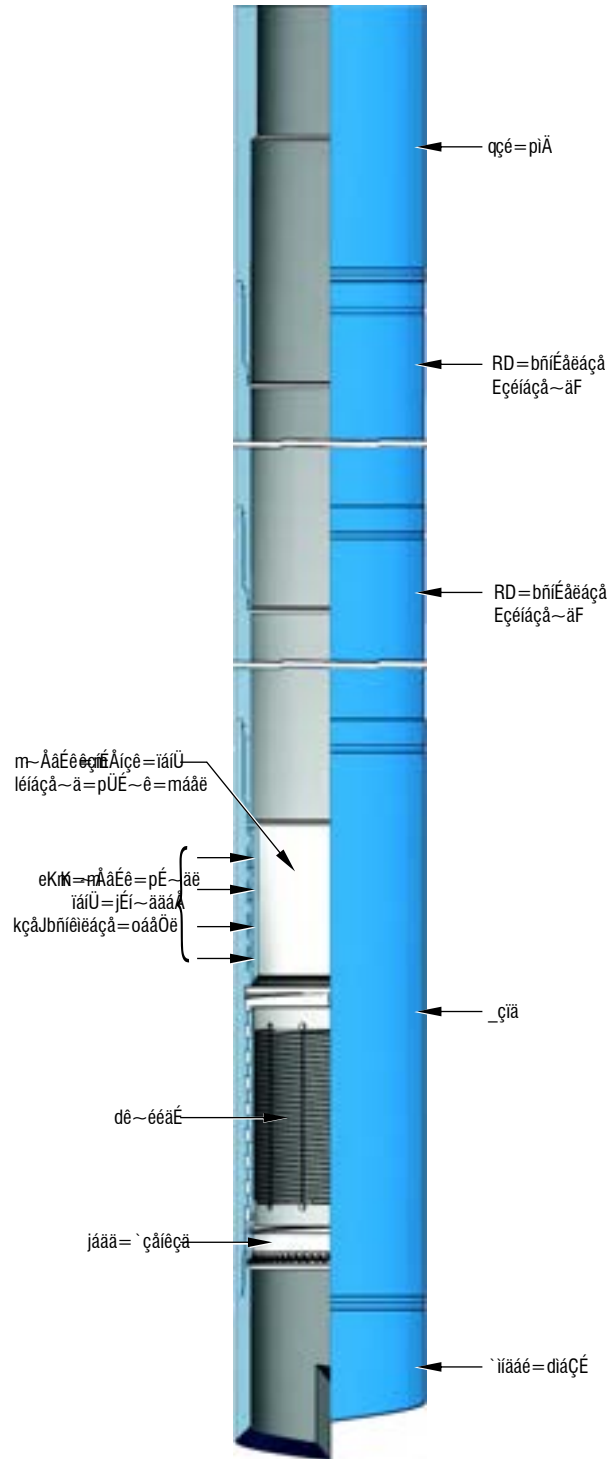
## Complete Disassembly

To completely disassemble the Casing Patch, proceed as follows:

1. Clamp the assembly in a suitable vise horizontally. Clamp immediately below the top connection, just below the threaded joint.
2. Break loose and remove the Top Sub.
3. Remove the Top Sub Seal.
4. Break loose and remove the Guide.
5. Lift out the Mill Control.
6. Remove the Grapple. This may be done by unscrewing it, using right hand rotation.
7. Remove the Packer Protector by sliding it out the upper end of the Bowl.
8. Remove the Packer. This may be done by slipping a bent screwdriver under one end of the Packer until the edge can be grasped. Collapse the Packer toward the center and remove it. This completes the disassembly of the tool.



**Figure 2.**  
**7" Casing and Below**



**Figure 3.**  
**7 5/8" Casing and Above**

## Specifications

| CASING SIZE<br>(inches) | MAXIMUM O.D<br>(inches) | MAXIMUM<br>PRESSURE RATING<br>@ O.D. (psi) | ASSEMBLY<br>PART NUMBER | MAXIMUM RECOMMENDED<br>PULL LOAD<br>@ 0 Pressure (lbs) | MAXIMUM RECOMMENDED<br>PULL LOAD<br>@ MAX Pressure (lbs) |
|-------------------------|-------------------------|--|-------------------------|--|--|
| 2 3/8                   | 3 15/32                 | 20000                                      | 504803                  | 189000   | 100000   |
| 2 7/8                   | 4 1/32                  | 20000                                      | 504751                  | 246000   | 116000   |
| 3 1/2                   | 4 13/16                 | 20000                                      | 504738                  | 333000   | 140000   |
| 4 1/2                   | 6                       | 17000                                      | 504294                  | 488000   | 218000   |
| 5 1/2                   | 7 1/8                   | 17000                                      | 504305                  | 642000   | 238000   |
| 6 5/8                   | 8 5/16                  | 15000                                      | 504727                  | 770000   | 253000   |
| 7                       | 9 1/16                  | 15000                                      | 504159                  | 938000   | 360000   |
| 7 5/8                   | 9 9/16                  | 15000                                      | 504635                  | 1032000  | 347000   |
| 7 3/4                   | 9 11/16                 | 15000                                      | 504536                  | 1028000  | 321000   |
| 8 5/8                   | 10 5/8                  | 15000                                      | 504679                  | 1108000  | 232000   |
| 9 5/8                   | 12 1/8                  | 15000                                      | 504567                  | 1521000  | 430000   |
| 9 7/8                   | 12 3/8                  | 15000                                      | 504402                  | 1561000  | 412000   |
| 10 3/4                  | 13 3/8                  | 15000                                      | 504648                  | 1802000  | 440000   |
| 11 3/4                  | 14 1/2                  | 15000                                      | 504194                  | 2014000  | 388000   |
| 11 7/8                  | 14 5/8                  | 15000                                      | 504668                  | 2031000  | 370000   |
| 13 3/8                  | 16 1/2                  | 15000                                      | 504617                  | 2593000  | 485000   |
| 13 5/8                  | 16 3/4                  | 15000                                      | 504074                  | 2633000  | 446000   |
| 16                      | 18 11/16                | 8000                                       | 504701                  | 1881000  | 272000   |
| 18 5/8                  | 22 1/8                  | 8000                                       | 504716                  | 2569000  | 389000   |
| 20                      | 24                      | 8000                                       | 504518                  | 2881000  | 368000   |

**NOTE:** The pressure ratings and pull loads listed above are for the maximum O.D. Tools with smaller O.D.'s and corresponding lower pressure ratings and pull loads are available upon request. New High Pressure Casing Patch sizes are being designed and may not be on this list. Call sales for updated information.

## Replacement Parts

### Bowen High Pressure Casing Patches — Basket Grapple

| CASING O.D. (inches)      | O= $\frac{1}{2}$ PLU= | O= $\frac{3}{4}$ TLU= | P= $\frac{1}{2}$ = | Q= $\frac{1}{2}$ = | R= $\frac{1}{2}$ = | S= $\frac{1}{2}$ RLU= | T= $\frac{1}{2}$ RLU= | T= $\frac{1}{2}$ PLQ= | U= $\frac{1}{2}$ RLU= |        |
|---------------------------|-----------------------|-----------------------|--------------------|--------------------|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------|
| <b>MAXIMUM PATCH O.D.</b> | P=NRLPO               | Q=NLPLO               | Q=NPLNS            | S=====             | T=NLU=             | U=RLNS                | V=NLNS                | V=VLNS                | V=NNLNS               | NM=RLU |
| <b>COMPLETE ASSEMBLY</b>  |                       |                       |                    |                    |                    |                       |                       |                       |                       |        |
| m~ $\frac{1}{2}$ =kçK     | RMQUMP                | RMQTRN                | RMQTPU             | RMQOVQ             | RMQPMR             | RMQTOT                | RMQNRV                | RMQSPR                | RMQRPS                | RMQSTV |
| t ÉáÖÜí=EäÄëF             | 00R                   | 00Q                   | PVR                | RVO                | TVT                | VUS                   | NOOKS                 | NONMKN                | NOQNKQ                | NPVT   |

### Replacement Parts

|                           |                       |            |            |            |            |            |            |            |            |            |            |
|---------------------------|-----------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Cutlip Guide</b>       | m~ $\frac{1}{2}$ =kçK | RMQUMQ     | RMQTRO     | RMQTPV     | RMQOUQ     | RMQOVR     | RMQTOU     | RMQNQV     | RMQSPS     | RMQRPT     | RMQSUM     |
|                           | t ÉáÖÜí=EäÄëF         | TKR        | TKV        | NMKO       | OMKV       | ORKO       | OVKU       | PQ         | RS         | SSKV       | TRKS       |
| <b>Mill Control</b>       | m~ $\frac{1}{2}$ =kçK | RMQUMR     | RMQTRP     | RMQTQM     | RMQOUR     | RMQOVS     | RMQTOV     | RMQNSN     | RMQSPV     | RMQRPU     | RMQSUN     |
|                           | t ÉáÖÜí=EäÄëF         | MKQ        | MKR        | MKS        | TKQ        | TKQ        | OKS        | TKQ        | RKO        | QKV        | RKV        |
| <b>Bowl</b>               | m~ $\frac{1}{2}$ =kçK | RMQUMS     | RMQTRQ     | RMQTQN     | RMQOUS     | RMQOVT     | RMQTPM     | RMQNRQ     | RMQSPQ     | RMQRQM     | RMQSUO     |
|                           | t ÉáÖÜí=EäÄëF         | NU         | NVQR       | OSKT       | PRKR       | RMKP       | TSKR       | UV         | NTTKO      | NTVKP      | ONPKP      |
| <b>Basket Grapple</b>     | m~ $\frac{1}{2}$ =kçK | RMQUMT     | RMQTRR     | RMQTQO     | RMQOUT     | RMQOVU     | RMQTPN     | RMQNSM     | RMQSPU     | RMQRPV     | RMQSUP     |
|                           | t ÉáÖÜí=EäÄëF         | NKR        | NKT        | OKO        | TKU        | NMKT       | NQKU       | NSKO       | NTKQ       | NTKS       | OP         |
| <b>Packer</b>             | m~ $\frac{1}{2}$ =kçK | RMQUNM     | RMQTRU     | RMQTQR     | RMQOUU     | RMQOVV     | RMQTPQ     | RMQNST     | RMQSPQ     | RMQRQO     | RMQSUQ     |
|                           | t ÉáÖÜí=EäÄëF         | MKN        | MKN        | MKN        | MKP        | MKP        | MKR        | MKR        | MKR        | MKR        | MKR        |
| <b>Non-Extrusion Ring</b> | m~ $\frac{1}{2}$ =kçK | RMQUNN     | RMQTRV     | RMQTQS     | RMQOUV     | RMQPMN     | RMQTPP     | RMQNSS     | RMQSQR     | RMQRQN     | RMQSUR     |
|                           | t ÉáÖÜí=EäÄëF         | MKNO       | MKNR       | MKO        | MKP        | MKQ        | MKR        | MKS        | MKT        | MKT        | MKT        |
| <b>Seal Body</b>          | m~ $\frac{1}{2}$ =kçK | RMQUMU     | RMQTRS     | RMQTQP     | RMQPRS     | RMQQMM     | RMQTSR     | RMQRUV     |            |            |            |
|                           | t ÉáÖÜí=EäÄëF         | NQ         | NQKU       | ONKS       | OVKQ       | PVKT       | QVKU       | RT         |            |            |            |
| <b>Connecting Sub</b>     | m~ $\frac{1}{2}$ =kçK | RMQUMV     | RMQTRT     | RMQTQQ     | RMQPRQ     | RMQQMN     | RMQTSS     | RMQRVM     |            |            |            |
|                           | t ÉáÖÜí=EäÄëF         | NSKO       | NSKU       | OOKP       | OU         | QRKS       | RS         | TTKS       |            |            |            |
| <b>Shear Ring</b>         | m~ $\frac{1}{2}$ =kçK | RMQUNP     | RMQTSN     | RMQTQU     | RMQOVN     | RMQPMO     | RMQTPR     | RMQNSP     | RMQSQP     | RMQRQQ     | RMQSUT     |
|                           | t ÉáÖÜí=EäÄëF         | MKQ        | MKR        | MKS        | N          | NKO        | NKR        | O          | NKV        | NKV        | NKV        |
| <b>Shear Pin</b>          | m~ $\frac{1}{2}$ =kçK | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR |
|                           | t ÉáÖÜí=EäÄëF         | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |
| <b>Packer Protector</b>   | m~ $\frac{1}{2}$ =kçK | RMQUNO     | RMQTSM     | RMQTQT     | RMQOVM     | RMQPMN     | RMQTPQ     | RMQNRQ     | RMQSQM     | RMQRQP     | RMQSUS     |
|                           | t ÉáÖÜí=EäÄëF         | OKP        | OKU        | PKQ        | QKU        | T          | VKO        | NM         | NUKO       | QPKR       | OT         |
| <b>Extension</b>          | m~ $\frac{1}{2}$ =kçK | RMQUNQ     | RMQTSO     | RMQTQV     | RMQOVO     | RMQPMQ     | RMQTPS     | RMQNSQ     | RMQSQN     | RMQRQR     | RMQSUU     |
|                           | t ÉáÖÜí=EäÄëF         | UMKR       | URKU       | NNUKQ      | NTSKN      | OOVKN      | OTRKT      | PQU        | PRPKT      | PRPKQ      | PVPKP      |
| <b>Top Sub</b>            | m~ $\frac{1}{2}$ =kçK | RMQUNR     | RMQTSP     | RMQTRM     | RMQOVP     | RMQPMQ     | RMQTPQ     | RMQNSR     | RMQSQQ     | RMQRQS     | RMQSUV     |
|                           | t ÉáÖÜí=EäÄëF         | OVKT       | POKR       | QQKU       | TPKP       | NMUKV      | NPSKP      | NTQ        | OOO        | ONRKT      | OSM        |
| <b>O-Ring</b>             | m~ $\frac{1}{2}$ =kçK | RSUOPPLMOM | RSUOPTLMOM | RSUOQO     | RSUORNLMOM | RSUORVLMOM | RSUOSPLMOM | RSUOSRLMOM | RSUOSULMOM | RSUOSULMOM | RSUOTOLMOM |
|                           | t ÉáÖÜí=EäÄëF         | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |
| <b>O-Ring</b>             | m~ $\frac{1}{2}$ =kçK | RSUOPNLMOM | RSUOPRLMOM | RSUOQM     | RSUOQVLMOM | RSUORTLMOM | RSUOSOLMOM | RSUOSQLMOM | RSUOSSLMOM | RSUOSTLMOM | RSUOTMLMOM |
|                           | t ÉáÖÜí=EäÄëF         | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |
| <b>Parbak</b>             | m~ $\frac{1}{2}$ =kçK | ULNPM      | ULNNN      | ULVON      | ULONR      | ULMPT      | ULMOU      | ULVNR      | ULOST      | ULVOU      | ULOTN      |
|                           | t ÉáÖÜí=EäÄëF         | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |
| <b>Parbak</b>             | m~ $\frac{1}{2}$ =kçK | ULMQN      | ULVNV      | ULMPU      | ULMPS      | ULORT      | ULVOR      | ULNMT      | ULVNR      | ULMOS      | ULMOQ      |
|                           | t ÉáÖÜí=EäÄëF         | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |

#### How to Order:

##### Specify:

- 1 – Name and Number of Assembly or Part
- 2 – Casing O.D.
- 3 – Size and Type of Top Connection
- 4 – Hole Size

## Replacement Parts (continued)

### Bowen High Pressure Casing Patches — Basket Grapple

| CASING O.D. (inches)     | V==RLU=  | V==TLU=  | NM==PLQ= | NN==PLQ= | NN==TLU= | NP==PLU= | NP==RLU= | NS=====  | NU==RLU= | OM     |
|--------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------|
| MAXIMUM PATCH O.D.       | NO==NLU= | NO==PLU= | NP==PLU= | NQ≠/2=   | NQ==RLU= | NS≠/2=   | NS==PLQ= | NU=NNLNS | OO==NLU= | OQ     |
| <b>COMPLETE ASSEMBLY</b> |          |          |          |          |          |          |          |          |          |        |
| m~b=kçK                  | RMQRST   | RMQQMO   | RMQSQU   | RMQNVQ   | RMQSSU   | RMQSNT   | RMQMTQ   | RMQTMN   | RMQTN5   | RMQRNU |
| t ÉáÖÜi=EäÄëF            | OMNV     | OMRV     | OQMR     | OSOT     | OTTM     | PSNS     | PSPF     | QRVSKUU  | RSRS     | TOQP   |

### Replacement Parts

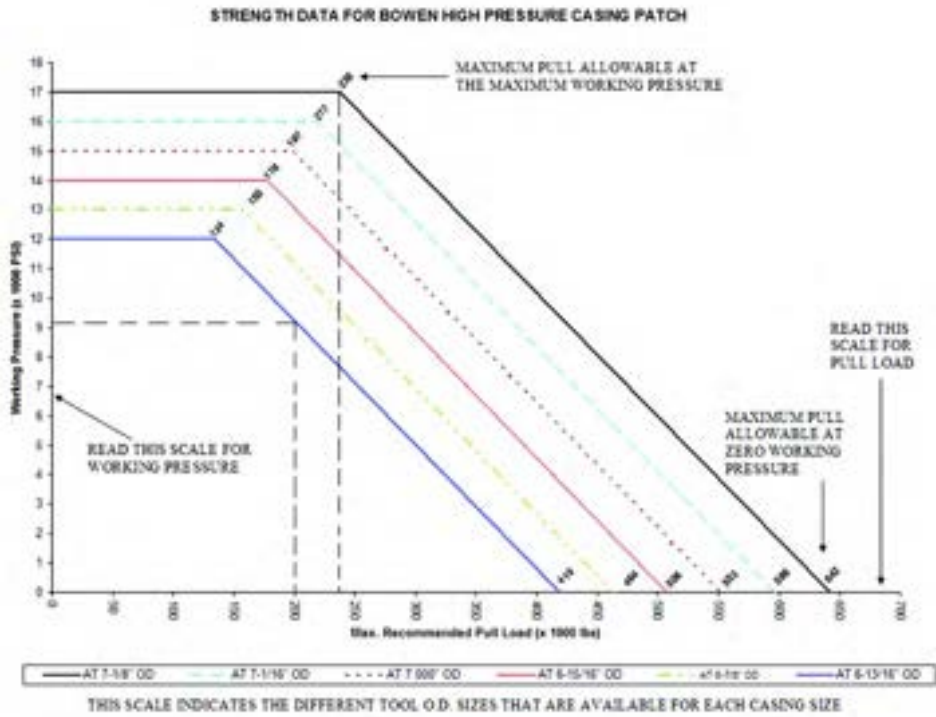
|                           |               |            |            |            |            |            |            |            |            |            |            |
|---------------------------|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Cutlip Guide</b>       | m~b=kçK       | RMQRST     | RMQQMP     | RMQSQV     | RMQNUN     | RMQSSV     | RMQSNU     | RMQMTV     | RMQTMO     | RMQTNT     | RMQROM     |
|                           | t ÉáÖÜi=EäÄëF | NNM        | NNN        | NOT        | NQP        | NQR        | ONR        | OOT        | OPR        | QNT        | RPN        |
| <b>Mill Control</b>       | m~b=kçK       | RMQRST     | RMQQMQ     | RMQSRM     | RMQNTU     | RMQSTM     | RMQSNV     | RMQMTT     | RMQTMP     | RMQTNU     | RMQRNV     |
|                           | t ÉáÖÜi=EäÄëF | TKT        | TKT        | VKT        | NMKV       | NN         | NQ         | NQ         | NS         | PM         | QN         |
| <b>Bowl</b>               | m~b=kçK       | RMQRSU     | RMQQMR     | RMQSRN     | RMQNTT     | RMQSTN     | RMQSOM     | RMQMTR     | RMQTMQ     | RMQTNV     | RMQRON     |
|                           | t ÉáÖÜi=EäÄëF | PPT        | PQQ        | QNM        | QSP        | QUQ        | STO        | SUQ        | TSR        | NMSO       | NPQQ       |
| <b>Basket Grapple</b>     | m~b=kçK       | RMQRSV     | RMQQMS     | RMQSRO     | RMQNUV     | RMQSTO     | RMQSON     | RMQMTS     | RMQTMR     | RMQTOM     | RMQROO     |
|                           | t ÉáÖÜi=EäÄëF | PQ         | PS         | QU         | RU         | RR         | VO         | VO         | NMU        | NPU        | ONO        |
| <b>Packer</b>             | m~b=kçK       | RMQRST     | RMQQMT     | RMQSRP     | RMQNUU     | NRRSUO     | RMQSOO     | RMQMUS     | RMQTM5     | RMQTON     | RMQROP     |
|                           | t ÉáÖÜi=EäÄëF | MKU        | MKU        | MKU        | NKM        | NKM        | NKP        | NKP        | NKR        | NKR        | OKM        |
| <b>Non-Extrusion Ring</b> | m~b=kçK       | RMQRST     | RMQQMU     | RMQSRQ     | RMQNTU     | RMQSTQ     | RMQSOP     | RMQMUR     | RMQTM5     | RMQTOO     | RMQROQ     |
|                           | t ÉáÖÜi=EäÄëF | NKP        | NKR        | NKS        | NKQ        | NKSU       | OKR        | OKR        | OKU        | RKT        | SKR        |
| <b>Seal Body</b>          | m~b=kçK       |            |            |            |            |            |            |            |            |            |            |
|                           | t ÉáÖÜi=EäÄëF |            |            |            |            |            |            |            |            |            |            |
| <b>Connecting Sub</b>     | m~b=kçK       |            |            |            |            |            |            |            |            |            |            |
|                           | t ÉáÖÜi=EäÄëF |            |            |            |            |            |            |            |            |            |            |
| <b>Shear Ring</b>         | m~b=kçK       | RMQRTR     | RMQQNM     | RMQSRR     | RMQNUS     | RMQSTS     | RMQSOQ     | RMQMUP     | RMQTMV     | RMQTOQ     | RMQROS     |
|                           | t ÉáÖÜi=EäÄëF | OKR        | OKS        | OKV        | PKO        | PKO        | Q          | Q          | RKSU       | UKP        | U          |
| <b>Shear Pin</b>          | m~b=kçK       | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR | RMQMUQLMMR |
|                           | t ÉáÖÜi=EäÄëF | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |
| <b>Packer Protector</b>   | m~b=kçK       | RMQRTO     | RMQQMV     | RMQSRS     | RMQNUP     | RMQSTR     | RMQSOR     | RMQMUM     | RMQTMU     | RMQTOP     | RMQROR     |
|                           | t ÉáÖÜi=EäÄëF | QS         | SV         | QM         | RP         | UQ         | TO         | NNN        | NOV        | NQM        | NQV        |
| <b>Extension</b>          | m~b=kçK       | RMQRTP     | RMQQNN     | RMQSRT     | RMQNUQ     | RMQSTT     | RMQSOS     | RMQMUN     | RMQTNM     | RMQTOR     | RMQROT     |
|                           | t ÉáÖÜi=EäÄëF | RSO        | RTQ        | SSQ        | TQO        | TSQ        | VSU        | VUP        | NOTS       | NQNR       | NTQP       |
| <b>Top Sub</b>            | m~b=kçK       | RMQRTQ     | RMQQNO     | RMQSRU     | RMQNUR     | RMQSTU     | RMQSOT     | RMQMUO     | RMQTNM     | RMQTOS     | RMQROU     |
|                           | t ÉáÖÜi=EäÄëF | PRN        | PPQ        | QNS        | QMN        | QPR        | RPS        | ROU        | TSV        | NMMM       | NQOS       |
| <b>O-Ring</b>             | m~b=kçK       | RSUOTRLMOM | RSUOTSLMOM | RSUOTULMOM | RSUOTVJMOM | RSUOTVLMOM | RSUOULMOM  | RSUOULMOM  | RSUOULMOM  | RSUOULMOM  | RSUOULMOM  |
|                           | t ÉáÖÜi=EäÄëF | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |
| <b>O-Ring</b>             | m~b=kçK       | RSUOTQLMOM | RSUOTRLMOM | RSUOTSLMOM | RSUOTVJMOM | RSUOTVLMOM |            | RSUOULMOM  | RSUOULMOM  | RSUOULMOM  | RSUOULMOM  |
|                           | t ÉáÖÜi=EäÄëF | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |
| <b>Parbak</b>             | m~b=kçK       | ULNNT      | ULOTS      | ULOTT      | ULOTV      | ULOTU      | ULOTV      | ULTMN      | ULOUO      | ULPUU      | ULPVM      |
|                           | t ÉáÖÜi=EäÄëF | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |
| <b>Parbak</b>             | m~b=kçK       | ULOTP      | ULNNT      | ULNNT      | ULOTU      | ULOTT      | ULTMN      | ULTMM      | ULTMM      | ULPUT      | ULPUU      |
|                           | t ÉáÖÜi=EäÄëF | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       | KL ^       |

#### How to Order:

##### Specify:

- 1 – Name and Number of Assembly or Part
- 2 – Casing O.D.
- 3 – Size and Type of Top Connection
- 4 – Hole Size

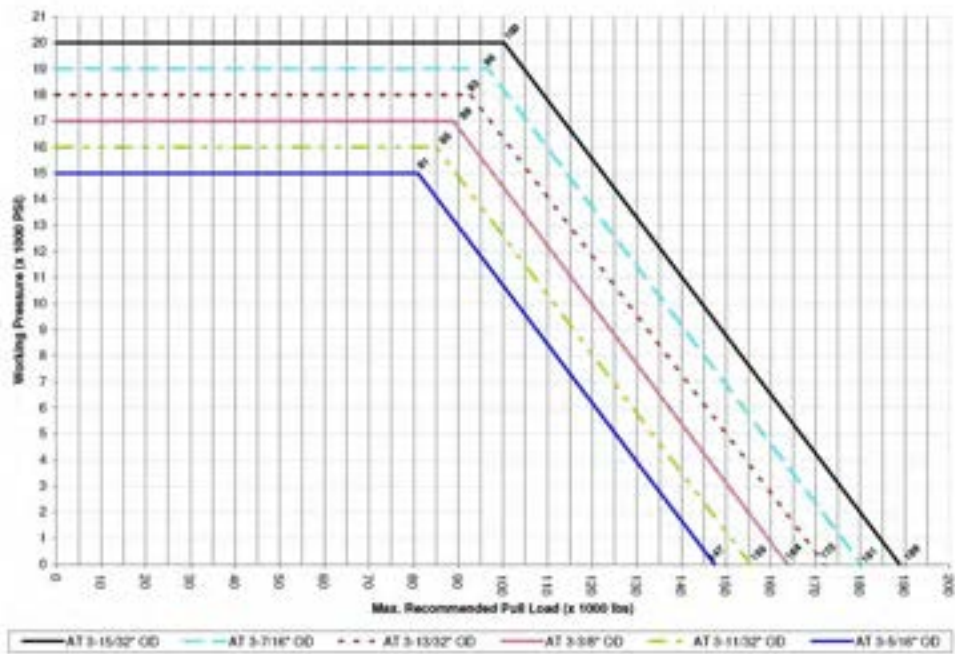
**Key Chart – Strength vs. Pressure**



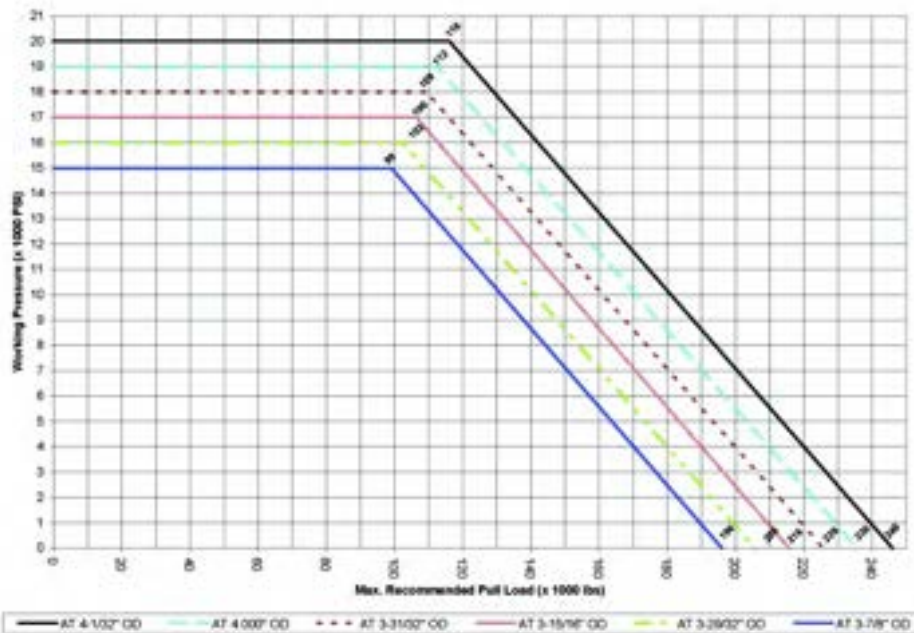


## Strength vs. Pressure Charts

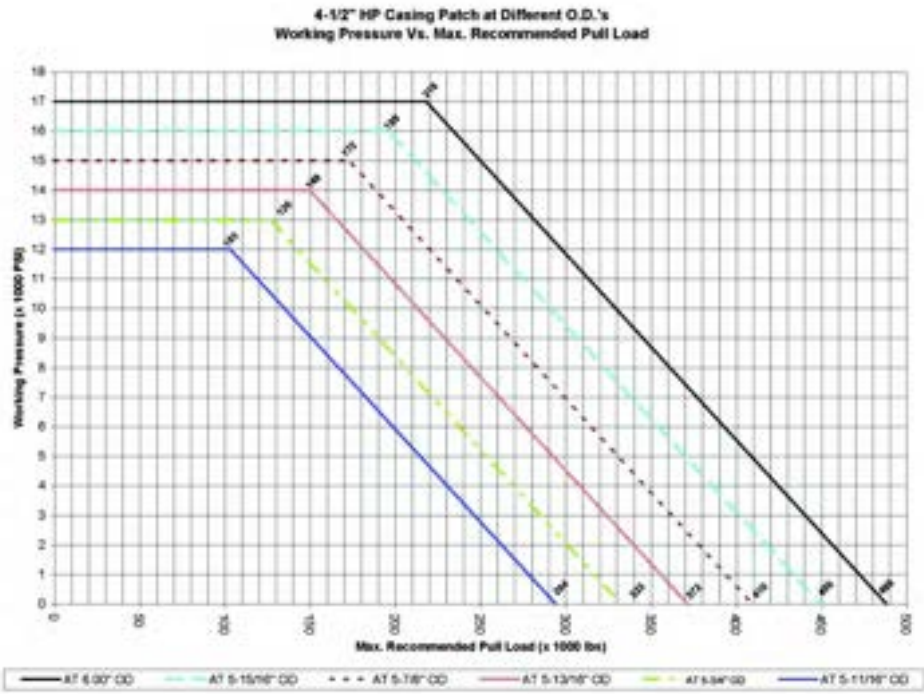
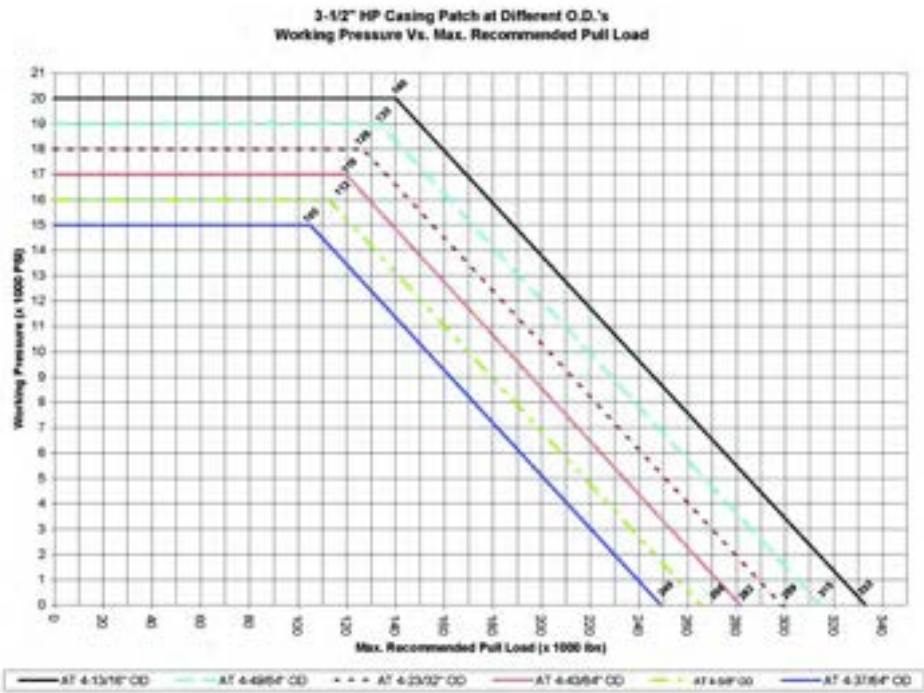
2-3/8" HP Casing Patch at Different O.D.'s  
Working Pressure Vs. Max. Recommended Pull Load



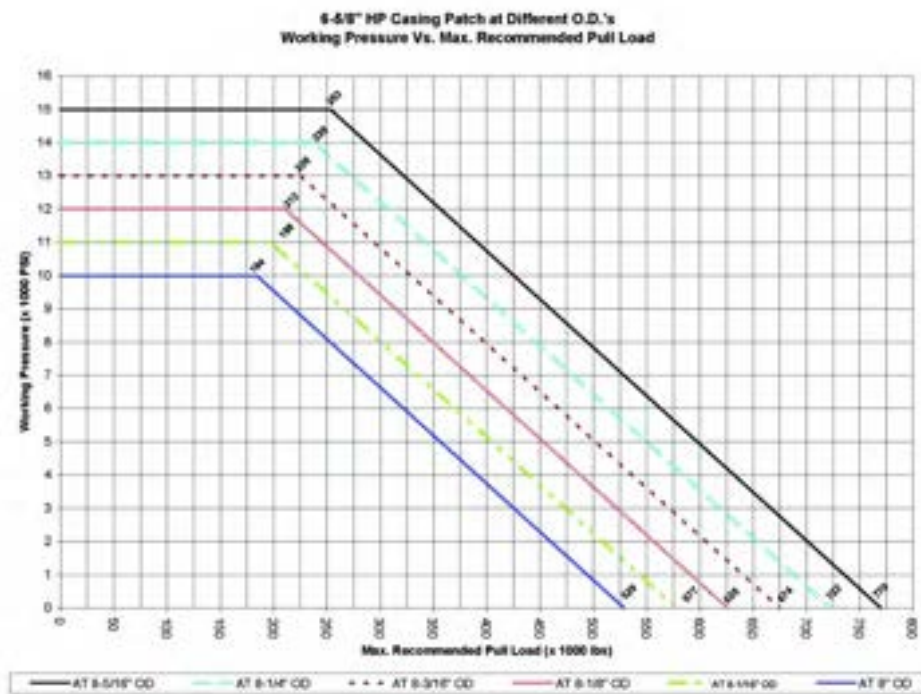
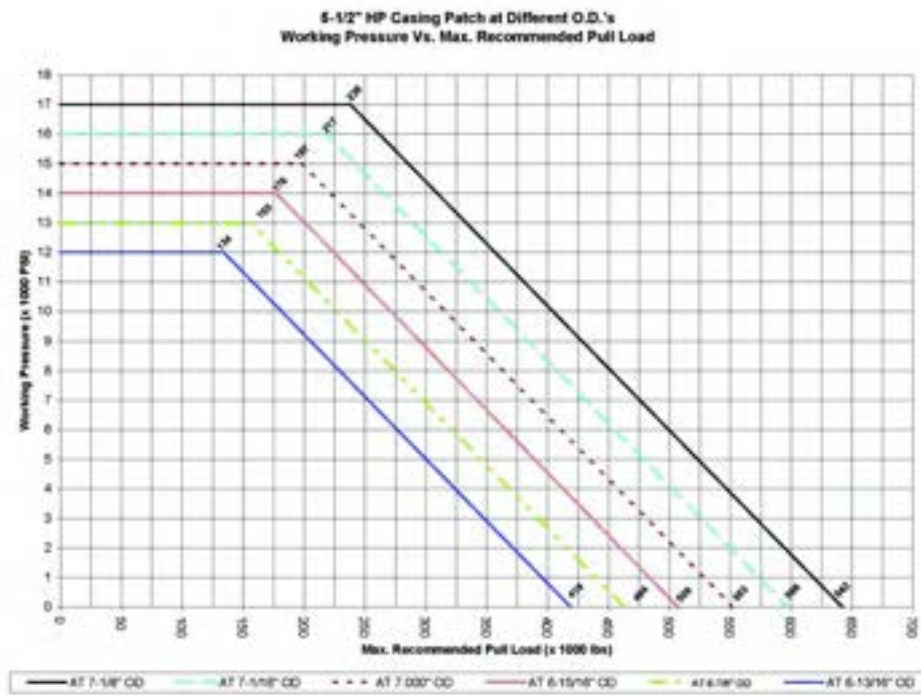
2-7/8" HP Casing Patch at Different O.D.'s  
Working Pressure Vs. Max. Recommended Pull Load



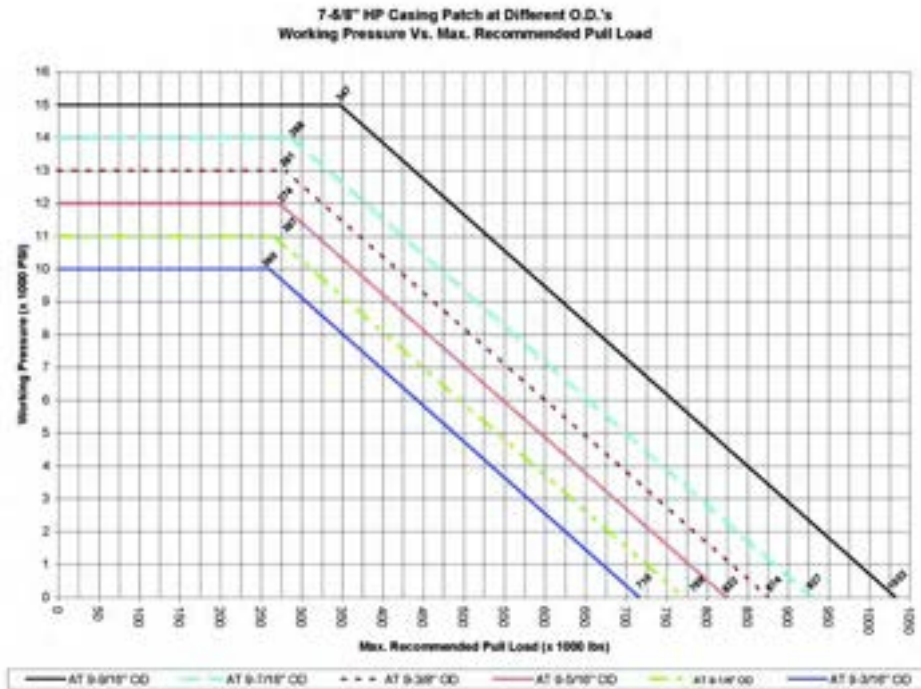
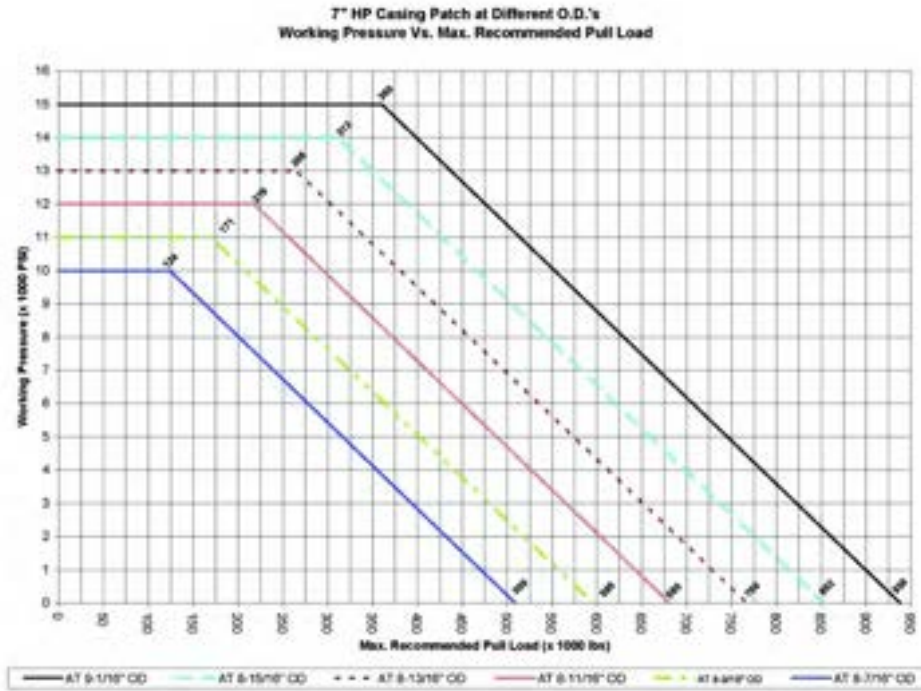
**Strength vs. Pressure Charts (continued)**



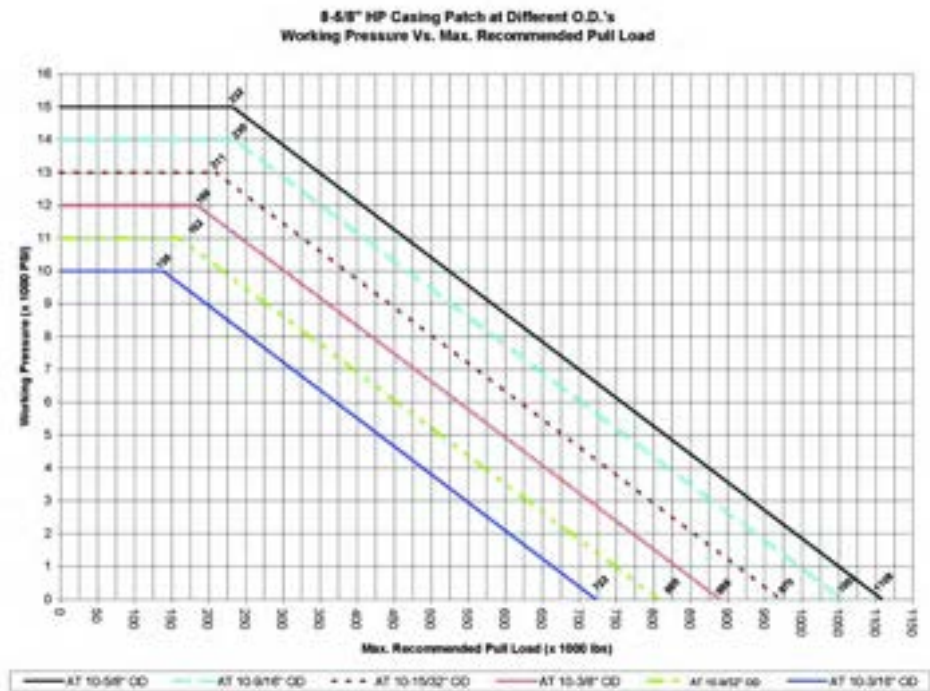
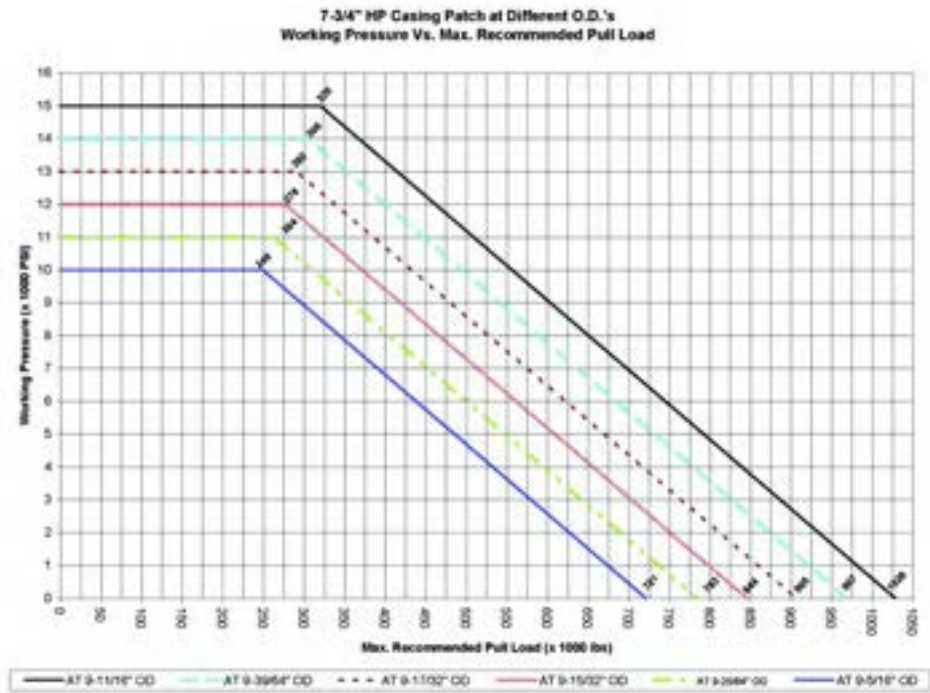
## Strength vs. Pressure Charts (continued)



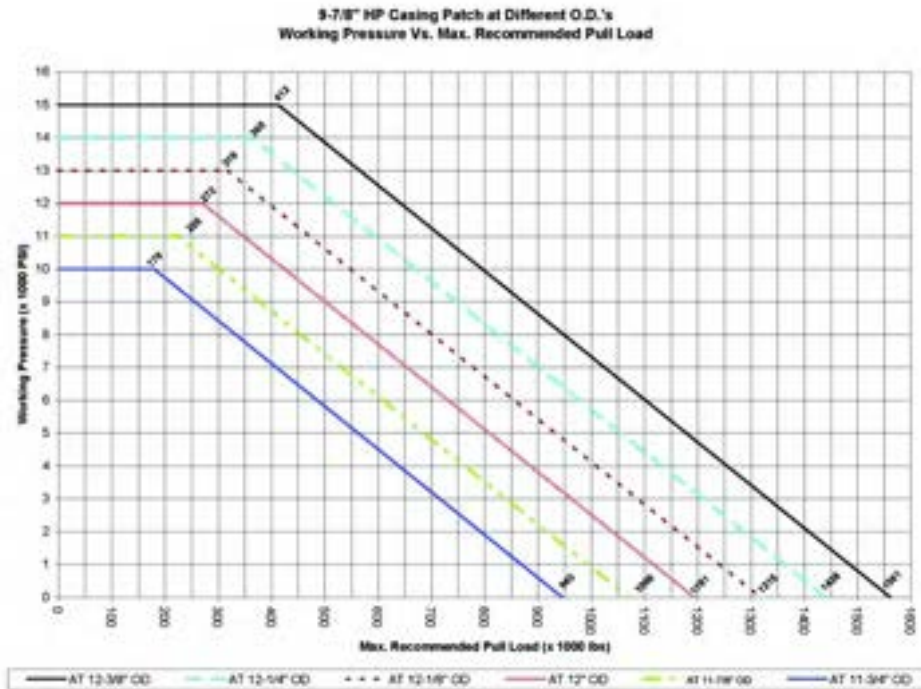
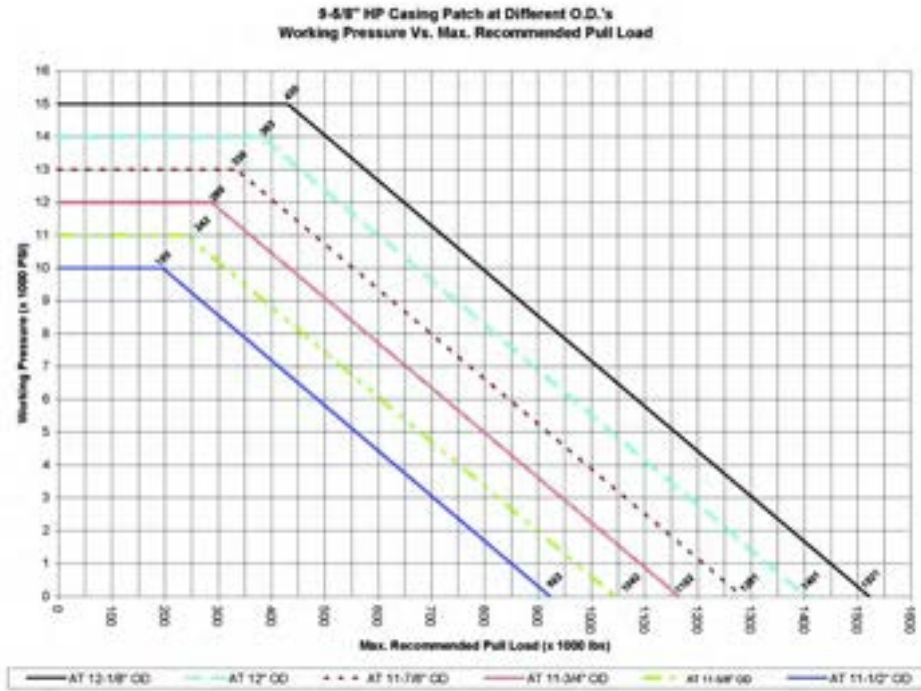
**Strength vs. Pressure Charts (continued)**



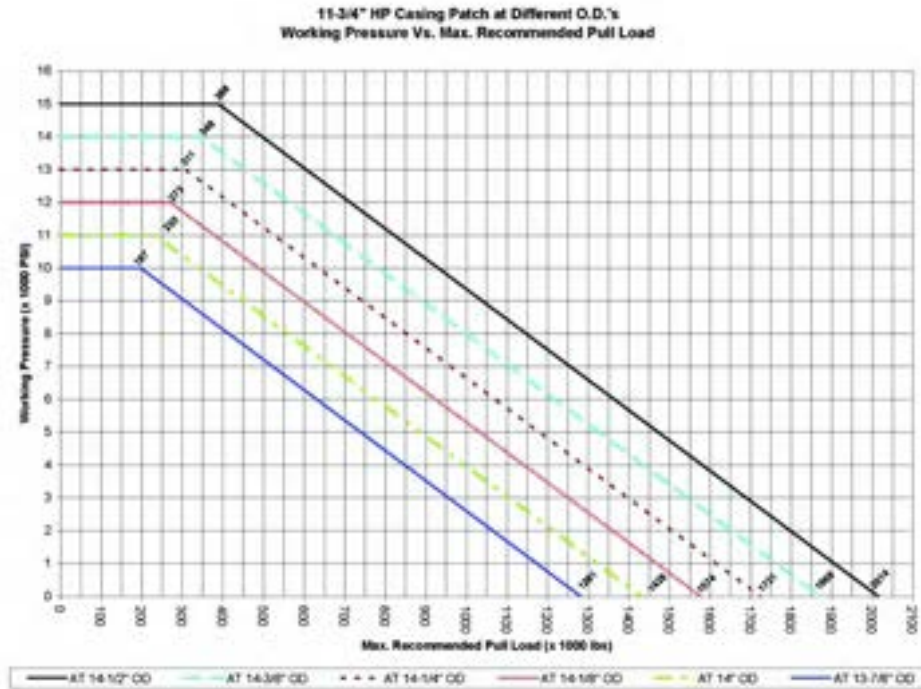
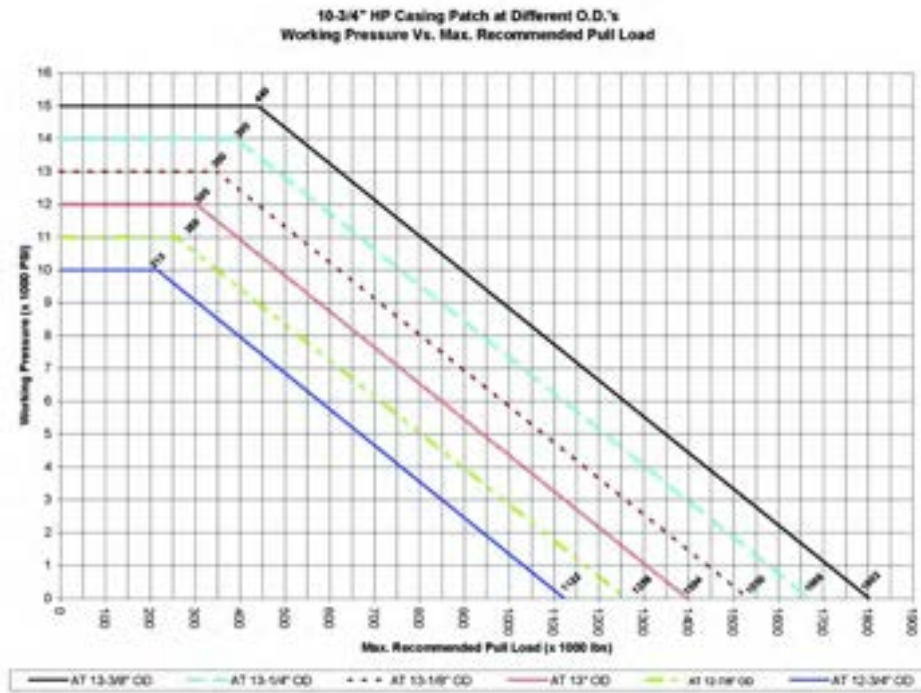
## Strength vs. Pressure Charts (continued)



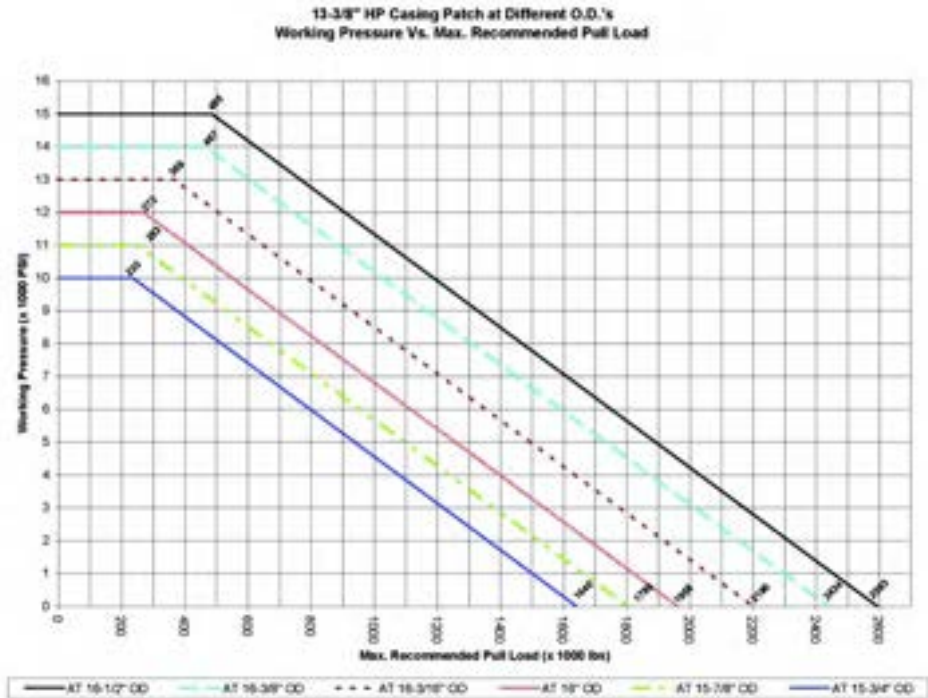
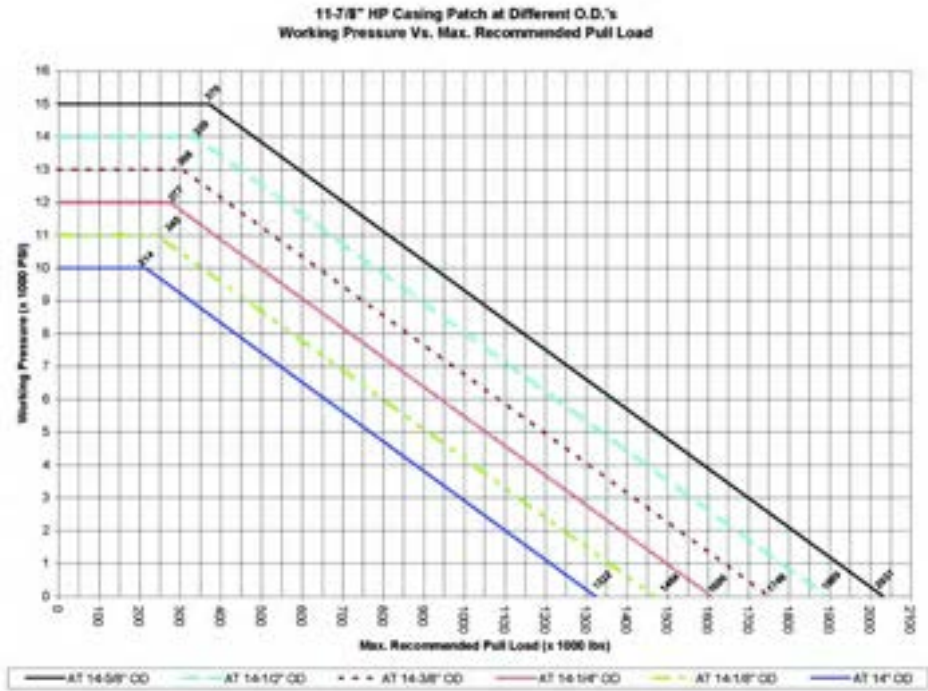
**Strength vs. Pressure Charts (continued)**



## Strength vs. Pressure Charts (continued)

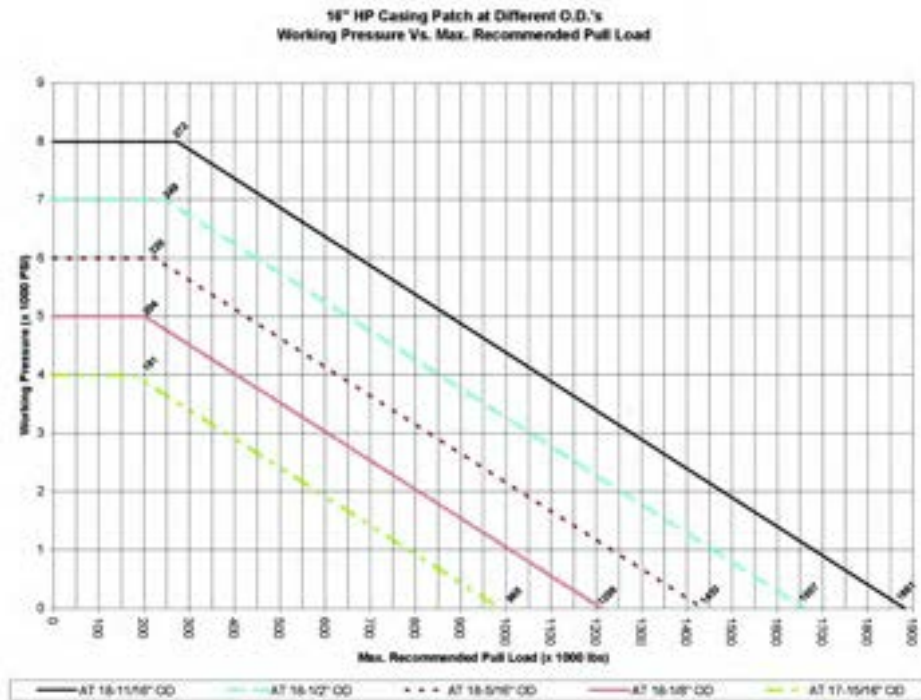
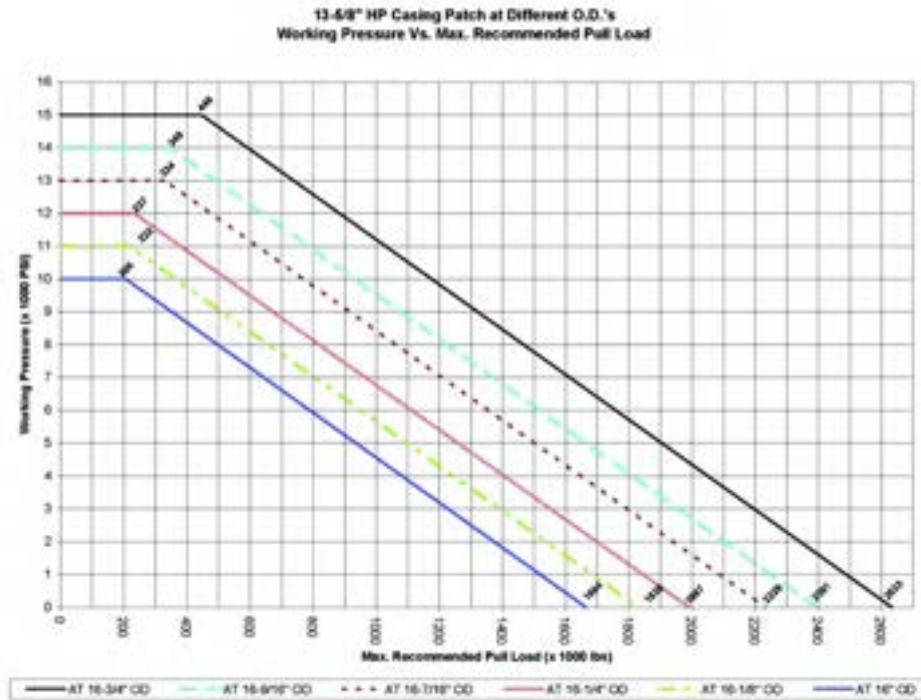


**Strength vs. Pressure Charts (continued)**

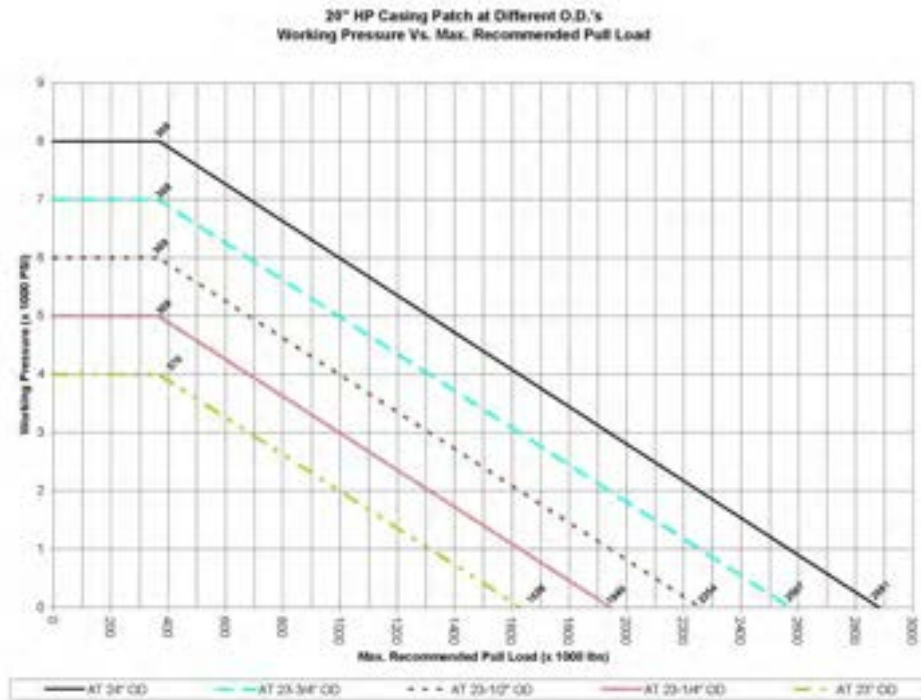
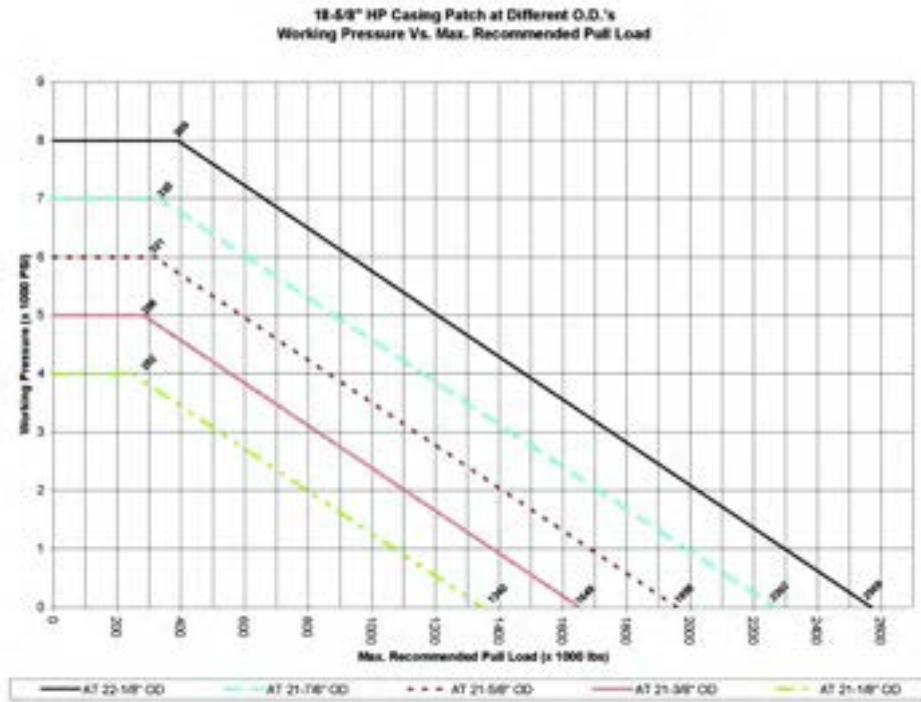




## Strength vs. Pressure Charts (continued)



**Strength vs. Pressure Charts (continued)**



## Connection Torque Requirements

| CASING SIZE<br>(inches) | MAXIMUM O.D<br>(inches) | ASSEMBLY<br>PART NUMBER | MAXIMUM RECOMMENDED TORQUE<br>FOR CUTLIP TO BOWL CONNECTION<br>(lb-ft) | MAXIMUM RECOMMENDED TORQUE<br>FOR ALL OTHER CONNECTIONS<br>(lb-ft) |
|-------------------------|-------------------------|-------------------------|--|--|
| 2 3/8                   | 3 15/32                 | 504803                  | 400  | 2600   |
| 2 7/8                   | 4 1/32                  | 504751                  | 800  | 3800   |
| 3 1/2                   | 4 13/16                 | 504738                  | 1200   | 7200   |
| 4 1/2                   | 6                       | 504294                  | 3000   | 13500  |
| 5 1/2                   | 7 1/8                   | 504305                  | 4400   | 21100  |
| 6 5/8                   | 8 5/16                  | 504727                  | 5300   | 29500  |
| 7                       | 9 1/16                  | 504159                  | 6600   | 38100  |
| 7 5/8                   | 9 9/16                  | 504635                  | 7500   | 45100  |
| 7 3/4                   | 9 11/16                 | 504536                  | 8100   | 46200  |
| 8 5/8                   | 10 5/8                  | 504679                  | 9900   | 54000  |
| 9 5/8                   | 12 1/8                  | 504567                  | 17400  | 82400  |
| 9 7/8                   | 12 3/8                  | 504402                  | 17700  | 86400  |
| 10 3/4                  | 13 3/8                  | 504648                  | 21700  | 107700   |
| 11 3/4                  | 14 1/2                  | 504194                  | 27600  | 135000   |
| 11 7/8                  | 14 5/8                  | 504668                  | 27700  | 137300   |
| 13 3/8                  | 16 1/2                  | 504617                  | 41300  | 197200   |
| 13 5/8                  | 16 3/4                  | 504074                  | 42800  | 203500   |
| 16                      | 18 11/16                | 504701                  | 49000  | 196900   |
| 18 5/8                  | 22 1/8                  | 504716                  | 80200  | 305500   |
| 20                      | 24                      | 504518                  | 125200   | 425200   |

**NOTE:** These values are the maximum torque values recommended and are set at 50% of yield. These torques are not required for all jobs and lower torques will work with less wear and tear to the threads. New torque values are required if running a tool with turned down OD. It is assumed that the torque is applied to the OD evenly so as to not collapse or cause excessive damage to the OD of the tool. Torque is measured in ft-lbs.

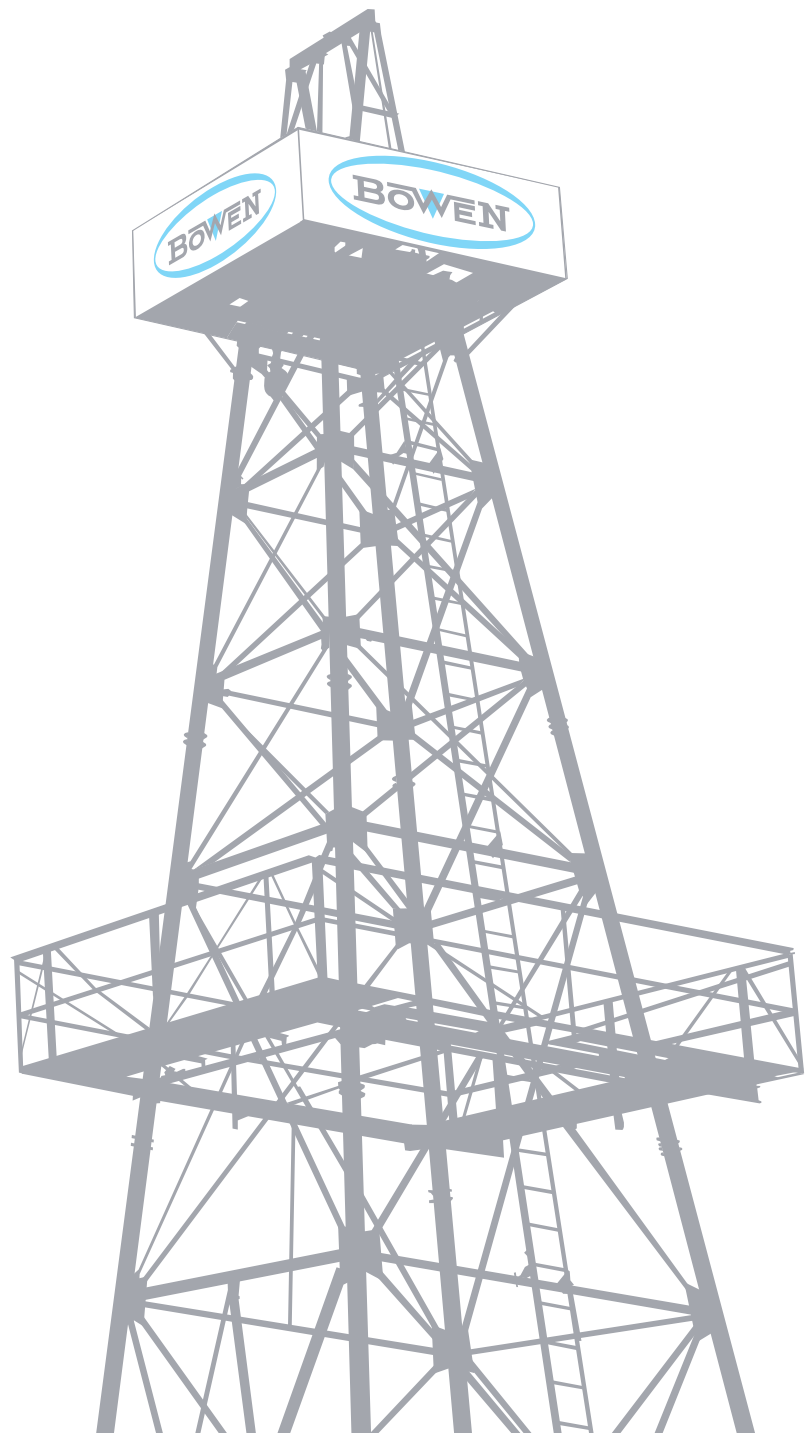
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# Bowen Premier Casing Patch

Instruction Manual 6550



**Bowen | NOW**

# Bowen Premier Casing Patch

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.



# Bowen Premier Casing Patch

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## General Description

The Bowen™ Premier casing patch is an external catch tool designed to engage a previously prepared fish, pack it off, and become a permanent part of the repaired casing, pipe or tubing.

The same dependable method of engagement and release which is utilized for Bowen overshots is employed in the Bowen Premier casing patch.

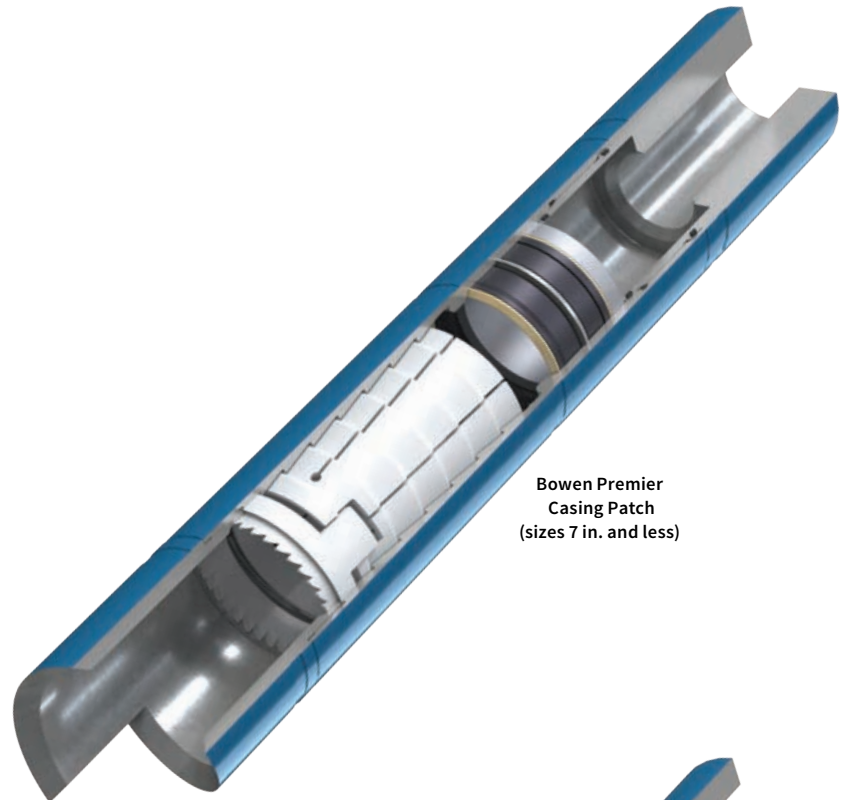
This method assures positive engagement and positive seal-off from either direction. The patch provides a permanent connection which remains rigid and leak-proof for many years, yet is positively releasable if ever the need arises.

