
DT Small Mixers Installation, Operation, Maintenance Manual

Equipment Reference:
50DTA Style Mixer
50DTL Style Mixer

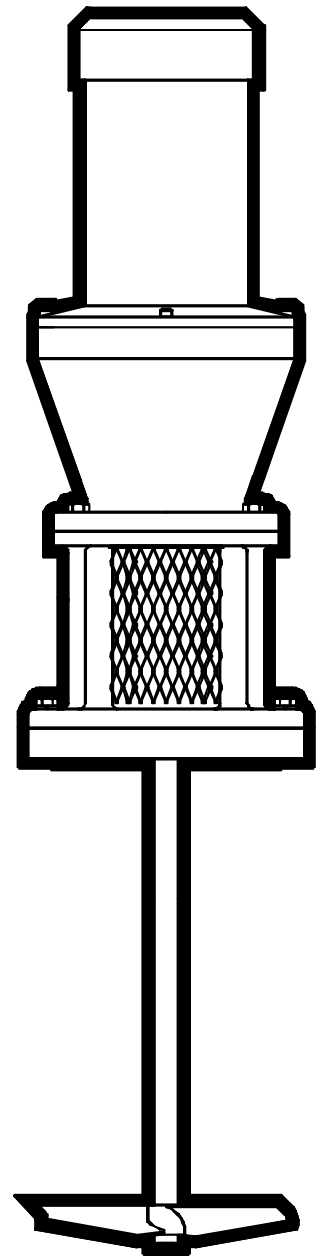


TABLE OF CONTENTS

Initial Inspection	1
Chemineer Assistance	1
Storage	2
Mounting & Installation	3
Vessel Evaluation	3
Sealed Tank Mixer Installation	7
Mixer Installation	17
Lubrication	20
Electric Motor	20
Air Motor	22
Gear Drive	22
Shaft Seals	22
Operation	23
Mixer	23
Electric Motors	24
Air Motors	24
Shaft Seals	25
Maintenance	26
Mixer Maintenance – Mixer Removal & Disassembly	26
Mixer Maintenance – Mixer Assembly	28
Stuffing Box Maintenance	31
V-Ring Seal Maintenance	32
Parts	34

TABLE OF CONTENTS

Tables	Page
Table 1: Recommended Minimum Head Thicknesses for Ungusseted Nozzle Mounting	3
Table 2: Recommended Minimum Head Thicknesses for Pad Mounting	3
Table 3: Recommended Minimum Head Thicknesses for Reinforced Nozzle or Pad Mounting	4
Table 4: Mounting Nozzle Reinforcement Dimensions	4
Table 5: Mounting Pad Reinforcement Dimensions	4
Table 6: Off-Center Positioning	16
Table 7: Bolt Tightening Torque	19
Table 8: Motor Bearing Grease Addition	20
Table 9: Typical NLGI No. 2 Greases	21
Table 10: Lubrication Frequency	22
Figures	
Figure 1: Models 50DTA, 50DTL Installation	5
Figure 2: Models 50DTA, 50DTL Mounting, Nozzle/Pad	6
Figure 3: Models 50DTA, 50DTL	8
Figure 4: Handhole Cover Assembly	9
Figure 5: Stuffing Box Installation	10
Figure 6: V-Ring Seal Installation	11
Figure 7: Angle Mounted Drive	14
Figure 8: Angle Mount Installation	15
Figure 9: Wiring Diagram, Motors	18

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.

STORAGE

Do not remove any protective packaging, coatings (generally applied to the motor output shaft), 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 50DTA and 50DTL 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, “T” 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, “T” 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

2. 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)

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

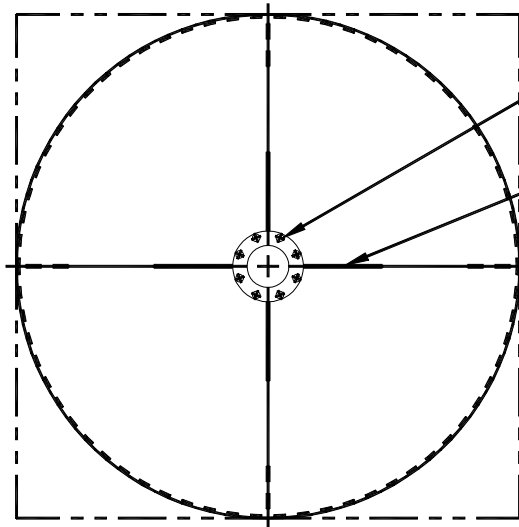
TABLE 4: MOUNTING NOZZLE REINFORCEMENT DIMENSIONS, inches (mm)

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)

A ANSI – DIN	D BACKUP PLATE RADIUS
6 (150)	12 (305)

VESSEL EVALUATION



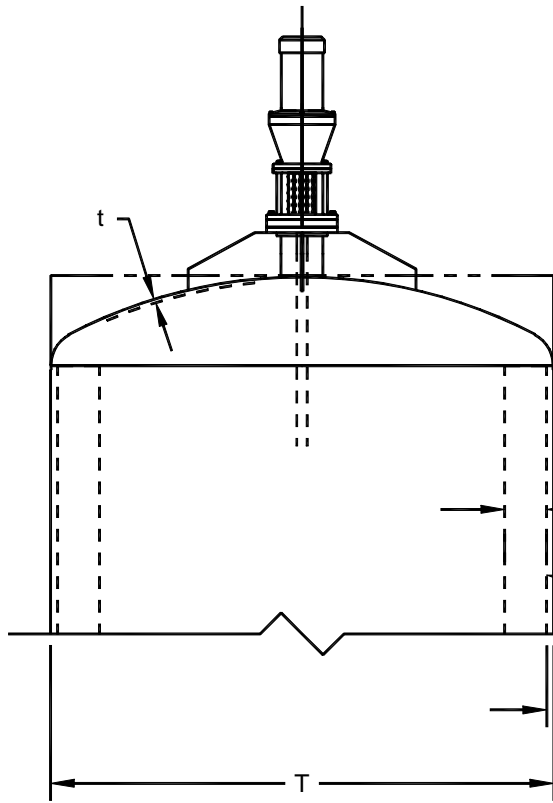
6"-150# FLANGE, BOLT HOLES STRADDLE CENTERLINE

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

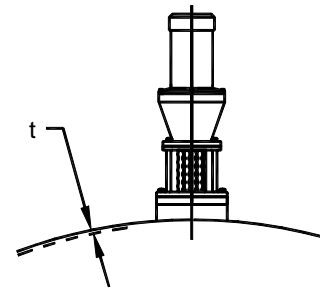
SEE TABLES 1 OR 2 FOR UNREINFORCED VESSEL HEAD THICKNESSES "t".

