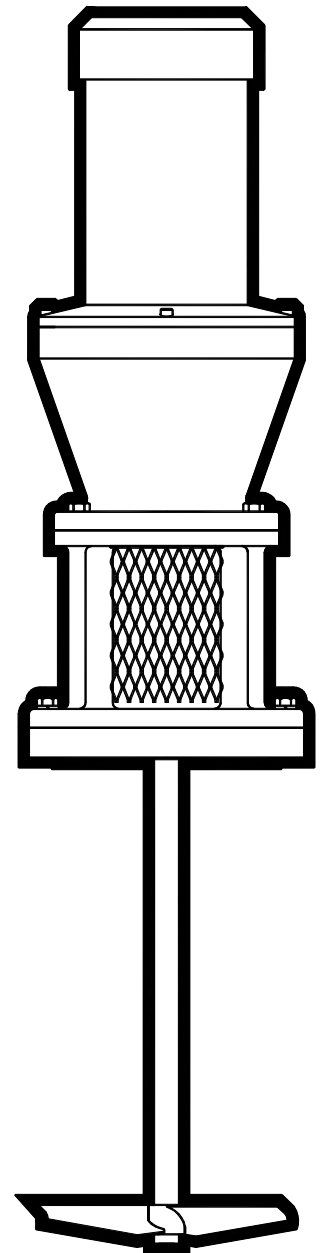


# DT Small Mixers Installation, Operation, Maintenance Manual

Equipment Reference:  
50DTNS Style Mixer  
50DTNC Style Mixer  
50DTN Style Mixer



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## INITIAL INSPECTION

**Step 1: Inspect crates.** Upon receipt, inspect all crates and equipment for shipping damage. Report shipping damage to your local Chemineer office or to the factory in Dayton, Ohio. A claim should be filed immediately with the carrier involved.

**Step 2: Uncrate. Check the contents.** Do not uncrate the unit until you have read the *Mounting & Installation* section of this manual and looked at the assembly drawing shipped with the unit. Be careful in uncrating and handling. Do not discard the crating without making sure that all mixer parts have been removed. Correct assembly of this unit requires referring to both the unit assembly drawing and this manual.

**Step 3: Questions? Call Chemineer.** If the shipment is not complete or you do not understand what you have received, please contact *your local Chemineer office* immediately.

## CHEMINEER ASSISTANCE

Chemineer maintains a fully staffed Parts and Field Service Department ready to help you with any service requirement. Simply contact your local Chemineer office, or contact Parts/Field Service at the Chemineer Factory in Dayton, Ohio:

Chemineer, Inc.

P.O. Box 1123

Dayton, Ohio 45401

Phone: (937) 454-3200

FAX: (937) 454-3375

Services available are as follows:

Installation and maintenance training seminars,  
Installation and start-up supervision,  
Preventative maintenance planning,  
Parts order service,  
Special instructions.

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## STORAGE

Do not remove any protective packaging, coatings (generally applied to the motor or gearmotor output shafts), or any protective coverings that may be applied to the wetted parts until the mixer is to be put into service. If the equipment is to be stored, *do not stack crates*. Store in a clean dry indoor location that is free from wide variations in temperature. The storage area should be free from vibration and excessive heat.

Inspect for external rust at six-month intervals. Apply rust preventative as required. If the unit has been in storage for more than six months or subjected to adverse moisture conditions, the motor windings may have to be dried prior to operation.

*CAUTION! Coated/rubber covered agitator parts require special handling to avoid damage to coatings/rubber coverings. Do not use chains or hooks on coated/covered surfaces. Special care is required to prevent damage to edges and outside corners. Contact Chemineer Field Service for instructions.*

### Short-Term Indoor Storage

Mixers should be stored indoors in areas with no vibration and relatively constant temperatures and humidity. The factory storage preparations should be acceptable for up to six months storage.

Rotate the drive coupling 10 to 15 revolutions at least once per month to reduce the possibility of brinelling of the bearings and to redistribute bearing grease.

## VESSEL EVALUATION

Refer to the mixer assembly drawing for the required support structure design loads.

In designing the structure to accommodate bending moment, the structure should be sufficiently rigid so that the mixer extension shaft will not move more than 1/64 inch (.4mm) per foot of length due to deflection of the mounting system.

The 50DTNS, 50DTNC and 50DTN units are supplied with a standard flange designed to mount on an ANSI or DIN nozzle or pad located on the vessel top head. Refer to the mixer assembly drawing for agitator mounting flange size and type. Special flanges, including ferrule type, are also available.

The following methodology will help determine if the designated vessel top head is sufficiently rigid to properly support a mixer or if reinforcement through gusseting is required.

1. Evaluate the designated vessel top head. Recommended head thicknesses are listed for un Gusseted nozzles (*Table 1*) and un Gusseted pads (*Table 2*). If the designated vessel head thickness conforms to the given dimension, refer to *page 7* for ***Sealed Tank Mixer Installation***. No further vessel head thickness evaluation is required.

**TABLE 1: RECOMMENDED MINIMUM HEAD THICKNESSES, “t”, inches (mm)  
FOR UNGUSSETED NOZZLE MOUNTING**

TANK DIAMETER, FT (M)												
2 (.61)	2.5 (0.76)	3 (0.91)	4 (1.22)	5 (1.52)	6 (1.83)	7 (2.13)	8 (2.44)	9 (2.74)	10 (3.05)	12 (3.66)	14 (4.27)	16 (4.88)
.625 (15.9)	.625 (15.9)	.750 (19.1)	.750 (19.1)	.875 (22.2)	.875 (22.2)	.875 (22.2)	1.000 (25.4)	1.000 (25.4)	1.000 (25.4)	1.000 (25.4)	1.000 (25.4)	1.000 (25.4)

**TABLE 2: RECOMMENDED MINIMUM HEAD THICKNESS, “t”, inches (mm)  
FOR PAD MOUNTING**

TANK DIAMETER, FT (M)												
2 (.61)	2.5 (0.76)	3 (0.91)	4 (1.22)	5 (1.52)	6 (1.83)	7 (2.13)	8 (2.44)	9 (2.74)	10 (3.05)	12 (3.66)	14 (4.27)	16 (4.88)
.375 (9.5)	.375 (9.5)	.500 (12.7)	.500 (12.7)	.500 (12.7)	.625 (15.9)	.625 (15.9)	.750 (19.1)	.750 (19.1)	.750 (19.1)	.875 (22.2)	.875 (22.2)	.875 (22.2)

**VESSEL EVALUATION**

- If the designated vessel top head **does not** meet *Table 1 or Table 2* criteria, reinforcement support may be added to provide the equivalent rigidity of a thicker head, providing that the existing head thickness meets the minimum thicknesses as noted in *Table 3, below*, for nozzles or pads. Reference *Figure 1, page 5*.

*If the vessel head still does not meet the minimum thicknesses listed below, consult Chemineer Field Service for assistance.*

**TABLE 3: RECOMMENDED MINIMUM HEAD THICKNESSES, “t”, inches (mm) FOR REINFORCED NOZZLE OR PAD MOUNTING**

TANK DIAMETER, FT (M)												
2 (.61)	2.5 (0.76)	3 (0.91)	4 (1.22)	5 (1.52)	6 (1.83)	7 (2.13)	8 (2.44)	9 (2.74)	10 (3.05)	12 (3.66)	14 (4.27)	16 (4.88)
.188 (4.8)	188 (4.8)	.250 (6.4)	.250 (6.4)	.250 (6.4)	.250 (6.4)	.250 (6.4)	.375 (9.5)	.375 (9.5)	.375 (9.5)	.500 (12.7)	.500 (12.7)	.625 (15.9)

- If reinforcement is applicable, refer to *Tables 4 and 5, below and Figure 2, page 6* for proper reinforcement dimensions.

**TABLE 4: MOUNTING NOZZLE REINFORCEMENT DIMENSIONS, inches (mm)**

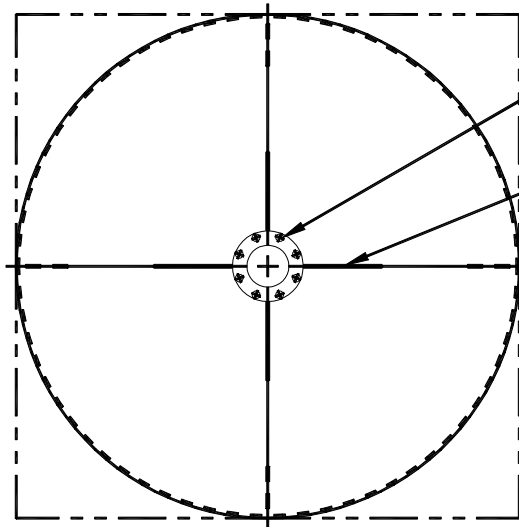
TANK DIAMETER, FT (M)			
A ANSI – DIN	B NOZZLE HEIGHT MINIMUM	C GUSSET DIMENSION	D BACKUP PLATE RADIUS
6 (150)	4 (102)	6.5 (165)	12 (305)

**TABLE 5: MOUNTING PAD REINFORCEMENT DIMENSIONS, inches (mm)**

TANK DIAMETER, FT (M)	
A ANSI – DIN	D BACKUP PLATE RADIUS
6 (150)	12 (305)



**VESSEL EVALUATION**



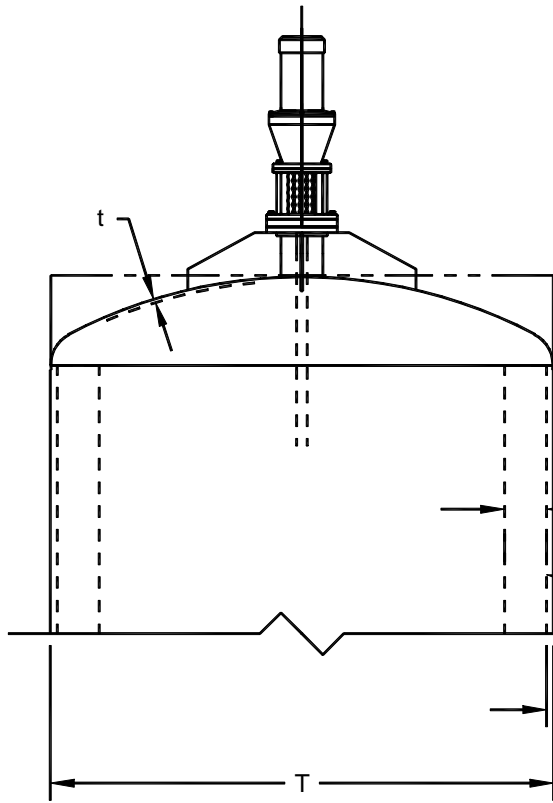
6"-150# FLANGE, BOLT HOLES STRADDLE CENTERLINE

EQUALLY SPACED GUSSETS (NOZZLE ONLY) QUANTITY OF GUSSETS IS ONE HALF OF THE NUMBER OF MOUNTING FLANGE BOLT HOLES. GUSSET THICKNESS EQUALS ONE HALF OF HEAD THICKNESS

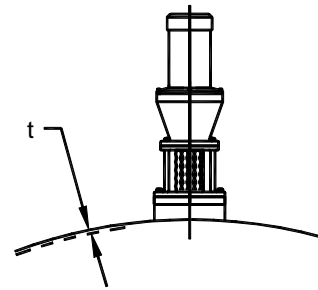
SEE TABLES 1 OR 2 FOR UNREINFORCED VESSEL HEAD THICKNESSES "t".

SEE TABLE 3 FOR REINFORCED MOUNTING

SEE TABLES 4 OR 5 FOR REINFORCEMENT DIMENSIONS.



NOZZLE MOUNT



PAD MOUNT

UNLESS OTHERWISE SPECIFIED (4) BAFFLES AT 90°. BAFFLES BY OTHERS.

Figure 1: Models 50DTNS, 50DTNC, 50DTN Mounting

**VESSEL EVALUATION**

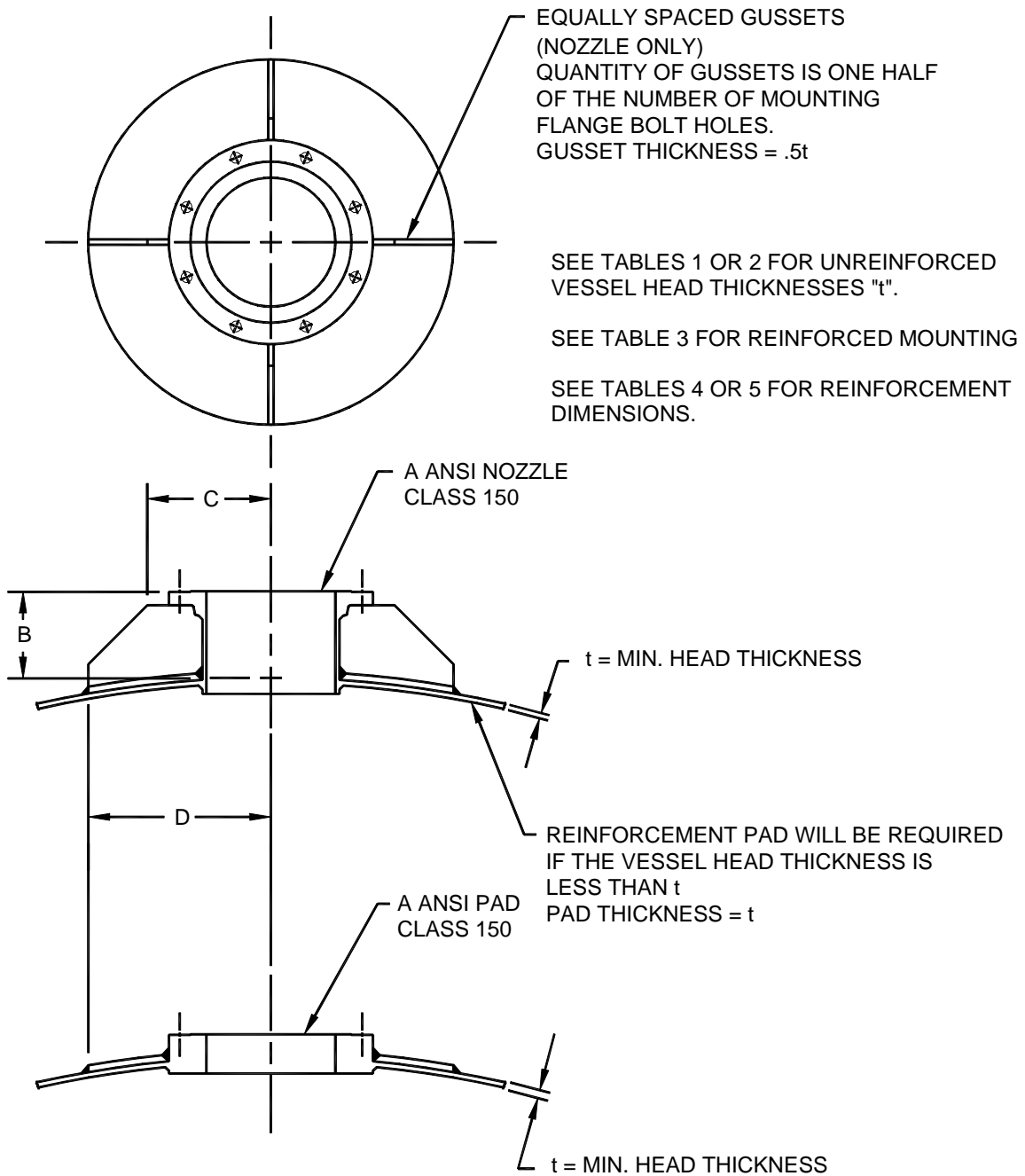


Figure 2: 50DTNS, 50DTNC, 50DTN Mounting, Nozzle/Pad

## SEALED TANK MIXER INSTALLATION

*Correct unit installation requires both the unit assembly drawing and this manual.*

The models 50DTNS, 50DTNC and 50DTN are gear reduced, heavy duty, single component mechanical seal (50DTNS), single cartridge mechanical seal (50DTNC), or double cartridge mechanical seal (50DTN) designs for sealed tank applications. The drive unit is typically shipped with the motor [100] mounted to the cast aluminum housing [201-05]. A flanged drive shaft [251] coupling with bearing support extends from the unit housing for removable coupling/extension shaft attachment. Also in the main unit box will be a separate carton for the seal assembly [1400, 1450, 1500, 1550, 1600, or 1650], seal adapter plate assembly [1260, 1270, 1280, or 1290], pedestal and handhole covers [1100], removable extension shaft coupling [300], mounting flange [1251], impellers [500] and all other required accessories. Shafting [400] is shipped separately.

