

WP0086

Dodge® Sleeveoil hydrodynamic mounted bearings: failure modes and remedies

Dodge Customer/Order Engineering

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Dodge Sleeveoil Pillow Blocks are heavy-duty hydrodynamic bearings primarily used in industrial applications. Hydrodynamic bearings support a load by a thin film of oil, and oil rings supply the bearing journal with the proper amount of oil for full hydrodynamic film development. In some cases, circulating oil systems may be used to improve bearing performance by cleaning and cooling the oil. Naturally, oil leaks may occur if proper installation and maintenance procedures are not followed.

Overfilling in Oil Ring Applications

Sleevoil Pillow Blocks have a recommended oil capacity, and the proper oil level must be maintained to ensure that the oil rings function properly. Exceeding the recommended amount of oil can cause oil to leak out of the shaft seals. The proper oil capacity for each bearing will depend on the bearing shaft size and bearing type (RXT, R-series, or RTL-Spherical). Also, all Sleeveoil Pillow Blocks include an oil gauge, and the correct oil level is between the center and top of the gauge. Please check the proper bearing instruction manual for the correct oil capacity.



Figure 1: RTL oil ring configuration (liner removed)

Overfilling in Circulating Oil Applications

To allow for bearing self-alignment, Sleeveoil Pillow Block shaft seals do not contact the housing. The clearances around the seals vent the bearings to the atmosphere. This means that positive pressure is not created inside the housing when using circulating oil systems, and gravity is the only force that returns the oil back to the circulating oil system reservoir. Certain procedures need to be followed to ensure proper drainage back to the system reservoir.

- 1) Use the largest oil return line that the bearing will physically accept.
- 2) Use the specified circulating oil drain on the housing (not the housing clean-out drain).
- 3) Vent the return line where trapped air can restrict return oil flow.
- 4) The return line must have a 15° downward slope (back to tank).
- 5) Return lines should be free from obstructions and blockages.

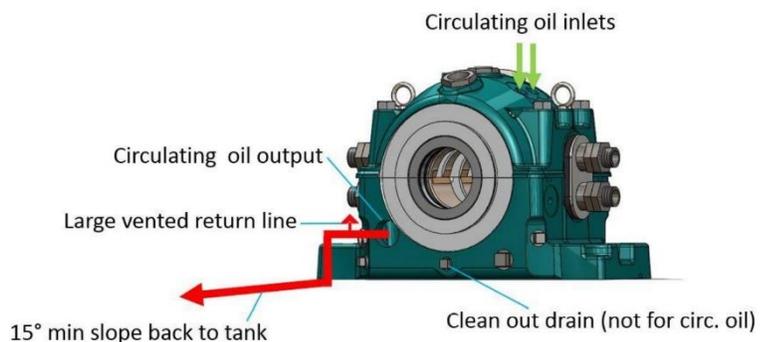


Figure 2. Circulating oil schematic

If restrictions to flow are seen, the oil level will rise within the bearing until it leaks.

EXTERNAL/PUBLIC DOCUMENT

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Leaking around the Coolant Pipe Grommets

Sleevoil bearings can be subjected to extreme heat which can have adverse effects on elastomer bearing components. The rubber grommets are no exception. Contact between internal elastomeric components and hot oil (or external factors) can cause the grommets to swell around the coolant pipes. This can cause a leak-path for oil to escape from the bearing.

Installing a second metal grommet plate between the bearing housing and the rubber grommet can reduce the effects of hot oil on the rubber components. The second grommet plate acts as a shield and reduces the rubber and oil contact. This potentially eliminates the chance of oil leaking around the coolant pipes (especially in circulating oil applications).

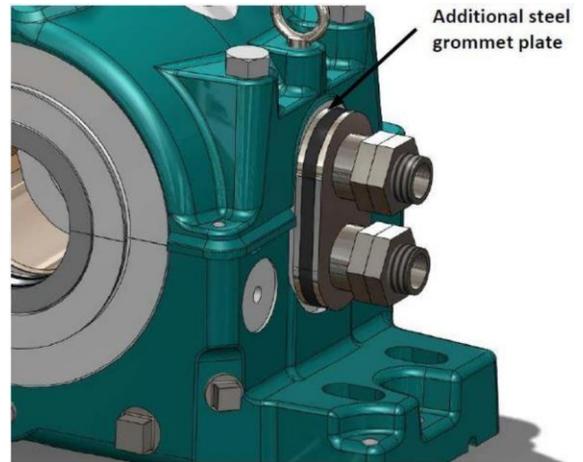


Figure 3. Additional grommet plate

Worn Components



Figure 4. Cork (top) and HNBR Dust Seal (bottom)

Of course, worn components can also facilitate the occurrence of oil leaks. The bearing seals, grommets, Orings, and other bearing parts should be inspected at regular maintenance intervals.

To extend seal life, Dodge sleeveoil pillow blocks have seal upgrades. Seal components. RTL Seal O-rings have been upgraded from Nitrile to Viton. R-series Dust Seals (and Auxiliary Seal Kit components) are now made from HNBR instead of a cork-neoprene compound. These upgraded seals became available in 2013.

Conclusion

Maintaining the proper oil level inside of a Sleeveoil bearing can be critical to bearing operation and the surrounding environment. Adding a circulating oil system will maintain the level, increase overall performance, and improve bearing life. However, it must be recognized that using a correctly configured drain line is critical. Replacing worn bearing components can reduce the occurrence of bearing leaks. Proper maintenance procedures will ensure an extended bearing life.



Figure 5. Dodge Cool Lube 2 circulating oil system



Figure 6. Dodge OLF-2 circulating oil system