Bowen Premier casing patches will not restrict the bore of the casing or tubing in any manner.

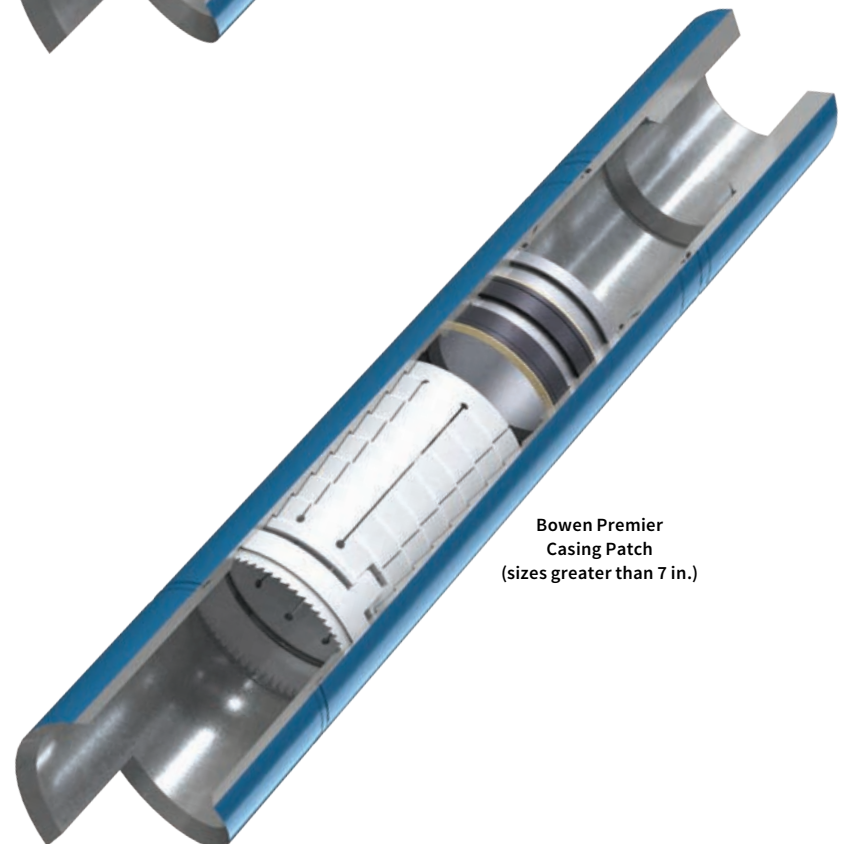
The Bowen Premier casing patch is composed of three outside parts and seven internal parts. This simplicity of design is matched by the simple positive operation.

## Use

The Bowen Premier casing patch is used to repair a damaged casing string by replacement of the damaged section without having to remove the entire string of casing from the hole. Where the upper portion of a casing string becomes ruptured or disoriented from the lower portion such as by faulting or caving of the formation, crushing, rupture, or backing off, the upper portion must be removed. New casing is then replaced, and the Bowen Premier casing patch forms the patch between the old and new strings.



**Bowen Premier  
Casing Patch  
(sizes 7 in. and less)**



**Bowen Premier  
Casing Patch  
(sizes greater than 7 in.)**

# Bowen Premier Casing Patch

## Construction

The Bowen high pressure casing patch is constructed in the most basic manner to perform the functions of engaging the fish, sealing off the fish, or releasing, either during or after setting operations, should this become advisable.

The top sub, extensions, bowl, and guide form the outer assembly.

The top sub has an upper connection to match the running string, and a lower connection to mate with the bowl or optional extensions as used for underwater operations. Top sub and extensions have seals, which are located immediately above and below the pin connection threads of the top sub and extensions.

The bowl has an upper connection for the top sub or optional extension, an area of length into which the packer protector slides during operation, a spiraled section which contains the engaging grapple, a space for the mill control, and a lower connection to accept the guide.

The guide is usually flush with the outside diameter of the casing patch, and cut lipped. The primary purpose of the guide is to assist smooth entry of the fish into the catch area of the patch. A secondary function is to maintain the inner working parts in position.

The inner working parts of the Bowen Premier casing patch are the grapple, packer, non-extrusion ring, mill control, shear ring, and packer protector.

The grapple is a cylinder with wickers in its inside diameter for engaging the fish and spirals on its outside diameter to mate with the spirals in the bowl. Both the wickers and the spirals are made with a left-hand lead, which allow release by right-hand rotation. The grapple has a series of longitudinal slots which allow the grapple to flex diametrically during operation.

The packer has a single oversized lip on the ID to seal on the casing and a small lip to seal on the inside of the bowl seal grooves. It is molded in one piece from

synthetic rubber compounds to include the best combination of properties for general oil well service. It withstands most well fluids and has good resistance to gas invasion and abrasion.

The non-extrusion rings serve as backup rings to the packers as to prevent the packers from extruding between the casing and the bowl. Made from various materials, the non-extrusion rings are very important to the performance of the packers. If they fail to perform, the packers alone will not be capable of containing a high working pressure.

In service, the outside of the packer seals against the inside of the bowl but the oversized lip on the ID is protected from damage by the packer protector, until the entering fish pushes the packer Protector up out of the way. This packer protector has a shear ring which includes holes for optional shear pins which are not required but can be used to ensure proper position of the packer protector until engagement of casing and prevent premature exposure of the packers and possible damage to packers.

The mill control serves the dual purpose of removing burrs from the outside of the fish as it enters the assembly and has a control finger that keys the grapple to the bowl. The grapple is free to move up and down sufficiently to engage or release the fish, but is prevented by the control finger from rotating. Thus, the torque required to release the assembly may be transmitted from the running string through the top sub, extensions, bowl, mill control, and on to the grapple.

## Operation

**NOTE: Prior to running the Casing Patch, the fish should be prepared. This usually includes washing over and cleaning the upper end of the fish of splits and burrs and sizing the fish.**

**NOTE: The tool should be assembled in accordance with the Complete Assembly instructions found on this page.**

1. Assemble the tool to the running string and buck it up tight.

**CAUTION: Use tongs on Top Sub only. If undue pressure is exerted on the Bowl, crushing or distortion may result.**

2. Lower the tool into the hole until the fish depth is reached. As the fish is reached, the running string should be slowly rotated to the right while lowering it slowly. This combined slow rotation and lowering is important to the operation of the tool.

This should be continued until the fish has entered the tool and “bottomed” the Packer Protector against the lower end of the Top Sub. This can be determined by watching the rig weight indicator. Allow 15,000 to 20,000 pounds of weight to be supported by the Casing Patch to assure good and complete engagement.

3. At this point, pick up the running string to remove the weight from the Casing Patch, while allowing the torque to slack from the running string.
4. The effectiveness of the Packer may be checked at this point, by applying mud pressure.

**CAUTION: Take care to gradually increase pressure, allowing the Packer to seat smoothly. In no case should the Casing Patch be slugged, or shock loaded unnecessarily by the mud pumps.**

5. Pick up the running string and apply sufficient pull to remove any slack from the string and set the slips. No load is required to maintain engagement nor is any load required to effect or maintain a seal; any excessive pull should therefore be avoided, as excessive pull reduces the allowable hydrostatic pressure capacity of the assembly. See strength charts in this manual.

**NOTE: The Bowen Premier Casing Patch is relatively unaffected by ordinary corrosion, etc., so that it may be released years after initial setting. If the Casing Patch is cemented in place, however, so that the internal working parts are invaded by cement,**

# Bowen Premier Casing Patch

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the patch may not release. In such cases, its removal may require milling it away or cutting the string below the patch and removing the patch with a portion of the milled over and retrieved string.

If for any reason it is desired to release and remove the Casing Patch from the tubing or casing string, proceed as follows:

## To Release the Premier Type Casing Patch

1. Bump down firmly until the top of the fish bottoms against the Top Sub. This will break the freeze between the Grapple and the fish.
2. After bumping down, slowly elevate the running string while simultaneously rotating slowly to the right.
3. Continue this slow elevation and rotation until the Casing Patch is clear of the fish. This combined slow rotation and elevation is important to the proper function of the Casing Patch.

**CAUTION:** Once the fish enters the Casing Patch and unseats the Packer Protector the Casing Patch may be released as previously described. No attempt should be made to re-engage the fish. Once it is disengaged, a second engagement would likely rupture the upper lip of the seal, rendering it useless. If a second engagement is necessary, the tool must be brought to the surface and the Seal Protector reseated as described in Complete Assembly. A second run may then be made with safety.

## Complete Assembly

**NOTE:** Before actual assembly begins, the parts should be thoroughly checked to assure that they are in good condition and of the proper size for the operation. The Packer, Grapple, and Mill Control are all marked with the part number and catch size.

**NOTE:** Clean all parts thoroughly and lubricate them with grease or lubricating oil. If the tool is to be stored for any length of time, it is preferable to not grease the Packer or that portion of the Bowl that houses the

Packer. Petroleum products are detrimental to rubber products, particularly when stored in the open atmosphere.

**NOTE:** All threads should be adequately greased with thread dope prior to assembly. All seals should be greased prior to assembly. Makeup torques can be found in the Makeup Torque Chart.

Actual assembly should proceed as follows:

1. Clamp the bowl in a suitable vise, horizontally.

**NOTE:** The assembly instructions assume assembly without extension sub. If using any number of extension subs are used, install all o-rings/back-up rings and properly grease all connections before making up in-between the top sub and bowl.

2. Packer Installation
  - a.) For 7 in. tools and below
    - Install the first Non-extrusion Ring, Packer, and Seal Back-up Ring into the Bowl as shown in the assembly drawing.
    - Next, install Snap Ring to keep the first seal in place.
    - The second Seal Back up Ring, Packer, and Non extrusion Ring are then installed.
  - b.) For 7-5/8 in. tools and above
    - Collapse the Packer by squeezing one side in toward the center. This will make the Packer small enough to be passed through the top end of the Bowl and be inserted into the space provided immediately above the spiraled section.
    - Each Packer requires a Non-extrusion Ring. Reference the assembly drawing for position and direction of Packer.
3. Packer Protector Installation
  - Install Shear Ring onto the Packer Protector by using Shear Pins to hold into place.
  - Assemble the Packer Protector Assembly into position by sliding it into the top end of the Bowl. The Packer Protector will slide in and keep the lip of the top Packer deflected. The bottom Packer will not be trapped under the Packer Protector. The Packer

Protector is slid in until it comes to rest with its lower end immediately above the bottom Packer.

- The Packer Protector is designed to keep the lip of the top Packer deflected until the fish pushes the Packer Protector out of the Packers. The Packer Protector prevents the lip of the Packers from being damaged during the setting operation. Once the fish is in proper catch position, the Packers will seal the fish in place.
4. Grapple Installation
    - Assemble the Grapple in the Bowl. This may be done by grasping the Grapple by its lower end and screwing it into the Bowl from the Bowl lower end. Left-hand rotation is required, as the spiraled outside diameter is a left-hand lead spiral. This design allows the tool to be released by right hand rotation, when required.
    - The lower end of the Grapple can be distinguished from the upper end by the single large slot in the lower end of the Grapple.
    - Insert the Grapple deep enough into the Bowl to allow the single large slot to line up with the similar slot in the bottom portion of the Bowl spiral.
    - The bottom of the Grapple should be just above the lowest part of the spiral in the Bowl, when in proper position.
  5. Mill Control Installation.

Insert the Mill Control into the Bowl so that the protruding control finger rests in the slot in the lower end of the Bowl spiral and simultaneously in the Grapple slot.
  6. Guide Installation. Apply thread dope to the threads of the guide and assemble the Guide to the Bowl and tighten.
  7. Top sub / Extension(s) Installation
    - Install the O-rings and Back-up Rings onto Top Sub grooves. Each Back-up Ring should be installed with their face of curvature lined up with the corresponding O-ring curvature. Refer to assembly drawing for details.
    - If any number of Extension subs are used (optional), install all O-rings and

# Bowen Premier Casing Patch

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Back-up Rings and properly grease all connections before making up in between the Top Sub and Bowl.

- Assemble the Top Sub to the Bowl or Extensions as applicable.

## Complete Disassembly

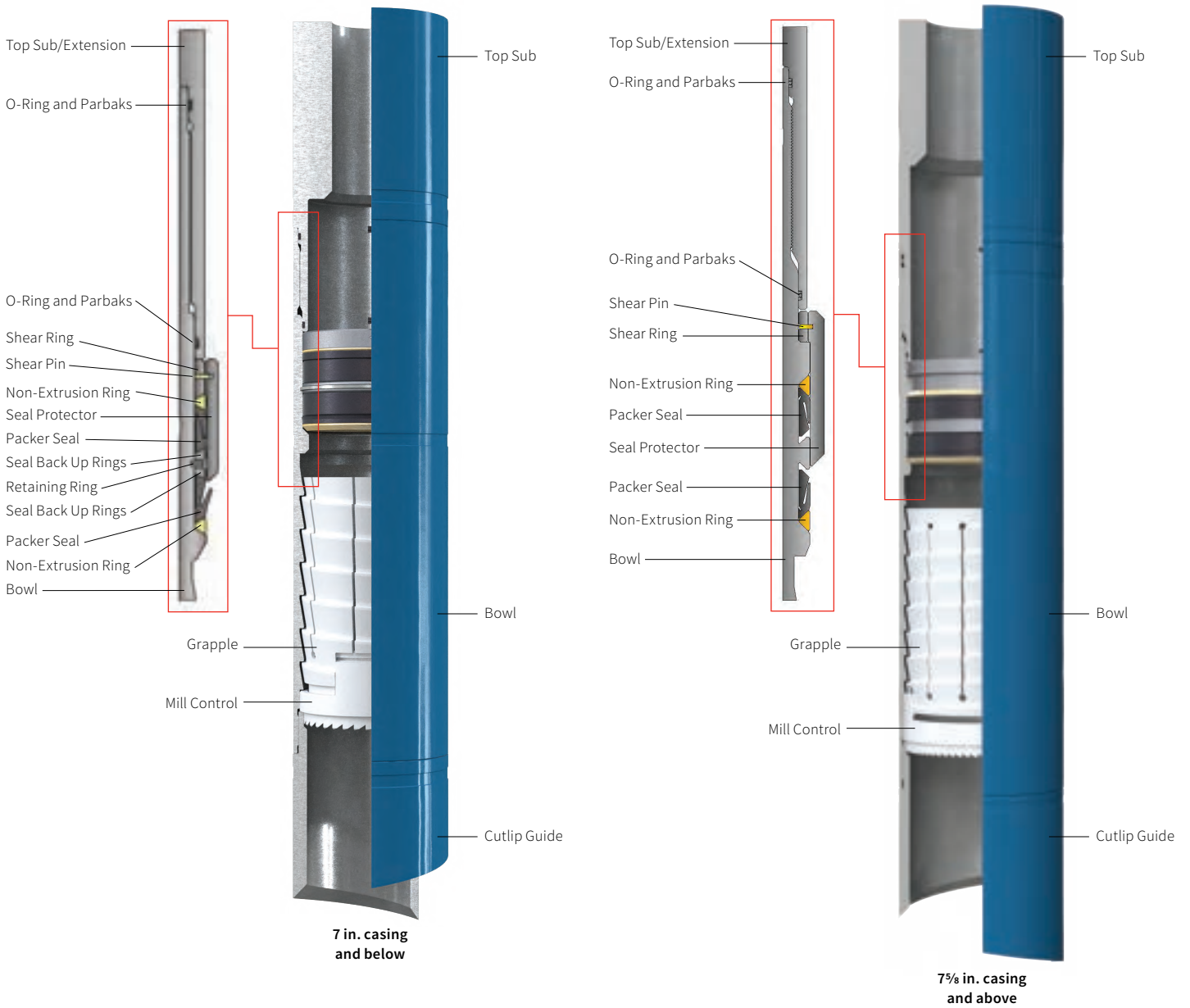
To completely disassemble the casing patch, proceed as follows:

1. Clamp the Assembly horizontally in a suitable vise. Clamp the Bowl in the middle, taking care not to crush the Bowl.
2. Break loose and remove the Top Sub and Extension(s) when applicable.

**CAUTION: If the Casing Patch was used and engaged and released from a fish, it is likely that the Packer Protector will be loose in the Top Sub and disengaged from the Shear Ring. Take care to secure this part so it does not fall and become damaged during disassembly.**

3. Remove the O-rings and Back-up Rings from the Top Subs and Extension(s).
4. If Packer Protector is still installed, remove the Packer Protector along with the Shear Ring, sliding it out the upper end of the Bowl.
5. Remove the Packers and Non-extrusion Rings. For 7 in. tools and below also remove Seal Back-up Rings and Support Ring in reverse order from the assembly instructions. Items may be removed with a bent screwdriver or other assembly tool.
6. Break loose and remove the guide.
7. Lift out the mill control.
8. Remove the grapple. This may be done by unscrewing it, using right hand rotation. This completes the disassembly of the tool.

# Bowen Premier Casing Patch



# Bowen Premier Casing Patch

## Strength Chart

| Casing Size | Standard O.D. | Assembly Part Number | Maximum Recommended Torque for Cutlip to Bowl Connection | Maximum Recommended Torque for all Other Connections |
|-------------|---------------|----------------------|--|--|
| 4½ in.      | 5¼ in.        | 508612               | 3,000 ft-lbs   | 5,400 ft-lbs   |
| 5½ in.      | 6¾ in.        | 508501               | 4,300 ft-lbs   | 9,700 ft-lbs   |
| 7 in.       | 8¼ in.        | 508603               | 6,400 ft-lbs   | 16,100 ft-lbs  |
| 9 in.       | 11½ in.       | 508522               | 17,200 ft-lbs  | 50,900 ft-lbs  |
| 13 in.      | 15¼ in.       | 508532               | 40,800 ft-lbs  | 111,800 ft-lbs                                       |

NOTE: These values are the maximum torque values recommended and are set at 50% of yield. These torques are not required for all jobs and lower torques will work with less wear and tear to the threads. New torque values are required if running a tool with turned down OD. It is assumed that the torque is applied to the OD evenly so as to not collapse or cause excessive damage to the OD of the tool. Torque is measured in ft-lbs.

## Makeup Torque Chart

| Casing Size | Standard O.D. | Pressure Rating @ Standard O.D. | Assembly Part Number | Maximum Recommended Pull Load @ 0 Pressure | Maximum Recommended Pull Load @ 10 KPSI |
|-------------|---------------|---------------------------------|----------------------|--|---|
| 4½ in.      | 5¼ in.        | 10,000 psi                      | 508612               | 274,390 lbs                                | 115,350 lbs                             |
| 5½ in.      | 6¾ in.        | 10,000 psi                      | 508501               | 390,910 lbs                                | 153,330 lbs                             |
| 7 in.       | 8¼ in.        | 10,000 psi                      | 508603               | 509,420 lbs                                | 124,580 lbs                             |
| 9 in.       | 11½ in.       | 10,000 psi                      | 508522               | 988,160 lbs                                | 260,560 lbs                             |
| 13 in.      | 15¼ in.       | 10,000 psi                      | 508532               | 1,640,100 lbs                              | 235,100 lbs                             |

NOTE: The pressure ratings and pull loads listed above are for the maximum O.D. Tools with smaller OD's and corresponding lower pressure ratings and pull loads are available upon request. New high pressure casing patch sizes are being designed and may not be on this list. Call sales for updated information.

# Bowen Premier Casing Patch

## Specifications and Replacement Parts

### Specifications for Bowen Premier Casing Patches — Basket Grapple

| Nominal Size        |          | 4½ in.  | 5½ in.  | 7 in.   | 9 in.     | 13 in.    |
|---------------------|----------|---------|---------|---------|-----------|-----------|
| Standard Patch O.D. |          | 5¼ in.  | 6¼ in.  | 8¼ in.  | 11½ in.   | 15¼ in.   |
| Complete Assembly   | Part No. | 508612  | 508501  | 508603  | 508522    | 508532    |
|                     | Weight*  | 138 lbs | 180 lbs | 270 lbs | 561 lbs   | 1,020 lbs |
|                     | Weight** | 458 lbs | 598 lbs | 794 lbs | 1,344 lbs | 2,413 lbs |

### Replacement Parts

|                    |          |            |            |            |            |            |
|--------------------|----------|------------|------------|------------|------------|------------|
| Cutlip Guide       | Part No. | 504284/010 | 504295/010 | 504149/010 | 504571/500 | 504618/500 |
|                    | Weight   | 19.3 lbs   | 23.7 lbs   | 48 lbs     | 82.8 lbs   | 162.9 lbs  |
| Mill Control       | Part No. | 504285     | 504296     | 504161     | 504570     | 504619     |
|                    | Weight   | 7.4 lbs    | 7.4 lbs    | 7.4 lbs    | 7.7 lbs    | 14 lbs     |
| Bowl               | Part No. | 508607     | 508496     | 508596     | 508520     | 508530     |
|                    | Weight   | 35.3 lbs   | 52.5 lbs   | 92.2 lbs   | 167.9 lbs  | 357 lbs    |
| Basket Grapple     | Part No. | 504287     | 504298     | 504160     | 504569     | 504621     |
|                    | Weight   | 7.8 lbs    | 10.7 lbs   | 16.2 lbs   | 34 lbs     | 77.6 lbs   |
| Packer             | Part No. | 504288     | 504299     | 504167     | 504576     | 504622     |
|                    | Weight   | 0.3 lbs    | 0.3 lbs    | 0.5 lbs    | 0.8 lbs    | 1.3 lbs    |
| Non-Extrusion Ring | Part No. | 504289     | 504300     | 504166     | 504577     | 504623     |
|                    | Weight   | 0.3 lbs    | 0.4 lbs    | 0.6 lbs    | 1.3 lbs    | 2.5 lbs    |
| Seal Backup Ring   | Part No. | 508609     | 508497     | 508600     | —          | —          |
|                    | Weight   | 0.2 lbs    | 0.3 lbs    | 0.5 lbs    | —          | —          |
| Retaining Ring     | Part No. | 508608     | 508499     | 508599     | —          | —          |
|                    | Weight   | 0.2 lbs    | 0.2 lbs    | 0.3 lbs    | —          | —          |
| Shear Ring         | Part No. | 504291     | 504302     | 504163     | 504575     | 504624     |
|                    | Weight   | 1 lbs      | 1.2 lbs    | 2 lbs      | 2.5 lbs    | 4 lbs      |
| Shear Pin          | Part No. | 504084/005 | 504084/005 | 504084/005 | 504084/005 | 504084/006 |
|                    | Weight   | N/A        | N/A        | N/A        | N/A        | N/A        |
| Packer Protector   | Part No. | 508610     | 508498     | 508601     | 508521     | 508531     |
|                    | Weight   | 2.8 lbs    | 3.5 lbs    | 6 lbs      | 18 lbs     | 43 lbs     |
| Extension          | Part No. | 504292/200 | 504303/200 | 504164/300 | 504573/500 | 504626/500 |
|                    | Weight   | 159.9 lbs  | 209 lbs    | 262 lbs    | 392 lbs    | 696 lbs    |
| Top Sub            | Part No. | 508611     | 508495     | 508602     | 508519     | 508529     |
|                    | Weight   | 62.9 lbs   | 78.7 lbs   | 112 lbs    | 243.8 lbs  | 355 lbs    |
| O-Ring             | Part No. | 568251/020 | 568259/020 | 568265/020 | 568275/020 | 568280/020 |
|                    | Weight   | N/A        | N/A        | N/A        | N/A        | N/A        |
| O-Ring             | Part No. | 568249/020 | 568257/020 | 568264/020 | 568274/020 | —          |
|                    | Weight   | N/A        | N/A        | N/A        | N/A        | N/A        |
| Parbak             | Part No. | 8/215      | 8/037      | 8/915      | 8/117      | 8/279      |
|                    | Weight   | N/A        | N/A        | N/A        | N/A        | N/A        |
| Parbak             | Part No. | 8/036      | 8/257      | 8/107      | 8/273      | 8/701      |
|                    | Weight   | N/A        | N/A        | N/A        | N/A        | N/A        |

\*Without Extensions

\*\* With Two Extensions



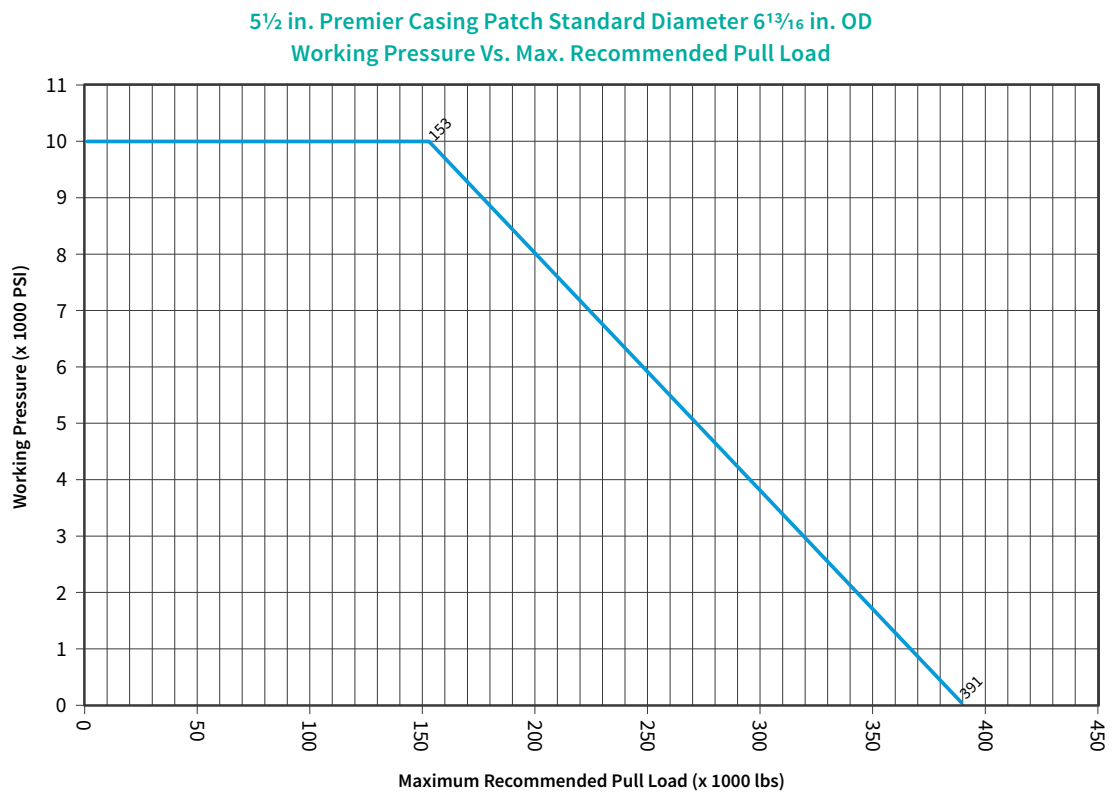
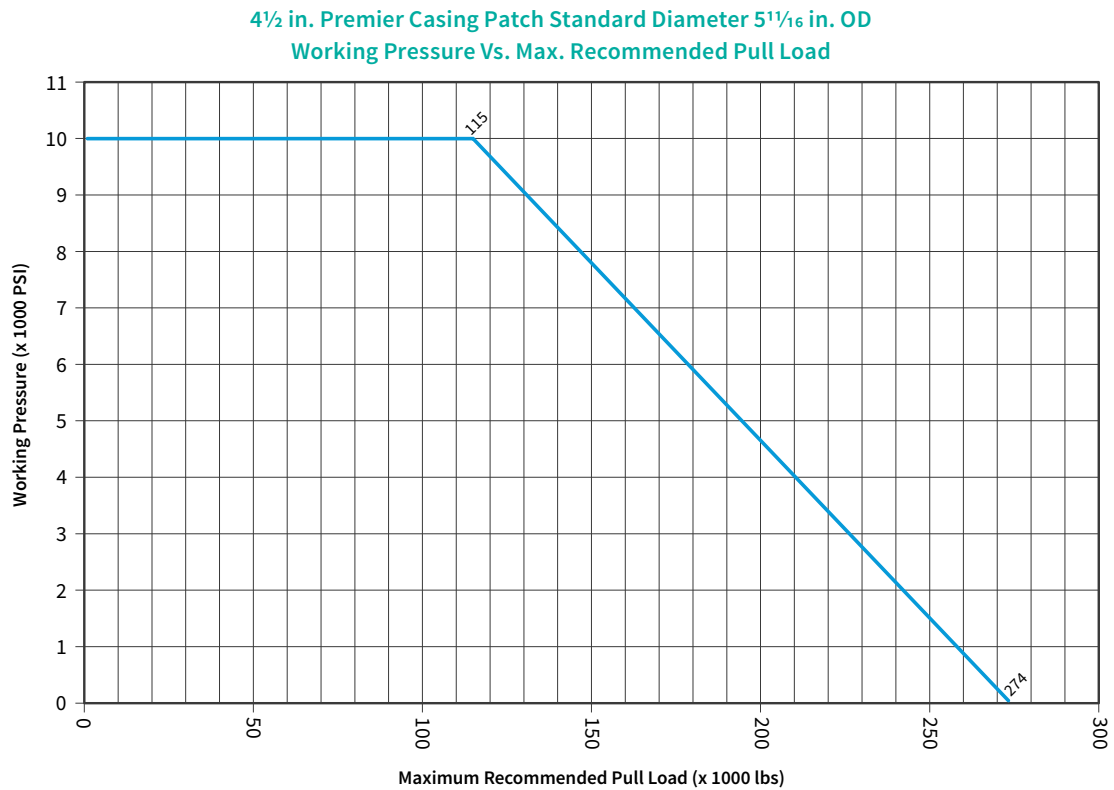
### How to Order

Specify:

- (1) Name and Number of Assembly or Part
- (2) Casing O.D.
- (3) Size and Type of Top Connection
- (4) Hole Size

# Bowen Premier Casing Patch

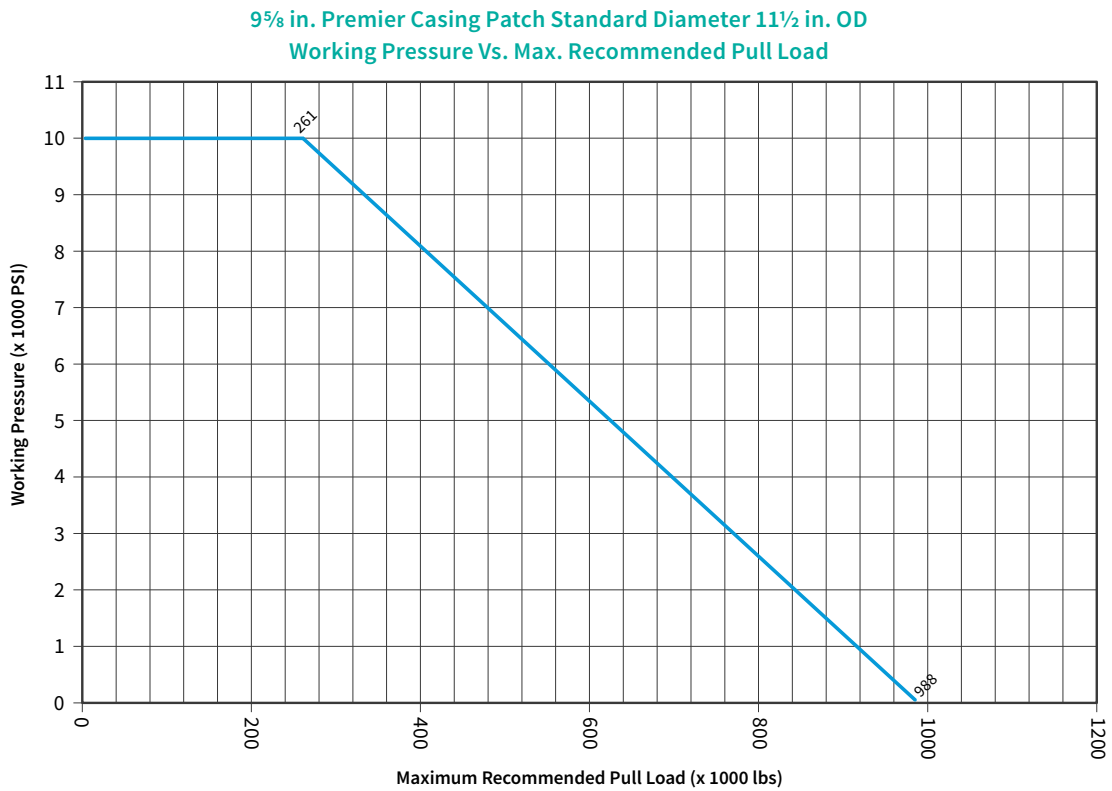
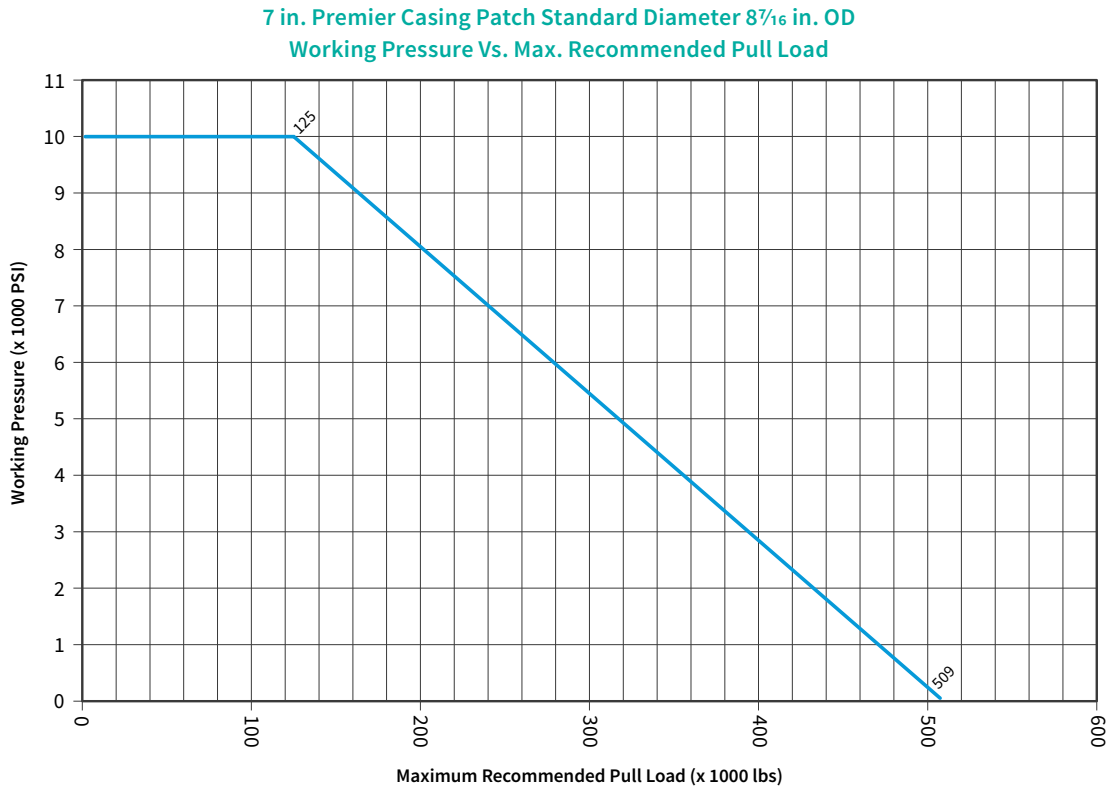
## Strength Vs. Pressure





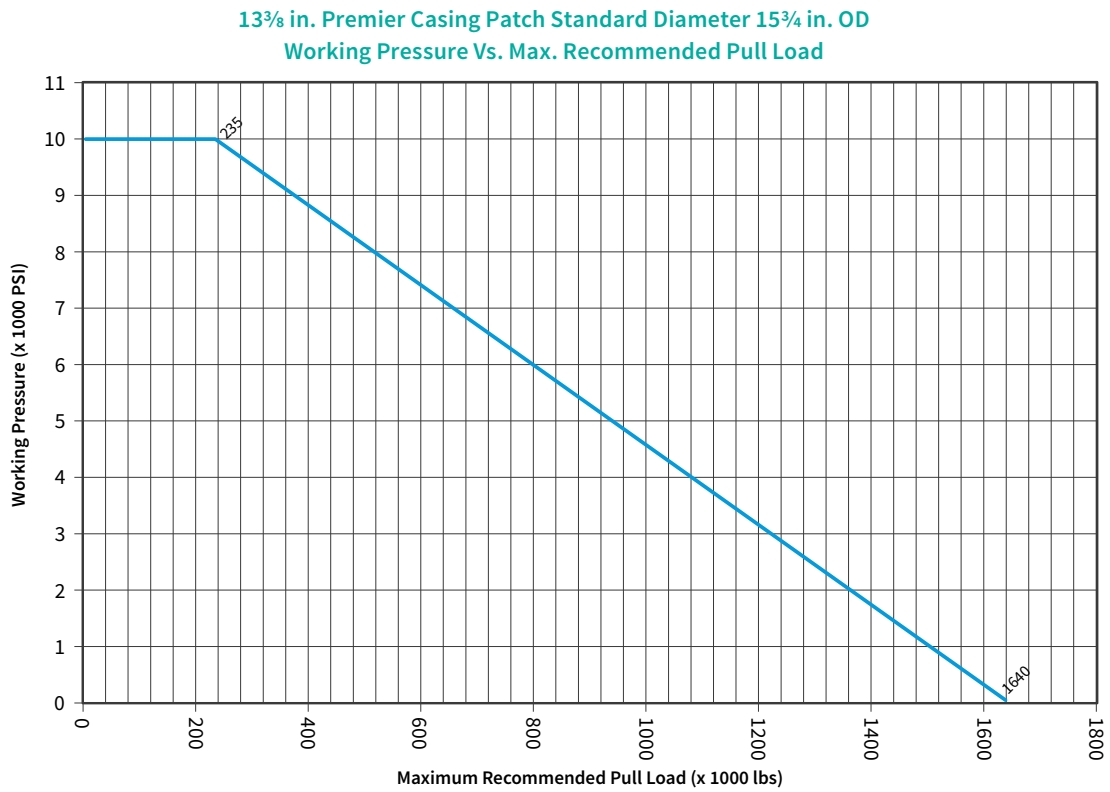
# Bowen Premier Casing Patch

## Strength Vs. Pressure



# Bowen Premier Casing Patch

## Strength Vs. Pressure



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# TUBING AND CASING ROLLERS

Instruction Manual 6200



PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

Tubing and Casing Rollers

# Tubing and Casing Rollers

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PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Twentieth Printing, September 2005



### General Description

The **Bowen Tubing and Casing Roller** is specifically designed for reconditioning casing and differs from any other tool intended for this use in that it does not contain any small parts to be worn, broken or lost in the well.

The Bowen Tubing and Casing Roller is extremely rugged yet simple in design. All moving parts are held in place on the Mandrel by large ball bearings running in deep grooves.

### Use

The Bowen Tubing and Casing Roller is used specifically to recondition and restore buckled, collapsed or dented well tubing and casings to their normal internal diameter and roundness. It is designed to enter into the smaller I.D. of the damaged casing. As it is rotated and forced downward, it exerts lateral pressure on the casing to restore it to its normal I.D.

### Construction

The Bowen Tubing and Casing Roller is manufactured from special alloy steels selected for their ability to resist wear. The Mandrel and all Rollers are case hardened for further wear qualities.

The Bowen Tubing and Casing Roller consists of an eccentric Mandrel upon which are mounted a series of Rollers and a tapered Nose Cone. The upper end of the Mandrel is fitted with a threaded box connection for connection to the drill pipe. The tapered Nose Cone locks all Rollers in place on the Mandrel by large ball bearings running in deep grooves in the Mandrel and the Nose Cone.

The design of the Bowen Tubing and Casing Roller permits the use of interchangeable Rollers to be used on each size Mandrel. (See Table) The large bearing areas between the Rollers and the eccentrics effectively reduce bearing

pressures, therefore increasing tool life.

### Operation

Make up the BOWEN TUBING and CASING ROLLER to either the drill collars or to the drill pipe; experience has shown that it is preferable to connect direct to the drill pipe.

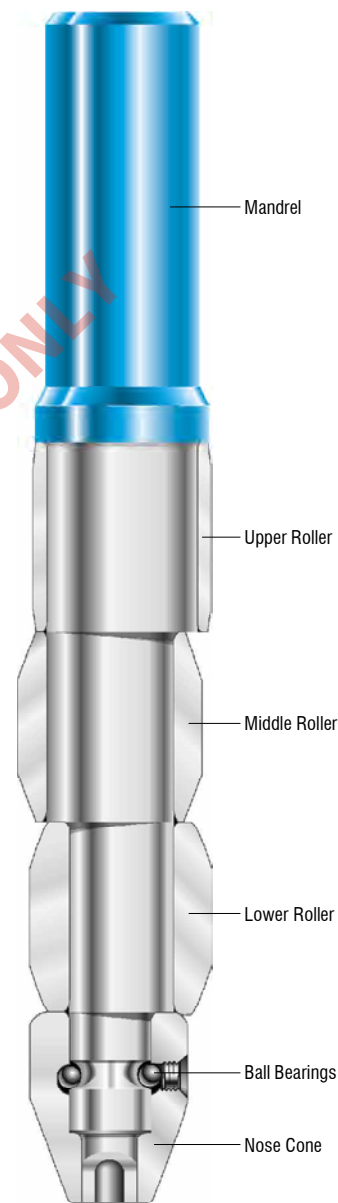
The drill pipe and the roller are rotated slowly and lowered gradually through the casing until the damaged area is located and contacted. Upon contact with the collapsed casing, increase the rotary speed to 40-75 RPM, start circulation and lower slowly.

The reduced portion of the tapered Nose Cone readily enters between the walls of the collapsed casing. As the Mandrel is rotated and lowered, the eccentrics force the Nose Cone and Rollers outwardly against the casing walls with great lateral pressure restoring the casing to its normal I.D. and roundness.

Moderate to heavy weight should be applied during operation. The use of too little weight, with high rotational speeds should be avoided. Light weight with high speeds tends to wear the rollers without straightening the pipe. If insufficient weight is available in the running string, drill collars should be added. The best guide to the amount of weight and rotational speed to use is experience; as long as steady downward progress is made by the Casing Roller, the weight-speed ratio is giving the proper results.

Badly damaged casing will require the maximum amount of weight for the Roller to enter into and straighten the casing. The rugged construction of the BOWEN TUBING and CASING ROLLER allows the operator to apply the maximum amount of weight and torque without damage to the tool.

**CIRCULATION MUST BE MAINTAINED DURING THE OPERATION!**



Bowen Casing Roller

### Disassembly

The Bowen Tubing and Casing Roller requires only a minimum of maintenance. Like any tool, it should be thoroughly cleaned and greased after use and before storage. To disassemble:

1. With an Allenhead wrench, remove the Loading Slot Set Screw. (This is a Nylok set screw. You will notice a nylon dot midway of the threads on one side. Do not destroy this dot.)
2. Shake or dump Ball Bearings from inside the Nose Cone out through the Loading Slot (see Table for the number of ball bearings for the respective sizes of Nose Cones).
3. Slide Rollers off the eccentric Mandrel.
4. Thoroughly wash and clean the Mandrel, and the Rollers.

If for any reason it is desired to release the Casing Patch from the casing string, proceed as follows:

### Reassembly

1. Before assembly, check the size of the Rollers to ascertain that the correct sizes are at hand. The size of the casing is stamped on the top outside edge of each Roller.
2. Thoroughly grease the eccentrics on the Mandrel and the interior of each roller particularly, the ball bearing grooves on the Mandrel and inside the Nose Cone.
3. Slide the Rollers onto the Mandrel. Each Roller is made to close tolerance to the respective Mandrel eccentric so there should be no difficulty in proper assembling.

4. Slide Nose Cone in place on the Mandrel.
5. With the Casing Roller horizontal, drop Ball Bearings, one by one, into the loading slot. Rotating Nose Cone back and forth will help to distribute the bearings around the groove. (See Table for the proper number of ball bearings for the respective sizes of Nose Cones.)
6. Insert and make up Loading Slot Set Screw into the Loading Slot. This is a Nylok set screw especially machined to seat into a shoulder. Make up tightly with an Allen wrench until it seats firmly.



### Bowen Tubing And Casing Rollers

|                              |                |              |            |              |             |             |           |             |           |               |           |           |
|------------------------------|----------------|--------------|------------|--------------|-------------|-------------|-----------|-------------|-----------|---------------|-----------|-----------|
| To Roll Casing Size          | 2-3/8 Tub.     | 2-7/8 Tub.   | 3-1/2 Tub. | 4 3-1/2 L.P. | 4-1/2 4-3/4 | 5-1/2 5-3/4 | 6-5/8 7   | 7-5/8 8-5/8 | 9 9-5/8   | 10-3/4 11-3/4 | 13 13-3/8 | 16 18-5/8 |
| Top Connection               | 1" DSS Hardy   | 1-13/16 F.J. | API 1-1/4  | EUE 1-1/2    | API 2-3/8   | API 2-7/8   | API 3-1/2 | API 4-1/2   | API 4-1/2 | API 6-5/8     | API 6-5/8 | API 6-5/8 |
| Circulation Hole             | 3/8            | 3/8          | 5/16       | 1/4          | 1/2         | 5/8         | 1         | 1-1/4       | 1-1/2     | 1-3/4         | 2         | 2         |
| Length of Individual Rollers | 3              | 3            | 3          | 4            | 4           | 5           | 6         | 7           | 8         | 9             | 10        | 11        |
| Complete Assembly            | Part No. 28802 | 26395        | 29046      | 28963        | 20660       | 20910       | 20920     | 20930       | 20940     | 20950         | 20960     | 20970     |
|                              | Weight 11-1/4  | 40           | 22         | 41-1/4       | 60          | 128         | 171       | 256         | 392       | 890           | 1349      | 1690      |

### Replacement Parts

|                        |            |       |       |         |       |       |       |       |       |       |       |       |       |
|------------------------|------------|-------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Mandrel                | Part No.   | 28803 | 26396 | 29051   | 28964 | 20661 | 20911 | 20921 | 20931 | 20941 | 20951 | 20961 | 20971 |
|                        | Weight     | 6     | 22    | 12      | 26    | 33    | 68    | 80    | 116   | 160   | 600   | 950   | 1000  |
| Nose Cone              | Part No.   | 28807 | 26400 | 29050   | 28965 | 20662 | 20912 | 20922 | 20932 | 20942 | 20952 | 20962 | 20972 |
|                        | Weight     | 1     | 3     | 2-1/4   | 3-1/4 | 5-1/4 | 6     | 17    | 30    | 42    | 60    | 120   | 340   |
| Lower Roller           | Part No.   | 28806 | 26399 | 29049   | 28966 | 20663 | 20913 | 20923 | 20933 | 20943 | 20953 | 20963 | 20973 |
|                        | Weight     | 1-3/4 | 5     | 2-13/16 | 6-3/4 | 9     | 16    | 28    | 40    | 80    | 90    | 160   | 250   |
| Middle Roller          | Part No.   | 28805 | 26398 | 29048   | 28967 | 20664 | 20914 | 20924 | 20934 | 20944 | 20954 | 20964 | 20974 |
|                        | Weight     | 1-1/2 | 4     | 2-3/4   | 4     | 8     | 16    | 26    | 40    | 80    | 90    | 110   | 250   |
| Upper Roller           | Part No.   | 28804 | 26397 | 29047   | 28968 | 20665 | 20915 | 20925 | 20935 | 20945 | 20955 | 20965 | 20975 |
|                        | Weight     | 1     | 3     | 2       | 1-1/4 | 5     | 9     | 20    | 20    | 30    | 50    | 105   | 250   |
| Ball Bearings          | Part No.   | 17294 | 17294 | 27940   | 20666 | 20666 | 20666 | 20926 | 20936 | 20936 | 20936 | 20966 | 20966 |
|                        | Weight     | 1/16  | 1/16  | 1/16    | 1/16  | 1/16  | 1/16  | 1/16  | 1/8   | 1/4   | 1/4   | 1/2   | 1/2   |
|                        | No. Req'd. | 9     | 13    | 8       | 7     | 9     | 13    | 15    | 12    | 16    | 24    | 21    | 27    |
| Loading Slot Set Screw | Part No.   | 28808 | 26401 | 29052   | 20667 | 20667 | 20667 | 20927 | 20937 | 20937 | 20937 | 20967 | 20967 |
|                        | Weight     | 1/16  | 1/16  | 1/16    | 1/16  | 1/16  | 1/16  | 1/8   | 1/4   | 1/4   | 1/4   | 1/2   | 1/2   |

#### How To Order:

**Specify:** (1) Name and Number of Assembly or Part.  
(2) Casing O.D. and Weight.  
(3) Top Connection, if other than Standard.

#### Recommended Spares:

(1) 1 Middle Roller, each Casing Size.  
(2) 1 Nose Cone, each Casing Size.  
(3) 1 Set of Ball Bearings.  
(4) 2 Loading Slot Set Screws.

NOTE: For prices, refer to Section 6200 of the Bowen Price Manual.

**Bowen Tubing And Casing Rollers - Range Sheet**

| Casing |     | Upper Roller |       |       | Middle Roller |       |       | Lower Roller |       |       | Nose Cone |       |       | Mean Casing Drift Dia. (Tool Rolls) |
|--------|-----|--------------|-------|-------|---------------|-------|-------|--------------|-------|-------|-----------|-------|-------|-------------------------------------|
| Size   | Wt. | Part No.     | O.D.  | Wt.   | Part No.      | O.D.  | Wt.   | Part No.     | O.D.  | Wt.   | Part No.  | O.D.  | Wt.   |                                     |
| 2-3/8  | 4.6 | 28804        | 1.750 | 1     | 28805         | 1.938 | 1-1/2 | 28806        | 1.750 | 1-3/4 | 28807     | 1.562 | 1     | 1.901                               |
| 2-7/8  | 6.4 | 26397        | 2.187 | 3     | 26398         | 2.360 | 4     | 26399        | 2.187 | 5     | 26400     | 1.875 | 3     | 2.347                               |
| 3-1/2  | 7.7 | 29047        | 2.812 | 2     | 29048         | 2.674 | 2-3/4 | 29049        | 2.812 | 2-3/4 | 29050     | 2.437 | 2-1/4 | 2.943                               |
| 4      | 9.5 | 28968        | 3.219 | 1-1/4 | 28967         | 3.281 | 4     | 28966        | 3.219 | 6-3/4 | 28965     | 2.875 | 3-1/4 | 3.423                               |

| Casing |       | Upper Roller |       |       | Middle Roller |       |       | Lower Roller |       |       | Nose Cone |       |       | Mean Casing (Tool Rolls) |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
|--------|-------|--------------|-------|-------|---------------|-------|-------|--------------|-------|-------|-----------|-------|-------|--------------------------|-------|-------|-------|-------|-------|--------|-------|-------|-------|----|-------|-------|---|-------|
| Size   | Wt.   | Part No.     | O.D.  | Wt.   | Part No.      | O.D.  | Wt.   | Part No.     | O.D.  | Wt.   | Part No.  | O.D.  | Wt.   |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 4-1/2  | 9.5   | 20665        | 3.688 | 3-1/2 | 20664         | 3.875 | 7-1/2 | 20663        | 3.688 | 8     | 20662     | 3.125 | 5-1/4 | 4.032                    |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
|        | 11.6  |              |       |       |               |       | 3.688 |              |       |       |           |       |       | 5-1/2                    | 3.938 |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 4-3/4  | 13.6  | 15.75        | 3.688 | 3-1/2 | 3.875         | 7-1/4 | 3.688 | 8            | 4.032 | 4.500 | 4.438     | 4.343 | 4.234 | 4.218                    |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
|        | 5     |              |       |       |               |       |       |              |       |       |           |       |       |                          | 11.5  | 4.250 | 7-1/2 | 4.250 | 10    | 4.250  | 12    | 4.500 |       |    |       |       |   |       |
| 5      | 13.0  | 4.000        | 5-1/2 | 4.114 | 4.192         | 9-1/2 | 3.976 | 8            | 4.218 | 4.094 | 3.688     | 8     | 4.982 | 4.950                    |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
|        | 15.0  |              |       |       |               |       |       |              |       |       |           |       |       |                          | 4.000 | 5-1/2 | 4.192 | 9-1/2 | 4.000 | 10-1/2 | 4.343 |       |       |    |       |       |   |       |
|        | 17.7  |              |       |       |               |       |       |              |       |       |           |       |       |                          | 3.976 | 8     | 4.234 |       |       |        |       |       |       |    |       |       |   |       |
|        | 18.0  |              |       |       |               |       |       |              |       |       |           |       |       |                          | 3.965 | 8     | 4.218 |       |       |        |       |       |       |    |       |       |   |       |
|        | 21.0  |              |       |       |               |       |       |              |       |       |           |       |       |                          | 3.688 | 3-1/2 | 4.000 | 8     | 3.688 | 8      | 4.094 |       |       |    |       |       |   |       |
|        | 5-1/2 |              |       |       |               |       |       |              |       |       |           |       |       |                          | 13.0  | 20915 | 4.662 | 9     | 20914 | 4.802  | 14    | 20913 | 4.662 | 16 | 20912 | 3.750 | 6 | 4.982 |
|        | 14.0  |              |       |       |               |       |       |              |       |       |           |       |       |                          | 4.738 | 14    | 4.950 |       |       |        |       |       |       |    |       |       |   |       |
| 15.0   | 4.666 | 13           | 4.912 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 15.5   | 4.609 | 9            | 4.888 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 17.0   | 4.554 | 11           | 4.830 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 20.0   | 4.359 | 6            | 4.716 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 23.0   | 4.358 | 10           | 4.608 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 5-3/4  | 14.0  | 4.875        | 12    | 5.082 | 17            | 4.875 | 19    | 5.228        |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 17.0   | 4.894 | 15           | 5.128 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 19.5   | 4.662 | 9            | 5.028 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 22.5   | 4.694 | 14           | 4.928 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 6      | 15.0  | 5.125        | 15    | 5.300 | 20            | 5.125 | 22    | 5.462        |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 16.0   | 5.250 | 19           | 5.438 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 18.0   | 5.100 | 18           | 5.362 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 20.0   | 4.956 | 16           | 5.290 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 23.0   | 4.875 | 12           | 4.982 | 17    | 4.875         | 19    | 5.178 |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 6-5/8  | 17.0  | 20925        | 5.734 | 15    | 20924         | 5.910 | 24    | 20923        | 5.734 | 27    | 20922     | 5.000 | 17    | 6.072                    |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 20.0   | 5.745 | 22           | 5.987 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 22.0   | 5.609 | 13           | 5.745 | 22    | 5.609         | 25    | 5.927 |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 24.0   | 5.609 | 20           | 5.859 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 26.0   | 5.478 | 18           | 5.793 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 26.0   | 5.442 | 17           | 5.775 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 28.0   | 5.350 | 16           | 5.729 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 29.0   | 5.359 | 10           | 5.699 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 32.0   | 5.375 | 16           | 5.613 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 7      | 17.0  | 6.250        | 24    | 6.202 | 29            | 6.250 | 36    | 5.500        | 22    | 6.476 |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 20.0   | 6.038 | 25           | 6.394 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 22.0   | 6.000 | 20           | 6.336 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 23.0   | 6.108 | 26           | 6.304 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 24.0   | 6.048 | 25           | 6.274 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 26.0   | 5.830 | 16           | 6.214 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 28.0   | 5.970 | 25           | 6.152 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |
| 29.0   | 5.910 | 24           | 6.122 |       |               |       |       |              |       |       |           |       |       |                          |       |       |       |       |       |        |       |       |       |    |       |       |   |       |

**Bowen Tubing And Casing Rollers - Range Sheet (Continued)**

| Casing                          |                                 | Upper Roller |        |        | Middle Roller |        |        | Lower Roller |        |        | Nose Cone |       |        | Mean Casing Drift Dia. (Tool Rolls) |        |
|---------------------------------|---------------------------------|--------------|--------|--------|---------------|--------|--------|--------------|--------|--------|-----------|-------|--------|-------------------------------------|--------|
| Size                            | Wt.                             | Part No.     | O.D.   | Wt.    | Part No.      | O.D.   | Wt.    | Part No.     | O.D.   | Wt.    | Part No.  | O.D.  | Wt.    |                                     |        |
| 7                               | 30.0                            |              |        |        |               | 5.854  | 23     |              |        |        |           |       |        | 6.092                               |        |
|                                 | 32.0                            |              | 5.734  | 15     |               | 5.830  | 23     |              | 5.734  | 27     |           | 5.000 | 17     | 6.032                               |        |
|                                 | 35.0                            |              | 5.609  | 13     |               | 5.776  | 22     |              | 5.609  | 25     |           |       |        | 5.942                               |        |
|                                 | 38.0                            |              |        |        |               | 5.609  | 20     |              |        |        |           |       |        | 5.858                               |        |
|                                 | 40.0                            |              |        |        |               | 5.442  | 17     |              |        |        |           |       |        | 5.774                               |        |
| 7- <sup>5</sup> / <sub>8</sub>  | 20.0                            | 20935        | 6.500  | 23     | 20934         | 6.875  | 42     | 20933        | 6.500  | 43     | 20932     | 5.375 | 30     | 7.062                               |        |
|                                 | 24.0                            |              |        |        |               | 6.676  | 39     |              |        |        |           |       |        | 6.963                               |        |
|                                 | 26.4                            |              |        |        |               | 6.562  | 37     |              |        |        |           |       |        | 6.906                               |        |
|                                 | 29.7                            |              | 6.188  | 18     |               | 6.686  | 42     |              | 6.188  | 40     |           |       |        | 6.812                               |        |
|                                 | 33.7                            |              |        |        |               | 6.468  | 35     |              |        |        |           |       |        | 6.703                               |        |
|                                 | 39.0                            |              |        |        |               | 6.188  | 30     |              |        |        |           |       |        | 6.563                               |        |
|                                 | 8- <sup>5</sup> / <sub>8</sub>  | 24.0         | 20935  | 7.562  | 44            | 20934  | 7.758  | 62           | 20933  | 7.562  | 67        | 20932 | 6.500  | 48                                  | 8.035  |
| 28.0                            |                                 |              |        |        |               | 7.594  | 56     |              |        |        |           |       |        | 7.955                               |        |
| 32.0                            |                                 |              | 7.375  | 39     |               | 7.594  | 56     |              | 7.375  | 62     |           |       |        | 7.859                               |        |
| 36.0                            |                                 |              |        |        |               | 7.402  | 54     |              |        |        |           |       |        | 7.763                               |        |
| 38.0                            |                                 |              |        |        |               | 7.302  | 52     |              |        |        |           |       |        | 7.713                               |        |
| 40.0                            |                                 |              | 7.125  | 38     |               | 7.452  | 54     |              | 7.125  | 58     |           | 6.000 | 40     | 7.663                               |        |
| 43.0                            |                                 |              |        |        |               | 7.304  | 52     |              |        |        |           |       |        | 7.589                               |        |
| 44.0                            |                                 |              |        |        |               | 7.250  | 44     |              |        |        |           |       |        | 7.563                               |        |
| 49.0                            |                                 |              |        |        |               | 7.024  | 45     |              |        |        |           |       |        | 7.449                               |        |
| 9                               | 34.00                           | 20945        | 8.000  | 44     | 20944         | 7.676  | 50     | 20943        | 8.000  | 74     | 20942     | 6.625 | 42     | 8.212                               |        |
|                                 | 38.00                           |              | 7.718  | 37     |               | 7.768  | 52     |              | 7.718  | 67     |           |       |        | 8.118                               |        |
|                                 | 40.00                           |              |        |        |               | 7.676  | 50     |              |        |        |           |       |        | 8.072                               |        |
|                                 | 45.00                           |              | 7.343  | 27     |               | 7.812  | 54     |              | 7.343  | 57     |           |       |        | 7.954                               |        |
|                                 | 55.00                           |              |        |        |               | 7.375  | 43     |              |        |        |           |       |        | 7.734                               |        |
|                                 | 9- <sup>5</sup> / <sub>8</sub>  | 29.30        |        | 8.500  | 58            |        | 8.720  | 82           |        | 8.500  | 88        |       |        |                                     | 8.985  |
| 32.30                           |                                 |              |        |        |               | 8.696  | 81     |              |        |        |           |       |        | 8.973                               |        |
| 36.00                           |                                 |              |        |        |               | 8.438  | 75     |              |        |        |           |       |        | 8.843                               |        |
| 40.00                           |                                 |              | 8.250  | 51     |               | 8.514  | 77     |              | 8.250  | 81     |           |       |        | 8.757                               |        |
| 43.00                           |                                 |              |        |        |               | 8.354  | 70     |              |        |        |           |       |        | 8.677                               |        |
| 47.00                           |                                 |              | 8.000  | 44     |               | 8.456  | 76     |              | 8.000  | 74     |           |       |        | 8.603                               |        |
| 53.50                           |                                 |              |        |        |               | 8.164  | 63     |              |        |        |           |       |        | 8.457                               |        |
| 10                              |                                 | 33.00        |        | 8.812  | 70            |        | 9.050  | 91           |        | 8.812  | 100       |       |        | 9.306                               |        |
| 10- <sup>3</sup> / <sub>4</sub> | 32.75                           | 20955        | 9.500  | 36     | 20954         | 9.728  | 78     | 20953        | 9.500  | 96     | 20952     | 8.250 | 60     | 10.114                              |        |
|                                 | 40.00                           |              |        |        |               | 9.444  | 68     |              |        |        |           |       |        | 9.976                               |        |
|                                 | 40.50                           |              |        |        |               |        |        |              |        |        |           |       |        | 9.972                               |        |
|                                 | 45.00                           |              |        |        |               | 9.254  | 59     |              |        |        |           |       |        | 9.882                               |        |
|                                 | 45.50                           |              |        |        |               |        |        |              |        |        |           |       |        | 9.872                               |        |
|                                 | 48.00                           |              |        |        |               | 9.148  | 54     |              |        |        |           |       |        | 9.824                               |        |
|                                 | 51.00                           |              | 9.250  | 27     |               | 9.294  | 60     |              | 9.250  | 87     |           |       |        | 9.772                               |        |
|                                 | 54.00                           |              |        |        |               | 9.162  | 56     |              |        |        |           |       |        | 9.706                               |        |
|                                 | 55.50                           |              |        |        |               | 9.114  | 50     |              |        |        |           |       |        | 9.682                               |        |
|                                 | 11- <sup>3</sup> / <sub>4</sub> | 38.0         |        | 10.250 | 36            |        | 10.896 | 122          |        | 10.250 | 128       |       | 8.750  | 80                                  | 11.072 |
|                                 |                                 | 42.00        |        |        |               |        | 10.754 | 113          |        |        |           |       |        |                                     | 11.002 |
| 47.00                           |                                 |              |        |        |               | 10.594 | 108    |              |        |        |           |       |        | 10.922                              |        |
| 54.00                           |                                 |              |        |        |               | 10.354 | 104    |              |        |        |           |       |        | 10.802                              |        |
| 60.00                           |                                 |              |        |        |               | 10.138 | 95     |              |        |        |           |       |        | 10.694                              |        |
| 12                              | 40.00                           |              | 10.750 | 90     |               | 10.862 | 120    |              | 10.750 | 150    |           |       | 11.306 |                                     |        |
| 13                              | 40.00                           | 20965        | 11.625 | 105    | 20964         | 11.846 | 118    | 20963        | 11.625 | 158    | 20962     | 10.00 | 120    | 12.360                              |        |
|                                 | 45.00                           |              |        |        |               | 11.677 | 107    |              |        |        |           |       |        | 12.282                              |        |
|                                 | 50.00                           |              |        |        |               | 11.534 | 100    |              |        |        |           |       |        | 12.204                              |        |
|                                 | 54.00                           |              |        |        |               | 11.410 | 95     |              |        |        |           |       |        | 12.142                              |        |
|                                 | 13- <sup>3</sup> / <sub>8</sub> | 48.00        |        | 12.000 | 75            |        | 12.024 | 118          |        | 12.000 | 178       |       |        |                                     | 12.637 |
| 54.50                           |                                 |              |        |        |               | 11.812 | 117    |              |        |        |           |       |        | 12.537                              |        |
| 61.00                           |                                 |              |        |        |               | 11.625 | 107    |              |        |        |           |       |        | 12.437                              |        |

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**Bowen Tubing And Casing Rollers - Range Sheet (Continued)**

| Casing                          |       | Upper Roller |        | Middle Roller |          | Lower Roller |     | Nose Cone |        |     | Mean Casing Drift Dia. (Tool Rolls) |       |     |        |
|---------------------------------|-------|--------------|--------|---------------|----------|--------------|-----|-----------|--------|-----|-------------------------------------|-------|-----|--------|
| Size                            | Wt.   | Part No.     | O.D.   | Wt.           | Part No. | O.D.         | Wt. | Part No.  | O.D.   | Wt. | Part No.                            | O.D.  | Wt. |        |
| 13- <sup>3</sup> / <sub>8</sub> | 68.00 |              | 11.625 | 105           |          | 11.812       | 102 |           | 11.625 | 158 |                                     |       |     | 12.337 |
|                                 | 72.00 |              |        |               |          | 11.677       | 97  |           |        |     |                                     |       |     | 12.269 |
|                                 | 83.00 |              |        |               |          | 11.320       | 93  |           |        |     |                                     |       |     | 12.097 |
|                                 | 85.00 |              |        |               |          | 11.288       | 90  |           |        |     |                                     |       |     | 12.081 |
| 16                              | 55.00 | 20975        | 14.500 | 146           | 20974    | 14.844       | 250 | 20973     | 14.500 | 284 | 20972                               | 14.00 | 340 | 15.297 |
|                                 | 65.00 |              |        |               |          | 14.554       | 234 |           |        |     |                                     |       |     | 15.172 |
|                                 | 75.00 |              |        |               |          | 14.344       | 220 |           |        |     |                                     |       |     | 15.047 |
|                                 | 84.00 |              |        |               |          | 14.114       | 210 |           |        |     |                                     |       |     | 14.932 |
| 18- <sup>5</sup> / <sub>8</sub> | 78.00 |              | 17.000 | 325           |          | 17.304       | 440 |           | 17.000 | 463 |                                     |       |     | 17.777 |
|                                 | 87.50 |              |        |               |          | 17.104       | 392 |           |        |     |                                     |       |     | 17.104 |
|                                 | 96.50 |              |        |               |          | 16.904       | 370 |           |        |     |                                     |       |     | 17.577 |

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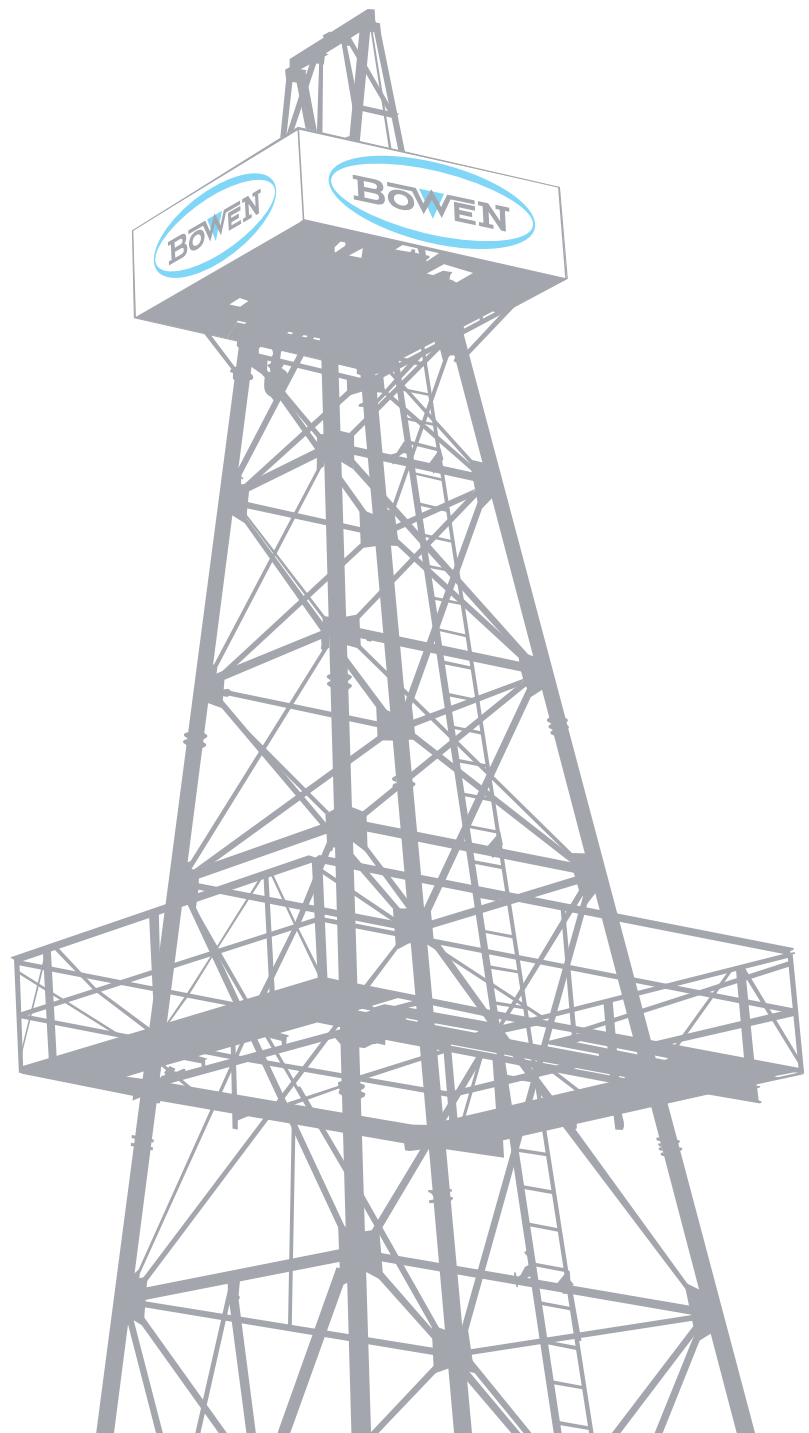
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# Bowen Fishing Magnets

Instruction Manual 3400



**Bowen | NOV**



# Bowen Fishing Magnets

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Fishing Magnets

## General Description

Bowen™ fishing magnets retrieve small objects such as bit cones, bearings, slips, tong pins, and milling cuttings that can often only be retrieved by magnetic attraction. Valuable for use prior to diamond coring, the magnets completely clean the hole of damaging junk items.

Magnets are available in sizes from 1 inch O.D. through 20 inches O.D., and with all popular threaded pin connections, for wire line or pipe operation. They are capable of exerting pulls from 5 to 3,000 pounds, depending on size, and full circulation may be maintained through most of the magnets during service.

The Bowen magnet charger is available as an optional accessory.

## Use

Bowen fishing magnets are an indispensable accessory for all diamond coring operations. Particles such as chipped bit teeth and broken bearings can seriously damage or diminish the performance of a diamond core bit. Often, in a single run, Bowen fishing magnets can completely cleanse the hole of all such particles, assuring the bit's safety and performance.

## Construction

The Bowen fishing magnet incorporates a patented construction using a special permanent magnet in which the magnetic flux is concentrated in a controlled field around the bottom pole plate. The pole plate is highly magnetic, and its field extends completely across the bottom end of the tool. Since no magnetism emanates to any other part of the tool, the outside case is not magnetized and the tool can

be run inside cased holes without losing its effectiveness.

Generous circulation holes are provided through the body of the tool and terminate in a series at the bottom of the tool inside the fishing guide. Circulation through these holes keeps the pole plate clean at all times.

The Bowen fishing magnet consists of a body, an integral housing, an integral pole plate, a magnetic element, and a bottom guide.

The standard guide is the flush guide type (having no extension below the pole plate.) Optional guides available are the lipped guide, mill guide.

The body is manufactured from alloy steel. It has a suitable tool joint pin at its upper end, a thread at its lower end to engage the housing, and ample circulation ports.

The magnetic element is the best, most efficient permanent magnet available. It is engineered and furnished to exacting specifications to best perform its important function.

The housing, body and pole plate are screwed together and welded at assembly, with the magnetic element in position.

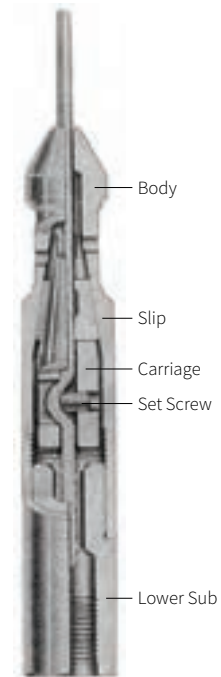
The bottom guide is removable to allow the guide to be changed or repaired.