*Be certain to locate all contents before discarding packaging materials.*

1. Remove all shipping constraints. A nylon strap, or similar, should be secured around the mixer housing [201-05] to lift and move the mixer. Please note the approximate net weight of the unit as shown on the assembly drawing and use caution when moving or lifting these items. *At no point during installation or maintenance of the mixer, should the extension shaft ever be used as a lifting point!*

**WARNING:** *DO NOT connect the mixer to the power source until the unit is fully assembled and properly positioned in the vessel.*

2. Install the mounting flange [1251], onto the vessel nozzle using a customer supplied gasket and fastener set.
3. Install handhole cover bolts and lockwashers [1108, 1109] into the pedestal [1101]. Refer to *Figure 4, page 9*. Assemble pedestal to mounting flange using bolts and lockwashers [1105, 1106]. Torque bolts to the value shown in *Table 7, page 36*.
4. Refer to the seal assembly drawing provided with the unit for shaft support collar “set” dimension. Set shaft collar [1253] to proper dimension from upper shaft end and clamp into place by tightening bolts [1254] provided with the collar. Lift the mixer shaft [400] and lower it into the vessel until the collar rests on the shaft support shelf inside the mounting flange. All welded shaft assemblies should be lowered into the vessel and then raised through the mounting flange, prior to attaching the shaft support collar. Shaft support collar may then be attached and the shaft lowered onto the support shelf in the mounting flange.

SEALED TANK MIXER INSTALLATION

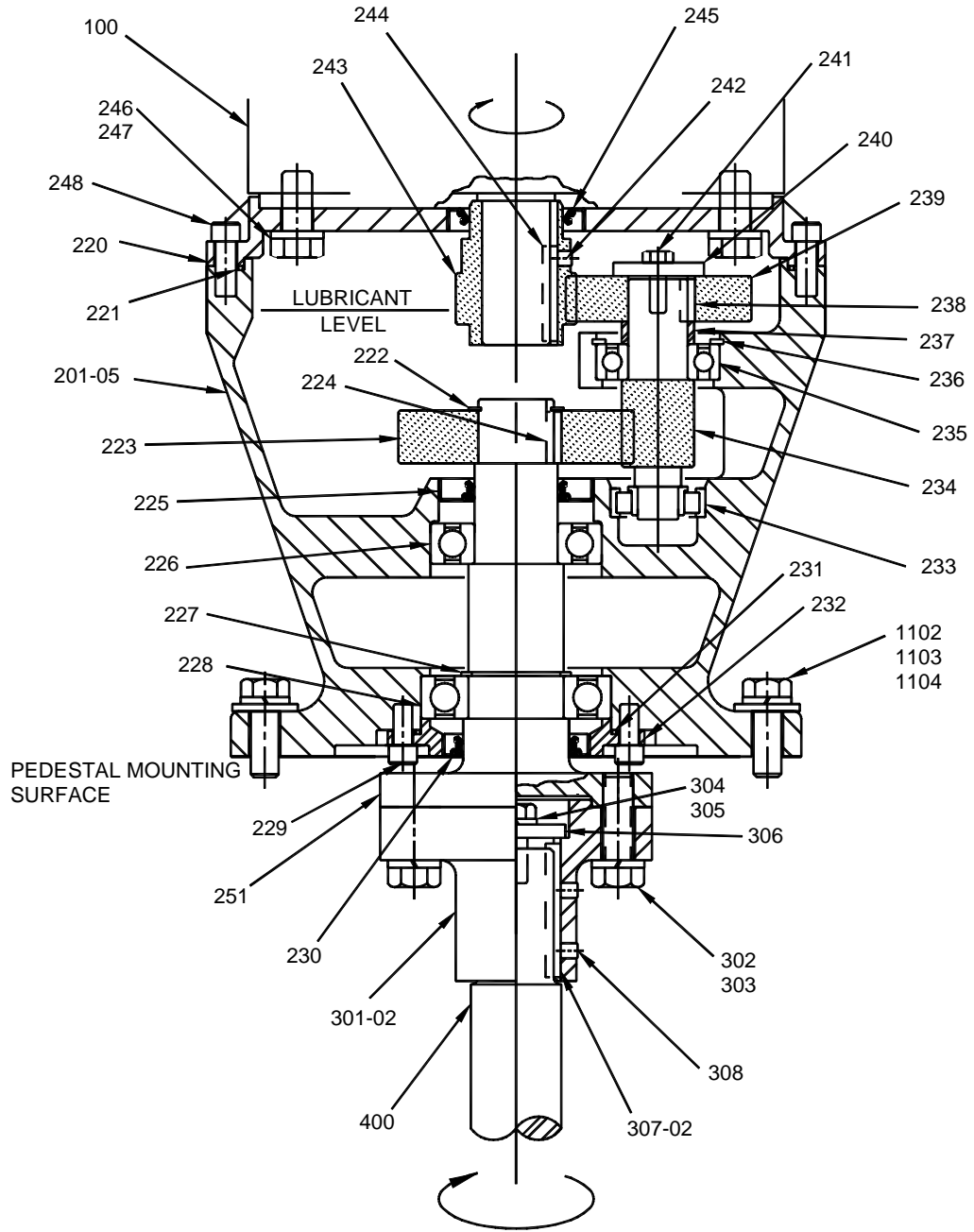


Figure 3: Model 50DTNS, 50DTNC, 50DTN Drive Assembly

**SEALED TANK MIXER INSTALLATION**

*Handhole Cover Installation*

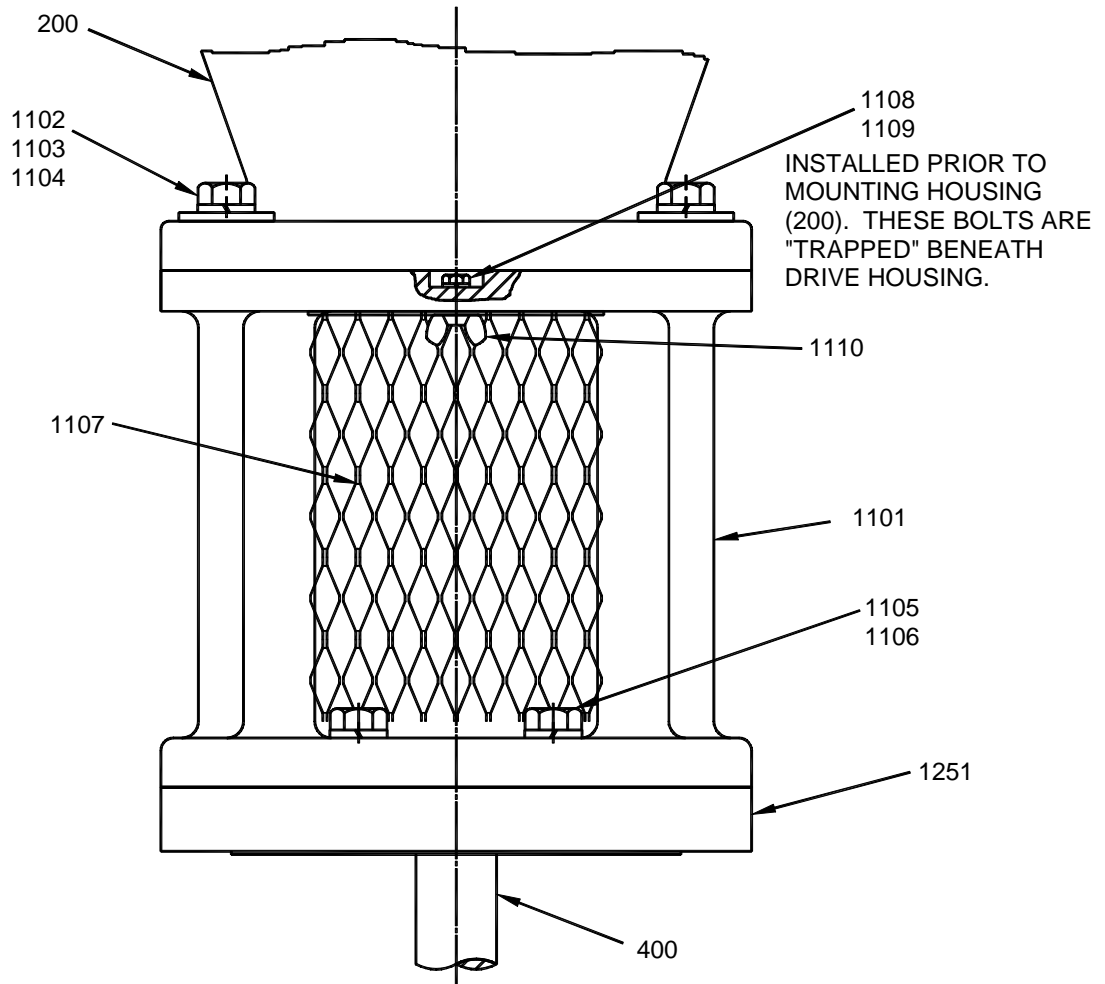


Figure 4: Handhole Cover Assembly

## SEALED TANK MIXER INSTALLATION

### *Seal Cartridge Installation*

#### *Model 50DTNS, Flowserve MCRO Seal:*

1. Place o-ring [1252] into groove in mounting flange [1251].
2. Install seal adapter plate [1261] onto flange. Install bolts, lockwashers, and flatwashers [1262, 1263, 1264] loosely to center seal adapter plate.
3. Install stationary seal ring [1456] and o-ring [1457] into the adapter plate [1261].
4. Remove o-ring [1455] from rotary seal ring [1454]. Lubricate and re-install o-ring [1455] into rotary seal ring [1454]. Lubricate shaft [400]. Compress seal spring [1453] into rotary seal ring and slide entire seal ring, o-ring, and spring assembly down shaft to rest on the stationary seal insert [1456]. O-ring [1455] should be fully seated in rotary seal ring [1454]. *CAUTION: Do not get lubricant on the sealing faces.*
5. Install collar [1451] with setscrews [1452].
6. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].
7. Lower the mixer drive onto the pedestal [1101] and removable coupling half [301-02], and attach with bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Torque bolts to the value shown in *Table 7*. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling [301] and flanged drive shaft coupling [251] faces together. Install and tighten the remaining coupling bolts and lockwashers [302, 303].

SEALED TANK MIXER INSTALLATION

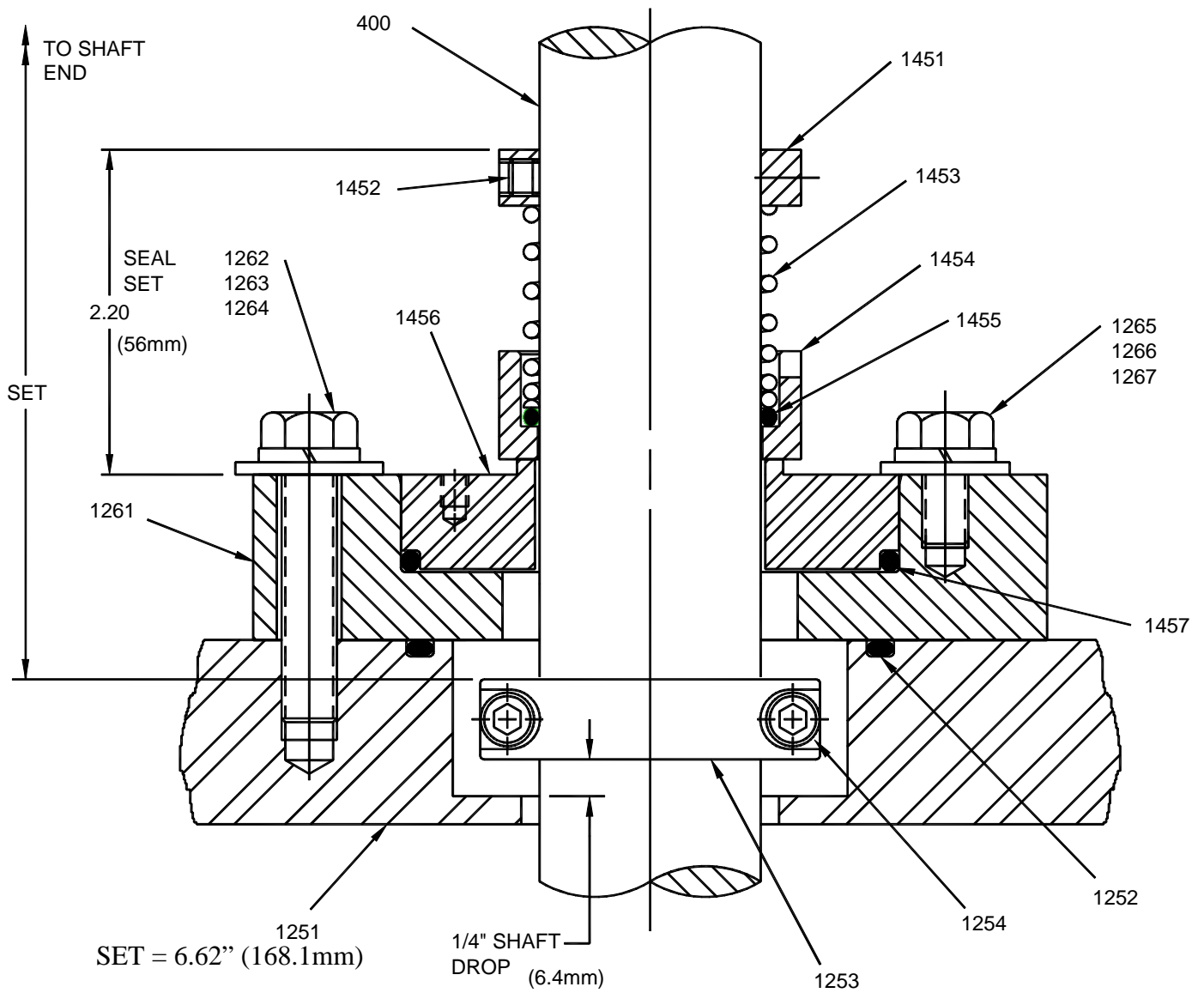


Figure 5: Model DTNS Seal, Flowserve MCRO

## SEALED TANK MIXER INSTALLATION

8. Slide the rotary seal ring **[1454]** up the extension shaft **[400]**. Center the mechanical seal adapter plate/stationary seal ring **[1261/1456]** on the extension shaft. Torque bolts **[1262]** to the value shown in *Table 7, page 36*.
9. Install bolts, lockwashers, and flatwashers **[1265, 1266, 1267]**. Torque bolts to the value shown in *Table 7*.
10. Set collar **[1451]** at 2.20" (55.9mm) above the adapter plate face per *Figure 5, page 11*. Evenly tighten all cup point setscrews **[1452]**.
11. Install the handhole covers **[1107]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher **[1108, 1109]**. Refer to *Figure 4, page 9*.
12. For single impeller assemblies, install the impeller with the lower hub face even with the shaft end. Impeller orientation should allow the driving edge of the impeller to pump toward the bottom of the mixing vessel. Tighten the impeller setscrews (typically quantity two).

