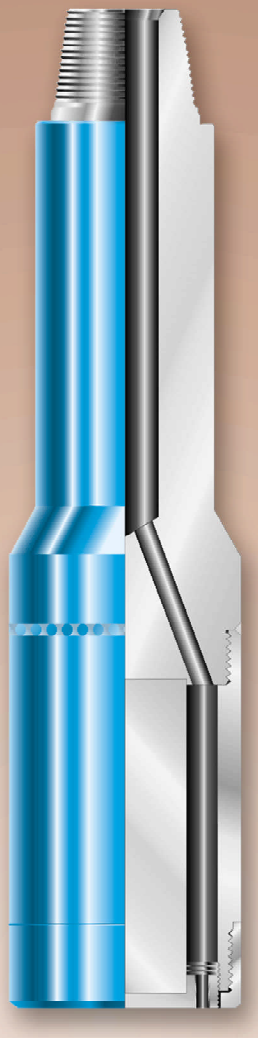
FISHING MAGNETS

Instruction Manual 3400



Fishing Magnets

NATIONAL OILWELL VARCO

One Company | Unlimited Solutions

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Fishing Magnets

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.

Twenty-first Printing, September 2005

General Description

Bowen Fishing Magnets are the best special purpose Fishing tools available for retrieving undrillable objects having magnetic attraction. Small odd shaped items which cannot be caught by other conventional (inside or outside catch) fishing tools, are readily attracted and retrieved by Bowen Fishing Magnets.

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 pounds 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

Tool failures, milling jobs, and accidents often cause objects such as bit cones, bearings, slips, mill cuttings, tong pins and hammers to collect at the bottom of the hole. In many instances, such objects can only be engaged and retrieved by magnetic attraction.

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 design of 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.

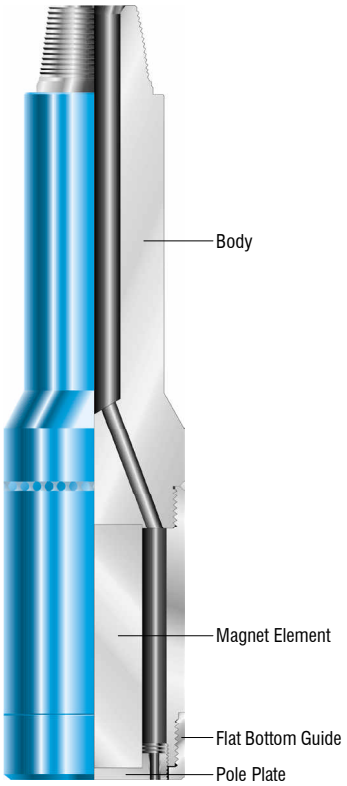
The Body is manufactured from alloy steel. It has a suitable tool joint pin at its upper end, a thread at its lower end to engage the Housing, and ample circulation ports.

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.



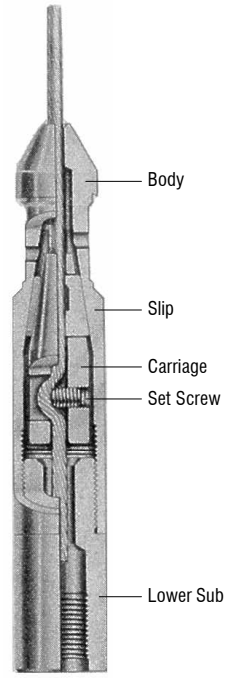
Bowen Fishing Magnet

Operation

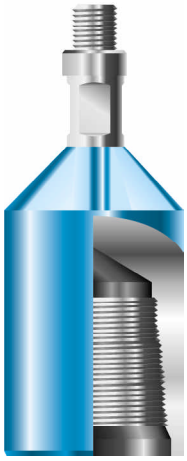
Bowen Fishing Magnets are most often operated on tubing or drill pipe. However, where circumstances demand it, they may be operated on wire line.

Operation on wire line is achieved by utilizing Sucker Rod Adaptors, and Wireline Rope Sockets, which are also available from National Oilwell. The Magnet, with a Flush Guide is lowered to the bottom of the hole and returned to the surface at a fairly slow speed. Operation on wire line is economical, but does not allow fluid circulation through the tool.

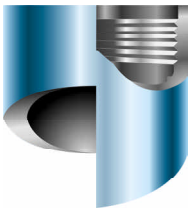
After the Magnet is assembled on the running string, lower it within 6 inches or 1 foot of the fish. Circulate the fluid long enough to wash out and remove heavy cuttings. Reduce circulation and lower the Magnet into contact with the fish. Rotate enough to assure good contact, and discontinue circulation.