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 50DTA, 50DTL Installation

VESSEL EVALUATION

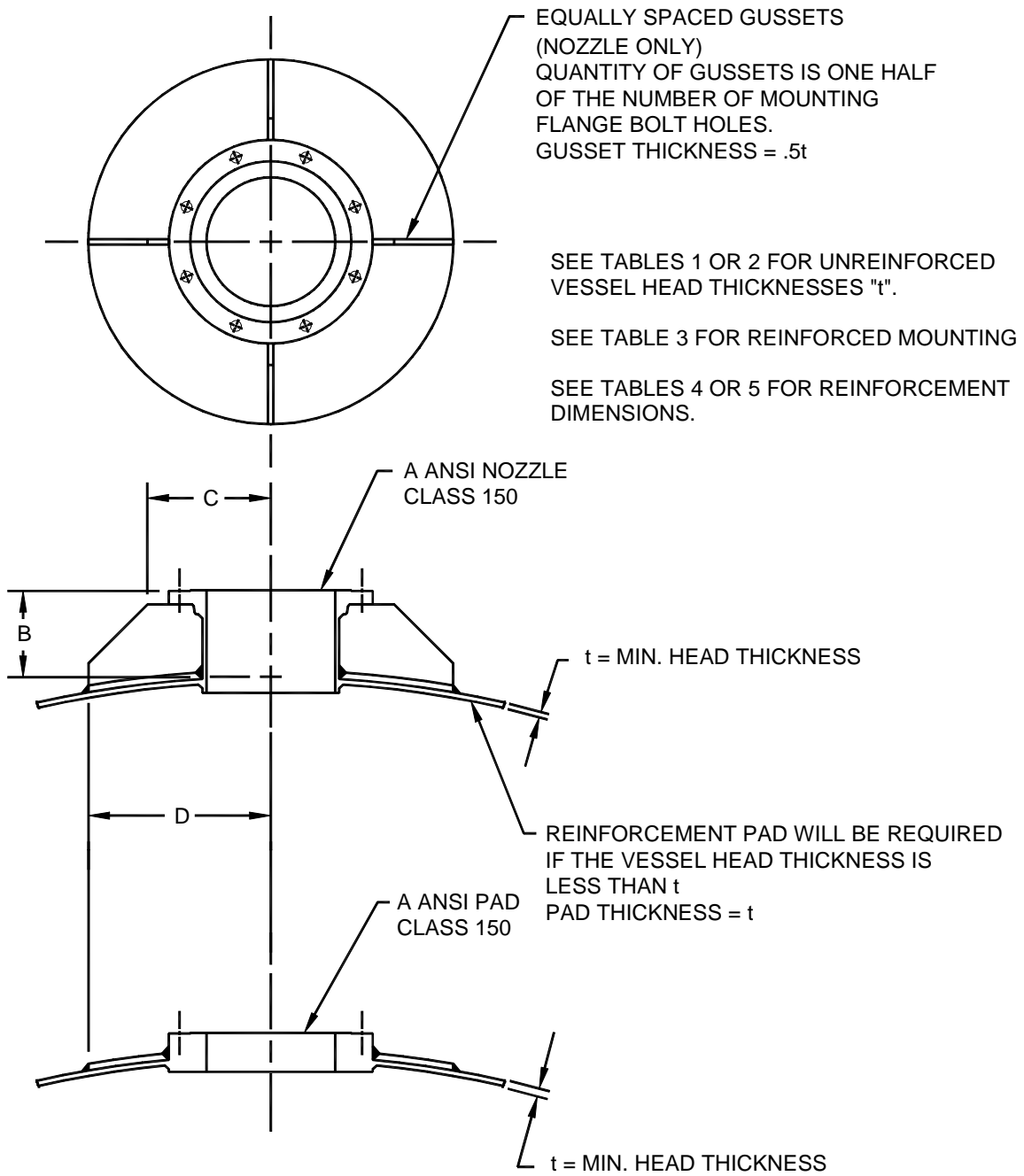


Figure 2: 50DTA, 50DTL Mounting, Nozzle/Pad

SEALED TANK MIXER INSTALLATION

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

The models 50DTA and 50DTL are gear reduced, heavy duty, stuffing box (50DTA) or v-ring (50DTL) sealed designs for closed tank applications. The drive unit is typically shipped with the motor [100] mounted to the cast aluminum housing [201-05]. Extension shaft attachment may be via either a chuck drive shaft [249] coupling or a flanged drive shaft [251] coupling, with bearing support that extends from the housing. Also in the main unit box will be a separate carton for the seal assembly [1300 or 1800], pedestal and handhole covers [1100], removable extension shaft coupling [300] if applicable, 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 19*.
4. Lift the mixer shaft [400] and lower it into the vessel. All welded shaft assemblies may require an alternate vessel opening to lower the shaft assembly through, prior to raising it through the mixer mounting flange.
5. For units with 1" diameter shafting, lift the shaft up through the mixer mounting flange from the inside of the vessel and block it in place such that the shaft end is approximately 1" below the pedestal top surface.

For units with 1-1/2" diameter shafting, lift the shaft up through the mixer mounting flange from the inside of the vessel and block it in place such that the shaft end extends approximately 5" above the pedestal top surface.