The magnet assembly is magnetized after being completely assembled and is then given a final inspection.



**Bowen Fishing Magnet**

to wash out and remove heavy cuttings. Reduce circulation and lower the magnet into contact with the fish. Rotate enough to assure good contact and discontinue circulation.



**Wireline Rope Socket**

## Operation

Bowen fishing magnets are most often operated on tubing or drill pipe. However, where circumstances demand it, they may be operated on wireline.

For wireline operations, use sucker rod adaptors and wireline rope sockets, which are also available from NOV. Along with a flush guide, the magnet is lowered to the bottom of the hole and returned to the surface at a fairly slow speed. Operation on wireline is economical, but does not allow fluid circulation through the tool.

After the magnet is assembled on the running string, lower it within 6 inches or 1 foot of the fish. Circulate the fluid long enough

# Bowen Fishing Magnets

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The **lipped guide** should also be used for long objects which are lying to one side and need to be straightened up. For example: if an 18-inch pipe wrench is lost in the hole, it will usually lean to the side, therefore, the lipped guide should be used in order to rake it up straight, so that it may enter the guide. Use caution not to apply too much weight. Excessive weight tends to push the object into the formation and may damage the magnet pole plate.

Pull the magnet to the surface and remove the fish. Before making a second run, assure that all circulation holes are clear and open. If necessary, remove any debris plugging these holes with a screwdriver or small rod probe. Repeat this procedure for any additional objects still in the hole.

## Operational Examples: Fishing for one Cone

Assemble the Bowen fishing magnet with the mill type guide and run it in the hole.

Upon running the last stand or joint of the running string, make up the kelly and start circulation immediately. Start the rotary at the same time. Rotate the tool down to within 6 inches or 1 foot of the fish. Leave the tool in this position for 3 or 4 minutes in order to wash the bottom of the hole clean. Observe the weight indicator closely for any sign of loss of weight. If loss of weight does appear, it is a positive indication that additional washing is required in order to reach true bottom. **DO NOT ROTATE YET.**

Lift the tool off bottom approximately 5 to 10 feet. Repeat the lowering and probing procedure, checking for the same depth and weight. Make sure there is not a subsequent weight loss.

After making sure that no more weight will be circulated off, engage the rotary. Using 3,000 pounds of weight, let the rotary turn 3 to 6 turns, observing whether there is torque resistance. Six turns should not give more than 1 or 2 turns of torque. If 5 or 6 turns of torque are returned with 5 to 6 rounds of rotary, take off about half the weight shown on the weight indicator and try rotating again. If the formation is hard or firm, this should be indicated by a jump of the rotary and subsequent smoothing out.

At this point, disengage the pump. Lift the tool 5 to 10 feet off bottom. Allow it to be idle for a couple of minutes. Slowly lower it back to bottom. **DO NOT USE THE PUMP AND DO NOT ROTATE.** Check the depth and weight on the fish. If the weight and depth check properly, turn the rotary 3 or 4 rounds. The same jump of the rotary and

subsequent smoothing out will probably appear. It is good practice to repeat this last procedure, but do so without circulation.

It should be noted that this procedure will vary with hole conditions and with type and quantity of junk being fished.

Ample circulation and proper weight applications are the keys to success while running a Bowen fishing magnet. In most cases, too much circulation is almost impossible, and the maximum weight that should be applied to any size magnet during rotation is 5,000 pounds. Some jobs require no rotary. Maximum weight applied to any size magnet without rotation should, in most cases, be limited to 10,000 pounds.

The application of excessive weight or rotation may cause severe damage to the pole plate and magnetic element.

The **flush guide** catches objects such as sledge hammers, zublin cones, or flat objects too large to fit inside a lipped or mill guide.

The **mill guide** is used when fishing for tong dies, one or two cones only, or during safety runs prior to diamond coring operations.

The **lipped guide** is used when three or more cones are lost in the hole. The purpose of using the lipped guide is to dig one of the cones out of the nest, roll it over one of the other cones and cause it to ride up to the pole plate.

After recovery of the first cone in this manner, it is good practice to replace the lipped guide with the mill guide for the second run.

# Bowen Fishing Magnets

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## Maintenance

Maintenance of Bowen fishing magnets is minimal since the tools are never completely disassembled.

After each use, the magnet should be thoroughly washed out with fresh water. Circulate the fresh water through the tool from the pin until assured that all drilling mud, salt and other solutions have been removed. Allow the tool to dry.

Thoroughly clean all outside surfaces and paint or grease the body and housing. Do not paint the pole plate.

Apply thread dope or grease to the tool joint pin and guide threads.

Inspect the circulation ports in the pole plate. Remove any metal particles found in these ports. This may be done by placing a screwdriver on the side of the guide, and inserting the point into the holes, lifting metal particles out on the point of the screwdriver.

**CAUTION: When storing or transporting more than one tool together, never place the bottom of two tools against each other, especially if one is larger than the other; the smaller tool will give up part of its charge and be weakened.**

The magnetic element in a Bowen magnet is essentially permanent, but the mishandling of the magnet or the passage of time may cause weakening. When this occurs, the magnet should be recharged. Unless the operator has an NOV magnet re-charger, the tools requiring recharge must be returned to NOV for proper recharging.

Also, if through wear or damage a magnet requires extensive repairs, it should be returned to Bowen. Workers at NOV facilities completely demagnetize, disassemble, repair and reassemble the tool under controlled conditions. Reassembly of these tools must be properly done if they are to function properly.

# Bowen Fishing Magnets

## Specifications and Replacement Parts

### Bowen Fishing Magnets Specifications

| Hole size                   | 1¼ in. to 2 in. | 1½ in. to 2½ in. | 2 in. to ¾ in.  | 2½ in. to 3¼ in. | 2¾ in. to 3½ in. | 3 in. to 3¾ in. | 3½ in. to 4 ½ in. | 4 in. to 4½ in.  |        |
|-----------------------------|-----------------|------------------|-----------------|------------------|------------------|-----------------|-------------------|------------------|--------|
| <b>Size – O.D.</b>          | 1 in.           | 1¼ in.           | 1½ in.          | 1¾ in.           | 2¼ in.           | 2½ in.          | 3 in.             | 3¼ in.           |        |
| <b>Top Connection – Pin</b> | ¾ in. 11-N.C.   | ¾ in. S.R.       | ¾ in. S.R.      | ¾ in. S.R.       | ¾ in. S.R.       | ¾ in. S.R.      | 2½ in. Tbg.       | 2½ in. Tbg.      |        |
| <b>Approximate Pull*</b>    | 5 lbs – 7 lbs   | 8 lbs – 10 lbs   | 11 lbs – 14 lbs | 15 lbs – 20 lbs  | 25 lbs – 50 lbs  | 50 lbs – 85 lbs | 85 lbs – 190 lbs  | 85 lbs – 190 lbs |        |
| <b>Complete assembly</b>    | <b>Part no.</b> | 32060            | 32080           | 32100            | 32120            | 32150           | 32170             | 32180            | 32190  |
|                             | <b>Weight</b>   | 1 lbs            | 1 ½ lbs         | 3 ¼ lbs          | 5 lbs            | 16 lbs          | 18 lbs            | 20 lbs           | 25 lbs |

### Component Parts

| <b>Body</b>             | <b>Part no.</b> | —     | 32081  | 32101  | 32121 | 32151  | 32171  | 32181  | 32191   |
|-------------------------|-----------------|-------|--------|--------|-------|--------|--------|--------|---------|
|                         | <b>Weight</b>   | —     | 1¼ lbs | 1½ lbs | 3 lbs | 10 lbs | 10 lbs | 11 lbs | 12¾ lbs |
| <b>Housing</b>          | <b>Part no.</b> | 32062 | 32082  | 32102  | 32122 | 32152  | 32172  | 32182  | 32192   |
|                         | <b>Weight</b>   | ¾ lb  | ¾ lb   | 1 lb   | 1 lb  | 3½ lbs | 4 lbs  | 4½ lbs | 6½ lbs  |
| <b>Pole Plate</b>       | <b>Part no.</b> | 32063 | 32083  | 32103  | 32123 | 32153  | 32173  | 32183  | 32193   |
|                         | <b>Weight</b>   | ½ lb  | ½ lb   | ¾ lb   | ¾ lb  | ½ lb   | ¾ lb   | ¾ lb   | 1 lb    |
| <b>Magnetic Element</b> | <b>Part no.</b> | 32064 | 32064  | 32104  | 32124 | 32154  | 32174  | 32184  | 32194   |
|                         | <b>Weight</b>   | ½ lb  | ½ lb   | ½ lb   | ½ lb  | 1½ lbs | 1½ lbs | 3 lbs  | 4 lbs   |
| <b>Flush Guide</b>      | <b>Part no.</b> | —     | 32085  | 32105  | 32125 | 32155  | 32175  | 32185  | 32195   |
|                         | <b>Weight</b>   | —     | ¼ lb   | ¼ lb   | ½ lb  | ½ lb   | ¾ lb   | ¾ lb   | ¾ lb    |

### Accessories

|                                 |                 |   |       |       |       |       |       |         |         |
|---------------------------------|-----------------|---|-------|-------|-------|-------|-------|---------|---------|
| <b>Lipped Guide</b>             | <b>Part no.</b> | — | 32085 | 32105 | 32125 | 32155 | 32175 | 32185   | 32195   |
|                                 | <b>Weight</b>   | — | ¼ lb  | ¼ lb  | ½ lb  | 1 lb  | 1 lb  | 1 lb    | 3 lbs   |
| <b>Mill Guide</b>               | <b>Part no.</b> | — | 32085 | 32105 | 32125 | 32155 | 32175 | 32185   | 32195   |
|                                 | <b>Weight</b>   | — | ¼ lb  | ¼ lb  | ¾ lb  | 1 lb  | 2 lbs | 2¾ lbs  | 3 lbs   |
| <b>¾ in. Adapter Sucker Rod</b> | <b>Part no.</b> | — | —     | —     | —     | —     | —     | 70513   | 70513   |
|                                 | <b>Weight</b>   | — | —     | —     | —     | —     | —     | 12½ lbs | 12½ lbs |

### Bowen Fishing Magnets Specifications

| Hole Size                   | 4¼ in. to 4½ in.  | 4½ in. to 5 in.   | 5½ in. to 5½ in.  | 5½ in. to 6 in.   | 6½ in. to 6½ in.  | 6½ in. to 6½ in.  | 6½ in. to 7½ in.  | 7½ in. to 8½ in.  |         |
|-----------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------|
| <b>Size – O.D.</b>          | 3½ lbs            | 4 lbs             | 4½ lbs            | 5 lbs             | 5½ lbs            | 5¾ lbs            | 6 lbs             | 7 lbs             |         |
| <b>Top Connection – Pin</b> | 2 ¾ in.           | 2¾ in.            | 2¾ in.            | 2¾ in.            | 3½ in.            | 3½ in.            | 3½ in.            | 4 in.             |         |
| <b>Approximate Pull*</b>    | 150 lbs – 250 lbs | 175 lbs – 250 lbs | 250 lbs – 320 lbs | 320 lbs – 385 lbs | 385 lbs – 425 lbs | 385 lbs – 425 lbs | 425 lbs – 500 lbs | 550 lbs – 700 lbs |         |
| <b>Complete Assembly</b>    | <b>Part no.</b>   | 32210             | 32230             | 32240             | 32260             | 32270             | 32280             | 32290             | 32300   |
|                             | <b>Weight</b>     | 27½ lbs           | 43 lbs            | 67 lbs            | 80 lbs            | 95 lbs            | 106 lbs           | 120 lbs           | 162 lbs |

Finger shoe replacement is furnished with the same O.O. as the standard shoe unless otherwise specified.

### Component Parts

|                         |                 |        |        |         |        |        |        |        |         |
|-------------------------|-----------------|--------|--------|---------|--------|--------|--------|--------|---------|
| <b>Body</b>             | <b>Part no.</b> | 32211  | 32231  | 32241   | 32261  | 32271  | 32281  | 32291  | 2301    |
|                         | <b>Weight</b>   | 14 lbs | 26 lbs | 40 lbs  | 47 lbs | 59 lbs | 75 lbs | 70 lbs | 105 lbs |
| <b>Housing</b>          | <b>Part no.</b> | 32212  | 32232  | 32242   | 32262  | 32272  | 32282  | 32292  | 32302   |
|                         | <b>Weight</b>   | 7 lbs  | 9¼ lbs | 15½ lbs | 17 lbs | 19 lbs | 16 lbs | 20 lbs | 29 lbs  |
| <b>Pole Plate</b>       | <b>Part no.</b> | 32213  | 32233  | 32243   | 32263  | 32273  | 32273  | 32293  | 32303   |
|                         | <b>Weight</b>   | 1 lbs  | 1¼ lbs | 2 lbs   | 2 lbs  | 2½ lbs | 2¾ lbs | 3 lbs  | 3½ lbs  |
| <b>Magnetic Element</b> | <b>Part no.</b> | 32214  | 32224  | 32244   | 32264  | 32274  | 32274  | 32294  | 32304   |
|                         | <b>Weight</b>   | 4½ lbs | 5 lbs  | 7½ lbs  | 10 lbs | 11 lbs | 12 lbs | 15 lbs | 19 lbs  |
| <b>Flush Guide</b>      | <b>Part no.</b> | 32215  | 32235  | 32245   | 32265  | 32275  | 32285  | 32295  | 32305   |
|                         | <b>Weight</b>   | 1 lbs  | 1½ lbs | 2 lbs   | 4 lbs  | 4 lbs  | 4¼ lbs | 5 lbs  | 5½ lbs  |

### Accessories

|                                 |                 |        |        |        |        |        |        |        |        |
|---------------------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Lipped Guide</b>             | <b>Part no.</b> | 32215  | 32235  | 32245  | 32265  | 32275  | 32285  | 32295  | 32305  |
|                                 | <b>Weight</b>   | 3¼ lbs | 3¾ lbs | 5 lbs  | 8 lbs  | 8 lbs  | 10 lbs | 12 lbs | 20 lbs |
| <b>Mill Guide</b>               | <b>Part no.</b> | 32215  | 32235  | 32245  | 32265  | 32275  | 32285  | 32295  | 32305  |
|                                 | <b>Weight</b>   | 3½ lbs | 4 lbs  | 4½ lbs | 8 lbs  | 8 lbs  | 15 lbs | 17 lbs | 25 lbs |
| <b>¾ in. Adapter Sucker Rod</b> | <b>Part no.</b> | —      | 62250  | 62252  | 62252  | 62254  | 62254  | 62254  | 62256  |
|                                 | <b>Weight</b>   | —      | 13 lbs | 19 lbs | 19 lbs | 33 lbs | 33 lbs | 33 lbs | 48 lbs |
| <b>¾ in. Adapter Sucker Rod</b> | <b>Part no.</b> | —      | 62251  | 62253  | 62253  | 62255  | 62255  | 62255  | 62257  |
|                                 | <b>Weight</b>   | —      | 13 lbs | 19 lbs | 19 lbs | 33 lbs | 33 lbs | 33 lbs | 48 lbs |

\* All pull loads listed are based on a magnet engaging a flat surface covering the entire face of the magnet.

\*Pick up\* capability will be reduced considerably when engaging smaller surface areas.

# Bowen Fishing Magnets

## Specifications and Replacement Parts

### Specifications

| Hole size                   | 8 1/2 in. to 9 1/4 in. | 9 1/2 in. to 11 1/8 in. | 10 1/2 in. to 11 1/2 in. | 11 1/4 in. to 13 in.  | 12 1/4 in. to 14 in.  | 15 in.                | 17 in.                | 20 in.                  |          |
|-----------------------------|------------------------|-------------------------|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------|----------|
| <b>Size – O.D.</b>          | 8 in.                  | 9 in.                   | 10 in.                   | 10 1/2 in.            | 11 1/2 in.            | 14 in.                | 16 in.                | 19 in.                  |          |
| <b>Top Connection – Pin</b> | 4 1/2 in. API Reg      | 4 1/2 in. API Reg       | 6 in. API Reg            | 6 in. API Reg         | 6 in. API Reg         | 6 in. API Reg         | 6 in. API Reg         | 13 1/8 in. Reed V-4 Thd |          |
| <b>Approximate Pull*</b>    | 700 lbs – 850 lbs      | 850 lbs – 1,000 lbs     | 1,000 lbs – 1,125 lbs    | 1,125 lbs – 1,260 lbs | 1,260 lbs – 1,550 lbs | 1,700 lbs – 2,100 lbs | 3,200 lbs – 4,000 lbs | 4,200 lbs – 5,000 lbs   |          |
| <b>Complete assembly</b>    | <b>Part no.</b>        | 32310                   | 32330                    | 32340                 | 32350                 | 32370                 | 32380                 | 145729                  | 79189    |
|                             | <b>Weight</b>          | 205 lbs                 | 335 lbs                  | 390 lbs               | 431 lbs               | 512 lbs               | 770 lbs               | 1200 lbs                | 1700 lbs |

### Component Parts

|                         |                 |         |         |            |         |         |         |         |         |
|-------------------------|-----------------|---------|---------|------------|---------|---------|---------|---------|---------|
| <b>Body</b>             | <b>Part no.</b> | 32311   | 32331   | 32341      | 32351   | 32371   | 32381   | 145730  | 79190   |
|                         | <b>Weight</b>   | 121 lbs | 108 lbs | 208 lbs    | 215 lbs | 268 lbs | 365 lbs | 550 lbs | 700 lbs |
| <b>Housing</b>          | <b>Part no.</b> | 32312   | 32332   | 32342      | 32352   | 32372   | 32382   | 145731  | 79191   |
|                         | <b>Weight</b>   | 40 lbs  | 85 lbs  | 105 lbs    | 110 lbs | 128 lbs | 190 lbs | 300 lbs | 400 lbs |
| <b>Pole Plate</b>       | <b>Part no.</b> | 32313   | 32333   | 32343      | 32343   | 32373   | 32383   | 145732  | 79192   |
|                         | <b>Weight</b>   | 6 lbs   | 9 lbs   | 10 lbs     | 11 lbs  | 15 lbs  | 35 lbs  | 65 lbs  | 120 lbs |
| <b>Magnetic Element</b> | <b>Part no.</b> | 32314   | 32334   | 32344      | 32344   | 32374   | 32384   | 32384   | 79193   |
|                         | <b>Weight</b>   | 30 lbs  | 49 lbs  | 55 lbs     | 60 lbs  | 84 lbs  | 153 lbs | 200 lbs | 325 lbs |
| <b>Flush Guide</b>      | <b>Part no.</b> | 32315   | 32335   | 32345      | 32355   | 32375   | 32385   | 79188   | 79194   |
|                         | <b>Weight</b>   | 10 lbs  | 12 lbs  | 14 1/2 lbs | 15 lbs  | 17 lbs  | 27 lbs  | 85 lbs  | 125 lbs |

### Accessories

|                                   |                 |        |        |        |        |        |         |   |   |
|-----------------------------------|-----------------|--------|--------|--------|--------|--------|---------|---|---|
| <b>Lipped Guide</b>               | <b>Part no.</b> | 32315  | 32335  | 32345  | 32355  | 32375  | 32385   | — | — |
|                                   | <b>Weight</b>   | 27 lbs | 35 lbs | 43 lbs | 47 lbs | 62 lbs | 100 lbs | — | — |
| <b>Mill Guide</b>                 | <b>Part no.</b> | 32315  | 32335  | 32345  | 32355  | 32375  | 32385   | — | — |
|                                   | <b>Weight</b>   | 32 lbs | 40 lbs | 55 lbs | 63 lbs | 83 lbs | 120 lbs | — | — |
| <b>3/4 in. Adapter Sucker Rod</b> | <b>Part no.</b> | 62256  | 62256  | 62258  | 62258  | 62258  | 62258   | — | — |
|                                   | <b>Weight</b>   | 48 lbs | 48 lbs | 95 lbs | 95 lbs | 95 lbs | 95 lbs  | — | — |
| <b>3/4 in. Adapter Sucker Rod</b> | <b>Part no.</b> | 62257  | 62257  | 62259  | 62259  | 62259  | 62259   | — | — |
|                                   | <b>Weight</b>   | 48 lbs | 48 lbs | 95 lbs | 95 lbs | 95 lbs | 95 lbs  | — | — |

\* All pull loads listed are based on a magnet engaging a flat surface covering the entire face of the magnet.

\*Pick up\* capability will be reduced considerably when engaging smaller surface areas.



### How to Order

- Specify:
- (1) Name and number of assembly
  - (2) Size – O.D.
  - (3) Top connection, if other than standard



### Recommended Accessories:

- (1) 1 Lipped Guide
- (2) 1 Mill Guide

NOTE: Prices are furnished for reference. Individual parts are furnished only for repairs.

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# INSTRUCTION MANUAL



## BOWEN CASING SCRAPERS

PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY



**Bowen Tools, Inc.**





INSTRUCTION MANUAL  
BOWEN CASING SCRAPERS

(PATENTED)

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PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

*The designs and specifications for the tools described in this Instruction Manual were in effect at the time this manual was approved for printing. Bowen Tools, Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications, without notice or without incurring obligation.*

*Sixteenth Printing, July 1979*

# INSTRUCTION MANUAL

## BOWEN CASING SCRAPER

(PATENTED)

### GENERAL DESCRIPTION

The BOWEN CASING SCRAPER, field-proved in hundreds of operations, is essentially a thick walled, high-grade, alloy steel body into which are fitted a series of precision, cast-hardened steel blades so arranged to completely scrape and clean the casing of rust, mill scale, cement, paraffin, perforation burrs and other such obstructions.

Precision cast blades with integral flanged back-up plates installed in close-fitting slots are arranged so that complete 360° casing interior scraping is assured whether the scraper is being rotated or spudded.

Each Bowen Casing Scraper has 18 blades arranged in such a way that each group of 6 blades will scrape a complete 360° circle. This arrangement provides triple coverage of the entire surface, assuring thorough uniform cleaning of the surface.

Distinguished by its simple, strong, trouble free construction, the BOWEN CASING SCRAPER will perform many gruelling scraping jobs with little or no maintenance. There are no protruding parts except the blades and there are no bolts, screws, springs or other small parts to shear or vibrate off.

### USES

The BOWEN CASING SCRAPER is used to remove any deposits, irregularities or burrs from oil well casing that might be the cause of trouble during later operation, such as running packers and other close tolerance equipment. Some of the main uses are:

- (1) Clean out cement, hardened mud, paraffin.
- (2) Remove burrs from perforations.
- (3) Remove bullets that become imbedded in the casing.
- (4) Remove burrs and nicks that might have resulted from the running of bits, or fishing tools.
- (5) Remove tight spots that might have been caused by dents in casing as a result of mishandling.



BOWEN CASING SCRAPER

Removing obstructions from the inside of casing offers many advantages to the operator. Packers can be run easily and without damage to the sealing element. Packer seating and sealing is positive in clean, burr-free casing. If a casing swab is run, damage to the expensive swab rubbers is held to a minimum and rubber life is greatly increased.

The BOWEN CASING SCRAPER may be run either with the pin up or the pin down. It may be rotated or spudded. In all cases, full 360° interior casing scraping is assured due to the arrangement of the blades. Yet, this same arrangement and the contour of the blades permits passage through casing couplings and easy re-entry at the bottom, in the event the scraper passes out through the bottom of the casing.

Fluid may be circulated through the Washpipe at the convenience of the operator to wash out cement or excessive paraffin. Holes in the Top Sub and Bottom Sub effect pressure equalization between the inside and outside of the Support Sleeve. Therefore, hydrostatic pressure has no effect upon the scraping action of the scraper.

## CONSTRUCTION

The BOWEN CASING SCRAPER is composed of a Body, Support Sleeve, Washpipe, Washpipe Seal, Blades, Top Sub and Bottom Sub.

The Body is a thick-walled alloy steel tube. It has connection threads at each end, and a series of slots precision located and milled in place. These blade slots form three complete left-hand spirals in pattern. This arrangement presents the broadest face of each Blade for a scraping surface, during normal right-hand rotation. This results in the best possible shearing action for removing burrs or small protrusions.

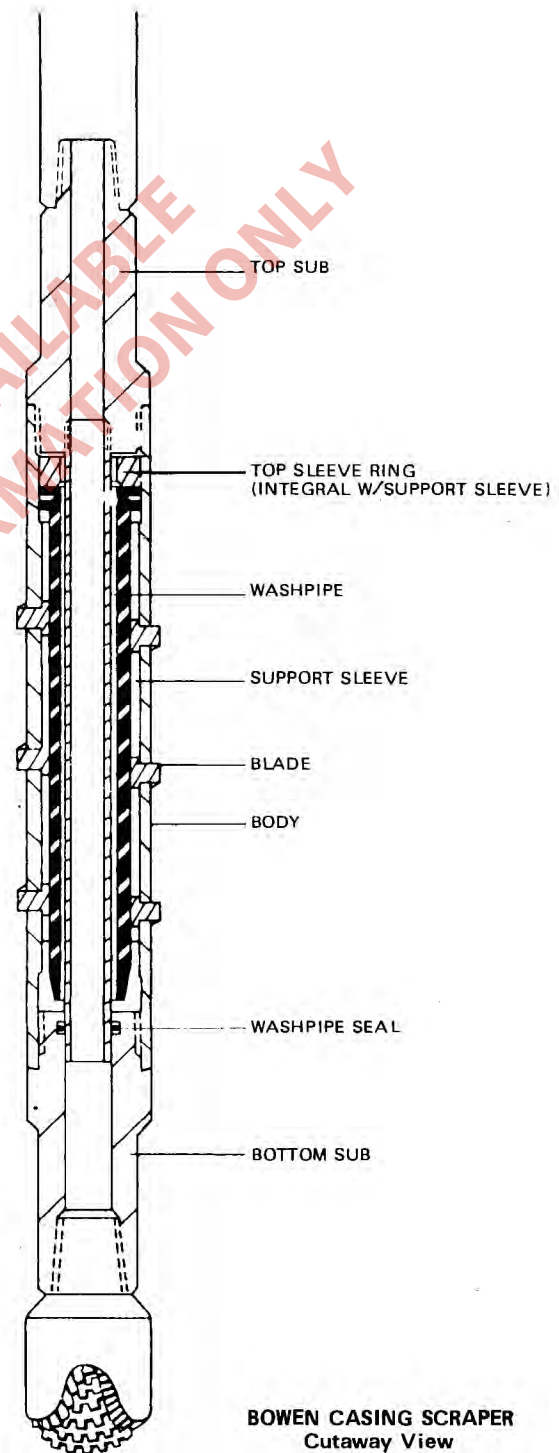
The Support Sleeve is a thick synthetic rubber cylinder, with an integral Sleeve Ring molded into its upper end. This ring is nonferrous and corrosion resistant. The synthetic rubber Sleeve is designed to have good resistance to most general well fluids and gases.

The Washpipe is a steel cylinder with a self-sealing thread at one end, and a finished seal surface at the other. Its presence allows unrestricted circulation pressure to be maintained through the tool with no effect on the Sleeve or the scraping action.

The Blades are precision cast from high-quality wear-resistant steel. They are very tough,

but not brittle. They tend to work-harden slightly in service, which prevents wear very effectively. The Blades have integral flanged back-up plates. They are designed to fit closely in the slots in the Body, so that lateral movement is kept to an absolute minimum.

The Top Sub and Bottom Sub are made from alloy steel and heat treated. The Top Sub has a pin top connection and a lower connection to fit



the Body. The Bottom Sub has a box lower connection, and a connection to fit the Body. Both Top Sub and Bottom Sub have circulation holes to allow equalization of pressure between the inside and outside of the Support Sleeve. Both Top Sub and Bottom Sub have a suitable fishing neck to allow fishing out of the well if required. See principal dimension chart, page 6.

## OPERATION

The BOWEN CASING SCRAPER is usually run with the pin connection up. It can be run either way at the convenience of the operator, however. The scraping action of the blades is identical in either case.

The configuration of the blades, plus the arrangement in vertical and horizontal rows, is such that the area scraped by any one row is overlapped by the rows above, below and on either side.

The tool is made up on the string, and, usually, a bit is installed on the bottom. The Scraper is run in and the scraping operation begun, rotating or spudding as desired.

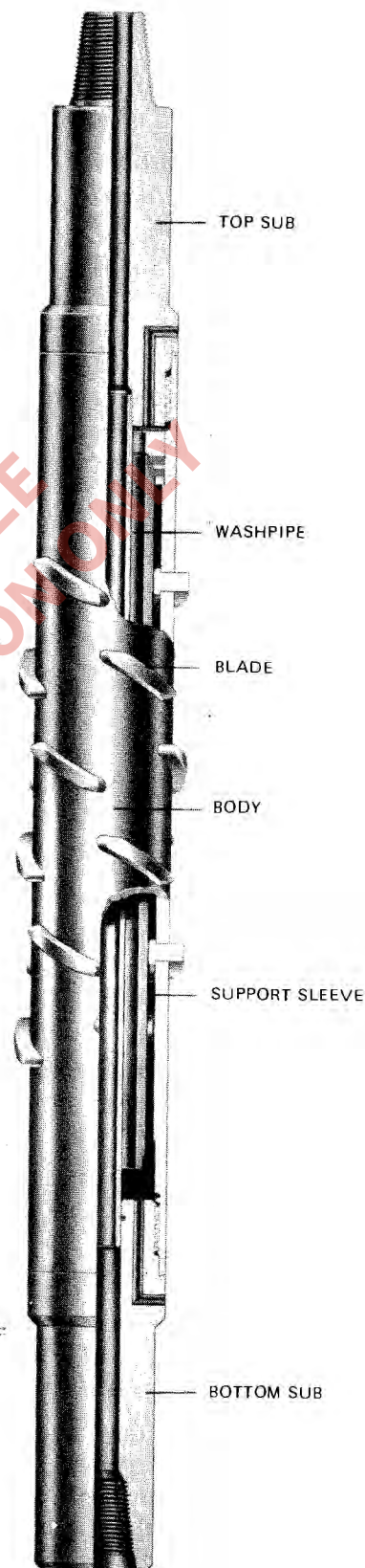
When a blade encounters an abrupt obstruction, such as a perforation burr or a fragment of cement, it is held firmly in its close-fitting slot by the rubber Sleeve and the back-up plate, and cannot retract. Increased weight and/or rotation will shear off the obstruction or burr.

Very slight or very gradual changes in casing internal diameters are passed over without damage to the casing, since there is little or no side thrust to the blade. The blades are simply held in contact with the clean surface of the casing without cutting the metal.

## MAINTENANCE

Good maintenance will prolong the life of the tool and prevent misruns. After each use, the tool should be completely disassembled and thoroughly cleaned. Any worn or damaged parts should be replaced at this time. See Disassembly and Assembly, page 5.

When the Casing Scraper is used in a high pressure gas well, the Support Sleeve may be invaded with gas, causing it to swell noticeably. If this occurs, the tool should be allowed to set idle for 12 to 24 hours. This will allow most of the gas to migrate to the surface and dissipate into the atmosphere.



BOWEN  
CASING SCRAPER ASSEMBLY

Always lubricate the Blades before assembly, but do not lubricate the Sleeve. Solvents and lubricants are harmful to rubber products of any type. Sleeves should be thoroughly cleaned and dried. They should be stored in a dry clean place out of direct light, when not in use.

#### **DISASSEMBLY**

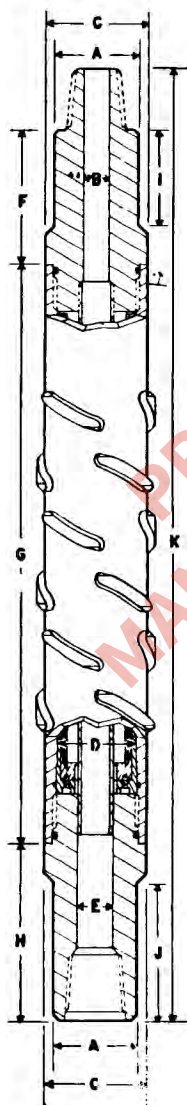
1. Clamp the Body in a suitable vise, near one end. Do not clamp tighter than required, as the joints will be difficult to unscrew when excessive clamping force is applied.
2. Break loose the Top Sub and Bottom Sub.
3. Remove the Bottom Sub.
4. Remove the Top Sub. The Washpipe will be removed with the Top Sub.
5. Remove the Support Sleeve from the top end of the Body. Normally the Sleeve will be easy to remove. Infrequently, the Sleeve may be stuck due to lack of cleaning or long hard usage. When this occurs, bolts may be fitted into the top face of the Sleeve to assist in its removal.
6. Remove the Blades from their slots. It may be necessary to tap them on the end with a light wooden or other soft mallet.
7. Remove the Seal from the inside of the Bottom Sub.
8. Remove the Washpipe from the Top Sub.
9. Thoroughly clean all the parts, and examine each for wear or damage. Replace any badly worn or damaged parts. If the Support Sleeve is cleaned with a solvent, it should afterward be thoroughly washed with plain soap and water, rinsed and dried.

#### **ASSEMBLY**

1. Clamp the Top Sub in a vise and make up the Washpipe to the Top Sub. Tighten it up.
2. Stand the Body upright on a workbench or clean wood floor. Either end may be considered the top, since both ends are identical.
3. Install the Blades in the slots of the Body. Begin with the lowermost and work upward. Large size Casing Scrapers may be dressed by reaching into the Body with each Blade. A Blade Installation Tool may be used to assemble smaller Casing Scrapers. To use this tool, insert the Blade in the Installation Tool, then lower it into the Body; set it in position on the slot, then release the Blade from the Installation Tool. Lubricate each Blade before assembly.
4. After all Blades are in place, slide the Support Sleeve in place from the top. If the Sleeve does not go into position easily, it will probably be due to one of the Blades having not been properly seated. Seat the Blade properly, then continue. See that the Top Sleeve Ring portion of the Sleeve seats against the shoulder provided in the Body.
5. Apply a good grade thread dope to the Top Sub threads. Insert the Washpipe into the Sleeve; slide it down until the Top Sub can be made up with the Body. Make up this joint. Clamp the Body in a suitable vise and tighten this joint.
6. Oil the Seal and insert it into the groove in the Bottom Sub. Never re-use an "o" ring seal.
7. Make up the Bottom Sub to the Body and tighten it.

**PRINCIPAL DIMENSIONS FOR CASING SCRAPERS**  
ALL SIZES IN INCHES

| Scraper Number  | 28790              | 20810              | 11590              | 43551            | 43558              | 43564            | 10270                 | 43568                  | 43575                 |
|-----------------|--------------------|--------------------|--------------------|------------------|--------------------|------------------|-----------------------|------------------------|-----------------------|
| For Casing Size | 2-3/8<br>O.D. Tbg. | 2-7/8<br>O.D. Tbg. | 4, 4-1/2,<br>4-3/4 | 5, 5-1/2         | 5-1/2,<br>5-3/4, 6 | 6-5/8, 7         | 7, 7-5/8,<br>8, 8-1/8 | 8-5/8, 9,<br>9-5/8, 10 | 10-3/4,<br>11-3/4, 12 |
| Connection      | 1 INT. JT.         | 1-13/16<br>Wil FJ  | 2-3/8<br>API-Reg   | 2-3/8<br>API-Reg | 2-7/8<br>API-I.F.  | 3-1/2<br>API-Reg | 3-1/2<br>API-Reg      | 4-1/2<br>API-F.H.      | 6-5/8<br>API-Reg      |
| Dimension: A    | 1-5/8              | 1-13/16            | 3-1/8              | 3-1/8            | 4-1/8              | 4-1/4            | 4-1/4                 | 5-3/4                  | 7-3/4                 |
| B               | 7/16               | 5/8                | 13/16              | 1-3/64           | 1-3/8              | 1-1/2            | 1-1/2                 | 2-1/2                  | 3-1/2                 |
| C               | 1-3/4              | 2-3/16             | 3-1/8              | 3-3/4            | 4-3/8              | 5                | 5-1/2                 | 7                      | 9                     |
| D               | 1-3/8              | 1-11/16            | 2-1/4              | 2-3/4            | 3-1/4              | 3-15/16          | 4-3/8                 | 5-5/8                  | 7-1/2                 |
| E               | 7/16               | 3/4                | 13/16              | 1                | 1-3/8              | 1-1/2            | 1-1/2                 | 2-1/2                  | 3-1/2                 |
| F               | 7-7/8              | 7-3/8              | 6                  | 9-1/2            | 10-1/2             | 10               | 9-7/8                 | 11-3/4                 | 10-3/4                |
| G               | 20-1/4             | 20-3/4             | 27-3/4             | 30-1/2           | 31-5/8             | 36-5/8           | 37-5/8                | 45                     | 50                    |
| H               | 9-5/8              | 9-5/8              | 6                  | 9-1/2            | 12-1/2             | 12-1/8           | 12-1/4                | 11-3/8                 | 12-3/8                |
| I               | 6-1/4              | 5-3/4              | ...                | 8                | 8-1/2              | 8                | 8                     | 8-3/4                  | 7-3/4                 |
| J               | 8                  | 7-3/4              | ...                | 8                | 9-1/2              | 10               | 10                    | 8-1/2                  | 9-1/2                 |
| K               | 39-1/2             | 39-1/2             | 42-1/4             | 52-1/2           | 57-5/8             | 62-1/4           | 63-1/2                | 72-1/8                 | 78-1/2                |



DIMENSIONAL DRAWING



# SPECIFICATIONS AND REPLACEMENT PARTS

## BOWEN CASING SCRAPER

|   |                               |                             |  |                          |                          |                                    |                                    |              |
|---|-------------------------------|-----------------------------|--|--------------------------|--------------------------|------------------------------------|------------------------------------|--------------|
| DESIGNED TO SCRAPE                      | 2-3/8 O.D.<br>TBG             | 2-7/8 O.D.<br>TUBING        | 4 O.D.<br>CSG<br>11.6                  | 5 O.D.<br>CSG<br>11.5-21 | 5 O.D.<br>CSG<br>11.5-21 | 5-1/2 O.D.<br>CSG<br>13-23         | 5-1/2 O.D.<br>CSG<br>13-23         |              |
| I.D. MAXIMUM<br>MINIMUM                 | 1.995                         | 2.469<br>2.441              | 3.563<br>3.428                         | 4.560<br>4.154           | 4.560<br>4.154           | 5.044<br>4.610                     | 5.044<br>4.610                     |              |
| CAN BE DRESSED WITH<br>BLADES TO SCRAPE |                               | 3-1/2 O.D.<br>TUB           | 4-1/2 O.D.<br>CSG<br>4-3/4 O.D.<br>CSG | 5-1/2 O.D.<br>CSG        | 5-1/2 O.D.<br>CSG        | 5-3/4 O.D.<br>CSG<br>6 O.D.<br>CSG | 5-3/4 O.D.<br>CSG<br>6 O.D.<br>CSG |              |
| *SEE BLADE CHART BELOW                  |                               |                             |  |                          |                          |                                    |                                    |              |
| TOOL JOINT SIZE                         | 1<br>E.U.E.                   | (Wilson<br>F.J.)<br>1-13/16 | 2-3/8<br>API Reg                       | 2-3/8<br>API Reg         | 2-3/8<br>API Reg         | 2-7/8<br>API IF                    | 2-7/8<br>API Reg                   |              |
| O.D. OF FISHING NECK                    | 1-5/8                         | 1-13/16                     | 3-1/8                                  | 3-1/8                    | 3-1/8                    | 4-1/8                              | 3-3/4                              |              |
| I.D. OF TOOL                            | 7/16                          | 5/8                         | 13/16                                  | 1                        | 3/4                      | 1-3/8                              | 1-1/8                              |              |
| O.D. OF TOOL                            | 1-3/4                         | 2-3/16                      | 3-1/8                                  | 3-3/4                    | 3-3/4                    | 4-3/8                              | 4-3/8                              |              |
| COMPLETE ASSEMBLY                       | Part No. ....<br>Weight ..... | 28790<br>22                 | 20810<br>32                            | 11590<br>66              | 43551<br>100             | 10940*<br>100                      | 43558<br>140                       | 9820*<br>140 |

### REPLACEMENT PARTS

|                      |                               |                |               |               |               |               |              |               |
|----------------------|-------------------------------|----------------|---------------|---------------|---------------|---------------|--------------|---------------|
| TOP SUB              | Part No. ....<br>Weight ..... | 28791<br>6-1/2 | 20812<br>9    | 11591<br>19   | 43552<br>26   | 10941<br>26   | 43559<br>39  | 9821<br>39    |
| BODY                 | Part No. ....<br>Weight ..... | 28792<br>4-1/2 | 20814<br>11   | 11592<br>22   | 10942<br>38   | 10942<br>38   | 9823<br>45   | 9823<br>45    |
| BOTTOM SUB           | Part No. ....<br>Weight ..... | 28796<br>6     | 20813<br>7    | 11593<br>14   | 43553<br>20   | 10943<br>20   | 43560<br>34  | 9824<br>34    |
| BLADE<br>(18 Req'd.) | Part No. ....<br>Weight ..... | 28794<br>1/8   | 20816<br>1/8  | 11595<br>1/4  | 10945<br>3/8  | 10945<br>3/8  | 9829<br>3/8  | 9829<br>3/8   |
| WASHPIPE             | Part No. ....<br>Weight ..... | 28793<br>1     | 20811<br>1    | 11594<br>2    | 43554<br>3    | 10944<br>3    | 43561<br>5   | 9826<br>5     |
| SUPPORT SLEEVE       | Part No. ....<br>Weight ..... | 28795<br>1-3/4 | 20815<br>2    | 11599<br>4    | 43555<br>4    | 43555<br>4    | 43562<br>6   | 43562<br>6    |
| WASHPIPE SEAL        | Part No. ....<br>Weight ..... | 27-12<br>1/32  | 27-16<br>1/32 | 27-19<br>1/32 | 27-24<br>1/16 | 27-20<br>1/16 | 30-1<br>1/16 | 27-26<br>1/16 |

### BLADE CHART

|                      |               |       |            |            |            |            |            |            |
|----------------------|---------------|-------|------------|------------|------------|------------|------------|------------|
| CASING               | Size .....    | ..... | 3-1/2 O.D. | 4-1/2 O.D. | 5-1/2 O.D. | 5-1/2 O.D. | 5-3/4 O.D. | 5-3/4 O.D. |
|                      | Weight .....  | ..... | 7.7-10.2   | 9.5-13.5   | 13-23      | 13-23      | 14.25.2    | 14-25.2    |
|                      | I.D. Maximum  | ..... | 3.068      | 4.090      | 5.044      | 5.044      | 5.290      | 5.290      |
|                      | Minimum       | ..... | 2.922      | 3.823      | 4.610      | 4.610      | 4.890      | 4.890      |
| BLADE<br>(18 Req'd.) | Part No. .... | ..... | 30031      | 11602      | 10963      | 10963      | 9842       | 9842       |
|                      | Weight .....  | ..... | 1/8        | 1/4        | 3/8        | 3/8        | 3/8        | 3/8        |
| CASING               | Size .....    | ..... | .....      | 4-3/4 O.D. | .....      | .....      | 6 O.D.     | 6 O.D.     |
|                      | Weight .....  | ..... | .....      | 16-18      | .....      | .....      | 15-23      | 15-23      |
|                      | I.D. Maximum  | ..... | .....      | 4.082      | .....      | .....      | 5.524      | 5.524      |
|                      | Minimum       | ..... | .....      | 4.000      | .....      | .....      | 5.180      | 5.180      |
| BLADE<br>(18 Req'd.) | Part No. .... | ..... | .....      | 11602      | .....      | .....      | 9818       | 9818       |
|                      | Weight .....  | ..... | .....      | 1/4        | .....      | .....      | 1/2        | 1/2        |
| CASING               | Size .....    | ..... | .....      | .....      | .....      | .....      | .....      | .....      |
|                      | Weight .....  | ..... | .....      | .....      | .....      | .....      | .....      | .....      |
|                      | I.D. Maximum  | ..... | .....      | .....      | .....      | .....      | .....      | .....      |
|                      | Minimum       | ..... | .....      | .....      | .....      | .....      | .....      | .....      |
| BLADE<br>(18 Req'd.) | Part No. .... | ..... | .....      | .....      | .....      | .....      | .....      | .....      |
|                      | Weight .....  | ..... | .....      | .....      | .....      | .....      | .....      | .....      |

### REQUIRED ACCESSORIES

|                            |                               |            |            |            |            |            |            |            |
|----------------------------|-------------------------------|------------|------------|------------|------------|------------|------------|------------|
| BLADE<br>INSTALLATION TOOL | Part No. ....<br>Weight ..... | 22735<br>3 | 22735<br>3 | 11616<br>5 | 11616<br>5 | 11616<br>5 | 11616<br>5 | 11616<br>5 |
|----------------------------|-------------------------------|------------|------------|------------|------------|------------|------------|------------|

#### HOW TO ORDER:

- Specify: (1) Name and number of assembly or part  
(2) Size and weight of casing

#### RECOMMENDED SPARES:

- (1) 1 Set of blades for each size casing  
(2) 1 Washpipe  
(3) 2 Support sleeves  
(4) 12 Washpipe seals

#### SPECIAL NOTE:

Blade Wear Gauges are available for each Blade Range. Gauge Part Number is the same as Blade with the addition of "-G". Specify part number and casing size when ordering.  
Example: Blade Wear Gauge 11602-G-4-1/2" O.D, 13.5 lb. Casing  
Weight 1/4 lb.  
Assemblies marked \* are old Assemblies.

# SPECIFICATIONS AND REPLACEMENT PARTS

## BOWEN CASING SCRAPERS (Continued)

|   |                               |                            |   |                                     |                                     |                                      |                                      |               |
|---|-------------------------------|----------------------------|---|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|---------------|
| DESIGNED TO SCRAPE                      | 6-5/8 O.D.<br>CSG<br>17-32    | 6-5/8 O.D.<br>CSG<br>17-32 | 7 O.D.<br>CSG<br>17-40                                  | 8-5/8 O.D.<br>CSG<br>24-49          | 8-5/8 O.D.<br>CSG<br>24-49          | 10-3/4 O.D.<br>CSG<br>32.7-55.5      | 10-3/4 O.D.<br>CSG<br>32.7-55.5      |               |
| I.D. MAXIMUM                            | 6.135                         | 6.135                      | 6.538   | 8.097                               | 8.097                               | 10.192                               | 10.192                               |               |
| MINIMUM                                 | 5.615                         | 5.615                      | 5.836   | 7.451                               | 7.451                               | 9.760                                | 9.760                                |               |
| CAN BE DRESSED WITH<br>BLADES TO SCRAPE | 7 O.D.<br>CSG                 | 7 O.D.<br>CSG              | 7-5/8 O.D.<br>CSG<br>8 O.D.<br>CSG<br>8-1/8 O.D.<br>CSG | 9-5/8 O.D.<br>CSG<br>10 O.D.<br>CSG | 9-5/8 O.D.<br>CSG<br>10 O.D.<br>CSG | 11-3/4 O.D.<br>CSG<br>12 O.D.<br>CSG | 11-3/4 O.D.<br>CSG<br>12 O.D.<br>CSG |               |
| *SEE BLADE CHART BELOW                  |                               |                            |   |                                     |                                     |                                      |                                      |               |
| TOOL JOINT SIZE                         | 3-1/2<br>API Reg              | 3-1/2<br>API Reg           | 3-1/2<br>API Reg  | 4-1/2<br>API F.H.                   | 4-1/2<br>API Reg                    | 6-5/8<br>API Reg                     | 6-5/8<br>API Reg                     |               |
| O.D. OF FISHING NECK                    | 4-1/4                         | 4-1/4                      | 4-1/4   | 5-3/4                               | 5-1/2                               | 7-3/4                                | 7-3/4                                |               |
| I.D. OF TOOL                            | 1-1/2                         | 1-1/4                      | 1-1/2   | 2-15/32                             | 2                                   | 3-1/2                                | 2-1/4                                |               |
| O.D. OF TOOL                            | 5                             | 5                          | 5-1/2   | 7                                   | 7                                   | 9                                    | 9                                    |               |
| COMPLETE ASSEMBLY                       | Part No. ....<br>Weight ..... | 43564<br>200               | 11725*<br>200   | 10270<br>232                        | 43568<br>410                        | 11640*<br>410                        | 43575<br>560                         | 11390*<br>560 |

### REPLACEMENT PARTS

|                      |                               |              |              |              |                |                |              |              |
|----------------------|-------------------------------|--------------|--------------|--------------|----------------|----------------|--------------|--------------|
| TOP SUB              | Part No. ....<br>Weight ..... | 43565<br>50  | 11726<br>50  | 10271<br>56  | 43569<br>90    | 11641<br>90    | 43576<br>130 | 11391<br>130 |
| BODY                 | Part No. ....<br>Weight ..... | 11727<br>68  | 11727<br>68  | 10273<br>80  | 11642<br>156   | 11642<br>156   | 11392<br>255 | 11392<br>255 |
| BOTTOM SUB           | Part No. ....<br>Weight ..... | 43566<br>45  | 11728<br>45  | 10274<br>53  | 43570<br>93    | 11643<br>93    | 43577<br>125 | 11393<br>125 |
| BLADE<br>(18 Req'd.) | Part No. ....<br>Weight ..... | 11729<br>5/8 | 11729<br>5/8 | 10279<br>7/8 | 11644<br>1-1/2 | 11644<br>1-1/2 | 11395<br>3   | 11395<br>3   |
| WASHPIPE             | Part No. ....<br>Weight ..... | 43567<br>7   | 11734<br>7   | 10276<br>7   | 43571<br>8     | 11649<br>8     | 43578<br>15  | 11394<br>15  |
| SUPPORT SLEEVE       | Part No. ....<br>Weight ..... | 11731<br>11  | 11731<br>11  | 10281<br>12  | 11646<br>18    | 11646<br>18    | 11399<br>30  | 11399<br>30  |
| WASHPIPE SEAL        | Part No. ....<br>Weight ..... | 30-3<br>1/16 | 30-1<br>1/16 | 30-3<br>1/16 | 30-10<br>1/8   | 30-7<br>1/8    | 30-19<br>1/8 | 30-10<br>1/8 |

### BLADE CHART

|                      |               |                 |                 |                     |                         |                         |                    |                    |
|----------------------|---------------|-----------------|-----------------|---------------------|-------------------------|-------------------------|--------------------|--------------------|
| CASING               | Size .....    | 7 O.D.<br>17-40 | 7 O.D.<br>17-40 | 7-5/8 O.D.<br>20-45 | .....                   | .....                   | .....              | .....              |
|                      | Weight .....  | 5.538           | 6.538           | 7.123               | .....                   | .....                   | .....              | .....              |
| BLADE<br>(18 Req'd.) | I.D. Maximum  | 5.836           | 5.836           | 6.445               | .....                   | .....                   | .....              | .....              |
|                      | Minimum       | .....           | .....           | .....               | .....                   | .....                   | .....              | .....              |
| CASING               | Part No. .... | 11737           | 11737           | 11095               | .....                   | .....                   | .....              | .....              |
|                      | Weight .....  | 3/4             | 3/4             | 1                   | .....                   | .....                   | .....              | .....              |
| CASING               | Size .....    | .....           | .....           | 8 O.D.<br>16-26     | 9-5/8 O.D.<br>29.3-53.5 | 9-5/8 O.D.<br>29.3-43.5 | 12 O.D.<br>31.5-40 | 12 O.D.<br>31.5-40 |
|                      | Weight .....  | .....           | .....           | 7.628               | 9.063                   | 9.063                   | 11.514             | 11.514             |
| BLADE<br>(18 Req'd.) | I.D. Maximum  | .....           | .....           | 7.386               | 8.475                   | 8.475                   | 11.384             | 11.384             |
|                      | Minimum       | .....           | .....           | .....               | .....                   | .....                   | .....              | .....              |
| CASING               | Part No. .... | .....           | .....           | 10379               | 11657                   | 11657                   | 11429              | 11429              |
|                      | Weight .....  | .....           | .....           | 1-1/8               | 2                       | 2                       | 3-1/2              | 3-1/2              |
| CASING               | Size .....    | .....           | .....           | 8-1/8 O.D.<br>38-42 | 10 O.D.<br>22.7-61.2    | 10 O.D.<br>22.7-61.2    | .....              | .....              |
|                      | Weight .....  | .....           | .....           | 7.485               | 9.582                   | 9.582                   | .....              | .....              |
| BLADE<br>(18 Req'd.) | I.D. Maximum  | .....           | .....           | 7.125               | 8.790                   | 8.790                   | .....              | .....              |
|                      | Minimum       | .....           | .....           | .....               | .....                   | .....                   | .....              | .....              |
| BLADE<br>(18 Req'd.) | Part No. .... | .....           | .....           | 10379               | 11657                   | 11657                   | .....              | .....              |
|                      | Weight .....  | .....           | .....           | 1-1/8               | 2                       | 2                       | .....              | .....              |

#### HOW TO ORDER:

- Specify: (1) Name and number of assembly or part  
(2) Size and weight of casing

#### RECOMMENDED SPARES:

- (1) 1 Set of blades for each size casing  
(2) 1 Washpipe  
(3) 2 Support sleeves  
(4) 12 Washpipe seals

#### SPECIAL NOTE:

Blade Wear Gauges are available for each Blade Range. Gauge part number is the same as Blade with the addition of "G". Specify part number and casing size when ordering.  
Example: Blade Wear Gauge 11602-G-4-1/2" O.D., 13.5 lb. casing  
Weight 1/4 lb.  
Assemblies marked \* are old Assemblies



PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY



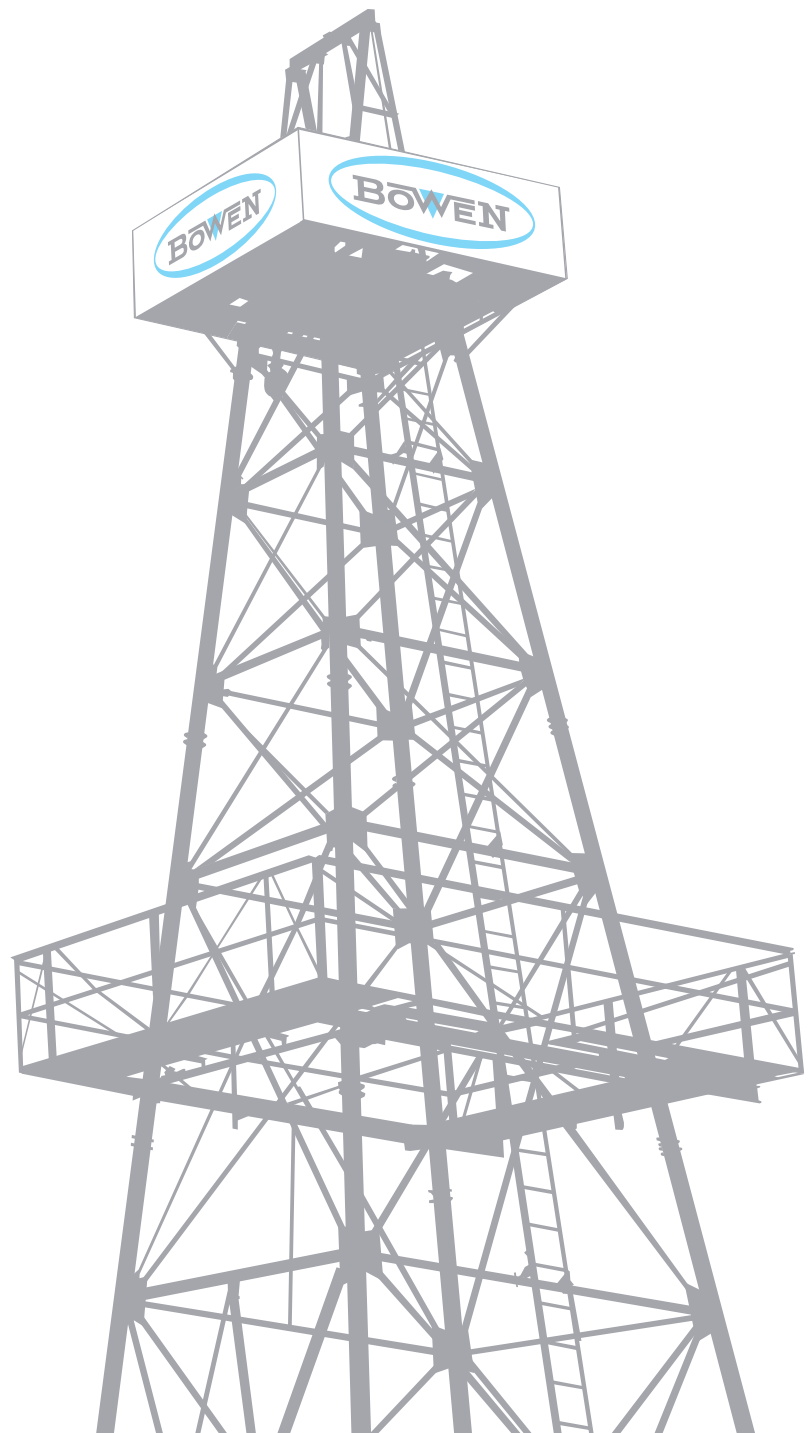
**Bowen Tools, Inc.**



2400 CROCKETT STREET  
P.O. BOX 3186 ■ HOUSTON, TEXAS 77253-3186 ■ PHONE 713-869-6711  
CABLE ADDRESS: ITCO ■ TELEX 762-484

# Bowen Full-Circle Casing Scraper

Instruction Manual 6255



**Bowen | NOV**

# Bowen Full-Circle Casing Scraper

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# Bowen Full-Circle Casing Scraper

## General Description

The Bowen™ Full-Circle casing scraper is ideal for the removal of mud, cement, bullets, rust, scale, paraffin, perforation burrs and other obstructions from the inside walls of casing.

Maintaining a clean casing I.D. is important when operating drilling, fishing or wireline tools. Likewise, packers, patches, spears and similar tools require clean surfaces to grip. Obstructions on casing walls will frequently cause these tools to fail or become difficult to operate.

Utilizing a simple one-piece mandrel design, the Bowen full-circle casing scraper is rugged, yet simple to operate and maintain.

The scraper conditions 50% more surface area than any other tool on the market. The full circle blades are so spaced to contact 600° (almost two complete circles) of casing surface at once.

Short and compact, the scraper also incorporates a long taper on blades for passing through joints without hanging. The scraper works in vertical or rotary operations and may be run on drill pipe.

Bowen Full-Circle casing scrapers are available to condition pipe ranging from 2 $\frac{3}{8}$  inch tubing to 13 $\frac{3}{8}$  inch casing.

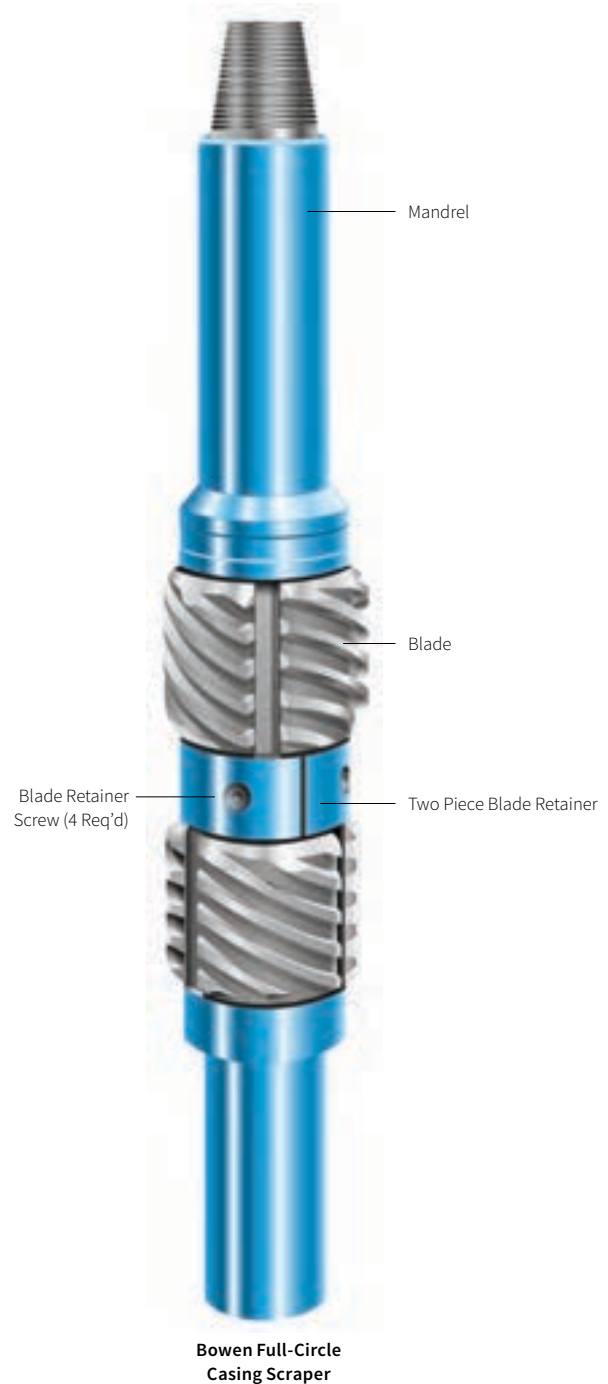
## Use

The Bowen Full-Circle casing scraper removes any deposits, irregularities or burrs from oil well casing that might be the cause of trouble during later operation, such as running packers and other close tolerance equipment. Some of the main uses are:

- (1) Clean out cement, hardened mud, and paraffin.
- (2) Remove burrs from perforations.
- (3) Remove bullets that become embedded in the casing.
- (4) Remove burrs and nicks that might have resulted from the running of bits, or fishing tools.
- (5) Remove tight spots that might have been caused by dents in casing as a result of mishandling.

Removing obstructions from the inside of casing offers many advantages. Packers can be run easily and without damage to the sealing element. Packer seating and sealing is positive in clean, burr-free casing. If a casing swab is run, damage to the expensive swab rubbers is held to a minimum and rubber life is greatly increased.

The Bowen Full-Circle casing scraper may be run either with the pin up or the pin down. It may be rotated or spudded. In all cases, interior casing scraping is assured due to the arrangement of the blades. Yet, this same arrangement and the contour of the blades permits passage through casing couplings and easy reentry at the bottom in the event the scraper passes out through the bottom of the casing.



# Bowen Full-Circle Casing Scraper

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## Construction

The Bowen Full-Circle casing scraper is composed of a rugged one-piece mandrel design with a two-piece split ring retained by four screws in the center. Blades are spring-loaded and scrape a full range of common casing weights with only one size of blade for each different casing O.D.

The blades are precision cast from high-quality wear-resistant tool steel. They are very tough, but not brittle. They tend to work-harden slightly in service, which prevents wear very effectively. The blades fit closely over the spring housing welded to the mandrel so that lateral movement is kept to an absolute minimum.

Springs are made of corrosion-resistant 302 stainless steel and are totally enclosed between the blade and spring housing. Accidental loss downhole is virtually impossible.

The mandrel is made from heat-treated alloy steel and has a pin by box connection. Both ends have a suitable fishing neck to allow fishing out of the well if required.

## Operation

The Bowen Full-Circle casing scraper is usually run with the pin connection up. It can be run either way at your convenience. The scraping action of the blades is identical in either case.

The configuration of the blades is such that the area scraped by the top row is overlapped by the row on the bottom.

The tool is made up on the string, and usually a bit is installed on the bottom. The scraper is run in and the scraping operation

begun, rotating or spudding as desired.

When a blade encounters an abrupt obstruction such as a perforation burr or a fragment of cement, it is held firmly in its close-fitting slot by the mandrel and two-piece retainer ring.

Very slight or very gradual changes in casing internal diameters are passed over without damage to the casing, since the blades move in or out adjusting itself to the irregularities. The blades are simply held in contact with the clean surface of the casing without cutting the metal.

## Maintenance

Good maintenance will prolong the life of the tool and prevent misruns. After each use, the tool should be completely disassembled and thoroughly cleaned. Any worn or damaged parts should be replaced as this time. See Disassembly and Assembly below.

## Disassembly

1. Clamp the mandrel in a suitable vise, near one end.
2. Remove four (4) socket head screws from split ring.
3. Remove all blades and springs from tool.
4. Thoroughly clean all the parts, and examine each for wear or damage. Replace any badly worn or damaged parts.

## Assembly

1. Clamp the mandrel in a vise near one end.
2. Insert the springs into slots

provided on the mandrel and hold in place with thick grease.

3. Place one row of blades in position and using the banding tool, compress the blades against the mandrel.
4. Secure the band and remove the banding tool.
5. Place second row of blades in position and using the banding tool, compress the blades against the mandrel.
6. Install the split ring between the blades and secure the ring with four (4) socket head screws. Coat the threads with LOC-TITE #242 (blue).
7. Remove the banding tool and steel band from first row of blades. The Bowen Full-Circle casing scraper is now ready for use.

# Bowen Full-Circle Casing Scraper

## Specifications and Replacement Parts

### Bowen Full-Circle Casing Scrapers

|  |                        |                         |                        |                        |                           |                          |
|--|------------------------|-------------------------|------------------------|------------------------|---------------------------|--------------------------|
| <b>Designed to scrape*</b>                   | 4½ in. OD<br>9.5-13.5# | 5½ in. OD<br>14.0-23.0# | 7 in. OD<br>17.0-38.0# | 9 in. OD<br>32.3-64.9# | 10¾ in. OD<br>32.75-79.2# | 13¾ in. OD<br>48.0-98.0# |
| <b>Can be dressed with blades to scrape*</b> | —                      | 6 in. OD                | 7 ⅝ in. OD             | —                      | —                         | —                        |
|  | —                      | 20.0-33.0#              | 24.0-47.1#             | —                      | —                         | —                        |
| <b>Tool joint connection</b>                 | 2¾ in. API Reg.        | 2 ⅞ in. API Reg.        | 3½ in. API Reg.        | 4½ in. API Reg.        | 6 in. API Reg.            | 6 in. API Reg.           |
| <b>OD of fishing neck</b>                    | 3 in.                  | 3 in.                   | 4 in.                  | 5 in.                  | 7 in.                     | 7 in.                    |
| <b>Tool ID</b>                               | 1 ⅞ in.                | 1 ¾ in.                 | 1½ in.                 | 2 in.                  | 3 in.                     | 3 in.                    |
| <b>Tool OD</b>                               | 3 in.                  | 4 in.                   | 5 in.                  | 8 in.                  | 9 ⅞ in.                   | 11 in.                   |
| <b>Complete assembly</b>                     | 150032                 | 149088                  | 149335                 | 150025                 | 150418                    | 150034                   |

\* See table below for recommended minimum and maximum casing ID ranges

### Replacement Parts

|                                  | Qty | Part Numbers |             |             |             |             |             |
|----------------------------------|-----|--------------|-------------|-------------|-------------|-------------|-------------|
| <b>Mandrel</b>                   | 1   | 150041       | 149089      | 149336      | 150026      | 152004      | 150035      |
| <b>Blade</b>                     | —   | 150361 (6)   | 149090 (6)  | 149338 (6)  | 150028 (8)  | 152007 (8)  | 150037 (8)  |
| <b>Optional blade</b>            | —   | —            | 150564      | 150017      | —           | —           | —           |
| <b>Spring</b>                    | —   | 150045 (24)  | 149888 (24) | 149340 (18) | 150030 (24) | 152016 (24) | 150039 (24) |
| <b>Blade retainer (2 pieces)</b> | 1   | 150042       | 149091      | 149337      | 150027      | 152005      | 150036      |
| <b>Screw</b>                     | 4   | 150903       | 150904      | 150904      | 23230       | 23230       | 23231       |

### Required Accessory

|                                |        |        |        |        |        |        |
|--------------------------------|--------|--------|--------|--------|--------|--------|
| <b>Blade installation tool</b> | 149267 | 149267 | 149267 | 149267 | 149267 | 149267 |
|--------------------------------|--------|--------|--------|--------|--------|--------|

### Recommended Minimum and Maximum Casing ID Ranges for Full-Circle Casing Scrapers

| Assembly                                    | 150032          | 149088              |                     | 149335              |                     | 150025              | 150418              | 150034               |                        |
|---|-----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|------------------------|
| <b>Blade</b>                                | 150361          | 149090              | 150564              | 149338              | 150017              | 150028              | 152007              | 150037               |                        |
| <b>Maximum casing ID</b>                    | 4.622 in.       | 5.250 in.           | 6.188 in.           | 6.688 in.           | 7.188 in.           | 9.188 in.           | 10.412 in.          | 13.238 in.           |                        |
| <b>Minimum casing ID</b>                    | 3.886 in.       | 4.662 in.           | 5.600 in.           | 5.850 in.           | 6.308 in.           | 8.224 in.           | 9.22 in.            | 11.911 in.           |                        |
| <b>Recommended casing sizes and weights</b> | <b>Sizes</b>    | 4 ½ in. OD          | 5½ in. OD           | 6 in. OD            | 6 in. OD            | 7 in. OD            | 9 in. OD            | 10¾ in. OD           | 13¾ in. OD             |
|   | <b>Weights*</b> | 9.5 lbs – 13.5 lbs  | 14.0 lbs – 23.0 lbs | 20.0 lbs – 33.0 lbs | 20.0 lbs – 24.0 lbs | 17.0 lbs – 23.0 lbs | 32.3 lbs – 64.9 lbs | 32.75 lbs – 79.2 lbs | 48.0 lbs – 98.0 lbs    |
|   | <b>Sizes</b>    | 5 in. OD            | 6 in. OD            | 7 in. OD            | 7 in. OD            | 7 in. OD            | 9 in. OD            | 11¼ in. OD           | 13½ in. OD             |
|   | <b>Weights*</b> | 11.5 lbs – 24.2 lbs | 23.0 lbs – 26.0 lbs | 29.0 lbs – 46.4 lbs | 17.0 lbs – 38.0 lbs | 24.0 lbs – 47.1 lbs | 59.2 lbs            | 80.5 lbs – 87.2 lbs  | 81.4 lbs               |
|   | <b>Sizes</b>    | 5½ in. OD           | 6 in. OD            | 7 in. OD            | 7 in. OD            | 7¾ in. OD           | 9 in. OD            | —                    | 13 in. OD              |
|   | <b>Weights*</b> | 26.0 lbs – 38.0 lbs | 43.7 lbs – 56.8 lbs | 55.3 lbs – 70.7 lbs | 39.0 lbs – 63.2 lbs | 46.1 lbs – 48.6 lbs | 62.8 lbs            | —                    | 88.2 lbs               |
|   | <b>Sizes</b>    | 6 in. OD            | 7 in. OD            | —                   | 7¾ in. OD           | 8 in. OD            | 10 in. OD           | —                    | 14 in. OD              |
|   | <b>Weights*</b> | 62.9 lbs – 71.3 lbs | 57.1 lbs – 70.3 lbs | —                   | 46.1 lbs – 48.6 lbs | 63.5 lbs – 77.1 lbs | 85.3 lbs – 109 lbs  | —                    | 92.68 lbs – 119.38 lbs |
|   | <b>Sizes</b>    | 7 in. OD            | 7 in. OD            | —                   | —                   | —                   | —                   | —                    | —                      |
|   | <b>Weights*</b> | 76.3 lbs            | 82.1 lbs – 84.8 lbs | —                   | —                   | —                   | —                   | —                    | —                      |

\*Based on nominal casing IDs and recommended ID ranges



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Size and weight of casing
  - (3) Tool joint connection



### Recommended Spare Parts:

- (1) 1 set of blades
- (2) 1 set of springs

# Bowen Full-Circle Casing Scraper

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# ITCO-TYPE JUNK BASKETS

Instruction Manual 3050



Itco-Type Junk Baskets

One Company Unlimited Solutions



**NATIONAL OILWELL**

# Itco-Type Junk Baskets

## Itco-Type Junk Baskets

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*Fourteenth Printing, August 2003*





**General Description**

The **Bowen Itco-Type Junk Basket** is an uncomplicated yet dependable fishing tool for retrieving all kinds of loose junk. Its simplicity of design, construction, operation and maintenance is such that any drilling crew can use it successfully. With free revolving double catchers, magnet inserts and accessory shoes, the Bowen Junk Basket is indispensable equipment on a rotary drilling rig.

**Use**

The **Bowen Itco-Type Junk Basket** is used to retrieve all sorts of junk that may accumulate at the bottom of a well and which may impede drilling progress. This junk may be such objects as rock bit cones, bearings, broken slips, bits of wire line, various hand tools, slivers and debris from twisted off drill string, milling cuttings, etc. It may also be used to take a core sample, drill a full gauge hole or to ream the hole.

**Construction**

The **Bowen Itco-Type Junk Basket** consists basically of a Barrel, a Top Sub, an Upper Catcher, a Lower Catcher, and a Type "A" Mill Shoe. This type shoe is faced with conventional hard metal on the cutting surfaces. Accessories include Magnet Inserts, Mill Shoes dressed with Itcoloy and Finger Shoes. The two catchers employ rivet-free construction, easily redressed on location. Catcher Fingers are cast from strong, long wearing manganese bronze or steel. The Fingers in the Upper Catcher extend only half way to the center, its function being to break the core when an upward strain is taken on the string. The Lower Catcher has alternately long and short fingers which extend almost to the center, forming a close fitting basket which will retain the core or small pieces of junk. Both Catchers are free to revolve within the Shoe, eliminating Finger breakage.



Junk Basket  
Lower Catcher



Junk Basket  
Upper Catcher



Bowen Itco-Type Junk Basket  
Dressed with a Type A Mill Shoe

## Accessories

### Mill Shoes

The Bowen Itco-Type Junk Basket is furnished with a standard **Type "A" Mill Shoe**. This is a mill type shoe with side wings and is ideal when used in softer formations. It is recommended that Itcoloy-faced Mill Shoes be considered when harder formations are encountered.

