Gear Pump Service & Assembly

Pump Assembly Procedure

1. Insert bearings into pump body and cover. Refer to instructions on page 2.
2. For helical gear pump front covers only: If plug is not fitted into cover, do so as specified on page 3 (refer to Table 2 and Figure 4).
3. Insert first wearplate into pump body, as described in page 4.
4. Fit drive gear first, ensuring correct orientation. Lightly lubricate gear flanks, faces and journals prior to assembly.
5. Fit driven gear into position, ensuring that both gears, once assembled, are level to each other. If not, remove both gears and check that the wearplate is seated correctly. Refit gears if necessary.
6. Fit second wearplate over gears as described in page 3.
7. Position interface seal into groove of pump body, ensuring that it is seated fully in the groove before fitting front cover.
8. Position the front cover and loosely fit the main fasteners.
9. Torque the main fasteners. For torque values refer to your master checksheet for the appropriate coverage.
10. For "A"/"C" design seal configurations, fit inner seal as specified in page 5.
11. Fit location ring (see Figure 12) into mounting flange as specified in page 6.
12. Apply continuous bead (1/1.5 mm dia.) of sealant (Loctite 573 or commercial equivalent) to mating surface of front cover approximately 10 mm from location ring (as shown in Figure 12).
13. Attach mounting flange and loosely fit flange fasteners.
14. Torque flange fasteners. For torque values refer to your master checksheet for the appropriate document.
15. For "C" design seal configuration only, insert outer seal, as specified on page 5.
17. For multiple pumps assemble separate pumps first as specified above. In addition:
18. Fit location rings as specified on page 6.
19. Fit spline coupling.
20. Position interface seal into groove of pump body per point 7.

General Bearing Insertion Notes

1. Ensure that bearing bores have had a chamfer machined prior to insertion of the bearings.
2. Ensure that the interface surfaces of the pump are not damaged during bearing installation. With dual bodies and intermediate covers, ensure that a suitable material is placed under the part to protect the lower face.
3. Ensure that the PTFE surface on the inside diameter of the bearing is undamaged before and after insertion. Any damaged bearings must be removed and replaced.
4. Any burrs or swarf produced during bearing insertion must be removed prior to assembly.

Bearing Insertion Procedure

1. Lightly oil bearing outside diameter with mineral oil prior to insertion. Ensure orientation of lubrication slots on bearings is correct. Orientation, which varies according to pump shaft input rotation, is shown in Figures 2, 3 and 4.
2. After bearing insertion, bearings must be below the wearplate face of the body or cover to dimension "E" as shown in Table 1 and Figure 1.

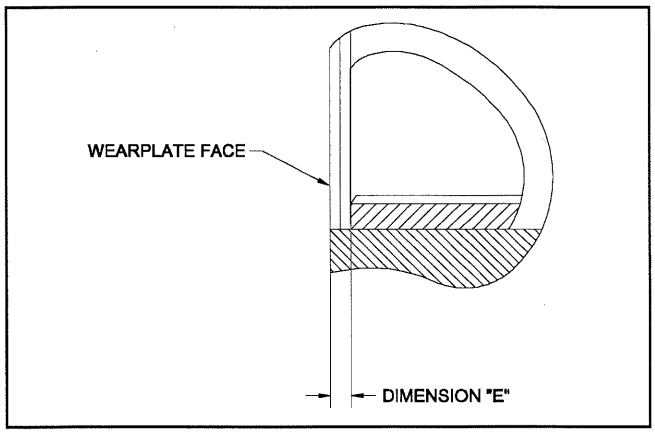

Figure 1: Bearing Insertion Depth

	Dim. E (Bearing Depth) In mm
R4	0.50/0.75
S4	0.50/0.75
R5	1.50/1.75
S5	1.50/1.75
R6	1.50/1.75
S6	1.50/1.75

Table 1: Bearing Insertion Depth

Plugging Internal Lubrication Drilling (Helical Gear Pumps Only)

1. Determine orientation of pump before fitting dryseal plug.
2. Fit dryseal plug to high pressure side of pump as shown in Figure 5.

Fitting Avseal Plug to Lubrication Drilling

Insert the plug into front cover, while taking note of the following:

1. Ensure that the hole to be plugged has a spotface larger than the nose of the mandrel.
2. Do not degrease or lubricate the plug, but do fully degrease the hole.
3. The fitted plug must be below the level of the spotface by the amount shown in Table 2 and as shown in Figures 3 and 5.