SEALED TANK MIXER INSTALLATION

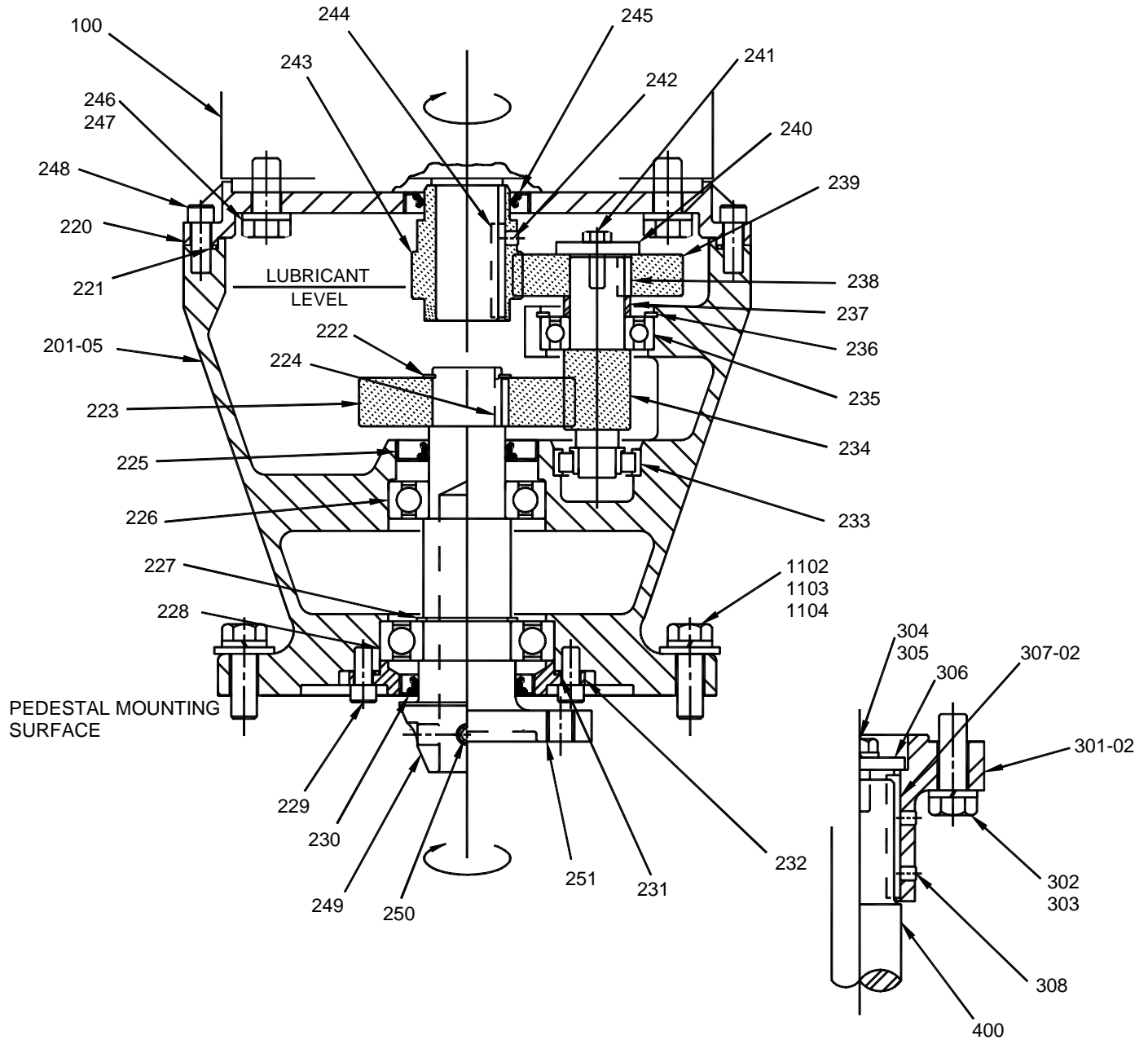


Figure 3: Models 50DTA, 50DTL

SEALED TANK MIXER INSTALLATION

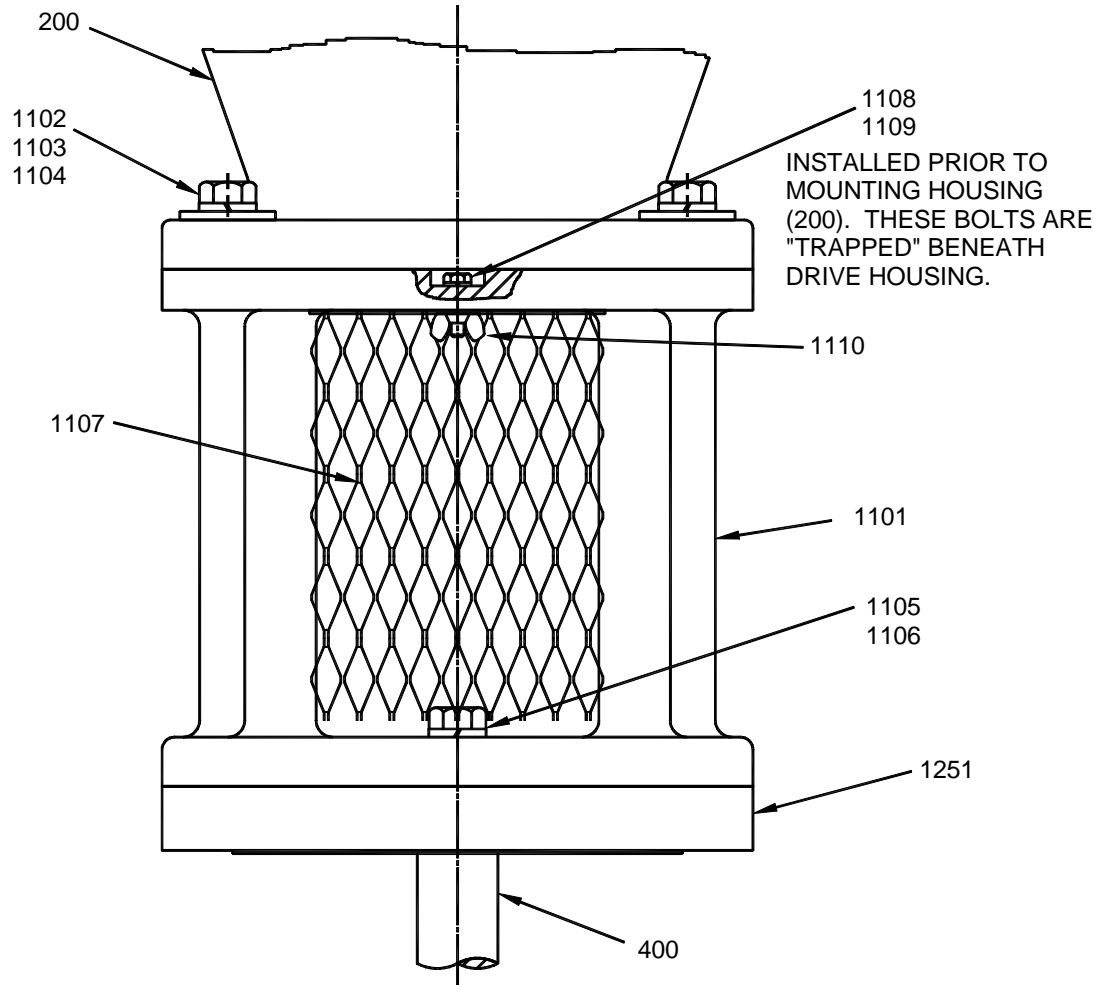


Figure 4: Handhole Cover Assembly

SEALED TANK MIXER INSTALLATION

6. **For DTA units:** Place o-ring [1252] into the groove in the mounting flange [1251]. Install packing housing [1307] with bolts, lockwashers, and flatwashers [1309, 1310, 1311]. *Do not tighten packing housing bolts at this time.