The **Type "B" Mill Shoe** is similar in design to the Type "A" but is hard faced with Itcoloy. Itcoloy is a material composed of sintered tungsten carbide is an extremely tough matrix which will effectively and rapidly mill up junk during the fishing operation. It is ideal when the cutting of hard formations is required.

The **Type "C" Mill Shoe** is a flat bottomed shoe which is hard faced with Itcoloy on the bottom, on the inner face and on the outer face. It will effectively mill up junk and is especially effective for cutting cores. This is a burning type shoe for cutting metal.

### Finger Shoe

When junk is lying loose on the bottom of the well or when junk is too large to pass through the Catchers, a **Finger Shoe** may be installed on the bottom of the Barrel in place of the Mill Shoe. When the Junk Basket engages the fish, combined rotating and lowering cause the long fingers to close in beneath the fish and retain it in the Barrel. Finger replacements are easy and inexpensive to replace on the Shoe Body.

### Magnet Inserts

**Magnet Inserts** are available to convert Bowen Junk Baskets into effective fishing magnets. The Magnet Insert is machined to fit into the recess normally occupied by the two Catchers. The Magnet Insert is used especially when in hard-to-drill formations and to thoroughly clean the hole prior to diamond drilling.



**Bowen Itco-Type Junk Basket with Magnet Insert**



**Magnet Insert**



**Finger Shoe**



**Type A Mill Shoe**



**Type B Mill Shoe**



**Type C Mill Shoe**



### **Operation**

First determine that the Bowen Itco-Type Junk Basket is properly assembled and that all parts are in good working order. (see "Reassembly")

Select the proper shoe:

If the junk is large and lying loose on the bottom, use the Finger Shoe.

If the formation is relatively soft and the fish is loose, use a Type "A" Mill Shoe.

If the formation is hard or the fish is imbedded in the formation, use either the Type "B" or Type "C" Itcoloy-faced Mill Shoe. Also, these hard faced shoes will cut away protruding excess metal to allow free entry of the junk into the basket.

Connect the assembly to the drill string and run it into the hole. Just before reaching bottom, start circulation at reduced pressure, begin rotation and slowly lower to contact the fish and bottom. Continue to rotate as weight is increased, permitting the Shoe to penetrate the information. Penetrating the formation forces the junk completely into the Barrel and cuts a short core.

After the core is cut, stop rotation and circulation, release the torque from the string, then take an upward strain to break the core. A Bowen Hydraulic Jar made up in the string above the Bowen Junk Basket will aid in quickly breaking the core.

As soon as the core is broken, the string and Basket may be removed from the well.

At the surface, break the joint between the Shoe and the Barrel, remove the Shoe and empty the Basket.

#### **NOTE:**

***When using Mill Shoes, maintain a ton of weight and rotate the Basket at a mill cutting rate of 50 to 150 rpm.***

***When using Finger Shoes, rotate and lower slowly until approximately two tons of weight is against the bottom.***

### **Maintenance**

The Bowen Itco-Type Junk Basket is a relatively simple tool to maintain. For best operation and long service life the following procedure should guide the operator:

1. After use, the Junk Basket should be completely disassembled and cleaned (see "Disassembly")
2. Inspect and replace as may be required any small parts, such as springs and fingers, that may be damaged.
3. Reassemble, greasing each internal part as it is assembled.
4. Dry and dope threaded connections as they are assembled.
5. After complete assembly, the entire outside of the Junk Basket should be painted or thoroughly greased, to prevent deterioration.

### **Disassembly**

1. Break the threaded joints between the Top Sub and Barrel, and between the Barrel and Shoe. This may best be done at the rig as the Junk Basket is removed from the hole.
2. Remove the Shoe from the Barrel. If the assembly is a large one, it may be necessary to use a lifting sub and large pipe vise to facilitate handling. If the Junk Basket is disassembled in horizontal position in a vise, care should be taken that the Catchers do not fall out as the Shoe is removed.
3. Lift out the two Catchers (or Magnet Insert) with their retrieved junk.
4. Remove the Top Sub from the Barrel.

5. If the Junk Basket is to be used again, immediately inspect the Catchers to assure they are not damaged and that all the Fingers work properly. If any damaged is found, disassemble and replace the damaged parts, or use a spare Catcher. (see "Redressing Catcher Assemblies")
6. Thoroughly clean and lubricate all internal parts, and the interior of all the outside parts.

### **Reassembly**

1. Clamp the Barrel in a pipe vise.
2. Make up the Top Sub to the Barrel.
3. Insert the Lower Catcher into the Shoe. The Lower Shoe is the one with alternate long and short Fingers. Insert the Upper Catcher into the Shoe above the Lower Catcher.

### **Caution**

The Fingers hinge upward in operation. Make sure that both Catchers are installed so that they deflect upward in service. Also make sure that both Catchers are well greased just before assembly, and that both rotate freely in the Shoe.

When the Magnet Insert is used, it is inserted into the same recess as both Catchers, with its bail uppermost.

4. Make up the Shoe and its inserted Catchers (or Magnet Insert) to the lower end of the Barrel.
5. Tighten the two joints.
6. Paint or thoroughly lubricate the entire outside of the Junk Basket to prevent deterioration.



**Redressing Catcher Assemblies**

**To Disassemble the Catcher**

Completely disassemble the Catcher. The only tools required are a suitable screwdriver (with a 1/4" blade) and a vise if the Catcher is large.

Referring to the photos on page 7, proceed as follows:

1. Place the Catcher assembly on a work-bench or in a vise, with the Retainer Ring at the top. Do not exert enough force against the Catcher with vise jaws to maul or distort it.
2. Remove the two Retainer Screws.
3. Remove the Retainer Ring. This should be done slowly and with care. The Retainer Ring holds the several Torsion Springs deflected so that when the Retainer Ring is partially disassembled, it will tend to spring off due to the spring load behind it. If it is allowed to spring off unrestricted, parts may be lost or damaged.
4. Remove the Fingers and the Torsion Springs.
5. Remove the Torsion Springs from the Fingers.
6. Remove the Pivot Pins where these are used.
7. Clean all parts thoroughly, and inspect them for damage or excessive wear. Replace any parts not in good service condition.

**To Reassemble the Catcher**

All Catchers are assembled by the same method, but more care must be taken with the Lower Catcher than with the Upper Catcher to assure that alternate long and short fingers assembled are in the proper sequence.

1. Check the Catcher replacement parts list to assure that the Proper Fingers in correct quantity are being used (see pages 11–16). Grease all parts thoroughly.
2. Assemble a Torsion Spring in one of the Long Fingers, so that one leg of the Torsion Spring is inserted into the small hole at the upper end of the Finger, and the other leg of the Torsion Spring is protruding out toward the code letter on the Finger.

**NOTE:**  
*Some Catcher assemblies do not have Fingers with integral lugs. These assemblies utilize separate Pivot Pins. Fingers used in these assemblies are assembled with the Torsion Spring maintained in position by the pivot pin.*

3. Insert the Finger with its assembled Torsion Spring into any one of the open slots in the side of the Body. The two pilot lugs on the Finger will nest into the smaller cross-slots at the upper end of the Finger slot.

**Caution**

Be sure to insert the Finger with the code letter toward the outside of the Catcher. These Fingers must be free to revolve inward toward the center of the Catcher when the Retainer Ring is installed, and the Fingers must be free to deflect upward when in service after assembly.

4. Install the first short Finger next to the first long Finger, in the same manner.
5. Install a second long Finger.
6. Continue installation of long and short Fingers, alternately until all have been installed.

After all Fingers have been installed, each Finger will have one leg of the Torsion Spring extending outward approximately 1/4" to 1/2", depending on size. Do not trim off these Torsion Spring legs. They are necessary to the function of the Catcher Fingers.

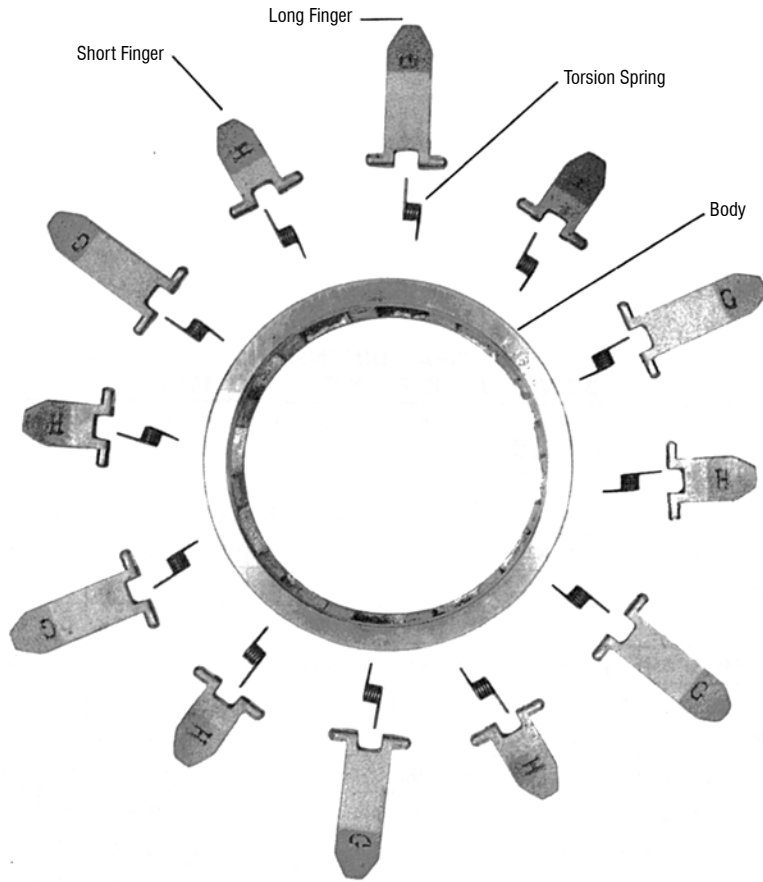
7. Slip the Retainer Ring over the upper part of the Body, with the two holes at the bottom side. These two holes are 180° apart. They should be aligned with the two tapped holes in the Body.
8. Shove the Retainer Ring down, deflecting the Torsion Spring legs until the bottom edge of the Retainer Ring rests on the series of shoulders near the center of the Body.

**NOTE:**  
*If the Catcher is very large, two people may be required to assemble the Retainer Ring; one maintaining the Fingers and Torsion Springs in place, while the second pushes the Retainer Ring down.*

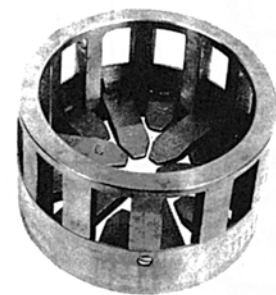
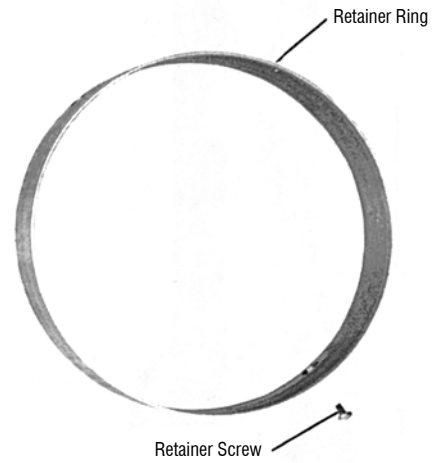
*The total force exerted by the Torsion Springs in large Catchers may be too great for one person to comfortable overcome.*

9. Align the two holes in the Retainer Ring, with the two tapped holes in the Body.
10. Insert the two Retainer Screws, and tighten, making sure that the heads are completely centered in the Retainer Ring holes, and does not overlap the edge of the hole.  
  
Do not over-tighten these two screws.
11. Check the action of each of these assembled Fingers to assure proper deflection and retraction.

The Catcher is now ready for assembly in the Junk Basket.

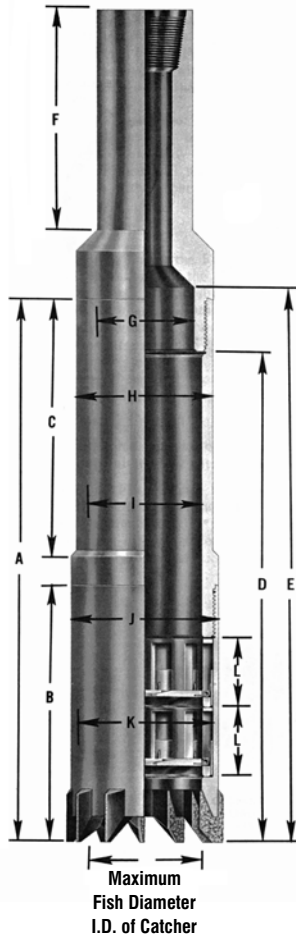


**Parts to Assemble  
Bowen Junk Basket Catcher**



**Assembled Bowen Junk Basket Catcher  
(Lower)**





**Principle Dimensions**

| Part Number | Hole Size       | Standard O.D. of Hardfaced Shoe | Max. Fish Dia. | A        | B        | C        | D        | E        | F  | G      | H      | I       | J      | K       | L       |
|-------------|-----------------|---------------------------------|----------------|----------|----------|----------|----------|----------|----|--------|--------|---------|--------|---------|---------|
| 14590       | 3-3/4 - 4-1/8   | 3-5/8 - 4-1/8                   | 2-23/32        | 26-1/4   | 8-1/4    | *        | 23       | 26-5/8   | †  | 1-7/8  | 3-5/8  | 2-23/32 | 3-5/8  | 2-9/32  | 1-7/8   |
| 14586       | 4-1/4 - 4-1/2   | 4-1/16 - 4-1/2                  | 2-31/32        | 26-3/8   | 8-3/8    | 15-27/32 | 23-1/8   | 26-3/4   | †  | 2-1/8  | 3-1/4  | 2-31/32 | 4-1/16 | 3-23/32 | 2-5/16  |
| 14595       | 4-5/8 - 5       | 4-1/2 - 5                       | 3-9/32         | 27-1/8   | 9-1/8    | 15-11/16 | 23-7/8   | 27-1/2   | †  | 2-3/8  | 3-7/8  | 3-9/32  | 4-1/2  | 4-1/16  | 2-3/8   |
| 19375       | 4-5/8 - 5       | 4-1/2 - 5                       | 3-3/8          | 27       | 9        | 15-11/16 | 23-3/4   | 27-5/8   | 13 | 2-3/8  | 3-7/8  | 3-13/32 | 4-1/2  | 4-7/64  | 2-7/16  |
| 14600       | 5-1/8 - 5-1/2   | 4-1/8 - 5-1/2                   | 3-9/32         | 26-15/16 | 8-15/16  | 51-1/16  | 23-15/16 | 27-9/16  | †  | 2-3/4  | 4-1/4  | 3-23/32 | 4-7/8  | 4-17/32 | 2-5/8   |
| 2618        | 5-5/8 - 6       | 5-1/8 - 5-3/4                   | 3-25/32        | 29-7/8   | 11-7/8   | *        | 26-5/8   | 30-5/8   | †  | 3-3/4  | 5-1/8  | 3-25/32 | 5-1/8  | 4-1/2   | 2-5/8   |
| 14605       | 5-5/8 - 6       | 5-3/8 - 6                       | 4-1/16         | 29-3/16  | 11-3/16  | 15-47/64 | 25-15/16 | 29-11/16 | †  | 3      | 4-3/4  | 4-1/16  | 5-3/8  | 4-15/16 | 2-25/32 |
| 2670        | 6-1/8 - 6-1/2   | 5-3/4 - 6-1/2                   | 4-3/8          | 30-1/4   | 11-15/16 | *        | 47-1/4   | 31-1/4   | †  | 4      | 5-3/4  | 4-13/32 | 5-3/4  | 5-5/32  | 2-13/16 |
| 14610       | 6-1/8 - 6-5/8   | 5-7/8 - 6-5/8                   | 4-5/16         | 30-11/16 | 12-11/16 | 15-5/8   | 27-7/16  | 31       | †  | 3-5/16 | 5-1/8  | 4-5/16  | 5-7/8  | 5-3/8   | 2-7/8   |
| 19379       | 6 - 6-3/8       | 5-7/8 - 6-3/8                   | 4-1/2          | 30-11/16 | 12-11/16 | 15-5/8   | 27-7/16  | 28       | 13 | 3-1/2  | 5-1/8  | 4-7/32  | 5-7/8  | 5-15/32 | 2-7/8   |
| 14615       | 6-3/4 - 7-1/4   | 6-1/4 - 7-1/4                   | 4-3/16         | 31-1/4   | 13-1/4   | 15-3/4   | 28       | 32-1/4   | †  | 3-1/2  | 5-3/4  | 4-13/16 | 6-1/4  | 5-3/4   | 3-1/16  |
| 14620       | 7-3/8 - 8-1/4   | 7-1/8 - 8-1/4                   | 5-7/16         | 31-3/4   | 13-3/4   | 15-11/16 | 28-1/2   | 31-3/4   | †  | 4-5/8  | 6-1/2  | 5-7/16  | 7-1/8  | 6-7/16  | 3-5/16  |
| 14625       | 8-3/8 - 9 1/4   | 8-1/8 - 9-1/4                   | 6-3/16         | 33-1/4   | 15-1/4   | 15-11/16 | 29-1/2   | 33-1/2   | †  | 5-1/8  | 7-1/2  | 6-3/16  | 8-1/8  | 7-3/16  | 3-13/16 |
| 14630       | 9-3/8 - 10 1/4  | 9-1/8 - 10-1/4                  | 7-3/16         | 34-1/4   | 16-1/4   | 15-11/16 | 30-5/8   | 34-5/8   | †  | 6-1/8  | 8-1/2  | 7-3/16  | 9-1/8  | 8-3/16  | 4-5/16  |
| 14635       | 10-3/8 - 11-7/8 | 10-1/8 - 11-7/8                 | 8-1/16         | 35-7/8   | 17-7/8   | 15-5/8   | 32-1/8   | 37-1/8   | †  | 6-1/2  | 9-3/8  | 8-1/16  | 10-1/8 | 9-3/8   | 5       |
| 14640       | 11-3/4 - 14-1/4 | 11-1/4 - 14 1/4                 | 9-1/16         | 37-5/16  | 19-1/16  | 15-13/16 | 33-5/16  | 38-5/16  | †  | 7-1/4  | 10-3/8 | 9-1/16  | 11-1/4 | 10-7/16 | 5-3/16  |
| 14645       | 12-5/8 - 15     | 12-1/4 - 15                     | 10-1/16        | 44-5/8   | 22-5/8   | 19-9/16  | 40-3/8   | 50-1/8   | †  | 7-1/2  | 11-3/8 | 10-1/16 | 12-1/4 | 11-3/8  | 6       |
| 14650       | 14-3/4 - 18     | 14-1/2 - 18                     | 12-1/16        | 50-3/4   | 26-3/4   | 21       | 46       | 52-1/4   | †  | 9-1/4  | 13-3/4 | 12-1/16 | 14-1/2 | 13-5/8  | 7       |

\* Flush from Shoe to Sub

† Length to order, specify box or pin connection.

**Specifications**

|                                 |                 |                |                |            |            |                |            |            |                |                |
|---------------------------------|-----------------|----------------|----------------|------------|------------|----------------|------------|------------|----------------|----------------|
| <b>Hole Size</b>                |                 | 3-3/4 to 4-1/8 | 4-1/4 to 4-1/2 | 4-5/8 to 5 | 4-5/8 to 5 | 5-1/8 to 5-1/2 | 5-3/8 to 6 | 5-5/8 to 6 | 6-1/8 to 6-1/2 | 6-1/8 to 6-1/2 |
| <b>O.D. Barrel (Top End)</b>    |                 | 3-5/8          | 3-3/4          | 3-7/8      | 3-7/8      | 4-1/4          | 5-1/8      | 4-3/4      | 5-3/4          | 5-1/8          |
| <b>O.D. Shoe (Top End)</b>      |                 | 3-5/8          | 4-1/16         | 4-1/2      | 4-1/2      | 4-7/8          | 5-1/8      | 5-3/8      | 5-3/4          | 5-7/8          |
| <b>Maximum Diameter of Fish</b> |                 | 2-11/16        | 2-15/16        | 3-9/32     | 3-3/8      | 3-23/32        | 3-25/32    | 4-1/16     | 4-13/32        | 4-5/16         |
| <b>Number of Teeth</b>          |                 | 8              | 8              | 8          | 8          | 8              | 8          | 8          | 8              | 8              |
| <b>Complete Assembly</b>        | <b>Part No.</b> | 14590          | 14586          | 14595      | 19375      | 14600          | 2618       | 14605      | 59996          | 14610          |
|                                 | <b>Weight</b>   | 55             | 60             | 65         | 65         | 80             | 80         | 100        | 200            | 110            |

**Replacement Parts**

|                            |                 |         |         |         |         |         |          |         |         |         |
|----------------------------|-----------------|---------|---------|---------|---------|---------|----------|---------|---------|---------|
| <b>Top Sub</b>             | <b>Part No.</b> | 14725   | 14726   | 14727   | 14727   | 14728   | 2619     | 14729   | 59997   | 14730   |
|                            | <b>Weight</b>   | 20-1/2  | 21-1/2  | 22      | 22      | 23-1/8  | 23       | 29-1/2  | 42      | 30-1/2  |
| <b>Barrel</b>              | <b>Part No.</b> | 14591   | 14587   | 14596   | 19376   | 14601   | 2620     | 14606   | 15134   | 14611   |
|                            | <b>Weight</b>   | 2528    | 32      | 31      | 40      | 40      | 48       | 48      | 55      |         |
| <b>Upper Catcher</b>       | <b>Part No.</b> | —       | —       | —       | —       | —       | —        | 14607-W | 15130-W | 14612-W |
|                            | <b>Weight</b>   | —       | —       | —       | —       | —       | —        | 3       | 3       | 3       |
| <b>Lower Catcher</b>       | <b>Part No.</b> | 14593-W | 14589-W | 14598-W | 19377-W | 14603-W | 21735-W0 | 14608-W | 28349-W | 14613-W |
|                            | <b>Weight</b>   | 1-1/2   | 1-1/2   | 2       | 2       | 2-1/2   | 2-1/2    | 3       | 3       |         |
| <b>Conventional Shoe</b>   | <b>Part No.</b> | 14594-A | 14574-A | 14599-A | 19378-A | 14604-A | 2625-A   | 14609-A | 2676-A  | 14614-A |
| <b>Type A (Hard-Faced)</b> | <b>Weight</b>   | 8       | 8       | 14      | 10      | 14      | 16       | 16      | 18-1/2  | 18-1/2  |

**Mill Shoes - Extra**

|                         |                 |         |         |         |         |         |        |         |        |         |
|-------------------------|-----------------|---------|---------|---------|---------|---------|--------|---------|--------|---------|
| <b>Mill Shoe Type B</b> | <b>Part No.</b> | 14954-B | 14574-B | 14599-B | 19378-B | 14604-B | 2625-B | 14609-B | 2676-B | 14614-B |
| <b>(Itcoloy-Faced)</b>  | <b>Weight</b>   | 10      | 10      | 12      | 12      | 16      | 18     | 18      | 22     | 22      |
| <b>Mill Shoe Type C</b> | <b>Part No.</b> | 14594-C | 14574-C | 14599-C | 19378-C | 14604-C | 2625-C | 14609-C | 2676-C | 14614-C |
| <b>(Itcoloy-Faced)</b>  | <b>Weight</b>   | 12      | 12      | 14      | 14      | 18      | 25     | 25      | 30     | 30      |

**Finger Shoes - Extra**

|                                 |                 |       |         |        |        |       |       |       |       |       |
|---------------------------------|-----------------|-------|---------|--------|--------|-------|-------|-------|-------|-------|
| <b>To Fit Basket Number</b>     |                 | 14590 | 14586   | 14595  | 19375  | 14600 | 2618  | 14605 | 2670  | 14610 |
| <b>Maximum Diameter of Fish</b> |                 | 3-1/4 | 3-13/16 | 4-1/16 | 4-1/16 | 4-1/2 | 4-1/2 | 4-3/4 | 5-1/4 | 5-3/8 |
| <b>Replacement</b>              | <b>Part No.</b> | 22203 | 22206   | 22207  | 22207  | 22208 | 22208 | 22209 | 22218 | 19406 |
|                                 | <b>Weight</b>   | 6     | 8       | 10     | 10     | 12    | 12    | 16    | 18    | 20    |

*Finger Shoe replacement is furnished with the same O.D. as the standard shoe unless otherwise specified.*

**Magnet Inserts - Extra**

|                             |                 |         |         |          |          |          |          |           |           |           |
|-----------------------------|-----------------|---------|---------|----------|----------|----------|----------|-----------|-----------|-----------|
| <b>To Fit Basket Number</b> |                 | 14590   | 14586   | 14595    | 19375    | 14600    | 2618     | 14605     | 2670      | 14610     |
| <b>Total Pull in Lbs.</b>   |                 | 45 – 55 | 45 – 55 | 80 – 100 | 80 – 100 | 80 – 100 | 80 – 100 | 180 – 205 | 180 – 205 | 180 – 205 |
| <b>Complete Assembly</b>    | <b>Part No.</b> | 61842-M | 61838-M | 61858-M  | 61858-M  | 61852-M  | 61852-M  | 61862-M   | 61866-M   | 62637-M   |
|                             | <b>Weight</b>   | 16      | 16-1/2  | 29       | 29       | 32       | 32       | 55        | 55        | 55        |
| <b>Adapter</b>              | <b>Part No.</b> | M-61843 | M-61839 | M-61859  | M-61859  | M-61853  | M-61853  | M-61863   | M-61867   | M-62638   |
|                             | <b>Weight</b>   | 2       | 2 1/2   | 3        | 3        | 4        | 4        | 8         | 8         | 8         |
| <b>Magnetic Assembly</b>    | <b>Part No.</b> | M-61812 | M-61812 | M-61814  | M-61814  | M-61814  | M-61814  | M-61816   | M-61816   | M-61816   |
|                             | <b>Weight</b>   | 14      | 14      | 26       | 26       | 28       | 28       | 47        | 47        | 47        |

*It is recommended that Shoes be at least 1/8" over the Barrel size.*

**How to Order**

Specify:

- (1) Name and number of assembly or part
- (2) O.D. and type of shoe
- (3) Top connection, if other than standard

**RECOMMENDED SPARE PARTS:**

- (1) 2 Upper Catchers
- (2) 2 Lower Catchers
- (3) 3 Mill Shoes
- (4) 2 Finger Shoes
- (5) 4 Finger Shoe Replacements



**Specifications**

|                                 |                 |               |           |           |           |                |                 |                 |             |         |
|---------------------------------|-----------------|---------------|-----------|-----------|-----------|----------------|-----------------|-----------------|-------------|---------|
| <b>Hole Size</b>                |                 | 6-1/8 – 6-1/2 | 6-5/8 – 7 | 7-1/4 – 8 | 8-1/4 – 9 | 9-1/4 – 10-1/8 | 10-1/4 – 11-5/8 | 11-3/4 – 12-1/2 | 12-5/8 – 15 | 15 – 20 |
| <b>O.D. Barrel (Top End)</b>    |                 | 5-1/4         | 5-3/4     | 6-1/2     | 7-1/2     | 8-1/2          | 9-3/8           | 10-3/8          | 11-3/8      | 13-3/4  |
| <b>O.D. Shoe (Top End)</b>      |                 | 5-7/8         | 6-1/4     | 7-1/8     | 8-1/8     | 9-1/8          | 10-1/8          | 11-1/4          | 12-1/4      | 14-1/2  |
| <b>Maximum Diameter of Fish</b> |                 | 4-1/2         | 4-13/16   | 5-7/16    | 6-3/16    | 7-3/16         | 8-1/16          | 9-1/16          | 10-1/16     | 12-1/16 |
| <b>Number of Teeth</b>          |                 | 8             | 8         | 8         | 8         | 10             | 12              | 12              | 12          | 16      |
| <b>Complete Assembly</b>        | <b>Part No.</b> | 19379         | 14615     | 14620     | 14625     | 14630          | 14635           | 14640           | 14645       | 14650   |
|                                 | <b>Weight</b>   | 110           | 125       | 160       | 205       | 255            | 290             | 360             | 450         | 655     |

**Replacement Parts**

|  |                 |         |         |         |         |         |         |         |         |         |
|--|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Top Sub</b>                               | <b>Part No.</b> | 19380   | 14731   | 14732   | 14733   | 14734   | 14735   | 14736   | 14737   | 14738   |
|  | <b>Weight</b>   | 30-1/2  | 42      | 53      | 67      | 86      | 94      | 128     | 140     | 155     |
| <b>Barrel</b>                                | <b>Part No.</b> | 19381   | 14616   | 14621   | 14626   | 14631   | 14636   | 14641   | 14646   | 14651   |
|  | <b>Weight</b>   | 55      | 55      | 68      | 85      | 102     | 117     | 134     | 170     | 265     |
| <b>Upper Catcher</b>                         | <b>Part No.</b> | 19382-W | 14617-W | 14622-W | 14627-W | 14632-W | 14637-W | 14642-W | 14647-W | 14652-W |
|  | <b>Weight</b>   | 3       | 4       | 5       | 7       | 8       | 12      | 14      | 20      | 30      |
| <b>Lower Catcher</b>                         | <b>Part No.</b> | 19383-W | 14618-W | 14623-W | 14628-W | 14633-W | 14638-W | 14643-W | 14648-W | 14653-W |
|  | <b>Weight</b>   | 3       | 4       | 5       | 7       | 8       | 12      | 14      | 20      | 30      |
| <b>Conventional Shoe Type A (Hard-Faced)</b> | <b>Part No.</b> | 19384-A | 14619-A | 14624-A | 14629-A | 14634-A | 14639-A | 14644-A | 14649-A | 14654-A |
|  | <b>Weight</b>   | 181/2   | 20      | 28      | 38      | 49      | 55      | 70      | 100     | 175     |

**Mill Shoes - Extra**

|   |                 |         |         |         |         |         |         |         |         |         |
|---|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Mill Shoe Type B (Itcoloy Faced)</b> | <b>Part No.</b> | 19384-B | 14619-B | 14624-B | 14629-B | 14634-B | 14639-B | 14644-B | 14649-B | 14654-B |
|   | <b>Weight</b>   | 22      | 25      | 34      | 44      | 56      | 62      | 72      | 110     | 190     |
| <b>Mill Shoe Type C (Itcoloy Faced)</b> | <b>Part No.</b> | 19384-C | 14619-C | 14624-C | 14629-C | 14634-C | 14639-C | 14644-C | 14649-C | 14654-C |
|   | <b>Weight</b>   | 30      | 33      | 43      | 51      | 66      | 72      | 82      | 125     | 215     |

**Finger Shoes - Extra**

|                                 |                 |       |        |       |       |       |        |       |       |       |
|---------------------------------|-----------------|-------|--------|-------|-------|-------|--------|-------|-------|-------|
| <b>To Fit Basket Number</b>     |                 | 19379 | 14615  | 14620 | 14625 | 14630 | 14635  | 14640 | 14645 | 14650 |
| <b>Maximum Diameter of Fish</b> |                 | 51/2  | 529/32 | 61/2  | 71/4  | 81/8  | 915/16 | 11    | 117/8 | 151/4 |
| <b>Replacement</b>              | <b>Part No.</b> | 19406 | 22210  | 22211 | 22212 | 22213 | 22214  | 22215 | 22216 | 22217 |
|                                 | <b>Weight</b>   | 20    | 28     | 29    | 37    | 45    | 64     | 71    | 89    | 160   |

*Finger Shoe replacement is furnished with the same O.D. as the standard shoe unless otherwise specified.*

**Magnet Inserts - Extra**

|                             |                 |         |         |         |         |         |          |           |           |           |
|-----------------------------|-----------------|---------|---------|---------|---------|---------|----------|-----------|-----------|-----------|
| <b>To Fit Basket Number</b> |                 | 19379   | 14615   | 14620   | 14625   | 14630   | 14635    | 14640     | 14645     | 14650     |
| <b>Total Pull in lbs.</b>   |                 | 180-205 | 250-290 | 310-360 | 425-495 | 620-720 | 930-1080 | 1265-1440 | 1265-1440 | 1740-2050 |
| <b>Complete Assembly</b>    | <b>Part No.</b> | 61868-M | 61874-M | 61949-M | 61955-M | 61959-M | 61969-M  | 61977-M   | 61979-M   | 61987-M   |
|                             | <b>Weight</b>   | 59      | 77      | 98      | 120     | 182     | 268      | 331       | 353       | 467       |
| <b>Adapter</b>              | <b>Part No.</b> | M-61869 | M-61875 | M-61950 | M-61956 | M-61960 | M-61970  | M-61978   | M-61980   | M-61988   |
|                             | <b>Weight</b>   | 12      | 14      | 19      | 24      | 32      | 47       | 65        | 87        | 113       |
| <b>Magnetic Assembly</b>    | <b>Part No.</b> | M-61816 | M-61818 | M-61822 | M-61824 | M-61826 | N-61828  | N-61830   | N-61830   | P-61834   |
|                             | <b>Weight</b>   | 47      | 63      | 79      | 96      | 150     | 221      | 266       | 266       | 354       |

**How to Order**

Specify:

- (1) Name and number of assembly or part
- (2) O.D. and type of shoe
- (3) Top connection, if other than standard

**RECOMMENDED SPARE PARTS:**

- (1) 2 Upper Catchers
- (2) 2 Lower Catchers
- (3) 3 Mill Shoes
- (4) 2 Finger Shoes
- (5) 4 Finger Shoe Replacements

### Catcher Specifications

| Will Fit Junk Basket Number: |          |         |         |         |         |         |         |         |         |         |         |         |
|------------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Single Catcher               | —        | 14590   | 7724    | 14586   | —       | 7453    | 14595   | —       | 7731    | —       | —       |         |
| Upper Catcher                | —        | —       | —       | —       | —       | —       | —       | 10995   | —       | —       | —       |         |
| Lower Catcher                | —        | —       | —       | —       | —       | —       | —       | —       | 10995   | —       | —       |         |
| Catcher Dimensions:          |          |         |         |         |         |         |         |         |         |         |         |         |
| Internal Diameter            | 1-3/4    | 2-23/32 | 24964   | 2-31/32 | 3-1/16  | 3-1/16  | 3932    | 3-13/32 | 3-13/32 | 3-13/32 | 3-13/32 |         |
| External Diameter            | 2.075    | 31564   | 3-11/16 | 3-13/16 | 3-13/16 | 4       | 3-31/32 | 3-31/32 | 4-1/16  | 4-1/16  | 4-9/32  |         |
| Height                       | 1-3/4    | 1-7/8   | 1-7/8   | 2-1/4   | 2-1/2   | 2-1/2   | 2-3/8   | 1-63/64 | 1-63/64 | 2-3/8   | 2-1/4   |         |
| Complete Assembly            | Part No. | 11270-W | 14593-W | 21810-W | 14589-W | 22075-W | 21780-W | 14598-W | 21880-W | 21805-W | 19377-W | 18940-W |
|                              | Weight   | 7/8     | 1       | 7/8     | 1-1/2   | 2       | 2       | 1-3/4   | 1-3/8   | 1-3/8   | 1-3/4   | 1-3/4   |

### Replacement Parts

|                        |          |       |       |       |       |       |       |       |       |       |       |       |
|------------------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Body</b>            | Part No. | 42230 | 45541 | 45542 | 45590 | 45591 | 45591 | 45568 | 45565 | 45565 | 45563 | 45579 |
|                        | Weight   | 1/2   | 3/4   | 5/8   | 1-1/8 | 1-1/2 | 1-1/2 | 1-1/4 | 1     | 1     | 1-1/4 | 1-1/4 |
| <b>Finger Retainer</b> | Part No. | 42253 | 45543 | 45538 | 45562 | 45592 | 45592 | 45569 | 45566 | 45566 | 45564 | 45580 |
|                        | Weight   | 1/8   | 1/8   | 1/8   | 1/8   | 3/16  | 3/16  | 3/16  | 1/8   | 1/8   | 3/16  | 3/16  |
| <b>Short Finger</b>    | Part No. | 42254 | 45539 | 45539 | 45574 | 45574 | 45574 | 55962 | 45574 | 45574 | 55962 | 45581 |
|                        | Code     | E     | E     | W-3   | W-3   | W-3   | 690-W | W-3   | W-3   | W-3   | 610-W | W-1   |
|                        | Weight   | 1/32  | 1/32  | 1/32  | 1/32  | 1/16  | 1/16  | 1/16  | 1/32  | 1/32  | 1/16  | 1/16  |
|                        | Req'd    | 8     | 5     | 5     | 5     | 10    | 5     | 6     | 12    | 6     | 6     | 6     |
| <b>Long Finger</b>     | Part No. | —     | 45540 | 45540 | 45575 | —     | 45575 | 55963 | —     | 45575 | 55963 | 45582 |
|                        | Code     | —     | F     | F     | W-4   | —     | W-4   | 691-W | —     | W-4   | 691-W | W-2   |
|                        | Weight   | —     | 1/16  | 1/16  | 1/16  | —     | 1/8   | 1/8   | —     | 1/16  | 1/8   | 1/8   |
|                        | Req'd    | —     | 5     | 5     | 5     | —     | 5     | 6     | —     | 6     | 6     | 6     |
| <b>Pivot Pin</b>       | Part No. | 42255 | 45535 | 45535 | 45583 | 45583 | 45583 | 55957 | 45583 | 45583 | 55957 | 55957 |
|                        | Weight   | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  |
|                        | Req'd    | 8     | 10    | 10    | 10    | 10    | 10    | 12    | 12    | 12    | 12    | 12    |
| <b>Torsion Spring</b>  | Part No. | 42256 | 45567 | 45567 | 55958 | 45571 | 45571 | 55958 | 45571 | 45571 | 55958 | 45571 |
|                        | Weight   | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  |
|                        | Req'd    | 8     | 10    | 10    | 10    | 10    | 10    | 12    | 12    | 12    | 12    | 12    |
| <b>Retainer Screw</b>  | Part No. | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 |
|                        | Weight   | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  |
|                        | Req'd    | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     |
| <b>Top Cap</b>         | Part No. | 42252 | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
|                        | Weight   | 1/16  | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |

### Code

Each Finger is stenciled with a Letter or Letter-Number Code. These Codes are used in lieu of the Part Number because of space limitations on small Fingers. The Code Numbers indicate Part Numbers as follows.

| Code | Part No. | Code | Part No. | Code | Part No. | Code    | Part No. |
|------|----------|------|----------|------|----------|---------|----------|
| A    | 45516    | I    | 45561    | P-1  | 45588    | 21778-W | 45607    |
| B    | 45517    | J    | 45507    | P-2  | 45589    | 21779-W | 45608    |
| C    | 45518    | K    | 45508    | W-1  | 45581    | 362-W   | 362      |
| D    | —        | L    | 45510    | W-2  | 45582    | 363-W   | 363      |
| E    | 45539    | M    | 45525    | W-3  | 45574    | 690-W   | 45623    |
| F    | 45540    | N    | 45526    | W-4  | 45575    | 691-W   | 45624    |
| G    | 45557    | O    | —        | X-1  | 45597    | 666-W   | 666      |
| H    | 45558    | P    | —        | X-2  | 45598    | 667-W   | 667      |

### How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Finger number and code when ordering Fingers

### RECOMMENDED SPARE PARTS:

- (1) 2 Sets Fingers
- (2) 4 Sets Torsion Springs
- (3) 1 Set Pivot Pins
- (4) 4 Retainer Screws



**Catcher Specifications**

| Will Fit Junk Basket Number: |                 |         |         |         |         |         |         |         |         |         |         |         |
|------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Single Catcher</b>        |                 | —       | 5516    | —       | —       | —       | —       | —       | 7737    | —       | —       | 12097   |
|                              |                 |         | 2168    |         |         |         |         |         | 7441    |         |         | 7441    |
|                              |                 |         |         |         |         |         |         |         | 2570    |         |         |         |
| <b>Upper Catcher</b>         |                 | 2618    | —       | —       | —       | —       | 14605   | —       | —       | 14610   | 2670    | —       |
| <b>Lower Catcher</b>         |                 | —       | 12109   | —       | 2618    | 14605   | —       | —       | 12139   | —       | —       | 2670    |
| Catcher Dimensions:          |                 |         |         |         |         |         |         |         |         |         |         |         |
| <b>Internal Diameter</b>     |                 | 3-3/4   | 3-3/4   | 3-3/4   | 3-3/4   | 4-1/16  | 4-1/16  | 4-1/16  | 4-3/32  | 4-5/16  | 3-13/32 | 4-13/32 |
| <b>External Diameter</b>     |                 | 4-15/32 | 4-15/32 | 4-15/32 | 4-15/32 | 4-7/8   | 4-7/8   | 4-7/8   | 4-3/4   | 5-5/16  | 4-1/16  | 5-5/32  |
| <b>Height</b>                |                 | 29/16   | 29/16   | 2-9/16  | 2-9/16  | 2-25/32 | 2-25/32 | 1-9/16  | 2-1/2   | 2-7/8   | 2-13/16 | 2-13/16 |
| <b>Complete Assembly</b>     | <b>Part No.</b> | 14747-W | 21735-W | 31043-W | 14603-W | 14608-W | 14607-W | 21960-W | 21820-W | 14612-W | 15130-W | 28349-W |
|                              | <b>Weight</b>   | 2       | 2-1/2   | 2-1/2   | 2-3/4   | 3-1/4   | 3       | 2       | 2-1/2   | 4-1/8   | 3-1/4   | 3-1/2   |

**Replacement Parts**

|                        |                 |       |       |       |       |       |       |       |       |       |       |       |
|------------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Body</b>            | <b>Part No.</b> | 45559 | 45559 | 45559 | 45559 | 45555 | 45555 | 45600 | 45595 | 45572 | 45511 | 45511 |
|                        | <b>Weight</b>   | 1-1/2 | 1-3/4 | 1-3/4 | 1-7/8 | 2     | 1-3/4 | 1-1/2 | 1-3/4 | 2-1/2 | 2     | 2-1/4 |
| <b>Finger Retainer</b> | <b>Part No.</b> | 45560 | 45560 | 45560 | 45560 | 45556 | 45556 | 45556 | 45596 | 45573 | 45519 | 45519 |
|                        | <b>Weight</b>   | 1/4   | 1/4   | 1/4   | 1/4   | 1/4   | 1/4   | 1/4   | 1/4   | 1/4   | 1/4   | 1/4   |
| <b>Short Finger</b>    | <b>Part No.</b> | 45558 | 45558 | 45558 | 45558 | 45558 | 45558 | 45558 | 45597 | 45517 | 45517 | 45517 |
|                        | <b>Code</b>     | H     | H     | H     | H     | H     | H     | H     | X-1   | B     | B     | R     |
|                        | <b>Weight</b>   | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  |
|                        | <b>Req'd</b>    | 10    | 5     | 10    | 5     | 6     | 12    | 12    | 6     | 1212  | 8     |       |
| <b>Long Finger</b>     | <b>Part No.</b> | —     | 45561 | —     | 45561 | 45557 | —     | —     | 45598 | —     | —     | 45516 |
|                        | <b>Code</b>     | —     | I     | —     | I     | G     | —     | —     | X-2   | —     | —     | A     |
|                        | <b>Weight</b>   | —     | 1/8   | —     | 1/8   | 1/8   | —     | —     | 1/8   | —     | —     | 1/8   |
|                        | <b>Req'd</b>    | —     | 5     | —     | 5     | 6     | —     | —     | 6     | —     | —     | 4     |
| <b>Pivot Pin</b>       | <b>Part No.</b> | —     | —     | —     | —     | —     | —     | —     | 45599 | —     | —     | —     |
|                        | <b>Weight</b>   | —     | —     | —     | —     | —     | —     | —     | 1/32  | —     | —     | —     |
|                        | <b>Req'd</b>    | —     | —     | —     | —     | —     | —     | —     | 12    | —     | —     | —     |
| <b>Torsion Spring</b>  | <b>Part No.</b> | 45520 | 45520 | 45520 | 45520 | 45520 | 45520 | 45520 | 45571 | 45520 | 45520 | 45520 |
|                        | <b>Weight</b>   | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  |
|                        | <b>Req'd</b>    | 10    | 10    | 10    | 10    | 12    | 12    | 12    | 12    | 12    | 12    | 12    |
| <b>Retainer Screw</b>  | <b>Part No.</b> | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 |
|                        | <b>Weight</b>   | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  |
|                        | <b>Req'd</b>    | —     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     |
| <b>Top Cap</b>         | <b>Part No.</b> | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
|                        | <b>Weight</b>   | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |

**Code**

Each Finger is stenciled with a Letter or Letter-Number Code. These Codes are used in lieu of the Part Number because of space limitations on small Fingers. The Code Numbers indicate Part Numbers as follows.

| Code | Part No. | Code | Part No. | Code | Part No. | Code    | Part No. |
|------|----------|------|----------|------|----------|---------|----------|
| A    | 45516    | I    | 45561    | P-1  | 45588    | 21778-W | 45607    |
| B    | 45517    | J    | 45507    | P-2  | 45589    | 21779-W | 45608    |
| C    | 45518    | K    | 45508    | W-1  | 45581    | 362-W   | 362      |
| D    | —        | L    | 45510    | W-2  | 45582    | 363-W   | 363      |
| E    | 45539    | M    | 45525    | W-3  | 45574    | 690-W   | 45623    |
| F    | 45540    | N    | 45526    | W-4  | 45575    | 691-W   | 45624    |
| G    | 45557    | O    | —        | X-1  | 45597    | 666-W   | 666      |
| H    | 45558    | P    | —        | X-2  | 45598    | 667-W   | 667      |

**How to Order**

Specify:

- (1) Name and number of assembly or part
- (2) Finger number and code when ordering Fingers

**RECOMMENDED SPARE PARTS:**

- (1) 2 Sets Fingers
- (2) 4 Sets Torsion Springs
- (3) 1 Set Pivot Pins
- (4) 4 Retainer Screws



**Catcher Specifications**

| Will Fit Junk Basket Number: |          |         |         |         |         |         |         |         |         |         |         |         |
|------------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Single Catcher               | —        | —       | 6109    | —       | —       | —       | —       | 5895    | —       | —       | —       |         |
|                              |          |         | 7318    |         |         |         |         | 7072    |         |         |         |         |
|                              |          |         | 2677    |         |         |         |         | 2554    |         |         |         |         |
| Upper Catcher                | 19379    | —       | —       | —       | 14615   | —       | —       | —       | —       | 14620   | —       |         |
|                              |          |         |         |         |         |         |         |         |         | 19385   |         |         |
| Lower Catcher                | —        | 19379   | —       | —       | —       | 14615   | —       | —       | —       | —       | 14620   |         |
|                              |          |         |         |         |         |         |         |         |         |         | 19385   |         |
| Catcher Dimensions:          |          |         |         |         |         |         |         |         |         |         |         |         |
| Internal Diameter            | 4-17/32  | 4-17/32 | 4-3/4   | 4-3/4   | 4-13/16 | 4-13/16 | 5-3/16  | 5-3/16  | 5-1/4   | 5-7/16  | 5-7/16  |         |
| External Diameter            | 5-13/32  | 5-13/32 | 5-5/8   | 5-5/8   | 5-23/32 | 5-23/32 | 6-1/4   | 6-1/4   | 6-1/8   | 6-3/8   | 6-3/8   |         |
| Height                       | 2-7/8    | 2-7/8   | 2-5/8   | 2-5/8   | 3-1/16  | 3-1/16  | 3-5/16  | 3-5/16  | 2-3/4   | 3-5/16  | 3-5/16  |         |
| Complete Assembly            | Part No. | 19382-W | 19383-W | 21750-W | 22045-W | 14617-W | 14618-W | 22050-W | 21725-W | 22030-W | 14622-W | 14623-W |
|                              | Weight   | 4       | 4       | 4-1/4   | 4-1/4   | 4-1/2   | 5       | 5-1/4   | 5-1/4   | 4-3/4   | 6       | 6       |

**Replacement Parts**

|                 |          |       |       |       |       |       |       |       |       |       |       |       |
|-----------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Body            | Part No. | 45553 | 45553 | 45584 | 45584 | 45512 | 45512 | 45550 | 45550 | 45601 | 45545 | 45545 |
|                 | Weight   | 2-1/2 | 2-1/2 | 2-3/4 | 2-3/4 | 2-7/8 | 3     | 3-1/8 | 3-1/8 | 2-5/8 | 3-1/4 | 3-1/4 |
| Finger Retainer | Part No. | 45554 | 45554 | 45585 | 45585 | 45552 | 45552 | 45551 | 45551 | 45527 | 45546 | 45546 |
|                 | Weight   | 3/8   | 3/8   | 3/8   | 3/8   | 3/8   | 3/8   | 1/2   | 1/2   | 1/2   | 1/2   | 1/2   |
| Short Finger    | Part No. | 45517 | 45517 | 45517 | 45517 | 45517 | 45517 | 45557 | 45557 | 45517 | 45517 | 45517 |
|                 | Code     | B     | B     | B     | B     | B     | G     | G     | B     | B     | B     | B     |
|                 | Weight   | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/16  | 1/8   | 1/8   | 1/8   |
|                 | Req'd    | 12    | 6     | 6     | 12    | 12    | 6     | 12    | 6     | 12    | 14    | 7     |
| Long Finger     | Part No. | —     | 45516 | 45516 | —     | —     | 45516 | —     | 45518 | —     | —     | 45518 |
|                 | Code     | —     | A     | A     | —     | —     | A     | —     | C     | —     | —     | C     |
|                 | Weight   | —     | 1/8   | 1/8   | —     | —     | 1/8   | —     | 3/16  | —     | —     | 3/16  |
|                 | Req'd    | —     | 6     | 6     | —     | —     | 6     | —     | 6     | —     | —     | 7     |
| Pivot Pin       | Part No. | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
|                 | Weight   | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
| Torsion Spring  | Part No. | 45520 | 45520 | 45520 | 45520 | 45520 | 45520 | 45520 | 45520 | 45520 | 45520 | 45520 |
|                 | Weight   | —     | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  |
|                 | Req'd    | 12    | 12    | 12    | 12    | 12    | 12    | 12    | 12    | 12    | 14    | 14    |
| Retainer Screw  | Part No. | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 |
|                 | Weight   | —     | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  |
|                 | Req'd    | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     |
| Top Cap         | Part No. | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
|                 | Weight   | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |

**Code**

Each Finger is stenciled with a Letter or Letter-Number Code. These Codes are used in lieu of the Part Number because of space limitations on small Fingers. The Code Numbers indicate Part Numbers as follows.

| Code | Part No. | Code | Part No. | Code | Part No. | Code    | Part No. |
|------|----------|------|----------|------|----------|---------|----------|
| A    | 45516    | I    | 45561    | P-1  | 45588    | 21778-W | 45607    |
| B    | 45517    | J    | 45507    | P-2  | 45589    | 21779-W | 45608    |
| C    | 45518    | K    | 45508    | W-1  | 45581    | 362-W   | 362      |
| D    | —        | L    | 45510    | W-2  | 45582    | 363-W   | 363      |
| E    | 45539    | M    | 45525    | W-3  | 45574    | 690-W   | 45623    |
| F    | 45540    | N    | 45526    | W-4  | 45575    | 691-W   | 45624    |
| G    | 45557    | O    | —        | X-1  | 45597    | 666-W   | 666      |
| H    | 45558    | P    | —        | X-2  | 45598    | 667-W   | 667      |

**How to Order**

Specify:  
 (1) Name and number of assembly or part  
 (2) Finger number and code when ordering Fingers

**RECOMMENDED SPARE PARTS:**

- (1) 2 Sets Fingers
- (2) 4 Sets Torsion Springs
- (3) 1 Set Pivot Pins
- (4) 4 Retainer Screws



**Catcher Specifications**

| Will Fit Junk Basket Number: |                 |         |         |         |         |         |         |         |         |         |         |         |
|------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Single Catcher</b>        | —               | 7751    | 6228    | —       | —       | 7754    | —       | —       | —       | —       | —       |         |
|                              |                 | 7010    | 7567    |         |         | 7015    |         |         |         |         |         |         |
|                              |                 |         |         |         |         | 13003   |         |         |         |         |         |         |
| <b>Upper Catcher</b>         | 10880           | —       | —       | —       | 14625   | —       | —       | 14630   | 1100    | —       | —       |         |
|                              |                 |         |         |         | 19388   |         |         |         |         |         |         |         |
| <b>Lower Catcher</b>         | —               | 10880   | —       | 14625   | —       | 10885   | 14630   | —       | —       | 11005   | —       |         |
|                              |                 |         |         | 19388   |         |         | 19391   |         |         |         |         |         |
| Catcher Dimensions:          |                 |         |         |         |         |         |         |         |         |         |         |         |
| <b>Internal Diameter</b>     | 5-5/8           | 5-5/8   | 6       | 6-3/16  | 6-3/16  | 6-1/2   | 7-3/16  | 7-3/16  | 7-3/16  | 7-13/16 | 8-5/16  |         |
| <b>External Diameter</b>     | 6-19/32         | 6-19/32 | 7       | 7-1/8   | 7-1/8   | 7-7/16  | 8-1/8   | 8-1/8   | 8-1/8   | 9-1/32  | 9-3/4   |         |
| <b>Height</b>                | 2-7/8           | 3-5/8   | 3-7/16  | 3-13/16 | 3-13/16 | 3-1/2   | 4-5/16  | 4-5/16  | 3-3/8   | 4-5/8   | 5       |         |
| <b>Complete Assembly</b>     | <b>Part No.</b> | 21865-W | 18936-W | 18725-W | 14628-W | 14627-W | 18720-W | 14633-W | 14632-W | 21885-W | 18945-W | 31046-W |
|                              | <b>Weight</b>   | 5-1/2   | 6-3/4   | 7       | 7-1/4   | 7-1/4   | 7-1/2   | 9-1/4   | 9-1/4   | 8       | 10      | 17-1/4  |

**Replacement Parts**

|                        |                 |       |       |       |       |       |       |       |       |       |       |        |
|------------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| <b>Body</b>            | <b>Part No.</b> | 45602 | 45514 | 45505 | 45547 | 45547 | 45515 | 45521 | 45521 | 45504 | 45522 | 45576  |
|                        | <b>Weight</b>   | 3     | 3-3/4 | 4     | 4-1/4 | 4-1/4 | 4-1/2 | 4-1/2 | 4-1/2 | 3-1/4 | 5-1/4 | 10-1/4 |
| <b>Finger Retainer</b> | <b>Part No.</b> | 45528 | 45528 | 45506 | 45548 | 45548 | 45529 | 45530 | 45530 | 45530 | 45531 | 45578  |
|                        | <b>Weight</b>   | 1/2   | 1/2   | 1/2   | 1/2   | 1/2   | 1/2   | 1/2   | 1/2   | 1/2   | 1/2   | 1      |
| <b>Short Finger</b>    | <b>Part No.</b> | 45517 | 45517 | 45508 | 47670 | 47670 | 45508 | 45588 | 45588 | 45588 | 45507 | 45525  |
|                        | <b>Code</b>     | B     | B     | K     | 362-W | 362-W | K     | P-1   | P-1   | P-1   | J     | M      |
|                        | <b>Weight</b>   | 1/8   | 1/8   | 1/8   | 1/8   | 1/8   | 1/8   | 3/16  | 3/16  | 3/16  | 3/16  | 1/4    |
|                        | <b>Req'd</b>    | 12    | 6     | 6     | 6     | 12    | 6     | 6     | 12    | 12    | 6     | 16     |
| <b>Long Finger</b>     | <b>Part No.</b> | —     | 45518 | 45507 | 47669 | —     | 45507 | 45589 | —     | —     | 70277 | —      |
|                        | <b>Code</b>     | —     | C     | J     | 363-W | —     | J     | P-2   | —     | —     | N     | —      |
|                        | <b>Weight</b>   | —     | 3/16  | 3/16  | 3/16  | —     | 3/16  | 1/4   | —     | —     | 1/4   | —      |
|                        | <b>Req'd</b>    | —     | 6     | 6     | 6     | —     | 6     | 6     | —     | —     | 6     | —      |
| <b>Pivot Pin</b>       | <b>Part No.</b> | —     | —     | —     | 45536 | 45536 | —     | —     | —     | —     | —     | —      |
|                        | <b>Weight</b>   | —     | —     | —     | 1/16  | 1/16  | —     | —     | —     | —     | —     | —      |
| <b>Torsion Spring</b>  | <b>Part No.</b> | 45520 | 45520 | 45509 | 45537 | 45537 | 45509 | 45549 | 45549 | 45509 | 45509 | 45509  |
|                        | <b>Weight</b>   | 1/32  | 1/32  | 1/16  | 1/16  | 1/16  | 1/16  | 1/8   | 1/8   | 1/8   | 1/8   | 1/8    |
|                        | <b>Req'd</b>    | 12    | 12    | 12    | 12    | 12    | 12    | 12    | 12    | 12    | 12    | 16     |
| <b>Retainer Screw</b>  | <b>Part No.</b> | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257  |
|                        | <b>Weight</b>   | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32  | 1/32   |
|                        | <b>Req'd</b>    | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2      |

**Code**

Each Finger is stenciled with a Letter or Letter-Number Code. These Codes are used in lieu of the Part Number because of space limitations on small Fingers. The Code Numbers indicate Part Numbers as follows.

| Code | Part No. | Code | Part No. | Code | Part No. | Code    | Part No. |
|------|----------|------|----------|------|----------|---------|----------|
| A    | 45516    | I    | 45561    | P-1  | 45588    | 21778-W | 45607    |
| B    | 45517    | J    | 45507    | P-2  | 45589    | 21779-W | 45608    |
| C    | 45518    | K    | 45508    | W-1  | 45581    | 362-W   | 362      |
| D    | —        | L    | 45510    | W-2  | 45582    | 363-W   | 363      |
| E    | 45539    | M    | 45525    | W-3  | 45574    | 690-W   | 45623    |
| F    | 45540    | N    | 45526    | W-4  | 45575    | 691-W   | 45624    |
| G    | 45557    | O    | —        | X-1  | 45597    | 666-W   | 666      |
| H    | 45558    | P    | —        | X-2  | 45598    | 667-W   | 667      |

**How to Order**

Specify:

- (1) Name and number of assembly or part
- (2) Finger number and code when ordering Fingers

**RECOMMENDED SPARE PARTS:**

- (1) 2 Sets Fingers
- (2) 4 Sets Torsion Springs
- (3) 1 Set Pivot Pins
- (4) 4 Retainer Screws



**Catcher Specifications**

| Will Fit Junk Basket Number: |          |         |         |         |         |         |         |         |
|------------------------------|----------|---------|---------|---------|---------|---------|---------|---------|
| Single Catcher               | —        | —       | —       | —       | —       | 2708    | —       |         |
| Upper Catcher                | —        | —       | 14640   | —       | 14645   | —       | —       |         |
| Lower Catcher                | —        | —       | —       | 14645   | —       | —       | —       |         |
| Catcher Dimensions:          |          |         |         |         |         |         |         |         |
| Internal Diameter            | 8-5/16   | 8-11/16 | 9-1/8   | 10-1/8  | 10-1/8  | 1-13/16 | 1-13/16 |         |
| Height                       | 4-1/2    | 5-3/32  | 5-3/16  | 6       | 6       | 7-5/16  | 7-5/16  |         |
| Complete Assembly            | Part No. | 22000-W | 31047-W | 14642-W | 14648-W | 14647-W | 21775-W | 22090-W |
|                              | Weight   | 15-3/4  | 17      | 19-1/4  | 24-1/2  | 24-3/4  | 29      | 29      |

**Replacement Parts**

|                        |                 |       |       |       |       |        |         |         |
|------------------------|-----------------|-------|-------|-------|-------|--------|---------|---------|
| <b>Body</b>            | <b>Part No.</b> | 45577 | 45593 | 45524 | 45586 | 45586  | 45605   | 45605   |
|                        | <b>Weight</b>   | 8-3/4 | 10    | 12    | 17    | 17-1/4 | 16-1/2  | 16-1/2  |
| <b>Finger Retainer</b> | <b>Part No.</b> | 45578 | 45594 | 45533 | 45587 | 45587  | 45606   | 45606   |
|                        | <b>Weight</b>   | 1     | 1     | 1-1/4 | 1-1/2 | 1-1/2  | 1-3/4   | 1-3/4   |
| <b>Short Finger</b>    | <b>Part No.</b> | 45525 | 45507 | 45507 | 666   | 666    | 45607   | 45607   |
|                        | <b>Code</b>     | M     | J     | J     | 666-W | 666-W  | 21778-W | 21778-W |
|                        | <b>Weight</b>   | 1/4   | 3/16  | 3/16  | 1/4   | 1/4    | 5/16    | 5/16    |
|                        | <b>Req'd</b>    | 16    | 16    | 16    | 8     | 16     | 7       | 14      |
| <b>Long Finger</b>     | <b>Part No.</b> | —     | —     | —     | 667   | —      | 45608   | —       |
|                        | <b>Code</b>     | —     | —     | —     | 667-W | —      | 21779-W | —       |
|                        | <b>Weight</b>   | —     | —     | —     | 5/16  | —      | 3/8     | —       |
|                        | <b>Req'd</b>    | —     | —     | —     | 8     | —      | 7       | —       |
| <b>Pivot Pin</b>       | <b>Part No.</b> | —     | —     | —     | 45603 | 45603  | 45609   | 45609   |
|                        | <b>Weight</b>   | —     | —     | —     | 1/8   | 1/8    | 3/16    | 3/16    |
|                        | <b>Req'd</b>    | —     | —     | —     | 16    | 16     | 14      | 14      |
| <b>Torsion Spring</b>  | <b>Part No.</b> | 45509 | 45509 | 45509 | 45604 | 45604  | 45610   | 45610   |
|                        | <b>Weight</b>   | 1/8   | 1/8   | 1/8   | 3/16  | 3/16   | 1/4     | 1/4     |
|                        | <b>Req'd</b>    | 16    | 16    | 16    | 16    | 16     | 14      | 14      |
| <b>Retainer Screw</b>  | <b>Part No.</b> | 42257 | 42257 | 42257 | 42257 | 42257  | 42257   | 42257   |
|                        | <b>Weight</b>   | 1/32  | 1/32  | 1/32  | 1/32  | 1/32   | 1/32    | 1/32    |
|                        | <b>Req'd</b>    | 2     | 2     | 2     | 2     | 2      | 2       | 2       |

**Code**

Each Finger is stenciled with a Letter or Letter-Number Code. These Codes are used in lieu of the Part Number because of space limitations on small Fingers. The Code Numbers indicate Part Numbers as follows.

| Code | Part No. | Code | Part No. | Code | Part No. | Code    | Part No. |
|------|----------|------|----------|------|----------|---------|----------|
| A    | 45516    | I    | 45561    | P-1  | 45588    | 21778-W | 45607    |
| B    | 45517    | J    | 45507    | P-2  | 45589    | 21779-W | 45608    |
| C    | 45518    | K    | 45508    | W-1  | 45581    | 362-W   | 362      |
| D    | —        | L    | 45510    | W-2  | 45582    | 363-W   | 363      |
| E    | 45539    | M    | 45525    | W-3  | 45574    | 690-W   | 45623    |
| F    | 45540    | N    | 45526    | W-4  | 45575    | 691-W   | 45624    |
| G    | 45557    | O    | —        | X-1  | 45597    | 666-W   | 666      |
| H    | 45558    | P    | —        | X-2  | 45598    | 667-W   | 667      |

**How to Order**

Specify:  
 (1) Name and number of assembly or part  
 (2) Finger number and code when ordering Fingers

**RECOMMENDED SPARE PARTS:**

- (1) 2 Sets Fingers
- (2) 4 Sets Torsion Springs
- (3) 1 Set Pivot Pins
- (4) 4 Retainer Screws



### Catcher Specifications

| Will Fit Junk Basket Number: |          |         |         |         |         |         |         |
|------------------------------|----------|---------|---------|---------|---------|---------|---------|
| Single Catcher               | —        | 7747    | —       | 11292   | —       | —       |         |
|                              |          | 7005    |         | 2690    |         |         |         |
| Upper Catcher                | —        | 14635   | —       | —       | —       | —       |         |
| Lower Catcher                | 14610    | —       | 14635   | —       | 11010   | 14640   |         |
| Catcher Dimensions:          |          |         |         |         |         |         |         |
| Internal Diameter            | 4-5/16   | 5-1/4   | 8-1/16  | 8-3/16  | 8-11/16 | 9-1/8   |         |
| External Diameter            | 5-5/16   | 6-1/8   | 9-5/16  | 9-3/4   | 10-3/32 | 10-7/16 |         |
| Height                       | 2-7/8    | 3-5/16  | 5       | 5       | 5-3/32  | 5-3/16  |         |
| Complete Assembly            | Part No. | 14613-W | 18935-W | 14638-W | 21760-W | 21840-W | 14643-W |
|                              | Weight   | 4-1/4   | 5-1/4   | 15-1/2  | 18-1/4  | 19-1/4  | 19-1/4  |

### Replacement Parts

|                 |          |       |       |       |        |       |       |
|-----------------|----------|-------|-------|-------|--------|-------|-------|
| Body            | Part No. | 45572 | 45513 | 45523 | 45576  | 45593 | 45524 |
|                 | Weight   | 2-3/4 | 3     | 8-1/2 | 11-1/4 | 12    | 12    |
| Finger Retainer | Part No. | 45573 | 45527 | 45532 | 45578  | 45594 | 45533 |
|                 | Weight   | 3/8   | 1/2   | 1     | 1      | 1-1/4 | 1-1/8 |
| Short Finger    | Part No. | 45517 | 45517 | 45525 | 45525  | 45507 | 45507 |
|                 | Code     | B     | B     | M     | M      | J     | J     |
|                 | Weight   | 1/16  | 1/16  | 3/16  | 3/16   | 3/16  | 3/16  |
|                 | Req'd    | 6     | 6     | 8     | 8      | 8     | 8     |
| Medium Finger   | Part No. | 45557 | 45516 | 45507 | 45510  | 45510 | 45510 |
|                 | Code     | G     | A     | J     | L      | L     | L     |
|                 | Weight   | 3/32  | 3/32  | 1/4   | 1/4    | 1/4   | 1/4   |
|                 | Req'd    | 3     | 3     | 4     | 4      | 4     | 4     |
| Long Finger     | Part No. | 45516 | 45518 | 68295 | 45526  | 45526 | 45526 |
|                 | Code     | A     | C     | N     | N      | N     | N     |
|                 | Weight   | 1/8   | 1/8   | 5/16  | 5/16   | 5/16  | 5/16  |
|                 | Req'd    | 3     | 3     | 4     | 4      | 4     | 4     |
| Torsion Spring  | Part No. | 45520 | 45520 | 45509 | 45509  | 45509 | 45509 |
|                 | Weight   | 1/32  | 1/32  | 1/16  | 1/16   | 1/16  | 1/16  |
|                 | Req'd    | 12    | 12    | 16    | 16     | 16    | 16    |
| Retainer Screw  | Part No. | 42257 | 42257 | 42257 | 42257  | 42257 | 42257 |
|                 | Weight   | 1/32  | 1/32  | 1/32  | 1/32   | 1/32  | 1/32  |
|                 | Req'd    | 2     | 2     | 2     | 2      | 2     | 2     |

### Code

Each Finger is stenciled with a Letter or Letter-Number Code. These Codes are used in lieu of the Part Number because of space limitations on small Fingers. The Code Numbers indicate Part Numbers as follows.

| Code | Part No. | Code | Part No. | Code | Part No. | Code    | Part No. |
|------|----------|------|----------|------|----------|---------|----------|
| A    | 45516    | I    | 45561    | P-1  | 45588    | 21778-W | 45607    |
| B    | 45517    | J    | 45507    | P-2  | 45589    | 21779-W | 45608    |
| C    | 45518    | K    | 45508    | W-1  | 45581    | 362-W   | 362      |
| D    | —        | L    | 45510    | W-2  | 45582    | 363-W   | 363      |
| E    | 45539    | M    | 45525    | W-3  | 45574    | 690-W   | 45623    |
| F    | 45540    | N    | 45526    | W-4  | 45575    | 691-W   | 45624    |
| G    | 45557    | O    | —        | X-1  | 45597    | 666-W   | 666      |
| H    | 45558    | P    | —        | X-2  | 45598    | 667-W   | 667      |

### How to Order

Specify:

- (1) Name and number of assembly or part
- (2) Finger number and code when ordering Fingers

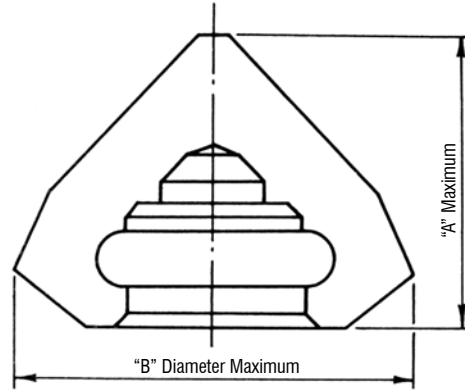
### RECOMMENDED SPARE PARTS:

- (1) 2 Sets Fingers
- (2) 4 Sets Torsion Springs
- (3) 1 Set Pivot Pins
- (4) 4 Retainer Screws



**Rock Bit Cone Dimensions**

| 2-Cone Bits |         | Size   |           | 3-Cone Bits |          |
|-------------|---------|--------|-----------|-------------|----------|
| A           | B       |        |           | A           | B        |
| —           | —       | 3-3/4  | — 4-1/8   | 13-1/32     | 24-5/64  |
| —           | —       | 4-1/4  | — 4 1/2   | 2-13/64     | 2-59/64  |
| —           | —       | 4-5/8  | — 5-21/32 | 3-13/64     |          |
| —           | —       | 5-1/8  | — 5-1/2   | 2-41/64     | 3-17/64  |
| —           | —       | 5-5/8  | — 6       | 3-1/8       | 4-1/64   |
| —           | —       | 6-1/8  | — 6-1/2   | 3-7/64      | 4-3/16   |
| —           | —       | 6-5/8  | — 7       | 3-7/16      | 4-9/16   |
| —           | —       | 7-1/8  | — 7-1/2   | 3-45/64     | 4-27/32  |
| 3-45/64     | 5-17/32 | 7-5/8  | — 8       | 3-31/32     | 5-17/64  |
| 4-11/32     | 6-7/64  | 8-1/8  | — 8-1/2   | 4-3/8       | 5-25/32  |
| 4-11/32     | 6-5/16  | 8-5/8  | — 9       | 4-17/32     | 6-1/32   |
| —           | —       | 9-1/8  | — 9-1/2   | 4-9/16      | 6-13/32  |
| 4-7/8       | 7       | 9-5/8  | — 9-7/8   | 4-15/16     | 6-41/64  |
| 5-23/64     | 7-19/32 | 10-1/2 | — 11-1/2  | 5-27/64     | 7-5/32   |
| 5-63/64     | 8-27/64 | 11-3/4 | — 12-1/2  | 6-1/8       | 7-61/64  |
| —           | —       | 12-5/8 | — 13 1/8  | 6-5/16      | 8-31/64  |
| —           | —       | 13-1/2 | — 14-1/4  | 7-1/32      | 8-13/16  |
| —           | —       | 14-1/2 | — 15      | 7-25/64     | 9-19/32  |
| —           | —       | 16     |           | 9-27/32     | 10-1/8   |
| —           | —       | 17     | — 17-1/2  | 8-13/64     | 11-11/64 |
| —           | —       | 18-1/2 | — 18-7/8  | 8-25/32     | 11-23/64 |
| —           | —       | 20     |           | 9-1/2       | 11-7/8   |
| —           | —       | 22     |           | 10-15/32    | 14-1/64  |
| —           | —       | 24     |           | 10-15/16    | 14-9/16  |
| —           | —       | 26     |           | 12-19/64    | 14-31/64 |



The cone sizes shown are the nominal Hughes Christensen cone dimensions and are the maximum for the size indicated in the middle column. They may be used as a guide in junk fishing operations.