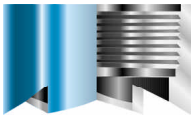
Wireline Rope Socket



Adapter



Lipped Guide



Mill Guide

The **Flush Guide** is used to catch 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.

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. Caution should be used in such cases, not to apply too much weight. Excessive weight will tend to push the object in to 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 it should be done 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.

Severe damage may be done to the Pole Plate and Magnetic Element by the application of excessive weight or rotation.

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.

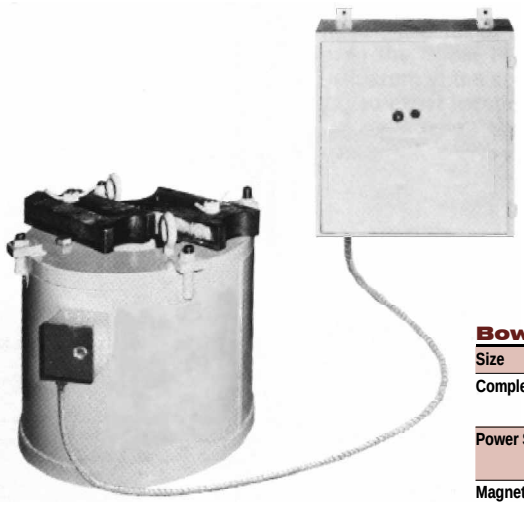
The Magnetic Element in a Bowen Magnet is essentially permanent, but over a long period of time, or by mishandling may become weakened. When this occurs the magnet should be recharged. Unless the operator has a National Oilwell Magnet Re-charger, the tools requiring recharge must be returned to National Oilwell for proper recharging.

Also, if through wear or damage, a magnet requires extensive repairs, it should be returned to Bowen for such repairs. National Oilwell's facilities allow the tool to be completely demagnetized, disassembled, repaired and reassembled under controlled conditions. Reassembly of these tools must be properly done if they are to function properly.

Bowen Magnet Charger

The **Bowen Magnet Charger** is designed to induce a strong magnetic charge into bar type fishing magnets. It is able to do big charging jobs with small electrical service. The Bowen Magnet Charger is a pulsed type unit and requires much less electrical power than ordinary continuous type chargers.

The Bowen Magnet Charger includes a Power Supply Unit and Magnetizing Coil Unit. The solid state Power Supply Unit converts alternating current input into short-pulse, high-peak direct current output to the Magnetizing Coil.



Bowen Magnet Charger

Bowen Magnet Charger

Size		14-Inch	20-Inch
Complete Assembly	Part. No.	71999	76662
	Weight	5,100	7,100
Power Supply Unit	Part No.	70973	70973
	Weight	100	100
Magnetizing Coil Unit	Part No.	70974	76663
	Weight	5,000	7,000

Input Requirements:
100 amperes, 208–230 volts, 50/60 Hz, AC, single phase

The magnet is placed in the Magnetizing Coil and locked into place by means of adjustable arms which are a part of the magnetic circuit. A push of the button on the Power Supply Unit starts the magnetizing cycle, which automatically shuts off after the short interval of time required to reach peak magnetizing force.

The Bowen Magnet Charger can be used to magnetize fishing magnets up to 14- and 20-inches outside diameter.

Proper Charge

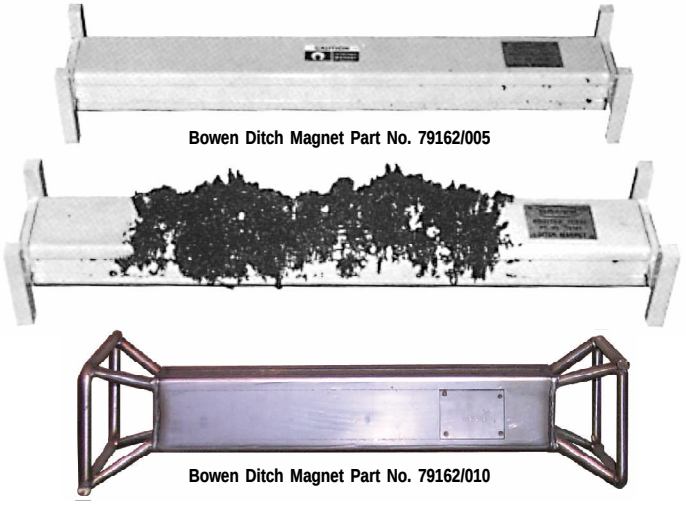
Regardless of the charging method, a Bowen Fishing Magnet is properly charged when it reads 2,500 gausses or more on a commercial gauss meter. Lifting capacity is a function of size, contact area and charge. The gauss meter reads the strength of the charge which does not vary because of the size of the magnet.

