



# OBERDORFER PUMPS

A GARDNER DENVER PRODUCT

## Inspections for Possible Problems with Gear Pumps

Close inspection of gear pumps removed from service will show if those pumps can be repaired. It is imperative that all disassembled parts be handled with extreme care. When necessary, clean each part individually in kerosene or other solvent which will depend upon the liquid being pumped.

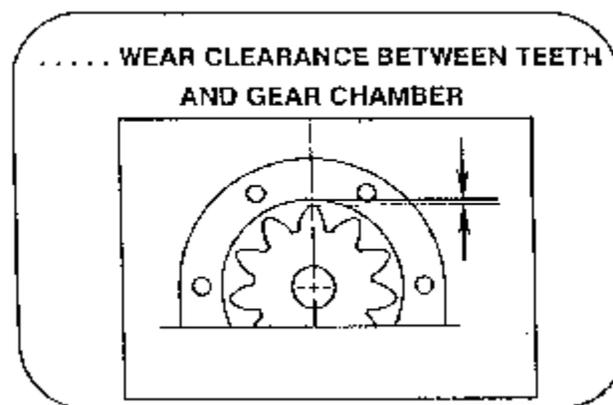
Start inspection by removing the screws holding the cover to the body. A pump which has been in service for some time usually refuses to release its cover by finger pressure alone. The cover will lift off its flange if the exposed end of the drive shaft is tapped lightly with a mallet or on a wooden bench.

Once the cover is off and while the gears are still in the pump body, observe:

- [Wear Clearance Between Gear Teeth and Gear Chamber](#)
- [Bearing Wear](#)
- [Gear Wear](#)
- [Sheared Pin](#)
- [Bulged Cover](#)
- [Chemical Deterioration](#)
- [Scoured Shafts](#)

### Wear Clearance Between Gear Teeth and Gear Chamber:

A new pump would barely permit a sheet of wrapping paper to be inserted (.005 - .007 inches). Greater clearance is a result of wear or scrubbing of the teeth on the chamber wall. This means metal has been scrubbed off both the gear tips and the wall. When pumping, hydraulic and mechanical forces tend to separate the gears and force the gear tips against the walls. For the gears to shift to this wear position, the shaft bearings, normally holding gears in alignment, must also be worn. Check bearing wear.





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## Bearing Wear:

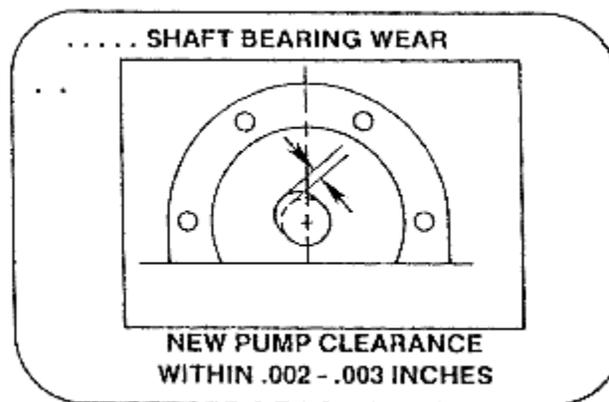
Check all bearings for wear. Since the idle shaft bearings are subjected to greater loads, they normally show greater wear. Severely worn bearings assume an egg shape. Some idea of bearing wear is obtained by removing the drive gear and shaft from the pump and re-inserting the exposed end of the shaft in each bearing as a plug gauge. (This is possible if the exposed shaft has not been damaged.) When a pump is new, clearance between the shaft and bearing is within .002 - .003 inches. This is the thickness of an average human hair. More clearance than this introduces the wear conditions described in the paragraph above. Severe wear between gear teeth and gear chamber, and bearing wear causes a pump to lose its ability to generate pressures and lift. Extreme noise and high power consumption are also symptoms. For gear tip wear, as described above, of .010 - .015 inches the pump would only have 30 - 40% of its pumping ability.

**\* THIS PUMP SHOULD BE REPLACED, IT IS BEYOND REPAIR.**

### Note Severe Wear Symptoms:

- Extreme Noise
- High Power Consumption
- Loss of Pressure
- Loss of Lift

It is time to replace the pump!



## Gear Wear:

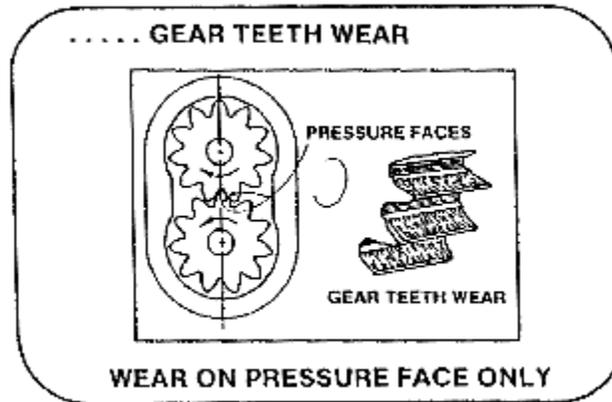


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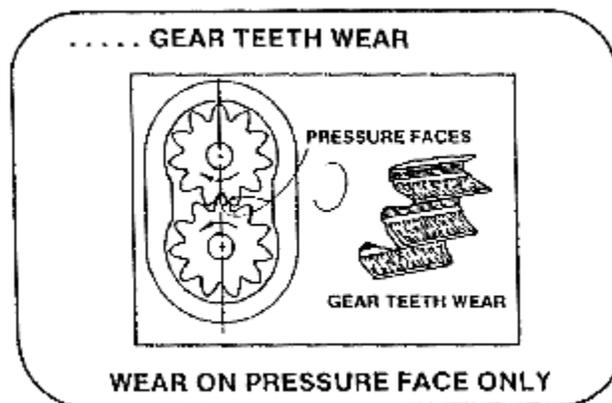
Gear teeth wear occurs on the pressure face of each tooth only. The extent of wear can be approximated by visualizing the tooth profile on the back face transposed to the pressure face. Wear can cause noise, loss of pumping, priming, or lift ability.