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**Scotland**

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Fax: 441-224-723034

**Singapore**

Unit 1 Block 323  
Terrace Warehouse  
Until Jan. 2003  
Loyang Offshore Supply Base  
Box 5014  
Loyang Crescent,  
Singapore 508988  
Tel: 65-6542-5211  
Fax: 65-6542-8127

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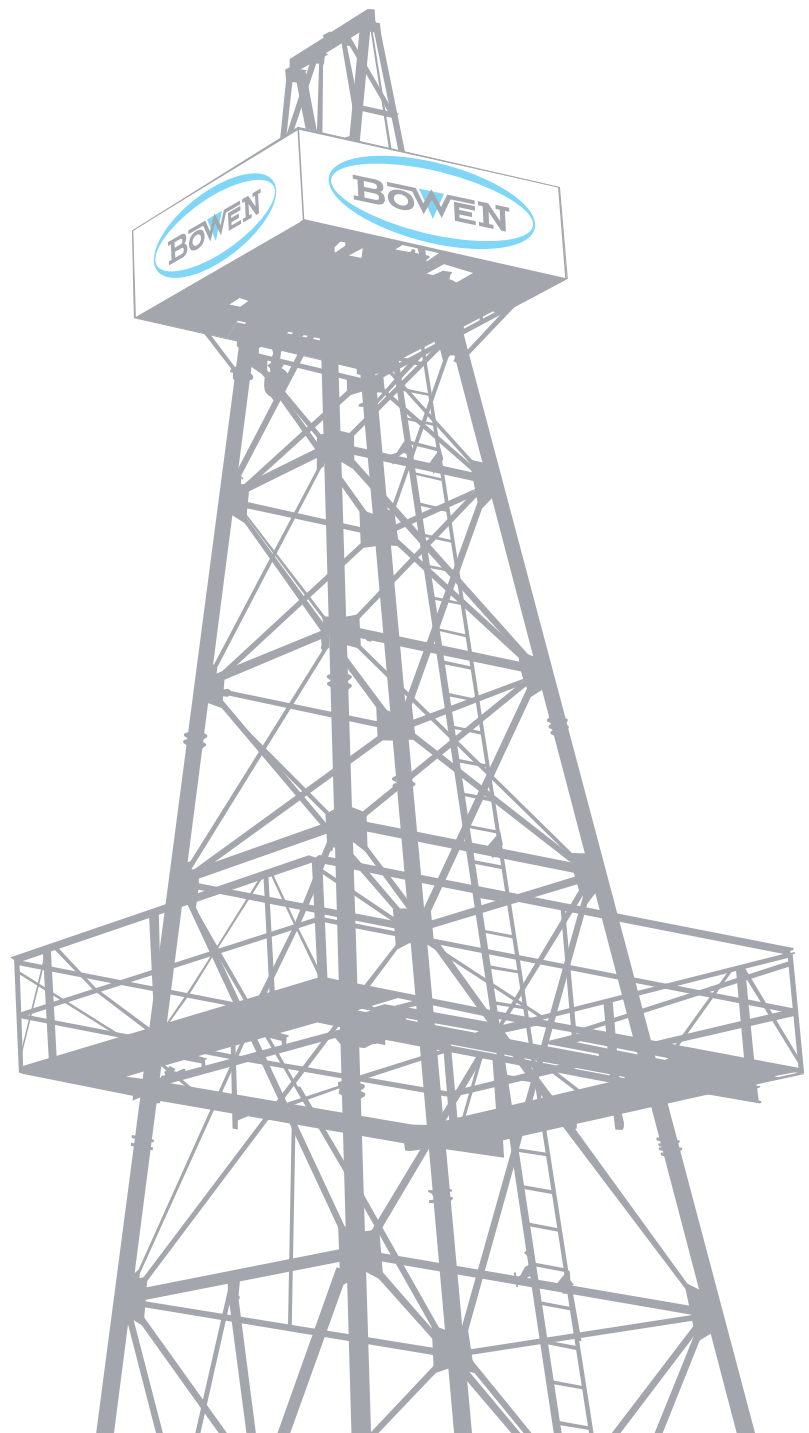
**Production Solutions**

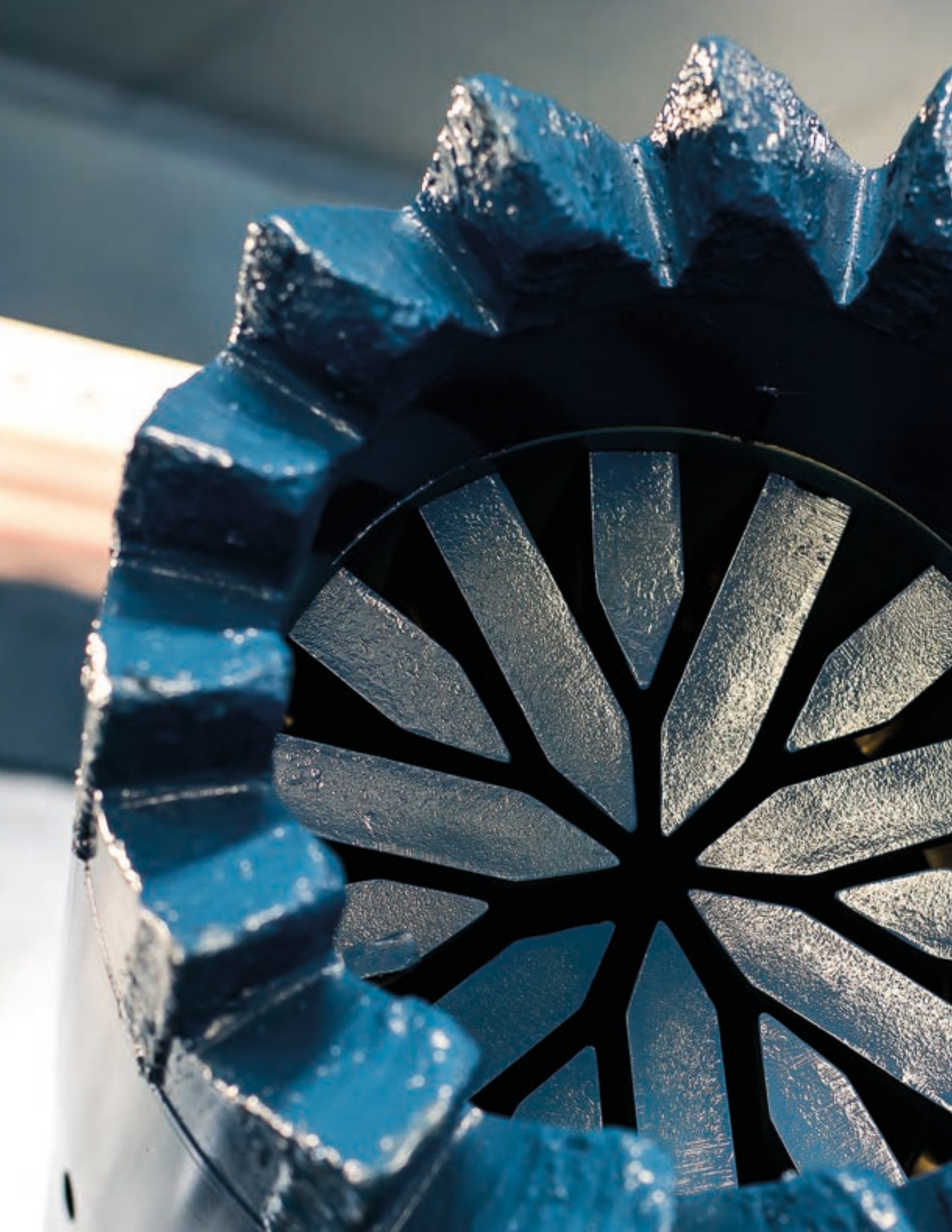
**Supply Chain Management**

**Engineering and Project Management**

# Bowen Reverse Circulation Junk Basket

Instruction Manual 3100





# Bowen Reverse Circulation Junk Basket

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## Index

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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. NOV Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

# Bowen Reverse Circulation Junk Basket

## General Description

The Bowen™ reverse circulation junk basket retrieves all types of small junk objects in wellbores using reverse circulation, eliminating misruns. A drain through the tool eliminates the possibility of pulling a wet string even though the inner barrel is plugged by the core. You may convert the tool into an effective fishing magnet and still retain the reverse circulation feature.

## Use

In operation, the reverse circulation junk basket circulates fluid out and down against the full circumference of the hole, where it is deflected in a manner that directs all objects into the long hollow barrel of the basket.

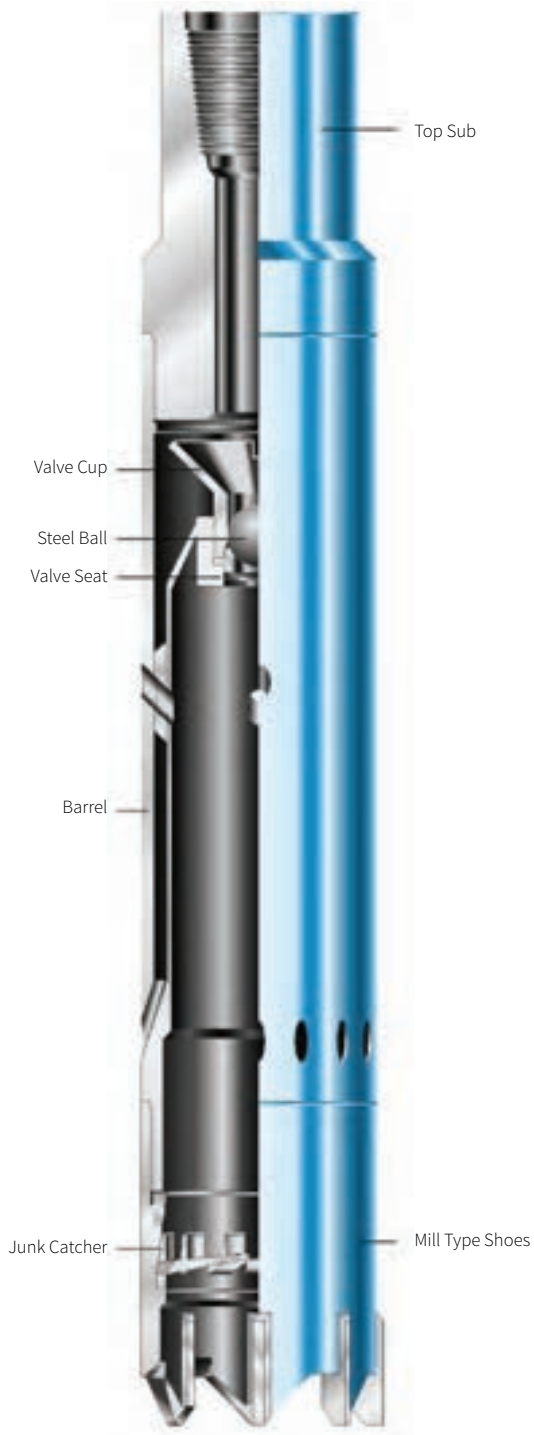
## Construction

The Bowen reverse circulation junk basket consists of a barrel, a top sub, a junk catcher, a shoe, and a valve assembly. A lifting sub allows easy handling of the junk basket and provides a storage place for the steel ball.

The barrel, which is, in effect, a two-bowl assembly, allows reverse circulation. Once the steel ball has settled into the valve seat, circulation fluid diverts around the valve and through the inner passages of the barrel, where it jets down and out against the full circumference of the hole. The Venturi effect causes the fluid to flow in a continuous stream up through the barrel and then out the return ports at the upper end of the barrel. (See illustration at top of page 6).

Bowen reverse circulation junk baskets are available in two types: Standard and W7R. Standard type baskets are designed to retrieve the more popular sizes of bit

cones. The W7R type baskets are designed to retrieve W7R and other oversized bit cones.



# Bowen Reverse Circulation Junk Basket

## Accessories

### Mill Shoes

The Bowen reverse circulation junk basket is furnished with a standard Type A mill shoe, a hard faced mill shoe that has side wings. We recommend that you consider itcoloy-faced mill shoes.

The Type B mill shoe is similar in design to the Type A but is hard-faced with itcoloy, a material composed of sintered tungsten carbide in an extremely tough matrix which will effectively and rapidly mill up junk during the fishing operation.

The type C mill shoe is a flat-bottomed shoe, which is hard-faced with itcoloy on the bottom, on the inner face, and on the outer face. It effectively mills up junk and is especially effective for cutting cores.

### Finger Shoes

When junk is lying loose on the bottom of the well or when it is too large to pass through the catchers, you may install a finger shoe on the bottom of the barrel in place of the mill shoe. When the junk basket engages the fish, combined rotating and lowering causes the long fingers to close in beneath the fish and retain it in the barrel. Finger replacements are easy and inexpensive to replace on the shoe body.

### Magnet Inserts

Magnet inserts are available to convert Bowen junk baskets into effective fishing magnets. The magnet insert fits into the recess normally occupied by the catcher. The magnet insert is useful in hard-to-drill formations and for thoroughly cleaning the hole prior to diamond drilling. This arrangement provides a magnet that incorporates the advantages of reverse circulation.



Type A Mill Shoe



Type B Mill Shoe



Type C Mill Shoe



Finger Shoe



Magnet Insert



Standard Catcher



Lifting Su

Lifting Sub

Steel Ball



# Bowen Reverse Circulation Junk Basket

## Operation

First, determine that the junk basket is properly assembled and that all its parts are in good working condition.

Standard style baskets retrieve all popular types of bit cones used to drill hole sizes within their ranges. See table for dimensions.

W7R style baskets are required to retrieve W7R and other oversize types of bit cones.

### Selection of Shoe

If the fish is embedded in a hard formation and a core must be cut, the junk basket must be equipped with the proper mill type shoe.

If the fish is lying loosely on the bottom of the hole, the junk basket may be equipped with either the proper mill type shoe or the proper finger type shoe.

Finger type shoes will normally retrieve larger objects than mill type shoes, provided the junk is lying loose on the bottom and a core does not need to be taken.

Itcoloy-faced shoes, with their hard, rugged and long-lasting qualities, cut away protruding excess metal to allow free entry of the junk into the basket and the retention of the junk on the one run.

Remove the lifting sub and retain it and the steel ball at the derrick floor.

Using the top sub, connect the junk basket to the string and run it in the hole. If small junk particles are very prevalent in the hole, a junk sub should be installed on top of top sub.

Where a window sub is available, install on the top joint of drill pipe and connect the kelly.

### To Recover Fish when Basket is Equipped with Mill Type Shoe

When the junk basket is approximately ten feet off bottom, turn on the circulating pumps and maintain circulation for a few minutes to condition the mud. Turn off the circulating pumps. Unscrew the kelly from the string. Drop the steel ball down the drill pipe. Reconnect the kelly. (Where a window sub is available, remove the plug from the sub and drop the steel ball down the drill pipe. Replace the plug in the window sub.)

Turn on the circulating pumps and while maintaining high pressure circulation, rotate the string slowly to the right and lower the junk basket to the bottom of the hole.

Continue righthand rotation and lowering until a core at least ten inches long has been cut.

**NOTE: When using the itcoloy-faced shoes, maintain one ton of weight on the shoe and rotate the basket 50–150 rpm to ensure proper milling.**

Stop rotation and circulation and pull the junk basket from the hole.

### To Recover Fish when Basket is Equipped with Finger Type Shoe

When the junk basket is approximately ten feet off bottom, turn on the circulating pumps and maintain circulation for a few minutes to condition the mud. Turn off the circulating pumps.

Unscrew the kelly from the string. Drop the steel ball down the drill

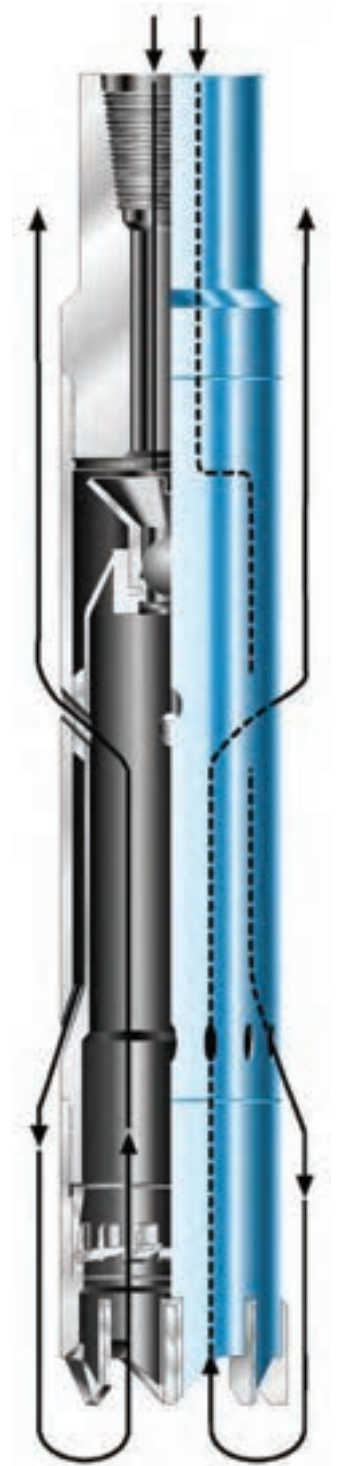
pipe. Reconnect the kelly. (Where a window sub is available, remove the plug from the sub and drop the steel ball down the drill pipe. Replace the plug in the window sub.)

Turn on the circulating pumps and while maintaining high pressure circulation, rotate the string slowly to the right and lower it until approximately two tons of weight rest against the bottom of the hole.

Stop rotation and circulation and pull the junk basket from the hole.

### To Remove the Fish or Core

Unscrew the mill type shoe or the finger type shoe from the junk basket and wash out the barrel.



Flow Path Diagram

# Bowen Reverse Circulation Junk Basket

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## Precautions

Make sure that the inside diameters of the tool joints in the string are large enough to pass the steel ball.

Be sure to retain the steel ball at the surface while the junk basket is being lowered into the hole.

## Explanation of Mechanism

The *Bowen* reverse circulation junk basket retrieves all types of small objects such as bit cones, tong pins, hammers, mill cuttings, and similar junk. Its unique principle of reverse fluid circulation ensures more complete recovery of junk in the hole and eliminates misruns.

## Function of Junk Basket in Recovering Fish with Mill Type Shoe

1. Turning on the circulation pumps and forcing circulation through the junk basket for a few minutes before dropping the steel ball flushes out any mud that may have gathered in the barrel during the run in.
2. After the steel ball has been dropped down the drilling pipe, its downward progress will not be halted until it encounters the valve seat in the junk basket. Thereafter, when circulation is resumed, the fluid flows through the inner passages of the barrel and jets outwardly and downwardly against the full circumference of the hole, where it is deflected in a manner that flushes all objects toward center. The fluid then flows in a continuous stream to the center of the junk basket and up through it and out the return ports in the upper end of the barrel, thus giving a reverse circulation action.

3. Cutting a length of core allows the fish to ride past the junk catcher. The fingers on the junk catcher fold back while the core and fish are entering.
4. Pulling up the junk basket causes the fingers in the junk catcher to dig in and cut off a section of core, thus holding the fish and core securely in the junk basket barrel.

## Function of Junk Basket in Recovering Fish with Finger Type Shoe

1. Turning on the circulating pump and forcing circulation through the junk basket for a few minutes before dropping the steel ball flushes out any mud that may have gathered in the barrel during the run in.
2. After the steel ball has been dropped down the drill pipe, its downward progress will not be halted until it encounters the valve seat in the junk basket. Then, when circulation resumes, the fluid flows through the inner passages of the barrel and jets outwardly and downwardly against the full circumference of the hole where it is deflected in a manner that flushes all objects toward center. The fluid then flows in a continuous stream to the center of the junk basket and up through it and out the return ports in the upper end of the barrel, thus giving a reverse circulation action.
3. Rotating to the right and lowering the junk basket to bottom causes the fingers of the finger type shoe to close in beneath the fish.

## Maintenance

To guard against misruns and to prolong the life of the tool, dismantle and thoroughly cleanse the junk basket after each job.

## Assembly

1. Install the magnetic insert assembly (if applicable) to the junk catcher assembly recess. The magnet insert assembly consists of a magnetic assembly and adapter.
2. If applicable, assemble the finger type shoe. The finger type shoe consists of a body and replacement.
3. Install the junk catcher assembly to the shoe (mill type a, b, or c, or finger type).
4. Install the shoe to the barrel.
5. Install the valve assembly. The valve assembly consists of a valve cup and valve seat.
6. Install the top sub to the assembly.

## Disassembly

1. Unthread and remove the top sub from the tool. Remove the steel ball.
2. Unthread and remove the valve assembly.
3. Unthread and remove the shoe from the barrel.
4. For tools with a finger type shoe, remove the finger type shoe replacement from the finger type shoe body.
5. Remove the junk catcher from the shoe.

6. Thoroughly clean the tool after use. Wash out both the inside and inner passages of the barrel, ensuring that the circulation holes are clean.
7. Check all parts carefully. Replace damaged parts with new ones.
8. To prevent rust, apply either paint or grease.
9. Store the steel ball in the lifting sub if applicable.

## Magnet Insert Assembly Installation

1. Remove shoe from barrel of the junk basket.
2. Remove catcher from shoe.
3. Install magnetic insert in catcher recess.
4. Reassemble junk basket.

## Maintenance

1. Thoroughly clean after use; make sure circulation hole is clean.
2. Store with keeper in place to preserve magnetism.

# Bowen Reverse Circulation Junk Basket

## Specifications and Replacement Parts

### Specifications

| Hole size                | 3 ¼ in. to 4 in. | 4 ½ in. to 4 ½ in. | 4 ¾ in. to 5 in. | 5 ½ in. to 5 ½ in. | 5 ¾ in. to 6 in. | 6 ¼ in. to 6 ½ in. | 6 ¾ in. to 7 ¾ in. | 7 ½ in. to 8 ¼ in. |         |
|--------------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|--------------------|--------------------|---------|
| O.D. Of barrel           | 3 ¾ in.          | 4 in.              | 4 ½ in.          | 4 ¾ in.            | 5 ½ in.          | 5 ¾ in.            | 6 ¼ in.            | 7 in.              |         |
| Maximum diameter of fish | 2 ¼ in.          | 2 ½ in.            | 3 ⅛ in.          | 3 ⅜ in.            | 3 ¾ in.          | 4 ¾ in.            | 4 ¾ in.            | 5 ½ in.            |         |
| Top connection           | 2 ¾ in.          | 2 ¾ in.            | 2 ¾ in.          | 2 ¾ in.            | 3 ½ in.          | 3 ½ in.            | 4 ½ in.            | 4 ½ in.            |         |
| Number of teeth on mill  | 6                | 6                  | 8                | 8                  | 8                | 8                  | 8                  | 8                  |         |
| Complete assembly        | Part no.         | 6635               | 7295             | 4448               | 4572             | 2618               | 2670               | 2677               | 2554    |
|                          | Weight           | 85 lbs             | 98 lbs           | 108 lbs            | 128 lbs          | 142 lbs            | 185 lbs            | 238 lbs            | 293 lbs |

### Replacement Parts

|                        |          |             |             |             |             |           |           |             |             |
|------------------------|----------|-------------|-------------|-------------|-------------|-----------|-----------|-------------|-------------|
| Top sub                | Part no. | 6636        | 7296        | 4449        | 4573        | 2619      | 2671      | 2678        | 2493        |
|                        | Weight   | 24 lbs      | 29 lbs      | 25 lbs      | 42 lbs      | 57 lbs    | 74 lbs    | 99 lbs      | 113 lbs     |
| Barrel                 | Part no. | 6637        | 7297        | 4450        | 4574        | 2620      | 2672      | 2679        | 2555        |
|                        | Weight   | 48 lbs      | 51 lbs      | 54 lbs      | 57 lbs      | 62 lbs    | 85 lbs    | 108 lbs     | 136 lbs     |
| Valve cap              | Part no. | 6638        | 6638        | 4451        | 4451        | 2621      | 2621      | 2621        | 2570        |
|                        | Weight   | 3 lbs       | 3 lbs       | 4 lbs       | 4 lbs       | 5 lbs     | 5 lbs     | 5 lbs       | 7 lbs       |
| Steel ball             | Part no. | 6640        | 6640        | 4453        | 4453        | 2623      | 2623      | 2623        | 2572        |
|                        | Diameter | 1 ⅞ in.     | 1 ⅞ in.     | 1 ½ in.     | 1 ½ in.     | 1 ¾ in.   | 1 ¾ in.   | 1 ¾ in.     | 1 ⅞ in.     |
| Valve seat             | Part no. | 6639        | 6639        | 4452        | 4452        | 2622      | 2622      | 2622        | 2571        |
|                        | Weight   | ½ lb        | ½ lb        | ½ lb        | ½ lb        | ½ lb      | ½ lb      | ½ lb        | ½ lb        |
| Junk catcher assembly* | Part no. | 21795W      | 21855W      | 21780W      | 18940W      | 21735W    | 28349W    | 21750W      | 21725W      |
|                        | Weight   | 1 ¼ lbs     | 1 ½ lbs     | 2 lbs       | 3 lbs       | 3 lbs     | 4 ½ lbs   | 4 ½ lbs     | 7 lbs       |
| Mill shoe type A       | Part no. | 6642        | 7299        | 4455        | 4576        | 2625      | 2676      | 2683        | 2556        |
|                        | Weight   | 8 lbs       | 10 lbs      | 12 lbs      | 13 lbs      | 14 lbs    | 16 lbs    | 18 lbs      | 28 lbs      |
| Lifting sub            | Part no. | 4568        | 4568        | 424         | 424         | 425       | 425       | 1849        | 1849        |
|                        | Weight   | 9 lbs       | 9 lbs       | 12 lbs      | 12 lbs      | 17 lbs    | 18 lbs    | 45 lbs      | 45 lbs      |
| Pipe plug              | Part no. | 61520       | 61520       | 61520       | 61520       | 61521     | 61521     | 61522       | 61522       |
|                        | Weight   | ½ lb        | ½ lb        | ½ lb        | ½ lb        | ½ lb      | ½ lb      | ½ lb        | ½ lb        |
|                        | Thread   | 1 ½ in. NPT | 1 ½ in. NPT | 1 ½ in. NPT | 1 ½ in. NPT | 2 in. NPT | 2 in. NPT | 2 ½ in. NPT | 2 ½ in. NPT |

### Mill Shoes

|                  |          |       |        |        |        |        |        |        |        |
|------------------|----------|-------|--------|--------|--------|--------|--------|--------|--------|
| Mill shoe type B | Part no. | 6642  | 7299   | 4455   | 4576   | 2625   | 2676   | 2683   | 2556   |
|                  | Weight   | 8 lbs | 10 lbs | 12 lbs | 13 lbs | 14 lbs | 16 lbs | 18 lbs | 28 lbs |
| Mill shoe type C | Part no. | 6642  | 7299   | 4455   | 4576   | 2625   | 2676   | 2683   | 2556   |
|                  | Weight   | 9 lbs | 11 lbs | 14 lbs | 15 lbs | 16 lbs | 19 lbs | 21 lbs | 31 lbs |

### Finger Shoes

|                          |          |         |         |         |         |         |         |         |         |
|--------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Maximum diameter of fish |          | 3 ¼ in. | 3 ¾ in. | 4 ⅛ in. | 4 ½ in. | 4 ¾ in. | 5 ⅞ in. | 5 ⅞ in. | 6 ¾ in. |
| Complete assembly        | Part no. | 6643    | 7300    | 4456    | 4577    | 22208   | 22218   | 2739    | 2740    |
|                          | Weight   | 16 lbs  | 20 lbs  | 24 lbs  | 27 lbs  | 30 lbs  | 36 lbs  | 42 lbs  | 60 lbs  |
| Body                     | Part no. | 6643-2  | 7300-2  | 4456-2  | 4577-2  | 22208-2 | 22218-2 | 2739-2  | 2740-2  |
|                          | Weight   | 10 lbs  | 10 lbs  | 14 lbs  | 15 lbs  | 14 lbs  | 14 lbs  | 14 lbs  | 28 lbs  |
| Replacement              | Part no. | 6643-1  | 7300-1  | 4456-1  | 4577-1  | 22208-1 | 22218-1 | 2739-1  | 2740-1  |
|                          | Weight   | 6 lbs   | 8 lbs   | 10 lbs  | 12 lbs  | 16 lbs  | 22 lbs  | 28 lbs  | 32 lbs  |

### Magnet Insert

|                                       |          |          |          |          |           |           |            |            |            |
|---------------------------------------|----------|----------|----------|----------|-----------|-----------|------------|------------|------------|
| To fit assembly no.                   |          | 6635     | 7295     | 4448     | 4572      | 2618      | 2670       | 2677       | 2554       |
| Total pull in lbs                     |          | 45 to 55 | 45 to 55 | 45 to 55 | 80 to 100 | 80 to 100 | 125 to 145 | 180 to 205 | 250 to 290 |
| Magnet insert assembly consisting of: | Part no. | 61836    | 61848    | 61840    | 61850     | 61852     | 61866      | 61872      | 61876      |
|                                       | Weight   | 16 lbs   | 19 lbs   | 20 lbs   | 34 lbs    | 35 lbs    | 48 lbs     | 57 lbs     | 77 lbs     |
| Magnetic assembly                     | Part no. | 61810    | 61812    | 61812    | 61814     | 61814     | 61816      | 61818      | 61820      |
|                                       | Weight   | 4 lbs    | 5 lbs    | 6 lbs    | 6 lbs     | 7 lbs     | 8 lbs      | 10 lbs     | 14 lbs     |
| Adapter                               | Part no. | 61837    | 61849    | 61841    | 61851     | 61853     | 61867      | 61873      | 61948      |
|                                       | Weight   | 12 lbs   | 14 lbs   | 14 lbs   | 28 lbs    | 28 lbs    | 40 lbs     | 47 lbs     | 63 lbs     |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) OD and type of shoe
  - (3) Top connection desired



### Recommended Spare Parts:

- (1) 2 Junk catchers
- (2) 2 Mill shoes
- (3) 1 Valve cup
- (4) 1 Valve seat
- (5) 1 Steel ball

### Recommended Accessories

- (1) 2 Finger shoes
- (2) 4 Finger shoe replacements
- (3) 1 Magnet insert

NOTE: Finger shoe replacement is furnished with the same O.D. as standard shoe unless otherwise specified. \* See catcher assembly tables for parts breakdown.

# Bowen Reverse Circulation Junk Basket

## Specifications and Replacement Parts

### Specifications

| Hole size                |          | 8 3/4 in. to 9 1/2 in. | 9 3/4 in. to 10 3/4 in. | 10 3/4 in. to 11 3/4 in. | 11 3/4 in. to 12 1/2 in. | 12 3/4 in. to 13 3/4 in. | 13 3/4 in. to 16 in. | 16 in. to 17 1/2 in. |
|--------------------------|----------|------------------------|-------------------------|--------------------------|--------------------------|--------------------------|----------------------|----------------------|
| O.D. Of barrel           |          | 7 7/8 in.              | 9 1/8 in.               | 10 1/8 in.               | 11 in.                   | 11 7/8 in.               | 13 in.               | 15 in.               |
| Maximum diameter of fish |          | 6 1/16 in.             | 7 1/16 in.              | 7 3/8 in.                | 8 3/16 in.               | 8 1/2 in.                | 9 13/16 in.          | 11 in.               |
| Top connection           |          | 5 1/2 in.              | 6 3/8 in.               | 6 3/8 in.                | 6 3/8 in.                | 6 3/8 in.                | 6 3/8 in.            | 6 3/8 in.            |
| Number of teeth on mill  |          | 8                      | 10                      | 10                       | 12                       | 12                       | 14                   | 16                   |
| Complete assembly        | Part no. | 2567                   | 2659                    | 2684                     | 2690                     | 2696                     | 2702                 | 2708                 |
|                          | Weight   | 374 lbs                | 441 lbs                 | 576 lbs                  | 665 lbs                  | 797 lbs                  | 932 lbs              | 1563 lbs             |

### Replacement Parts

|                        |          |               |               |               |               |               |               |               |
|------------------------|----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Top sub                | Part no. | 2568          | 2660          | 2685          | 2691          | 2697          | 2703          | 2709          |
|                        | Weight   | 154 lbs       | 179 lbs       | 203 lbs       | 226 lbs       | 257 lbs       | 286 lbs       | 530 lbs       |
| Barrel                 | Part no. | 2569          | 2661          | 2686          | 2692          | 2698          | 2704          | 2710          |
|                        | Weight   | 166 lbs       | 193 lbs       | 279 lbs       | 322 lbs       | 399 lbs       | 462 lbs       | 734 lbs       |
| Valve cap              | Part no. | 2570          | 2662          | 2662          | 2662          | 2662          | 2662          | 2662          |
|                        | Weight   | 7 lbs         | 9 lbs         | 9 lbs         | 9 lbs         | 9 lbs         | 9 lbs         | 9 lbs         |
| Steel ball             | Part no. | 2572          | 2665          | 2665          | 2665          | 2665          | 2665          | 2665          |
|                        | Diameter | 1 11/16 in.   | 2 1/4 in.     | 2 1/4 in.     | 2 1/4 in.     | 2 1/4 in.     | 2 1/4 in.     | 2 1/4 in.     |
|                        | Weight   | 3/4 lb        | 2 lb          | 2 lb          | 2 lb          | 2 lb          | 2 lb          | 2 lb          |
| Valve seat             | Part no. | 2571          | 2663          | 2663          | 2663          | 2663          | 2663          | 2663          |
|                        | Weight   | 1/4 lb        | 3/4 lb        | 3/4 lb        | 3/4 lb        | 3/4 lb        | 3/4 lb        | 3/4 lb        |
| Junk catcher assembly* | Part no. | 18725W        | 14633W        | 21755W        | 21760W        | 21840W        | 21770W        | 21775W        |
|                        | Weight   | 7 1/2 lbs     | 9 lbs         | 16 lbs        | 20 lbs        | 25 lbs        | 40 lbs        | 90 lbs        |
| Mill shoe type A       | Part no. | 2574          | 2668          | 2689          | 2695          | 2701          | 2707          | 2713          |
|                        | Weight   | 36 lbs        | 43 lbs        | 61 lbs        | 78 lbs        | 94 lbs        | 124 lbs       | 218 lbs       |
| Lifting sub            | Part no. | 426           | 427           | 427           | 427           | 427           | 427           | 427           |
|                        | Weight   | 55 lbs        | 79 lbs        | 79 lbs        | 79 lbs        | 81 lbs        | 83 lbs        | 83 lbs        |
| Pipe plug              | Part no. | 61523         | 61523         | 61523         | 61523         | 61523         | 61523         | 61523         |
|                        | Weight   | 1/2 lb        | 1/2 lb        | 1/2 lb        | 1/2 lb        | 1/2 lb        | 1/2 lb        | 1/2 lb        |
|                        | Thread   | 3 1/2 in. NPT | 3 1/2 in. NPT | 3 1/2 in. NPT | 3 1/2 in. NPT | 3 1/2 in. NPT | 3 1/2 in. NPT | 3 1/2 in. NPT |

### Mill Shoes

|                  |          |        |        |        |        |         |         |         |
|------------------|----------|--------|--------|--------|--------|---------|---------|---------|
| Mill shoe type B | Part no. | 2574   | 2668   | 2689   | 2695   | 2701    | 2707    | 2713    |
|                  | Weight   | 36 lbs | 43 lbs | 61 lbs | 78 lbs | 94 lbs  | 124 lbs | 218 lbs |
| Mill shoe type C | Part no. | 2574   | 2668   | 2689   | 2695   | 2701    | 2707    | 2713    |
|                  | Weight   | 39 lbs | 48 lbs | 68 lbs | 83 lbs | 102 lbs | 131 lbs | 225 lbs |

### Finger Shoes

|                          |          |             |         |             |         |            |         |            |
|--------------------------|----------|-------------|---------|-------------|---------|------------|---------|------------|
| Maximum diameter of fish |          | 7 23/32 in. | 9 in.   | 9 15/16 in. | 11 in.  | 11 7/8 in. | 13 in.  | 15 1/4 in. |
| Complete assembly        | Part no. | 2741        | 2742    | 2743        | 2744    | 2745       | 2746    | 2747       |
|                          | Weight   | 81 lbs      | 102 lbs | 135 lbs     | 154 lbs | 213 lbs    | 276 lbs | 351 lbs    |
| Body                     | Part no. | 2741-2      | 2742-2  | 2743-2      | 2744-2  | 2745-2     | 2746-2  | 2747-2     |
|                          | Weight   | 37 lbs      | 50 lbs  | 64 lbs      | 83 lbs  | 124 lbs    | 154 lbs | 191 lbs    |
| Replacement              | Part no. | 2741-1      | 2742-1  | 2743-1      | 2744-1  | 2745-1     | 2746-1  | 2747-1     |
|                          | Weight   | 44 lbs      | 52 lbs  | 64 lbs      | 71 lbs  | 89 lbs     | 122 lbs | 160 lbs    |

### Magnet Insert

|                                       |          |            |            |            |             |             |              |              |
|---------------------------------------|----------|------------|------------|------------|-------------|-------------|--------------|--------------|
| To fit assembly no.                   |          | 2567       | 2659       | 2684       | 2690        | 2696        | 2702         | 2708         |
| Total pull in lbs                     |          | 310 to 360 | 620 to 720 | 620 to 720 | 930 to 1080 | 930 to 1080 | 1265 to 1440 | 1740 to 2050 |
| Magnet insert assembly consisting of: | Part no. | 61953      | 61961      | 61963      | 61973       | 61975       | 61981        | 61985        |
|                                       | Weight   | 97 lbs     | 174 lbs    | 186 lbs    | 266 lbs     | 281 lbs     | 348 lbs      | 485 lbs      |
| Magnetic assembly                     | Part no. | 61822      | 61826      | 61826      | 61828       | 61828       | 61830        | 61832        |
|                                       | Weight   | 18 lbs     | 24 lbs     | 36 lbs     | 45 lbs      | 60 lbs      | 82 lbs       | 131 lbs      |
| Adapter                               | Part no. | 61954      | 61966      | 61968      | 61974       | 61976       | 61982        | 61986        |
|                                       | Weight   | 79 lbs     | 150 lbs    | 150 lbs    | 221 lbs     | 221 lbs     | 266 lbs      | 354 lbs      |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) OD and type of shoe
  - (3) Top connection desired



### Recommended Spare Parts:

- (1) 2 Junk catchers
- (2) 2 Mill shoes
- (3) 1 Valve cup
- (4) 1 Valve seat
- (5) 1 Steel ball

### Recommended Accessories

- (1) 2 Finger shoes
- (2) 4 Finger shoe replacements
- (3) 1 Magnet insert

NOTE: Finger shoe replacement is furnished with the same O.D. as standard shoe unless otherwise specified. \* See catcher assembly tables for parts breakdown.

# Bowen Reverse Circulation Junk Basket

## Specifications and Replacement Parts (W7R Type)

### Specifications

| Hole size                |          | 3 ¼ in. to 4 ½ in. | 4 ¼ in. to 4 ½ in. | 4 ¾ in. to 5 in. | 5 ½ in. to 5 ½ in. | 5 ¾ in. to 6 in. | 6 ½ in. to 7 in. | 7 ½ in. to 7 ½ in. |
|--------------------------|----------|--------------------|--------------------|------------------|--------------------|------------------|------------------|--------------------|
| O.D. Of barrel           |          | 3 ¾ in.            | 4 ¼ in.            | 4 ½ in.          | 4 ¾ in.            | 5 ¾ in.          | 5 ¾ in.          | 6 ¾ in.            |
| Maximum diameter of fish |          | 2 ¾ in.            | 3 in.              | 3 ¾ in.          | 3 ¾ in.            | 4 ½ in.          | 4 ¾ in.          | 5 ¼ in.            |
| Top connection           |          | 2 ¾ in.            | 2 ¾ in.            | 2 ¾ in.          | 2 ¾ in.            | 2 ¾ in.          | 3 ½ in.          | 3 ½ in.            |
| Number of teeth on mill  |          | 6                  | 6                  | 8                | 8                  | 8                | 8                | 8                  |
| Complete assembly        | Part no. | 7724               | 7727               | 7731             | 7734               | 7737             | 7743             | 7747               |
|                          | Weight   | 78 lbs             | 85 lbs             | 95 lbs           | 108 lbs            | 141 lbs          | 173 lbs          | 223 lbs            |

### Replacement Parts

|                        |          |             |             |             |             |             |           |           |
|------------------------|----------|-------------|-------------|-------------|-------------|-------------|-----------|-----------|
| Top sub                | Part no. | 6636        | 7728        | 4449        | 4573        | 7738        | 7744      | 7748      |
|                        | Weight   | 24 lbs      | 30 lbs      | 35 lbs      | 42 lbs      | 63 lbs      | 77 lbs    | 104 lbs   |
| Barrel                 | Part no. | 7725        | 7729        | 7732        | 7735        | 7739        | 7745      | 7749      |
|                        | Weight   | 41 lbs      | 43 lbs      | 46 lbs      | 50 lbs      | 61 lbs      | 73 lbs    | 90 lbs    |
| Valve cap              | Part no. | 6638        | 6638        | 6638        | 4451        | 4451        | 2621      | 2621      |
|                        | Weight   | 3 lbs       | 3 lbs       | 3 lbs       | 4 lbs       | 4 lbs       | 5 lbs     | 5 lbs     |
| Steel ball             | Part no. | 6640        | 6640        | 6640        | 4453        | 4453        | 2623      | 2623      |
|                        | Diameter | ¾ in.       | ¾ in.       | ¾ in.       | ¾ in.       | ¾ in.       | ½ in.     | ½ in.     |
|                        | Weight   | 1 ½ lb      | 1 ½ lb      | 1 ½ lb      | 1 ½ lb      | 1 ½ lb      | 1 ½ lb    | 1 ¾ lb    |
| Valve seat             | Part no. | 6639        | 6639        | 6639        | 4452        | 4452        | 2622      | 2622      |
|                        | Weight   | ½ lb        | ½ lb        | ½ lb        | ½ lb        | ½ lb        | ½ lb      | ½ lb      |
| Junk catcher assembly* | Part no. | 21810W      | 21815W      | 21805W      | 18940W      | 21820W      | 21830W    | 18935W    |
|                        | Weight   | 1 ½ lbs     | 1 ½ lbs     | 2 lbs       | 3 lbs       | 3 lbs       | 3 ½ lbs   | 6 lbs     |
| Mill shoe type A       | Part no. | 6982        | 6987        | 6960        | 6992        | 6997        | 7004      | 7009      |
|                        | Weight   | 7 lbs       | 7 ½ lbs     | 8 ½ lbs     | 9 ½ lbs     | 11 lbs      | 14 lbs    | 19 lbs    |
| Lifting sub            | Part no. | 4568        | 4568        | 4568        | 424         | 424         | 425       | 425       |
|                        | Weight   | 8 lbs       | 8 lbs       | 8 lbs       | 12 lbs      | 13 lbs      | 18 lbs    | 19 lbs    |
| Pipe plug              | Part no. | 61520       | 61520       | 61520       | 61520       | 61520       | 61521     | 61521     |
|                        | Weight   | ½ lb        | ½ lb        | ½ lb        | ½ lb        | ½ lb        | ½ lb      | ½ lb      |
|                        | Thread   | 1 ½ in. NPT | 1 ½ in. NPT | 1 ½ in. NPT | 1 ½ in. NPT | 1 ½ in. NPT | 2 in. NPT | 2 in. NPT |

### Mill Shoes

|                  |          |       |         |         |          |        |        |        |
|------------------|----------|-------|---------|---------|----------|--------|--------|--------|
| Mill shoe type B | Part no. | 6982  | 6987    | 6960    | 6992     | 6997   | 7004   | 7009   |
|                  | Weight   | 7 lbs | 7 ½ lbs | 8 ½ lbs | 9 ½ lbs  | 11 lbs | 14 lbs | 19 lbs |
| Mill shoe type C | Part no. | 6982  | 6987    | 6960    | 6992     | 6997   | 7004   | 7009   |
|                  | Weight   | 8 lbs | 8 ½ lbs | 10 lbs  | 10 ½ lbs | 13 lbs | 16 lbs | 21 lbs |

### Finger Shoes

|                          |          |         |           |           |         |        |           |         |
|--------------------------|----------|---------|-----------|-----------|---------|--------|-----------|---------|
| Maximum diameter of fish |          | 3 ¼ in. | 3 1 ¾ in. | 4 1 ¾ in. | 4 ½ in. | 5 in.  | 5 1 ¾ in. | 6 ½ in. |
| Complete assembly        | Part no. | 7726    | 7730      | 7733      | 7736    | 7740   | 7746      | 7750    |
|                          | Weight   | 15 lbs  | 19 lbs    | 24 lbs    | 27 lbs  | 33 lbs | 41 lbs    | 52 lbs  |
| Body                     | Part no. | 7726-2  | 7730-2    | 7733-2    | 7736-2  | 7740-2 | 7746-2    | 7750-2  |
|                          | Weight   | 9 lbs   | 11 lbs    | 14 lbs    | 15 lbs  | 17 lbs | 19 lbs    | 23 lbs  |
| Replacement              | Part no. | 7726-1  | 7730-1    | 7733-1    | 7736-1  | 7740-1 | 7746-1    | 7750-1  |
|                          | Weight   | 6 lbs   | 8 lbs     | 10 lbs    | 12 lbs  | 16 lbs | 22 lbs    | 29 lbs  |

### Magnet Insert

|                                       |          |          |          |           |           |            |            |            |
|---------------------------------------|----------|----------|----------|-----------|-----------|------------|------------|------------|
| To fit assembly no.                   |          | 7224     | 7727     | 7731      | 7734      | 7737       | 7743       | 7747       |
| Total pull in lbs                     |          | 45 to 55 | 45 to 55 | 80 to 100 | 80 to 100 | 125 to 145 | 180 to 205 | 250 to 290 |
| Magnet insert assembly consisting of: | Part no. | 61842    | 61838    | 61860     | 61856     | 61864      | 61870      | 61876      |
|                                       | Weight   | 16 lbs   | 16 ½ lbs | 29 lbs    | 32 lbs    | 45 lbs     | 55 lbs     | 73 lbs     |
| Magnetic assembly                     | Part no. | 61812    | 61812    | 61814     | 61814     | 61812      | 61818      | 61820      |
|                                       | Weight   | 2 lbs    | 2 ½ lbs  | 3 lbs     | 4 lbs     | 5 lbs      | 8 lbs      | 10 lbs     |
| Adapter                               | Part no. | 61843    | 61839    | 61861     | 61857     | 61865      | 61871      | 61948      |
|                                       | Weight   | 14 lbs   | 14 lbs   | 26 lbs    | 28 lbs    | 40 lbs     | 47 lbs     | 63 lbs     |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) OD and type of shoe
  - (3) Top connection desired



### Recommended Spare Parts:

- (1) 2 Junk catchers
- (2) 2 Mill shoes
- (3) 1 Valve cup
- (4) 1 Valve seat
- (5) 1 Steel ball

### Recommended Accessories

- (1) 2 Finger shoes
- (2) 4 Finger shoe replacements
- (3) 1 Magnet insert

NOTE: Finger shoe replacement is furnished with the same O.D. as standard shoe unless otherwise specified. \* See catcher assembly tables for parts breakdown.

# Bowen Reverse Circulation Junk Basket

## Specifications and Replacement Parts (W7R Type) Continued

### Specifications

| Hole size                | 7 3/16 in. to 8 1/2 in. | 8 3/8 in. to 9 1/2 in. | 9 in. to 10 3/8 in. | 10 1/2 in. to 11 3/8 in. | 11 3/4 in. to 13 3/8 in. | 13 1/2 in. to 15 in. |         |
|--------------------------|-------------------------|------------------------|---------------------|--------------------------|--------------------------|----------------------|---------|
| O.D. Of barrel           | 7 3/16 in.              | 8 3/8 in.              | 9 1/8 in.           | 9 3/8 in.                | 11 in.                   | 12 3/4 in.           |         |
| Maximum diameter of fish | 5 3/8 in.               | 6 1/2 in.              | 7 1/8 in.           | 7 3/4 in.                | 8 3/8 in.                | 9 13/16 in.          |         |
| Top connection           | 4 1/2 in.               | 4 1/2 in.              | 5 1/2 in.           | 5 1/2 in.                | 6 3/8 in.                | 6 3/8 in.            |         |
| Number of teeth on mill  | 8                       | 10                     | 10                  | 10                       | 12                       | 14                   |         |
| Complete assembly        | Part no.                | 7751                   | 7754                | 7757                     | 7760                     | 7764                 | 7767    |
|                          | Weight                  | 280 lbs                | 380 lbs             | 407 lbs                  | 484 lbs                  | 597 lbs              | 794 lbs |

### Replacement Parts

|                        |          |             |             |               |               |               |               |
|------------------------|----------|-------------|-------------|---------------|---------------|---------------|---------------|
| Top sub                | Part no. | 7752        | 7755        | 2660          | 7761          | 2691          | 7768          |
|                        | Weight   | 126 lbs     | 158 lbs     | 179 lbs       | 197 lbs       | 226 lbs       | 278 lbs       |
| Barrel                 | Part no. | 7753        | 7756        | 7758          | 7762          | 7765          | 7769          |
|                        | Weight   | 115 lbs     | 145 lbs     | 164 lbs       | 210 lbs       | 277 lbs       | 390 lbs       |
| Valve cap              | Part no. | 2570        | 2570        | 2662          | 2662          | 2662          | 2662          |
|                        | Weight   | 7 lbs       | 7 lbs       | 9 lbs         | 9 lbs         | 9 lbs         | 9 lbs         |
| Steel ball             | Part no. | 2572        | 2572        | 2665          | 2665          | 2665          | 2665          |
|                        | Diameter | 1 11/16 in. | 1 11/16 in. | 2 1/4 in.     | 2 1/4 in.     | 2 1/4 in.     | 2 1/4 in.     |
|                        | Weight   | 3/4 lb      | 3/4 lb      | 2 lb          | 2 lb          | 2 lb          | 2 lb          |
| Valve seat             | Part no. | 2571        | 2571        | 2663          | 2663          | 2663          | 2663          |
|                        | Weight   | 1/4 lb      | 1/4 lb      | 3/4 lb        | 3/4 lb        | 3/4 lb        | 3/4 lb        |
| Junk catcher assembly* | Part no. | 18936W      | 18720W      | 21835W        | 18945W        | 21840W        | 21850W        |
|                        | Weight   | 7 1/2 lbs   | 8 lbs       | 9 lbs         | 16 lbs        | 21 lbs        | 40 lbs        |
| Mill shoe type A       | Part no. | 7014        | 7019        | 7023          | 7028          | 7033          | 7038          |
|                        | Weight   | 25 lbs      | 32 lbs      | 41 lbs        | 51 lbs        | 63 lbs        | 86 lbs        |
| Lifting sub            | Part no. | 1849        | 1849        | 426           | 426           | 427           | 427           |
|                        | Weight   | 45 lbs      | 46 lbs      | 59 lbs        | 59 lbs        | 79 lbs        | 83 lbs        |
| Pipe plug              | Part no. | 61522       | 61522       | 61523         | 61523         | 61523         | 61523         |
|                        | Weight   | 1/2 lb      | 1/2 lb      | 1/2 lb        | 1/2 lb        | 1/2 lb        | 1/2 lb        |
|                        | Thread   | 2 in. NPT   | 2 in. NPT   | 3 1/2 in. NPT | 3 1/2 in. NPT | 3 1/2 in. NPT | 3 1/2 in. NPT |

### Mill Shoes

|                  |          |        |        |        |        |        |        |
|------------------|----------|--------|--------|--------|--------|--------|--------|
| Mill shoe type B | Part no. | 7014   | 7019   | 7023   | 7028   | 7033   | 7038   |
|                  | Weight   | 25 lbs | 32 lbs | 41 lbs | 51 lbs | 63 lbs | 86 lbs |
| Mill shoe type C | Part no. | 7014   | 7019   | 7023   | 7028   | 7033   | 7038   |
|                  | Weight   | 28 lbs | 37 lbs | 47 lbs | 59 lbs | 71 lbs | 93 lbs |

### Finger Shoes

|                          |          |           |           |         |           |         |            |
|--------------------------|----------|-----------|-----------|---------|-----------|---------|------------|
| Maximum diameter of fish |          | 7 1/4 in. | 8 1/8 in. | 9 in.   | 9 3/4 in. | 11 in.  | 12 1/2 in. |
| Complete assembly        | Part no. | 7342      | 7343      | 7759    | 7763      | 7766    | 7770       |
|                          | Weight   | 70 lbs    | 86 lbs    | 102 lbs | 130 lbs   | 154 lbs | 276 lbs    |
| Body                     | Part no. | 7342-2    | 7343-2    | 7759-2  | 7763-2    | 7766-2  | 7770-2     |
|                          | Weight   | 33 lbs    | 41 lbs    | 50 lbs  | 61 lbs    | 83 lbs  | 154 lbs    |
| Replacement              | Part no. | 7342-1    | 7343-1    | 7759-1  | 7763-1    | 7766-1  | 7770-1     |
|                          | Weight   | 37 lbs    | 45 lbs    | 52 lbs  | 69 lbs    | 71 lbs  | 122 lbs    |

### Magnet Insert

|                                       |          |            |            |            |            |             |              |
|---------------------------------------|----------|------------|------------|------------|------------|-------------|--------------|
| To fit assembly no.                   |          | 7751       | 7754       | 7757       | 7760       | 7764        | 7767         |
| Total pull in lbs                     |          | 310 to 360 | 425 to 495 | 620 to 720 | 620 to 720 | 930 to 1080 | 1265 to 1440 |
| Magnet insert assembly consisting of: | Part no. | 61951      | 61957      | 61961      | 61963      | 61971       | 61981        |
|                                       | Weight   | 93 lbs     | 113 lbs    | 172 lbs    | 178 lbs    | 259 lbs     | 322 lbs      |
| Magnetic assembly                     | Part no. | 61822      | 61824      | 61826      | 61826      | 61828       | 61830        |
|                                       | Weight   | 14 lbs     | 17 lbs     | 24 lbs     | 28 lbs     | 38 lbs      | 56 lbs       |
| Adapter                               | Part no. | 61952      | 61958      | 61966      | 61968      | 61972       | 61982        |
|                                       | Weight   | 79 lbs     | 96 lbs     | 150 lbs    | 150 lbs    | 221 lbs     | 266 lbs      |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) OD and type of shoe
  - (3) Top connection desired



### Recommended Spare Parts:

- (1) 2 Junk catchers
- (2) 2 Mill shoes
- (3) 1 Valve cup
- (4) 1 Valve seat
- (5) 1 Steel ball

### Recommended Accessories

- (1) 2 Finger shoes
- (2) 4 Finger shoe replacements
- (3) 1 Magnet insert

NOTE: Finger shoe replacement is furnished with the same O.D. as standard shoe unless otherwise specified. \* See catcher assembly tables for parts breakdown.

# Bowen Reverse Circulation Junk Basket

## Replacement Parts - Bowen Junk Basket Catchers

### Bowen Junk Basket Catchers

| Number of junk basket it will fit | 6635     | 7295    | 4448    | 4572   | 2618   | 2670   | 2677    |         |
|-----------------------------------|----------|---------|---------|--------|--------|--------|---------|---------|
| Complete assembly                 | Part no. | 21795W  | 21855W  | 21780W | 18940W | 21735W | 28349W  | 21750W  |
|                                   | Weight   | 1 ¼ lbs | 1 ½ lbs | 2 lbs  | 3 lbs  | 3 lbs  | 4 ½ lbs | 4 ½ lbs |

### Replacement Parts

|                 |            |       |       |       |       |       |       |         |
|-----------------|------------|-------|-------|-------|-------|-------|-------|---------|
| Body            | Part no.   | 56357 | 68366 | 45591 | 45579 | 45559 | 45511 | 45584   |
|                 | Weight     | ¼ lb  | ¼ lb  | ½ lb  | ¾ lb  | ¾ lb  | 1 lb  | 1 ¼ lbs |
| Finger retainer | Part no.   | 56358 | 68367 | 45592 | 45580 | 45560 | 45519 | 45585   |
|                 | Weight     | ⅙ lb  | ⅙ lb  | ⅙ lb  | ⅙ lb  | ¼ lb  | ¼ lb  | ¼ lb    |
| Short finger    | Part no.   | 68368 | 68368 | 45574 | 45581 | 45558 | 45517 | 45517   |
|                 | Weight     | ⅙ lb  | ⅙ lb  | ⅙ lb  | ⅙ lb  | ⅙ lb  | ⅙ lb  | ⅙ lb    |
|                 | No. Req'd. | 4     | 4     | 5     | 6     | 5     | 8     | 8       |
| Medium finger   | Part no.   | -     | -     | -     | -     | -     | -     | -       |
|                 | Weight     | -     | -     | -     | -     | -     | -     | -       |
|                 | No. Req'd. | -     | -     | -     | -     | -     | -     | -       |
| Long finger     | Part no.   | 68389 | 68389 | 45575 | 45582 | 45561 | 45516 | 45516   |
|                 | Weight     | ⅙ lb  | ⅙ lb  | ⅙ lb  | ⅙ lb  | ⅙ lb  | ¼ lb  | ¼ lb    |
|                 | No. Req'd. | 4     | 4     | 5     | 6     | 5     | 4     | 6       |
| Pivot pin       | Part no.   | 45583 | 45583 | 45583 | 45583 | -     | -     | -       |
|                 | Weight     | ½ lb  | ½ lb  | ½ lb  | ½ lb  | -     | -     | -       |
|                 | No. Req'd. | 8     | 8     | 10    | 12    | -     | -     | -       |
| Torsion spring  | Part no.   | 45571 | 45571 | 45571 | 45571 | 45520 | 45520 | 45520   |
|                 | Weight     | ½ lb  | ½ lb  | ½ lb  | ½ lb  | ⅙ lb  | ⅙ lb  | ⅙ lb    |
|                 | No. Req'd. | 8     | 8     | 10    | 12    | 10    | 12    | 12      |
| Retainer screw  | Part no.   | 42257 | 42257 | 42257 | 42257 | 42257 | 42257 | 42257   |
|                 | Weight     | ½ lb  | ½ lb  | ½ lb  | ½ lb  | ½ lb  | ½ lb  | ½ lb    |
|                 | No. Req'd. | 2     | 2     | 2     | 2     | 2     | 2     | 2       |

### Bowen Junk Basket Catchers

| Number of junk basket it will fit | 2554     | 2567   | 2659   | 2684   | 2690   | 2696   | 2702   |        |
|-----------------------------------|----------|--------|--------|--------|--------|--------|--------|--------|
| Complete assembly                 | Part no. | 21725W | 18725W | 14633W | 21755W | 21760W | 21840W | 21770W |
|                                   | Weight   | 7 lbs  | 7 lbs  | 9 lbs  | 16 lbs | 20 lbs | 25 lbs | 40 lbs |

### Replacement Parts

|                 |            |         |         |       |         |       |        |          |
|-----------------|------------|---------|---------|-------|---------|-------|--------|----------|
| Body            | Part no.   | 45550   | 45505   | 45521 | 68116   | 45576 | 45593  | 64810    |
|                 | Weight     | 2 ½ lbs | 2 ½ lbs | 3 lbs | 6 ½ lbs | 7 lbs | 9 lbs  | 12 ½ lbs |
| Finger retainer | Part no.   | 45551   | 45506   | 45530 | 68117   | 45578 | 45594  | 64811    |
|                 | Weight     | ½ lb    | ½ lb    | ¾ lb  | 1½ lb   | 1½ lb | 2 lb   | 2 ½ lb   |
| Short finger    | Part no.   | 45557   | 45508   | 45588 | 45507   | 45525 | 45507  | 666      |
|                 | Weight     | ¼ lb    | ¼ lb    | ¾ lb  | ¾ lb    | ½ lb  | ¾ lb   | 1 ¼ lb   |
|                 | No. Req'd. | 6       | 6       | 6     | 6       | 8     | 8      | 8        |
| Medium finger   | Part no.   | -       | -       | -     | -       | 45510 | 45510  | -        |
|                 | Weight     | -       | -       | -     | -       | ¾ lb  | ¾ lb   | -        |
|                 | No. Req'd. | -       | -       | -     | -       | 4     | 4      | -        |
| Long finger     | Part no.   | 45518   | 45507   | 45589 | 70277   | 45526 | 45526  | 667      |
|                 | Weight     | ¼ lb    | ¾ lb    | ½ lb  | ¾ lb    | ¾ lb  | 1 ¼ lb | 1 ½ lb   |
|                 | No. Req'd. | 6       | 6       | 6     | 6       | 4     | 4      | 8        |
| Pivot pin       | Part no.   | -       | -       | -     | -       | -     | -      | 45603    |
|                 | Weight     | -       | -       | -     | -       | -     | -      | ⅙ lb     |
|                 | No. Req'd. | -       | -       | -     | -       | -     | -      | 16       |
| Torsion spring  | Part no.   | 45520   | 45509   | 45549 | 45509   | 45509 | 45509  | 45604    |
|                 | Weight     | ⅙ lb    | ⅙ lb    | ⅙ lb  | ⅙ lb    | ⅙ lb  | ⅙ lb   | ⅙ lb     |
|                 | No. Req'd. | 12      | 12      | 12    | 12      | 16    | 16     | 16       |
| Retainer screw  | Part no.   | 42257   | 42257   | 42257 | 42257   | 42257 | 42257  | 42257    |
|                 | Weight     | ½ lb    | ½ lb    | ½ lb  | ½ lb    | ½ lb  | ½ lb   | ½ lb     |
|                 | No. Req'd. | 2       | 2       | 2     | 2       | 2     | 2      | 2        |

# Bowen Reverse Circulation Junk Basket

## Replacement Parts - Bowen Junk Basket Catchers (Continued)

### Bowen Junk Basket Catchers

| Number of junk basket it will fit |          | 2708   | 7724    | 7727    | 7731   | 7734   | 7737   | 7743    |
|-----------------------------------|----------|--------|---------|---------|--------|--------|--------|---------|
| Complete assembly                 | Part no. | 21775W | 21810W  | 21815W  | 21805W | 18940W | 21820W | 21830W  |
|                                   | Weight   | 90 lbs | 1 ½ lbs | 1 ½ lbs | 2 lbs  | 3 lbs  | 3 lbs  | 3 ½ lbs |

### Replacement Parts

| Body            | Part no.   | 45605   | 45542   | 68370   | 45565   | 45579   | 45595   | 68377   |
|-----------------|------------|---------|---------|---------|---------|---------|---------|---------|
|                 | Weight     | 20 lbs  | ¼ lb    | ¼ lb    | 7/16 lb | 3/16 lb | ½ lb    | 3/16 lb |
| Finger retainer | Part no.   | 45606   | 45538   | 68371   | 45566   | 45580   | 45596   | 68378   |
|                 | Weight     | 3 ¼ lbs | 1/16 lb | 1/16 lb | 1/16 lb | 3/16 lb | 1/8 lb  | 3/16 lb |
| Short finger    | Part no.   | 45607   | 45539   | 22132   | 45574   | 45581   | 45597   | 45597   |
|                 | Weight     | 3 lbs   | 1/16 lb | 1/16 lb | 1/16 lb | 1/8 lb  | 1/8 lb  | 1/8 lb  |
|                 | No. Req'd. | 8       | 5       | 5       | 6       | 6       | 6       | 6       |
| Medium finger   | Part no.   | -       | -       | -       | -       | -       | -       | -       |
|                 | Weight     | -       | -       | -       | -       | -       | -       | -       |
|                 | No. Req'd. | -       | -       | -       | -       | -       | -       | -       |
| Long finger     | Part no.   | 45608   | 45540   | 22131   | 45575   | 45582   | 45598   | 45598   |
|                 | Weight     | 5 lbs   | 1/16 lb | 1/16 lb | 1/16 lb | 3/16 lb | 3/16 lb | 3/16 lb |
|                 | No. Req'd. | 8       | 5       | 5       | 6       | 6       | 6       | 6       |
| Pivot pin       | Part no.   | 45609   | 45535   | 45583   | 45583   | 45583   | 45599   | 45599   |
|                 | Weight     | 1/16 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb |
|                 | No. Req'd. | 3       | 10      | 10      | 12      | 3       | 12      | 12      |
| Torsion spring  | Part no.   | 45610   | 45567   | 45567   | 45571   | 45571   | 45571   | 45571   |
|                 | Weight     | 1/8 lb  | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb |
|                 | No. Req'd. | 16      | 10      | 10      | 12      | 12      | 12      | 12      |
| Retainer screw  | Part no.   | 42257   | 42257   | 42257   | 42257   | 42257   | 42257   | 42257   |
|                 | Weight     | 1/16 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb | 1/32 lb |
|                 | No. Req'd. | 1       | 2       | 2       | 2       | 1       | 2       | 2       |

### Bowen Junk Basket Catchers

| Number of junk basket it will fit |          | 7747   | 7751    | 7754   | 7757   | 7760   | 7764   | 7767   |
|-----------------------------------|----------|--------|---------|--------|--------|--------|--------|--------|
| Complete assembly                 | Part no. | 18935W | 18936W  | 18720W | 21835W | 18945W | 21840W | 21850W |
|                                   | Weight   | 6 lbs  | 7 ½ lbs | 8 lbs  | 9 lbs  | 16 lbs | 21 lbs | 40 lbs |

### Replacement Parts

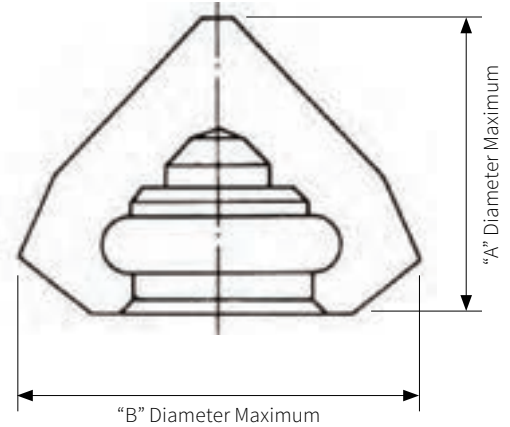
| Body            | Part no.   | 45513   | 45514   | 45515      | 70700      | 45522     | 45583   | 70703    |
|-----------------|------------|---------|---------|------------|------------|-----------|---------|----------|
|                 | Weight     | 1 ¼ lbs | 1 ½ lbs | 1 7/16 lbs | 1 3/16 lbs | 3 ½       | 4 lbs   | 12 ½ lbs |
| Finger retainer | Part no.   | 45527   | 45528   | 45529      | 70701      | 45531     | 45594   | 64811    |
|                 | Weight     | 3/8 lb  | 3/8 lb  | 1/2 lb     | 3/8 lb     | 1 3/16 lb | 1 ½     | 2 ½ lb   |
| Short finger    | Part no.   | 45517   | 45517   | 45508      | 45588      | 45507     | 45507   | 666      |
|                 | Weight     | 1/4 lb  | 3/8 lb  | 3/8 lb     | 1/2 lb     | 3/4 lb    | 3/4 lb  | 1 ¼ lb   |
|                 | No. Req'd. | 6       | 6       | 6          | 6          | 6         | 8       | 8        |
| Medium finger   | Part no.   | 45516   | -       | -          | -          | -         | -       | -        |
|                 | Weight     | 3/16 lb | -       | -          | -          | -         | -       | -        |
|                 | No. Req'd. | 3       | -       | -          | -          | -         | -       | -        |
| Long finger     | Part no.   | 45518   | 45518   | 45507      | 45589      | 70277     | 45526   | 667      |
|                 | Weight     | 3/8 lb  | 1/2 lb  | 1/2 lb     | 3/8 lb     | 1 lb      | 1 lb    | 1 ½ lb   |
|                 | No. Req'd. | 3       | 6       | 6          | 6          | 6         | 8       | 8        |
| Pivot pin       | Part no.   | -       | -       | -          | -          | -         | -       | 45603    |
|                 | Weight     | -       | -       | -          | -          | -         | -       | 1/16 lb  |
|                 | No. Req'd. | -       | -       | -          | -          | -         | -       | 16       |
| Torsion spring  | Part no.   | 45520   | 45520   | 45509      | 45549      | 45509     | 45529   | 45604    |
|                 | Weight     | 1/16 lb | 1/16 lb | 1/16 lb    | 1/16 lb    | 1/16 lb   | 1/16 lb | 1/8 lb   |
|                 | No. Req'd. | 12      | 12      | 12         | 12         | 12        | 16      | 16       |
| Retainer screw  | Part no.   | 42257   | 42257   | 42257      | 42257      | 42257     | 42257   | 42257    |
|                 | Weight     | 1/32 lb | 1/32 lb | 1/32 lb    | 1/32 lb    | 1/32 lb   | 1/32 lb | 1/32 lb  |
|                 | No. Req'd. | 2       | 2       | 2          | 2          | 2         | 1       | 2        |



# Bowen Reverse Circulation Junk Basket

## Rock Bit Cone Dimensions

| 2 Cone bits |             | Size                     | 3 Cone bits  |              |
|-------------|-------------|--------------------------|--------------|--------------|
| A           | B           |                          | A            | B            |
|             |             | 3 3/4 in. to 4 1/2 in.   | 1 3/32 in.   | 2 45/64 in.  |
|             |             | 4 1/4 in. to 4 1/2 in.   | 2 13/64 in.  | 2 59/64 in.  |
|             |             | 4 5/8 in. to 5 in.       | 2 11/32 in.  | 3 13/64 in.  |
|             |             | 5 1/8 in. to 5 1/2 in.   | 2 41/64 in.  | 3 17/64 in.  |
|             |             | 5 5/8 in. to 6 in.       | 3 1/8 in.    | 4 1/64 in.   |
|             |             | 6 1/8 in. to 6 1/2 in.   | 3 5/64 in.   | 4 31/64 in.  |
|             |             | 6 5/8 in. to 7 in.       | 3 7/16 in.   | 4 9/16 in.   |
|             |             | 7 1/8 in. to 7 1/2 in.   | 3 49/64 in.  | 4 27/32 in.  |
| 3 45/64 in. | 5 17/32 in. | 7 3/8 in. to 8 in.       | 3 31/32 in.  | 5 17/64 in.  |
| 4 11/32 in. | 6 7/64 in.  | 8 1/8 in. to 8 1/2 in.   | 4 3/8 in.    | 5 29/32 in.  |
| 4 11/32 in. | 6 5/16 in.  | 8 5/8 in. to 9 in.       | 4 17/32 in.  | 6 1/2 in.    |
|             |             | 9 1/8 in. to 9 1/2 in.   | 4 9/16 in.   | 6 13/32 in.  |
| 4 7/8 in.   | 7 in.       | 9 5/8 in. to 9 7/8 in.   | 4 15/16 in.  | 6 41/64 in.  |
| 5 23/64 in. | 7 19/32 in. | 10 1/2 in. to 11 1/2 in. | 5 27/64 in.  | 7 5/32 in.   |
| 5 63/64 in. | 8 27/64 in. | 11 3/4 in. to 12 1/2 in. | 6 1/8 in.    | 7 61/64 in.  |
|             |             | 12 5/8 in. to 13 1/8 in. | 6 5/16 in.   | 8 31/64 in.  |
|             |             | 13 1/2 in. to 14 1/4 in. | 7 1/32 in.   | 8 13/16 in.  |
|             |             | 14 1/2 in. to 15 in.     | 7 29/64 in.  | 9 19/32 in.  |
|             |             | 16 in.                   | 9 27/32 in.  | 10 1/8 in.   |
|             |             | 17 in. to 17 1/2 in.     | 8 13/64 in.  | 11 11/64 in. |
|             |             | 18 1/2 in. to 18 7/8 in. | 8 29/32 in.  | 11 23/64 in. |
|             |             | 20 in.                   | 9 1/2 in.    | 11 7/8 in.   |
|             |             | 22 in.                   | 10 15/32 in. | 14 1/64 in.  |
|             |             | 24 in.                   | 10 15/16 in. | 14 9/16 in.  |
|             |             | 26 in.                   | 12 19/64 in. | 14 31/64 in. |



The cone sizes shown are the nominal Hughes Christensen Company cone dimensions and are the maximum for the size indicated in the middle column. They may be used as a guide in junk fishing operations.