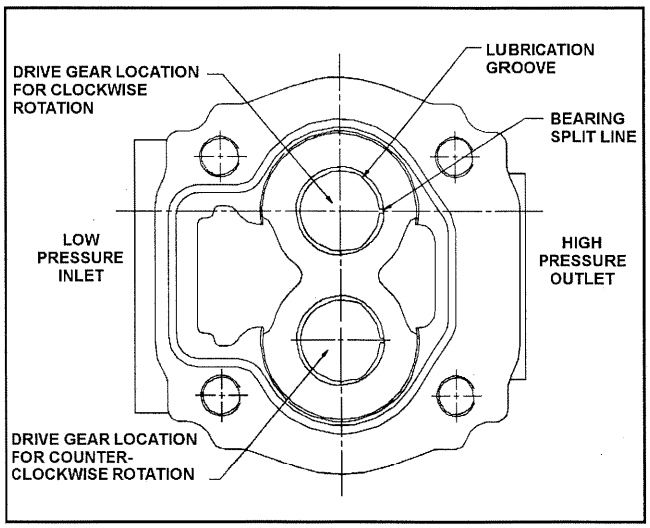

Figure 2: Bearing Orientation in Pump Body For Clockwise & Counter-Clockwise Rotation

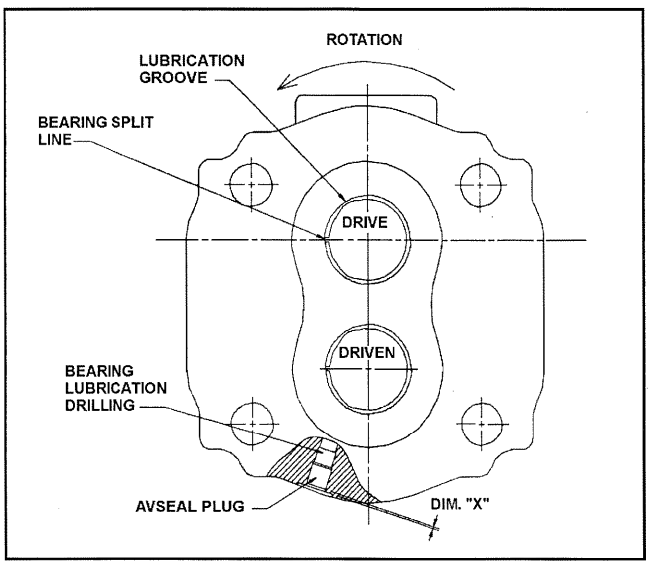

Figure 3: Bearing Orientation in Cover For Clockwise Rotation Viewed on Figure "8" Spigot

Plug Dia.	Distance from Spotface to top of Plug (Dim. "X")
4 mm	0.762-1.27 mm
5 mm	0.762-1.27 mm
6 mm	1.016-1.524 mm
6.5 mm	1.016-1.524 mm
7 mm	1.016-1.524 mm
8 mm	1.27-1.778 mm
9 mm	1.27-1.778 mm
10 mm	1.27-1.778 mm

Table 2: Plug Dimensions

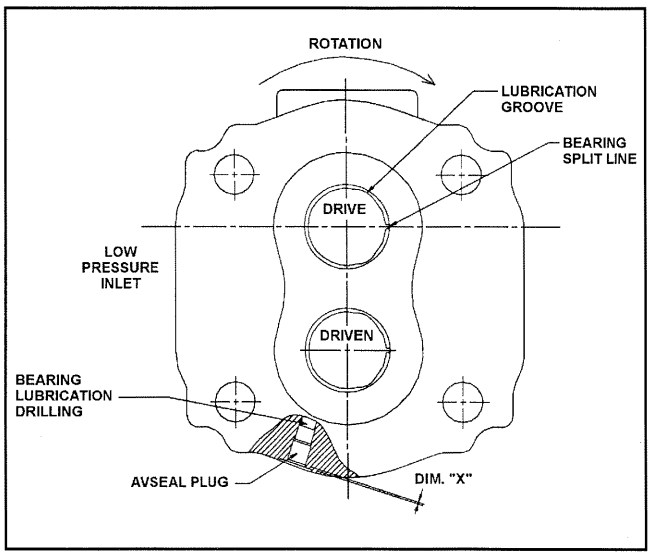

Figure 4: Bearing Orientation in Cover For Counter-Clockwise Rotation Viewed on Figure "8" Spigot