Bowen Ditch Magnet

The **Bowen Ditch Magnet** is the best available and most effective means of trapping and removing metal particles from the drilling mud that the shale shaker will not get. This unit will capture all metals having magnetic attraction and hold them until they can be removed from the mud stream. The Magnet is particularly valuable during milling operations. Removal of mill cuttings and debris reduces wear of mud pumps and other equipment, as well as eliminating problems caused by the return downhole of harmful debris. They are equally effective during washover and fishing jobs.

The Bowen Ditch Magnet features simplicity, ruggedness and high power-to-weight ratio. The three-foot-long Magnet weighs only 90 pounds and will hold in suspension as much as half this weight of mill cuttings. The design is clean — eliminating trays, gates and other auxiliary equipment. The magnet is encased in stainless steel and has integral H-handles at each end for lifting.

No special instructions are required to operate the Bowen Ditch Magnet. It is most effective when suspended by soft line in the mud ditch. It may also be suspended by soft line in the shaker discharge. The unit should be cleaned several times per day, depending on milling rate. Just remove the Magnet and clean with fresh or salt water hose. Wipe all cuttings from the unit and return it to duty. The unit may be cleaned less often during other operations when return cuttings come slower.



Bowen Ditch Magnet Part No. 79162/005

Bowen Ditch Magnet Part No. 79162/010

Standard length is 36 inches. Optional lengths available upon request.

Bowen Fishing Magnets Specifications

Hole Size		1-1/4 to 2	1-5/8 to 2-1/2	2 to 2-3/4	2-3/8 to 3-1/4	2-3/4 to 3-5/8	3 to 3-3/4	3-1/4 to 4-1/8	4 to 4-1/4
Size – O.D.		1	1-1/4	1-1/2	1-3/4	2-1/4	2-1/2	3	3-1/4
Top Connection – Pin		5/8	5/8	5/8	3/4	3/4	3/4	2-3/8	2-3/8
		11-N.C.	S.R.	S.R.	S.R.	S.R.	S.R.	Tbg.	Tbg.
Approximate Pull In lbs*		5–7	8–10	11–14	15–20	25–50	50–85	85–190	85–190
Complete Assembly	Part No.	32060	32080	32100	32120	32150	32170	32180	32190
	Weight	1	1-1/2	3-1/4	5	16	18	20	25

Component Parts

Body	Part No.	—	32081	32101	32121	32151	32171	32181	32191
	Weight	—	1-1/4	1-1/2	3	10	10	11	12-3/4
Housing	Part No.	32062	32082	32102	32122	32152	32172	32182	32192
	Weight	3/4	3/4	1	1	3-1/2	4	4-1/2	6-1/2
Pole Plate	Part No.	32063	32083	32103	32123	32153	32173	32183	32193
	Weight	1/8	1/8	1/4	1/4	1/2	3/4	3/4	1
Magnetic Element	Part No.	32064	32064	32104	32124	32154	32174	32184	32194
	Weight	1/8	1/8	1/2	1/2	1-1/2	1-1/2	3	4
Flush Guide	Part No.	—	32085	32105	32125	32155	32175	32185	32195
	Weight	—	1/4	1/4	1/2	1/2	3/4	3/4	3/4

Accessories

Lipped Guide	Part No.	—	32085	32105	32125	32155	32175	32185	32195
	Weight	—	1/4	1/4	1/2	1	1	1	3
Mill Guide	Part No.	—	32085	32105	32125	32155	32175	32185	32195
	Weight	—	1/4	1/4	3/4	1	2	2-3/4	3
Adapter 3/4" Sucker Rod	Part No.	—	—	—	—	—	—	70513	70513
	Weight	—	—	—	—	—	—	12-1/2	12-1/2