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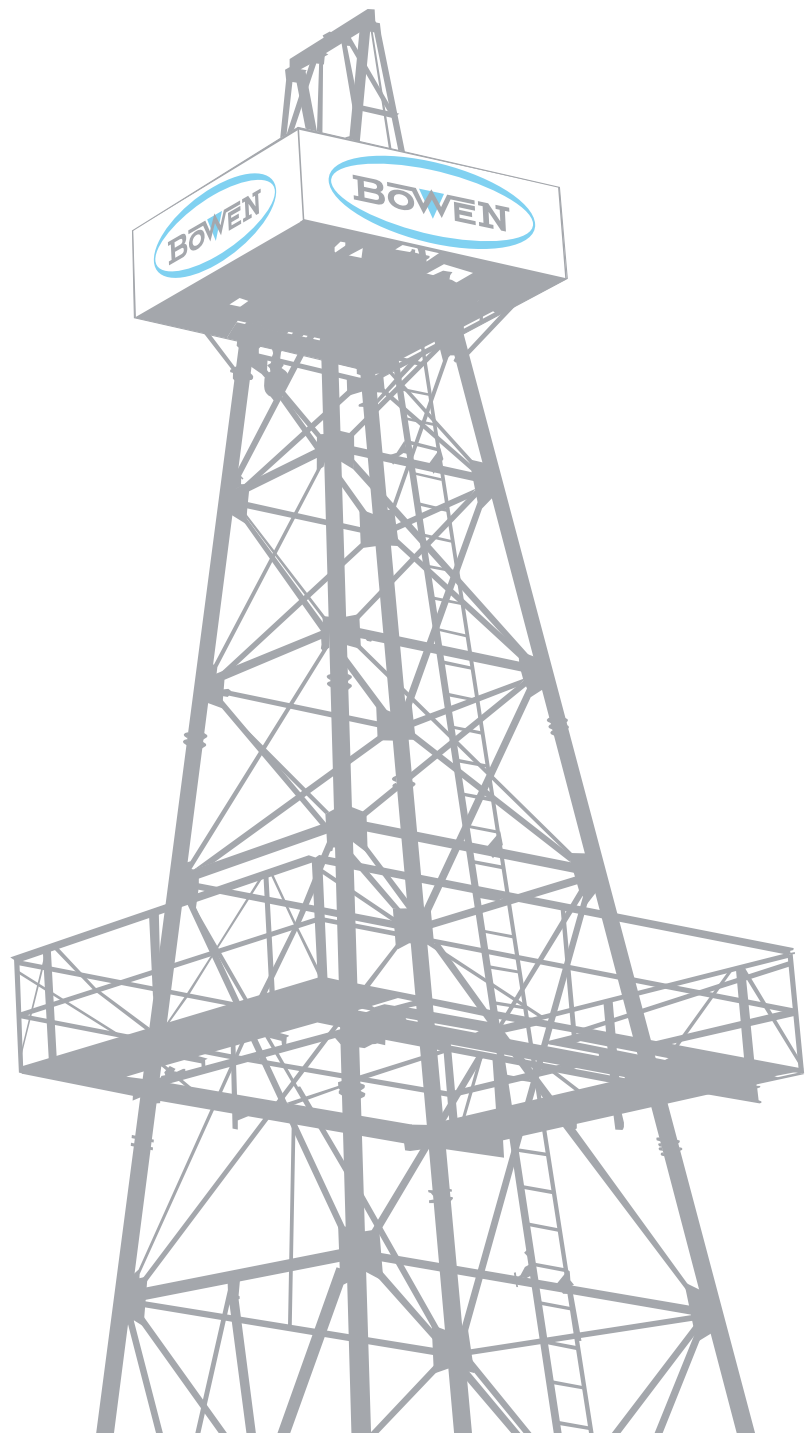
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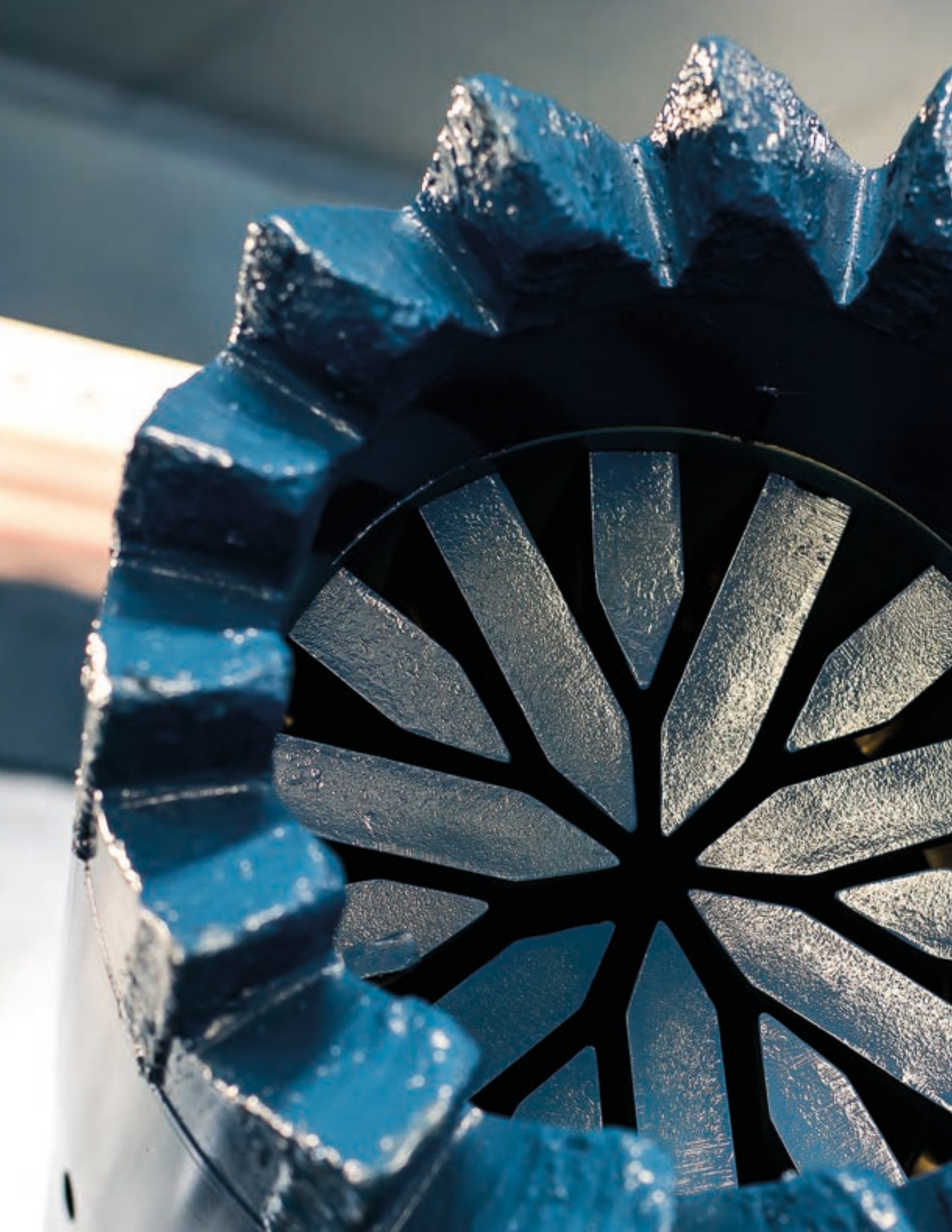
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# Bowen Full Flow Type Reverse Circulation Junk Basket

Instruction Manual 3105



**Bowen | NOV**



# Full Flow Type Reverse Circulation Junk Basket

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# Bowen Full Flow Type Reverse Circulation Junk Basket

## General Description

The Bowen™ full-flow reverse circulation junk basket retrieves small junk objects in well bores using a unique valve assembly that allows circulation through the center to keep out shale or debris while running in the hole. A drain through the tool eliminates the possibility of pulling a wet string. The tool's unique reverse circulation feature ensures complete recovery of junk and eliminates misruns. This tool may also be converted into an effective fishing magnet which still retains the reverse circulation feature.

## Use

Bowen full flow type reverse circulation junk baskets are used to retrieve all types of junk that accumulates at the bottom of a well. This junk may include objects such as rock bit cones and bearings, broken slips, bits of wireline, various hand tools, slivers and debris from twisted-off drill strings, milling cuttings, etc. In operation, the circulating fluid jets outwardly and downwardly against the full circumference of the hole, where it is deflected in a manner that directs all objects into the long hollow barrel of the basket.

## Construction

Bowen full flow type reverse circulation junk baskets consist basically of a barrel, a top sub, junk catcher(s), a shoe, a filter, a valve assembly and a pick up sub. The valve assembly consists of a ball, a ball seat, a ball seat retainer, four shear pins, and seals.

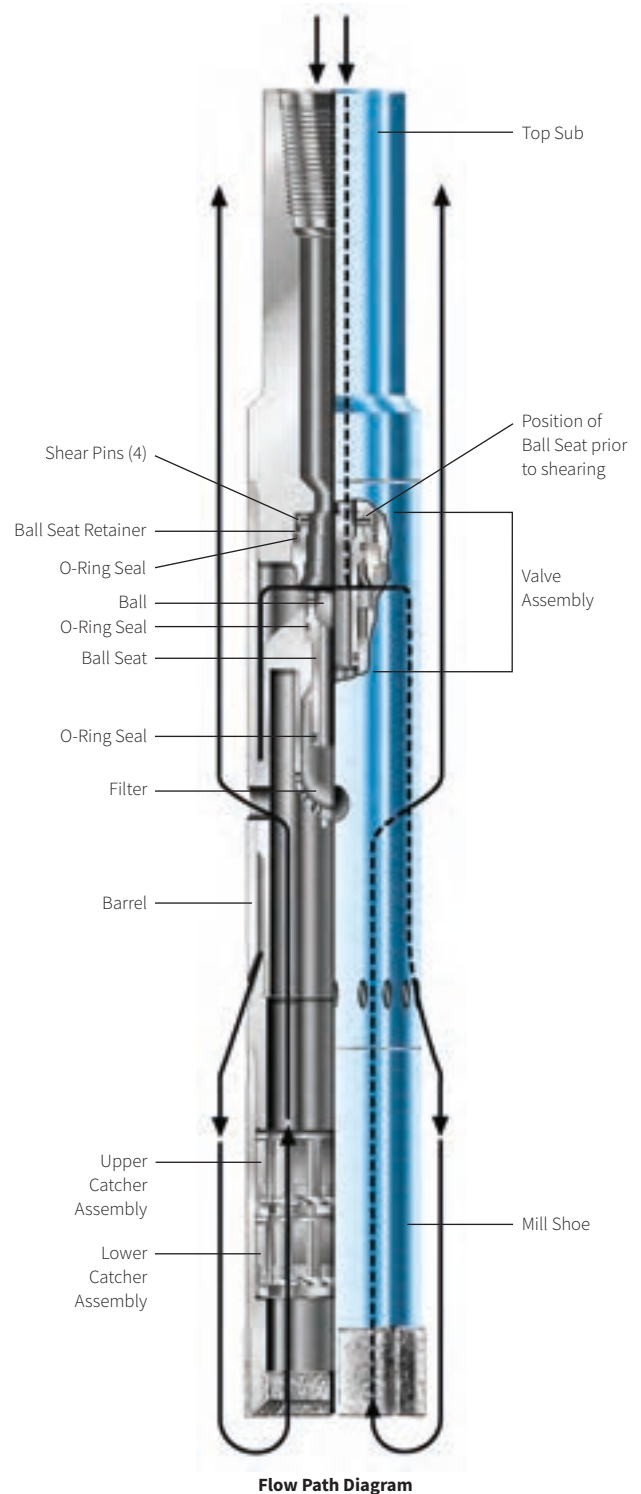
These junk baskets are available with one (1) junk catcher assembly or they can be provided with two (2) on request.

## Explanation of Mechanism

With unique reverse fluid circulation, the full flow type reverse circulation junk basket ensures more complete recovery of junk in the hole and eliminates misruns.

## Full Flow Type Valve Assembly

The full flow type reverse circulation occurs the same way as the standard type. The unique feature of the full flow type is in the valve assembly. Sometimes when the standard type is being lowered into the well toward a fish, pieces of shale, shell, etc., break away from the walls, sift up through the catchers, and clog the valve, starting the reverse flow action prematurely. The full flow seals off the cavity used in the reverse circulation until it is needed. When dressed for running in the hole, the ball seat of the full flow type is fastened to the ball seat retainer with shear pins. This blocks off the reverse circulation ports and provides a washpipe between the top sub and barrel so that flow will be directed through the I.D. to keep the barrel washed clean while going in the hole. When the basket is over the fish, the ball is dropped and seated and pump pressure causes the pins to shear. The ball seat drops down to a matching beveled shoulder of the valve assembly part of the barrel, opening the cavity and starting reverse circulation. (See illustration.)



# Full Flow Type Reverse Circulation Junk Basket

## Accessories

### Mill Shoes

Bowen full flow type reverse circulation junk baskets are furnished with a standard Type A mill shoe, a mill type with side wings. We recommend considering Itcoloy-faced mill shoes.

The Type B mill shoe is similar in design to the Type A but is hard-faced with Bowen Itcoloy, a material composed of sintered tungsten carbide in an extremely tough matrix which will effectively and rapidly mill up junk during the fishing operation.

The Type C mill shoe is a flat-bottomed shoe hard-faced with Itcoloy on the bottom and on the inner and outer faces. It effectively mills up junk and is especially effective for cutting cores.

### Finger Shoes

When junk is lying loose on the bottom of the well is too large to pass through the catchers, a finger shoe may be installed on the bottom of the barrel in place of the mill shoe. When the junk basket engages the fish, combined rotating and lowering causes the long fingers to close in beneath the fish and retain it in the barrel. Finger replacements are easy and inexpensive to replace on the shoe body.

### Magnet Inserts

Magnet inserts are available to convert Bowen full flow type reverse circulation junk baskets into effective fishing magnets. The magnet insert fits into the recess normally occupied by the catcher. The magnet insert is useful in hard-to-drill formations and for thoroughly cleaning the hole prior to diamond drilling. This arrangement provides a magnet that incorporates the advantages of reverse circulation.

## Operation

First, examine the junk basket and make sure it is properly assembled and in good working condition. Look inside the top sub to see if the ball seat is positioned properly in the ball seat retainer with the shear pins in place. For shoe selection and operation, follow the same instructions described under "Selection of Shoes."

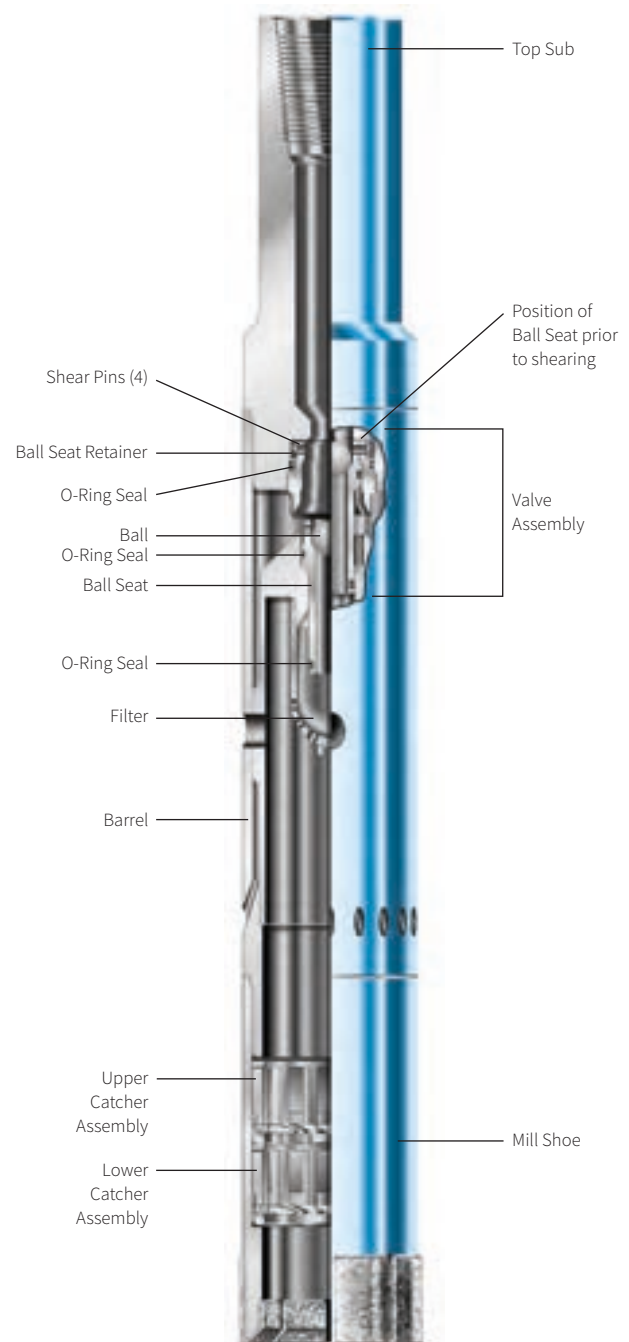
1. Make up the junk basket to the fishing string, lower into well, and turn on the circulation pumps. When the tool is a few feet off bottom, stop lowering and turn off the pumps.
2. Unscrew the Kelly from the string. Drop the steel ball down the drill pipe. Reconnect the Kelly. (Where a window sub is available, remove the plug from the sub and drop the steel ball down the drill pipe. Replace the plug in the window sub.)
3. Turn the circulation pumps back on and watch the mud pressure gauge. When the ball reaches the ball seat, a slight pressure build up will occur. When the pins shear, the gauge will show a sudden drop in pressure, indicating that reverse circulation is taking place.
4. Maintain high pressure circulation, rotate the string slowly to the right and lower the junk basket to the bottom of the hole.

When coring, continue right-hand rotation and lowering until a core at least ten inches long has been cut.

**NOTE:** When using the Itcoloy-faced shoes, maintain one ton

**of weight on the shoe and rotate the basket to give a surface speed of 250 ft/min to insure proper milling.**

5. Stop rotation and circulation and pull the junk basket from the hole.



**Bowen Full Flow Reverse Circulation Junk Basket**



# Bowen Full Flow Type Reverse Circulation Junk Basket

## Selection of Shoe

If the fish is embedded in a hard formation and a core must be cut, the Junk Basket must be equipped with the proper Mill Type Shoe.

If the fish is laying loosely on the bottom of the hole, the Junk Basket may be equipped with either the proper Mill Type shoe or the proper finger type shoe.

Finger type shoes will normally retrieve larger objects than mill type shoes, provided the junk is lying loose on the bottom and a core does not need to be taken.

Itcoloy-faced shoes, with their hard, rugged and long lasting qualities, make possible the cutting away of protruding excess metal to allow free entry of the junk into the basket and the retention of the junk on the one run.

Remove the lifting sub and retain it and the steel ball at the derrick floor.

Using the top sub, connect the junk basket to the string and run it in the hole. If small junk particles are very prevalent in the hole, a junk sub should be installed above the junk basket.

Where a window sub is available, install on the top joint of drill pipe and connect the kelly.



Type A Mill Shoe



Type B Mill Shoe



Type C Mill Shoe



Finger Shoe



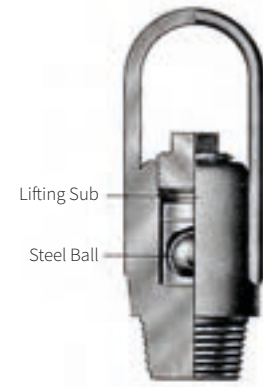
Magnet Insert



Standard Catcher



Window Sub



Lifting Sub

# Full Flow Type Reverse Circulation Junk Basket

## Operation of Junk Basket in Recovering Fish with Mill Type Shoe

1. Turn on the circulation pumps and force circulation through the junk basket for a few minutes before dropping the steel ball. This flushes out any mud that may have gathered in the barrel during the run in.
2. After the steel ball has been dropped down the drilling pipe, its downward progress will not halt until it encounters the valve seat in the junk basket. Thereafter, when circulation resumes, the fluid is forced through the inner passages of the barrel and jetted outwardly and downwardly against the full circumference of the hole, where it is deflected in a manner that flushes all objects toward center. The fluid then flows in a continuous stream to the center of the junk basket and up through it and out the return ports in the upper end of the barrel, thus giving a reverse circulation action.
3. Cut a length of core so that the fish rides past the junk catcher. The fingers on the junk catcher fold back while the core and fish are entering.
4. Pull up the junk basket so that the fingers in the junk catcher dig in and cut off a section of core. This holds the fish and core securely in the junk basket barrel.

## To Recover Fish when Basket is Equipped with Finger Type Shoe

When the junk basket is approximately ten feet off bottom, turn on the circulating pumps

and maintain circulation for a few minutes to condition the mud. Turn off the circulating pumps.

Unscrew the kelly from the string. Drop the steel ball down the drill pipe. Reconnect the kelly. (Where a window sub is available, remove the plug from the sub and drop the steel ball down the drill pipe. Replace the plug in the window sub.)

Turn on the circulating pumps and while maintaining high pressure circulation, rotate the string slowly to the right and lower it until approximately two tons of weight rest against the bottom of the hole.

Stop rotation and circulation and pull the Junk Basket from the hole.

## To Remove the Fish or Core

Unscrew the mill type shoe or the finger type shoe from the junk basket and wash out the barrel.

**NOTE: The junk basket should be washed as soon as possible after being used. Pay particular attention to the space between the inner and outer barrels.**

## Precautions

Make sure that the inside diameters of the tool joints in the string are large enough to pass the steel ball.

Be sure to retain the steel ball at the surface while the junk basket is being lowered into the hole.

## Maintenance

To guard against misruns and to prolong the life of the tool, dismantle and thoroughly cleanse the junk basket after each job.

## Disassembly

1. Unscrew the top sub.

2. Using pipe wrench on diameter of ball seat retainer protruding from bottom of top sub, unscrew and remove the retainer. Knock out old pieces of shear pins from top of retainer.

3. Remove the steel ball and ball seat.
4. (a) Unscrew the mill type shoe. (b) Remove the junk catcher from the shoe.
5. Finger Type Shoe:  
(a) Unscrew the finger type shoe from the barrel.  
(b) Unscrew the finger type shoe replacement from the finger type shoe body.

6. Using the T-wrench provided, reach inside bottom of barrel and unscrew filter. Remove the filter and clean out any debris which may be lodged in the holes of the filter.

7. Wash out both the inside and the inner passages in the barrel.

8. Check all parts carefully. Replace damaged parts with new ones.

9. Reassemble in the reverse order.

10. Before installing ball seat retainer in top sub, replace o-ring seals on retainer and ball seat with new ones. Insert ball seat into and against matching beveled shoulder of ball seat retainer and install new shear pins. Screw this assembly into the top sub until snug. Heavy torque is not required.

11. Store the steel ball in the lifting sub.

12. To prevent rust, apply either paint or grease.

## Magnet Insert Assembly Installation

1. Remove shoe from barrel of the junk basket.
2. Remove catcher from shoe.
3. Install magnetic insert in catcher recess.
4. Reassemble junk basket.

## Maintenance

1. Thoroughly clean after use; make sure circulation hole is clean.
2. Store with keeper in place to preserve magnetism.

# Bowen Full Flow Type Reverse Circulation Junk Basket

## Specifications and Replacement Parts

### Bowen Full Flow Reverse Circulation Junk Basket Specifications

| Hole size                |          | 4 ½ in. to 4 ½ in. | 4 ¾ in. to 5 in. | 6 ¼ in. to 6 ½ in. | 7 ½ in. to 8 ¼ in. | 8 ¾ in. to 9 ½ in. | 9 ¾ in. to 10 ¾ in. | 10 ¾ in. to 11 ¾ in. | 11 ¾ in. to 12 ½ in. |
|--------------------------|----------|--------------------|------------------|--------------------|--------------------|--------------------|---------------------|----------------------|----------------------|
| O.D. Of barrel           |          | 4 in.              | 4 ½ in.          | 5 ¾ in.            | 7 in.              | 7 ¾ in.            | 9 ¾ in.             | 10 ¾ in.             | 11 in.               |
| Maximum diameter of fish |          | 2 ½ in.            | 3 ¼ in.          | 4 ¾ in.            | 5 ½ in.            | 5 15/16 in.        | 7 7/16 in.          | 7 11/16 in.          | 8 5/16 in.           |
| Top connection           |          | 2 ¾ in.            | 2 7/8 in.        | 3 ½ in.            | 4 ½ in.            | 5 ½ in.            | 6 ¾ in.             | 6 ¾ in.              | 6 ¾ in.              |
| Number of teeth on mill  |          | 6                  | 8                | 8                  | 8                  | 8                  | 10                  | 10                   | 12                   |
| Pressure to shear pin    |          | 750 psi            | 750 psi          | 750 psi            | 327 psi            | 327 psi            | 237 psi             | 237 psi              | 237 psi              |
| Complete assembly        | Part no. | 71226              | 70702            | 71127              | 70908              | 70923              | 71198               | 71218                | 70910                |
|                          | Weight   | 103 lbs            | 112 lbs          | 195 lbs            | 305 lbs            | 390 lbs            | 460 lbs             | 600 lbs              | 695 lbs              |

### Replacement Parts

|                              |          |            |         |         |            |            |         |         |         |
|------------------------------|----------|------------|---------|---------|------------|------------|---------|---------|---------|
| Top sub                      | Part no. | 71227      | 71104   | 71125   | 70935      | 70926      | 71202   | 71219   | 70920   |
|                              | Weight   | 28 lbs     | 24 lbs  | 73 lbs  | 112 lbs    | 152 lbs    | 177 lbs | 201 lbs | 224 lbs |
| Barrel                       | Part no. | 71230      | 71116   | 71115   | 70911      | 70924      | 71203   | 71220   | 70921   |
|                              | Weight   | 53 lbs     | 56 lbs  | 88 lbs  | 139 lbs    | 170 lbs    | 196 lbs | 283 lbs | 329 lbs |
| Ball seat                    | Part no. | 70699      | 70851   | 70851   | 67354      | 67354      | 67168   | 67168   | 67168   |
|                              | Weight   | 1 ¾ lbs    | 1 ¼ lbs | 1 ¼ lbs | 1 ¾ lbs    | 1 ¾ lbs    | 2 lbs   | 2 lbs   | 2 lbs   |
| Ball seat retainer           | Part no. | 70850      | 70850   | 70850   | 67353      | 67353      | 67167   | 67167   | 67167   |
|                              | Weight   | 1 lbs      | 1 lbs   | 1 lbs   | 1 ¼ lbs    | 1 ¼ lbs    | 1 ¾ lbs | 1 ¾ lbs | 1 ¾ lbs |
| Shear pin (4 Req'd.)         | Part no. | 70852      | 70852   | 70852   | 67175      | 67175      | 67175   | 67175   | 67175   |
|                              | Weight   | ¼ lb       | ¼ lb    | ¼ lb    | ¼ lb       | ¼ lb       | ¼ lb    | ¼ lb    | ¼ lb    |
| Upper junk catcher assembly* | Part no. | 22070-W    | 22075-W | 15130-W | 22050-W    | 21730-W    | 14632-W | 25235-W | 31046-W |
|                              | Weight   | 1 ½ lbs    | 2 lbs   | 4 ½ lbs | 5 lbs      | 7 lbs      | 9 lbs   | 11 lbs  | 15 lbs  |
| Lower junk catcher assembly* | Part no. | 21855-W    | 21780-W | 28349-W | 21725-W    | 18725-W    | 14633-W | 18945-W | 21760-W |
|                              | Weight   | 1 ½ lbs    | 2 lbs   | 4 ½ lbs | 7 lbs      | 7 ½ lbs    | 9 lbs   | 16 lbs  | 20 lbs  |
| Filter                       | Part no. | 80768      | 80768   | 80768   | 70731      | 70731      | 70764   | 70764   | 70764   |
|                              | Weight   | 1 ¾ lbs    | 1 ¾ lbs | 1 ¾ lbs | 2 ¼ lbs    | 2 ¼ lbs    | 3 lbs   | 3 lbs   | 3 lbs   |
| Mill shoe                    | Part no. | 71228      | 70909   | 71124   | 72070      | 72081      | 71199   | 72080   | 72071   |
|                              | Weight   | 15 lbs     | 20 lbs  | 31 lbs  | 28 lbs     | 36 lbs     | 50 lbs  | 61 lbs  | 78 lbs  |
| Steel ball                   | Part no. | 6640       | 4453    | 4453    | 2572       | 2572       | 2665    | 2665    | 2665    |
|                              | Diameter | 1 1/16 in. | 1 ½ in. | 1 ½ in. | 1 1/16 in. | 1 1/16 in. | 2 ¼ in. | 2 ¼ in. | 2 ¼ in. |
|                              | Weight   | ¼ lb       | ¼ lb    | ¼ lb    | ¾ lb       | ¾ lb       | 2 lbs   | 2 lbs   | 2 lbs   |
| Retainer O-ring seal         | Part no. | 27-34      | 27-34   | 27-34   | 30-21      | 30-21      | 30-26   | 30-26   | 30-26   |
|                              | Weight   | ½ lb       | ½ lb    | ½ lb    | ½ lb       | ½ lb       | ½ lb    | ½ lb    | ½ lb    |
| Upper seat O-ring seal       | Part no. | 27-28      | 27-28   | 27-28   | 30-9       | 30-9       | 30-13   | 30-13   | 30-13   |
|                              | Weight   | ½ lb       | ½ lb    | ½ lb    | ½ lb       | ½ lb       | ½ lb    | ½ lb    | ½ lb    |
| Lower seat O-ring Seal       | Part no. | 27-20      | 27-20   | 27-20   | 30-2       | 30-2       | 30-7    | 30-7    | 30-7    |
|                              | Weight   | ½ lb       | ½ lb    | ½ lb    | ½ lb       | ½ lb       | ½ lb    | ½ lb    | ½ lb    |

### Optional

|                               |          |          |          |          |          |          |          |          |          |
|-------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Pick up sub                   | Part no. | 4568     | 424      | 425      | 1849     | 426      | 427      | 427      | 427      |
|                               | Weight   | 9 lbs    | 12 lbs   | 18 lbs   | 45 lbs   | 55 lbs   | 79 lbs   | 79 lbs   | 79 lbs   |
| Finger type shoe consists of: | Part no. | 7300     | -        | 2738     | -        | 2741     | 2742     | 2743     | -        |
|                               | Weight   | 20 lbs   | -        | 37 lbs   | -        | 83 lbs   | 105 lbs  | 135 lbs  | -        |
| Finger type shoe replacement  | Part no. | 7300-1   | -        | 2738-1   | -        | 2741-1   | 2742-1   | 2743-1   | -        |
|                               | Weight   | 8 lbs    | -        | 22 lbs   | -        | 44 lbs   | 52 lbs   | 64 lbs   | -        |
| Finger type shoe body         | Part no. | 7300-2   | -        | 2738-2   | -        | 2741-2   | 2742-2   | 2743-2   | -        |
|                               | Weight   | 10 lbs   | -        | 14 lbs   | -        | 37 lbs   | 50 lbs   | 64 lbs   | -        |
| Finger type collar            | Part no. | -        | 4456-2   | -        | 2740-2   | -        | -        | -        | 2744-2   |
|                               | Weight   | -        | 14 lbs   | -        | 28 lbs   | -        | -        | -        | 83 lbs   |
| Finger replacement            | Part no. | -        | 4456-1   | -        | 2740-1   | -        | -        | -        | 2744-1   |
|                               | Weight   | -        | 10 lbs   | -        | 32 lbs   | -        | -        | -        | 71 lbs   |
| Pipe plug                     | Part no. | 61520    | 61520    | 61521    | 61522    | 61523    | 61523    | 61523    | 61523    |
|                               | Weight   | ¾ lb     | ¾ lb     | 1 lb     | 1 lb     | 1 ¼ lbs  | 1 ¼ lbs  | 1 ¼ lbs  | 1 ¼ lbs  |
| Magnet insert assembly        | Part no. | -        | 61840    | 61866    | 61876    | 61953    | 61961    | 62657    | 61973    |
|                               | Weight   | -        | 20 lbs   | 48 lbs   | 77 lbs   | 97 lbs   | 174 lbs  | 186 lbs  | 186 lbs  |
| T-wrench                      | Part no. | 72067    | 72067    | 72067    | 72069    | 72069    | 72068    | 72068    | 72068    |
|                               | Weight   | 2 lbs    | 2 lbs    | 2 lbs    | 2 ¼ lbs  | 2 ¼ lbs  | 2 ½ lbs  | 2 ½ lbs  | 3 lbs    |
| Lower catcher repair kit      | Part no. | 21855-WK | 21780-WK | 15130-WK | 21725-WK | 18725-WK | 14633-WK | 18945-WK | 21760-WK |
|                               | Weight   | ½ lb     | ½ lb     | ½ lb     | ½ lb     | ½ lb     | ½ lb     | ½ lb     | ½ lb     |
| Upper catcher repair kit      | Part no. | 21855-WK | 22075-WK | 28349-WK | 22050-WK | 21640-WK | 14632-WK | 25235-WK | 31046-WK |
|                               | Weight   | ½ lb     | ½ lb     | ½ lb     | ½ lb     | ½ lb     | ½ lb     | ½ lb     | ½ lb     |
| Valve repair kit              | Part no. | 72064    | 72062    | 72063    | 72058    | 72061    | 72065    | 72059    | 72060    |
|                               | Weight   | ¼ lb     | ¼ lb     | ¼ lb     | ¼ lb     | ¾ lb     | ¾ lb     | ¾ lb     | ¾ lb     |

# Full Flow Type Reverse Circulation Junk Basket

## Specifications and Replacement Parts

### Bowen Junk Basket Catchers (Continued)

| Number of junk basket it will fit | 71226    | 70702   | 71127   | 70908   | 70923   | 71198   | 71218   | 70910   |         |
|-----------------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Complete assembly (upper)         | Part no. | 22070-W | 22075-W | 15130-W | 22050-W | 21730-W | 14632-W | 25235-W | 31046-W |
|                                   | Weight   | 1 ½ lbs | 2 lbs   | 4 ½ lbs | 5 lbs   | 7 lbs   | 9 lbs   | 11 lbs  | 15 lbs  |

### Replacement Parts

|                 |            |       |       |       |         |       |       |       |         |
|-----------------|------------|-------|-------|-------|---------|-------|-------|-------|---------|
| Body            | Part no.   | 68366 | 45591 | 45511 | 45550   | 45505 | 45521 | 68388 | 45576   |
|                 | Weight     | ¼ lbs | ½ lbs | 1 lbs | 1 ½ lbs | 2 lbs | 3 lbs | 4 lbs | 6 lbs   |
| Finger retainer | Part no.   | 68367 | 45592 | 45519 | 45551   | 45506 | 45530 | 45531 | 45578   |
|                 | Weight     | ⅙ lb  | ⅙ lb  | ¼ lb  | ⅜ lb    | ½ lb  | ¾ lb  | 1 lbs | 1 ¼ lbs |
| Short finger    | Part no.   | 68368 | 45574 | 45517 | 45557   | 45508 | 45588 | 68383 | 45525   |
|                 | Weight     | ⅙ lb  | ⅙ lb  | ¼ lb  | ⅜ lb    | ½ lb  | ¾ lb  | ½ lb  | ½ lb    |
| Long finger     | No. Req'd. | 4     | 10    | 12    | 12      | 12    | 12    | 12    | 16      |
|                 | Part no.   | -     | -     | -     | -       | -     | -     | -     | -       |
| Pivot pin       | Weight     | -     | -     | -     | -       | -     | -     | -     | -       |
|                 | No. Req'd. | -     | -     | -     | -       | -     | -     | -     | -       |
| Torsion spring  | Part no.   | 45583 | 45583 | -     | -       | -     | -     | -     | -       |
|                 | Weight     | ⅓ lb  | ⅓ lb  | -     | -       | -     | -     | -     | -       |
| Retainer screw  | No. Req'd. | 8     | 10    | -     | -       | -     | -     | -     | -       |
|                 | Part no.   | 42257 | 42257 | 42257 | 42257   | 42257 | 42257 | 42257 | 42257   |
| Retainer screw  | Weight     | ⅓ lb  | ⅓ lb  | ⅓ lb  | ⅓ lb    | ⅓ lb  | ⅓ lb  | ⅓ lb  | ⅓ lb    |
|                 | No. Req'd. | 2     | 2     | 2     | 2       | 2     | 2     | 2     | 2       |

### Catchers Continued

| Number of junk basket it will fit | 71226    | 70702   | 71127   | 70908   | 70923   | 71198   | 71218   | 70910   |         |
|-----------------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Complete assembly (lower)         | Part no. | 21855-W | 21780-W | 28349-W | 21725-W | 18725-W | 14633-W | 18945-W | 21760-W |
|                                   | Weight   | 1 ½ lbs | 2 lbs   | 4 ½ lbs | 7 lbs   | 7 ½ lbs | 9 lbs   | 11 lbs  | 20 lbs  |

### Replacement Parts

|                 |            |       |       |       |         |         |       |         |         |
|-----------------|------------|-------|-------|-------|---------|---------|-------|---------|---------|
| Body            | Part no.   | 68366 | 45591 | 45511 | 45550   | 45505   | 45521 | 45522   | 45576   |
|                 | Weight     | ¼ lb  | ½ lb  | 1 lbs | 2 ½ lbs | 2 ½ lbs | 3 lbs | 6 ½ lbs | 7 lbs   |
| Finger retainer | Part no.   | 68367 | 45592 | 45519 | 45551   | 45506   | 45530 | 45531   | 45578   |
|                 | Weight     | ⅙ lb  | ⅙ lb  | ¼ lb  | ½ lb    | ½ lb    | ¾ lb  | 1 ½ lbs | 1 ½ lbs |
| Short finger    | Part no.   | 68368 | 45574 | 45517 | 45557   | 45508   | 45588 | 45507   | 45525   |
|                 | Weight     | ⅙ lb  | ⅙ lb  | ¼ lb  | ¼ lb    | ¼ lb    | ¾ lb  | ¾ lb    | ½ lb    |
| Medium finger   | No. Req'd. | 4     | 5     | 8     | 6       | 6       | 6     | 6       | 8       |
|                 | Part no.   | -     | -     | -     | -       | -       | -     | -       | 45510   |
| Long finger     | Weight     | -     | -     | -     | -       | -       | -     | -       | ¾ lb    |
|                 | No. Req'd. | -     | -     | -     | -       | -       | -     | -       | 4       |
| Pivot pin       | Part no.   | 68369 | 45575 | 45516 | 45518   | 45507   | 45589 | 70277   | 45526   |
|                 | Weight     | ⅙ lb  | ⅙ lb  | ¼ lb  | ¼ lb    | ¾ lb    | ½ lb  | ¾ lb    | ¾ lb    |
| Torsion spring  | No. Req'd. | 4     | 5     | 4     | 6       | 6       | 6     | 6       | 4       |
|                 | Part no.   | 45583 | 45583 | -     | -       | -       | -     | -       | -       |
| Retainer screw  | Weight     | ⅓ lb  | ⅓ lb  | -     | -       | -       | -     | -       | -       |
|                 | No. Req'd. | 8     | 10    | -     | -       | -       | -     | -       | -       |
| Torsion spring  | Part no.   | 45571 | 45571 | 45520 | 45520   | 45509   | 45549 | 45509   | 45509   |
|                 | Weight     | ⅓ lb  | ⅓ lb  | ⅙ lb  | ⅙ lb    | ⅙ lb    | ⅙ lb  | ⅙ lb    | ⅙ lb    |
| Retainer screw  | No. Req'd. | 8     | 10    | 12    | 12      | 12      | 12    | 12      | 16      |
|                 | Part no.   | 42257 | 42257 | 42257 | 42257   | 42257   | 42257 | 42257   | 42257   |
| Retainer screw  | Weight     | ⅓ lb  | ⅓ lb  | ⅓ lb  | ⅓ lb    | ⅓ lb    | ⅓ lb  | ⅓ lb    | ⅓ lb    |
|                 | No. Req'd. | 2     | 2     | 2     | 2       | 2       | 2     | 2       | 2       |



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) OD and type of shoe
  - (3) Top connection desired



### Recommended Spare Parts:

- (1) 2 Junk catchers
- (2) 2 Mill shoes
- (3) 1 Ball Seat
- (4) 1 Ball Seat Retainer
- (5) 1 Steel ball
- (5) 4 Valve Repair Kits
- (5) 2 Catcher Repair Kits (for Each Assembly)

### Recommended Accessories

- (1) 2 Finger shoes
- (2) 4 Finger shoe replacements
- (3) 1 Magnet insert

NOTE: Finger Shoe replacement is furnished with the same O.D. as standard Shoe unless otherwise specified.

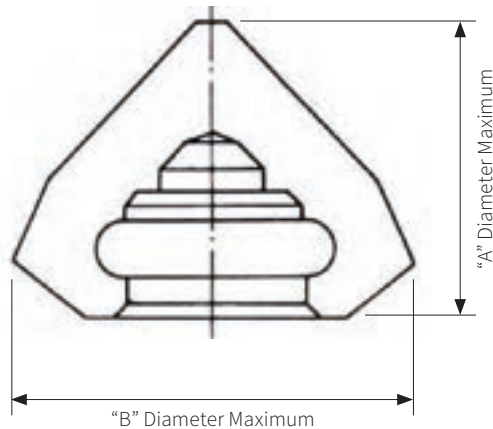
\*See Catcher Assembly tables for parts breakdown.

Miscellaneous O-ring Seals are normally furnished in sealed plastic bags of 10, 25, or 100 pieces each to prevent deterioration. Other quantities will be furnished in unsealed packages. Packing Sets, however, will always be furnished in sealed plastic bags.

# Bowen Full Flow Type Reverse Circulation Junk Basket

## Rock Bit Cone Dimensions

| 2 Cone bits |         | Size                 | 3 Cone bits |          |
|-------------|---------|----------------------|-------------|----------|
| A           | B       |                      | A           | B        |
|             |         | 3 ¾ in. to 4 ½ in.   | 1 ¾ in.     | 2 ¼ in.  |
|             |         | 4 ¼ in. to 4 ½ in.   | 2 ¼ in.     | 2 ¾ in.  |
|             |         | 4 ¾ in. to 5 in.     | 2 ½ in.     | 3 ¼ in.  |
|             |         | 5 ½ in. to 5 ½ in.   | 2 ¾ in.     | 3 ¼ in.  |
|             |         | 5 ½ in. to 6 in.     | 3 ½ in.     | 4 ¼ in.  |
|             |         | 6 ½ in. to 6 ½ in.   | 3 ¾ in.     | 4 ¾ in.  |
|             |         | 6 ½ in. to 7 in.     | 3 ¾ in.     | 4 ¾ in.  |
|             |         | 7 ½ in. to 7 ½ in.   | 3 ¾ in.     | 4 ¾ in.  |
| 3 ¾ in.     | 5 ½ in. | 7 ½ in. to 8 in.     | 3 ¾ in.     | 5 ¼ in.  |
| 4 ½ in.     | 6 ¾ in. | 8 ½ in. to 8 ½ in.   | 4 ¾ in.     | 5 ¾ in.  |
| 4 ½ in.     | 6 ¾ in. | 8 ½ in. to 9 in.     | 4 ¾ in.     | 6 ½ in.  |
|             |         | 9 ½ in. to 9 ½ in.   | 4 ¾ in.     | 6 ½ in.  |
| 4 ¾ in.     | 7 in.   | 9 ½ in. to 9 ¾ in.   | 4 ¾ in.     | 6 ¾ in.  |
| 5 ¼ in.     | 7 ½ in. | 10 ½ in. to 11 ½ in. | 5 ¼ in.     | 7 ½ in.  |
| 5 ¾ in.     | 8 ¼ in. | 11 ¾ in. to 12 ½ in. | 6 ½ in.     | 7 ¾ in.  |
|             |         | 12 ½ in. to 13 ½ in. | 6 ¾ in.     | 8 ¾ in.  |
|             |         | 13 ½ in. to 14 ¼ in. | 7 ½ in.     | 8 ¾ in.  |
|             |         | 14 ½ in. to 15 in.   | 7 ¾ in.     | 9 ½ in.  |
|             |         | 16 in.               | 9 ½ in.     | 10 ½ in. |
|             |         | 17 in. to 17 ½ in.   | 8 ¾ in.     | 11 ¼ in. |
|             |         | 18 ½ in. to 18 ¾ in. | 8 ¾ in.     | 11 ¾ in. |
|             |         | 20 in.               | 9 ½ in.     | 11 ¾ in. |
|             |         | 22 in.               | 10 ½ in.    | 14 ¼ in. |
|             |         | 24 in.               | 10 ¾ in.    | 14 ¾ in. |
|             |         | 26 in.               | 12 ¼ in.    | 14 ¾ in. |



The cone sizes shown are the nominal Hughes Christensen Company cone dimensions and are the maximum for the size indicated in the middle column. They may be used as a guide in junk fishing operations.



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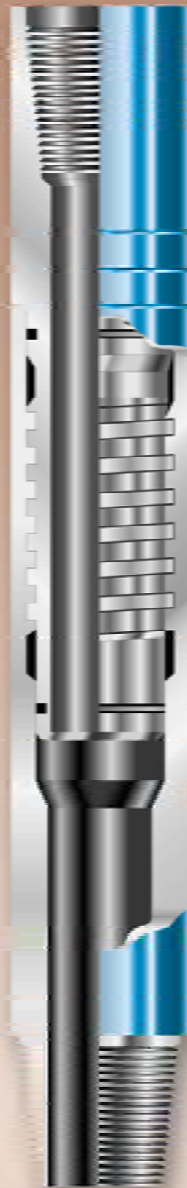
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# COARSE THREAD SAFETY JOINTS

Instruction Manual 4605



Coarse Thread Safety Joints



One Company Unlimited Solutions



# Coarse Thread Safety Joints

|   |   |
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The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Sixth Printing, September 2005

### General Description

The **Bowen Coarse Thread Safety Joint** allows quick release from drilling, fishing, testing washover or tubing strings should they become stuck, leaving a minimum of pipe in the hole, thereby reducing the problems of fishing or sidetracking.

The new design is simple, eliminating the need of a release ring mechanism and lengthy disengagement procedures.

The Bowen Coarse Thread Safety Joint has a rugged coarse thread design which will not loosen or wedge during operation. Once in the string the Safety Joint is resistant to vibration, heavy loads and left or right hand torque. The tool will disengage by simple left hand rotation at approximately 40% of the tool's right-hand make-up torque.

O-ring seals above and below threads seal against internal and external fluid pressures. Both packers are rated for all normal pump pressures in continuous service.

The tool has a simple, two-piece, two-seal design which allows operators easy disassembly during cleaning and lubrication.

The new Safety Joint is available in a full range of sizes, types, lengths, etc. National Oilwell will manufacture the tool to fit the customer's exact requirements.

### Use

The Bowen Coarse Thread Safety Joint is used in a drilling, fishing, testing, washover or tubing string whenever and wherever a releasing safety connection is needed.

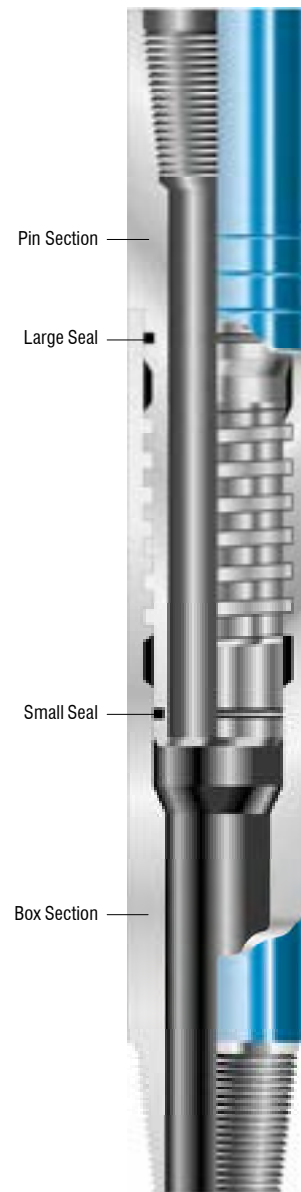
**In Drilling Strings** — The Safety Joint is usually located far enough above the drill collars to prevent compression loading and to avoid sticky or heaving formations. Drill pipe Safety Joints have drill pipe box and pin connections with the O.D. and I.D. corresponding to the drill pipe tool joints.

**In Fishing Strings** — The Safety Joint is usually located immediately above the grappling or fishing tool and below any accessory tool such as jars or bumper subs.

**In Drill Stem Testing Strings** — The Safety Joint is usually located above the packer and test tool but below any accessory tool such as a jar or bumper sub.

**In Washover Strings** — The Safety Joint is located between the drill pipe and the washover string. Washover Safety Joints are provided with a drill pipe box connection and a washover pin connection. Diameters conform to washover pipe.

**In Tubing Strings** — The Safety Joint is usually located immediately above the tubing catcher or production packer. Tubing Safety Joints have tubing box and pin connections with O.D.s corresponding to tubing couplings and I.D.s corresponding to the tubing.



Drill Pipe Safety Joint

### Construction

The Bowen Coarse Thread Safety Joint consists of an upper Pin Section, a lower Box Section and two seals. The upper Pin Section has a box connection up for connecting to the tool joint and a male coarse thread down for connection to the Box Section. The Box Section has a female coarse thread matching the male thread of the Pin Section and has a tool joint pin connection down for connecting to the pipe.

The coarse thread design of the Pin and Box Sections allows speed and ease of engagement. When the Safety Joint is made up tightly, the joining coarse threads grip each other securely, pulling the surfaces into complete contact and therefore, form the Safety Joint into a rigid unit.

The Pin Section is grooved at the top and bottom to accommodate the O-ring type seals which seal the Safety Joint from both internal and external fluid pressures. Both seals are rated for high pressure operation, capable of withstanding up to 10,000 psi in continuous service.

### Operation

1. First, examine the Pin Section to ascertain that the Top and Bottom seals are in good condition and are properly installed in the grooves.
2. Thoroughly lubricate the coarse thread surfaces of the Pin Section and the Box Section. Make up the Pin and Box Sections by hand.

3. Position the Safety Joint at the desired point in the string.
  - (a) Drilling String — Position the Safety Joint far enough above the Drill Collars to avoid compression loading and to avoid sticky or heaving formations.
  - (b) Fishing String — Position the Safety Joint immediately above the grappling or fishing tool.
  - (c) Drill Stem Test — Position the Safety Joint above the packer and testing tool.
  - (d) Washover String — Position the Safety Joint between the washover string and the drill pipe.
  - (e) Tubing String — Position the Safety Joint above the tubing catcher or the production packer.
4. Screw the tool joint pin of the Safety Joint into the joint box of the pipe and make it up as an ordinary tool joint.
5. With one tong on the Box Section and one tong on the Pin Section, make up the Safety Joint to the same degree of tightness as the tool joints in the string.
6. Screw the pin end of the next stand of pipe into the box of the Safety Joint and make it up similarly to an ordinary tool joint connection and run the pipe into the well.

### To Disengage the Safety Joint in the Hole

1. To break the connection, rotate the string to the left at 40 percent of the tools right hand make-up torque one turn in straight or shallow holes, two or three turns in deep or crooked holes.

2. Now, pick up the string until at least 1,000 lbs. of weight but not more than 2,000 lbs. remains on the Safety Joint. If more than 2,000 lbs. is applied, the Safety Joint will release but the possibility of damage to the shoulder at the point of disengagement exists.
3. Pick the string up slowly while rotating to the left to unscrew the Safety Joint. As the coarse threads unscrew, they will lift the pipe approximately 1/2 inch per revolution.
4. During the releasing of the Safety Joint, the pipe weight will decrease. The operator should be careful to maintain the pipe weight at 1,000 lbs. but not more than 2,000 lbs. as noted in Step 2 above.

### To Reengage the Safety Joint in the Hole

1. Lower the string into the hole until the Pin Section contacts the Box Section.
2. Carefully apply one point of weight and rotate slowly to the right. An increase in torque will indicate that the Safety Joint has reengaged.

### Precautions

Use lubricating oil or a similar lubricant to lubricate the coarse threads of the Pin Section and Box Section of the Safety Joint.

Whenever the Safety Joint is used in continuous operation such as a drilling string, it is recommended that it be dismantled periodically (at least once a week). The seals should be replaced and the two sections be thoroughly greased.

## **Maintenance**

To guard against misruns and to prolong the life of the tool, the Bowen Coarse Thread Safety Joint should be dismantled after use, thoroughly cleaned, lubricated and serviced before storing.

1. Dismantle the Safety Joint. If the two sections are not in tight engagement, they may be unscrewed by hand. If, on the other hand, the two sections are in tight engagement, place a tong wrench on each section and unscrew the Pin Section from the Box Section.

**NOTE: Be sure to protect the tool joint pin connection before dismantling.**

2. Thoroughly clean each section.
3. Replace the large seal (top) and the small seal (bottom).
4. Thoroughly lubricate the coarse thread surfaces of the Pin Section and Box Section. Make up the Pin and Box Sections by hand.
5. Reassemble the Safety Joint. Paint or lubricate all exterior surfaces to prevent rust or deterioration.

**Specifications – Bowen Drill Pipe Safety Joints**

|                   |                    |                          |                       |                          |              |              |              |              |              |              |              |               |               |
|-------------------|--------------------|--------------------------|-----------------------|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|
| Size              |                    | 2-3/8                    | 2-3/8                 | 2-7/8                    | 2-7/8        | 2-7/8        | 3-1/2        | 3-1/2        | 3-1/2        | 3-1/2        | 3-1/2        | 4             | 4             |
| Type              |                    | API Reg.<br>Acme<br>Reg. | API I.F.<br>Hyd. I.F. | API Reg.<br>Acme<br>Reg. | Hyd. I.F.    | API<br>I.F.  | API Reg.     | Hyd. I.F.    | API<br>F.H.  | API<br>Reg.  | API<br>I.F.  | API<br>F.H.   | API<br>I.F.   |
| Joint O.D.        |                    | 3-1/8                    | 3-3/8                 | 3-3/4                    | 3-7/8        | 4-1/8        | 4-1/4        | 4-1/2        | 4-5/8        | 4-3/4        | 4-3/4        | 5-1/4         | 5-3/4         |
| Bore of Joint     |                    | 1                        | 1-3/4                 | 1-1/4                    | 2-1/8        | 2-1/8        | 1-1/2        | 2-9/16       | 2-7/16       | 1-1/2        | 2-11/16      | 2-13/16       | 3-1/4         |
| Complete Assembly | Part No.<br>Weight | 149342<br>40             | 149346<br>40          | 149350<br>60             | 149354<br>48 | 149358<br>58 | 149362<br>70 | 149366<br>63 | 149378<br>72 | 149374<br>69 | 149378<br>68 | 149382<br>105 | 149386<br>120 |
| Pin Section       |                    | 149343                   | 149347                | 149351                   | 149355       | 149359       | 149363       | 149367       | 149379       | 149375       | 149379       | 149383        | 149387        |
| Box Section       |                    | 149344                   | 149348                | 149352                   | 149356       | 149360       | 149364       | 149368       | 149380       | 149376       | 149380       | 149384        | 149388        |
| O-Ring – Small    |                    | 568325                   | 568226                | 568329                   | —            | 568333       | 568333       | —            | 568337       | —            | 568337       | —             | —             |
| O-Ring – Large    |                    | 568329                   | 568332                | 568333                   | —            | 568337       | 568337       | —            | 568341       | —            | 568341       | —             | —             |

**Specifications – Bowen Drill Pipe Safety Joints, Cont'd**

|                   |                    |               |               |               |                          |               |               |               |               |               |               |               |               |
|-------------------|--------------------|---------------|---------------|---------------|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Size              |                    | 4-1/2         | 4-1/2         | 4-1/2         | 4-1/2                    | 5-1/2         | 5-1/2         | 5-1/2         | 6-5/8         | 6-5/8         | 6-5/8         | 7-5/8         | 8-5/8         |
| Type              |                    | API<br>Reg.   | API<br>F.H.   | X-hole        | API<br>I.F.<br>Hyd. I.F. | API<br>Reg.   | API<br>F.H.   | API<br>I.F.   | API<br>Reg.   | API<br>F.H.   | API<br>I.F.   | API<br>Reg.   | API<br>Reg.   |
| Joint O.D.        |                    | 5-1/2         | 5-3/4         | 6             | 6-1/8                    | 6-3/4         | 7             | 7-3/8         | 7-3/4         | 8             | 8-1/2         | 9             | 10            |
| Bore of Joint     |                    | 2-1/4         | 3             | 3-1/4         | 3-3/4                    | 2-3/4         | 4             | 4-13/16       | 3-1/2         | 5             | 5-29/32       | 4             | 4-3/4         |
| Complete Assembly | Part No.<br>Weight | 149394<br>130 | 149398<br>120 | 149406<br>115 | 149406<br>115            | 149410<br>225 | 149414<br>205 | 149418<br>195 | 149422<br>315 | 149426<br>270 | 149430<br>260 | 149434<br>440 | 149438<br>520 |
| Pin Section       |                    | 149395        | 149399        | 149407        | 149407                   | 149411        | 149415        | 149419        | 149423        | 149427        | 149431        | 149435        | 149439        |
| Box Section       |                    | 149396        | 149400        | 149408        | 149408                   | 149412        | 149416        | 149420        | 149424        | 149428        | 149432        | 149436        | 149440        |
| O-Ring – Small    |                    | —             | 568344        | 568347        | 568347                   | —             | —             | —             | 568355        | 568435        | —             | 568361        | —             |
| O-Ring – Large    |                    | —             | 568349        | 568429        | 568429                   | —             | —             | —             | 568359        | 568438        | —             | 568363        | —             |

**Specifications – Bowen Tubing Safety Joints**

|                   |                    |                 |                            |                 |                 |              |              |                 |              |              |
|-------------------|--------------------|-----------------|----------------------------|-----------------|-----------------|--------------|--------------|-----------------|--------------|--------------|
| Size              |                    | 3/4             | 1                          | 1               | 1-1/2           | 2            | 2-1/2        | 2-7/8           | 3            | 3            |
| Type              |                    | EUE             | D.S.S.<br>Hardy<br>Griffin | EUE<br>Hydril   | C.S.            | EUE          | EUE          | Hydril<br>C-100 | EUE          | EUE          |
| Joint O.D.        |                    | 1.660           | 1.590                      | 1-29/32         | 2-1/2           | 3-1/16       | 3-21/32      | 3-1/2           | 4-1/2        | 5            |
| Bore of Joint     |                    | .812            | .812                       | 1               | 1-1/2           | 1-59/64      | 2-7/16       | 2-3/8           | 3            | 3            |
| Complete Assembly | Part No.<br>Weight | 149442<br>3-2/4 | 149446<br>4                | 149450<br>6-1/4 | 149454<br>3-7/8 | 149458<br>18 | 149462<br>28 | 149466<br>23    | 149470<br>47 | 149474<br>50 |
| Pin Section       |                    | 149443          | 149447                     | 149451          | 149455          | 149459       | 149463       | 149467          | 149471       | 149475       |
| Box Section       |                    | 149444          | 149448                     | 149452          | 149456          | 149460       | 149464       | 149468          | 149472       | 149476       |
| O-Ring – Small    |                    | —               | —                          | 568025          | 568131          | 568138       | 568146       | —               | 568152       | —            |
| O-Ring – Large    |                    | —               | —                          | 568128          | 568225          | 568230       | 568233       | —               | 568241       | —            |

**Specifications – Bowen Washover Pipe Safety Joints**

|                   |                    |              |              |              |              |               |               |                |               |               |               |               |               |             |
|-------------------|--------------------|--------------|--------------|--------------|--------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|---------------|-------------|
| Size              |                    | 4            | 4-1/2        | 5            | 5-1/2        | 5-3/4         | 7             | 7-3/8          | 7-5/8         | 8-1/8         | 9             | 9-5/8         | 10-3/4        | 11-3/4      |
| Type              |                    | F.J.         | F.J.         | F.J.         | F.J.         | F.J.          | F.J.          | Hydril<br>F.J. | F.J.          | F.J.          | F.J.          | F.J.          | F.J.          | F.J.        |
| Joint O.D.        |                    | 4            | 4-1/2        | 5-3/8        | 5-1/2        | 5-3/4         | 7-5/16        | 7-3/8          | 8             | 8-5/32        | 9-3/8         | 10-1/8        | 11-1/16       | 11-3/4      |
| Bore of Joint     |                    | 1-1/4        | 1-1/4        | 2-1/8        | 2-9/16       | 2-7/16        | 3-3/4         | 3              | 3-3/4         | 3-5/32        | 4             | 4             | 4             | 3-5/8       |
| Complete Assembly | Part No.<br>Weight | 149478<br>42 | 149482<br>50 | 149486<br>54 | 149490<br>58 | 149494<br>141 | 149498<br>103 | 149502<br>339  | 149506<br>135 | 149510<br>439 | 149514<br>210 | 149518<br>240 | 150047<br>791 | 151992<br>— |
| Pin Section       |                    | 149479       | 149483       | 149487       | 149491       | 149495        | 149499        | 149513         | 149507        | 149511        | 149515        | 149519        | 150048        | 151993      |
| Box Section       |                    | 149480       | 149484       | 149488       | 149492       | 149496        | 149500        | 149504         | 149508        | 149512        | 149516        | 149520        | 150049        | 151994      |
| O-Ring – Small    |                    | —            | 568340       | —            | 568244       | 568350        | —             | —              | 568438        | 568364        | —             | —             | 568274        | 568275      |
| O-Ring – Large    |                    | —            | 568241       | —            | 568248       | 568251        | —             | —              | 563440        | 568263        | —             | —             | 568375        | 568276      |

\*Note: Left-hand connections available upon request.

**How to Order**

Specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Any spares desired, by name and part number



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Postfach 31232  
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Phone: 49 5176 97670  
Fax: 49 5176 9767 22

\* Denotes Manufacturing and Engineering facilities

Downhole Solutions

Drilling Solutions

Engineering and Project Management Solutions

Lifting and Handling Solutions

Production Solutions

Supply Chain Solutions

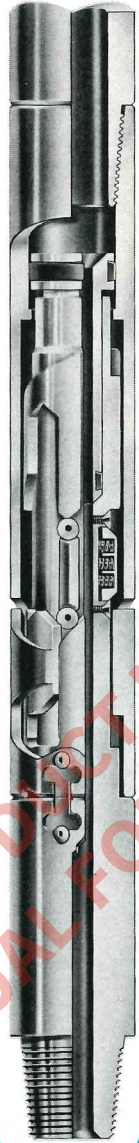
Tubular and Corrosion Control Solutions

Well Service and Completion Solutions

Corporate Headquarters

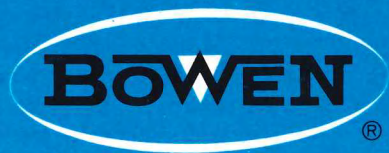
10000 Richmond Avenue  
Houston, Texas 77042  
United States  
Phone: 713 346 7500  
Fax: 713 346 4493

# INSTRUCTION MANUAL



## **BOWEN-LEBUS UNLATCHING JOINT**

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**Bowen Tools, Inc.**

# INSTRUCTION MANUAL

## **BOWEN-LEBUS**

### **UNLATCHING JOINT**

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*The designs and specifications of the tools described in this Instruction Manual were in effect at the time this manual was approved for printing. Bowen Tools, Inc., whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs or specifications, without notice or without incurring obligation.*



# INSTRUCTION MANUAL

## **BOWEN-LEBUS**

### **UNLATCHING JOINT**

#### **GENERAL DESCRIPTION AND USE**

The BOWEN-LEBUS UNLATCHING JOINT is a unique multi-purpose tool. It may be used as a Setting or Running Tool; a Safety Joint or in any operation which requires a tensile and torque load transmitting device, which may be released and re-engaged at the operator's option.

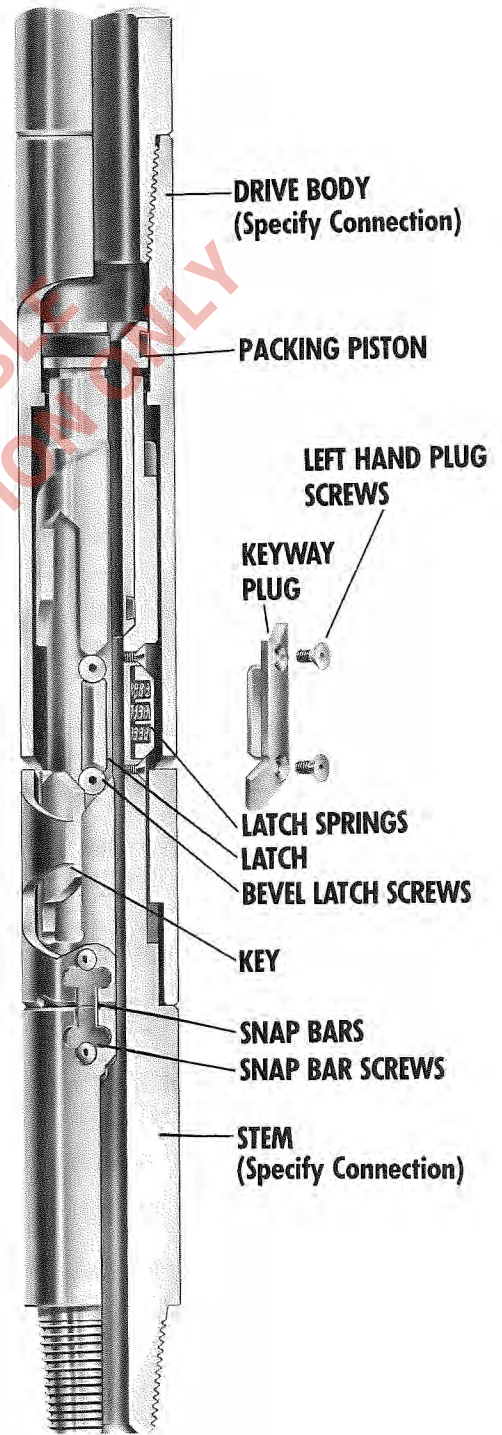
The Bowen-Lebus Unlatching Joint is particularly well suited for use as a companion tool to the well known Bowen-Lebus Anchor Washpipe Spear.

The Bowen-Lebus Unlatching Joint may be dressed for either right-hand rotation, left-hand release or right-hand rotation, right-hand release. This eliminates the necessity for a separate tool for each. Since a combination of torque and vertical pull is required to release the tool, full torque may be applied in either direction during operation. The tool will not release accidentally.

Bowen-Lebus Unlatching Joints are available in all sizes from 3¼" O.D. through 7¾" O.D. Additional sizes may be furnished on special request.

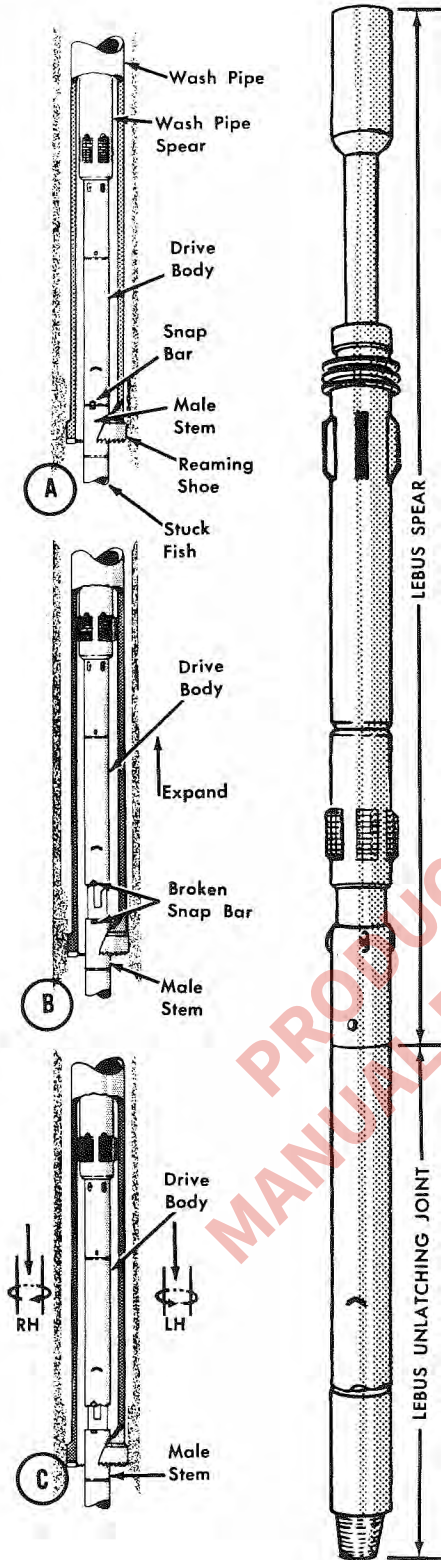
#### **OPERATION**

The BOWEN-LEBUS UNLATCHING JOINT is designed primarily for use with wash pipe and the ANCHOR WASH PIPE SPEAR. It is a means of allowing the wash pipe spear to be removed from the well with the wash pipe. The unlatching joint is operated by predetermined movements of the wash pipe because the spear slips are firmly set to the inside wall of the wash pipe when the unlatching joint is unlatched and moved with it. To remove the wash pipe spear from the hole, the unlatching joint is expanded upward to break the snap bar (see figure 1-B, page 2) and to set the spear slips. Lowering the drive body while applying torque moves the drive body into the unlatched position. From this position the wash pipe and wash pipe spear are free and can be removed from the hole (see figure 1-B, page 2). The unlatching joint's male stem is now firmly engaged to the stuck fish,



*Bowen-Lebus  
Unlatching Joint*

Figure No. 1



the joint's drive body is engaged to the wash pipe spear. The joint will automatically re-engage into the latched position when the drive body is lowered over the male stem while applying right-hand torque.

If the joint is dressed for left-hand unlatching, the joint's drive body is torqued to the left (see figure 3, page 3). If the joint is modified for right-hand unlatching, the drive body is torqued to the right (see figure 2, page 3).

Right-hand unlatching is used for deviated holes where applying left-hand torque to the unlatching joint might possibly unscrew the wash pipe above the BOWEN-LEBUS UNLATCHING JOINT.

NOTE: The Beveled Latches are designed to prevent movement of the drive body to the left.

### RIGHT-HAND LATCHING AND UNLATCHING

Figure No. 2, page 3, shows Beveled Latches inserted into windows on the BOWEN-LEBUS UNLATCHING JOINT for right-hand latching and unlatching. To latch the joint, the drive body is lowered over the male stem while applying right-hand torque. The drive key engages Slot A and drops until it engages Surface B. The drive body continues to rotate to right, passing over the Beveled Latch until it engages Slot D and moves into the latched position.

To unlatch expand the joint to its upper latched position with a pull to set the wash pipe spear slips. Lowering the drive body while applying right-hand torque allows the drive body to move to the right, passing over the Beveled Latch, engaging Surface C. Pulling up on the drive body causes the drive key to engage Slot A, unlatching the joint.

### RIGHT-HAND LATCHING AND LEFT-HAND UNLATCHING

Figure No. 3, page 3, shows a Keyway Plug inserted into the window on the BOWEN-LEBUS UNLATCHING JOINT for right-hand latching and left-hand unlatching. To latch the joint, the drive body is lowered over the male stem while applying right-hand torque. The drive body's drive keys engage Slot A and drops until it engages Keyway B. The drive body continues to move to the right until the opposite drive key engages the Keyway Plug and moves into the latched position.

Figure No. 2

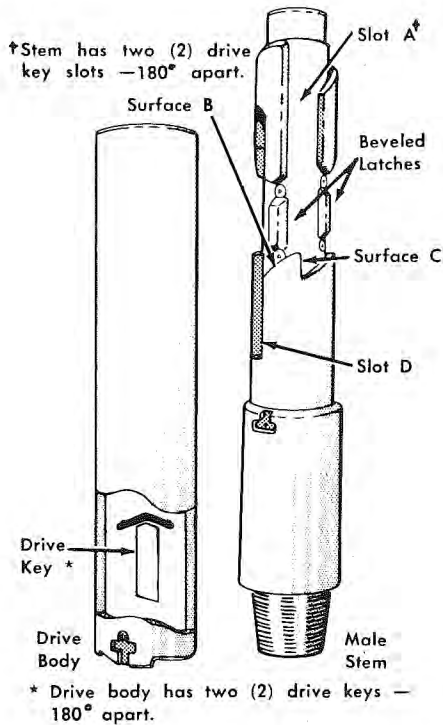
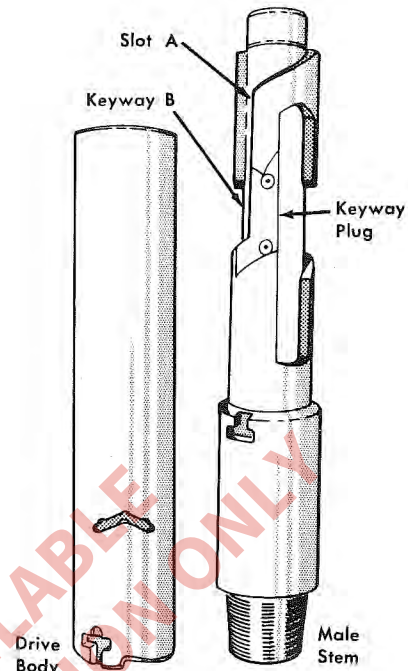


Figure No. 3



To unlatch, expand the joint upward from the latched position until the spear slips are firmly set. Then, by lowering the drive body while applying left-hand torque allows the drive body to move to the left until the Keyway Plug is contacted. Continue left-hand torque and pull up on the drive body. This will cause the drive body keys to engage Slot A, unlatching the joint.

NOTE: The Keyway Plug prevents the joint from unlatching with right-hand torque and movement.

#### LATCHING OPERATION

Figure No. 4, page 4, shows the BOWEN-LEBUS UNLATCHING JOINT drive body being lowered over the stem while maintaining right-hand torque to latch the joint.

#### LOCKING JOINT FOR RUNNING INTO WELL

Figure No. 5, page 4, shows the BOWEN-LEBUS UNLATCHING JOINT drive body in the latched position with snap bars and packing stem inserted. The snap bars lock the drive body to the male stem to prevent joint disengagement while running into the well.

Applying torque to the BOWEN-LEBUS UN-

LATCHING JOINT will not break the snap bars. They break only when the joint is expanded in tension.

After breaking, the snap bar parts remain attached to the drive body and male stem — no jamming, no clogging.

#### LATCHING OR UNLATCHING JOINT

Figure No. 6, page 4, shows the LEBUS UNLATCHING JOINT being separated after unlatching. This figure also illustrates joining parts together for latching the joint.

#### INSTRUCTIONS FOR DRESSING THE JOINT

##### For Right-Hand Release (See Fig. 7, Pg. 5)

1. Remove insert keyway plug (3) and screws (8).
2. Place both beveled latches (4) and springs (5) in latch windows using proper length screws (7).

NOTE: The latches and latch windows are marked with an "X". When the "X"s are lined up, the latches will be in the correct position. Latches MUST be placed in slots so bevel on latches will allow the drive body to pass over BOTH latches while moving to the RIGHT.

### For Left-Hand Release

1. Remove BOTH spring loaded beveled latches (4) and screws (7).
2. Place insert keyway plug in proper window and secure with proper screws (8).

NOTE: Screws for insert keyway plug are longer than the screws for the spring loaded latches. Screws MUST NOT be allowed to protrude above the keyway plug.