* Install the packing rings [1308] being careful to stagger the packing split. Seat each packing ring as it is installed. Install the two threaded studs [1301] at 180° from each other.

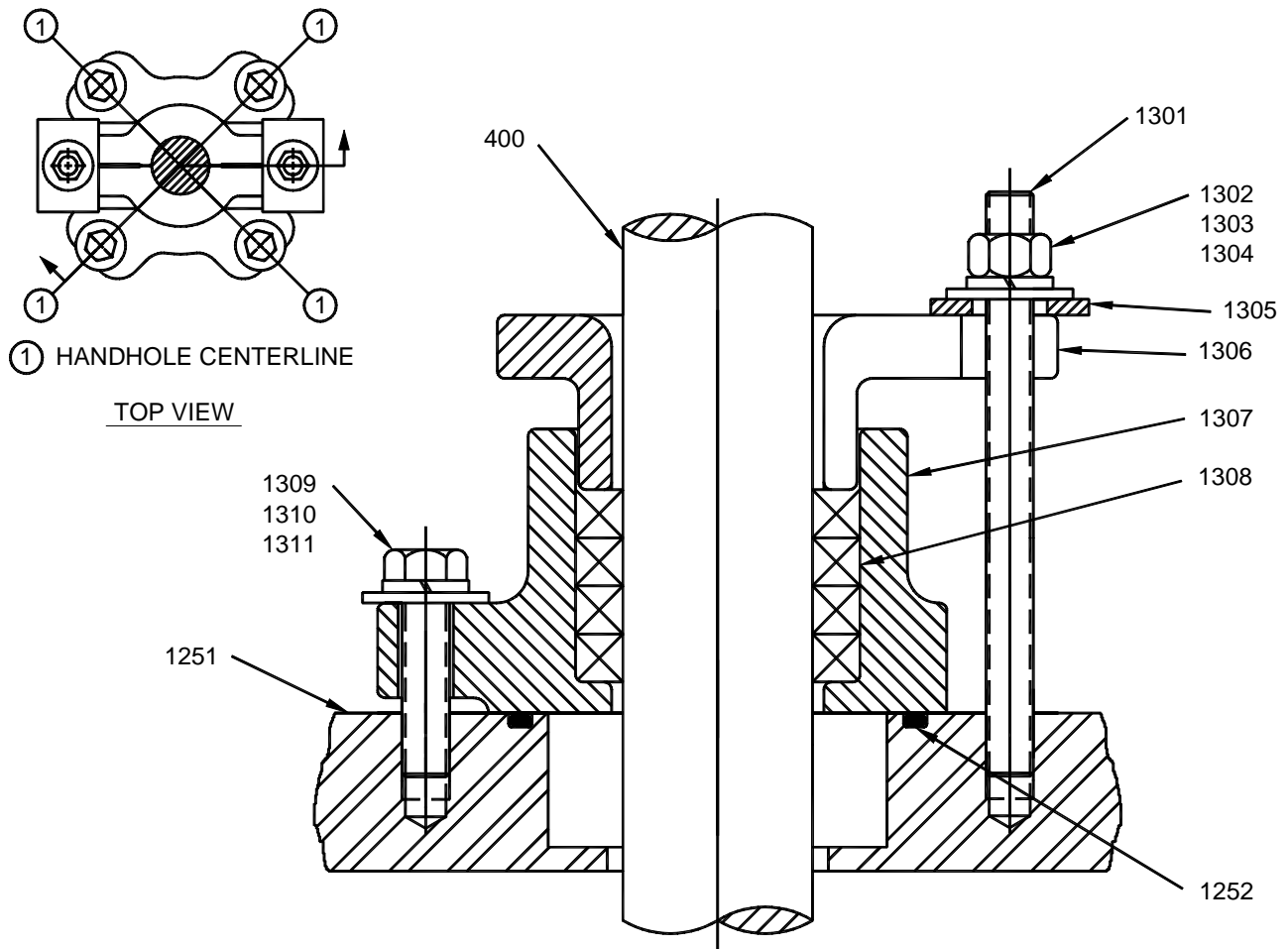


Figure 5: Stuffing Box Installation

SEALED TANK MIXER INSTALLATION

For DTL units: Place o-ring [1252] into the groove in the mounting flange [1251]. Install the seal plate [1802] with bolts and lockwashers [1803, 1804]. Install the v-ring [1801] over the shaft end and onto the seal plate. *Do not tighten seal plate mounting bolts at this time.*