Bowen Fishing Magnets Specifications

Hole Size		4-1/4 to 4-1/2	4-1/2 to 5	5-1/8 to 5-1/2	5-5/8 to 6	6-1/8 to 6-1/2	6-1/8 to 6-1/2	6-5/8 to 7-1/2	7-5/8 to 8-1/2
Size – O.D.		3-1/2	4	4-1/2	5	5-1/2	5-3/4	6	7
Top Connection – Pin		2-3/8	2-3/8	2-7/8	2-7/8	3-1/2	3-1/2	3-1/2	4-1/2
		Reg.	API Reg.	API Reg.	API Reg.	API Reg.	API Reg.	API Reg.	API Reg.
Approximate Pull In Lbs.*		150–250	175–250	250-320	320-385	385–425	385–425	425–500	550–700
Complete Assembly	Part No.	32210	32230	32240	32260	32270	32280	32290	32300
	Weight	27-1/2	43	67	80	95	106	120	162

Component Parts

Body	Part No.	32211	32231	32241	32261	32271	32281	32291	2301
	Weight	14	26	40	47	59	75	70	105
Housing	Part No.	32212	32232	32242	32262	32272	32282	32292	32302
	Weight	7	9-1/4	15-1/2	17	19	16	20	29
Pole Plate	Part No.	32213	32233	32243	32263	32273	32273	32293	32303
	Weight	1	1-1/4	2	2	2-1/2	2-3/4	3	3-1/2
Magnetic Element	Part No.	32214	32224	32244	32264	32274	32274	32294	32304
	Weight	4-1/2	5	7-1/2	10	11	12	15	19
Flush Guide	Part No.	32215	32235	32245	32265	32275	32285	32295	32305
	Weight	1	1-1/2	2	4	4	4-1/4	5	5-1/2

Accessories

Lipped Guide	Part No.	32215	32235	32245	32265	32275	32285	32295	32305
	Weight	3-1/4	3-3/4	5	8	8	10	12	20
Mill Guide	Part No.	32215	32235	32245	32265	32275	32285	32295	32305
	Weight	3-1/2	4	4-1/2	8	8	15	17	25
5/8" Adapter Sucker Rod	Part No.	—	62250	62252	62252	62254	62254	62254	62256
	Weight	—	13	19	19	33	33	33	48
3/4" Adapter Sucker Rod	Part No.	—	62251	62253	62253	62255	62255	62255	62257
	Weight	—	13	19	19	33	33	33	48

* 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

Hole Size		8-5/8 to 9-3/4	9-7/8 to 11-5/8	10-1/2 to 11-7/8	11-3/4 to 13	12-1/4 to 14	15	17	20
Size – O.D.		8	9	10	10-1/2	11-1/2	14	16	19
Top Connection – Pin		4-1/2 API Reg.	4-1/2 API Reg.	65/8 API Reg.	6-5/8 API Reg.	6-5/8 API Reg.	6-5/8 API Reg.	6-5/8 API Reg.	13-3/8 Reed V-4 Thd
Approximate Pull in lbs*		700–850	850–1,000	1,000–1,125	1,125–1,260	1,260–1,550	1,700–2,100	3,200–4,000	4,200–5,000
Complete Assembly	**Part No.**	32310	32330	32340	32350	32370	32380	79183	79189
	Weight	205	335	390	431	512	770	1200	1700

Component Parts

Body	**Part No.**	32311	32331	32341	32351	32371	32381	79184	79190
	Weight	121	108	208	215	268	365	550	700
Housing	**Part No.**	32312	32332	32342	32352	32372	32382	79185	79191
	Weight	40	85	105	110	128	190	300	400
Pole Plate	**Part No.**	32313	32333	32343	32343	32373	32383	79186	79192
	Weight	6	9	10	11	15	35	65	120
Magnetic Element	**Part No.**	32314	32334	32344	32344	32374	32384	73641	79193
	Weight	30	49	55	60	84	153	200	325
Flush Guide	**Part No.**	32315	32335	32345	32355	32375	32385	79188	79194
	Weight	10	12	14-1/2	15	17	27	85	125

Accessories

Lipped Guide	**Part No.**	32315	32335	32345	32355	32375	32385	—	—
	Weight	27	35	43	47	62	100	—	—
Mill Guide	**Part No.**	32315	32335	32345	32355	32375	32385	—	—
	Weight	32	40	55	63	83	120	—	—
5/8" Adapter Sucker Rod	**Part No.**	62256	62256	62258	62258	62258	62258	—	—
	Weight	48	48	95	95	95	95	—	—
3/4" Adapter Sucker Rod	**Part No.**	62257	62257	62259	62259	62259	62259	—	—
	Weight	48	48	95	95	95	95	—	—

* 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 cther 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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* 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

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