

# Instruction Bulletin

## Series 300, 700, and FLOMAX 40 PUMPS

**MOUNTING THE PUMP** - Close-coupled pumps are assembled into a rigid unit and should be bolted down securely. The close-coupled pump can be mounted in any position. However, when mounted in other than horizontal position, the pump motor must be located above the pump so that liquid leakage will not damage the motor.

Pedestal or foot mounted pumps with grease lubricated bearings can be mounted in any position. The bearing housing must be above the pump in any non-horizontal application to prevent bearing damage due to liquid leakage. The pedestal or foot mounted pumps, when provided with driver and a coupling, are mounted on a steel base plate which accommodates both pump and driver. **Although the components have been aligned accurately at the factory, the alignment must be re-checked after the unit has been set in place at the job site.**

**PIPING** - Do not allow the pump to carry the weight of piping. Both suction and discharge piping should be supported independently at a point near the pump. Piping must be installed carefully so that it will not be necessary to force it into place when connecting to the pump. Use slip joints or flexible connectors where long discharge lines are being used or lines that are subject to wide temperature ranges. Flexible connectors also help to prevent transmission of noise and vibrations.

**SUCTION PIPING** - Place pump as close to the liquid source as possible. The suction line should be short, and large, with as few fittings as possible and with smooth long radius elbows, where space permits, to keep friction loss at a minimum. When necessary, a good strainer or foot valve for priming should be used. A valve is usually included in the suction line to facilitate servicing the pump. Suction piping must be absolutely free of leaks.

Also a careful check must be made to be sure that the pump's required net positive suction head (NPSH<sub>R</sub>) is available. When the suction line draws liquid from an open sump, its lower end should be submerged sufficiently so that air is not drawn into the line by vortex action.

If a reducer is used between piping and pump, reducer should be eccentric type with the flat side on top to prevent air from being trapped in the suction line. Piping should always slope up to the pump with no high spots to trap air.

**DISCHARGE PIPING** - To minimize friction losses, care should be taken in sizing, layout, number of fittings, etc. of discharge pipeline. A gate valve should be installed in discharge line to control pump flow and to allow servicing of pump without having to drain the discharge line and any connected vessels. The discharge valve should be open during self-priming start-up for the FLOMAX 40.

### START UP:

Centrifugal pumps must be primed before they will start pumping. Fill the suction line and pump and enough of the discharge line to establish a liquid level one or two feet above the top of the pump case. Turn the pump shaft by hand so that air trapped within the impeller can escape.

The FLOMAX 40 is a self-priming pump. The pump case must be filled with water for initial start-up. The suction line of this pump does not have to be filled as the pump will evacuate the air from the line when it performs its self-priming function.

Make sure that the gate valve between the suction of the pump and the source of supply is open.



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**IMPORTANT:**

***Check for correct direction of rotation of prime-mover. Check rotation of three phase motors by turning on power only for an instant so that pump turns just a few revolutions (prolonged operation of pump in wrong direction may damage it). If direction is wrong, reverse rotation by interchanging any two of the three wires, either at the motor or electric starter, in a three phase electrical system.***

Close gate valve in discharge line and start pump. Open valve gradually to half-open position after driver attains full speed. If pump fails to function after a few seconds of operation, stop it, add more priming liquid if needed, and let air escape completely. Restart the pump.

FLOMAX 40, as a self-priming pump, requires that the discharge valve be in the fully open position on start-up to permit the air in the suction line to be expelled into the discharge line. Failure to open the discharge line will prohibit the pump from priming itself. Self-priming requires a minute or more for the pump to evacuate the air from the suction before pumping begins.

Do not permit the pump to run for more than a few seconds unless it remains full of liquid and is discharging properly. Prolonged operation of an unprimed pump can cause severe damage to rotating parts.

If the pump must be shut down after initial start up while exposed to below freezing weather, protect it and connected piping from damage by draining the system completely or by introducing a corrosion inhibiting antifreeze to the system.

**SERVICE AND MAINTENANCE INSTRUCTIONS**

When seal maintenance is required, they can be serviced by leaving the housing in the piping. All pumps have back pull out design. Jackscrews are provided to assist in removing the housing and seal cover.

**NOTE:**

***A lifting eye is provided to lift the pump only. This should not be used to lift the electric motor, base, and pump assembly.***

The following instructions assume the entire pump has been removed from the piping and is on a bench to be serviced. The instructions for back pullout are the same with the exception that the two bolts holding the bearing assembly to the rear support bracket should be removed allowing the bearing adaptor, impeller, and shaft assembly to be removed in the back pullout mode. **Refer to proper parts list.**

There are two possible causes for leaks along the pump shaft:

1. The impeller sealing gaskets could be worn or defective causing leakage through the sleeve. (See Figure 1). When the pump is operating this leakage can be detected by visual inspection of the juncture between sleeve and the shoulder on the pump shaft.
2. A worn or defective seal. In most cases, a seal leak will be a much higher capacity leak than that of a leak underneath the sleeve. In addition, it will be evident that leakage is coming out along the shaft from underneath the seal.

