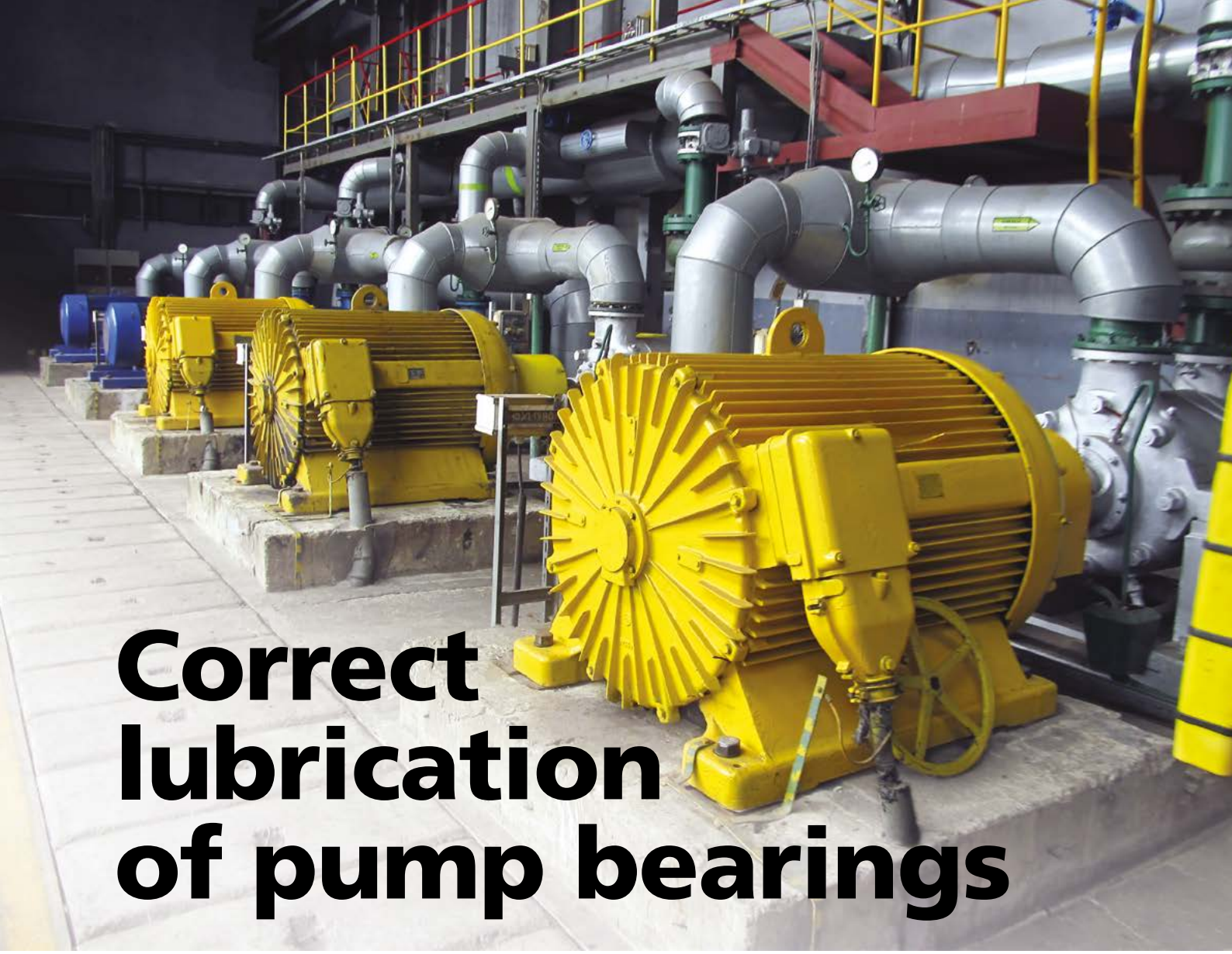

# Correct lubrication of pump bearings

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Manufacturers, designers, and end users in many industry branches know that nearly 50 percent of bearing failures are caused by improper lubrication – either too much or too little. A large portion of this is attributed to poor re-lubrication practices. A good maintenance program is easy to document; but implementation and follow up can be overlooked or inconsistent due to operator error.

Pump bearings can be difficult to lubricate properly. The bearing lubrication system is often inadequately designed. For example, in oil-lubricated bearings, the oil level is typically viewed through a sight glass. The oil level reading is only accurate when the pump is off and on level ground. The oil level must be maintained at the midpoint of the lowest roller to prevent overfilling. Overfills can lead to extreme heat generation, and compromise the integrity of the lubricant film over time. Also, sight glasses are often difficult to read when the oil is contaminated and the glass is discoloured.