Figure No. 4

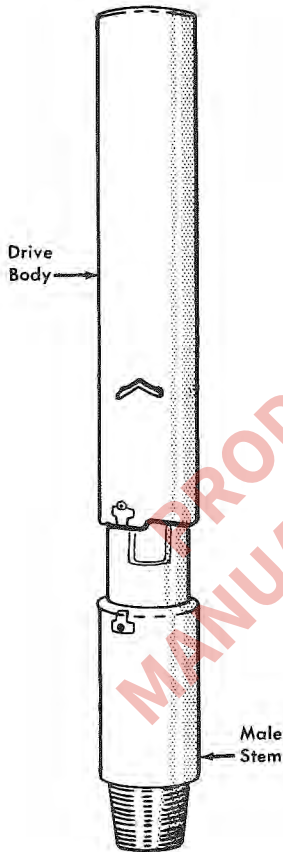


Figure No. 5

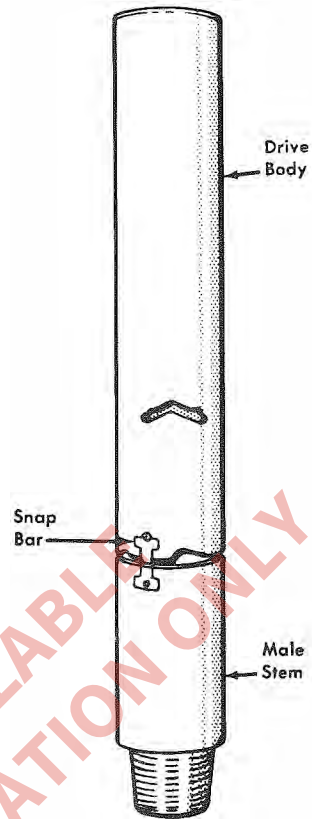
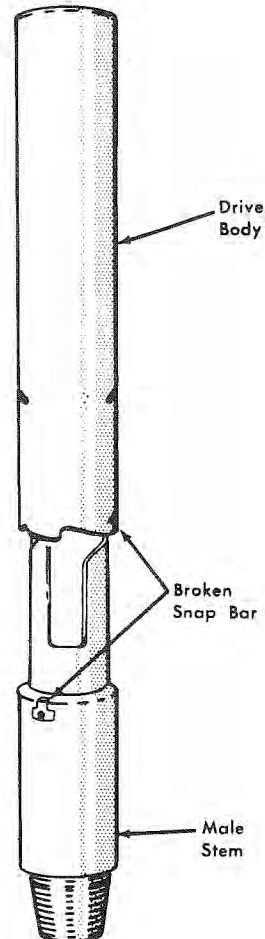
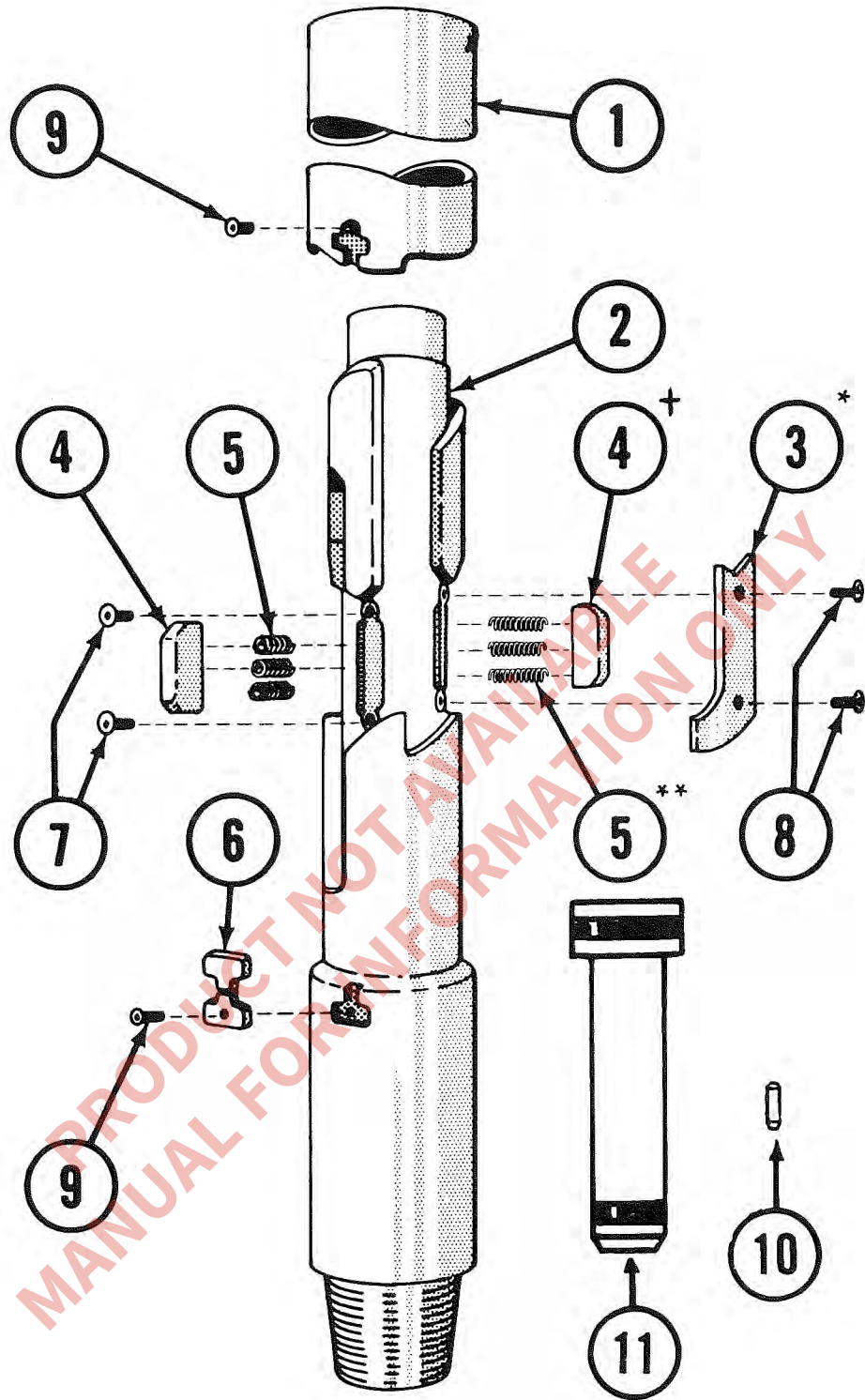


Figure No. 6





\* For LH Release Only  
 † For RH Release Only  
 \*\* Used with (4)

Figure No. 7

**BOWEN-LEBUS UNLATCHING JOINT  
SPECIFICATIONS AND PARTS LIST  
RS-25**

|                      |                                    |              |              |              |                          |              |                   |                             |                             |
|----------------------|------------------------------------|--------------|--------------|--------------|--------------------------|--------------|-------------------|-----------------------------|-----------------------------|
| BODY O.D. (Inches)   |                                    | 3/4          | 4            | 4 5/8        | 4 3/4                    | 5 3/4        | 6 1/4             | 6 3/4                       | 7 3/4                       |
| CONNECTIONS (Inches) |                                    | 2 3/8<br>REG | 2 7/8<br>IF  | 3 1/2<br>FH  | 3 1/2<br>REG<br>IF<br>FH | 4 1/2<br>FH  | 4 1/2<br>FH<br>IF | 4 1/2<br>IF<br>5 1/2<br>REG | 5 1/2<br>IF<br>6 3/8<br>REG |
| I.D. (Inches)        |                                    | 3/4          | 1            | 1 3/8        | 1 1/2                    | 1 3/4        | 2                 | 2                           | 3                           |
| COMPLETE ASSEMBLY    | <b>Part No. *</b><br><b>Weight</b> | 41307<br>90  | 38572<br>100 | 47023<br>140 | 38596<br>150             | 38611<br>235 | 38627<br>315      | 41324<br>405                | 41338<br>515                |

**REPLACEMENT PARTS**

|   |                                  |                    |               |               |               |               |               |               |               |
|---|----------------------------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| DRIVE BODY                                | <b>Part No.</b><br><b>Weight</b> | 1<br>41308<br>30   | 38573<br>34   | 47024<br>50   | 38597<br>55   | 38612<br>95   | 38628<br>130  | 41325<br>147  | 41339<br>190  |
| STEM                                      | <b>Part No.</b><br><b>Weight</b> | 2<br>41309<br>55   | 38574<br>60   | 47025<br>90   | 38598<br>95   | 38613<br>130  | 38629<br>175  | 41326<br>245  | 41340<br>310  |
| KEY FOR LEFT<br>HAND RELEASE              | <b>Part No.</b><br><b>Weight</b> | 3<br>41310<br>1/2  | 38575<br>1/2  | 47026<br>1    | 38599<br>1/2  | 38614<br>3/4  | 38630<br>3/4  | 38630<br>1    | 41341<br>1    |
| LATCH FOR RIGHT HAND<br>RELEASE (2 REQ'D) | <b>Part No.</b><br><b>Weight</b> | 4<br>41311<br>1/4  | 38576<br>1/4  | 47027<br>1/4  | 38600<br>1/4  | 38631<br>1/4  | 38631<br>1/4  | 38631<br>1/2  | 41343<br>1/2  |
| LATCH SPRING (6 REQ'D)                    | <b>Part No.</b><br><b>Weight</b> | 5<br>41312<br>1/16 | 38632<br>1/16 | 38632<br>1/16 | 38632<br>1/16 | 38632<br>1/16 | 38632<br>1/8  | 38632<br>1/8  | 38632<br>1/8  |
| SNAP BAR (2 REQ'D)                        | <b>Part No.</b><br><b>Weight</b> | 6<br>41313<br>1/8  | 38633B<br>1/8 | 38633B<br>1/4 | 38633B<br>108 | 38633B<br>1/4 | 38633B<br>1/4 | 38633B<br>1/4 | 38633B<br>1/4 |
| BEVEL LATCH SCREW<br>(4 REQ'D)            | <b>Part No.</b><br><b>Weight</b> | 7<br>23124<br>1/32 | 23138<br>1/32 | 25220<br>1/32 | 25220<br>1/32 | 23138<br>1/32 | 23138<br>1/32 | 23138<br>1/32 | 23138<br>1/32 |
| LEFT HAND PLUG SCREW<br>(2 REQ'D)         | <b>Part No.</b><br><b>Weight</b> | 8<br>23126<br>1/32 | 23141<br>1/32 | 23141<br>1/32 | 23141<br>1/32 | 23142<br>1/32 | 23142<br>1/32 | 23142<br>1/32 | 23142<br>1/32 |
| SNAP BAR SCREW<br>(4 REQ'D)               | <b>Part No.</b><br><b>Weight</b> | 9<br>38165<br>1/16 | 38165<br>1/16 | 38165<br>1/16 | 38165<br>1/16 | 38165<br>1/16 | 38165<br>1/16 | 38165<br>1/16 | 38165<br>1/16 |
| PACKING STEM                              | <b>Part No.</b><br><b>Weight</b> | 11<br>41319<br>4   | 58841<br>5    | 58842<br>7    | 38603<br>7    | 58843<br>9    | 58844<br>9    | 58844<br>11   | 41353<br>13   |
| PACKING STEM SEAL<br>LARGE (2 REQ'D)      | <b>Part No.</b>                  | 46157              | 30-4          | 30-9          | 30-12         | 30-16         | 30-15         | 30-15         | 30-21         |
| PACKING STEM SEAL<br>SMALL (2 REQ'D)      | <b>Part No.</b>                  | 46158              | 27-27         | 30-1          | 30-4          | 30-6          | 30-8          | 30-8          | 30-16         |
| LUGS<br>(2 REQ'D)                         | <b>Part No.</b>                  | 46156              | 46159         | 47029         | 43499         | 43789         | 46162         | 46165         | 46168         |

\* Item Nos. in this column will correspond to exploded view on Page 5

**HOW TO ORDER:**

**Specify:**

- (1) Name and Number of Assembly or Part
- (2) Any Desired Spares
- (3) O.D. if Other than Standard
- (4) Connections if Other than Standard

**RECOMMENDED SPARES:**

- (1) 12 Snap Bars
- (2) 6 Snap Bar Screws
- (3) 3 Keys
- (4) 12 Shear Pins
- (5) 4 Left Hand Plug Screws
- (6) 2 Packing Stem Seals (Large and Small)

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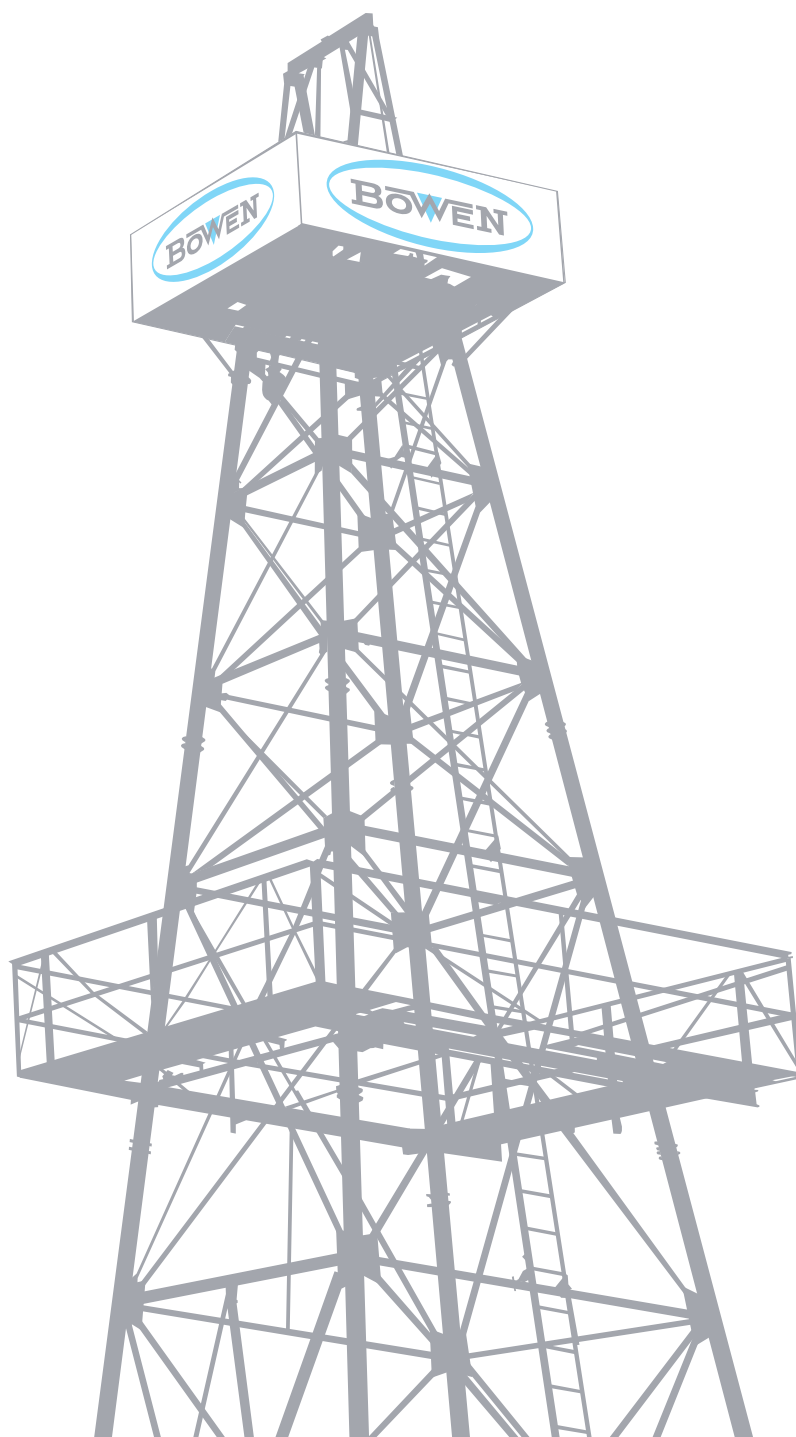
**Bowen Tools, Inc.**

2400 CROCKETT STREET

P.O. BOX 3186 ■ HOUSTON, TEXAS 77253-3186 ■ PHONE 713-869-6711  
CABLE ADDRESS: ITCO ■ TELEX 762-484

# Bowen Lebus Knuckle Joints

Instruction Manual 4810





# Bowen Lebus Knuckle Joints

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# Bowen Lebus Knuckle Joints

## General Description

The Bowen Lebus Knuckle Joint is an indispensable tool when fishing for lost tools or pipe in open hole or in greatly oversized cased holes. Its presence in the fishing string protects against misruns and allows retrieval of lost fish where they would otherwise be impossible to reach. This is particularly true where the upper end of the fish is located in a cavity or below a bridge or other obstruction.

Bowen Lebus knuckle joints are capable of transmitting full torque at all times during operation. Any normal jarring, bumping, pulling or rotating may be fully utilized during fishing.

The full-opening bore of the tool allows use of inside cutters, logging instruments or other tools to be run through the knuckle joint during operation.

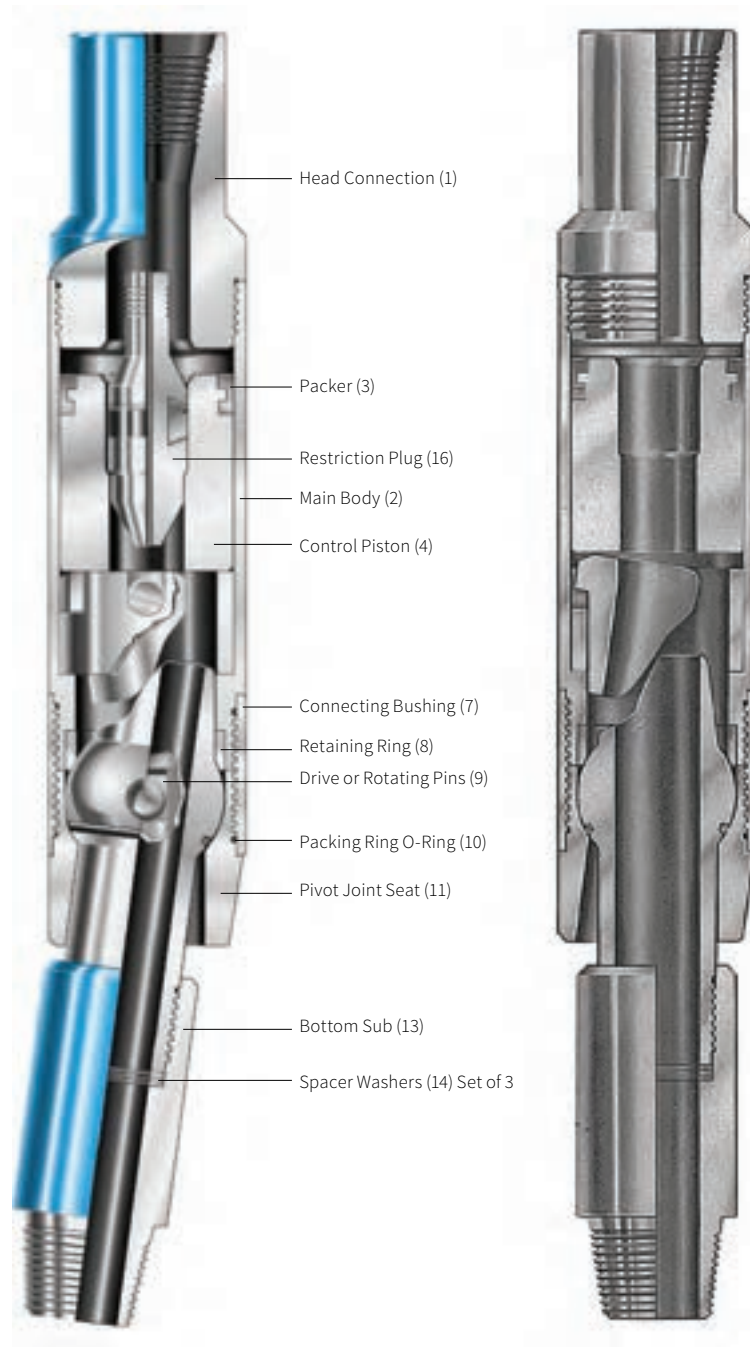
## Use

The Bowen Lebus knuckle joint is used to very good advantage in all fishing operations; either in cased holes that are greatly larger than the fish or in open holes. Even in well-conditioned holes, the knuckle joint aids in making quick easy contact and engagement with the fish.

The knuckle joint may be used with any fishing tool. It is particularly useful when running Bowen overshots, although any overshot, releasing spear, taper tap or other fishing tool may be run on the knuckle joint.

In cases where the top of the fish is in a cavity and the fishing tool cannot be lowered over the fish, the knuckling action produced by the knuckle joint will add lateral reach to the fishing tool which can

be gained in no other manner. The angling thus produced greatly increases the area in which the fishing tool can effectively engage the fish.



**Bowen Lebus Knuckle Joint**

# Bowen Lebus Knuckle Joints

## Construction

The construction of the Bowen Lebus knuckle joint is rugged and simple. It consists of the knuckle joint, a separate restriction plug to actuate the knuckling action, and a restriction plug overshot with which to retrieve the restriction plug when required.

The knuckle joint is composed of a head connection, main body, control piston, control lever, control lever cage, connecting bushing, retaining ring, pivot body, pivot joint, bottom sub, drive pins, spacer washers and seals.

The inside diameter of the control piston may vary from the maximum allowable, and ordered any reduced diameter as required. During operation, when the restriction plug is dropped, it seats in the control piston, deflecting it downward, forcing the control lever and control lever cage downward. This in turn causes the pivot joint to pivot to one side by a predetermined amount of approximately 7 degrees.

The radial direction of knuckle is oriented by the use of more or less washers between the pivot joint and bottom sub when the tool is assembled for use.

The restriction plug is essentially a dart with a packer on its outside diameter. It has a tapered lower end and a fishing neck at its upper end. It has a restricted bore, through which circulation may be maintained to the fishing tool below, during operation. The fishing neck allows the restriction plug to be retrieved during operation by use of the restriction plug overshot.

The restriction plug overshot is composed of an overshot head, body, spring, ring and slips. It may be run on wire line and rope socket, or on a small (cutting) string of pipe or tubing, to fish out the restriction plug. A drain hole in the head is provided to omit the necessity of pulling a wet string when withdrawing the overshot.

**NOTE: Because of the variation in available tool joint pin bore sizes, the control piston (Part 4) is the only part that has a variable bore, not of standard size. When the knuckle joint is ordered, the required bore size must be stipulated, or the bore size of the tool joint pins the tool is to be used with. This will assure receiving the proper bore size in the control piston, and the proper size restriction plug to match it. If the knuckle joint is to be used with several different sizes of tool joints, be sure to order a control piston and restriction plug for each.**

Refer to the restriction plug overshot and control piston table on pages 7 and 8 to aid in identifying and choosing restriction plugs, restriction plug pack-ers, restriction plug overshots, control pistons, and restriction plug overshot standard connections.

## Operation

The tool is first assembled and inspected to assure that it is in good operating condition.

**NOTE: Before or during assembly of the knuckle joint to the running string, check the bore of the control piston to assure that the bore is of the proper size. If the bore is too large, it will not stop and catch**

**the restriction plug. Also, check the inside diameter of the joints of the running string to assure that they will pass the proper restriction plug; or else the restriction plug cannot reach the knuckle joint.**

If the bore of the control piston is greatly undersize, it will cause the knuckle joint to function by force of the circulating mud pressure accidentally, and without use of the restriction plug.

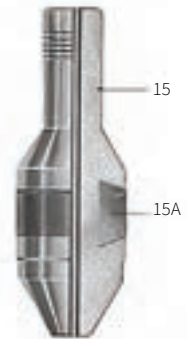
After the knuckle joint is made up to the fishing string, the overshot or other fishing tool should be made up to the knuckle joint. If a wall hook guide or cut lip guide is being used on the overshot, check whether the cut lip is positioned properly to contact the fish when the knuckle joint is caused to knuckle. Knuckle the knuckle joint by hand to determine this. If it does not, correct it by removing the bottom sub (part 13), and adding or removing one or more spacer washers (Part 14) as required. Then remake and check its action as before.

The knuckle joint is located in the fishing string immediately above the fishing tool. The balance of the fishing string, including fishing bumper sub, hydraulic jar and unlatching joint or safety joint, is located above the knuckle joint.

The knuckle joint is run into the hole to near the fish depth, maintaining full circulation through the tool. Circulation halts as the fish is approached and the restriction plug drops into the fishing string.



Restriction Plug Overshot



Restriction Plug



Restriction Plug Being Retrieved by Restriction Plug Overshot

# Bowen Lebus Knuckle Joints

**CAUTION:** Be sure to drop the restriction plug with the fishing neck in the upward position; otherwise it cannot be later retrieved.

Circulation is then reestablished to seat the restriction plug and maintain it in position. This will deflect the control piston, causing the tool to knuckle.

The string may be lowered to engage the fish. It may be necessary to raise and lower the string several times, rotating 5° to 10° each time the string is raised in order to locate and engage the fish (see picture on page 6).

After the fish is contacted and engaged, circulation is again halted. The restriction plug overshot, run on wireline or small tubing string, is used to retrieve the restriction plug. Full circulation may then be utilized to aid in pulling the fish.

If it is impossible to pull the fish by pulling and jarring, then the usual procedure is to run an inside cutter to a point below the stuck point; cut the pipe, and make recovery.

## Maintenance

Maintenance of the Bowen Lebus knuckle joint is relatively simple, confined primarily to cleaning and inspection. After use, completely disassemble and thoroughly clean the tool. Inspect all parts for signs of advanced wear or damage, and repair or replace any such parts. Coat all internal parts with grease or heavy grade oil before storing the tool.

## Complete Disassembly Knuckle Joint

1. To begin disassembly, clamp the main body in a suitable vise, horizontally. Do not overtighten the body in the vise.
2. Remove the head connection (Part 1).



**Restriction Plug Overshot**

3. Re-clamp on the pivot joint seat (part 12), and loosen and remove the bottom sub (Part 13).
4. Remove the pivot joint seat (Part 12).
5. Remove the pivot body (Part 11), from the pivot joint seat.
6. Remove the drive pins (Part 9) and o-ring from the pivot joint seat.
7. Re-clamp on the main body and remove the connection bushing (Part 7).

8. Using a rod or hammer handle, push the control lever (Part 5), and control lever cage (Part 6) out of the main body.
9. Remove the packer (Part 3) from the control piston (Part 4).

Thoroughly clean all parts and inspect them. Replace or repair any damaged or badly worn parts. Thoroughly grease all parts before reassembling.

## Restriction Plug, (Part 16).

1. Clamp in a suitable vise on the head (Part 16A). Remove the body (Part 16B).
2. Turn the body downside upward, allowing the slips (Part 16E), ring (Part 16D), and spring (Part 16C) to drop free.
3. If the restriction plug (Part 15) is in place and must be released, it may be released by screwing it out, using a left-hand screwing action.

The packer (Part 15A) may be removed from the restriction plug (Part 15) by slipping the bit of a screwdriver under the upper edge and lifting it sufficiently to start it over the retaining shoulder. Be careful not to nick or cut the packer during its removal.

# Bowen Lebus Knuckle Joints



Knuckle Joint Positioning Overshot Being Lowered to Engage Fish



Bowen Lebus Knuckle Joint with Overshot and Wallhook Guide Contacting Fish in a Cavity



After Contacting the Fish, Ready for Retrieval

# Bowen Lebus Knuckle Joints

## Restriction Plug Overshot Table

### Restriction Plugs, Control Pistons and Restriction Plug Overshots

| Knuckle Joint |           | Restriction Plug |                           | Restriction Plug Packer Part No. | Control Piston Part No. | Restriction Plug Overshot Part No. | Restriction Overshot Head Connection        |
|---------------|-----------|------------------|---------------------------|----------------------------------|-------------------------|------------------------------------|---|
| Part No.      | O.D.      | Part No.         | Size (O.D.'s)             |                                  |                         |                                    |   |
| 38795         | 4         | 38896            | 1 5/16 in. x 1 11/16 in.  | 42689                            | 38798                   | 38904                              | 5/8 in. S.R. Pin<br>or<br>3/4 in. S.R. Pin  |
|               |           | 53267            | 1 5/16 in. x 1 7/16 in.   | 54872                            | 60556                   |                                    |   |
| 38807         | 4 1/4 in. | 38896            | 1 5/16 in. x 1 11/16 in.  | 42689                            | 38810                   | 38904                              | 5/8 in. S.R. Pin<br>or<br>3/4 in. S.R. Pin  |
| 38819         | 4 3/4 in. | 38897            | 1 15/16 in. x 2 1/16 in.  | 42690                            | 38822                   |                                    |   |
|               |           | 41866            | 1 3/4 in. x 1 7/8 in.     | 43623                            | 45810                   |                                    |   |
|               |           | 38896            | 1 5/16 in. x 1 11/16 in.  | 42689                            | 50858                   |                                    |   |
|               |           | 53267            | 1 5/16 in. x 1 7/16 in.   | 54871                            | 54871                   |                                    |   |
| 38831         | 5 3/4 in. | 38899            | 2 1/2 in. x 2 5/8 in.     | 42691                            | 38834                   | 38910                              | 3/4 in. S.R. Pin                            |
|               |           | 38898            | 2 3/16 in. x 2 5/16 in.   | 50885                            | 50859                   |                                    |   |
|               |           | 38897            | 1 15/16 in. x 2 1/16 in.  | 42690                            | 50860                   | 38904                              | 5/8 in. S.R. Pin<br>or<br>3/4 in. S.R. Pin  |
|               |           | 41866            | 1 3/4 in. x 1 7/8 in.     | 43623                            | 50774                   |                                    |   |
|               |           | 38896            | 1 5/16 in. x 1 11/16 in.  | 42689                            | 50861                   |                                    |   |
| 38843         | 6 1/2 in. | 38900            | 2 13/16 in. x 2 5/16 in.  | 42692                            | 38846                   | 38916                              | 7/8 in. S.R. Pin or Box<br>3/4 in. S.R. Pin |
|               |           | 38899            | 2 1/2 in. x 2 5/8 in.     | 42691                            | 50863                   |                                    |   |
|               |           | 38898            | 2 3/16 in. x 2 5/16 in.   | 50885                            | 50864                   | 38904                              | 5/8 in. S.R. Pin<br>or<br>3/4 in. S.R. Pin  |
|               |           | 38897            | 1 15/16 in. x 2 1/16 in.  | 42690                            | 50865                   |                                    |   |
|               |           | 41866            | 1 3/4 in. x 1 7/8 in.     | 43623                            | 46450                   |                                    |   |
|               |           | 38896            | 1 5/16 in. x 1 11/16 in.  | 42689                            | 50866                   |                                    |   |
| 38856         | 7 1/4 in. | 38901            | 2 15/16 in. x 3 1/16 in.  | 42693                            | 38859                   | 38916                              | 7/8 in. S.R. Pin<br>or Box                  |
|               |           | 38900            | 3 13/16 in. x 2 15/16 in. | 42692                            | 50867                   |                                    |   |
|               |           | 38899            | 2 1/2 in. x 2 5/8 in.     | 42691                            | 50868                   | 38910                              | 3/4 in. S.R. Pin                            |
|               |           | 38898            | 2 3/16 in. x 2 5/16 in.   | 50885                            | 50869                   |                                    |   |
|               |           | 38897            | 1 15/16 in. x 2 1/16 in.  | 42690                            | 50870                   | 38904                              | 5/8 in. S.R. Pin<br>or<br>3/4 in. S.R. Pin  |
|               |           | 41866            | 1 3/4 in. x 1 7/8 in.     | 43623                            | 45052                   |                                    |   |
|               |           | 38896            | 1 5/16 in. x 1 11/16 in.  | 42689                            | 50871                   |                                    |   |
| 38870         | 7 1/2 in. | 38902            | 3 1/2 in. x 3 5/8 in.     | 42694                            | 38873                   | 38916                              | 7/8 in. S.R. Pin<br>or Box                  |
|               |           | 38901            | 2 15/16 in. x 3 1/16 in.  | 42693                            | 38859                   |                                    |   |
|               |           | 38900            | 2 13/16 in. x 2 15/16 in. | 42692                            | 50872                   | 38910                              | 3/4 in. S.R. Pin                            |
|               |           | 38899            | 2 1/2 in. x 2 5/8 in.     | 42691                            | 50873                   |                                    |   |
|               |           | 38898            | 2 3/16 in. x 2 5/16 in.   | 50885                            | 50874                   | 38904                              | 5/8 in. S.R. Pin<br>or<br>3/4 in. S.R. Pin  |
|               |           | 38897            | 1 15/16 in. x 2 1/16 in.  | 42690                            | 50875                   |                                    |   |
|               |           | 41866            | 1 3/4 in. x 1 7/8 in.     | 43623                            | 45052                   |                                    |   |
|               |           | 38896            | 1 5/16 in. x 1 11/16 in.  | 42689                            | 50876                   |                                    |   |

# Bowen Lebus Knuckle Joints

## Restriction Plug Overshot Table

### Restriction Plugs, Control Pistons and Restriction Plug Overshots

| Knuckle Joint |                          | Restriction Plug |                           | Restriction Plug Packer Part No. | Control Piston Part No. | Restriction Plug Overshot Part No. | Restriction Overshot Head Connection                              |
|---------------|--------------------------|------------------|---------------------------|----------------------------------|-------------------------|------------------------------------|---|
| Part No.      | O.D.                     | Part No.         | Size (O.D.'s)             |                                  |                         |                                    |   |
| 41385         | 7 7/8 in.                | 38902            | 3 1/2 in. x 3 3/8 in.     | 42694                            | 38873                   | 38916                              | 7 7/8 in. S.R. Pin<br>or Box                                      |
|               |                          | 38901            | 2 15/16 in. x 3 1/16 in.  | 42693                            | 38859                   |                                    |   |
|               |                          | 38900            | 2 13/16 in. x 2 15/16 in. | 42692                            | 50872                   |                                    |   |
|               |                          | 38899            | 2 1/2 in. x 2 5/8 in.     | 42691                            | 50873                   | 38910                              | 3/4 in. S.R. Pin  |
|               |                          | 38898            | 2 3/16 in. x 2 5/16 in.   | 50885                            | 50874                   |                                    |   |
|               |                          | 38897            | 1 15/16 in. x 2 1/16 in.  | 42690                            | 50875                   | 38904                              | 5/8 in. S.R. Pin<br>or<br>3/4 in. S.R. Pin                        |
|               |                          | 41866            | 1 3/4 in. x 1 7/8 in.     | 43623                            | 45052                   |                                    |   |
|               |                          | 38896            | 1 9/16 in. x 1 11/16 in.  | 42689                            | 50876                   |                                    |   |
| 38883         | 8 1/4 in.                | 38903            | 4 1/2 in. x 4 5/8 in.     | 45830                            | 38886                   | 38922                              | 2 3/8 in. API IF Box  |
|               |                          | 38902            | 3 1/2 in. x 3 5/8 in.     | 42694                            | 50877                   |                                    |   |
|               |                          | 38901            | 2 15/16 in. x 3 1/16 in.  | 42693                            | 50878                   | 38916                              | 7/8 in. S.R. Pin<br>or Box  |
|               |                          | 38900            | 2 13/16 in. x 2 15/16 in. | 42692                            | 50879                   |                                    |   |
|               |                          | 38899            | 2 1/2 in. x 2 5/8 in.     | 42691                            | 50880                   |                                    |   |
|               |                          | 38898            | 2 3/16 in. x 2 5/16 in.   | 50885                            | 50881                   | 38910                              | 3/4 in. S.R. Pin  |
|               |                          | 38897            | 1 15/16 in. x 2 1/16 in.  | 42690                            | 50882                   |                                    |   |
|               |                          | 41866            | 1 3/4 in. x 1 7/8 in.     | 43623                            | 50883                   | 38904                              | 5/8 in. S.R. Pin<br>or<br>3/4 in. S.R. Pin                        |
| 38896         | 1 9/16 in. x 1 11/16 in. | 42689            | 50884                     |                                  |                         |                                    |   |
| 41418         | 8 3/4 in.                | 38903            | 4 1/2 in. x 4 5/8 in.     | 45830                            | 38886                   | 38922                              | 2 3/4 in. API - IF Box  |
| 41497         | 9 3/8 in.                | 41512            | 5 1/2 in. x 5 5/8 in.     | 42695                            | 41501                   | 38922                              | 2 3/8 in. API - IF Box  |
|               |                          | 38903            | 4 1/2 in. x 4 5/8 in.     | 45830                            | 58766                   |                                    |   |
|               |                          | 38902            | 3 1/2 in. x 3 5/8 in.     | 42694                            | 58761                   |                                    |   |
|               |                          | 38901            | 2 15/16 in. x 3 1/16 in.  | 42693                            | 58762                   | 38916                              | 3/4 in. S.R. Pin  |
|               |                          | 38900            | 2 13/16 in. x 2 15/16 in. | 42692                            | 58760                   |                                    |   |
|               |                          | 38899            | 2 1/2 in. x 2 5/8 in.     | 42691                            | 58763                   | 38910                              | 7/8 in. S.R. Box  |
|               |                          | 38898            | 2 3/16 in. x 2 5/16 in.   | 50885                            | 58764                   |                                    |   |
|               |                          | 38897            | 1 15/16 in. x 2 1/16 in.  | 52690                            | 58765                   |                                    |   |
|               |                          |                  |                           |                                  |                         | 38904                              | 1 5/16 in. - 10 Pin or<br>3/4 in. S.R. Pin or<br>5/8 in. S.R. Pin |

# Bowen Lebus Knuckle Joints

## Specifications and Replacement Parts

### Bowen Lebus Knuckle Joint

| Lebus Part No. | O.D. Size                | 4 in.        | 4 ¼ in.                 | 4 ¾ in.                      | 5 ¾ in.                      | 6 in.        | 7 ¼ in.                             | 7 ½ in.     | 7 ¾ in.                  | 8 ¼ in.                      | 8 ¾ in.                      | 9 ¾ in.      |
|----------------|--------------------------|--------------|-------------------------|------------------------------|------------------------------|--------------|-------------------------------------|-------------|--------------------------|------------------------------|------------------------------|--------------|
|                | <b>Connections</b>       | 2 ¾ in. I.F. | 2 ¾ in. or 2 ¾ in. I.F. | 2 ¾ in. I.F. or 3 ½ in. F.H. | 3 ½ in. I.F. or 4 ½ in. F.H. | 4 ½ in. F.H. | 4 ½ in. F.H. or X-Hole or 5 ½ in. R | 4 ½ in I.F. | 5 ½ in. F.H. or 6 ¾ F.H. | 5 ½ in. I.F. or 6 ¾ in. F.H. | 5 ½ in. I.F. or 6 ¾ in. F.H. | 6 ¾ in. I.F. |
|                | <b>Maximum tool I.D.</b> | 1 ¾ in.      | 1 ¾ in.                 | 1 ¾ in.                      | 2 ½ in.                      | 2 ¾ in.      | 2 ¾ in.                             | 3 ½ in.     | 3 ½ in.                  | 4 ½ in.                      | 4 ½ in.                      | 5 ½ in.      |
|                | <b>Complete assembly</b> |              |                         |                              |                              |              |                                     |             |                          |                              |                              |              |
|                | <b>Part No.</b>          | 38795        | 38807                   | 38819                        | 38831                        | 38843        | 38856                               | 38870       | 41385                    | 38883                        | 41418                        | 41497        |
|                | <b>Weight</b>            | 92 lbs       | 108 lbs                 | 140 lbs                      | 227 lbs                      | 316 lbs      | 361 lbs                             | 379 lbs     | 426 lbs                  | 479 lbs                      | 534 lbs                      | 588 lbs      |

### Replacement Parts

|    |                                |          |         |         |         |         |         |        |        |         |         |         |         |
|----|--------------------------------|----------|---------|---------|---------|---------|---------|--------|--------|---------|---------|---------|---------|
| 1  | Head connection                | Part No. | 38796   | 38808   | 38820   | 38832   | 38844   | 38857  | 38871  | 41386   | 38884   | 41419   | 41499   |
|    |                                | Weight   | 10      | 20 lbs  | 30 lbs  | 55 lbs  | 80 lbs  | 90 lbs | 90 lbs | 100 lbs | 113 lbs | 125 lbs | 140 lbs |
| 2  | Main body                      | Part No. | 38797   | 38809   | 38821   | 38833   | 38845   | 38858  | 38872  | 41387   | 38885   | 41455   | 41500   |
|    |                                | Weight   | 15 lbs  | 16 lbs  | 21 lbs  | 34 lbs  | 40 lbs  | 45 lbs | 60 lbs | 63 lbs  | 66 lbs  | 70 lbs  | 75 lbs  |
| 3  | Packer                         | Part No. | 41291   | 41292   | 41293   | 41294   | 41295   | 41296  | 41296  | 41296   | 41298   | 41298   | 41511   |
|    |                                | Weight   | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb   | ¼ lb   | ¼ lb    | ¼ lb    | ¼ lb    | ¼ lb    |
| 4  | Control piston*                | Part No. | 38798   | 38810   | 38822   | 38834   | 38846   | 38859  | 38873  | 38873   | 38886   | 38886   | 41501   |
|    |                                | Weight   | 7 lbs   | 9 lbs   | 13 lbs  | 26 lbs  | 30 lbs  | 47 lbs | 39 lbs | 43 lbs  | 46 lbs  | 50 lbs  | 55 lbs  |
| 5  | Control lever                  | Part No. | 38799   | 38811   | 38823   | 38835   | 38847   | 38860  | 38874  | 38874   | 38887   | 38887   | 41502   |
|    |                                | Weight   | 2 ½ lbs | 2 ½ lbs | 3 lbs   | 3 ½ lbs | 7 lbs   | 9 lbs  | 10 lbs | 11 lbs  | 12 lbs  | 13 lbs  | 14 lbs  |
| 6  | Control lever cage             | Part No. | 38800   | 38812   | 38824   | 38836   | 38848   | 38861  | 38875  | 38875   | 38888   | 38888   | 41503   |
|    |                                | Weight   | 2 lbs   | 2 lbs   | 3 ½ lbs | 5 lbs   | 8 lbs   | 10 lbs | 11 lbs | 12 lbs  | 13 lbs  | 14 lbs  | 15 lbs  |
| 7  | Connecting bushing             | Part No. | 38801   | 38813   | 38825   | 38837   | 38849   | 38862  | 38876  | 41391   | 38889   | 41472   | 41504   |
|    |                                | Weight   | 4 lbs   | 4 lbs   | 7 lbs   | 11 lbs  | 12 lbs  | 14 lbs | 15 lbs | 16 lbs  | 17 lbs  | 18 lbs  | 19 lbs  |
| 8  | Retaining ring                 | Part No. | —       | —       | —       | —       | 38850   | 38863  | 38877  | 38877   | 38890   | 38890   | 42055   |
|    |                                | Weight   | —       | —       | —       | —       | 2 ½ lbs | 3 lbs  | 3 lbs  | 3 lbs   | 3 lbs   | 4 lbs   | 4 lbs   |
| 9  | Drive or rotating Pins per set | Part No. | 38802   | 38814   | 38826   | 38838   | 38851   | 38864  | 38878  | 38878   | 38891   | 38891   | 41505   |
|    |                                | Weight   | ¾ lbs   | ¼ lbs   | ¼ lbs   | ½ lbs   | ¾ lbs   | 1 lbs  | 1 lbs  | 1 ½ lbs | 1 ½ lbs | 2 lbs   | 2 lbs   |
| 10 | Packing ring O-ring            | Part No. | 30-9    | 30-10   | 30-12   | 30-20   | 30-23   | 30-29  | 30-30  | 30-34   | 30-36   | 30-36   | 30-42   |
|    |                                | Weight   | ½ lbs   | ½ lbs   | ½ lbs   | ½ lbs   | ½ lbs   | ½ lbs  | ½ lbs  | ½ lbs   | ½ lbs   | ½ lbs   | ½ lbs   |
| 11 | Pivot joint seat               | Part No. | 38803   | 38815   | 38827   | 38839   | 38852   | 38865  | 38879  | 41393   | 38892   | 41474   | 41506   |
|    |                                | Weight   | 7       | 9       | 12      | 17      | 24      | 35     | 46     | 47      | 48      | 49      | 51      |
| 12 | Pivot joint body               | Part No. | 38804   | 38816   | 38828   | 38840   | 38853   | 38866  | 38880  | 38880   | 38893   | 38893   | 41507   |
|    |                                | Weight   | 11 lbs  | 11 lbs  | 13 lbs  | 27 lbs  | 39 lbs  | 40 lbs | 41 lbs | 43 lbs  | 45 lbs  | 48 lbs  | 53 lbs  |
| 13 | Bottom sub                     | Part No. | 38806   | 38817   | 38829   | 38841   | 38854   | 38867  | 38881  | 38881   | 38894   | 41479   | 41509   |
|    |                                | Weight   | 23 lbs  | 24 lbs  | 25 lbs  | 29 lbs  | 52 lbs  | 46 lbs | 47 lbs | 64 lbs  | 90 lbs  | 115 lbs | 135 lbs |
| 14 | Spacer washers per set of 3    | Part No. | 38805   | 38805   | 38830   | 38842   | 38855   | 38868  | 38882  | 38882   | 38895   | 38895   | 41508   |
|    |                                | Weight   | ¼ lbs   | ¼ lbs   | ¼ lbs   | ¼ lbs   | ¼ lbs   | ¼ lbs  | ¼ lbs  | ¼ lbs   | ¾ lbs   | ¾ lbs   | ¼ lbs   |

\* Refer to tables on Pages 7 and 8 for additional control pistons and list of restriction plugs and packers.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Any desired spares
  - (3) O.D. if other than standard
  - (4) Connections if other than standard



### Recommended Spare Parts:

- (1) 2 rubber packers
- (2) 1 packer ring
- (3) 1 overshot
- (4) 1 restriction plug



# Bowen Lebus Knuckle Joints

## Specifications and Replacement Parts

### Bowen Lebus Knuckle Joint

| Lebus Part No. | Complete assembly | Part No. | 38795 | 38807 | 38819 | 38831 | 38843 | 38856 | 38870 | 41385 | 38883 | 41418 | 41497 |
|----------------|-------------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|----------------|-------------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

### Replacement Parts (Continued)

|     |                           |          |         |         |         |         |         |         |         |         |         |         |         |
|-----|---------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 15  | Restriction* plug         | Part No. | 38896   | 38896   | 38897   | 38899   | 38900   | 38901   | 38902   | 38902   | 38903   | 38903   | 41512   |
|     |                           | Weight   | 2 ½ lbs | 2 ½ lbs | 4 lbs   | 7 lbs   | 8 lbs   | 8 ½ lbs | 9 lbs   | 9 lbs   | 10 lbs  | 11 lbs  | 11 lbs  |
| 15A | Restriction* plug packer  | Part No. | 42689   | 42689   | 42690   | 42691   | 42692   | 42693   | 42694   | 42694   | 45830   | 45830   | 42695   |
|     |                           | Weight   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | —       | —       |
| 16  | Restriction plug Overshot | Part No. | 38904   | 38904   | 38904   | 38910   | 38916   | 38916   | 38916   | 38916   | 38922   | 38922   | 38922   |
|     |                           | Weight   | 4 lbs   | 4 lbs   | 4 lbs   | 5 ¼ lbs | 5 ¾ lbs | 5 ¾ lbs | 5 ¾ lbs | 5 ¾ lbs | 6 ½ lbs | 6 ½ lbs | 6 ½ lbs |
| 16A | Overshot head             | Part No. | 38905   | 38905   | 38905   | 38911   | 38917   | 38917   | 38917   | 38917   | 38923   | 38923   | 38923   |
|     |                           | Weight   | 2 ½ lbs | 2 ½ lbs | 2 ½ lbs | 2 ½ lbs | 2 ¾ lbs | 2 ¾ lbs | 2 ¾ lbs | 2 ¾ lbs | 3 lbs   | 3 lbs   | 3 lbs   |
| 16B | Overshot body             | Part No. | 38906   | 38906   | 38906   | 38912   | 38918   | 38918   | 38918   | 38918   | 38924   | 38924   | 38923   |
|     |                           | Weight   | 1 ¼ lbs | 1 ¼ lbs | 1 ¼ lbs | 2 ½ lbs | 2 ¾ lbs | 2 ¾ lbs | 2 ¾ lbs | 2 ¾ lbs | 3 lbs   | 3 lbs   | 3 lbs   |
| 16C | Overshot spring           | Part No. | 38907   | 38907   | 38907   | 38913   | 38919   | 38919   | 38919   | 38919   | 38925   | 38925   | 38923   |
|     |                           | Weight   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    |
| 16D | Overshot ring             | Part No. | 38908   | 38908   | 38908   | 38914   | 38920   | 38920   | 38920   | 38920   | 38926   | 38926   | 38923   |
|     |                           | Weight   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    |
| 16E | Overshot slips            | Part No. | 38909   | 38909   | 38909   | 38915   | 38921   | 38921   | 38921   | 38921   | 38927   | 38927   | 38923   |
|     |                           | Weight   | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    | ½ lb    |

\* Refer to tables on Pages 7 and 8 for additional control pistons and list of restriction plugs and packers.



### How to Order

- Specify:
- (1) Name and number of assembly or part
  - (2) Any desired spares
  - (3) O.D. if other than standard
  - (4) Connections if other than standard



### Recommended Spare Parts:

- (1) 2 rubber packers
- (2) 1 packer ring
- (3) 1 overshot
- (4) 1 restriction plug

### Calculated Strength Bowen Lebus Knuckle Joints

| Assembly Number | Outside Diameter | Maximum Inside Diameter | Tensile* Strength @ Yield Point | Torque* Strength @ Yield Point |
|-----------------|------------------|-------------------------|---------------------------------|--------------------------------|
| 38795           | 4 in.            | 1 9/16 in.              | 269,400 lbs                     | 12,700 ft-lbs                  |
| 38807           | 4 ¼ in.          | 1 9/16 in.              | 332,880 lbs                     | 12,880 ft-lbs                  |
| 38819           | 4 ¾ in.          | 1 11/16 in.             | 359,160 lbs                     | 18,508 ft-lbs                  |
| 38831           | 5 ¾ in.          | 2 ½ in.                 | 565,440 lbs                     | 37,500 ft-lbs                  |
| 38843           | 6 ½ in.          | 2 13/16 in.             | 637,080 lbs                     | 49,921 ft-lbs                  |
| 38856           | 7 ¼ in.          | 2 13/16 in.             | 940,440 lbs                     | 68,638 ft-lbs                  |
| 38870           | 7 ½ in.          | 3 ½ in.                 | 808,680 lbs                     | 70,175 ft-lbs                  |
| 38883           | 8 ¼ in.          | 4 ½ in.                 | 753,000 lbs                     | 80,085 ft-lbs                  |

\* The strengths shown are theoretical calculations based on yield strength of the material used in each case. The strengths shown are therefore accurate plus or minus 20% of the figure shown only. These figures do not constitute a guarantee, actual or implied; they are meant to serve as a guide only, and appropriate allowance must be made in use, as a safety factor.



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BOWEN KEYSEAT REAMERS  
INSTRUCTION MANUAL 5/5190

**PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY**

# INSTRUCTION MANUAL

## BOWEN KEYSEAT REAMER

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## BOWEN KEYSEAT REAMERS

### GENERAL

#### DESCRIPTION

Used in conjunction with a routine drilling Assembly, Bowen Keyseat Reamers are designed to remove keyseats which may hamper efforts to remove the drill pipe.

A Keyseat is a slot worn on the high side of the hole when the rotating drill pipe experiences a severe angle change. This slot prohibits the drill collars from passing through the hole as the drill pipe is removed.

#### CONSTRUCTION

Bowen Keyseat Reamers are constructed with a sliding sleeve. Welded on the sleeve, in a spiral configuration, are Itcoloy (sintered tungsten carbide) strips with an outside diameter slightly larger than the drill collars. This diameter allows the sleeve to be rotated through the keyseat, enlarging the slot enough to pass the full sized drill collar assemblies. This rotation is accomplished with the use of a positive clutch located at the bottom of the tool. Should the sleeve become stuck in the keyseat, the tool may be jarred free by setting weight down and rotating, which causes a downward blow. This procedure is accomplished through the use of the tool's cam type overriding clutch, located at the top of the tool.

#### OPERATION

The Bowen Keyseat Reamer should be located in the string immediately above the drill collars. After locating the Keyseat, the Bowen Keyseat Reamer is raised to engage it. The tool is then rotated, causing the Itcoloy strips to cut clearance for the drill collars. During drilling operations, the sleeve remains engaged with the positive clutch and rotates with the drill pipe.

#### MAINTENANCE

Bowen Keyseat Reamers require very little maintenance. The tool's sleeve is furnished with washout holes for flushing out debris from around the mandrel. Occasionally, the Itcoloy strips welded on the tool's sleeve will require resurfacing. This may easily be done by any qualified welder familiar with brazing techniques.

Before storing the Bowen Keyseat Reamer for an extended period, the Mandrel should be greased or oiled through the washout holes. All tool joints should be heavily greased and the entire tool repainted.

SPECIFICATIONS - BOWEN KEYSEAT REAMERS

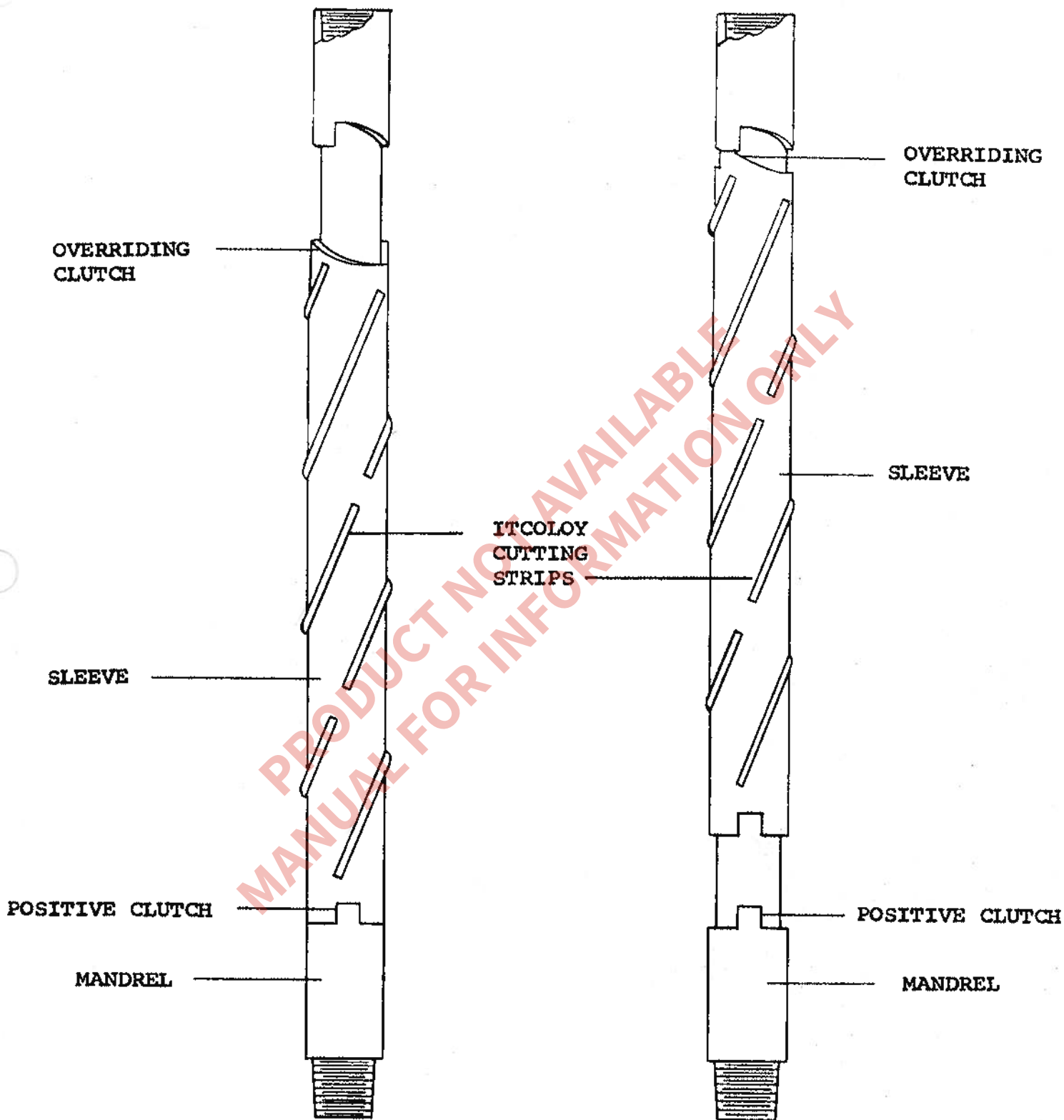
|                   |                    |                |              |              |
|-------------------|--------------------|----------------|--------------|--------------|
| CONNECTION        | 2-7/8<br>IF        | 3-1/2<br>IF FH | 4<br>FH      | 4-1/2<br>FH  |
| TOOL O.D.         | 4-1/4              | 4-3/4          | 5-1/2        | 5-3/4        |
| BLADE O.D.        | 4-7/8              | 5              | 5-3/4        | 6            |
| BORE SIZE         | 1-1/4              | 1-1/2          | 1-3/4        | 2-1/4        |
| LENGTH            | 66                 | 84             | 93           | 101          |
| COMPLETE ASSEMBLY | Part No.<br>Weight | 77711<br>178   | 77712<br>272 | 77713<br>344 |
|                   |                    |                |              | 77714<br>449 |

|                   |                    |              |                          |                            |
|-------------------|--------------------|--------------|--------------------------|----------------------------|
| CONNECTION        | 4-1/2<br>X-HOLE    | 4-1/2<br>IF  | 4-1/2<br>IF X<br>5-1/2FH | 4-1/2<br>IF X<br>6-5/8 REG |
| TOOL O.D.         | 6                  | 6-1/4        | 6-3/4                    | 7-3/4                      |
| BLADE O.D.        | 6-1/4              | 6-1/2        | 7-1/4                    | 8-1/4                      |
| BORE SIZE         | 2-1/4              | 2-3/4        | 2-3/4                    | 2-3/4                      |
| LENGTH            | 101                | 102          | 102                      | 105                        |
| COMPLETE ASSEMBLY | Part No.<br>Weight | 77715<br>461 | 77716<br>593             | 77717<br>728               |
|                   |                    |              |                          | 77718<br>832               |

HOW TO ORDER:

SPECIFY:

- (1) Tool Joint Size, Type, & O.D.
- (2) Drill Collar O. D.
- (3) Hole Size



BOWEN KEYSEAT REAMER



# WIRELINER RETRIEVER

Instruction Manual 8820



PRODUCT NOT AVAILABLE  
MANUAL FOR INFORMATION ONLY

Wireline Retriever



**NATIONAL OILWELL VARCO**

One Company Unlimited Solutions

# Wireline Retriever

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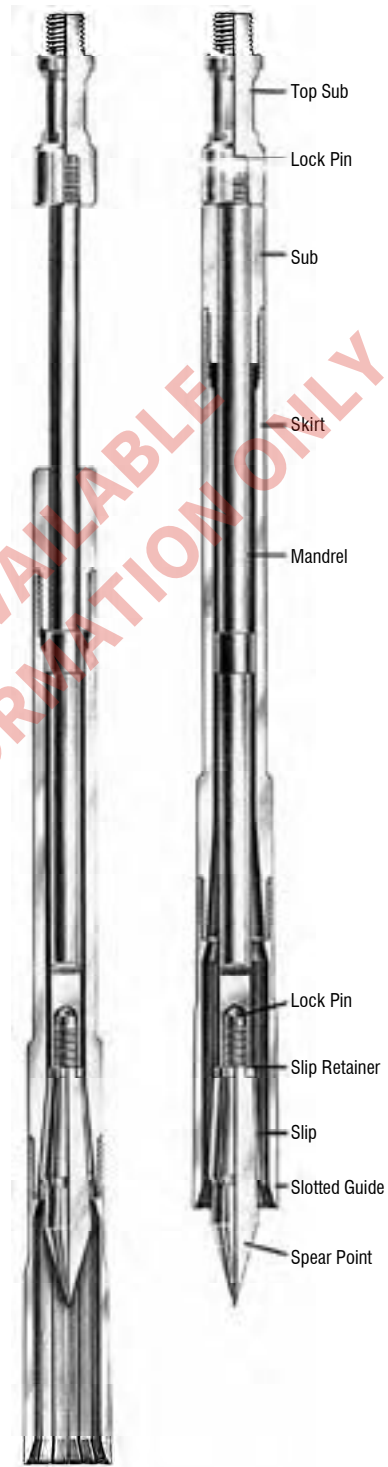
The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Second printing, September 2005

### General Description

**Bowen Wireline Retrievers** are specifically designed for recovering cut or broken single-strand measuring lines or small-diameter stranded lines. Since cut or broken wireline stands in soft coils inside the pipe with the uppermost portion standing fairly straight up, it is desirable to grab the line just below the break in order to prevent damage to it or to the well.

In operation, the Bowen Wireline Retriever is made up on the bottom of the running-in string. As it descends into the well, the well fluid and friction causes the Skirt to ride up on the Mandrel exposing the Spear Point and the opening between the Guide and the Slip. When the tool contacts the broken line, the line will pass through the space between the Guide and the Slip. Contact is indicated by a loss of running-in string weight or in the rate of descent. Stopping the decent causes the Skirt to move down the Mandrel, wedging the caught line between the two matching tapers of the Slip and Skirt. Pulling up on the wireline securely wedges the line between the Slip and the Skirt, and the entire wireline can then be pulled from the well.



Bowen Wireline Retriever

### Bowen Wireline Retriever Specifications

|                          |          |         |        |         |
|--------------------------|----------|---------|--------|---------|
| Tool O.D. - (Inches)     |          | 1-1/2   | 1-1/2  | 1-13/16 |
| To Run In                |          | 1-1/2   | 1-1/2  | 2-3/8   |
|                          |          | Tubing  | Tubing | Tubing  |
| Can Be Adapted To Run In |          | 2-1/16  | 2-3/8  | 2-7/8   |
| (See Extra Parts)        |          | 2       | 2-7/8  | 3-1/2   |
| Top Connection Pin       |          | 15/16   | 15/16  | 15/16   |
|                          |          | 10 Thd  | 10 Thd | 10 Thd  |
| Type                     |          | Slip    | Slip   | Slip    |
| Skirt Type               |          | Slotted | Plain  | Slotted |
| Complete                 | Part No. | 27650   | 15717  | 18995   |
| Assembly                 | Weight.  | 13      | 13     | 15      |

### Replacement Parts

|               |          |       |        |       |
|---------------|----------|-------|--------|-------|
| Top Sub       | Part No. | 11741 | 10761  | 10761 |
|               | Weight.  | 3-1/2 | 2-1/4  | 2-1/4 |
| Mandrel       | Part No. | 27653 | 15718  | 15718 |
|               | Weight.  | 2     | 3      | 3     |
| Sub           | Part No. | 27652 | 15719  | 15719 |
|               | Weight.  | 1-1/2 | 1-1/2  | 1-1/2 |
| Spear Point   | Part No. | 27655 | 15720  | 15720 |
|               | Weight.  | 1/8   | 1-1/2  | 1-1/2 |
| Skirt         | Part No. | 27651 | 15721* | 18996 |
|               | Weight.  | 3     | 4-1/8  | 6     |
| Slip          | Part No. | 27654 | 15722  | 15722 |
|               | Weight.  | 1     | 1/2    | 1/2   |
| Spring Pin    | Part No. | 16010 | 14214  | 14214 |
|               | Weight.  | 1/16  | 1/16   | 1/16  |
| Spring Pin    | Part No. | 2632  | 13431  | 13431 |
|               | Weight.  | 1/16  | 1/16   | 1/16  |
| Slip Retainer | Part No. | 27657 | 15728  | 15728 |
|               | Weight.  | 1/4   | 1/4    | 1/4   |
| Guide         | Part No. | 27656 | —      | 18997 |
|               | Weight.  | 1/2   | —      | 2     |

### Extra Parts - Oversize Skirts

|                  |          |   |       |   |
|------------------|----------|---|-------|---|
| For 2-3/8 Tubing | Part No. | — | 15721 | — |
| For 2-7/8 Tubing | Part No. | — | 15721 | — |

### Oversize Guides

|                            |          |       |   |       |
|----------------------------|----------|-------|---|-------|
| For 2-1/16 Tubing          | Part No. | 27656 | — | —     |
| For 2-3/8 Tubing           | Part No. | 27656 | — | 18997 |
| For 2-1/4 O.D.             | Part No. | —     | — | 18997 |
| For 2-7/8 Tubing           | Part No. | 27656 | — | 18997 |
| For 3-1/2 9.2 – 9.3 Tubing | Part No. | 27655 | — | 18997 |
| For 3-1/2 10.2 Tubing      | Part No. | —     | — | 18997 |
| For 4 O.D. Tubing          | Part No. | —     | — | 18997 |

\* Special Slotted Skirt, No. 15721.

### How to Order

Specify:

- (1) Name and Number of Assembly and Part
- (2) Tubing Size to Run In
- (3) Any Desired Extras by Name and Part Number

Recommended Spares:

- (1) 1 Guide or Skirt for Each Tubing Size
- (2) 6 Each Spring Pins



**Alaska**  
4111 Ingra  
Anchorage, Alaska 99503  
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Fax: 907 561 0071

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Fax: 337 839 2211

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Fax: 985 851 1117

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Fax: 405 677 2457

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Fax: 361 664 0462

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Fax: 713 691 7807

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Fax: 903 984 7170

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United States  
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Fax: 304 623 2174

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Fax: 307 237 2546

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Canada  
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Fax: 780 463 2348

3550 93 Street\*  
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Canada  
Phone: 780 944 3929  
Fax: 780 430 0760

1100 540 5th Avenue SW (Mailing)  
1010 540 5th Avenue SW (Office)  
Calgary, Alberta T2P 0M2  
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Fax: 403 294 5790

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Fax: 44(0) 1242 602614

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Jakarta, 12560  
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Fax: 62 21 782 6086

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Pitmedden Road Industrial Estate  
Dyce, Aberdeen AB21 0BF  
Scotland  
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Fax: 441 224 723034

**Singapore**  
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Singapore  
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Fax: 65 68610728

**Germany**  
Edesser Straße 1  
31234 Edemissen Berkhöpen  
Postfach 31232  
Germany  
Phone: 49 5176 97670  
Fax: 49 5176 9767 22

\* Denotes Manufacturing and Engineering facilities

Downhole Solutions

Drilling Solutions

Engineering and Project Management Solutions

Lifting and Handling Solutions

Production Solutions

Supply Chain Solutions

Tubular and Corrosion Control Solutions

Well Service and Completion Solutions

Corporate Headquarters

10000 Richmond Avenue  
Houston, Texas 77042  
United States  
Phone: 713 346 7500  
Fax: 713 346 4493

# CABLE GUIDED & SIDE DOOR FISHING METHODS

Instruction Manual 8890



Cable Guided & Side Door Fishing Methods

One Company Unlimited Solutions



**NATIONAL OILWELL**

# Cable Guided & Side Door Fishing Methods

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## **Cable Guided & Side Door Fishing Methods**

### **Cable Guided Fishing Method**

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### **Side Door Fishing Method**

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*Seventeenth Printing, April 2004*



**NATIONAL OILWELL**

**General Description**

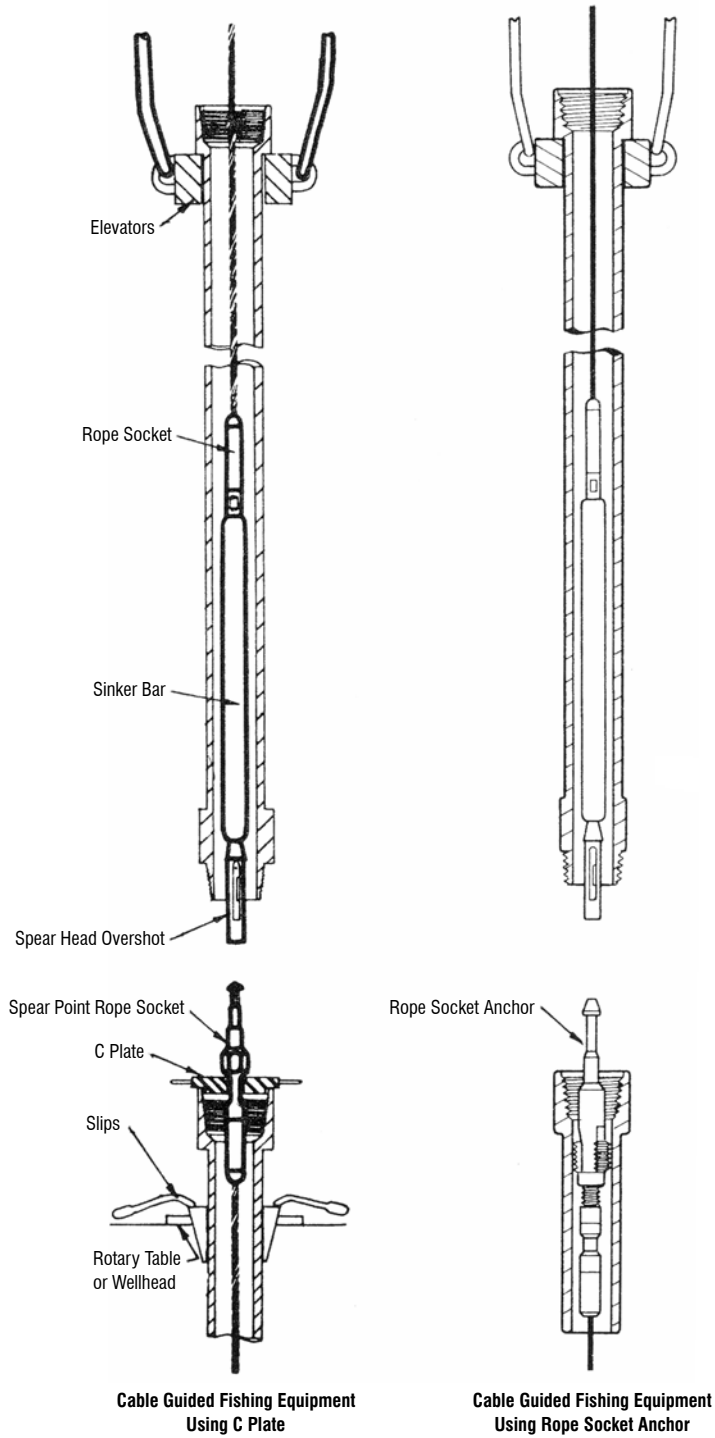
The Bowen Cable Guided Fishing Method employs specialty tools and accessories to insure positive engagement with stuck subsurface tools by the Overshot before the cable is released from the cable head. With the Bowen Cable Guided Fishing Method, valuable tools can be recovered, expensive multi-conductor cable can be salvaged and the bore hole can be cleared with a minimum of downtime.

The Side Door Fishing method employs the **Series 160 Side Door Overshot**, which is run on tubing or drill pipe, when fishing wire line in a cased hole. Use of these Overshots eliminates the necessity of cutting the line or cable.

**Use**

The Bowen Cable Guided Fishing Method is most frequently used in open-hole electrical well logging and related services conducted in uncased holes. Frequently, well conditions are such that tools used in these services become stuck, bridged over, or the line becomes key-seated in the walls of the well bore. The Cable Guided Fishing Method provides not only the procedure but also a completely custom tailored set of tools to recover such stuck tools and clear the well bore.

The Series 160 Side Door Overshot is recommended for use when fishing for conductor line or cable in a cased hole. They eliminate the necessity of cutting the line or cable, and provide greater pull capacity and control than do conventional wire line overshots.



**Cable Guided Fishing Equipment Using C Plate**

**Cable Guided Fishing Equipment Using Rope Socket Anchor**



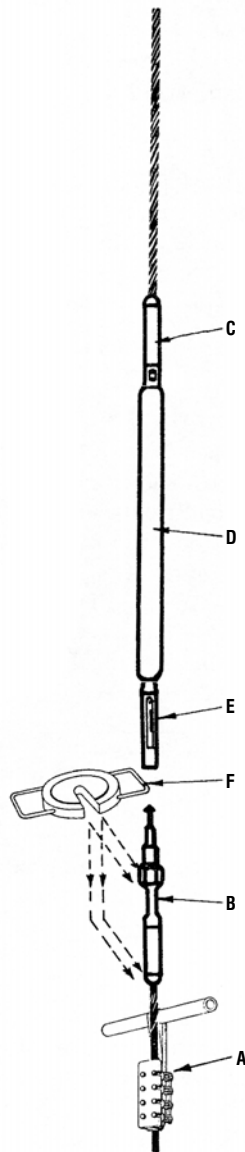
### Construction

Construction of the individual component assemblies will be covered separately in the following pages. Construction of the overall fishing assembly for the Bowen Cable Guided Fishing Method consists of a Cable Hanger, Spear Head Rope Socket, Rope Socket, Sinker Bar, Spear head Overshot, and "C" Plate.

### Assembly of the Equipment

The component assemblies are assembled together as follows:

1. Take a light strain on the cable to remove the slack.
2. Attach the Cable Hanger (A) to the cable at the well head, and lower the cable until the Cable Hanger rests on the Well Head or rotary table.
3. Cut the cable approximately four (4) feet above the Cable Hanger.
4. Make the Spear head Rope Socket (B) up to the 4 feet long end of the cable above the Cable Hanger (the lower half of the severed cable).
5. Make the second Rope Socket (C) up to the upper severed half of the cable end.
6. Connect the Sinker Bar (D) to the upper Rope Socket (C).
7. Connect the Spear head Overshot (E) to the Sinker Bar (D).
8. Engage the Spear Head Overshot (E) with the Spear Head Rope Socket (B) and exert a test strain of 1,000 pounds, or less strain than the pull-out strength of the cable head being used.
9. Disengage the Spear Head Overshot and break down both Rope Sockets, and re-tighten the set screws.





10. Engage the Spear Head Overshot with the Spear Head Rope Socket, and take another test strain of 1,000 pounds (or less than the cable head pull-out strength).
11. With the Spear Head Overshot engaged with the Spear Head Rope Socket, take sufficient strain to pick up the Cable Hanger, and remove the Cable Hanger.
12. Place the "C" Plate either under the hexagonal section of the Spear Head Rope Socket or under the Rope Socket around the cable. Allow the entire assembly to rest on the well head or rotary table.

This completes the assembly of the components. The fishing operations may now proceed.

