



Newsletter No. 1

Electric Motor Specialists will be periodically putting together a newsletter covering various topics, such as; bearing failure, proper lubrication, variable frequency drive issues, bearing currents, motor repairs, etc.

Bearing failure or proper lubrication? The choice is yours.

Better lubrication practices could prevent the type of bearing damage that leads to costly premature motor failures in countless plants. How are you taking care of these crucial activities in your operations?

Useful bearing life depends in large on how, when, and with what it is lubricated with.

Roller bearings fail for many reasons, but improper lubrication is right at the top of the list. A breakdown of why bearings fail shows 43% due to improper lubrication, 27% because of improper mounting, 21% due to other causes and 9% from metal fatigue.

Proper lubrication of ball and roller bearings in electric motors is essential to their health. Grease reduces friction and protects the surface finish from rust during long idle periods and in unfavorable environmental conditions. It also transfers heat from the bearing and even helps protect the bearing from dirt and contaminants. Since bearing life—and, by extension, motor life—depends on proper lubrication, it's important to use the right grease for the application and to re-lubricate bearings at the correct intervals.

The basics

Grease is a “dirt magnet,” so it’s surprising to many that packing it into the cavity around the bearing actually helps keep dirt and other contaminants from getting into this critical component.

On very old motors, lubrication was provided by oil-soaked felt that “wicked” oil to the bearings. Grease serves this function in today’s machines. Consisting of oil suspended in a base material like lithium, calcium or polyurea, it lubricates the bearing continuously while preventing the oil from leaching out. Depending on its composition, different greases may be better suited for one application than another. For example, one may be superior at high or low temperatures, another impervious to water, while still others retain oil better under extreme pressures.

The lesson here is to select the right grease for the application. An electric motor in an Arizona open-pit copper mine where the ambient temperature is 130 F requires different grease than an identical motor in the Arctic Circle. Of Course, it’s sometimes necessary to meet one stringent requirement at the expense of others.

In the food process industry, for instance, the most important property of lubricants is that they won’t poison you if they somehow get into the can of beans you’re going to eat for supper.

Table I. NLGI Grease Compatibility Chart

| | Aluminum Complex | Barium | Calcium | Calcium 12-hydroxy | Calcium Complex | Clay | Lithium | Lithium 12-hydroxy | Lithium Complex | Polyurea |
|--------------------|------------------|--------|---------|--------------------|-----------------|------|---------|--------------------|-----------------|----------|
| Aluminum Complex | X | I | I | C | I | I | I | I | C | I |
| Barium | I | X | I | C | I | I | I | I | I | I |
| Calcium | I | I | X | C | I | C | C | B | C | I |
| Calcium 12-hydroxy | C | C | C | X | B | C | C | C | C | I |
| Calcium Complex | I | I | I | B | X | I | I | C | I | C |
| Clay | I | I | C | C | I | X | I | I | I | I |
| Lithium | I | I | C | C | I | I | X | C | C | I |
| Lithium 12-hydroxy | I | I | B | C | I | I | C | C | X | I |
| Lithium Complex | C | I | C | C | C | I | C | C | X | I |
| Polyurea | I | I | I | I | C | I | I | I | I | X |

Compatibility issues

An old professor of Texas history used to say, “Never mix gunpowder and alcohol, ’cause you can’t shoot it, and it tastes terrible!” Although it’s usually okay to combine lithium- and calcium-based greases, mixing lithium- and polyurea-based greases causes the oil to leach out much more quickly than normal, potentially starving the bearing of lubrication. Be sure you know which types of grease your plant uses—and know which ones are compatible with one another.

Table I provides general guidelines for grease compatibility, based on the variances in compatibility of different greases tested by the National Lubricating Grease Institute (NLGI), April 1983. Grease manufacturers often can provide similar charts.

Although compatibility guidelines are helpful, there are enough exceptions to warrant care. Before mixing two greases, check with both manufacturers. If both say it is all right to mix those specific greases, it probably is safe to do so. If either of them says no, don’t risk it. Note that in some instances both manufacturers may say it is safe to mix specific greases that are incompatible according to the general guidelines in Table I.

Types of grease in motor bearings

Some motor manufacturers have used polyurea-based grease—which performs well at high temperatures (over 250 F) and high speeds (10,000 rpm or higher)—almost exclusively for more than 30 years. Recently, though, several of them have switched to a second-generation polyurea grease that reportedly has even better properties than the old standby. Because these manufacturers produce tens of thousands of motors weekly, their decision to change grease is significant. Such a move indicates a high confidence level in that grease.

Bearing manufacturers, on the other hand, use various greases, depending on application requirements. As a result, the replacement bearings you buy from your local bearing supplier might not contain grease that is compatible with what you use in your plant. So, be careful. *(to be continued)*

Motor and Drive Sales and Warranty Service

| | |
|-------------------------|--------------------------|
| ABB | Marathon |
| A.O. Smith | Reliance |
| Baldor | Reuland |
| General Electric | Siemens |
| Hitachi | Teco/Westinghouse |
| Lafert | Toshiba |
| Leeson | U.S. Electrical |
| Lincoln | Weg |
| Magnetek | |

Field Services Available

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| AC/DC Generators & Welders |
| Electrical Fabrication |
| In Place balancing |
| In Place Bearing Replacement |
| Mechanical Alignment |
| Predictive Maintenance Programs |
| Preventive Maintenance |
| Troubleshoot Controls and Drives |
| Vibration Analysis |

Pump Services

| | |
|------------------------|-------------------|
| ABS | Hydromatic |
| Barnes | KSB |
| Davis EMU | Pumpex |
| Ebara | Vaughn |
| Fairbanks Morse | Weil |
| Flygt ITT | Wienman |
| Gorman Rupp | Yeomans |
| Goulds | Svelada |
| Homa | Wemco |

Servo Motor Services

| | |
|----------------------|------------------------|
| ABB | Indramat |
| Alaton Parvex | Malivor |
| Baldor | Porter Peerless |
| Electro Craft | SEM |
| Fanuc/GE | Siemens |
| Gettys | Yaskawa |

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As an EASA shop, we can, at no cost to you, provide you with manufacturers warranty inspection on all motors manufactured in the United States.

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We welcome you to call us with any questions you may have and look forward to establishing a future business relationship with you. You can also visit our website at www.emssandiego.com.

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