As the pump is disassembled, carefully check the parts to determine if the leakage was through the impeller sealing gaskets rather than the seal. The removal procedure outlined below may result in the destruction of the seal and should not be used unless it is definitely established that the seal is leaking.

**STANDARD AND SEVERE SERVICE SEAL CHANGE PROCEDURE:****Remove the pump housing as follows:**

1. Remove the housing capscrews.
2. Using the outer set of jackscrews start the removal of the housing. If the screws are missing use two of the capscrews removed from the housing. The jackscrews are not long enough to completely disengage the housing from the adaptor.

**Remove the impeller as follows:**

1. Hold impeller with a small pry bar or piece of hard wood in the discharge of the impeller.
2. Remove seal bolt with 3/4" socket. Also remove stainless steel and Teflon sealing washers and O-ring.
3. Slide the impeller off the shaft. It may be necessary use two small pry bars or large screwdrivers behind the impeller to break it loose.

The seal head will frequently set up on the sleeve so that it cannot be easily removed by hand. If this occurs, it will be necessary to use the seal cover to assist in removing the seal head from the sleeve as follows:

1. Remove the two capscrews holding the seal cover in place.
2. Use the two jackscrews to start removal of the seal cover.
3. When the jackscrews have been moved to the limit the seal cover can be removed by hand. This will remove the seal from the pump. In the event the seal is firmly attached to the sleeve, the shaft sleeve may also be removed with this procedure.

4. After removal from the pump the seal should be carefully examined. In the majority of cases the seal must be discarded since the removal in this way usually damaged the seal faces or the rubber parts.

If the sleeve did not come out with the seal head when it was pushed out with the adaptor, then it should be removed, examined, and cleaned up. It is removed as follows:

1. Take out the square key and slide the sleeve off of the shaft. Remove the shaft slinger.

At assembly the shaft was coated with an anti-seizing compound to facilitate removal of the sleeve. If the sleeve does not come off easily it may be necessary to use a sharp chisel at the joint between the sleeve and shaft to break it loose. When the sleeve is loose it should slide off the shaft easily. After the sleeve has been removed, the pump and the sleeve should be thoroughly cleaned to remove all foreign matter. Burrs or rough spots should be smoothed out with a file or crocus cloth. The face at the impeller end of the sleeve must be carefully inspected to be sure it is free of any burrs or gouges because this face is part of the sealing system that requires this surface be smooth.

Remove the old seal from the seal cover. Clean up the seal cover and install a new seat. Lubricate the outside of the seal seat with a water soluble lubricant and press this into the seal cover taking care not to damage the smooth lapped sealing face of the seal seat. Remove any excess lubricant from the face of the seal seat. Be careful not to scratch the seal face. Replace the shaft slinger.

Before installing the seal cover lightly coat the pump shaft with an anti-seize compound. This should be applied up to within a 1/2" of the shoulder next to the impeller. This aids the removal of the sleeve the next time the pump has to be serviced. If the anti-seize compound is placed all the way to the shoulder then an excess buildup may occur and be transferred to the face of the seal seat when installing the sleeve.

Install the seal adaptor in the body assembly.

**CAUTION:**

**Do not bump the seal seat on the shaft or you may damage it. Secure the seal cover in place with the two capscrews that were removed earlier.**

Install the seal head on the stainless steel sleeve as follows:

1. Place the cardboard disc that comes with the seal on a clean flat surface. Then place the seal head on it with the face down.

**CAUTION:**

**The mechanical seal and seal cavity must be clean and free of grit, filings, or any other foreign material that would damage the seal face.**

2. Wipe a **small** amount of water-soluble lubricant around the inside of the seal bellows. Take the stainless steel sleeve and apply a **thin** film of lubricant around the entire outside area of the sleeve.
3. Insert the sleeve into the seal head assembly taking care to start the sleeve straight in. Once started slide the seal head about half way back on the sleeve. Clean off any excess lubricant on the seal face and on the stainless steel sleeve on the seal face side but not behind it.

Install the sleeve and seal head assembly in the pump by pushing it over the shaft. Do not get any lubricant or anti-seizing compound between the seal faces. Line up the keyways on the shaft and sleeve.

Install the square key in the keyway and push it back until it stops.

Make up the front seal washer assembly as follows:

1. Take a new sealbolt and make sure the O-ring is in the groove of the bolt head and not crushed or twisted. Take the stainless steel washer and put it over the bolt. Then take a new Teflon washer and put it over the bolt and against the stainless steel washer. Apply a few drops of Loctite 271 or 601 to the sealbolt and threaded hole in the pump shaft.