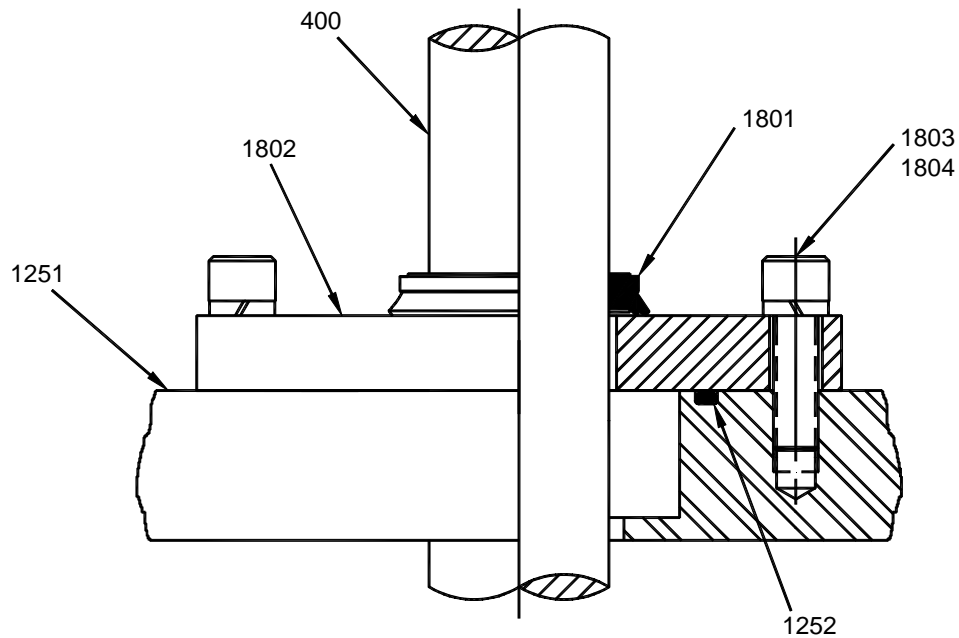


Figure 6: V-Ring Seal Installation

SEALED TANK MIXER INSTALLATION

7. For units with 1" diameter shafting and chuck drive shaft coupling:
- Lower the drive motor/housing assembly onto the pedestal **[1101]**. Remove the shaft blocking. Raise the extension shaft **[400]** and insert it into the drive shaft **[249]** chuck until the shaft bottoms out, approximately 5" (127mm). Orient the shaft to allow the chuck setscrews **[250]** (two at 90°) to engage the "flats" on the extension shaft. Tighten chuck setscrews **[250]** with a 3/16" hex key wrench.
 - Attach the housing to the pedestal with bolts, lockwashers, and flatwashers **[1102, 1103, 1104]**. Torque bolts to the value shown in *Table 7, page 19*.

For units with 1-1/2" diameter shafting and flanged drive shaft coupling:

- Clean the extension shaft **[400]** turndown diameter and the removable shaft coupling **[301-02]**. Make sure both 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 19*. Engage the two coupling setscrews **[308]** onto the shaft key **[307-02]**.
- Lift and suspend the mixer drive over the pedestal **[1101]** and removable coupling half **[301-02]** close enough 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]**. Lift the mixer assembly enough to remove the shaft blocking and gently lower the drive housing onto the pedestal. Attach the drive to the pedestal with bolts, lockwashers, and flatwashers **[1102, 1103, 1104]**. Torque bolts to the value shown in *Table 7*.

SEALED TANK MIXER INSTALLATION

8. **For DTA units:** Install the split packing gland [1306] over the threaded studs [1301] with gland clamps [1305], flatwashers, lockwashers, and hex adjusting nuts [1302, 1303, 1304]. Refer to *Figure 5, page 10*. The split packing gland must be square with the packing housing. Tighten packing housing bolts [1309]. Torque to the value shown in *Table 7, page 19*.

Tighten the hex adjusting nuts [1302]. Let the packing set for five to ten minutes so that it can cold flow and adjust to the gland pressure. Loosen the hex adjusting nuts, then finger tighten. After starting the unit, the packing will require adjusting. Refer to ***Operation – Shaft Seals, page 25***.

For DTL units: Center the seal plate on the shaft. Torque bolts to the value shown in *Table 7, page 19*. Refer to *Figure 6, page 11*. Slide the v-ring [1801] down the shaft to contact the seal plate [1802].

9. Install the handhole covers [1107-01] onto the pedestal. Tighten wing nuts [1110] to previously installed bolts and lockwashers.
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 lower impeller should be a minimum of one impeller diameter below the liquid surface at all times during mixer operation.

SEALED TANK MIXER INSTALLATION OPTIONAL ANGLE MOUNTED DRIVE

Model 50DTA and 50DTL mixers may be angle mounted. See *Figure 8, page 15* 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 vessel nozzle using customer supplied fastener set.