For dual impeller assemblies, space the upper impeller at a recommended minimum of two impeller diameters and maximum of three impeller diameters above the lower impeller. The lower impeller should be a minimum of one impeller diameter below the liquid surface at all times during mixer operation.



## SEALED TANK MIXER INSTALLATION

### *Seal Cartridge Installation*

#### *Model 50DTNS, Crane 8B2 Seal:*

1. Place o-ring [1252] into groove in mounting flange [1251].
2. Install pin [1561] into seal adapter plate [1261]. Place seal adapter plate onto flange. Install bolts, lockwashers, and flatwashers [1262, 1263, 1264] loosely to center seal adapter plate.
3. Mating ring adapter [1559], stationary mating ring [1554], o-ring [1558], anti-rotation pin [1557], and snap ring [1562] are pre-assembled. Install mating ring adapter [1559] assembly into adapter plate [1261]. Make sure slot engages pin [1561]. Do not install bolts [1265] at this time.
4. Lubricate shaft [400]. Slide rotary seal ring [1553] assembly down shaft to rest on stationary mating ring [1554].
5. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].
6. Lower the mixer drive onto the pedestal [1101] and removable coupling half [301-02], and attach with bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Torque bolts to the value shown in *Table 7*. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling [301] and flanged drive shaft coupling [251] faces together. Install and tighten the remaining coupling bolts and lockwashers [302, 303].
7. Slide the rotary seal ring [1553] assembly up the extension shaft. Center the mechanical seal adapter plate/stationary mating ring [1261, 1554] on the extension shaft. Torque bolts [1262] to the value shown in *Table 7*.
8. Install bolts, lockwashers, and flatwashers [1265, 1266, 1267]. Torque bolts to the value shown in *Table 7*.

**SEALED TANK MIXER INSTALLATION**

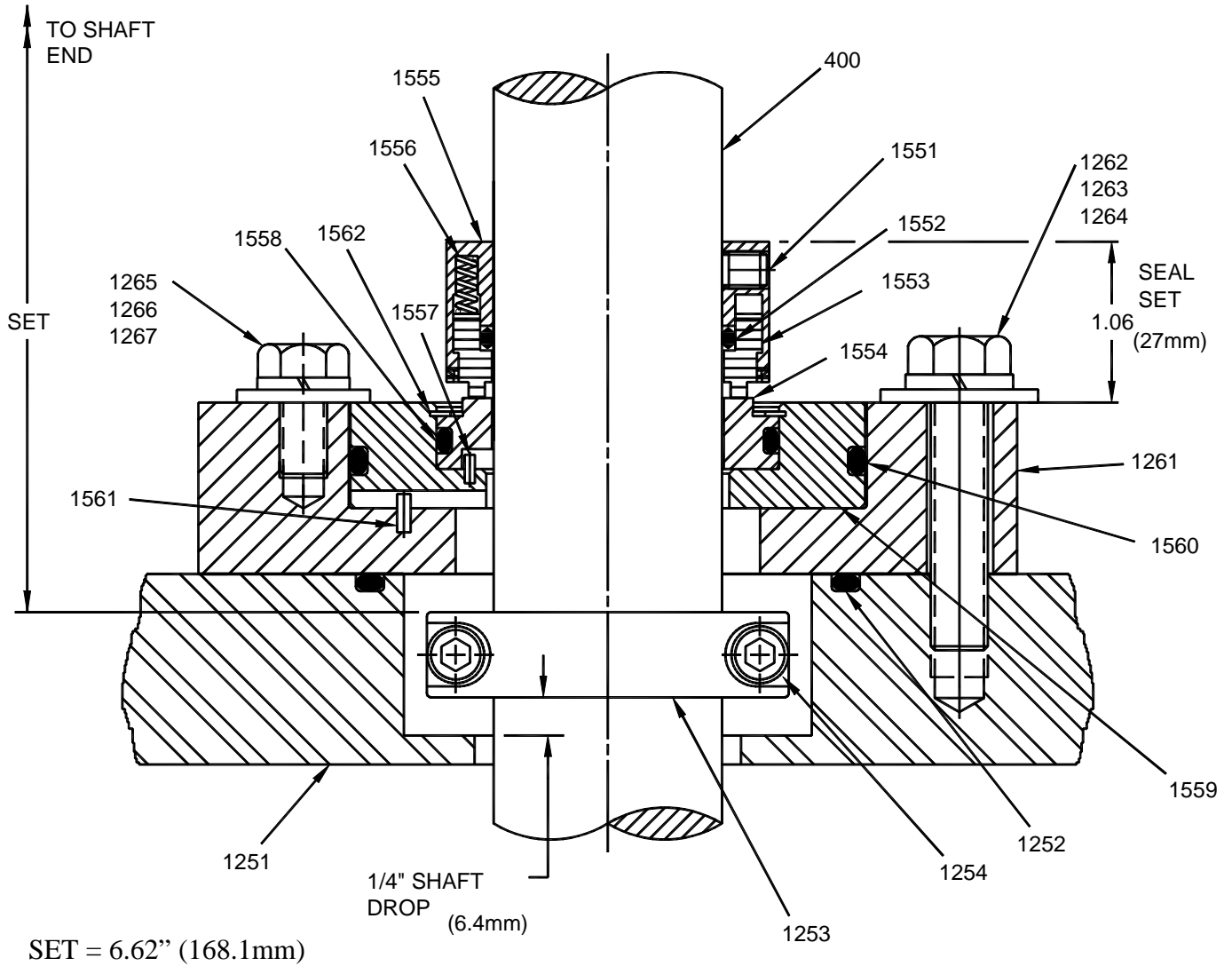


Figure 6: Model DTNS Seal, Crane 8B2

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## SEALED TANK MIXER INSTALLATION

9. Set rotary seal ring **[1555]** retainer at 1.06" (26.9mm) above the adapter plate face per *Figure 6, page 14*. Evenly tighten all cup point setscrews **[1551]**.
10. Install the handhole covers **[1107]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher. Refer to *Figure 4, page 9*.
11. For single impeller assemblies, install the impeller with the lower hub face even with the shaft end. Impeller orientation should allow the driving edge of the impeller to pump toward the bottom of the mixing vessel. Tighten the impeller setscrews (typically quantity two).

For dual impeller assemblies, space the upper impeller at a recommended minimum of two impeller diameters and maximum of three impeller diameters above the lower impeller. The upper impeller should be a minimum of one impeller diameter below the liquid surface at all times during mixer operation.

## SEALED TANK MIXER INSTALLATION

### *Seal Cartridge Installation*

#### *Model 50DTNC, Chesterton 155 Seal:*

1. Place o-ring [1252] into groove in mounting flange [1251].
2. Install seal adapter plate [1291] onto flange. Install bolts, lockwashers, and flatwashers [1295, 1296, 1297] loosely, do not tighten.
3. Lubricate shaft [400]. Slide seal cartridge [1400] assembly with gasket [1412] down shaft to rest on adapter plate [1291].
4. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].
5. Lower the mixer drive onto the pedestal [1101] and removable coupling half [301-02], and attach with bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Torque bolts to the value shown in *Table 7*. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling [301] and flanged drive shaft coupling [251] faces together. Install and tighten the remaining coupling bolts and lockwashers [302, 303].
6. Slide the mechanical seal cartridge [1400] up the extension shaft. Center the mechanical seal adapter plate [1291] on the extension shaft. Torque bolts [1295] to the value shown in *Table 7*.
7. Slide mechanical seal cartridge down shaft and install bolts, lockwashers, and flatwashers [1292, 1293, 1294]. Tighten bolts evenly. Do not overtighten.

SEALED TANK MIXER INSTALLATION

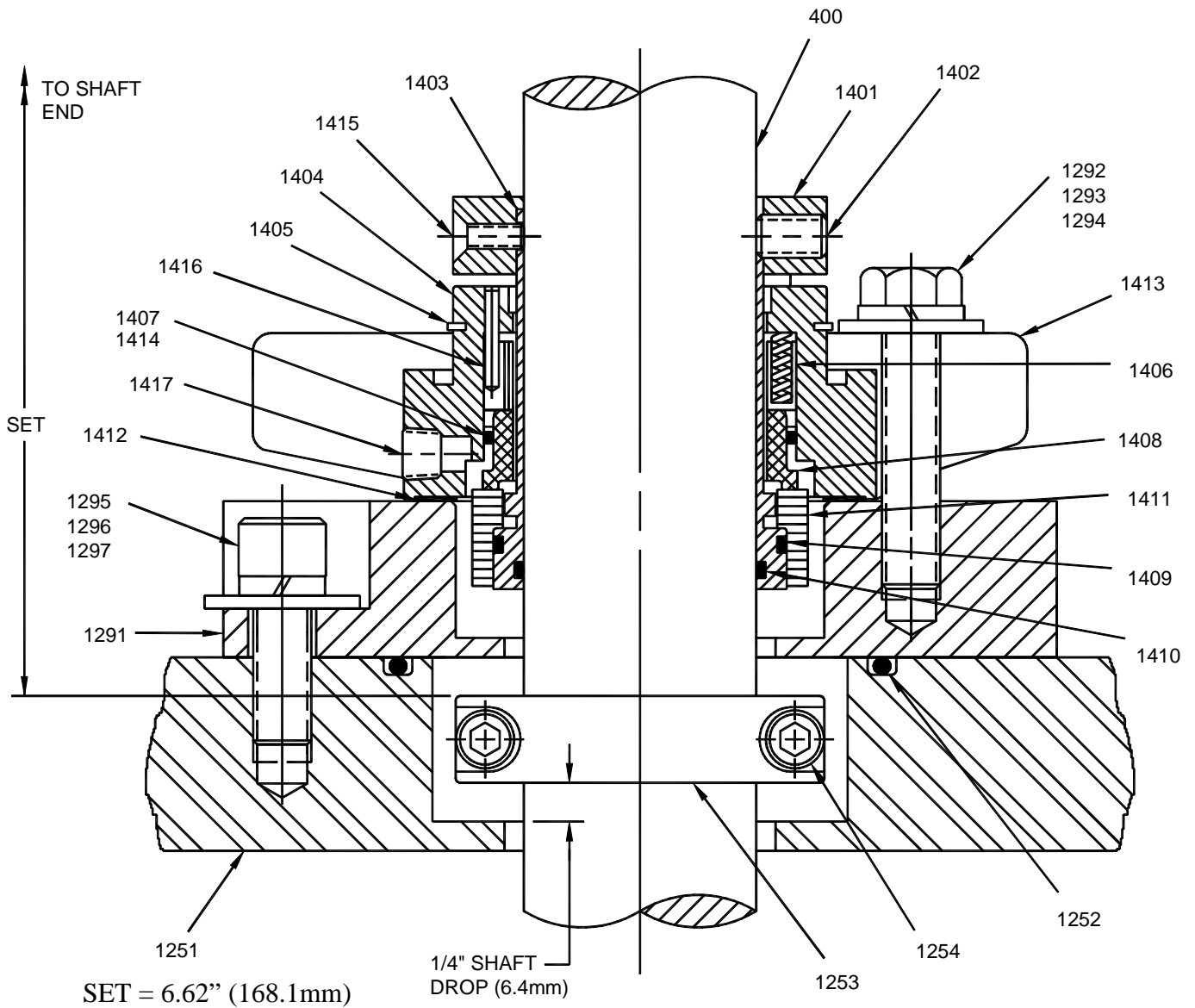


Figure 7: Model DTNC Seal, Chesterton 155

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## SEALED TANK MIXER INSTALLATION

8. Evenly tighten lock ring setscrews **[1402]**, securing seal cartridge to shaft. Remove centering strap and save for later use during seal changeout. *NOTE: It may be easier to tighten three setscrews at 120°, and then remove centering strap. Remaining setscrews may be better accessed for tightening by rotating the shaft.*
9. Install the handhole covers **[1107]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher. Refer to *Figure 4, page 9*.
10. For single impeller assemblies, install the impeller with the lower hub face even with the shaft end. Impeller orientation should allow the driving edge of the impeller to pump toward the bottom of the mixing vessel. Tighten the impeller setscrews (typically quantity two).

For dual impeller assemblies, space the upper impeller at a recommended minimum of two impeller diameters and maximum of three impeller diameters above the lower impeller. The upper impeller should be a minimum of one impeller diameter below the liquid surface at all times during mixer operation.

## SEALED TANK MIXER INSTALLATION

### *Seal Cartridge Installation*

#### *Model 50DTNC, Flowsolve VRA Seal*

1. Place o-ring [1252] into groove in mounting flange [1251].
2. Install gland ring [1605] assembly with stationary seal ring [1608] and o-rings [1609] onto flange. Install bolts and lockwashers [1298, 1299] loosely, do not tighten.
3. Lubricate shaft [400]. Slide drive collar rotary seal ring [1603] assembly down shaft to stationary seal ring [1608].
4. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].
5. Lower the mixer drive onto the pedestal [1101] and removable coupling half [301-02], and attach with bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Torque bolts to the value shown in *Table 7*. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling [301] and flanged drive shaft coupling [251] faces together. Install and tighten the remaining coupling bolts and lockwashers [302, 303].
6. Slide drive collar rotary seal ring [1603] assembly up the extension shaft. Center the gland ring [1605] assembly on the extension shaft. Torque bolts [1298] to the value shown in *Table 7*.
7. Slide drive collar rotary seal ring [1603] assembly down shaft, and set seal spring gap dimension at 1.875" (47.6 mm). Refer to *Figure 8, page 20*. Evenly tighten all cup point setscrews [1604].