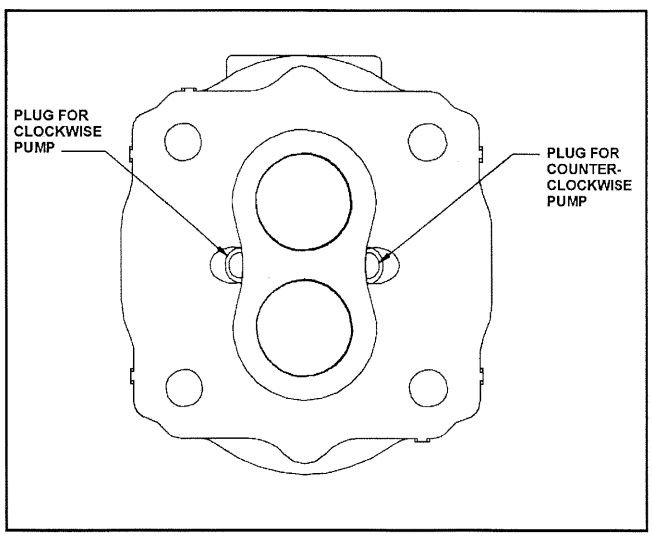

Figure 5: Helical Gear Only Front Cover With Dryseal Plugs. NOTE: Do Not Fit Plugs on Both Sides. No Plug Drillings on Spur Pumps.

Backup Seals

There are two current types of backup seal, namely Moulded Backup with seal and Moulded Backup with cord seal. Refer to Figures 6 and 7.

Fitting Moulded Backup with Seal

1. Apply grease to the three positions shown on Figure 6 before inserting the seals in position.
2. Fit the moulded rubber seal into the wearplate groove with the flat face at the bottom of the seal groove as shown in Figure 6.
3. Fit the nylon backup seal into the recess in the top of the rubber seal, with the radiused edges and "legs" of the backup face downwards.

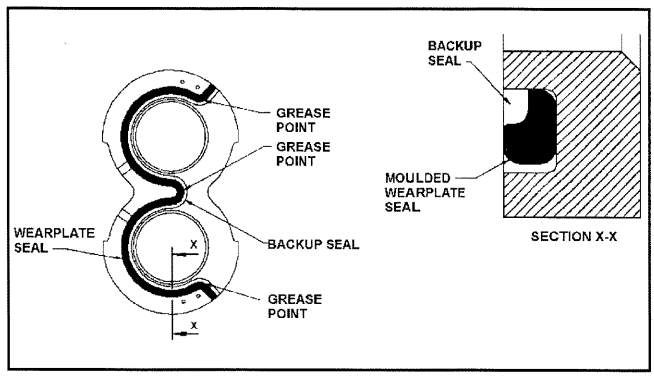

Figure 6: Moulded Backup with Seal Type Wearplate

Fitting Moulded Backup with Rubber Cord Seal

Fit rubber cord seal into the wearplate groove and locate the plastic backup over the rubber seal as shown in Figure 7. Ensure that the rubber seal is positioned centrally within the groove.

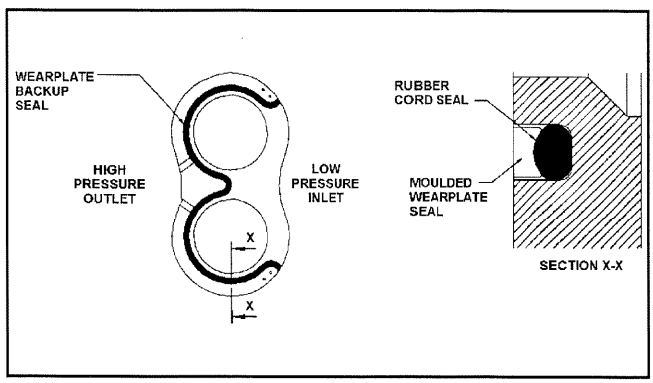

Figure 3: Moulded Backup with Rubber Cord Seal Type Wearplate

Assembly of Wearplates in Pumps

1. There are two types of wearplates: Type F and Type G. Examples of these types are shown in Figure 8. The main differences between the two types lie in the handling of the pressure relief slot.

   It is critical to note the following when assembling wearplates into pumps:

2. The rotation of the pump, i.e. clockwise or counter-clockwise.
3. The wearplate must be assembled so that the seal and backup are adjacent to the wearplate face and body.
4. The high pressure side of the wearplate must be adjacent to the outlet port.

   NOTE: WHEN ASSEMBLING WEARPLATE INTO THE PUMP, ENSURE SEAL AND BACKUP REMAIN IN POSITION AT ALL TIMES UNTIL FULLY SEATED IN POSITION. IF SEAL AND BACKUP COME OUT OF SEAL GROOVE, WEARPLATE MUST BE REMOVED AND REASSEMBLED.