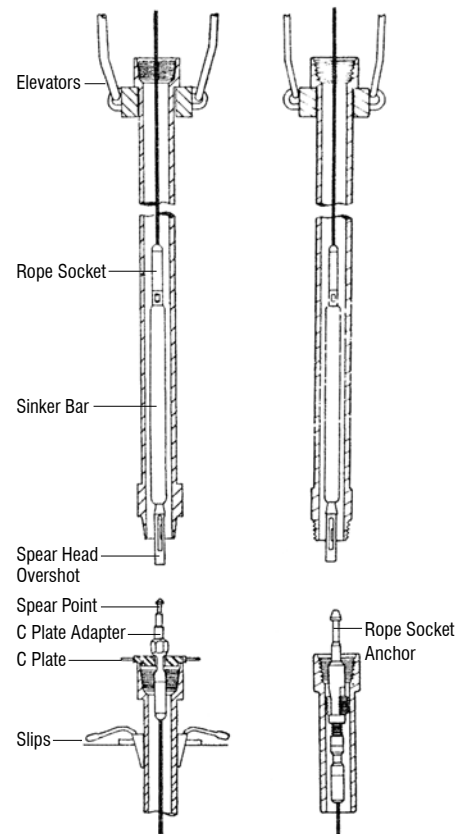
An alternate assembly employs the use of a Rope Socket Anchor in place of the "C" Plate and "C" Plate adaptor.

The Rope Socket Anchor is a simple rugged tool which has spring loaded slips. These slips set in the casing against any downward pull, but allow free movement in an upward direction. The Rope Socket Anchor is attached directly to the top of the Spear Head Rope Socket, in place of the "C" Plate Adaptor. Its use will be described under "Operation."

**Operation**

1. Disconnect the Spear Head Overshot and pull it up to the derrick man.
2. The derrick man will then thread the Spear Head Overshot and Sinker Bar through the first stand of pipe to which the Cable Head Overshot has been attached (see page 9 for Cable Head Overshot Instructions).
3. The Driller will then pick up the first stand and suspend it over the well head.
4. The Spear Head Overshot should then be connected to the Spear Head, a light strain taken on the cable and the "C" Plate removed.
5. The first stand of pipe is then run in and the slips are set.
6. After the "C" Plate is replaced and the assembly allowed to rest on the tool joint, the Spear Head Overshot is then disconnected and pulled back up to the derrick man.
7. The derrick man threads the Spear Head Overshot through the next stand of pipe, which in turn is picked up by the driller and suspended over the well head.
8. The Spear Head Overshot is connected to the Spear Head Rope Socket, the "C" Plate is removed and this stand is stabbed and made up to the first stand and run in.
9. The "C" Plate is replaced, the Spear Head Overshot again disconnected and pulled back up up to the derrick man and this procedure is repeated until enough pipe has been run in to contact and free the fish.

10. After the fish has been contacted and pulled free, the Cable Hanger is again placed on the cable, the Rope Sockets are removed and the cable tied together with a square knot.
11. With the elevator latched around the "T" bar on the Hanger, a strain sufficient to pull the cable out of the fish is taken.
12. Remove the Cable Hanger and spool the free cable on to the service truck reel. The fishing string along with the fish may then be pulled from the hole in the conventional manner.



Operation using the Rope Socket Anchor is as follows:

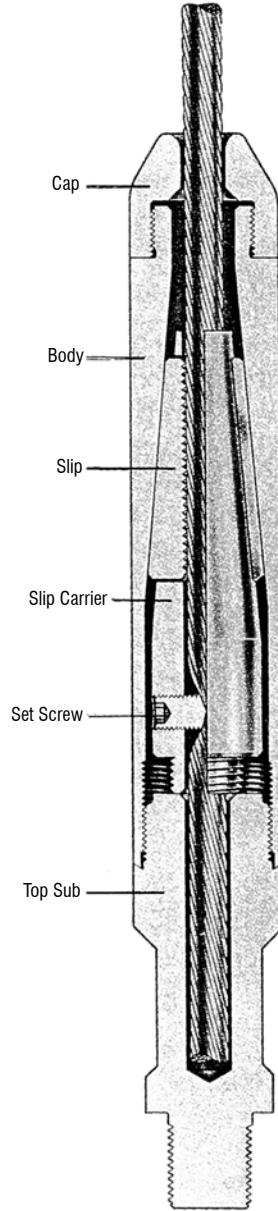
The Spear Head Overshot is disconnected and pulled up to the derrick man, who will thread the Overshot and Sinker Bar through the first stand of pipe to which the Overshot has been attached.

The driller picks up the first stand, suspending it over the well head. Connect the Spear Head Overshot to the Rope Socket Anchor; run in the first stand of pipe and set the slips. Set the Rope Socket Anchor in top of this stand of pipe. Disconnect the Spear Head Overshot, and pull it back up to the derrick man. The derrick man threads the spear Head Overshot through the next stand of pipe, which in turn is picked up by the driller and suspended over the well head. The Spear Head Overshot is again connected to the Rope Socket Anchor, and this stand is made up to the first stand and run in the hole. The Spear Head Overshot is again disconnected and pulled back up to the derrick man. This procedure is repeated until sufficient pipe has been run in to contact and engage the fish.

After the fish has been pulled, the Cable Hanger is again attached the cable, the Rope Sockets removed and the cable ends tied together with a square knot.

With the elevator latched around the Cable Hanger, a strain sufficient to pull the cable from the fish is taken.

The Cable Hanger may then be removed and the free cable spooled onto a drum. The fishing string, along with the free fish, may then be removed from the hole, in conventional manner.



**Slip Type Rope Socket**



**Extractor Tool  
Shown in Position**



**Bowen Slip Type Rope Sockets**

Bowen Slip Type Rope Sockets are designed for use in the Cable Guided Fishing Method, particularly for the recovery of open-hole logging tools. Because of their construction, they provide for quick, easy installation or removal from the cable. The Slip Type Rope Socket consists of a Cap, a Body, a Slip Carrier, two Slips, a Set Screw, and a Sub. As strain is pulled on the cable, the Slips are squeezed in by the taper of the Body, forcing the teeth of the Slips to bite into the cable. Caps, Slip Carriers, and Slips are manufactured to close tolerance, and are code designated to insure proper usage, and to indicate recommended line sizes.

**To Assemble on Cable**

1. Thread the cable through the Cap and small I.D. of the tapered Body.
2. Make the Cap up to the Body.
3. Thread the small end of the Slip Carrier onto the cable, allowing 2" to 3" of cable to extend past the end.
4. IMPORTANT! The Set Screw should be made up until the cable is forced over FLUSH with the O.D. at the opening on the other side of the Slip Carrier.
5. Place the Slips in their Slots on the Slip Carrier and pull this portion of the tool down tightly into the Body.
6. Make the Sub up to the completed assembly.

**NOTE: As mentioned in the "Assembly Procedure" on page 4 of this manual, the Rope Socket should be tested with a pull of 1,000 pounds, or something less than the pull-out strength of the Cable Head being used. Following this, it is highly recommended that the Rope Socket be dismantled and the Set Screw retightened, then reassembled, tested again and put into operation.**

**Disassembly**

1. Remove the Sub and insert the shaft of the Extractor Tool making it up to the pin on the rear on the Slip Carrier.
2. Run the Extractor Tool Nut up to the Rope Socket Body and, using a wrench, continue to tighten the Nut until the Slip Carrier breaks free.
3. Back off the Screw and remove the Rope Socket parts from the cable.

**Spear Head Overshot**

The Spear Head Overshot is used to engage the Spear Head on the lower Rope Socket and provides a very strong, safe connection which may be quickly disconnected only upon the application of the following simple procedure.

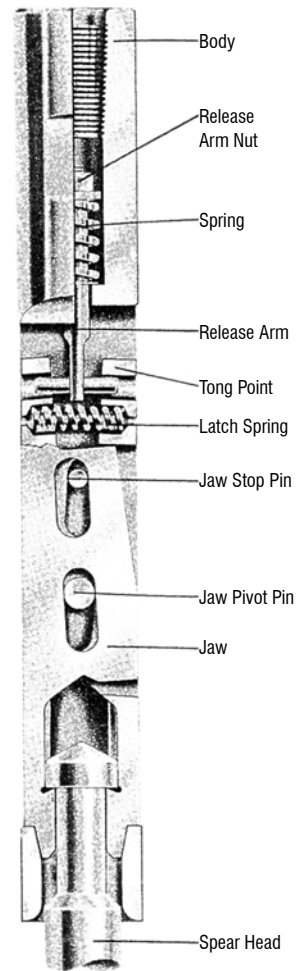
**Operation**

To dis-engage the Spear Head Overshot, all weight from the Spear Head must necessarily be relieved and Tongs applied to the Jaws near the top where two Tong "Dimples" will be found.

To engage the Overshot to the Spear Head, one needs only to drop or push the open end of the Overshot over the Spear Head.

**To Assemble the Overshot**

1. The Release Arm is inserted through the side of the Overshot Body and placed up inside the small hole between the middle and the top of the Body.
2. Next, one of the Jaws is slipped through the side of the Body and positioned on one side of the "Tee" on the Release Arm.
3. As the second Jaw is placed in the Body, the Latch Spring should be placed between the two Jaws, then the second Jaw positioned on the "Tee" of the Release Arm and held in by hand.



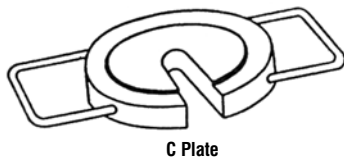
**Spear Head Overshot with Spear Head Engaged**



4. With this done and while holding the Jaws in against the Latch Spring, the Jaw Pin Stop and Jaw Pivot Pins are inserted and made up with a socket head wrench.
5. Raise the Jaws to their upper-most position and from the top, drop in the Release Arm Washer and then the Release Arm Spring.
6. Make up the Release Arm Nut to complete the assembly.

**Disassembly**

Merely reverse the above ASSEMBLY procedure.



**C Plate**



**Spear Head Sub and Adapter**

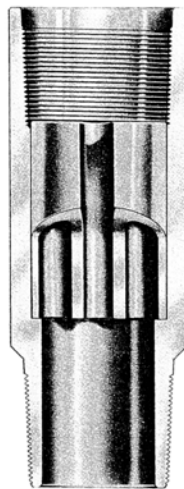
**"C" Plates**

Two standard types of "C" Plates are available, depending upon the type of Rope Socket components with which it is employed.

One "C" Plate fits under the Rope Socket and around the cable. It has a 29/32" wide slot. The other fits the "C" Plate Adaptor and has a 11/4" wide slot. Refer to the specifications and replacement parts list.

Special Circulating Subs and "C" Plates are available for use in wells that require circulation to be maintained when using the Cable Head Overshot.

The Circulation "C" Plate is inserted into the Circulating Sub around the cable. The "C" Plate seats below the tool joint in a recess provided for the purpose. The "C" Plate has ample circulation holes, as well as tapped holes in its face to allow insertion of a suitable bolt to aid in its removal from the Circulating Sub. Several of the more commonly used Circulating Subs and "C" Plates are listed in the specifications and replacement parts. Others are available on request to meet requirements.



**Circulating Sub with C Plates**

**Bowen Circulating Subs with C Plates**

|                               |                |
|-------------------------------|----------------|
| Standard "C" Plate Slot Width | 5/8            |
| Body O.D.                     | 6"             |
| Type                          | Plain          |
| Standard Connections          | 4/2" x H.      |
| Complete Assembly             | Part No. 17205 |
|                               | Weight 90      |

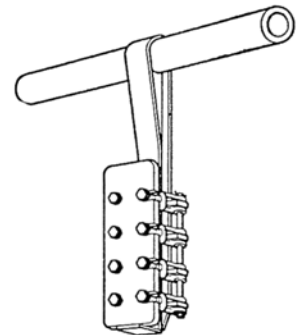
**Replacement Parts**

|                  |                |
|------------------|----------------|
| Sub Body         | Part No. 17206 |
|                  | Weight 75      |
| "C" Plate (Plug) | Part No. 17207 |
|                  | Weight 15      |

**How to Order:**

**Specify:**

- (1) Name and number of assembly or part.
- (2) Slot width of "C" Plate, if other than standard.
- (3) Connections and O.D., if other than standard.



**Cable Hanger**

**Cable Hanger**

Cable Hangers are available to provide a safe, quick means of holding the cable during the cutting and the application of the Rope Sockets. The Cable Hanger is again utilized at the conclusion of the fishing job in order to pull the cable out of the released fish.

A grooved, hinged member, employed in conjunction with swinging clamp bolts, holds the cable while the "Tee" Handle on the Hanger offers a sturdy means of holding or supporting the entire assembly. Replaceable, grooved Liners are available, and line size must be specified to insure proper operation.

**Rope Socket Anchor**

The Rope Socket Anchor is designed specifically to anchor the upper end of a cable to the upper portion of the casing or drill pipe in which the cable is being fished.

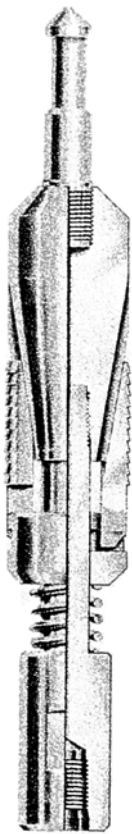
The Rope Socket Anchor is constructed so that the drill pipe may be run into the hole around the Rope Socket Anchor and cable while the Rope Socket Anchor remains near the top of the well being maintained in position by the SpearHead Overshot. The spring loaded slips allow the Rope Socket Anchor to slide upward in the drill pipe, but will set in the drill pipe when downward force is applied.

Construction is simple consisting of six parts: The Spear Head, Cone, Mandrel, Slips, Slip Carrier and Main Spring.

Disassembly is equally simple: Clamp the Cone in a suitable vise. Remove the Spear Head and Mandrel. The Main Spring may be slid off the Mandrel. The Slips and Slip Carrier will slide freely from the Cone in either direction.

Reassembly is accomplished by reversing this procedure. The parts should be thoroughly greased at assembly.

**Caution: Make sure the tool is dressed with proper size slips for the drill pipe they are to be used in. See chart on page 15.**



**Rope Socket Anchor**

**Cable Head Overshot**

**Bowen Cable Head Overshots** are recommended for use when fishing in open hole for items used on conductor line in Perforating, Logging, and similar operation. Within the size ranges provided (see List on page 16), these Overshots are designed to engage the various diameters and cable-head lengths necessary to fish most conductor line tools.

These Overshots are normally equipped with top connections which allow running one or more joints of casing having ample I.D. to swallow a cable electrode or bobbin above the fishing neck, to assure that the Overshot will travel far enough to engage the fish.

Cable Head Overshots are used with the special wire line tools described on page 4 to fish by the Cable Guided method. This method of fishing is essentially a process of cutting the conductor line above the wellhead and stringing the line through the fishing string to which the Cable Head Overshot is made up. With the line anchored at the wellhead, the two sections of line are fitted with attachments which facilitate threading the line through each stand of pipe as it is lowered into the hole.

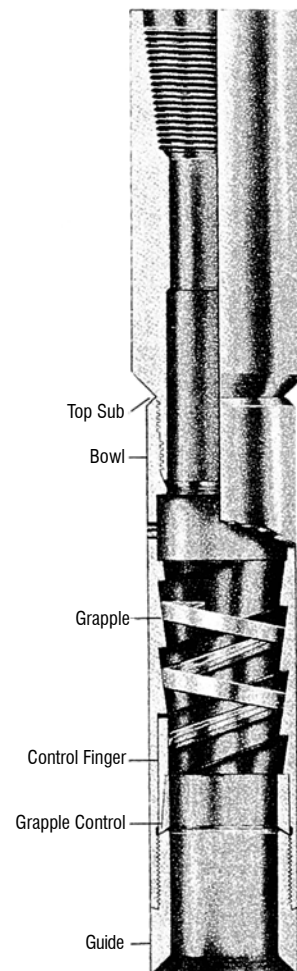
**Cable Head Overshot Construction**

The Overshot consists of a BOWL, a GRAPPLE, GRAPPLE CONTROL, and GUIDE. TOP SUBS are included as part of some assemblies, and are available as extras with others (see List, page 16).

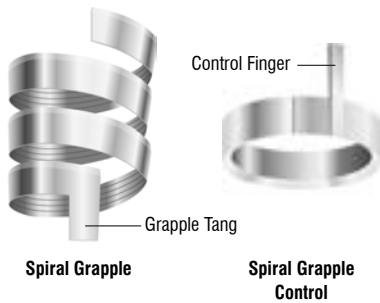
**TOP SUB.** A Top Sub can be provided to allow subbing the Overshot to casing of sufficient I.D. to swallow a cable-electrode or bobbin.

**BOWL.** The Bowl houses the Grapple and Grapple Control. It has an internal helix to accommodate the Grapple, and a shallow groove at the base of the helix to receive the Grapple Tang and Control Finger.

**GRAPPLE.** The Grapple is the part which actually takes hold of the fish. A Spiral-type Grapple is used for the larger sizes which the Overshot will catch, and a Basket-type Grapple is installed to adapt the Overshot to engage smaller sizes, beginning at 1/2" or 5/8" below the largest catch size of Spiral Grapples. (Exact ranges shown in Overshot Parts List, page 16).

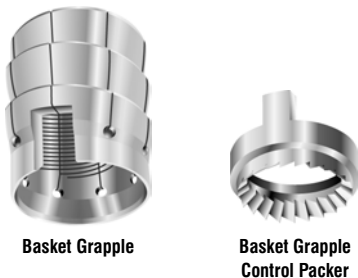


**Cable Head Overshot**



A SPIRAL GRAPPLE is an expansible, tapered left-hand helix whose external surface conforms to the interior of the Bowl, and whose interior surface is wickered to enable the Grapple to bite into and grip the fish.

Specially designed Spiral Grapples are available which are ideal to catch a rubber-covered bell housing or logging tool case. These have a single deep-cut wicker which penetrates the rubber wall and takes a positive grip on the fish.



A BASKET GRAPPLE is an expansible slotted cylinder with left-hand helical exterior which fits the interior helix of the Bowl. Like the Spiral type, it is equipped with a wickered interior surface for gripping the fish. An integral Stop can be provided if desire, to position the fish in the Basket Grapple.

GRAPPLE CONTROL. The Grapple Control's function is to anchor the Grapple in place in the Bowl. The Control is, like the Grapple, either a Spiral or Basket type. It fits in the Bowl at the base of the Grapple. A Control Finger fits next to the Tang of the Spiral Grapple, or in a slot in the Basket Grapple, and in a Bowl recess.

GUIDE. The Guide directs the fish into the Bowl. Most Guides for Cable Head Overshots are short and plain, as shown in the illustration.

**Cable Head Overshot Assembly, Operation, and Maintenance**

To assemble the CABLE HEAD OVERSHOT, proceed as follows:

Assemble the GRAPPLE in the Bowl. If a SPIRAL GRAPPLE is used, grasp the Grapple by the Control end which is tanged, and screw it into the Bowl. LEFT HAND rotation must be used, as the Grapple is made on a left-hand lead spiral. Insert the Grapple deep enough into the Bowl to allow the tang to come to rest in the slot provided for the purpose near its lower end.

Follow the Grapple with the GRAPPLE CONTROL, inserted into the Bowl with its finger up (toward the Grapple).

Allow the Control Finger to lay alongside the Grapple tang at the left side, when viewed from the lower end. This Control Finger functions as a special key. Seat the upper face of the Grapple Control against the lower spiral in the Bowl.

If a BASKET GRAPPLE is used, assemble it by using left-hand rotation. Allow it to come to rest with the control slot in its lower end aligned with the slot in the lowest spiral of the Bowl.

Follow the Basket Grapple with the Basket Grapple Control. Its finger will fit into the slot in the Bowl and also the slot in the Basket Grapple, keying the two together.

Insert the GUIDE and make it up tight.

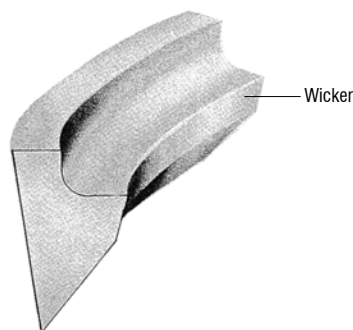
Make up the TOP SUB, if used. Some Cable Head Overshots use Top Subs, and others do not.

**Operation Engagement of Fish**

Make up the assembled Overshot on the fishing string and run it in. (Method of stringing line through Overshot and fishing string described on page 4). When the Overshot nears the fish, rotate slowly and simultaneously gradually lower the tool over the fish. With the wickered Grapple engaging the fish, the lowering and right-hand rotation of the string moves the Grapple upward within the tapered helix of the Bowl, thus allowing the Grapple to expand and permit easy entry of the fish.

**Pulling the Fish**

To pull the fish, take all torque out of the string and exert an upward strain on the pipe. The drag of fish on Grapple wickers pulls the Grapple downward in the tapered Bowl helix. This causes the Grapple to contract, thus biting into the fish and gripping it tightly, enabling the fish to be pulled as the upward strain is maintained.



*Cross-sectional view of special single-wickered Grapple used in some Cable Head Overshots to penetrate rubber wall and engage steel case.*



**Release from Fish**

To release from the fish, bump down sharply to break the freeze; then, while slowly rotating to the right, gradually raise the string (approximately 1 1/2" for each full turn of the Overshot) until tool is clear of fish. The same procedure is followed whether release is effected in the hole or from a recovered fish.

**Caution: The Overshot should be left intact until disengagement from fish is completed.**

**The tool should never be turned to the left when going over or coming off a fish.**

**Maintenance**

After use the Overshot should be disassembled and inspected for wear or damage. Badly worn or damaged parts should be replaced with new ones. All parts should be washed with solvent, and all interior parts, including the inside surfaces of Bowl, Top Sub, and Guide, should be greased with heavy grease. The tool should then be reassembled and the exterior greased or painted.

If the Overshot is not used for a long period of time, it should be disassembled and cleaned again before using. Re-grease outside of Grapple and inside of Bowl with heavy grease and re-assemble.

Thread dope should be used on threads when assembling tool. In making up and breaking connections, place tongs about 1" to 2" from connection, never in middle of Bowl.

**Fishing by Side Door Overshot Method**

**Bowen Series 160 Side Door Overshots** are recommended for use when fishing for conductor line or cable tools in a cased hole.

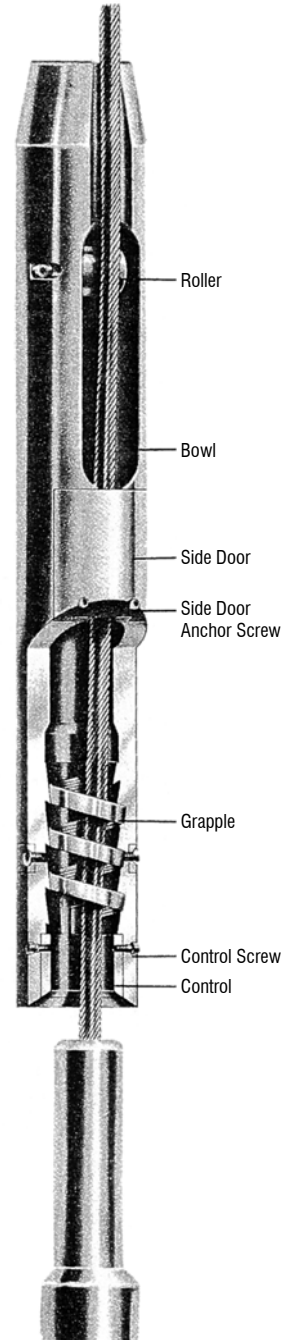
These Overshots are run in on tubing or drill pipe. A side door in the Bowl is removed to allow the line to be fed into the tool, after which the door is put back into position as part of the Bowl.

Thus these tools eliminate the necessity of cutting the line or cable; they eliminate the fouling of lines which sometimes takes place when two lines are in the hole; and they provide more positive control than would be possible in fishing with a conventional wireline overshot.

**Construction**

Principal parts are a Bowl, Grapple, and Grapple Control. The Bowl, designed to provide an easy anular approach over the cable to the fish, is long and grooved and equipped with a Roller on which the cable rides. The side door itself is a removable slide forming part of the wall of the Bowl. Removal of the side door permits the cable to be passed through the wall of the Bowl, allowing the Overshot to be made up on the line. When in place the side door is held in position by four countersunk set screws and a Shear Ring.

The Grapple, the part which actually engages the fish, is a left-hand helix which fits the interior helix of the Bowl. It takes hold of the fish by means of wickers which cover its interior surface.



Series 160 Side Door Overshot





A Spiral-type Grapple is used for the larger sizes caught by a given Overshot, and a Basket-type Grapple is used to adapt the tool to smaller sizes. An enlarged slot on the Basket Grapple permits it to be made up on the line.

The Grapple Control is likewise either a Spiral or Basket type. This part anchors the Grapple in the Bowl. It fits next to the Grapple with the Control Finger against the Spiral Grapple Tang, or in a slot in the Basket Grapple, and in a Bowl recess. The Control is held in place by set screws.

### **Assembly and Operation**

With the side door and all interior parts removed, the Bowl is placed on the cable and the side door fastened into place. The Grapple is slipped onto the cable and screwed into place in the Bowl, followed by the Control, which is fastened by the Control Screws.

The Overshot is run in, and as it nears the fish the string is rotated slowly to the right as the Overshot is gradually lowered over the fish. With the wickered Grapple engaging the fish, the lowering and right-hand rotation of the string moves the Grapple upward within the tapered helix of the Bowl, thus allowing the Grapple to expand and permit easy entry of the fish.

To pull the fish, take all torque out of the string and exert an upward strain on the pipe. The drag of fish on Grapple wickers pulls the Grapple downward in the tapered Bowl helix. This causes the Grapple to contract and bite into the fish, gripping it tightly. An upward strain is then maintained to pull the fish.

To release from a fish in the hole, bump down to break the freeze, then gradually raise the string while rotating slowly to

the right. To release from a recovered fish, follow the same procedure while holding the fish below the Overshot.

### **Maintenance**

After use, the Overshot should be disassembled and inspected and new parts installed in place of any badly worn ones. All parts should be washed with solvent, and the interior parts, including the inside surface of the Bowl, should be greased. The tool should be re-assembled and the exterior greased or painted.

If the Overshot is not used for a considerable period, it should be disassembled and cleaned again before using. The outside of the Grapple and the inside of the Bowl should then be re-greased and the tool re-assembled.



**Bowen Cable Guide Fishing Assembly**

|                        |          |              |              |              |              |
|------------------------|----------|--------------|--------------|--------------|--------------|
| Nominal Assembly Size  |          | 1-11/16      | 1-11/16      | 1-3/4        | 2-1/8        |
| Rope Socket Connection |          | 3/4 S.R.     | 3/4 S.R.     | 3/4 S.R.     | 7/8 S.R.     |
| Sinker Bar Connection  |          | 3/4 S.R. Pin | 3/4 S.R. Pin | 3/4 S.R. Pin | 7/8 S.R. Pin |
| Overshot Connection    |          | 3/4 S.R. Box | 3/4 S.R. Box | 3/4 S.R. Box | 7/8 S.R. Box |
| Complete Assembly      | Part No. | 14687        | 18930        | 18931        | 18932        |
|                        | Weight   | 80           | 189          | 190          | 145          |

**Replacement Parts**

|                                    |          |       |       |       |       |
|------------------------------------|----------|-------|-------|-------|-------|
| Sub-Assembly Rope Socket           | Part No. | 15680 | 15680 | 13115 | 12970 |
| Consists of                        | Weight   | 7     | 7     | 7     | 11    |
| Sub                                | Part No. | 15681 | 15681 | 13116 | 12971 |
|                                    | Weight   | 3     | 3     | 3     | 4     |
| Body                               | Part No. | 15682 | 15682 | 13117 | 12972 |
|                                    | Weight   | 1-1/2 | 1-1/2 | 1-1/2 | 4-1/4 |
| Slip Carrier                       | Part No. | 13118 | 13118 | 13118 | 12973 |
|                                    | Weight   | 1     | 1     | 1     | 1     |
| Slip (2 Required)                  | Part No. | 13119 | 13119 | 13119 | 12974 |
|                                    | Weight   | 1/2   | 1/2   | 1/2   | 1/2   |
| Cap                                | Part No. | 15683 | 15683 | 13120 | 12975 |
|                                    | Weight   | 1     | 1     | 1     | 1     |
| Set Screw                          | Part No. | 13121 | 13121 | 13121 | 13121 |
|                                    | Weight   | =     | =     | =     | =     |
| Carrier Extractor Tool             | Part No. | 15170 | 15170 | 15170 | 15175 |
|                                    | Weight   | 1     | 1     | 1     | 1     |
| Sinker Bar (1-11/16 O.D. X 6* Lg.) | Part No. | 12722 | 12722 | =     | =     |
|                                    | Weight   | =     | 47    | =     | =     |
| Sinker Bar (1-3/4 O.D. X 6* Lg.)   | Part No. | =     | =     | 12727 | =     |
|                                    | Weight   | =     | =     | 49    | =     |
| Sinker Bar (2-1/8 O.D. X 4* Lg.)   | Part No. | 12729 | 12729 | 12729 | 12728 |
|                                    | Weight   | 48    | 48    | 48    | 48    |
| Sub-assembly Spear Head Overshot   | Part No. | 11810 | 11810 | 11810 | 11825 |
| Consists of                        | Weight   | 10    | 10    | 10    | 11    |
| Body                               | Part No. | 11811 | 11811 | 11811 | 11826 |
|                                    | Weight   | 8     | 8     | 8     | 8-1/2 |
| Jaw (Set Of 2)                     | Part No. | 11812 | 11812 | 11812 | 11812 |
|                                    | Weight   | 1-1/4 | 1-1/4 | 1-1/4 | 1-1/4 |
| Pivot Pin                          | Part No. | 11813 | 11813 | 11813 | 11827 |
|                                    | Weight   | =     | =     | =     | =     |
| Jaw Stop Pin                       | Part No. | 11814 | 11814 | 11814 | 11828 |
|                                    | Weight   | =     | =     | =     | =     |
| Latch Spring                       | Part No. | 11815 | 11815 | 11815 | 11815 |
|                                    | Weight   | =     | =     | =     | =     |
| Release Spring                     | Part No. | 11816 | 11816 | 11816 | 11816 |
|                                    | Weight   | =     | =     | =     | =     |
| Spring Washer                      | Part No. | 11817 | 11817 | 11817 | 11817 |
|                                    | Weight   | =     | =     | =     | =     |

**How To Order:**

- Specify:**
- (1) Name & Number of Assembly & Part.
  - (2) Line Size (Diameter).
  - (3) Type C Plate Desired.

**Recommended Spare Parts:**

- (1) 3 Sets Slips for each Rope Socket.



**Bowen Cable Guide Fishing Assembly**

|                        |              |              |              |              |
|------------------------|--------------|--------------|--------------|--------------|
| Nominal Assembly Size  | 1-11/16      | 1-11/16      | 1-3/4        | 2-1/8        |
| Rope Socket Connection | 3/4 S.R.     | 3/4 S.R.     | 3/4 S.R.     | 7/8 S.R.     |
| Sinker Bar Connection  | 3/4 S.R. Pin | 3/4 S.R. Pin | 3/4 S.R. Pin | 7/8 S.R. Pin |
| Overshot Connection    | 3/4 S.R. Box | 3/4 S.R. Box | 3/4 S.R. Box | 7/8 S.R. Box |

**Replacement Parts**

|  |          |       |       |       |       |
|--|----------|-------|-------|-------|-------|
| Release Arm  | Part No. | 11819 | 11819 | 11819 | 11819 |
|  | Weight   | 1/4   | 1/4   | 1/4   | 1/4   |
| Release Arm Nut  | Part No. | 11820 | 11820 | 11820 | 11820 |
|  | Weight   | 1/8   | 1/8   | 1/8   | 1/8   |
| Oversize Guide 2-1/8" O.D.                             | Part No. | 11823 | 11823 | 11823 | =     |
|  | Weight   | 1-1/2 | 1-1/2 | 1-1/2 | =     |
| Oversize Guide 2-3/4" O.D.                             | Part No. | 11823 | 11823 | 11823 | =     |
|  | Weight   | 2     | 2     | 2     | =     |
| Guide Pins (2 Required)                                | Part No. | 11829 | 11829 | 11829 | =     |
|  | Weight   | =     | =     | =     | =     |
| Release Tongs  | Part No. | 11882 | 11882 | 11882 | 11882 |
|  | Weight   | 3     | 3     | 3     | 3     |
| Sub-Assembly Spear Head Rope Socket<br>Consists of     | Part No. | 15685 | 15685 | 14663 | 14870 |
|  | Weight   | 9     | 9     | 9     | 13    |
| Spear Head Sub   | Part No. | 15686 | 15686 | 14669 | 14871 |
|  | Weight   | 1     | 1     | 1     | 1     |
| Body   | Part No. | 15682 | 15682 | 13117 | 12972 |
|  | Weight   | 1-1/2 | 1-1/2 | 1-1/2 | 4-1/4 |
| Slip Carrier   | Part No. | 13118 | 13118 | 13118 | 12973 |
|  | Weight   | 1     | 1     | 1     | 1     |
| Slips (2 Req'd.)                                       | Part No. | 13119 | 13119 | 13119 | 12974 |
|  | Weight   | 1/2   | 1/2   | 1/2   | 1/2   |
| Cap  | Part No. | 15683 | 15683 | 13120 | 12975 |
|  | Weight   | 1     | 1     | 1     | 1     |
| Set Screw  | Part No. | 13121 | 13121 | 13121 | 13121 |
|  | Weight   | =     | =     | =     | =     |
| C-Washer Adapter (Hex)                                 | Part No. | 15689 | 15689 | 14667 | 31134 |
|  | Weight   | 1     | 1     | 1     | =     |
| C-Washer Adapter (Plain)                               | Part No. | 15690 | 15690 | 14668 | 14872 |
|  | Weight   | 1     | 1     | 1     | 1     |
| Cable Hanger (W/Liners)                                | Part No. | =     | 10380 | 10380 | 10380 |
|  | Weight   | =     | 46    | 46    | 46    |
| Replacement Cable Hanger Liners<br>(Specify Line Size) | Part No. | =     | 29272 | 29272 | 29272 |
|  | Weight   | =     | =     | =     | =     |
| C-Plate 29/32 Fits Under Rope Socket                   | Part No. | =     | 10382 | 10382 | 10382 |
|  | Weight   | =     | 7     | 7     | 7     |
| C-Plate 1-1/4 Fits Adapter                             | Part No. | =     | 10384 | 10384 | 10384 |
|  | Weight   | =     | 7     | 7*    | 7     |

**How To Order:**

- Specify:**
- (1) Name & Number of Assembly & Part.
  - (2) Line Size (Diameter).
  - (3) Type C Plate Desired.

**Recommended Spare Parts:**

- (1) 3 Sets Slips for each Rope Socket.



**Bowen Cable Guide Fishing Assembly**

**Optional Sub Assembly - Rope Socket Anchor**

|                           |          |                |                |                 |
|---------------------------|----------|----------------|----------------|-----------------|
| To Set In                 |          | 2-7/8 API-I.F. | 3-1/2 API-I.F. | 4-1/2 API- F.H. |
| O.D.                      |          | 1-13/16        | 2-1/4          | 2-5/8           |
| Spear Head O.D.           |          | 1-1/16         | 1-1/16         | 1-1/16          |
| Standard Lower Connection |          | 3/4 S.R. Box   | 3/4 S.R. Box   | 3/4 S.R. Box    |
| Complete Assembly         | Part No. | 14060          | 13980          | 12400           |
|                           | Weight   | 9-3/4          | 12-1/4         | 17-3/4          |

**Replacement Parts**

|                 |          |        |        |       |
|-----------------|----------|--------|--------|-------|
| Spear Head      | Part No. | 12401  | 12401  | 12401 |
|                 | Weight   | 1-1/4  | 1-1/4  | 1-1/4 |
| Cone            | Part No. | 14061  | 13982  | 12402 |
|                 | Weight   | 3-3/4  | 5-1/2  | 9     |
| Mandrel         | Part No. | 14062  | 13983  | 12403 |
|                 | Weight   | 3      | 3-1/4  | 5     |
| Slip (3 Req'd.) | Part No. | *14063 | †13984 | 8586  |
|                 | Weight   | 1/4    | 1/2    | 1/2   |
| Slip Carrier    | Part No. | 14064  | 13985  | 12405 |
|                 | Weight   | 1      | 1-1/4  | 1-1/2 |
| Main Spring     | Part No. | 14065  | 13986  | 12406 |
|                 | Weight   | 1/2    | 1/2    | 1/2   |

**Optional - Extra**

|                   |          |   |   |       |
|-------------------|----------|---|---|-------|
| Slip 4-1/2 X-Hole | Part No. | = | = | 12407 |
|                   | Weight   | = | = | 1/2   |
| Slip 4-1/2 I.F.   | Part No. | = | = | 12408 |
|                   | Weight   | = | = | 1/2   |

\* Also Fits 2-3/8 Tubing as is.

† Also Fits 3-1/2 API F.H. and 2-7/8 Tubing as is.

**Line Size Code For Carrier, Slips & Caps**

|              |              |         |         |         |
|--------------|--------------|---------|---------|---------|
| Part         | Line Size    | 15680   | 13115   | 12970   |
| Slip Carrier | 3/16 -       | 13118-5 | 13118-5 | =       |
|              | 7/32 - 5/16  | 13118-4 | 13118-4 | =       |
|              | 11/32 - 7/16 | 13118-3 | 13118-3 | 12973-3 |
|              | 15/32 - 9/16 | 13118-2 | 13118-2 | 12973-2 |
|              | 19/32 - 3/4  | =       | =       | 12973-1 |
| Slips        | 3/16 -       | 13119-5 | 13119-5 | =       |
|              | 7/32 - 5/16  | 13119-4 | 13119-4 | =       |
|              | 11/32 - 7/16 | 13119-3 | 13119-3 | 12974-3 |
|              | 15/32 - 9/16 | 13119-2 | 13119-2 | 12974-2 |
|              | 19/32 - 3/4  | =       | =       | 12974-1 |
| Caps         | 3/16 -       | 15683-5 | 13120-5 | =       |
|              | 7/32 - 5/16  | 15683-4 | 13120-4 | =       |
|              | 11/32 - 7/16 | 15683-3 | 13120-3 | 12975-3 |
|              | 15/32 - 9/16 | 15683-2 | 13120-2 | 12975-2 |
|              | 19/32 - 3/4  | =       | =       | 12975-1 |



**Cable Head Overshots**

|                          |                                |                        |                        |            |                      |                      |                          |
|--------------------------|--------------------------------|------------------------|------------------------|------------|----------------------|----------------------|--------------------------|
| Overshot Series          | 101                            | 101                    | 105                    | 101        | 101                  | 101                  | 100                      |
| Maximum Catch Spiral     | 2-3/8                          | 2-3/8                  | 2-3/8                  | 3-3/8      | 3-3/4                | 3-7/8                | 3-7/8                    |
| Maximum Catch Basket     | 1-7/8                          | 1-7/8                  | 1-7/8                  | 2-3/4      | 3-1/8                | 3-1/4                | 3-1/4                    |
| Overshot O.D.            | 3-1/8                          | 3-1/2                  | 3-1/2                  | 4-3/8      | 5                    | 5-1/4                | 5-1/4                    |
| Type Bowl Connection Box | 2-3/8<br>EUE<br>8 Thd.         | 2-3/8<br>EUE<br>8 Thd. | 2-3/8<br>EUE<br>8 Thd. | 3<br>Tub   | 4<br>Hydril<br>Flush | 4<br>Hydril<br>Flush | 4-1/2<br>Hydril<br>Flush |
| Complete Assembly        | Part No. 9750<br>Weight 24-1/2 | 9940<br>27             | 9357<br>35             | 4431<br>29 | 9980<br>87           | 11490<br>147         | 11805<br>121             |

**Replacement Parts**

|         |          |       |       |       |       |       |       |        |
|---------|----------|-------|-------|-------|-------|-------|-------|--------|
| Bowl    | Part No. | 9751  | 9941  | 9358  | 4432  | 9981  | 11491 | 11807  |
|         | Weight   | 14    | 24    | 27    | 23    | 44    | 45    | 30     |
| Grapple | Part No. | 9307  | 9952  | 1448* | 4195  | 814   | 859*  | 11808* |
|         | Weight   | 2     | 1/2   | 1     | 1     | 4-1/4 | 2-1/2 | 1      |
| Control | Part No. | 9308  | 9953  | 1449  | 4196  | 815   | 875   | 11809  |
|         | Weight   | 1/2   | 1/2   | 1/2   | 1-1/2 | 1-1/2 | 3     | 2      |
| Guide   | Part No. | 9312  | 9942  | 4074  | 4434  | 816   | 11492 | 11804  |
|         | Weight   | 5-1/2 | 2-1/2 | 3     | 3-1/2 | 37    | 12    | 14     |

**Basket Parts**

|  |          |       |       |      |       |       |       |       |
|--|----------|-------|-------|------|-------|-------|-------|-------|
| Basket Grapple   | Part No. | 9307  | 9952  | 1448 | 4195  | 814   | 859   | 11808 |
|  | Weight   | 1-1/2 | 1-1/2 | 1/2  | 2     | 2     | 2     | 12    |
| Basket Control   | Part No. | 9308  | 9953  | 1449 | 4196  | 815   | 875   | 11809 |
|  | Weight   | 1     | 1     | 1/4  | 1-1/2 | 1-1/2 | 1-1/2 | 8     |
| Thread Protector<br>Internal<br>(Inc. In Assembly Price) | Part No. | =     | =     | 9359 | =     | =     | =     | =     |
|  | Weight   | =     | =     | =    | =     | =     | =     | =     |
| Thread Protector<br>External<br>(Inc. In Assembly Price) | Part No. | =     | =     | 9360 | =     | =     | =     | =     |
|  | Weight   | =     | =     | =    | =     | =     | =     | =     |

**Accessories**

|                         |          |      |   |      |      |      |      |       |
|-------------------------|----------|------|---|------|------|------|------|-------|
| Top Sub                 | Part No. | 9768 | = | 9361 | 4433 | 9982 | 9982 | 11806 |
| (Add To Assembly Price) | Weight   | =    | = | 85   | 85   | 85   | 85   | 75    |

**How To Order:**

- Specify: (1) Name & Number of Assembly or Part.  
 (2) Top Connection.  
 (3) Size & Type of Fish to be Caught.  
 (4) Top Sub Connections, if desired.

**Recommended Spare Parts:**

- (1) Spiral - 2 grapples, 1 control each size.  
 (2) Basket - 2 grapples, 1 control each size.

**Special Notes:**

- (1) \* Special single wicker grapples to penetrate rubber and catch metal case, if specified.  
 (2) Assembly 9357 has a 2-3/8 EUE Box and a 3-1/2 D.P. Pin connection on Bowl. The 9489 Top Sub has a 4-1/2 F.H. Box Up with a 3-1/2 D.P. Box and a 5 X-Line Pin Down.



**Bowen Overshots - Series 160**

|                        |  |   |   |                               |   |      |
|------------------------|--|---|---|-------------------------------|---|------|
| Maximum Catch (Spiral) | 2  | 2   | 2 <sup>3</sup> / <sub>8</sub>                 | 2 <sup>3</sup> / <sub>8</sub> | 2 <sup>3</sup> / <sub>8</sub>                 |      |
| Maximum Catch (Basket) | 1 <sup>1</sup> / <sub>2</sub>            | 1 <sup>1</sup> / <sub>2</sub>             | 1 <sup>7</sup> / <sub>8</sub>                 | 1 <sup>7</sup> / <sub>8</sub> | 1 <sup>7</sup> / <sub>8</sub>                 |      |
| Overshot O.D.          | 3 <sup>1</sup> / <sub>8</sub>            | 3 <sup>3</sup> / <sub>4</sub>             | 4   | 4 <sup>1</sup> / <sub>2</sub> | 4 <sup>1</sup> / <sub>2</sub>                 |      |
| Top Connection         | 2 <sup>3</sup> / <sub>8</sub> EUE<br>Box | 2 <sup>7</sup> / <sub>8</sub> API<br>Reg. | 2 <sup>3</sup> / <sub>8</sub> API<br>Reg. Box | ACME STR<br>6 Thd.            | 2 <sup>3</sup> / <sub>8</sub> API<br>Reg. Box |      |
| Complete Assembly      | Part No.                                 | 15955                                     | C-11145                                       | 9560                          | 6400  | 9985 |
|                        | Weight                                   | 60  | 65  | 70                            | 195   | 105  |

**Replacement Parts**

|                                |          |                               |                               |      |       |       |
|--------------------------------|----------|-------------------------------|-------------------------------|------|-------|-------|
| Bowl                           | Part No. | 15957*                        | C-11146*                      | 9562 | 6401  | 9986* |
|                                | Weight   | 58                            | 60                            | 62   | 98    | 98    |
| Roller                         | Part No. | 15961                         | A-5440                        | 9566 | 6456  | 6456  |
|                                | Weight   | 1/4                           | 1/4                           | 1/4  | 1/4   | 1/4   |
| Roller Pin                     | Part No. | 15962                         | A-11296                       | 9567 | 6457  | 6457  |
|                                | Weight   | 1/8                           | 1/8                           | 1/8  | 1/8   | 1/8   |
| Roller Pin Screw               | Part No. | 9558                          | =                             | 9568 | 9568  | 9568  |
|                                | Weight   | =                             | =                             | =    | =     | =     |
| Shear Ring                     | Part No. | 15958                         | A-14221                       | 9564 | 6422  | 6422  |
|                                | Weight   | 1/4                           | 1/4                           | 3/8  | 3/8   | 3/8   |
| Shear Ring Screw<br>(2 Req'd.) | Part No. | 15964                         | 23124                         | 8593 | 25220 | 25220 |
|                                | Weight   | =                             | =                             | =    | =     | =     |
| Grapple                        | Part No. | 1811                          | B-11147                       | 1448 | 1448  | 1448  |
|                                | Weight   | 1/2                           | 1/2                           | 3/4  | 3/4   | 3/4   |
| Control                        | Part No. | 15965                         | A-11148                       | 6403 | 6403  | 6403  |
|                                | Weight   | 1 <sup>3</sup> / <sub>4</sub> | 1 <sup>3</sup> / <sub>4</sub> | 2    | 2     | 2     |
| Control Screw<br>(2 Req'd.)    | Part No. | 15966                         | 9933                          | 9558 | 10285 | 10285 |
|                                | Weight   | =                             | =                             | =    | =     | =     |
| Top Sub                        | Part No. | =                             | =                             | =    | 7243  | =     |
|                                | Weight   | =                             | =                             | =    | 30    | =     |
| Side Door Screw<br>(4 Req'd.)  | Part No. | 8181                          | 23507                         | 9559 | 9568  | 9568  |
|                                | Weight   | =                             | =                             | =    | =     | =     |

**Basket Parts**

|                |          |                               |                               |                               |                               |                               |
|----------------|----------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Basket Grapple | Part No. |                               |                               |                               |                               |                               |
|                | Weight   | 15956                         | B-11147                       | 6402                          | 6402                          | 6402                          |
| Basket Control | Price    | 1 <sup>1</sup> / <sub>2</sub> | 1 <sup>1</sup> / <sub>2</sub> | 2 <sup>3</sup> / <sub>4</sub> | 2 <sup>3</sup> / <sub>4</sub> | 2 <sup>3</sup> / <sub>4</sub> |
|                | Part No. | 15965-B                       | A-11148                       | 6403-B                        | 6403-B                        | 6403-B                        |
| Weight         | 1        | 1                             | 3                             | 3                             | 3                             |                               |

**Optional Equipment**

|                                    |          |       |   |                               |                               |                               |
|------------------------------------|----------|-------|---|-------------------------------|-------------------------------|-------------------------------|
| Oversize Guide                     | Part No. | 15959 | = | 9563                          | 7217                          | 7217                          |
|                                    | Weight   | 56    | = | 63                            | 60                            | 60                            |
| Guide Key Screw<br>(2 Req'd.)      | Part No. | 8181  | = | 9551                          | 6461                          | 6461                          |
|                                    | Weight   | =     | = | =                             | =                             | =                             |
| Guide Anchor Segment<br>(4 Req'd.) | Part No. | 15960 | = | 9552                          | 6462                          | 6462                          |
|                                    | Weight   | 2     | = | 2 <sup>1</sup> / <sub>4</sub> | 2 <sup>1</sup> / <sub>2</sub> | 2 <sup>1</sup> / <sub>2</sub> |
| Guide Anchor Segment Screw         | Part No. | 13847 | = | 9553                          | 9568                          | 9568                          |
|                                    | Weight   | =     | = | =                             | =                             | =                             |

\*Extra Wide Slot For Passage Of Cable Head.



**Bowen Overshots - Series 160**

|                        |          |                                   |                                   |                                   |
|------------------------|----------|-----------------------------------|-----------------------------------|-----------------------------------|
| Maximum Catch (Spiral) |          | 2 <sup>3</sup> / <sub>4</sub>     | 3 <sup>1</sup> / <sub>8</sub>     | 3 <sup>21</sup> / <sub>32</sub>   |
| Maximum Catch (Basket) |          | 2 <sup>1</sup> / <sub>4</sub>     | 2 <sup>5</sup> / <sub>8</sub>     | 3 <sup>1</sup> / <sub>8</sub>     |
| Overshot O.d.          |          | 4 <sup>1</sup> / <sub>2</sub>     | 4 <sup>11</sup> / <sub>16</sub>   | 5 <sup>1</sup> / <sub>2</sub>     |
| Top Connection         |          | 2 <sup>7</sup> / <sub>8</sub> API | 2 <sup>7</sup> / <sub>8</sub> API | 2 <sup>7</sup> / <sub>8</sub> API |
|                        |          | Reg. Box                          | Reg. Box                          | Reg. Box                          |
| Complete Assembly      | Part No. | 9900                              | 9965                              | 9920                              |
|                        | Weight   | 167                               | 139                               | 177                               |

**Replacement Parts**

|                                |          |                               |                               |                               |
|--------------------------------|----------|-------------------------------|-------------------------------|-------------------------------|
| Bowl                           | Part No. | 9901                          | 9966*                         | 9921                          |
|                                | Weight   | 154                           | 128                           | 168                           |
| Roller                         | Part No. | 9902                          | 9967                          | 9922                          |
|                                | Weight   | 1 <sup>1</sup> / <sub>2</sub> | 1 <sup>1</sup> / <sub>2</sub> | 1 <sup>1</sup> / <sub>2</sub> |
| Roller Pin                     | Part No. | 9903                          | 9968                          | 9923                          |
|                                | Weight   | 1 <sup>1</sup> / <sub>8</sub> | 1 <sup>1</sup> / <sub>8</sub> | 1 <sup>1</sup> / <sub>8</sub> |
| Roller Pin Screw               | Part No. | 9568                          | 9568                          | 9924                          |
|                                | Weight   | ≡                             | ≡                             | ≡                             |
| Shear Ring                     | Part No. | 9905                          | 9970                          | 9925                          |
|                                | Weight   | 3 <sup>3</sup> / <sub>8</sub> | 3 <sup>3</sup> / <sub>8</sub> | 3 <sup>3</sup> / <sub>8</sub> |
| Shear Ring Screw<br>(2 Req'd.) | Part No. | 9906                          | 9906                          | 9906                          |
|                                | Weight   | ≡                             | ≡                             | ≡                             |
| Grapple                        | Part No. | 9907                          | 1741                          | 6662                          |
|                                | Weight   | 1 <sup>1</sup> / <sub>4</sub> | 1 <sup>1</sup> / <sub>4</sub> | 1 <sup>1</sup> / <sub>2</sub> |
| Control                        | Part No. | 9908                          | 9973                          | 9927                          |
|                                | Weight   | 2                             | 2                             | 2 <sup>1</sup> / <sub>2</sub> |
| Control Screw<br>(2 Req'd.)    | Part No. | 9909                          | 9933                          | 9928                          |
|                                | Weight   | ≡                             | ≡                             | ≡                             |
| Top Sub                        | Part No. | ≡                             | ≡                             | ≡                             |
|                                | Weight   | ≡                             | ≡                             | ≡                             |
| Side Door Screw<br>(4 Req'd.)  | Part No. | 9558                          | 9558                          | 9558                          |
|                                | Weight   | ≡                             | ≡                             | ≡                             |

**Basket Parts**

|                |          |                               |                               |        |
|----------------|----------|-------------------------------|-------------------------------|--------|
| Basket Grapple | Part No. | 9907                          | 9972                          | 9934   |
|                | Weight   | 4 <sup>1</sup> / <sub>2</sub> | 3 <sup>1</sup> / <sub>2</sub> | 4      |
| Basket Control | Part No. | 9908-b                        | 9973-b                        | 9927-b |
|                | Weight   | 3                             | 3 <sup>1</sup> / <sub>2</sub> | 4      |

**Optional Parts**

|                                    |          |      |      |                               |
|------------------------------------|----------|------|------|-------------------------------|
| Oversize Guide                     | Part No. | 9911 | 9976 | 9930                          |
|                                    | Weight   | 6    | 7    | 7 <sup>1</sup> / <sub>2</sub> |
| Guide Key Screw<br>(2 Req'd.)      | Part No. | 6461 | 6461 | 6461                          |
|                                    | Weight   | ≡    | ≡    | ≡                             |
| Guide Anchor Segment<br>(4 Req'd.) | Part No. | 9913 | 9978 | 9932                          |
|                                    | Weight   | 2    | 2    | 3                             |
| Guide Anchor Segment Screw         | Part No. | 9933 | 9933 | 9933                          |
|                                    | Weight   | ≡    | ≡    | ≡                             |

NOTE: No. 6400 Side Door Overshot has a straight thread top connection in Bowl and requires special Top Subs.

Recommended Spares : 2 Grapples for each size, Basket or Spiral.  
2 Grapple Controls for each size.

\*Extra wide slot for passage of Cable Head.



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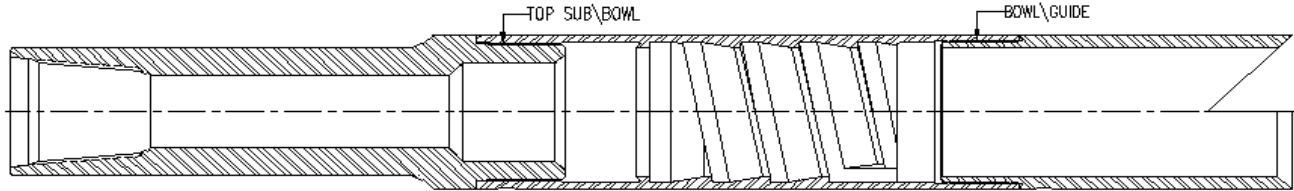
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## Series "150" Overshot Connection Make Up Torques & Strengths



| O.D. in Inches | Part Numbers |         |        |        | Makeup Torque w/ Bowl (ft-lbs)* |        | Tensile Yield w/ Bowl (lbs)* |         |
|----------------|--------------|---------|--------|--------|---------------------------------|--------|------------------------------|---------|
|                | Assembly     | Top Sub | Bowl   | Guide  | Top Sub                         | Guide  | Top Sub                      | Guide   |
| 2 5/16         | B8919        | A8920   | B8921  | 9404   | 600                             | 80     | 78,800                       | 9,500   |
| 2 21/32        | C10199       | A10200  | B10201 | A10206 | 1,300                           | 200    | 137,200                      | 23,700  |
| 3 1/8          | 9305         | 9311    | 9306   | 9312   | 2,000                           | 400    | 191,200                      | 34,400  |
| 3 3/8          | C4623        | A5083   | B5088  | A5093  | 2,700                           | 700    | 235,000                      | 54,700  |
| 3 5/8          | C5080        | A5081   | B5082  | A5087  | 2,700                           | 900    | 218,700                      | 71,900  |
| 3 5/8          | 9270         | 9276    | 9271   | 9275   | 2,500                           | 500    | 210,000                      | 40,300  |
| 3 3/4          | 37585        | 37586   | 37587  | 37592  | 2,600                           | 500    | 208,500                      | 42,000  |
| 3 15/16        | C5101        | A5102   | B5103  | A3598  | 1,900                           | 900    | 141,000                      | 64,700  |
| 3 7/8          | C1835        | A1842   | B1836  | A1841  | 2,400                           | 800    | 195,600                      | 55,400  |
| 4 1/8          | 9105         | 9106    | 9107   | 1746   | 3,500                           | 1,000  | 264,100                      | 69,800  |
| 3 7/8          | 21300        | 21301   | 21302  | 21307  | 1,700                           | 400    | 137,600                      | 27,800  |
| 4 3/8          | C4619        | A4620   | B4621  | A4622  | 4,400                           | 1,300  | 286,100                      | 80,000  |
| 4 9/16         | C5151        | A5152   | B5153  | A4341  | 5,500                           | 1,600  | 347,400                      | 97,500  |
| 4 11/16        | 9109         | 9110    | 9111   | 6667   | 3,400                           | 1,300  | 225,300                      | 81,100  |
| 4 5/8          | C5129        | B5130   | B5131  | A5135  | 5,700                           | 1,200  | 361,600                      | 73,300  |
| 4 11/16        | 9120         | 9110    | 9121   | 9125   | 3,400                           | 1,000  | 225,300                      | 63,800  |
| 4 7/8          | C5154        | A5155   | B5156  | A5161  | 6,200                           | 1,100  | 368,000                      | 67,600  |
| 5 9/16         | 5896         | 5897    | 5898   | 187    | 9,000                           | 2,600  | 496,900                      | 137,000 |
| 5 1/2          | C4969        | A4970   | B4971  | M1138  | 7,800                           | 1,700  | 404,200                      | 89,300  |
| 5 5/8          | 5698         | 5699    | 5700   | 1143   | 7,100                           | 1,700  | 370,800                      | 91,200  |
| 5 5/8          | C5168        | A5169   | B5170  | B2203  | 6,900                           | 1,900  | 350,700                      | 98,700  |
| 5 3/4          | 8975         | 8976    | 8977   | 6121   | 8,100                           | 1,600  | 414,400                      | 84,400  |
| 5 29/32        | C5171        | A5172   | B5173  | B4371  | 8,200                           | 2,200  | 409,100                      | 105,300 |
| 6 1/8          | 7787         | 7789    | 7788   | 5946   | 9,000                           | 2,400  | 425,700                      | 119,400 |
| 5 3/4          | C11823       | A11824  | B11825 | A11830 | 5,500                           | 1,600  | 266,500                      | 74,900  |
| 6 3/8          | 6655         | 6656    | 4503   | 4504   | 10,400                          | 3,400  | 473,400                      | 151,700 |
| 6 1/2          | 4773         | 4774    | 9205   | 4775   | 8,400                           | 2,900  | 395,200                      | 132,500 |
| 6 5/8          | 8625         | 8626    | 8617   | 8621   | 9,500                           | 3,300  | 415,800                      | 141,700 |
| 7 3/8          | 9692         | 9693    | 9694   | 9691   | 13,500                          | 3,700  | 560,100                      | 152,600 |
| 7 5/8          | 8741         | 8742    | 1641   | 5525   | 16,000                          | 4,700  | 619,500                      | 187,500 |
| 7 7/8          | C2108        | B2106   | B2109  | A2072  | 31,100                          | 6,400  | 1,171,100                    | 236,900 |
| 7 5/8          | 9860         | 9861    | 9862   | 9867   | 12,100                          | 4,000  | 485,600                      | 158,400 |
| 8 1/8          | C5342        | A5343   | B3711  | A2376  | 22,900                          | 6,800  | 809,500                      | 240,000 |
| 7 3/4          | 4785         | 9133    | 9134   | 9139   | 13,200                          | 4,200  | 521,300                      | 161,300 |
| 8 1/4          | C3032        | A3033   | B3034  | A1818  | 18,200                          | 7,000  | 642,100                      | 246,600 |
| 7 7/8          | C5222        | A5223   | B5224  | A5229  | 11,300                          | 4,400  | 409,200                      | 159,200 |
| 8 1/8          | 9217         | 9218    | 9219   | 9226   | 17,300                          | 4,600  | 648,700                      | 170,700 |
| 8 3/8          | C5354        | A5355   | B5356  | A5361  | 14,500                          | 5,200  | 496,800                      | 175,600 |
| 9 5/8          | 264          | 265     | 266    | 240    | 26,400                          | 10,200 | 805,600                      | 303,200 |
| 9 1/2          | 4834         | 9063    | 9062   | 9059   | 20,300                          | 6,200  | 649,500                      | 197,200 |
| 10 1/8         | 8960         | 8961    | 8962   | 8959   | 32,500                          | 10,200 | 969,300                      | 302,600 |
| 10 5/8         | C5321        | A5322   | B5323  | A5328  | 37,200                          | 13,100 | 1,009,900                    | 350,400 |
| 11 1/4         | C12822       | A12823  | B12824 | A12829 | 39,500                          | 15,700 | 995,350                      | 394,700 |
| 11 3/4         | 5329         | 5330    | 5331   | 5336   | 52,200                          | 16,100 | 1,277,400                    | 387,600 |
| 12 3/4         | 15800        | 15801   | 15802  | 15806  | 51,700                          | 16,100 | 1,214,900                    | 376,900 |
| 13 3/4         | 33006        | 33007   | 33008  | 33012  | 70,500                          | 17,600 | 1,541,100                    | 385,300 |
| 16             | 68028        | 68029   | 68030  | 68035  | 111,200                         | 34,670 | 1,972,600                    | 614,800 |
| 16 3/4         | 64553        | 64554   | 64555  | 64560  | 107,500                         | 26,670 | 1,932,900                    | 479,700 |

\* The above torque values are the maximum recommended torque values and are set at 50% of the calculated theoretical yield torque. These torques are not required for all fishing jobs and lower torque values will work with less wear and tear to the threads. It is assumed that the torque is applied evenly to the OD so as to not collapse the OD. The above tensile strengths are calculated theoretical tensile yield strengths and are considered accurate to ±20%. It should be noted that all strengths assume straight and steady pulling of a fully engaged round fish. Any long marks, damage to the Bowl's surface, or jarring can reduce the strength substantially.

# Bowen™ Reverse Circulation Junk Basket

| Reverse Circulating Junk Basket Connection Make Up Torques   |              |         |        |      |                                 |                               |
|--|--------------|---------|--------|------|---------------------------------|-------------------------------|
|  |              |         |        |      |                                 |                               |
| O.D. in<br>Inches  | Part Numbers |         |        |      | Makeup Torque Top<br>Sub-Barrel | Makeup Torque<br>Barrel-Guide |
|  | Assembly     | Top Sub | Barrel | Shoe | (ft-lbs)*                       | (ft-lbs)*                     |
| 3.63   | 6635         | 6636    | 6637   | 6642 | 2,100                           | 2,400                         |
| 4.00   | 7295         | 7296    | 7297   | 7299 | 2,500                           | 4,200                         |
| 4.50   | 4448         | 4449    | 4450   | 4455 | 2,700                           | 5,100                         |
| 4.88   | 4572         | 4573    | 4574   | 4576 | 4,000                           | 6,200                         |
| 5.13   | 2618         | 2619    | 2620   | 2625 | 4,400                           | 4,000                         |
| 5.75   | 2670         | 2671    | 2672   | 2676 | 5,500                           | 7,200                         |
| 6.25   | 2677         | 2678    | 2679   | 2683 | 7,500                           | 9,700                         |
| 7.00   | 2554         | 2493    | 2555   | 2556 | 9,400                           | 7,800                         |
| 7.88   | 2567         | 2568    | 2569   | 2574 | 11,100                          | 11,500                        |
| 9.13   | 2659         | 2660    | 2661   | 2668 | 25,300                          | 26,100                        |
| 10.13  | 2684         | 2685    | 2686   | 2689 | 33,700                          | 47,000                        |
| 11.00  | 2690         | 2691    | 2692   | 2695 | 44,200                          | 42,500                        |
| 11.88  | 2696         | 2697    | 2698   | 2701 | 69,300                          | 64,100                        |
| 13.00  | 2702         | 2703    | 2704   | 2707 | 69,700                          | 39,500                        |
| 15.00  | 2708         | 2709    | 2710   | 2713 | 77,300                          | 41,800                        |
| <small>* These values are the maximum torque values recommended and are set at 50% of yield. These torques are not required for all fishing jobs and lower torques will work with less wear and tear to the threads. It is also assumed that the torque is applied to the OD's evenly so as to not collapse the OD. Torque is measured in ft-lbs</small> |              |         |        |      |                                 |                               |

# ENGINEERING INDEX

Left Hand Threads Only and Completely Left Hand Conversion Table for Internal and External Catch Tools.

| REFERENCE                                     | REFERENCE DESCRIPTION  |  |
|---|--|--|
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| <p>DOCUMENT NUMBER</p> <p><b>10078488</b></p> |  | <p>REV</p> <p><b>01</b></p>  |



### **Revision History**

| Rev. | Date (yyyy-mm-dd) | Prepared | Reviewed   | Approved    |
|------|-------------------|----------|------------|-------------|
| 01   | 2012-12-14        | Tam Pham | Alan Foust | Troy Hudson |

### **Revision Description**

| Rev. | Change Description |
|------|--------------------|
| 01   | New                |

150 SERIES OVERSHOT  
CONVERSION TABLE

| OUTSIDE DIAMETER | STANDARD P/N | LEFT HAND THREADS ONLY P/N | COMPLETELY LEFT HAND P/N |
|------------------|--------------|----------------------------|--------------------------|
| 2 5/8            | C-10199      | 154669                     | 77749                    |
| 3 1/8            | 9305         |                            | 506206                   |
| 3 3/8            | C-4623       |                            | 157311                   |
| 3 5/8            | C-5080       |                            | 155821                   |
| 3 5/8            | 9270         | 19475                      |                          |
| 3 5/8            | C-9237       | 74989                      |                          |
| 3 5/8            | N-9270       | 80863                      | 146120                   |
| 3 3/4            | C-1827       |                            | C-13679                  |
| 3 3/4            | 37585        | 152265                     | 151813, 149523           |
| 3 7/8            | C-1835       | 56703                      |                          |
| 3 7/8            | 21300        |                            | 151667, 151820           |
| 3 15/16          | C-5101       | 53420                      | 70365                    |
| 4                | C-4736       | 70567, 48894               | 54118                    |
| 4                | C-5104       | 74827                      | 145310                   |
| 4 1/8            | 4390         | 78234                      | 151643                   |
| 4 1/8            | 9105         | 30080                      | 74785                    |
| 4 3/16           | C-5098       | 53886                      | 47438                    |
| 4 1/4            | C-5126       | 48890                      |                          |
| 4 3/8            | C-4619       | 151949                     | 154282                   |
| 4 7/16           | C-9773       |                            | 156881                   |
| 4 1/2            | 17201        | 36214                      | 152679                   |
| 4 1/2            | C-5123       |                            | 77573                    |
| 4 9/16           | C-5151       | 56707                      | 46238                    |
| 4 5/8            | C-5129       | 64133                      | 149201                   |
| 4 5/8            | 1255         |                            | 505225                   |
| 4 11/16          | 9109         | 60131                      | 51949                    |
| 4 11/16          | 9120         | 148548                     | 152633                   |
| 4 3/4            | C-5139       |                            | 152957                   |
| 4 7/8            | C-5154       |                            | 51469                    |
| 4 7/8            | 153578       |                            | 155738                   |
| 4 7/8            | C-5154       |                            | 51469 (CT)               |
| 5                | C-5148       | 53424                      | 73203                    |
| 5                | C-5428       |                            | 47111                    |
| 5 1/8            | C-5162       |                            | 151827, 149525           |

| OUTSIDE DIAMETER | STANDARD P/N | LEFT HAND THREADS ONLY P/N | COMPLETELY LEFT HAND P/N |
|------------------|--------------|----------------------------|--------------------------|
| 5 1/4            | 9515         |                            | 47439                    |
| 5 7/16           | C-5425       | 64743                      | 47440                    |
| 5 1/2            | C-4969       | 501186                     | 152639                   |
| 5 9/16           | 5896         | 70426                      | 505213                   |
| 5 5/8            | 5698         | 78345                      |                          |
| 5 5/8            | C-5168       | 51985                      | 54046                    |
| 5 3/4            | 8975         | 26350                      | 31764                    |
| 5 3/4            | C-7096       |                            | 47112                    |
| 5 3/4            | 79908        | 153299 (CT)                |                          |
| 5 13/16          | 4814         | 147699                     |                          |
| 5 7/8            | C-5171       | 151638                     | 70326                    |
| 6 1/16           | C-4829       | 52478                      | C-13720                  |
| 6 1/8            | 7787         | 147721                     | 151631                   |
| 6 3/16           | C-7093       |                            | 151834                   |
| 6 3/8            | 6655         |                            | 80700                    |
| 6 5/8            | C-4825       | 58288                      |                          |
| 6 5/8            | 8625         |                            | 504919                   |
| 6 7/8            | 8978         |                            | 69917                    |
| 7 1/4            | C-5206       | C-14140                    |                          |
| 7 3/8            | 150980       | 153185(HP)                 |                          |
| 7 3/8            | 6150         | 150975                     |                          |
| 7 3/8            | 9692         | 54132                      | 54059                    |
| 7 5/8            | 7572         | 54136                      | 54074                    |
| 7 5/8            | 8741         |                            | 39431                    |
| 7 5/8            | 9860         | 36414                      |                          |
| 7 3/4            | 9163         |                            | 77163                    |
| 7 3/4            | C-5204       | 48884                      |                          |
| 7 3/4            | 4785         | 49087                      |                          |
| 7 7/8            | C-2108       | 48303                      | 47113                    |
| 7 7/8            | 9678         | 59342                      |                          |
| 7 7/8            | 5222         | 14760                      |                          |
| 7 7/8            | C-5222       | 62288                      | 54141                    |
| 7 7/8            | C-5222       | 152667 (CT)                |                          |
| 8 1/8            | C-5342       | 50487                      | 47442                    |
| 8 1/8            | 9217         | 36418, 149323              | 70221                    |
| 8 1/8            | C-3263       |                            | 67323                    |
| 8 1/8            | C-5342       | 153310 (CT)                |                          |

| OUTSIDE DIAMETER | STANDARD P/N | LEFT HAND THREADS ONLY P/N | COMPLETELY LEFT HAND P/N |
|------------------|--------------|----------------------------|--------------------------|
| 8 3/8            | C-3833       | 56709                      |                          |
| 8 3/8            | C-5354       |                            | 148518                   |
| 8 1/2            | C-5233       |                            | 80137                    |
| 9 3/8            | C-1500       | 70521                      |                          |
| 9 5/8            | 264          | 54138                      | 54082                    |
| 9 5/8            | C-4179       | 64707                      |                          |
| 9 5/8            | 79951        | 152663 (CT)                |                          |
| 10 1/16          | C-1230       | 68000                      |                          |
| 10 1/8           | 8960         | 20165                      |                          |
| 10 5/8           | C-5321       | 56713                      |                          |
| 11 1/4           | C-12822      | 77160                      | 72253                    |
| 11 3/8           | C-5313       |                            | 80131                    |
| 11 3/4           | 15250        | 64740                      |                          |
| 11 3/4           | 5329         | 79668                      | 79778                    |
| 12 3/4           | 15800        | 59890                      |                          |
| 20 1/4           | 31653        | 77167                      |                          |

70 SERIES OVERSHOT  
CONVERSION TABLE

| OUTSIDE DIAMETER | STANDARD P/N | LEFT HAND THREADS ONLY P/N | COMPLETELY LEFT HAND P/N |
|------------------|--------------|----------------------------|--------------------------|
| 3 5/8            | 17615        |                            | 504377                   |
| 4 5/8            | 11290        |                            | 78694                    |
| 4 11/16          | 10434        | 504135, 150209             |                          |
| 4 3/4            | 12645        | 48881                      |                          |
| 5 5/8            | 11297        | 54174                      |                          |
| 5 3/4            | 13065        |                            | 153361                   |
| 5 7/8            | 10543        | 48755                      | 145314                   |
| 5 7/8            | 10560        | 54171                      | 78689                    |
| 7 5/8            | 11630        | 54134                      | 54069                    |



FULL CIRCLE SPEARS  
CONVERSION TABLE

| OUTSIDE DIAMETER | STANDARD P/N | LEFT HAND THREADS ONLY<br>P/N | COMPLETELY LEFT HAND P/N |
|------------------|--------------|-------------------------------|--------------------------|
| 2 3/8            | 6175         |                               | 7356                     |
| 2 7/8            | 6246         | 53383                         | 14241                    |
| 2 7/8            | 6684         |                               | 6417                     |
| 3 1/2            | 7640         |                               | 153094                   |
| 3 1/2            | 6701         |                               | C-9637                   |
| 4                | 6710         |                               | 78542                    |
| 4 1/2            | 6715         |                               | 9744                     |
| 4 1/2            | 10536        |                               | 11163                    |
| 5                | 9337         |                               | 59584                    |
| 7                | 9352         |                               | 78259                    |
| 8 5/8            | 6318         |                               | 147222                   |
| 9 5/8            | 10473        |                               | 78264                    |

ITCO SPEARS  
CONVERSION TABLE

| OUTSIDE DIAMETER | STANDARD P/N | LEFT HAND THREADS ONLY P/N | COMPLETELY LEFT HAND P/N |
|------------------|--------------|----------------------------|--------------------------|
| 1 1/4            | 11195        |                            | 35841                    |
| 2 3/8            | 9645         |                            | 74509                    |
| 2 3/8            | 1344         |                            | 42069                    |
| 2 7/8            | 1227         | 62242                      | 62198                    |
| 2 7/8            | 17231        |                            | 18820                    |
| 5                | 9680         |                            | 18270                    |
| 5                | 1332         |                            | 20115                    |
| 6                | 17234        |                            | 58292                    |
| 7                | 9266         |                            | 20890                    |
| 8 5/8            | 9380         |                            | 20895                    |
| 9 5/8            | 9281         | 81470                      | 20120                    |

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