SEALED TANK MIXER INSTALLATION

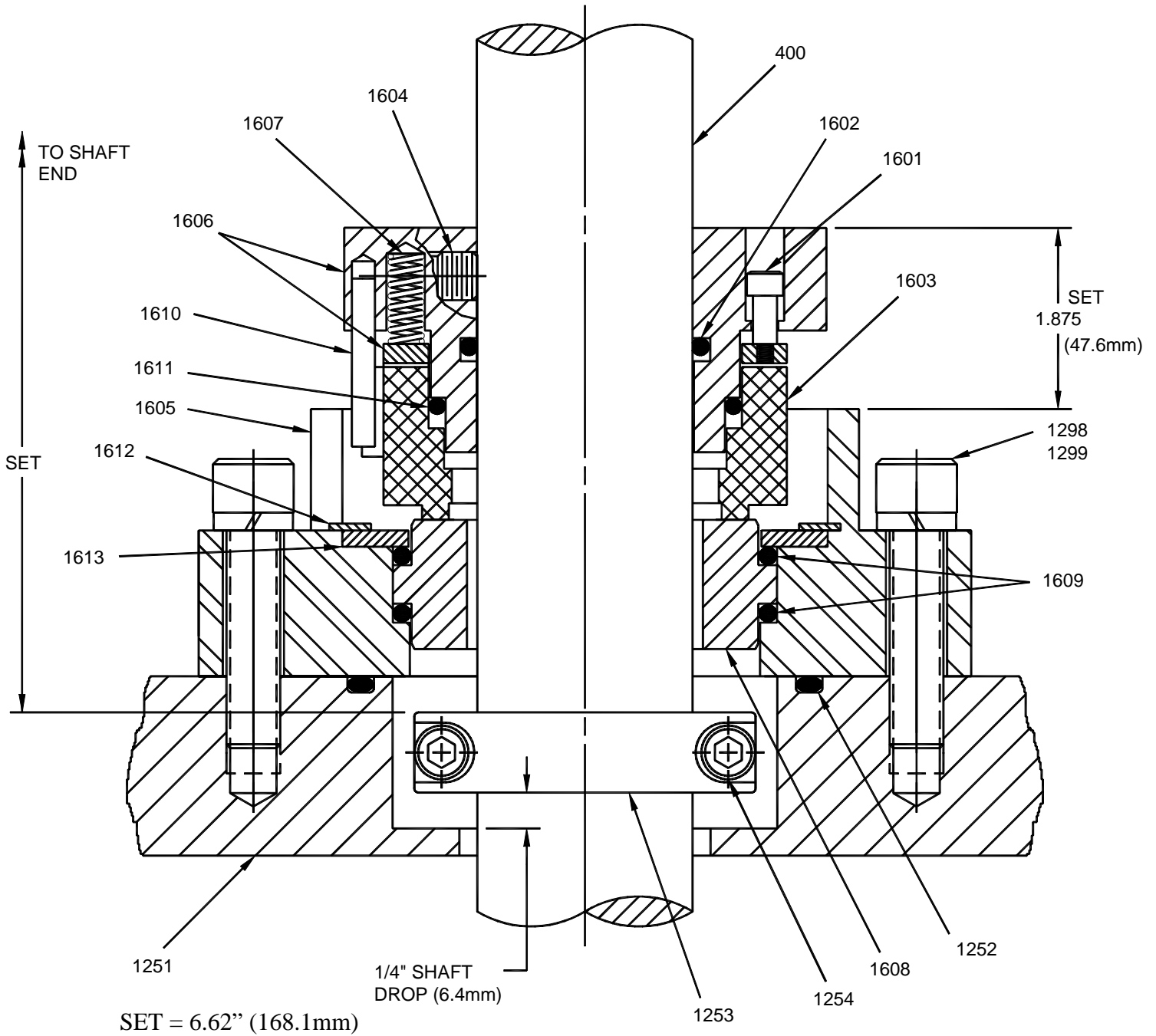


Figure 8: Model DTNC Seal, Flowserve VRA



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### SEALED TANK MIXER INSTALLATION

8. Install the handhole covers [1107] onto the pedestal. Tighten wing nut [1110] to previously installed bolt and lockwasher. Refer to *Figure 4, page 9*.
9. For single impeller assemblies, install the impeller with the lower hub face even with the shaft end. Impeller orientation should allow the driving edge of the impeller to pump toward the bottom of the mixing vessel. Tighten the impeller setscrews (typically quantity two).

For dual impeller assemblies, space the upper impeller at a recommended minimum of two impeller diameters and maximum of three impeller diameters above the lower impeller. The upper impeller should be a minimum of one impeller diameter below the liquid surface at all times during mixer operation.

## SEALED TANK MIXER INSTALLATION

### *Seal Cartridge Installation*

#### *Model 50DTN, Crane 5620 Seal*

1. Place gasket **[1255]** around bore of mounting flange **[1251]**.
2. Install seal adapter piece **[1281]** into flange bore (tenon fit).
3. Lubricate shaft **[400]**. Slide seal cartridge **[1650]** assembly with gasket **[1659]** down shaft until just above adapter piece.
4. Clean the removable shaft coupling **[301-02]**. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key **[307-02]** into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher **[304, 305, 306]** and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews **[308]** onto the shaft key **[307-02]**.
5. Lower the mixer drive onto the pedestal **[1101]**, to allow the installation of the coupling bolts and lockwashers **[302, 303]**. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling **[301]** and flanged drive shaft coupling **[251]** faces together. Install and tighten the remaining coupling bolts and lockwashers **[302, 303]**.
6. Slide mechanical seal assembly **[1650]** assembly into adapter piece **[1281]** (tenon fit). Orient fluid ports per mechanical seal assembly drawing included with unit. Install bolts, lockwashers, and flatwashers **[1282, 1283, 1284]**. Tighten bolts evenly. Attach mixer drive to pedestal with bolts, lockwashers, and flatwashers **[1102, 1103, 1104]**. Torque bolts to the value shown in *Table 7*.
7. Tighten collar setscrews **[1652]** evenly (1/4 turns to setscrews at 180° apart), securing seal to shaft.
8. Remove seal spacers and save for future seal changeout.
9. Attach seal lubrication lines. See *Options: Mechanical Seal Lubricator* for installation instructions.

**SEALED TANK MIXER INSTALLATION**

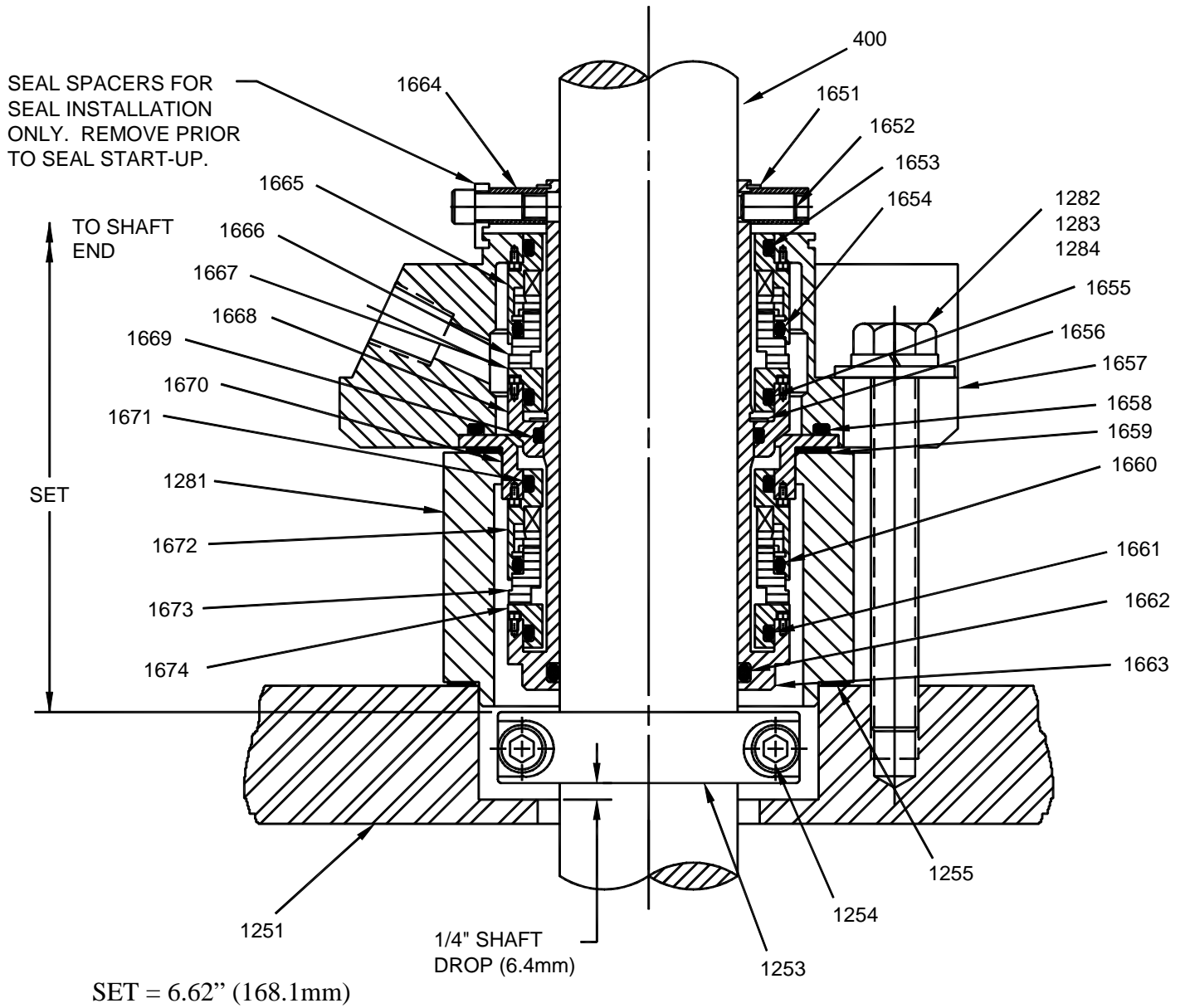


Figure 9: Model DTN Seal, Crane 5620

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## SEALED TANK MIXER INSTALLATION

10. Install the handhole covers **[1107, 1716]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher. Refer to *Figure 4, page 9*.
11. For single impeller assemblies, install the impeller with the lower hub face even with the shaft end. Impeller orientation should allow the driving edge of the impeller to pump toward the bottom of the mixing vessel. Tighten the impeller setscrews (typically quantity two).

For dual impeller assemblies, space the upper impeller at a recommended minimum of two impeller diameters and maximum of three impeller diameters above the lower impeller. The upper impeller should be a minimum of one impeller diameter below the liquid surface at all times during mixer operation.

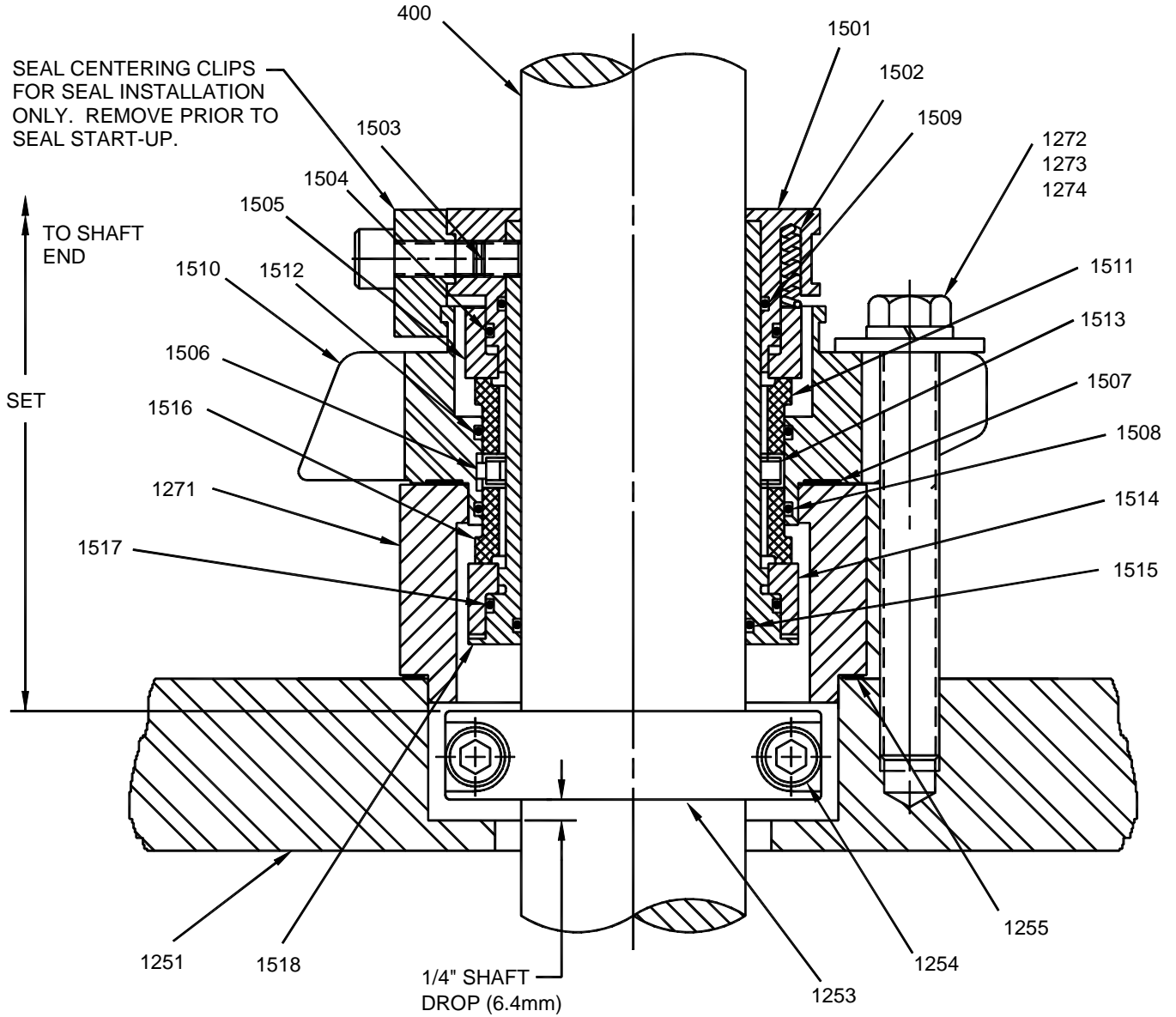
## SEALED TANK MIXER INSTALLATION

### *Seal Cartridge Installation*

#### *Model 50DTN, Chesterton 255 Seal*

1. Place gasket **[1255]** around bore of mounting flange **[1251]**.
2. Install seal adapter piece **[1271]** into flange bore (tenon fit).
3. Lubricate shaft **[400]**. Slide seal cartridge **[1500]** assembly down shaft until just above adapter piece.
4. Clean the removable shaft coupling **[301-02]**. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key **[307-02]** into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft end washer, bolt and lockwasher **[304, 305, 306]** and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews **[308]** onto the shaft key **[307-02]**.
5. Lower the mixer drive onto the pedestal **[1101]**, to allow the installation of the coupling bolts and lockwashers **[302, 303]**. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling **[301]** and flanged drive shaft coupling **[251]** faces together. Install and tighten the remaining coupling bolts and lockwashers **[302, 303]**.
6. Slide mechanical seal assembly **[1500]** assembly into adapter piece **[1271]** (tenon fit). Orient fluid ports per mechanical seal assembly drawing included with unit. Install bolts, lockwashers, and flatwashers **[1272, 1273, 1274]**. Tighten bolts evenly. Attach mixer drive to pedestal with bolts, lockwashers, and flatwashers **[1102, 1103, 1104]**. Torque bolts to the value shown in *Table 7*.
7. Tighten collar setscrews **[1503]** evenly, securing seal to shaft.
8. Remove centering clips and save for future seal changeout.
9. Attach seal lubrication or purge lines. See *Options: Mechanical Seal Lubricator* for installation instructions.

**SEALED TANK MIXER INSTALLATION**



SET = 6.62" (168.1mm)

Figure 10: Model DTN Seal, Chesterton 255

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## SEALED TANK MIXER INSTALLATION

10. Install the handhole covers [1107, 1716] onto the pedestal. Tighten wing nut [1110] to previously installed bolt and lockwasher. Refer to *Figure 4, page 9*.
11. For single impeller assemblies, install the impeller with the lower hub face even with the shaft end. Impeller orientation should allow the driving edge of the impeller to pump toward the bottom of the mixing vessel. Tighten the impeller setscrews (typically quantity two).