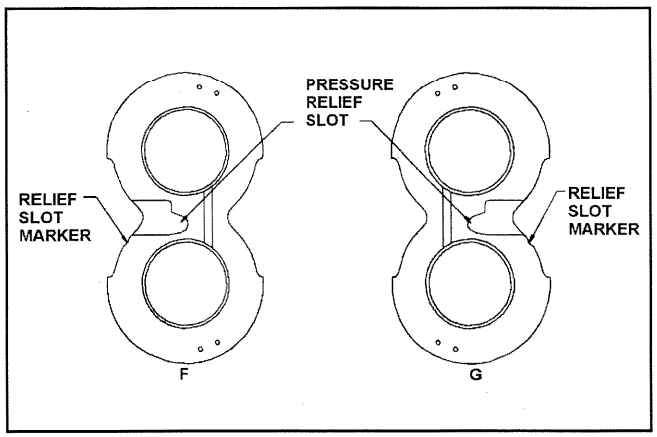

Figure 8: Type F & G Wearplates

5. To assemble a clockwise rotation pump, the type F wearplate must be installed into the body first (refer to Figure 9). The backup seal must be installed face down. Make sure the high pressure side of the wearplate is adjacent to the outlet port, with the relief slot positioned as shown.
6. When the gears have been installed, fit the second wearplate, type G. The second wearplate must be installed so that the backup seal is face up with the high pressure side adjacent to the outlet port and with the relief slot in line with the first wearplate. When assembled with gears in position the relief slot marker on both wearplates should be in line with each other.

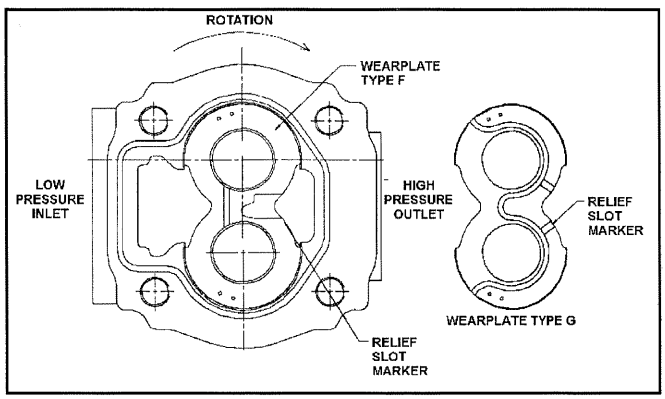

Figure 9: Wearplate Assembly: Clockwise Orientation

7. Assembly of a counter-clockwise rotation pump is shown in Figure 10. For counter-clockwise rotation, wearplate type G must be installed into position first. The backup seal must be installed face down. Make sure the high pressure side of the wearplate is adjacent to the outlet port, with the relief slot positioned as shown.
8. When the gears have been installed, fit the second wearplate, type F. The second wearplate must be installed so that the backup seal is face up with the high pressure side adjacent to the outlet port and with the relief slot in line with the first wearplate. When assembled with gears in position the relief slot marker on both wearplates should be in line with each other.

   NOTE: FOR BOTH CLOCKWISE AND COUNTER-CLOCKWISE PUMPS, THE WEARPLATE MUST BE ASSEMBLED SO THAT THE BACKUP SEAL IS NOT ON THE GEAR SIDE.

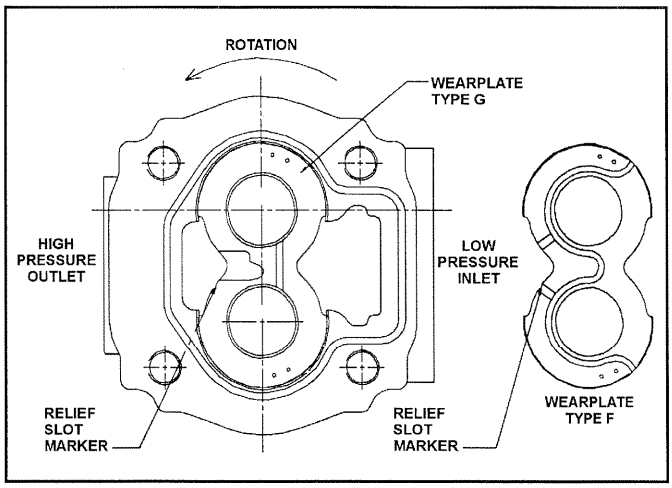

Figure 10: Wearplate Assembly - Counter-Clockwise Rotation

Bolt Torque Procedures and Values

Torque bolts in the order shown in Figure 11 in two stages:

1. To 50% of full torque value
2. To full torque value.

Refer to service manual for torque values.

