



Why LubriMist® Oil Mist?

Introduction

LubriMist® oil mist is a proven technology that provides advantages over conventional lubrication techniques such as oil splash and grease. A LubriMist® oil mist system is a centralized lubrication system that automatically and continuously delivers lubricant to machinery bearings. It is a system that has few moving parts making it very reliable. The heart of an oil mist system is the generator that utilizes the energy of compressed air to atomize oil into micron size particles. The lean mixture of oil and air produced by the generator is known as oil mist. The oil particles form a stable suspension that can be conveyed considerable distance (180 meters) through piping and tubing to the points requiring lubrication. One LubriMist® oil mist system can provide lubrication to sixty pumps and their drivers.

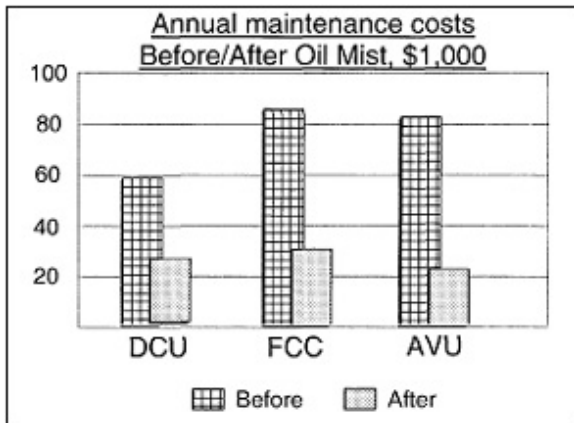
Applications and Use

Oil mist is used to lubricate rolling element bearings of all types. The most common applications in refineries and petrochemical plants are the bearings in pumps and their electric motor drivers. In addition, oil mist is used to purge gearboxes and the bearing houses of small steam turbines with sleeve bearings. Oil mist systems have been used in the hydrocarbon processing industry since the mid-1960's and large-scale LubriMist® oil mist systems are now found in most hydrocarbon processing regions around the world. LSC estimates there are over 1,500 large-scale oil mist systems in place and operating in the hydrocarbon processing industry worldwide.



Financial Benefits

LubriMist® oil mist systems are economically justified. It is well documented in technical papers released by end-users, bearing manufacturers and in university research that bearings lubricated with oil mist have longer life than bearings lubricated with oil sump or grease. Users claim from 50% to 90% reduction in lubrication related bearing failures when oil mist is used. Longer bearing life results in fewer equipment failures and lower maintenance costs. A bearing failure can lead to an equipment overhaul costing \$5,000 to \$10,000, not including lost production. Fewer failures also mean greater unit availability and reduced risk of fire. Reduction in seal failures has also been documented with the use of oil mist. The savings result in a payback period of less than two years and this combined with twenty-year life and low system operating cost means investment in LubriMist® is high return and low risk.



Technical Reasons for Superior Performance

- Bearings run cooler, typically on the order of 10°C. Lower bearing operating temperature means longer life.
- Oil mist lubrication is contaminant free. The oil mist particle is 1 to 3 micron diameter. There can be no large particulate in the mist meaning the lubrication is ultra pure.
- Documented research ("Field Investigation of Bearing Housing Oil Cleanliness," March 1996, Pump User Symposium) has shown that it is common to have high contamination levels in oil sumps even though bearing housing seals are in place and recommended oil change intervals are followed. This contamination is not present with pure oil mist lubrication.



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- The right amount of the correct lubricant is continuously applied without error. No longer is the bearing dependent on someone insuring that the proper oil level is maintained, not too high or too low, or that the proper re-greasing technique and interval have been followed.
- External contaminants such as water vapor and particulate matter are excluded from the bearing housing because the mist system operates at positive pressure.
- The need to change pump bearing housing sump oil is eliminated because with pure oil mist there is no oil sump.
- The bearing surfaces and internal surfaces of the bearing housing are always coated with oil. There is no possibility for corrosion. This also applies to stand-by equipment meaning back-up machinery is ready for operation.

Reliability and Manpower Efficiencies

LubriMist[®] oil mist systems are microprocessor controlled. The central mist generators are extremely reliable and have proven exceptional performance in harsh environments. LubriMist[®] systems operate in the hot and humid climates of the Middle East and the extreme cold of northern Canada. The microprocessor controllers have self-contained troubleshooting and data collection functions that allow for efficient root cause failure analysis and dependable operation. Because LubriMist[®] oil mist systems are centralized and equipped with these advanced control and monitoring techniques, minimal manpower is required to oversee system operation. Organization staffing can be optimized with oil mist because fewer personnel are required for lubrication and equipment repair. Operators and maintenance personnel can be re-directed towards more pro-active and more value-added assignments.

