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Air-Oil Summary

Air-Oil is a unique method of applying lubricant to rolling element bearings. There are many benefits of Air-Oil lubrication over other methods of lubrication.

Oil Mist History

Air-Oil is most often confused with Oil Mist systems. Oil mist systems are complicated lubrication systems, which use a small range of viscosity oils, heated, and atomized into airflow. The oil can be easily knocked out of the airflow by bends and reduced velocity of the airflow. The piping must be carefully routed to allow this drop out oil to return to the reservoir. Lines cannot become blocked with oil, or the lubrication flow will be affected. The atomized oil must then be re classified at the delivery point to deliver it to the lube point. This re-classification is not 100% effective and some of the oil escapes as a mist. This mist deposits oil on surrounding surfaces and hovers in the air creating safety and health concerns. The flow is also very difficult to divide accurately to multiple points.

Air-Oil Background

Delivery

In an Air-Oil system the oil always remains in liquid form. It is never atomized. Using a capillary effect the oil clings to the outer walls of the delivery tube. The air moving through the tube pushes the liquid oil along the tube. This transmission method is ideal for lubrication for a couple of reasons. The oil is delivered to the bearing in a constant and steady rate. The air that carries the oil to the bearing provides a positive pressure in the bearing cavity. This constant airflow coming out of the bearing prevents contaminants from entering the bearing cavity keeping the bearing clean. As well the air passing through the bearing can carry heat out of the bearing keeping it cooler. If an air-oil line becomes cut the oil will only drip out of the tube and not create a mist.

The flows of both oil and air-oil can be divided accurately to allow for a minimum of delivery points. Using distribution blocks an oil or airflow can be split many times. A thousand points have been delivered from a small-pressurized source. A single air and oil delivery point can be split into 48 or more air-oil points to lubricate bearings. The volume of this oil can be precisely delivered in quantities of cubic centimeters per hour (1cc=0.034oz).

Monitoring

Monitoring can be placed on an individual lubrication point or multiple points. The oil distribution is monitored by the unique operation of the progressive distributor used to divide and deliver the oil. The air-oil flows are monitored using airflow sensors. An individual point can be monitored with great accuracy or multiple points can be monitored more coarsely.

Lubricating Medium

Oil is a far better lubricant t for rolling element bearings than grease. Only a thin film of oil is necessary to provide adequate lubrication to the element. Grease on the other hand must be packed into the cavity to be effective. The grease creates additional heating effects by consuming energy as it is pushed around the bearing race. In order to keep contaminants from bearing the grease must be continuously replaced. This results in a buildup of grease around the bearings. Also greased bearings require significant clean up before they can be serviced or inspected. The chemicals required for cleanup create their own problems.

The volumes of oil used are well below the volumes of grease needed to perform the same task. Oil can perform the same lubrication with only 1% of the grease volume.

Supply

Thousands of lube points can be fed from a single reservoir. Pumps meter the oil to the lubrication system. Backup pumps are often installed to ensure system reliability. The level in the reservoir can be monitored and maintained using floats. The entire system is monitored and controlled by a PLC maintaining reliability.

Summary

Air Oil lubrication is applied in difficult or crucial applications. The ability to monitor and control the system and the large number of points the system is capable of controlling make it ideal for caster lubrication. The length of time bearings can be left in service can be increased, providing more uptime with fewer bearing changes. As well maintenance costs are reduced with less cleanup costs.