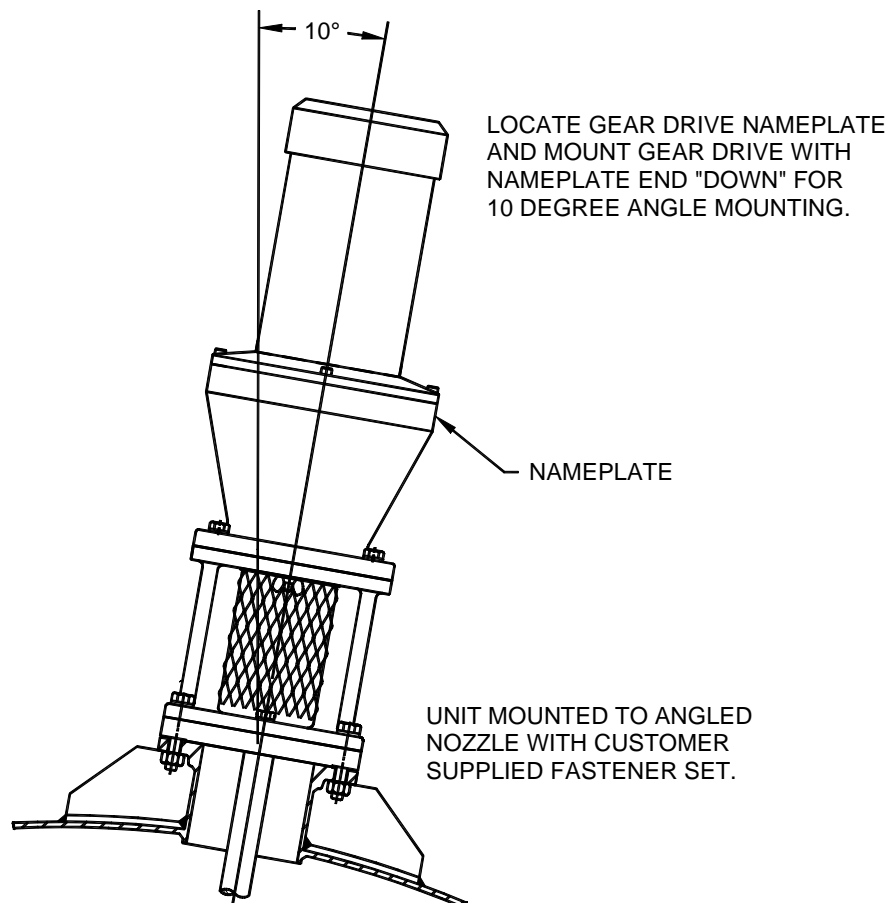


Figure 7: Angle Mounted Drive

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

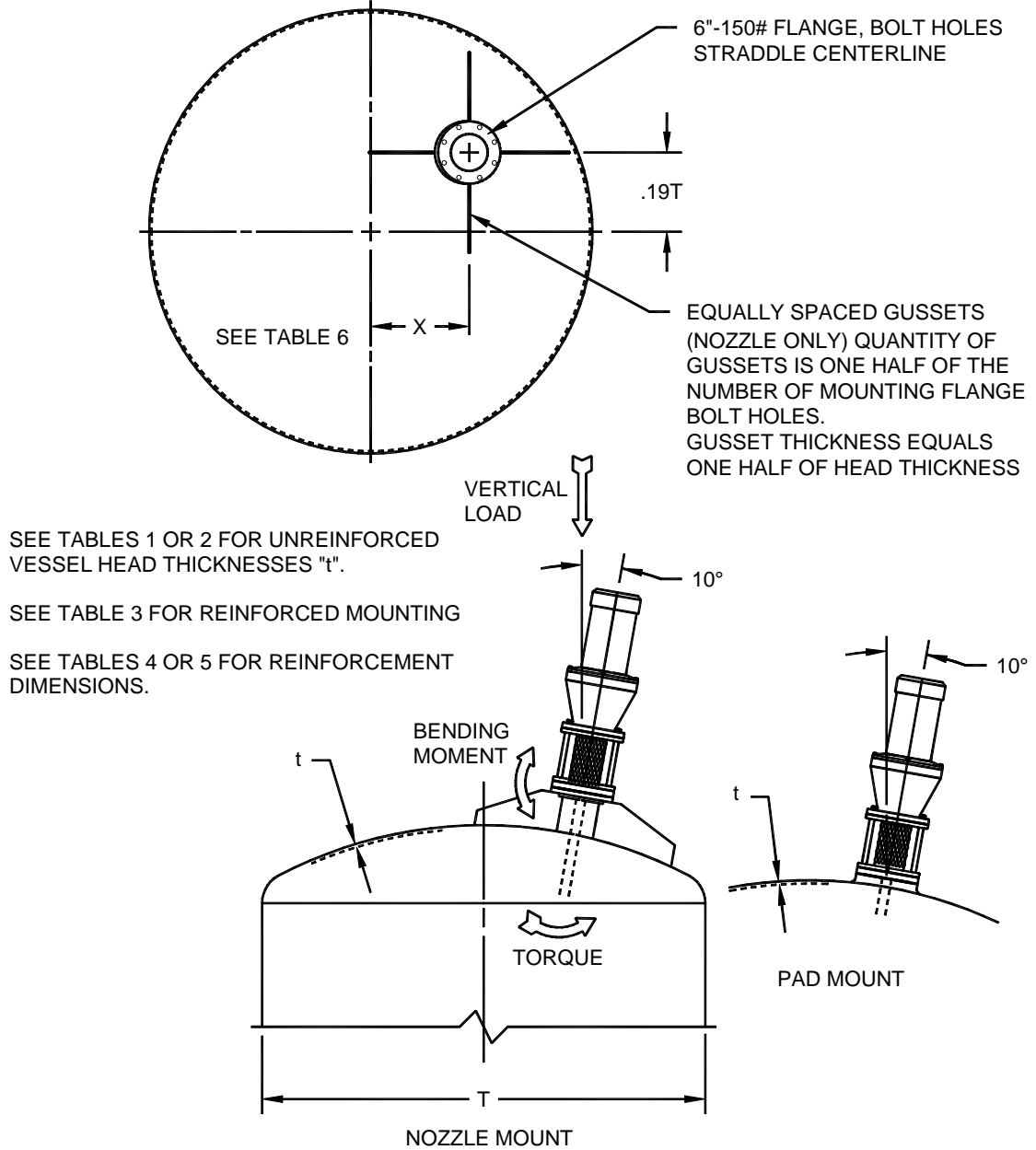


Figure 8: Angle Mount Installation

**SEALED TANK MIXER INSTALLATION
OPTIONAL ANGLE MOUNTED DRIVE****TABLE 6: OFF-CENTER POSITIONING**

SHAFT EXTENSION RANGE IN (MM)	“X” DIMENSION IN (MM)	MINIMUM TANK DIAMETER “T” 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.