Put the seal spring over the shaft and onto the seal.

Slide the impeller over the shaft and hold it in place by hand. Then thread the front sealbolt assembly into the shaft. Hold the impeller and tighten the sealbolt to a torque of 15 foot pounds.

Put the pump housing gasket over the seal adaptor and replace the housing using the eight capscrews and lockwashers that were previously removed.

Install the drain plugs in the housing if they were removed. Install the jackscrews in the threaded holes in the body. They should be tightened just enough to keep them from falling out.

**ADJUSTING IMPELLER END CLEARANCE -**

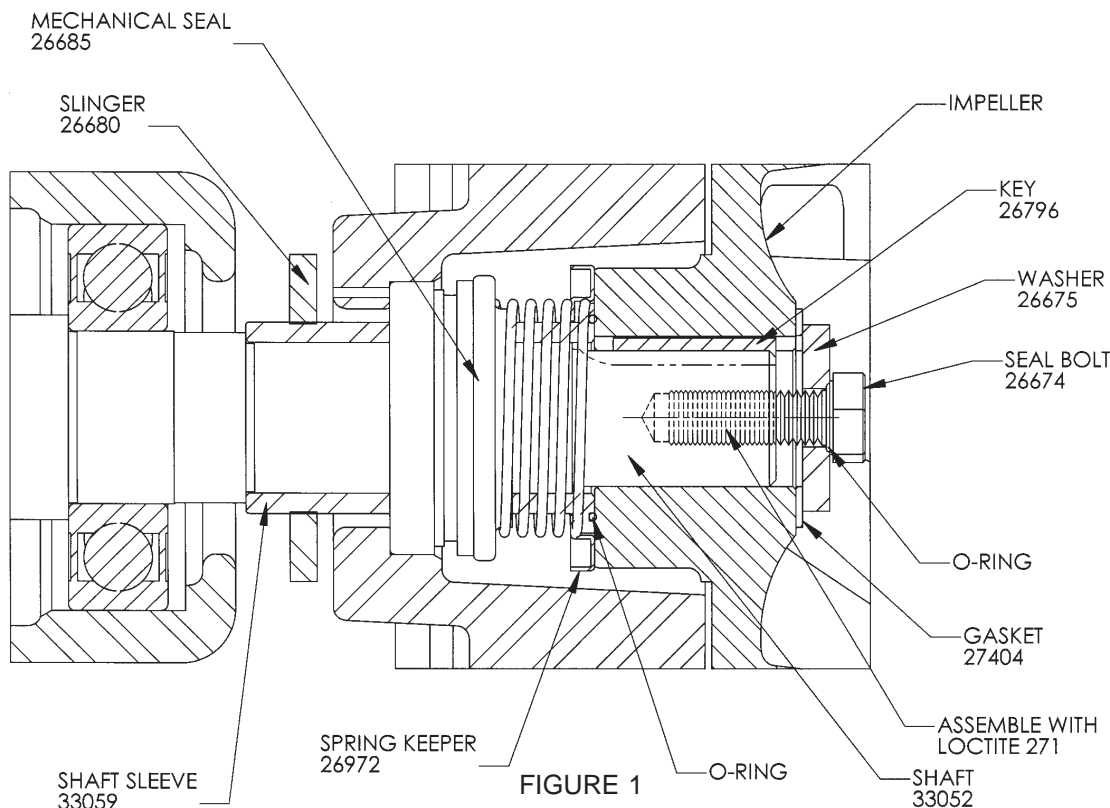
For pedestal mounted pumps: Loosen the shaft sleeve clamp and use a tool to push the impeller back, from the inlet of the pump, far enough to insert a piece of .020-.025" shim stock between the end of the impeller and the wear plate. Release the impeller and tighten the three hex head capscrews on the drive end of the pedestal assembly. The three dog point set screws can then be tightened and locked in place with the three hex nuts. Remove the shim stock from between the impeller and wear plate.

**LUBRICATION** - The liquid being pumped lubricates the shaft seal. No additional lubrication is required.

Rotating equipment such as electric motors or engines used to drive the pump should be lubricated in accordance with the manufacturer's instructions.

Pumps with grease lubricated bearings do not require lubrication as the bearings have been pre-lubricated at the factory.

**WEAR RING** - Series 700 pumps are provided with a wear ring in the housing. The Series 300 and FLOMAX 40 do not use wear rings. The wear ring is a press fit in the housing. If it is worn to the point of replacement it must be cut with a chisel and deformed to be removed. A new wear ring must be pressed into place using an arbor press and a cylindrical tool or heavy flat plate of the approximate OD of the wear ring. The important thing to remember when installing the wear ring is to press it in squarely. Then it will go in easily. If it is misaligned slightly, it will be very difficult to press into place.



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