For dual impeller assemblies, space the upper impeller at a recommended minimum of two impeller diameters and maximum of three impeller diameters above the lower impeller. The upper impeller should be a minimum of one impeller diameter below the liquid surface at all times during mixer operation.

## OPTIONS: MECHANICAL SEAL LUBRICATOR

Model DTN double cartridge mechanical seals are designed to be operated “wet” with a pressurized liquid barrier fluid. The Chesterton 255 Seal *ONLY* has the capability to run dry, with Nitrogen purge. Refer to the unit seal assembly drawing for the specific requirements of the seal type purchased.

*NOTE: The barrier fluid port connections are dependent upon the mixer extension shaft rotation. The standard mixer extension shaft rotation is clockwise, when looking into the tank. Refer to Figure 11, page 30.*

*For Crane 5620 Mechanical Seals:* The barrier fluid supply enters through Port #2, and the barrier fluid return exits through Port #1.

*For Chesterton 255 Mechanical Seals:* The barrier fluid supply enters through the left port, and the barrier fluid return exits through the right port (as viewed when facing the seal ports).

For *counter-clockwise* (non-standard) extension shaft rotation, the port connections are as follows:

*For Crane 5620 Mechanical Seals:* The barrier fluid supply enters through Port #4, and the barrier fluid return exits through Port #1.

*For Chesterton 255 Mechanical Seals:* The barrier fluid supply enters through the right port, and the barrier fluid return exits through the left port (as viewed when facing the seal ports).

### ***Lubricator Assembly Instructions***

1. Assemble the lubricator mounting bracket [1711] to the mechanical seal lubricator [1701] using bolts and lockwashers [1714, 1715]. Torque bolts to the value shown in *Table 7, page 36*.
2. Install sight glass [1703] and drain plug [1704]. Install pipe nipple [1709]. Install metal hose [1710] female union end onto the pipe nipple.
3. Install pipe nipple [1705], elbow [1706], and pipe nipple [1707]. Install metal hose [1708] female union end onto pipe nipple [1707].
4. Remove two drive mounting bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Install the lubricator/mounting bracket assembly onto the housing [201] using bolts and lockwashers [1712, 1713]. Torque bolts to the value shown in *Table 7*.
5. Install the flexible metal hose [1708, 1710] NPT male ends into the mechanical seal ports.



**OPTIONS: MECHANICAL SEAL LUBRICATOR**

6. Connect the flexible metal hose [1708, 1710] union ends.
7. Fill the mechanical seal lubricator to the center of the sight glass. The approximate capacity is .30 gallons U.S. (1.14 liters). Install the 3/8" NPT fill plug [1702].
8. Connect a pressure line to the mechanical seal lubricator 1/4" NPT inlet port. Pressurize using a gas bottle or other means to 25-50 psi (172-344 kPa) above the maximum vessel operating pressure. Check all fittings for leaks.

*CAUTION: Never pressurize the vessel without having the mechanical seal fully pressurized. See the **Lubrication** section for additional information.*

Install handhole covers and resume assembly instructions shown in *Sealed Tank Mixer Installation*.

**OPTIONS: MECHANICAL SEAL LUBRICATOR**

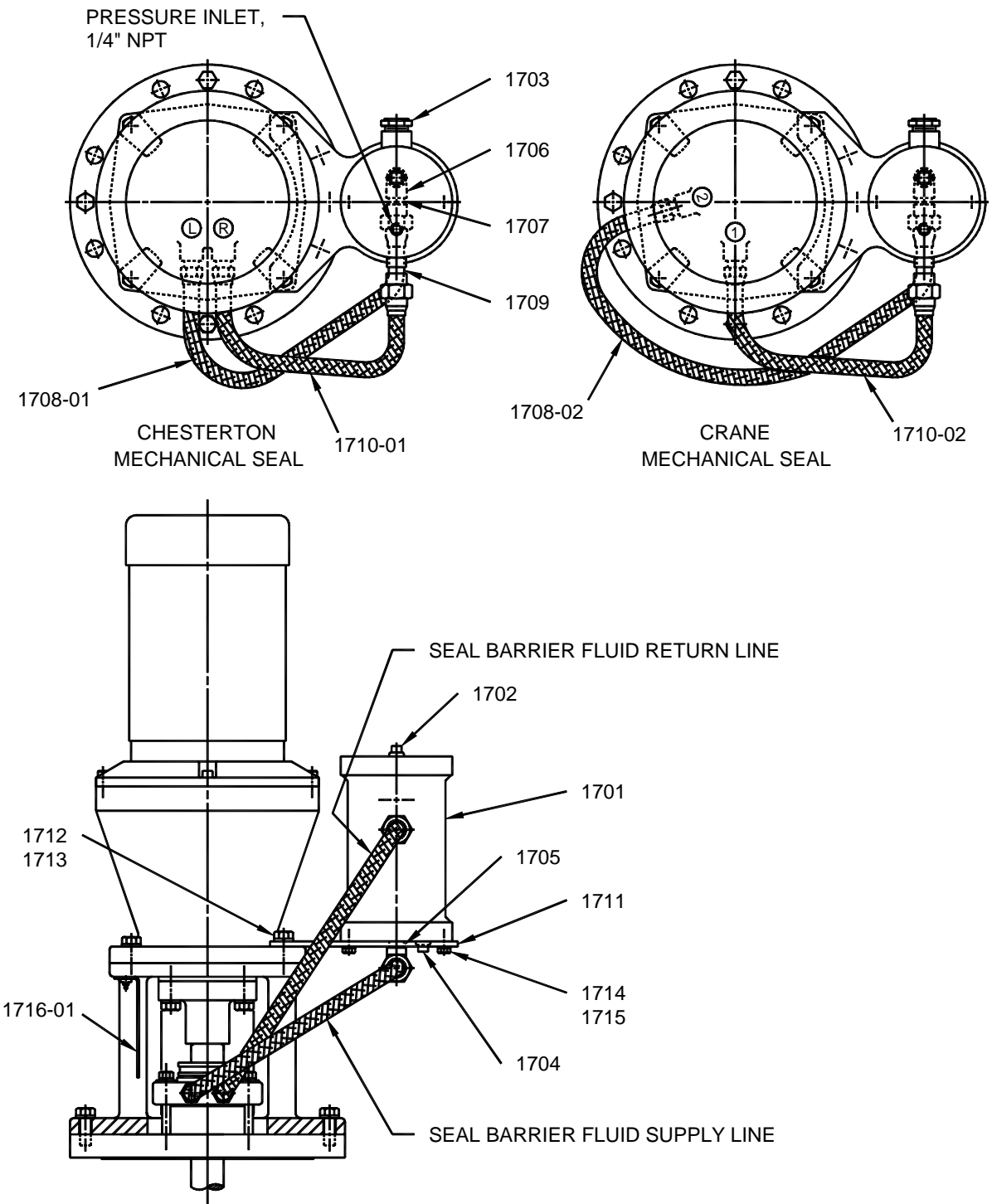


Figure 11: Seal Lubrication System

## SEALED TANK MIXER INSTALLATION OPTIONAL ANGLE MOUNTED DRIVE

Model 50DTNS, 50DTNC, and 50DTN mixers may be angle mounted. However, these units must be mounted to a solid structure in a vertical position prior to proceeding with the standard extension shaft and seal assembly and disassembly instructions, listed previously in this section of the manual.

See *Figure 13, page 32* for mixer nozzle location. See *Figure 1, page 5* for structural requirements.

*The drive unit must be angle mounted with nameplate end "down".* Unit will attach to support structure using customer supplied fastener set.

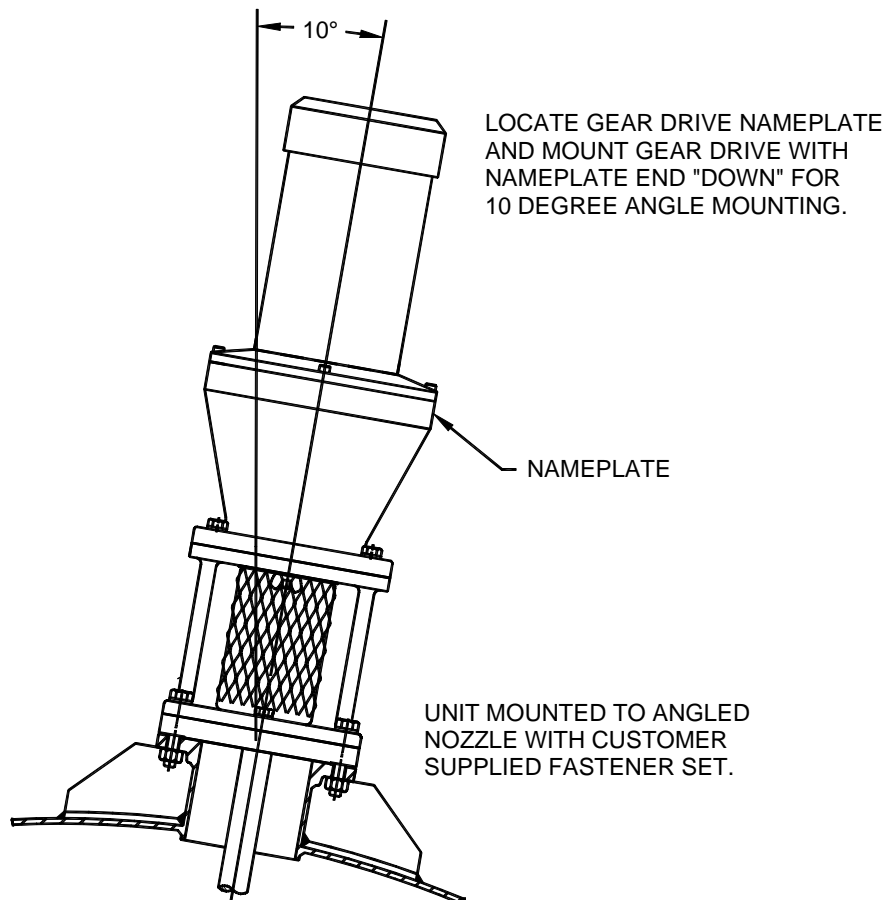


Figure 12: Angle Mounted Drive

**SEALED TANK MIXER INSTALLATION  
OPTIONAL ANGLE MOUNTED DRIVE**

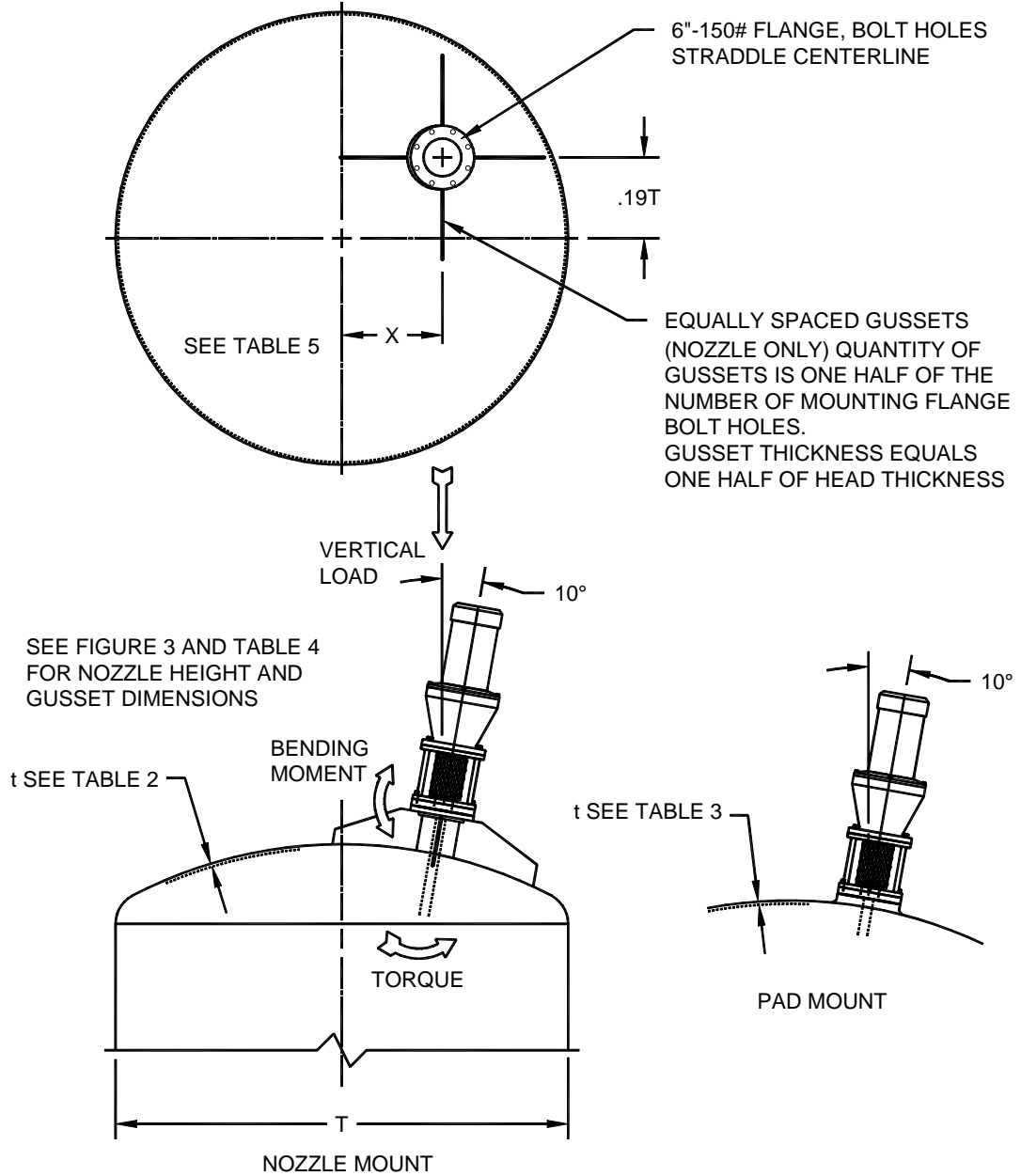


Figure 13: Angle Mount Installation

**SEALED TANK MIXER INSTALLATION  
OPTIONAL ANGLE MOUNTED DRIVE**

**TABLE 6: OFF-CENTER POSITIONING**

SHAFT EXTENSION RANGE IN (MM)	TANK DIAMETER, FT (M)	
	"X" DIMENSION IN (MM)	MINIMUM TANK DIAMETER IN (MM)
20" – 37" (508 – 940)	5" (127)	18" (457)
38" – 53" (965 – 1346)	7.5" (191)	22" (559)
54" – 76" (1372 – 1930)	10.75" (273)	32" (813)
77" – 110" (1956 – 2794)	15.5" (394)	46" (1168)
111" – 135" (2819 – 3429)	21.25" (540)	64" (1626)

## MIXER INSTALLATION

### ELECTRIC MOTORS

1. Check the nameplate data on the motor to assure that the available power supply agrees with the motor requirements. Protective devices should be of the proper size and rating to safely carry the load and interrupt the circuit on overloads.
2. If the motor has been stored in a damp location, the windings may require drying.