Greased bearings have issues as well. As with oil, bearings can be overfilled with grease. Typical pump applications call for a fill level of one-third to two-thirds of the free volume in a bearing. Again, overfilling leads to a high heat condition and may lead to bearing failure.

**Automatic lubrication**

As an alternative, automatic lubrication delivery systems help overcome the problems associated with manual lubrication. Alternatives can range from a lower-cost single-point lubricator to a sophisticated centralised system. The advantages of such systems include lower costs, ease of installation, and precise lubricant delivery to each lubrication point.

Additionally, centralised lubrication systems can lubricate entire systems and are permanent. One system can even serve an entire plant, provided that the same lubricant can be used at all points. However, maintenance is usually required to address water and contamination issues in large systems.

**Single- and multi-point lubricators**

Single-point lubricators can eliminate manual lubrication and help prevent premature failures. Gas- or electromechanical-powered units periodically deliver grease or oil to bearings, chains and other components. Multi-point lubricators can deliver grease to several lubrication points.

***Figure 1:*** *Single-point lubricators periodically deliver grease or oil to bearings, chains and other industrial equipment components.*

Smaller motorised multi-point lubricators can only lubricate a limited number of lubrication points, but they have several advantages versus centralised systems. The multi-point lubricant chamber always provides pure lubricant, needs minimal maintenance, and is a stand-alone system. A system malfunction does not shut down the entire plant. Multi-point lubrication systems are also compact and practical when different lubricants are used.


***Figure 2:*** *(AC2 InterLube Multi Line Grease Pump): The Interlube AC2 Multi Line Grease Pump is a multi-point lubrication system that can deliver grease to up to 36 lubrication points.*

Depending on the product and the application, lubricant delivery systems can last anywhere from days to many months. And, while some products are designed for one-time use, others are refillable.

**Centralised lubrication systems**

If a centralised system is needed, it is important to understand the different types available. The most common centralised lubrication system is the oil circulation type (e.g. Groeneveld or Interlube). In this type, oil from a reservoir is pumped to various lubrication points. One unit can service many bearings. But, over time, contamination and moisture can build up in the system which requires maintenance. Just 0.04 percent water in the lubricant can reduce bearing life by 50 percent. These systems also rely on contamination filters that must be cleaned regularly.

***Figure 3:*** *There are many types of centralised lubrication systems for an entire plant. The most common type is an oil circulation system.*

Oil misting is another type of centralised lubrication popular for pump bearings. In these systems, a specific amount of oil is misted onto the bearing at regular intervals. These systems work well but require maintenance to keep spray nozzles unclogged and free from contamination. Overspray and high costs are the drawbacks.

**Summary**

Pump bearings can be lubricated manually, with a centralised system, or by smaller single- or multi-point lubricators. Manual lubrication procedures may be well documented but are often neglected. Centralised lubrication systems can solve this issue through automation, but are costly and require maintenance to control contamination. Finally, multi-point lubricators service only a limited number of lube points but cost

less and are compact and almost maintenance-free. They are practical when multiple lubricants are needed or when a centralised system breakdown might risk a plant shutdown.

**Side note: lubricants**
Lubrication removes heat, reduces wear and friction, minimises debris problems and protects bearing surfaces from corrosion. For maximum performance, lubricants and methods must be chosen carefully.

Like oil, both low- and high-end greases have limitations regarding operating speeds, temperature and operating loads. Each unique combination may require different grease qualities or composition for maximum protection. What works for one application may not work for another. Proper grease selection requires a clear understanding of the bearing type, environment, application demands, and available grease options.

For example, a steel mill may need a product to use in roll neck bearings. These conditions require a product with the best corrosion and water washout resistance. Long-life synthetic greases are not a good option because bearing failures in this application are caused by rust and corrosion buildup.

Also, different bearing types may require different thickeners. For example, a medium-speed ball bearing operating under moderate load will have different lubricating needs than a tapered roller bearing under the same conditions. The ball bearing, because of its point contact with the ball and raceway, requires grease with minimal resistance to rolling motion, to inhibit sliding.

Proper grease selection requires understanding the available options. Commodity greases are fine for general purpose. These lower-cost products are usually based on lithium soap, calcium soap, and clay. Soap-type greases are usually temperature-limited and do not always use premium additives. Specialty greases are costlier but are designed to meet demanding performance specifications such as heavy water ingress or higher than normal temperatures. These greases usually contain a thickener such as calcium sulfonate, polyurea, or lithium, aluminum, or calcium complexes. Often, they use premium additives and synthetic base oils, creating synthetic greases.

Application-specific, custom-tailored lubrication solutions help ensure the efficient operation of bearings and other components in industrial environments. Additives for high temperatures, against wear and for water repulsion provide excellent protection under demanding conditions, increase the bearing life, boost productivity, and reduce downtime.

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