**THIS PUMP SHOULD BE REPLACED – IT IS BEYOND REPAIR.**



A second form of gear wear is on the gear side faces (thickness). It is extremely critical to pump performance (lift and pressure ability). Wear is observed by noting the level of the gear face below the flange surface. For a new pump, the gear face is even with or slightly above (.001 inches) the body flange. If the gear face falls below the flange by as little as the thickness of a sheet of wrapping paper (.005 - .007 inches) the pump will have only about 30-40% of its original ability to generate pressure and lift.

**THIS PUMP SHOULD BE REPLACED – IT IS BEYOND REPAIR.**



Shared Pin:

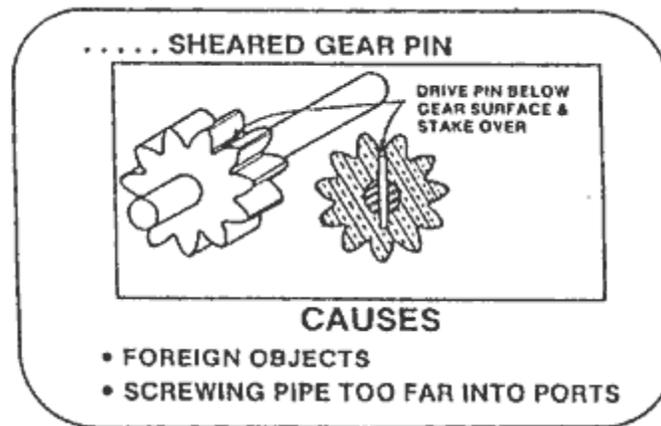


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On all gear pumps, the drive gear is pinned to the shaft. The shaft of a pump with a sheared pin can be rotated but will have absolutely no pumping ability, since the gears are not turning. If the pin is sheared due to a foreign object entering the pump and jamming the gears, or by screwing the pipes too far into the ports to jam the gears, repair can be made by redrilling and driving a rod into the hole(s). Use size and number of pins as evident on damaged parts. Since bronze is a soft metal, care must be exercised when placing parts in a vice – lead or wooden vice jaw protectors should be used.

Be sure to stake over the hole to prevent the pins from working out when in operation. Check the gears for ability to mesh with each other and remove burrs or other damage with a fine file as necessary.



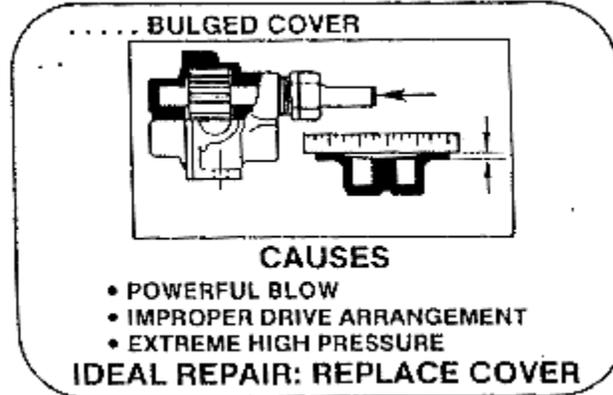
## **Bulged Cover:**

A powerful blow or force on the exposed pump shaft can cause the bulged pump cover. Another cause for a bulged cover is an improper drive arrangement where excessive shaft thrust is exerted by the drive mechanism. This would also show wear on the cover and gear face. Extremely high pressure due to accidentally shutting off the pump discharge line, and where no pressure relief equipment existed, could also cause a bulged cover. Place a straight edge across the cover face and check for bowing. The clearance caused by a bulged cover permits by-pass and slippage. If the clearance is appreciable, the pump has little ability to lift and generate pressures. Emergency repair can be made by grinding or sanding the cover flat. Ideal repair is to replace the cover. When this type of damage is evident, inspect the drive gear for gear teeth damage and for a sheared pin described above.



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## Chemical Deterioration:

A pump exposed to a chemical not compatible with bronze and stainless steel will deteriorate rapidly to the points and symptoms described for extreme wear. The metal will have a spongy or "eaten" and etched appearance and is usually accompanied by strong, irritating odors emanating from the pump. Little can be salvaged. Caution: After handling a pump exposed to chemicals, scrub hands thoroughly to prevent bodily harm.

THIS PUMP SHOULD BE REPLACED PROVIDING ITS LENGTH OF SERVICE LIFE HAS BEEN SATISFACTORY TO THE USER.

## Scoured Shafts:

A pump subjected to abrasives will show severe scour marks throughout, especially on shaft bearing surfaces. The abrasive nature of a liquid can be determined by rubbing residue or traces of liquid left in pump lightly between one's fingers. Severely scoured pumps will be worn. Wear will be accelerated and evident in the short life of the pump before loss of pumping ability. This pump should not be replaced unless abrasives can be removed from liquid.

Excessive tightening of the stuffing box will cause another form of shaft scouring. This will cause the stuffing box area to overheat and sometimes can be detected by discoloration – gray, smoky color. This can be repaired by replacing the drive gear and shaft assembly and repacking the stuffing box.

It is important to note that when a gear pump is reassembled, a gasket sealer (shellac or equal) should be used to insure a seal. Also, re-use the same gasket or one of equal thickness. Too thin a gasket will cause the cover to bind against the gears. It then becomes difficult to turn the pump shaft. Too thick a gasket allows slippage and by-pass within the pump keeping it from generating pressure and creating lift.



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