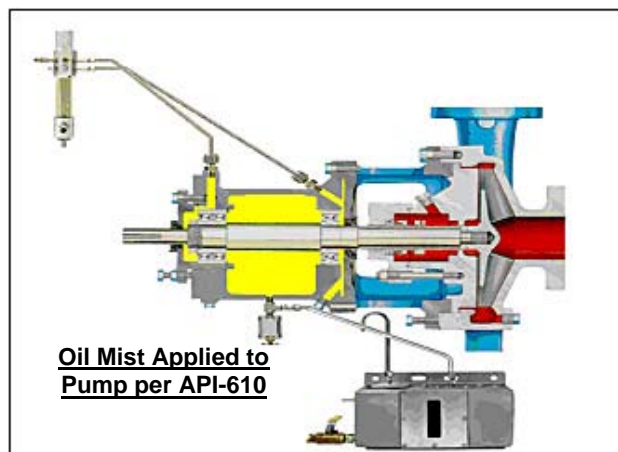
Environmental Benefits

Today's LubriMist[®] oil mist systems reduce oil consumption and are environmentally friendly. Most systems being installed are one-way, that is, the oil mist is applied and not recycled. With these systems the amount of oil consumed is 40% less than that needed with sump lubrication. In addition, the latest application techniques allow for recovery of more than 50% of the lubricant. Some users report a 70% reduction in lubricant purchases with routine collection of the coalesced oil from one-way systems.

When a company or a facility is striving to achieve maximum recycling, minimum discharge of hydrocarbon and elimination of waste, closed-loop oil mist systems are used. This technology was introduced to the hydrocarbon processing industry by LSC in 1993. (US patent 5,318,152) With closed-loop LubriMist[®] oil mist essentially all the coalesced oil and oil mist is captured and recycled. There is full reuse of the lubricating oil. This technology has allowed oil mist to be used inside buildings, confined spaces and in machinery manufacturer's test stands.

Oil Mist and Industry Specifications

The American Petroleum Institute (API) and the Process Industry Practices (PIP) group have taken a position that supports the use of oil mist. In their "Recommended Practices for Machinery Installation and Installation Design" specification (API RP-686, PIP REIIE 686), oil mist systems are prominently described. Also, in this specification oil mist is recommended as the approach to be considered when equipment are to be stored for a period longer than six months from time of shipment from the manufacturer to time of commissioning. In the API specification for pump design (API-610) oil mist lubrication is included as a means for lubrication. It is also interesting to note that in API-RP-751, "Safe Operation of Hydrofluoric Acid Alkyltion Units," it is written,





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“Alternative lubrication systems, such as oil mist, may be beneficial in reducing bearing failures that could cause seal failures.” This statement indicates that these technical groups believe oil mist leads to reduced probability of machinery failure.

Equipment Designs, Certifications, Installation and Maintenance

LSC offers mist generating consoles built and certified by third parties to NEC, IEC and ATEX standards. It is not necessary to carry out special designs for particular projects as LSC equipment is already approved for use in areas classified as hazardous.

LSC has the experience and capability to design LubriMist® oil mist systems for new construction projects and for retrofit to existing facilities. LSC can be involved in the design and supply of the specialty oil mist equipment and LSC can perform complete turnkey installations. Securing LubriMist® oil mist does not need to be a unique and major undertaking.

LSC provides field support for oil mist systems. LSC experienced and trained technicians perform maintenance. LSC also supports owner-performed maintenance with technical services. The routine maintenance of a LubriMist® oil mist system is not intensive and is usually scheduled at three to six month intervals so the upkeep of systems is low cost and can be easily managed.

LubriMist® Synthetic Oil

LubriMist® Synthetic Oils (LSO) are high-performance lubricants designed for use in oil mist systems. They are formulated from diester base stocks and advanced additive systems. LSO provides significant performance advantages in oil mist systems as compared to other lubricants, both mineral and PAO based. Users recognize that lubricant properties that are targeted for performance in flooded lubrication may not be ideal for oil mist systems. LSO offers specific advantages for use in oil mist systems and for oil mist lubrication. LubriMist® Synthetic Oils are manufactured for LSC by Infineum, a global leader with over 70 years of experience in formulating high-quality fuel and lubricant additives.

LSC Joint Program with General Electric

LSC and GE Energy have a program to jointly install LubriMist® oil mist systems with GE System 1® software/Bently Nevada Trendmaster® Pro condition monitoring systems. The program is offered to companies in process industries, including hydrocarbon processing. The System 1 software platform is the host system for Trendmaster Pro hardware. The same equipment monitored by System 1/Trendmaster Pro is lubricated by the LubriMist® oil mist system. Installing the systems together typically costs about twenty-five percent less than if the two systems were purchased and installed separately.

Machinery Manufacturers

As the use of oil mist has grown, pump and electric motor manufacturers now provide bearing housings designed for oil mist lubrication. Pump and electric motor manufacturers that have a significant presence in the hydrocarbon processing industry supply equipment ready for oil mist lubrication. API-610 provides clear standards for use of oil mist with pumps. The procedures for converting from grease lubricated motor bearings to oil mist are also readily available and easily adapted.

Conclusions

LubriMist® oil mist lubrication is a proven technology that delivers both financial and environmental benefits. Equipment failures are reduced lowering operating and maintenance costs. Consumption and discharge of lube oil is also reduced with oil mist. Financial payback on the investment in LubriMist® oil mist systems is quick and low risk. LSC has the experience and knowledge to successfully carry out the application of oil mist lubrication to machinery in the hydrocarbon processing industry where use of LubriMist® oil mist lubrication has become the preferred approach to bearing lubrication by many of the leading companies in this industry.