*NOTE: Do not obstruct the normal flow of ventilating air through or over the motor.*

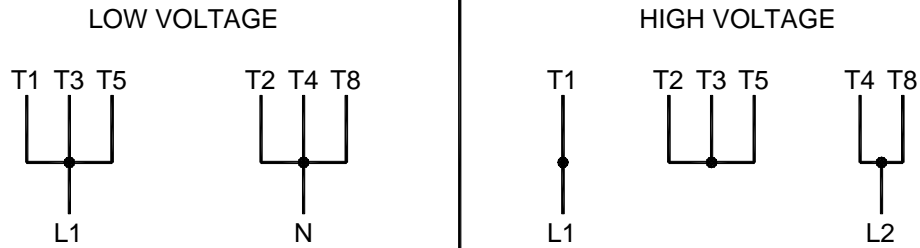
3. Many of the motors supplied with this product are dual voltage. The motor cord supplied with a single phase motor is applicable for use on 125VAC systems only. Customer is responsible for supplying all necessary motor connections and for properly wiring the motors. Refer to wiring diagram *Figure 14, page 35* for normal motor connections. Consult *Chemineer Field Service* if there are any questions pertaining to the installation or operation of the motor or mixer unit.
4. Connect the motor in accordance with the National Electric Code and local requirements, but do not make the connections permanent until the motor rotation has been checked. Jog the motor to check for correct rotation prior to securing wiring. Refer to unit assembly drawing for unit rotation direction.
5. If any additional motor auxiliary devices such as space heaters or temperature sensors are used, connect them in proper circuits and insulate them from motor power cables.

### AIR MOTORS

1. Air motors are designed to be driven by compressed air. Under no circumstances should they be driven with any other type of gas, fluids, particles, solids, or any substance mixed with air.
2. The muffler is shipped uninstalled on the air motor. Always install a moisture trap and filter in the air line ahead of the motor.
3. "Reversible" type air motors will work equally in both directions. A 4-way valve may be connected to both air ports to allow reversible operation. For efficiency of output and control of speed, use air lines of the same size or the next larger pipe size than the intake port of the motor.
4. *Lubrication of the air motor is required.* Refer to **Lubrication** section of this manual for more information.

**MIXER INSTALLATION**

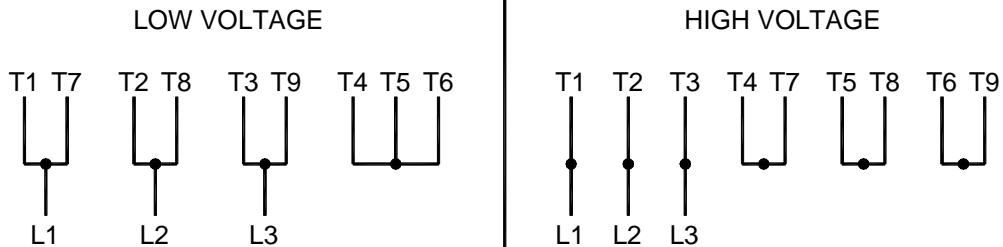
**SINGLE-PHASE MOTOR  
(WITHOUT THERMAL PROTECTOR)**



CCW ROTATION (LOOKING AT THE MOTOR FROM THE SHAFT END)

NOTE: TO REVERSE MOTOR SHAFT ROTATION,  
INTERCHANGE MOTOR LEADS T5 AND T8

**THREE-PHASE MOTOR  
(WITHOUT THERMAL PROTECTOR)**



NOTE: TO REVERSE MOTOR SHAFT ROTATION,  
INTERCHANGE ANY TWO LINE LEADS

CHECK MOTOR LEADS WITH CONNECTION DIAGRAMS ON MOTOR  
NAMEPLATE OR CONDUIT BOX FOR PROPER WIRING

CHECK THE MIXER SHAFT ROTATION AGAINST THE PROPER  
ROTATION INDICATED ON THE ASSEMBLY DRAWING

NOTE:  
THE NORMAL MOTOR SHAFT ROTATION SHOULD BE CCW WHEN  
LOOKING AT THE MOTOR FROM THE SHAFT END.  
THE NORMAL MIXER SHAFT ROTATION IS CW WHEN LOOKING INTO THE  
TANK FOR STANDARD ROTATION IMPELLERS.

Figure 14: Wiring Diagram, Motors

**MIXER INSTALLATION****TABLE 7: BOLT TIGHTENING TORQUE**

BOLT SIZE	CARBON STEEL <sup>(1)</sup>				300 SERIES STAINLESS <sup>(2)</sup>	
	GRADE 2		GRADE 5		Ft-lb	Nm
	Ft-lb	Nm	Ft-lb	Nm		
1/4-20	4.1	5.6	6	8.1	4.1	5.6
5/16-18	8.3	11	13	17	8.3	11
3/8-16	15	20	23	31	15	20
1/2-13	38	51	56	76	38	51
5/8-11	68	92	113	153	68	92
3/4-10	120	163	200	271	120	163

Tighten all fasteners to values shown unless specifically instructed to do otherwise. Lubricate all fasteners at assembly with grease, oil or an anti-seize material. Bolt threads and contact surfaces of bolt heads and nuts should be lubricated.

<sup>(1)</sup>If fasteners cannot be lubricated, multiply table values by 1.33.

<sup>(2)</sup>If fasteners cannot be lubricated, multiply table values by 1.25.



## LUBRICATION

This section defines the proper oils and greases that must be used with this equipment.

### ELECTRIC MOTOR

The motor bearings have been properly greased by the manufacturer. Motor bearings should be regreased at 12-month intervals when installed in clean, dry environments, or every six months for heavy duty and dusty locations. Any good quality general purpose grease consisting of a refined base oil stock and a lithium or calcium-complex based soap, with an NLGI No. 2 classification, will work satisfactorily. Most major oil companies offer such products, usually with extreme pressure (EP) additives for additional protection. *Table 9, page 38* lists some commonly available greases.

When regreasing, stop the motor, remove the outlet plug and add grease according to *Table 8* with a hand lever gun only. Run the motor for about ten minutes before replacing the outlet plug. Certain TEFC motors have a spring relief outlet fitting on the fan end. If the outlet plug is not accessible at the surface of the hood, it is the spring relief type and need not be removed when regreasing.

*CAUTION! Overgreasing is a major cause of bearing and motor failure.*

**TABLE 8: MOTOR BEARING GREASE ADDITION**

MOTOR FRAME SIZE	RELIANCE		LEESON		BALDOR	
	in <sup>3</sup>	cm <sup>3</sup>	in <sup>3</sup>	cm <sup>3</sup>	in <sup>3</sup>	cm <sup>3</sup>
56C	sealed for life		sealed for life		sealed for life	
140TC	sealed for life		sealed for life		0.6	9.8
180TC	0.5	8.2	N/A		0.6	9.8

**ELECTRIC MOTOR****TABLE 9: TYPICAL NLGI NO. 2 GREASES**

<i>For Ambient Temperature Range of 0° to 104° F (-18° to 40° C)</i>		
<b>MANUFACTURER</b>	<b>GENERAL PURPOSE</b>	<b>EP</b>
Amoco Oil Co.	Amolith grease: Grade 2	Amolith grease: Grade 2EP
Ashland Oil Co.		Multi-lube Lithium EP grease: Grade 2
		EP Lithium #2
Chevron U.S.A.Inc.	Industrial grease: Grade medium	Dura-Lith greases EP: Grade 2
CITGO Petroleum Corp.		Premium Lithium EP grease: Grade 2
Conoco Inc.		EP Conolith grease: Grade 2
Exxon Co. U.S.A.	Unirex N: Grade 2	Nebula EP: Grade 2
		Ronex MP: Grade 2
Mobil Oil Corp.		Mobilux EP 2
Pennzoil Products Co.		Pennlith EP grease 712
Phillips 66 Co.	Philube L Multi-purpose grease L-2	Philube EP grease: EP-2
Shell Oil Co.	Alvania grease 2	Alvania grease EP 2
		Alvania grease EP LF 2
Texaco Lubricants Co.	Premium RB grease	Multifak EP 2
Unocal 76		Unoba EP grease: Grade 2
		Multiplex EP: Grade 2

## ELECTRIC MOTOR

The following table may be used as a guide in determining frequency of lubrication. The periods listed assume a clean, dry environment with an ambient temperature not exceeding 104°F (40°C). If conditions are less desirable than this, adjust the frequency accordingly. (*Table 10* is for motor speeds 1800 RPM or slower).

**TABLE 10: LUBRICATION FREQUENCY**

DUTY	LUBRICATION INTERVAL (Months)
Intermittent	36
8-16 Hours/Day	30
Continuous	24

## AIR MOTOR

*Lubrication of the air motor is required.* An automatic air line lubricator must be installed in the air line just ahead of the air motor. The lubricator should be adjusted to feed one drop of oil for every 50-75 CFM of air going through the motor. Detergent SAE #10 automotive engine oil or equivalent is the recommended air motor lubricant.

## GEAR DRIVE

The gear drive has been permanently lubricated with Mobilux EP023 grease at the factory. High ambient operating temperatures, excessive moisture, dust, corrosive fumes, and/or wide temperature fluctuations may require replacement of lubricant. Even under normal operating conditions, it is recommended that you inspect the gear drive regularly for lubricant leaks, abnormal noise, vibration, etc.

The gear drive is lubricated for operation at up to a 10 degree mounting angle (gear drive mounted with nameplate end “down”). Lubricant changes should always be performed while the gear drive is on a level surface and the gear drive output shaft is vertical. Refer to the ***Maintenance*** section of this manual for lubricant fill instructions.

## SHAFT SEALS

Model DTN double cartridge mechanical seals are designed to be operated “wet” with a pressurized liquid barrier fluid. The Chesterton 255 Seal **ONLY**, has the capability to run dry, with Nitrogen purge. Refer to the unit seal assembly drawing for the specific requirements of the seal type purchased.

Common liquid barrier fluids include glycerine, ethylene glycol, mineral oil, and water.

Models DTNS and DTNC are furnished with single mechanical seals. These seals are designed to run “dry”. *Do not lubricate the sealing faces.*

The seal barrier fluid is to be pressurized 25-50psi (172-344kPa) above maximum vessel operating pressure. The seal should always be pressurized before pressurizing the vessel or operating the mixer.

The mechanical seal lubrication system should be checked regularly for proper lubrication level (*see Operation*).

## MIXER

Proper operating procedures will allow maximum performance of your Chemineer DT Mixer. The following list will aid in the safe operation of your unit.

- **Do not** operate the unit before reading and following the instructions on all tags and nameplates attached to the unit.
- **Do not** operate the unit with less than one impeller's diameter liquid coverage above the lowest impeller. Increased side loading caused by operations at liquid level will decrease unit life.
- **Do not** operate the unit in a fluid with a specific gravity or viscosity higher than that for which the unit was designed.
- **Do not** attempt to start the unit with the mixing impeller buried in solids or a "set up" fluid.
- **Do not** locate tank internals or other rotating equipment close to the mixer impellers or extension shaft.
- **Do not** make any modifications to the mixer unit in the field (i.e. motor horsepower, mixer speed, shaft length, impeller diameter, etc.) without reviewing the change with *your local Chemineer office or Chemineer Field Service.*

**CAUTION:** There may be a speed range where the unit cannot be operated because of shaft resonant frequency. This range must be avoided or passed through quickly or destructive forces can be generated. Refer to main unit assembly drawing for speed range information or consult *your local Chemineer office.*

Should there be problems operating the unit, confirm that the installation is correct. If you are unable to resolve the problem, contact *your local Chemineer office.*

## ELECTRIC MOTORS

Air circulation is very important to get full performance and long life from an electric motor. Do not block the suction inlets on fan-cooled motors. Motor life will be decreased if its temperature exceeds its thermal rating. The allowable temperature is stamped on the motor nameplate.

Prior to permanently wiring the electric motor:

- Check nameplate data on motor to assure that the available power supply agrees with the motor requirements. Protective devices should be the proper size and rating to safely carry the load and to interrupt the circuit on overloads.
- Check motor leads with connection diagrams on motor nameplate and/or conduit box so that the proper connections are made. All motors should be installed in accordance with the National Electric Code and local requirements.
- Check the output shaft rotation against the proper rotation indicated on the assembly drawing. For standard three-phase electric motors, the rotation is reversed by switching any two power leads.
- Check operating motor amperage against nameplate amperage.

The motor should start quickly and run smoothly. If the motor should fail to start or make abnormal noise, immediately shut motor off, disconnect it from the power supply, and investigate the cause. If the problem cannot be corrected, contact *your local Chemineer office* for assistance.

## AIR MOTORS

Air motors are designed to be driven by compressed air. Under no circumstances should they be driven with any other type of gas, fluids, particles, solids, or any substance mixed with air.

Operating pressures should not exceed 100psi (689 kPa). The speed and torque can be regulated by using a pressure regulator or regulating valve to obtain the desired power and conserve air.

## MECHANICAL SHAFT SEALS

Model DTN double cartridge mechanical seals must be pressurized to operate properly. Before operation, the seal cavity should be pressurized to 25-50 psi (172-344 kPa) above the maximum vessel operating pressure.

Refer to the unit assembly drawing for specific seal operating limits.

*CAUTION! Never pressurize the vessel without first pressurizing the mechanical seal cavity (mechanical seal lubricator).*

If the lubrication system is of Chemineer design, fill the lubricator pot by removing fill plug **[1702]** and slowly pouring in the barrier fluid. The lubricator is self-venting while being filled. As the seal lubricator is being filled, gravity flow will fill and purge the seal cavity. After filling, replace and tighten the fill plug. Pressurize the lubricator using a constant pressure source, such as a gas bottle, to the recommended seal cavity pressure. This is a thermosiphon system for use with model DTN mechanical seals only. Refer to *Figure 11, page 30*.

For lubrication system supplied by others, read and understand the installation and operation instructions supplied with that lubrication system.

During normal operation it is common for mechanical seals to leak a few drops of fluid per minute across the seal faces. The mechanical seal lubricator lubricant level should be checked regularly and refilled as required.

Models DTNS and DTNC are furnished with single mechanical seals. These seals are designed to run “dry”. *Do not lubricate the sealing faces.*

Refer to the unit assembly drawing for specific seal operating limits.

## MIXER MAINTENANCE

Refer to *Figure 3, page 8*.

### ***Mixer Drive Removal & Disassembly***

**CAUTION:** *Prior to removing mixer, review the installation to assure that all safety issues are resolved.*

1. Lock out and disconnect all power to the mixer motor and any optional devices.
2. Depressurize and ventilate vessel.
3. Remove the pedestal wing nuts **[1110]** and remove the handhole covers **[1107 or 1716]**.
4. Clean the portion of the agitator shaft between the removable coupling and the mechanical seal.
5. *For 50DTNS units, Flowserve MCRO:* Loosen cup point setscrews **[1452]** in collar **[1451]** one turn. Slide collar up shaft at least 1/2" (13mm). Refer to *Figure 5, page 11*.

*For 50DTNS units, Crane 8B2:* Loosen setscrews **[1551]** in rotary seal ring **[1553]** assembly one turn. Slide rotary seal ring assembly up shaft at least 1/2" (13mm). Refer to *Figure 6, page 14*.

*For 50DTNC units, Chesterton 155:* Insert seal centering strap. Loosen collar setscrews **[1402]** one turn. Refer to *Figure 7, page 17*.

*For 50DTNC units, Flowserve VRA:* Loosen collar setscrews **[1604]** in one turn. Refer to *Figure 8, page 20*.