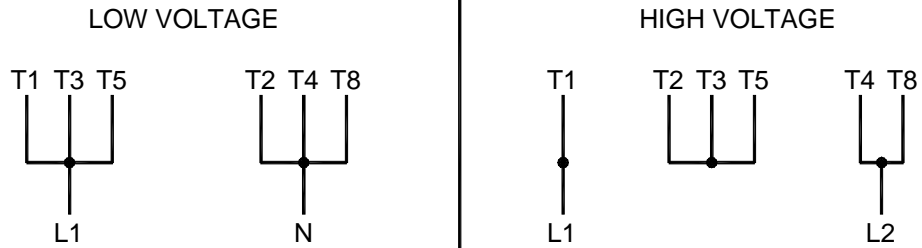
3. Many of the motors supplied with this product are dual voltage. The motor cord supplied with a single phase motor is applicable for use on 125VAC systems only. Customer is responsible for supplying all necessary motor connections and for properly wiring the motors. Refer to wiring diagram *Figure 9, page 18* 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

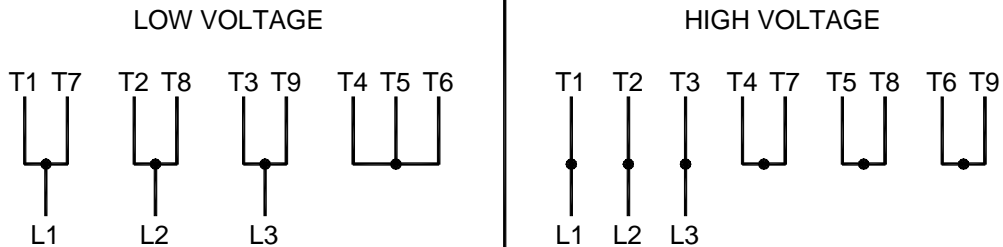
**SINGLE-PHASE MOTOR
(WITHOUT THERMAL PROTECTOR)**



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 9: Wiring Diagram, Motors

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

BOLT SIZE	CARBON STEEL ⁽¹⁾				300 SERIES STAINLESS ⁽²⁾	
	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.

⁽¹⁾If fasteners cannot be lubricated, multiply table values by 1.33.

⁽²⁾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 21* 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 ³	cm ³	in ³	cm ³	in ³	cm ³
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>		
MANUFACTURER	GENERAL PURPOSE	EP
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

The standard 50DTA stuffing box contains four rings of self-lubricated packing and will not require any additional lubrication for the life of the packing.

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 shut-off valve to obtain the desired power and conserve air.

SHAFT SEALS

50DTA stuffing box unit consists of four rings of self-lubricated packing suitable for 50psig (345kPa) at 400°F (204°C).

At start-up, the packing should be “run-in” by tightening the hex adjusting nuts gradually (one flat at a time), allowing 15 minutes between each take-up for the packing to reseal itself before further tightening. Repeat these adjustments at 15 minute intervals until the leakage rate is acceptable.

Make periodic inspections for leakage, but do not take-up on the packing gland unless necessary. Overtightening wears out packing prematurely and causes scoring and damage to the shaft.

MIXER MAINTENANCE

Refer to *Figures 3 & 4, pages 8 & 9.*

Mixer 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]**.
4. *For 50DTA units:* Loosen the hex adjusting nuts **[1302]** and bolts **[1309]**. Refer to *Figure 5, page 10.*

For 50DTL units: Loosen the bolts **[1803]**. Refer to *Figure 6, page 11.*

5. Remove mounting bolts, lockwashers, and flatwashers **[1102, 1103, 1104]**.
6. Lift mixer drive assembly away from the pedestal **[1101]**, sufficiently to allow the extension shaft **[400]** to be blocked in place and to provide access to the extension shaft fasteners.
7. *For units with 1" diameter shafting and chuck drive shaft coupling:* Block extension shaft in place and loosen chuck setscrews **[250]**.

For units with 1-1/2" diameter shafting and flanged drive shaft coupling: Block extension shaft in place, and remove coupling bolts and lockwashers **[302,303]**.

8. Remove the mixer drive unit from the tank and move to a suitable service area.
9. 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.*
10. Remove the lubricant from the housing.
11. Remove the motor shaft setscrews **[242]**. Remove the motor pinion gear **[243]** from the motor shaft.
12. Remove the motor mounting bolts **[246]**, and remove the motor **[100]** from the motor adapter **[220]**.

MIXER MAINTENANCE

13. Remove the lip seal [245] from the motor adapter.
14. Remove the bolt [241] and washer [240] from the driven pinion shaft [234]. Remove the high speed gear [239] from the pinion shaft.
15. Remove the bearing spacer [237] from the pinion shaft.
16. Remove the retaining ring [222] from the end of the drive shaft [249 or 251].
17. 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.*
18. Mount the housing [201], motor end up, in an arbor press. Press the drive shaft [249 or 251] through the output gear [223] and out of the housing.
19. Remove the upper shaft seal [225] from the housing.
20. Press the upper ball bearing [226] off of the drive shaft [249 or 251].
21. Remove the drive shaft retaining ring [227]. Press the lower ball bearing [228] off of the drive shaft.
22. Remove the seal housing [232] from the drive shaft. Remove the lower shaft seal [230] from the seal housing.
23. Remove the retaining ring [236] from the driven pinion shaft [234] housing bore, and remove the driven pinion shaft [234] from the housing [201].
24. Press the upper ball bearing [235] off the pinion shaft.
25. Remove the lower roller bearing [233] inner race from the pinion shaft.
26. 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 MAINTENANCE

Refer to *Figures 3 & 4, pages 8 & 9.*

Mixer Assembly

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 19.*
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 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.
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.

MIXER MAINTENANCE

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 chuck drive shaft [249] or 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 chuck drive shaft [249] or 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 19*.
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 22*. Reference *Figure 3, page 8* for lubricant level.