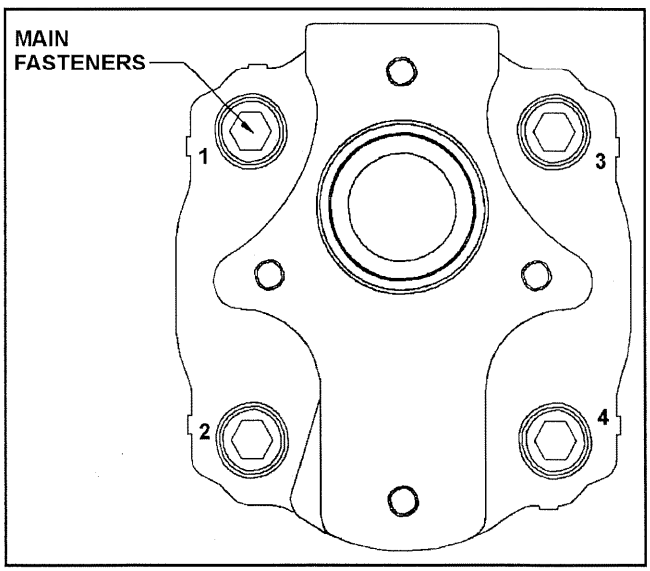

Figure 11: Bolt Tightening Order

Shaft Seal Lubrication

There are two types of seal designs. The "A" design has only one inner lip seal. The "C" design features a two-seal configuration with one inner lip seal and an external seal. The "C" design also includes a telltale drilling to allow faster and easier detection of seal leakage.

See Figure 12 for an illustration of seal types.To lubricate:

1. Apply a thin smear of "ALVANIA" grease plus Molybdenum Disulfide (MoS_2) to the seals to prevent burning during the bedding-in period.
2. Assemble as follows:
   "A" Design - Apply grease only to the outer lip of the seal
   "C" Design - Apply grease to the outer seal lip and to the outer lip on the inner seal.

   NOTE: IT IS ESSENTIAL THAT ONLY A LIGHT, THIN COATING OF GREASE BE APPLIED SO THAT ANY LEAK CAN BE DETECTED.

   NOTE: PLASTIC PLUG TO BE INSERTED FOR BOTH "A" AND "C" TYPE SEAL DESIGNS.

Shaft Seal Insertion Procedure

1. Fit inner and outer seals.
2. Place protective plastic seal over gear spline or keyway.
3. Press seal(s) into bore(s) to dimensions "B" and "C" as shown in Table 3 and Figure 12.

NOTE: IT IS IMPORTANT THAT SEALS ARE NOT PRESSED HARD AGAINST ABUTMENTS AS THIS WILL ADVERSELY AFFECT THEIR PERFORMANCE.

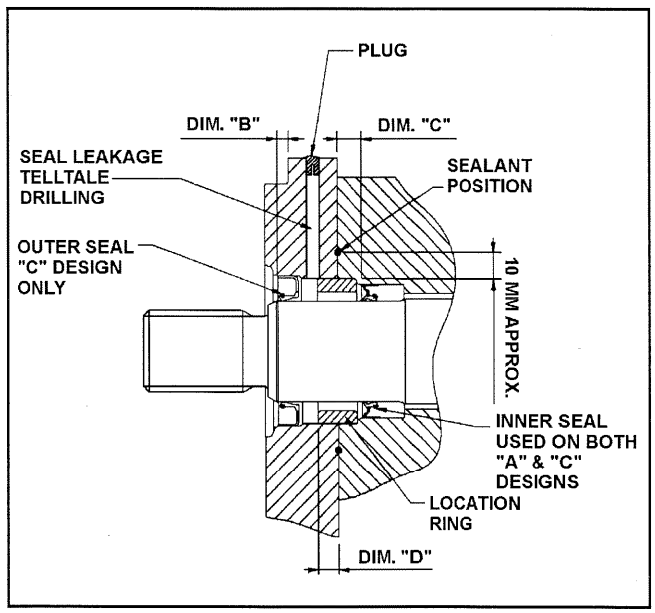

Figure 12: Shaft Seal & Location Ring

Location Ring Insertion Procedure

The location ring is to be inserted to the mounting flange according to dimension “D” as specified in Table 3 and Figure 12.

	Dimension B ("C" Design Only) In mm	Dimension C ("A" & "C" Design) In mm	Dimension D (Location Ring) In mm
R4	3.5	8.5	6.5
S4	3.5	8.5	6.5
R5	4	8.5	6.5
S5	4	8.5	6.5
R6	4	10.5	8.5
S6	4	10.5	8.5

Table 3: Insertion Dimensions