*For 50DTN units, Crane 5620 or Chesterton 255:* Depressurize the mechanical seal barrier fluid lines, and disconnect from seal ports. Plug seal ports. Install centering clips, and loosen collar setscrews **[1652 or 1503]** one turn. Refer to *Figure 9, page 23 or Figure 10, page 26*.

6. Lower the mixer shaft by loosening the coupling bolts **[302]**. Lower evenly until the shaft is supported by the shaft collar **[1253]**. The shaft should drop approximately 1/4" (6mm). Remove coupling bolts **[302]**.
7. Remove the housing to pedestal bolts **[1102]**. Remove the mixer drive unit from the pedestal and move to a suitable service area. The pedestal, mounting flange and mechanical seal assembly should remain on the vessel with the extension shaft and removable coupling extending above the seal.



## MIXER MAINTENANCE

8. Remove the motor adapter mounting bolts [248]. Carefully separate and remove the motor [100] and motor adapter [220] assembly from the housing [201-05]. *NOTE: Housing should be positioned with the motor end up when removing the motor adapter.*
9. Remove the lubricant from the housing.
10. Remove the motor shaft setscrews [242]. Remove the motor pinion gear [243] from the motor shaft.
11. Remove the motor mounting bolts [246], and remove the motor [100] from the motor adapter [220].
12. Remove the lip seal [245] from the motor adapter.
13. Remove the bolt [241] and washer [240] from the driven pinion shaft [234]. Remove the high speed gear [239] from the pinion shaft.
14. Remove the bearing spacer [237] from the pinion shaft.
15. Remove the retaining ring [222] from the end of the drive shaft [251].
16. Remove the bolts [229] from the lower seal housing [232]. *NOTE: For access to the bolts on units with a flanged drive shaft [251], use the access hole provided in the drive shaft flange.*
17. Mount the housing [201], motor end up, in an arbor press. Press the drive shaft [251] through the output gear [223] and out of the housing.
18. Remove the upper shaft seal [225] from the housing.
19. Press the upper ball bearing [226] off of the drive shaft [251].
20. Remove the drive shaft retaining ring [227]. Press the lower ball bearing [228] off of the drive shaft.
21. Remove the seal housing [232] from the drive shaft. Remove the lower shaft seal [230] from the seal housing.
22. Remove the retaining ring [236] from the driven pinion shaft [234] housing bore, and remove the driven pinion shaft [234] from the housing [201].
23. Press the upper ball bearing [235] off the pinion shaft.

## MIXER MAINTENANCE

24. Remove the lower roller bearing [233] inner race from the pinion shaft.

25. Remove the lower roller bearing [233] outer race from the housing.

*The mixer drive is now fully disassembled. Clean parts and inspect for wear. Replace worn parts as required.*

**Mixer Drive Re-Assembly** -- Refer to *Figure 3, page 8.*

1. Install the lip seal [245] into the motor adapter (seal lip facing away from the motor, flush with the top of the adapter). Apply grease to the lip of the seal.
2. Apply a bead of RTV Sealant, Three Bond #1215 or equal, to the motor adapter surface that mates with the motor [100]. Install the motor [100] onto the motor adapter [220]. Apply Loctite Threadlocker to the threads of the bolts [246]. Install bolts [246] and sealing washers [247]. Torque the bolts to the value shown in *Table 7, page 36.*
3. Install the motor key [244] onto the motor shaft using Loctite Adhesive. *NOTE: Key to be set back from the end of the motor shaft 1/16"-1/8" (1.6-3.2mm).*
4. Install the motor pinion gear [243] onto the motor shaft (chamfered end toward motor). Set the end face of the pinion gear so that it extends 1/32" (.8mm) beyond the end of the motor shaft. Tighten setscrews [242] securely. Apply RTV sealant onto the end of the motor shaft, spread smooth and flush with the end face of the pinion, and allow sealant to fully cure.
5. Press the roller bearing [233] outer race (and rollers) in housing [201-05], to the shoulder of the housing. *NOTE: Apply press to the outer race flange only, to avoid damaging the bearing.*
6. Press the roller bearing [233] inner race onto the driven pinion shaft [234], to the shaft shoulder. *NOTE: The inner race integral flange must be positioned against the shaft shoulder to allow the inner race to engage the bearing rollers when installed.*
7. Press the ball bearing [235] onto the driven pinion shaft [234], to the shaft shoulder. *NOTE: Apply press to the inner bearing race only, to avoid damaging the bearing.*
8. Press the driven pinion shaft [234] assembly into the housing [201]. Carefully align the lower bearing race to avoid damaging the rollers. *NOTE: Apply press to the outer bearing race only, to avoid damaging the bearing.*
9. Install the retaining ring [236] into the housing bearing bore.

## MIXER MAINTENANCE

10. Install the upper shaft seal **[225]** into the housing **[201]** (seal lip facing the motor, flush with the top of the housing). Apply grease to the lip of the seal.
11. Install the shaft seal **[230]** into the seal housing **[232]** (seal lip facing the bearing, flush with the top of the seal housing). Apply grease to the lip of the seal.
12. Install o-ring **[231]** onto the seal housing **[232]**.
13. Slide the seal housing **[232]** assembly onto the flanged drive shaft **[251]**. *NOTE: Seal lip and o-ring side of seal housing assembly to be facing bearing.*
14. Press the lower ball bearing **[228]** onto the drive shaft, to the shaft shoulder. *NOTE: Apply press to the inner bearing race only, to avoid damaging the bearing.*
15. Install the retaining ring **[227]** onto the drive shaft.
16. Press the upper ball bearing **[226]** onto the drive shaft, to the shaft shoulder. *NOTE: Apply the press to the inner bearing race only, to avoid damaging the bearing.*
17. Position the flanged drive shaft **[251]** assembly in the housing **[201]**. Position the output gear **[223]** and key **[224]** onto the drive shaft. *NOTE: Output gear and key must be in position on the drive shaft before pressing the shaft into the housing.* Press the drive shaft assembly into the housing while also pressing the output gear onto the drive shaft.
18. Install the retaining ring **[222]** to the drive shaft.
19. Apply Loctite Threadlocker to the threads of the bolts **[229]**. Install the seal housing bolts **[229]**. Tighten bolts securely. *NOTE: For access to the bolts on units with a flanged drive shaft **[251]**, use the access hole provided in the drive shaft flange.*
20. Install the spacer **[237]** onto the driven pinion shaft **[234]**.
21. Install the key **[238]** into the driven pinion shaft keyway. Press the high speed gear **[239]** onto the pinion shaft.
22. Apply Loctite Threadlocker to the threads of the pinion shaft bolt **[241]**. Install the washer **[240]** and bolt **[241]**. Torque the bolt to the value shown in *Table 7, page 36*.

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## MIXER MAINTENANCE

23. Fill the housing with approximately 1 U.S. gallon (3.8 liters) of Mobilux EP023 (or equal) grease. Refer also to the *Lubrication* section of this manual, *page 37*. Reference *Figure 3, page 8* for lubricant level.
24. Install the o-ring [221] onto the housing. Apply a bead of RTV Sealant to the motor adapter [220] surface that mates with the housing [201-05].
25. Install the motor/motor adapter assembly onto the housing. *NOTE: Carefully lower the motor adapter assembly into the housing, allowing the motor pinion to mesh with the high speed gear, until firmly seated.*
26. Apply Loctite Threadlocker to the threads of the bolts [248]. Install the bolts and tighten securely.

Refer to the *Mounting & Installation* section of the manual for mixer drive installation instructions.

## MIXER MAINTENANCE

Refer to main unit assembly *Figure 3, page 8* and seal assembly *Figure 5, page 11*.

### *Seal Cartridge Removal - Model 50DTNS, Flowserve MCRO Seal:*

1. Remove internal coupling bolt, lockwasher, and washer [304, 305, 306]. Loosen setscrews [308]. Remove coupling [301-02] and key [307]. Clean extension shaft above seal.
2. Remove collar [1451], spring [1453], rotary seal ring [1454], and o-ring [1455]. Remove bolts, lockwashers, and flatwashers [1265, 1266, 1267].
3. Remove bolts, lockwashers, and flatwashers [1262, 1263, 1264]. Remove mechanical seal adapter plate and o-ring [1261, 1252]. Remove stationary seal ring and o-ring [1456, 1457].
4. Inspect parts for wear. Replace worn or damaged parts as required.

### *Seal Cartridge Installation - Model 50DTNS, Flowserve MCRO Seal:*

1. Place o-ring [1252] into groove in mounting flange [1251]. Install seal adapter plate [1261] onto flange. Install bolts, lockwashers, and flatwashers [1262, 1263, 1264] loosely to center seal adapter plate.
2. Install stationary seal ring [1456] and o-ring [1457] into the adapter plate [1261]. Remove o-ring [1455] from rotary seal ring [1454]. Lubricate shaft [400]. Slide rotary seal ring down the shaft to rest on the stationary seal insert [1456].
3. Lubricate and install o-ring [1455] into rotary seal ring [1454]. *CAUTION: Do not get lubricant on the sealing faces.*
4. Install spring [1453] and collar [1451] with setscrews [1452]. If o-ring [1455] from previous step, is not fully seated in rotary seal ring [1454], use spring to push o-ring down into ring.
5. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].

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## MIXER MAINTENANCE

6. Lower the mixer drive onto the pedestal **[1101]** and removable coupling half **[301-02]**, and attach with bolts, lockwashers, and flatwashers **[1102, 1103, 1104]**. Torque bolts to the value shown in *Table 7, page 36*. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling **[301]** and flanged drive shaft coupling **[251]** faces together. Install and tighten the remaining coupling bolts and lockwashers **[302, 303]**.
7. Slide the rotary seal ring **[1454]** up the extension shaft **[400]**. Center the mechanical seal adapter plate/stationary seal ring **[1261/1456]** on the extension shaft. Torque bolts to the value shown in *Table 7*.
8. Install bolts, lockwashers, and flatwashers **[1265, 1266, 1267]**. Torque bolts to the value shown in *Table 7*.
9. Set collar **[1451]** at 2.20" (55.9mm) above the adapter plate face. Evenly tighten all cup point setscrews **[1452]**.
10. Install the handhole covers **[1107]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher **[1108, 1109]**. Refer to *Figure 4, page 9*.

## MIXER MAINTENANCE

Refer to main unit assembly *Figure 3, page 8* and seal assembly *Figure 6, page 14*.

### *Seal Cartridge Removal - Model 50DTNS, Crane 8B2 Seal:*

1. Remove internal coupling bolt, lockwasher, and washer [304, 305, 306]. Loosen setscrews [308]. Remove coupling [301-02] and key [307]. Clean extension shaft above seal.
2. Remove rotary seal ring [1553] assembly. Remove bolts, lockwashers, and flatwashers [1265, 1266, 1267]. Remove stationary mating ring adapter [1559] assembly and o-ring [1560].
3. Remove bolts, lockwashers, and flatwashers [1262, 1263, 1264]. Remove mechanical seal adapter plate and o-ring [1261, 1252]. Remove stationary mating ring [1554] and anti-rotation pin [1557] from mating ring adapter. Remove pin [1561] from seal adapter plate.
4. Inspect parts for wear. Replace worn or damaged parts as required.

### *Seal Cartridge Installation - Model 50DTNS, Crane 8B2 Seal:*

1. Place o-ring [1252] into groove in mounting flange [1251]. Install pin [1561] into seal adapter plate [1261]. Place seal adapter plate onto flange. Install bolts, lockwashers, and flatwashers [1262, 1263, 1264] loosely to center seal adapter plate.
2. Mating ring adapter [1559], stationary mating ring [1554], o-ring [1558], anti-rotation pin [1557], and snap ring [1562] are pre-assembled. Install mating ring adapter [1559] assembly into adapter plate [1261]. Make sure slot engages pin [1561]. Do not install bolts [1265] at this time.
3. Lubricate shaft [400]. Slide rotary seal ring [1553] assembly down shaft to rest on stationary mating ring [1554].
4. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].

## MIXER MAINTENANCE

5. Lower the mixer drive onto the pedestal **[1101]** and removable coupling half **[301-02]**, and attach with bolts, lockwashers, and flatwashers **[1102, 1103, 1104]**. Torque bolts to the value shown in *Table 7, page 36*. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling **[301]** and flanged drive shaft coupling **[251]** faces together. Install and tighten the remaining coupling bolts and lockwashers **[302, 303]**.
6. Slide the rotary seal ring **[1553]** assembly up the extension shaft. Center the mechanical seal adapter plate/stationary mating ring **[1261/1554]** on the extension shaft. Install bolts, lockwashers, and flatwashers **[1262, 1263, 1264]**. Torque bolts to the value shown in *Table 7*.
7. Install bolts, lockwashers, and flatwashers **[1265, 1266, 1267]**. Torque bolts to the value shown in *Table 7*.
8. Set rotary seal ring **[1555]** retainer at 1.06" (26.9mm) above the adapter plate face. Evenly tighten all cup point setscrews **[1551]**.
9. Install the handhole covers **[1107]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher **[1108, 1109]**. Refer to *Figure 4, page 9*.



## MIXER MAINTENANCE

Refer to main unit assembly *Figure 3, page 8* and seal assembly *Figure 7, page 17*.

### *Seal Cartridge Removal - Model 50DTNC, Chesterton 155:*

1. Remove internal coupling bolt, lockwasher, and washer [304, 305, 306]. Loosen setscrews [308]. Remove coupling [301-02] and key [307]. Clean extension shaft above seal. Insert centering strap.
2. Remove bolts, lockwashers, and flatwashers [1292, 1293, 1294]. Slide seal cartridge up and off of shaft.
3. Remove bolts [1295] and seal adapter plate. Remove o-ring [1252].
4. Inspect parts for wear. Replace worn or damaged parts as required.

### *Seal Cartridge Installation - Model 50DTNC, Chesterton 155:*

1. Place o-ring [1252] into groove in mounting flange [1251]. Install seal adapter plate [1291] onto flange. Install bolts, lockwashers, and flatwashers [1295, 1296, 1297] loosely, do not tighten.
2. Lubricate shaft [400]. Slide seal cartridge [1400] assembly with gasket [1412] down shaft to rest on adapter plate [1291].
3. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].
4. Lower the mixer drive onto the pedestal [1101] and removable coupling half [301-02], and attach with bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Torque bolts to the value shown in *Table 7*. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling [301] and flanged drive shaft coupling [251] faces together. Install and tighten the remaining coupling bolts and lockwashers [302, 303].
5. Slide the mechanical seal cartridge [1400] up the extension shaft. Center the mechanical seal adapter plate [1291] on the extension shaft. Torque bolts [1295] to the value shown in *Table 7*.

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## MIXER MAINTENANCE

6. Slide mechanical seal cartridge down shaft and install bolts, lockwashers, and flatwashers **[1292, 1293, 1294]**. Tighten bolts evenly. Do not overtighten.
7. Evenly tighten lock ring setscrews **[1402]**, securing seal cartridge to shaft. Remove centering strap and save for later use during seal changeout. *NOTE: It may be easier to tighten three setscrews at 120°, and then remove centering strap.* Remaining setscrews may be better accessed for tightening by rotating the shaft.
8. Install the handhole covers **[1107]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher **[1108, 1109]**. Refer to *Figure 4, page 9*.

## MIXER MAINTENANCE

Refer to main unit assembly *Figure 3, page 8* and seal assembly *Figure 8, page 20*.