MIXER MAINTENANCE

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]. Tighten securely.

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

STUFFING BOX MAINTENANCE

The 50DTA stuffing box is furnished with self-lubricating packing and will not require any additional lubrication for the life of the packing.

Stuffing Box Packing Replacement: Refer to *Figure 5, page 10*.

1. Lockout power and disconnect electrical service to motor.
2. Depressurize and ventilate vessel.
3. Remove handhole covers [1107].
4. Remove hex adjusting nuts [1302], lockwashers [1303], flatwashers [1304], and gland clamps [1305]. Remove split packing gland [1306]. With a packing hook (not provided), remove packing [1308].
5. Clean packing housing [1307] and extension shaft [400]. Inspect shaft surface for damage. Repair or replace shaft as required.
6. Install new packing rings [1308] into housing with packing split staggered. Seat each packing ring as it is installed. Install the split packing gland over the existing threaded studs [1301] with gland clamps [1305], flatwashers [1304], lockwashers [1303], and hex adjusting nuts [1302]. The split packing gland must be square with the packing housing.
7. Tighten the hex adjusting nuts [1302]. Let the packing set for five to ten minutes so that it can cold flow and adjust to the gland pressure. Loosen the hex adjusting nuts, then finger tighten. After starting the unit, the packing will require adjusting. Refer to *Operation – Shaft Seals, page 25*.

V-RING SEAL MAINTENANCE

V-Ring Seal Replacement:

1. Lockout power and disconnect electrical service to motor.
2. Ventilate vessel.
3. Remove handhole covers **[1107]**.
4. Cut the existing v-ring **[1801]** and remove it from the shaft.
5. Remove mounting bolts, lockwashers, and flatwashers **[1102, 1103, 1104]**.
6. For units with 1" diameter shafting and chuck drive shaft coupling:
 - a. Block extension shaft in place and loosen chuck setscrews **[250]**.
 - b. Lift the mixer drive unit away from the pedestal **[1101]**, being carefully to lift vertically to allow the extension shaft to slide out of the drive shaft **[249]** chuck.
 - c. Clean all exposed shaft and seal plate **[1802]** surfaces and inspect for damage. Repair or replace shaft as required.
 - d. Slide new v-ring **[1801]** down the shaft.
 - e. Loosen the shaft blocking and lower the extension shaft so that it is approximately 1" below the pedestal top surface. Re-block in place.
 - f. Lower the mixer drive unit onto the pedestal and mount with bolts, lockwashers, and flatwashers **[1102, 1103, 1104]**. Torque bolts to the value shown in *Table 7, page 19*.
 - g. Remove the shaft blocking. Raise the extension shaft **[400]** into the drive shaft **[249]** chuck until the shaft bottoms out. Orient the shaft to allow the chuck setscrews **[250]** (two at 90°) to engage the "flats" on the extension shaft. Tighten chuck setscrews **[250]** with a 3/16" hex key wrench.

V-RING SEAL MAINTENANCE

7. For units with 1-1/2" diameter shafting and flanged drive shaft coupling:
 - a. Block extension shaft in place, and remove coupling bolts and lockwashers [302, 303].
 - b. Lift the mixer drive unit away from the pedestal [1101].
 - c. Loosen the coupling setscrews [308]. Remove shaft bolt, lockwasher, and flatwasher [304, 305, 306] from the extension shaft. Remove the coupling half [301-02] and key [307-02].
 - d. Clean all exposed shaft and seal plate [1802] surfaces and inspect for damage. Repair or replace shaft as required.
 - e. Slide new v-ring [1801] down the shaft.
 - f. Loosen the shaft blocking and raise the extension shaft such that is approximately 5" above the pedestal top surface. Re-block in place.
 - g. Clean the extension shaft [400] turndown diameter and the removable shaft coupling [301-02] bore. Make sure both 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 19*. Engage the two coupling setscrews [308] onto the shaft key [307-02].
 - h. Lift and suspend the mixer drive unit over the pedestal [1101] and removable coupling half [301-02] close enough 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 [251] coupling faces together. Lift the mixer drive unit enough to remove the shaft blocking and gently lower the drive onto the pedestal. Attach the drive to the pedestal with bolts, lockwashers, and flatwashers [1102, 1103, 1104]. Torque bolts to the value shown in *Table 7*.
 - i. Slide the v-ring [1801] down the shaft to contact the seal plate [1802].

50DTA, 50DTL MIXER PART NUMBERS

Part #	Description	Qty.
100	Motor	1
200	Housing Assembly	
201-05	Housing, Model 50DTA, 50DTL	1
220-01	Motor Adapter, 56C/140TC	1
220-02	Motor Adapter, 180TC	1
221	O-Ring	1
222	Retaining Ring	1
223	Output Gear	1
224	Key	1
225	Shaft Seal	1
226	Ball Bearing	1
227	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	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	2
242-02	Setscrew, 180TC	2
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

50DTA, 50DTL MIXER PART NUMBERS

Part #	Description	Qty.
245-01	Lip Seal, 5:1	1
245-02	Lip 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
249	Chuck Drive Shaft	1
250	Setscrew	2
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	4
1108	Bolt	4
1109	Spring Lockwasher	4
1110	Wing Nut	4

50DTA, 50DTL MIXER PART NUMBERS

Part #	Description	Qty.
1251	Mounting Flange	1
1252	O-Ring	1
1300	Stuffing Box Assembly	
1301	Threaded Stud	2
1302	Hex Adjusting Nut	2
1303	Spring Lockwasher	2
1304	Flatwasher	2
1305	Gland Clamp	2
1306	Split Packing Gland Half	2
1307	Packing Housing	1
1308	Packing Ring	4
1309	Hex Bolt	4
1310	Spring Lockwasher	4
1311	Flatwasher	4
1800	V-Ring Assembly	
1801	V-Ring	1
1802	Seal Plate	1
1803	Socket Bolt	4
1804	Hi-Collar Lockwasher	4