### *Seal Cartridge Removal - Model 50DTNC, Flowserve VRA:*

1. Remove internal coupling bolt, lockwasher, and washer [304, 305, 306]. Loosen setscrews [308]. Remove coupling [301-02] and key [307]. Clean extension shaft above seal.
2. Remove rotary seal ring [1603] assembly.
3. Remove bolts and lockwashers [1298, 1299]. Remove gland ring [1605] assembly and o-ring [1252].
4. Inspect parts for wear. Replace worn or damaged parts as required.

### *Seal Cartridge Installation - Model 50DTNC, Flowserve VRA:*

1. Place o-ring [1252] into groove in mounting flange [1251]. Install gland ring [1605] assembly with stationary seal ring [1608] and o-rings [1609] onto flange. Install bolts and lockwashers [1298, 1299] loosely, do not tighten.
2. Lubricate shaft [400]. Slide drive collar rotary seal ring [1603] assembly down shaft to stationary seal ring [1608].
3. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].
4. Lower the mixer drive onto the pedestal [1101] and removable coupling half [301-02], and attach with bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Torque bolts to the value shown in *Table 7*. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling [301] and flanged drive shaft coupling [251] faces together. Install and tighten the remaining coupling bolts and lockwashers [302, 303].
5. Slide drive collar rotary seal ring [1603] assembly up the extension shaft. Center the gland ring [1605] assembly on the extension shaft. Torque bolts [1298] to the value shown in *Table 7*.

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## MIXER MAINTENANCE

6. Slide drive collar rotary seal ring **[1603]** assembly down shaft, and set seal spring gap dimension at 1.875" (47.6 mm). Evenly tighten all cup point setscrews **[1604]**.
7. Install the handhole covers **[1107]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher **[1108, 1109]**. Refer to *Figure 4, page 9*.

## MIXER MAINTENANCE

Refer to main unit assembly *Figure 3, page 8* and seal assembly *Figure 9, page 23*.

***Seal Cartridge Removal - Model 50DTN, Crane 5620:*** Refer to *Figure 8, page 22*.

1. Remove internal coupling bolt, lockwasher, and washer [304, 305, 306]. Loosen setscrews [308]. Remove coupling [301-02] and key [307]. Clean extension shaft above seal.
2. Remove bolts, lockwashers, and flatwashers [1282, 1283, 1284]. Slide seal cartridge up and off of shaft.
3. Remove adapter piece [1281]. Remove gasket [1255].
4. Inspect parts for wear. Replace worn or damaged parts as required.

***Seal Cartridge Installation - Model 50DTN, Crane 5620:***

1. Place gasket [1255] around bore of mounting flange [1251]. Install seal adapter piece [1281] into flange bore (tenon fit).
2. Lubricate shaft [400]. Slide seal cartridge [1650] assembly with gasket [1659] down shaft until just above adapter piece.
3. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft bolt, lockwasher, and flatwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].
4. Lower the mixer drive onto the pedestal [1101], to allow the installation of the coupling bolts and lockwashers [302, 303]. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling [301] and flanged drive shaft coupling [251] faces together. Install and tighten the remaining coupling bolts and lockwashers [302, 303].
5. Slide mechanical seal assembly [1650] assembly into adapter piece [1281] (tenon fit). Orient fluid ports per mechanical seal assembly drawing included with unit. Install bolts, lockwashers, and flatwashers [1282, 1283, 1284]. Tighten bolts evenly. Attach mixer drive to pedestal with bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Torque bolts to the value shown in *Table 7*.

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## MIXER MAINTENANCE

6. Tighten collar setscrews **[1652]** evenly (1/4 turns to setscrews at 180° apart), securing seal to shaft.
7. Remove seal spacers and save for future seal changeout.
8. Attach seal lubrication lines. See *Options: Mechanical Seal Lubricator* for installation instructions.
9. Install the handhole covers **[1107, 1716]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher **[1108, 1109]**. Refer to *Figure 4, page 9*.

## MIXER MAINTENANCE

Refer to main unit assembly *Figure 3, page 8* and seal assembly *Figure 10, page 26*.

***Seal Cartridge Removal - Model 50DTN, Chesterton 255:*** Refer to *Figure 9, page 25*.

1. Remove internal coupling bolt, lockwasher, and washer [304, 305, 306]. Loosen setscrews [308]. Remove coupling [301-02] and key [307]. Clean extension shaft above seal.
2. Remove bolts, lockwashers, and flatwashers [1272, 1273, 1274]. Slide seal cartridge up and off of shaft.
3. Remove adapter piece [1271]. Remove gasket [1255].
4. Inspect parts for wear. Replace worn or damaged parts as required.

***Seal Cartridge Installation - Model 50DTN, Chesterton 255:***

1. Place gasket [1255] around bore of mounting flange [1251]. Install seal adapter piece [1271] into flange bore (tenon fit).
2. Lubricate shaft [400]. Slide seal cartridge [1500] assembly with gasket [1507] down shaft until just above adapter piece.
3. Clean the removable shaft coupling [301-02]. Make sure both the extension shaft and coupling bore surfaces are completely dry and free from any burrs or nicks. Install the shaft key [307-02] into the extension shaft keyway, making sure it is fully bottomed into the keyway. Install the coupling over the shaft end. Install the shaft end washer, bolt and lockwasher [304, 305, 306] and torque to the value shown in *Table 7, page 36*. Engage the two coupling setscrews [308] onto the shaft key [307-02].
4. Lower the mixer drive onto the pedestal [1101], to allow the installation of the coupling bolts and lockwashers [302, 303]. Install two coupling bolts and lockwashers at 180°. Tighten the bolts to engage the tenon and pull the removable coupling [301] and flanged drive shaft coupling [251] faces together. Install and tighten the remaining coupling bolts and lockwashers [302, 303].
5. Slide mechanical seal assembly [1500] assembly into adapter piece [1271] (tenon fit). Orient fluid ports per mechanical seal assembly drawing included with unit. Install bolts, lockwashers, and flatwashers [1272, 1273, 1274]. Tighten bolts evenly. Attach mixer drive to pedestal with bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Torque bolts to the value shown in *Table 7*.

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## MIXER MAINTENANCE

6. Tighten collar setscrews **[1503]** evenly, securing seal to shaft.
7. Remove centering clips and save for future seal changeout.
8. Attach seal lubrication lines. See *Options: Mechanical Seal Lubricator* for installation instructions.
9. Install the handhole covers **[1107, 1716]** onto the pedestal. Tighten wing nut **[1110]** to previously installed bolt and lockwasher **[1108, 1109]**. Refer to *Figure 4, page 9*.



**MIXER PART NUMBERS**

Part #	Description	Qty.
100	Motor	1
200	Housing Assembly	
201-05	Housing, Model 50DTNS, 50DTNC, 50DTN	1
220-01	Motor Adapter, 56C/140TC	1
220-02	Motor Adapter, 180TC	1
221	O-Ring	1
222	External Retaining Ring	1
223	Output Gear	1
224	Key	1
225	Shaft Seal	1
226	Ball Bearing	1
227	External Retaining Ring	1
228	Ball Bearing	1
229	Socket Head Bolt	4
230	Shaft Seal	1
231	O-Ring	1
232	Seal Housing	1
233	Roller Bearing	1
234	Driven Pinion/Shaft	1
235	Ball Bearing	1
236	Internal Retaining Ring	1
237	Spacer	1
238	Key	1
239-01	High Speed Gear, 5:1	1
239-02	High Speed Gear, 10:1	1
240	Washer	1
241	Hex Bolt	1
242-01	Setscrew, 56C/140TC	1
242-02	Setscrew, 180TC	1
243-01	Pinion Gear, 5:1, 56C	1
243-02	Pinion Gear, 5:1, 140TC	1
243-03	Pinion Gear, 5:1, 180TC	1
243-04	Pinion Gear, 10:1, 56C	1
244-01	Motor Key, 56C	1
244-02	Motor Key, 140TC	1
244-03	Motor Key, 180TC	1

**MIXER PART NUMBERS**

Part #	Description	Qty.
245-01	Seal, 5:1	1
245-02	Seal, 10:1	1
246-01	Hex Bolt, 56C/140TC	4
246-02	Hex Bolt, 180TC	4
247-01	Sealing Washer, 56C/140TC	4
247-02	Sealing Washer, 180TC	4
248	Socket Head Bolt	4
251	Flanged Drive Shaft	1
300	Removable Coupling Assembly	
301-02	Removable Flanged Shaft Coupling	1
302	Hex Bolt	4
303	Spring Lockwasher	4
304	Hex Bolt	1
305	Spring Lockwasher	1
306	Flatwasher	1
307-02	Key	1
308	Setscrew	2
400	Extension Shaft	1
500	Propellers/Impellers	
	Marine Propeller, Type JP-3	
	High Efficiency Impeller, Type SC-3	
1100	Pedestal Assembly	
1101	Pedestal	1
1102	Hex Bolt	4
1103	Spring Lockwasher	4
1104	Flatwasher	4
1105	Hex Bolt	4
1106	Spring Lockwasher	4
1107-01	Handhole Cover (Non-Lubricated Seals)	4
1108	Bolt	4
1109	Spring Lockwasher	4
1110	Wing Nut	4

**MIXER PART NUMBERS**

Part #	Description	Qty.
1251	Mounting Flange	1
1252	O-Ring	1
1253	Shaft Collar	1
1254	Clamp Bolt	2
1255	Gasket	1
1260	Crane 8B2/Flowserve MCRO Seal Adapter Plate Assembly	
1261	Seal Adapter Plate	1
1262	Hex Bolt	4
1263	Spring Lockwasher	4
1264	Flatwasher	4
1265	Hex Bolt	4
1266	Spring Lockwasher	4
1267	Flatwasher	4
1270	Chesterton 255 Seal Adapter Piece Assembly	
1271	Seal Adapter Piece	1
1272	Hex Bolt	4
1273	Spring Lockwasher	4
1274	Flatwasher	4
1280	Crane 5620 Seal Adapter Piece Assembly	
1281	Seal Adapter Piece	1
1282	Hex Bolt	4
1283	Spring Lockwasher	4
1284	Flatwasher	4
1290	Chesterton 155 Seal Adapter Plate Assembly	
1291	Seal Adapter Plate	1
1292	Hex Bolt	4
1293	Spring Lockwasher	4
1294	Flatwasher	4
1295	Socket Bolt	4
1296	Hi-Collar Lockwasher	4
1297	Flatwasher	4
1298	Socket Bolt	4
1299	Hi-Collar Lockwasher	4

**MIXER PART NUMBERS**

Part #	Description	Qty.
1400	Chesterton 155 Seal Assembly	
1401	Lock Ring	1
1402	Setscrew, Cup Point	6
1403	Sleeve	1
1404	Gland Assembly	1
1405	Snap Ring	1
1406	Springs	
1407	Back-up Washer	1
1408	Stationary Seal Ring	1
1409	O-Ring	1
1410	O-Ring	1
1411	Rotary Seal Ring	1
1412	Gasket	1
1413	Gland Tab with Spring	8
1414	O-Ring	1
1415	Flat Head Socket Screw	3
1416	Stationary Drive Assembly	1
1417	Pipe Plug	1
1450	Flowserve MCRO Seal Assembly	
1451	Collar	1
1452	Setscrew, Cup Point	2
1453	Spring	1
1454	Rotary Seal Ring	1
1455	O-Ring	1
1456	Stationary Seal Ring	1
1457	O-Ring	1

**MIXER PART NUMBERS**

Part #	Description	Qty.
1500	Chesterton 255 Seal Assembly	
1501	Lock Ring	1
1502-01	Springs, 1.00" Shaft	
1502-02	Springs, 1.50" Shaft	
1503	Setscrew, Cup Point/Quarter Dog Point	3,3
1504	O-Ring	1
1505	Upper Rotary Seal Ring	1
1506	Lug	1
1507	Gasket	1
1508	O-Ring	1
1509	O-Ring	1
1510	Gland	1
1511	Upper Stationary Seal Ring	1
1512	O-Ring	1
1513	Drive Clip/Drive Channel	2,1
1514	Lower Rotary Seal Ring	1
1515	O-Ring	1
1516	Lower Stationary Seal Ring	1
1517	O-Ring	1
1518	Sleeve	1
1550	Crane 8B2 Seal Assembly	
1551	Setscrew	4
1552	O-Ring	1
1553	Rotary Seal Ring	1
1554	Stationary Mating Ring	1
1555	Retainer	1
1556	Spring	3
1557	Anti-Rotation Pin	1
1558	O-Ring	1
1559	Mating Ring Adapter	1
1560	O-Ring	1
1561	Pin	1
1562	Snap Ring	1

**MIXER PART NUMBERS**

Part #	Description	Qty.
1600	Flowserve VRA Seal Assembly	
1601	Shoulder Screw	3
1602	O-Ring	1
1603	Rotary Seal Ring	1
1604	Setscrew	4
1605	Gland Ring	1
1606	Drive Collar Assembly	1
1607	Spring	3
1608	Stationary Seal Ring	1
1609	O-Ring	2
1610	Drive Pin	4
1611	O-Ring	1
1612	Retaining Ring	1
1613	Retaining Plate	1
1650	Crane 5620 Seal Assembly	
1651	Snap Ring	1
1652	Setscrew	4
1653	O-Ring	1
1654	O-Ring with Anti-Extrusion Ring	1
1655	O-Ring	1
1656	Snap Ring	1
1657	Gland Plate	1
1658	O-Ring	1
1659	Gasket	1
1660	O-Ring with Anti-Extrusion Ring	1
1661	O-Ring	1
1662	O-Ring	1
1663	Sleeve	1
1664	Collar	1
1665	Upper Retainer with Drive Ring and Spring	1
1666	Upper Rotary Seal Ring	1
1667	Upper Stationary Ring	1
1668	Sleeve Adapter	1
1669	O-Ring	1
1670	Gland Adapter	1
1671	O-Ring	1
1672	Lower Retainer with Drive Ring and Spring	1
1673	Lower Rotary Seal Ring	1
1674	Lower Stationary Ring	1

**MIXER PART NUMBERS**

Part #	Description	Qty.
1700	Lubrication Assembly	
1701	Mechanical Seal Lubricator	1
1702	Plug, NPT	1
1703	Sight Glass, NPT	1
1704	Plug, NPT	1
1705	Pipe Nipple, NPT (1-1/2" Long)	1
1706	Pipe Elbow, NPT	1
1707	Pipe Nipple, NPT (1" Long)	1
1708-01	Flexible Metal Hose (Chesterton 255) [24" overall length]	1
1708-02	Flexible Metal Hose (Crane 5620) [30" overall length]	1
1709	Pipe Nipple, NPT (1" Long)	1
1710-01	Flexible Metal Hose (Chesterton 255) [24" overall length]	1
1710-02	Flexible Metal Hose (Crane 5620) [24" overall length]	1
1711	Mounting Bracket	1
1712	Hex Bolt	2
1713	Spring Lockwasher	2
1714	Hex Bolt	2
1715	Spring Lockwasher	2
 <i><u>Pedestal Handhole Covers – Chesterton 255 Seal</u></i>		
1107	Handhole Cover, Standard	3
1716	Handhole Cover, Special	1
 <i><u>Pedestal Handhole Covers – Crane 5620 Seal</u></i>		
1107	Handhole Cover, Standard	2
1716	Handhole Cover, Special	2



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