

A Guideline For Purchasing Lubricants

Achieving optimum benefit from lubrication and maximizing equipment uptime is more than just the correct lube application and monitoring. While these are essential components, getting the correct lubricant is the first step. This is not always as simple as it sounds because of multiple vendors, sole sourcing or variable and/or qualitative purchasing decisions. It can also be exacerbated by a lack of understanding of the application and/or the significance of any changes to a lubricant. Even lubricants by the same name and from the same supplier can undergo formulation changes or changes in the place they're manufactured. Normally, this goes unnoticed with the recent proliferation of mergers, acquisitions and product dropping.



Improvement Appraisal Lubricant Purchases

These guidelines were developed to help determine how to improve the lubricant purchasing process. They can also be used to help identify areas that could benefit from change.

- 1.** First, are purchase specifications available for the products? This is important because over the life of a product, many aspects can change including production procedures, packaging, base stocks and formulations. Consequently, if the application is important to production and/or the consequences can be safety-related, it might be prudent to at least quantify what is currently being used and to know what works.

Existing specifications and standards may be suitable for most products. This is a benefit because they have the advantage of being reviewed and time-tested. They can be industry-related, such as those prepared by a major steel company or electric utility, military or standards-writing bodies such as ASTM, ISO, IEC or DIN.

1a. If existing standards are available, when were they last updated? If it has been longer than five years, there could be cause for concern. If updated internally or by just one company ensure that they were updated by technically competent people. Ensure specific products that might have been changed but are working satisfactorily are not excluded. This can occur when a specification is based on an earlier formulation of a product. Suppliers should also be given the opportunity to comment on and/or offer substitutions.

1b. If specifications don't exist, why not? A valid reason should be available. One such reason could be that the product is a well-known brand name, there are no known problems, or the supplier has excellent quality assurance and a proven track record. But how do you know that none of the above will change before the next review?

1c. Before approval for general use, new products should be evaluated in service for at least 12 months with protocols suitable for the application. This will help minimize surprises because unique or unexpected events may occur. Having an effective approval process will also help foster better appreciation of the lubricants and discourage lube tinkering. As a recommendation, try the product in a few applications before making wholesale changes. This can help minimize the consequences if there are problems. Generally a year is long enough.

2. Is the price the only purchase consideration?

2a. If the answer is yes, also consider pricing supplier services such as technical support, training, testing and quality assurance. In addition, include costs for maintenance requirements, handling, service life and eventual disposal, because these costs should be considered as essential parts of any lube decision.

2b. If the answer is no, is there a formal life cycle costing approach? Must it be followed in every case? What are the exceptions, are they valid and when was the costing last updated?

3. Are the products purchased individually? Are they sole sourced? Are tenders required for small orders, or are they part of multiyear agreements? All of these factors have pros and cons to take into account. Consideration should also be given to periodic and random testing of products.

In addition, new drums of lubricants should be routinely sampled to ensure the correct products have been shipped. This helps in setting benchmarks for condition monitoring and for staving off potential problems. This applies to products in storage to verify their shelf life has not been exceeded. In this regard, all drums, kegs, pails and grease

cartridges should have a date. This can be date of manufacture, the purchase date, the received date or any other significant date.

Note: On a related matter, regularly check how the lubricants are being stored. Grease cartridges should generally be stored with the open end up for obvious greases; this prevents oil seepage. Drums having desiccant and filtered breathers can be stored upright. Other drums should be stored on their sides with the bung holes at three o'clock and nine o'clock. However, most facilities apparently do not store them this way likely because of leakage concerns. Plastic drum covers are also available for a few dollars, and can save many times that amount.

4. When was the last time the lubricants in use were properly reviewed? Many changes have been made to the formulations in the types of products available. Care should be taken not to overly reduce the number of products because specialty products serve a particular purpose.

Be careful when aftermarket additives are used. They can be detrimental to the equipment, or they may not be compatible with the lubricant and/or can result in higher disposal charges. If extra performance is required, consider fully formulated products with a heavier duty or a different additive package.

5. Is there a staff expert for lubricants? With so many new developments, it may be cost-effective to have at least one person to whom questions can be addressed. This can take years to develop; therefore, the responsibility should remain in place. Training two or more is a better idea, allowing them to alternate attending conferences or education courses. Upon their participation in conferences and training, these lubricant experts should share their new knowledge with staff, circulating the material of new ideas and key contacts.

Do employees stay in contact with the suppliers or technical staff? This could be a concern if questions are not asked and no feedback is provided. It is helpful to prepare a contact list at each supplier for technical matters. Buyers should not be the default contact.

5a. If employees are in contact with the suppliers, what specific training has been offered in the plant in the past year? This includes classroom settings, attendance at conferences or providing papers or presentations to be reviewed. Most oil companies have quality technical material and can provide some training. Numerous trade publications on lubricants and technical societies are available, such as the STLE that offers periodicals and technical meetings. Encourage technical discussions with your main lube supplier once a year. Just talking about engine oils is productive because there's always something new.

6. Is there a working feedback system to identify and correct problems?

6a. If there is, has purchasing received any input since the last order? If not, why?

7. Is lubricant consumption tracked to identify whether it is too high or low? If not, why? This can also be an important aspect of due diligence in case of a leak or spill.

8. Are the lubricants in-use properly tested to determine if the useful service life has been optimized? Is this part of the proactive maintenance process?

9. Have energy-saving lubricants been included? Have contacts been established with the local electric utility or government officials about programs with industry experts? If they cost more, who pays? This can be a significant disincentive if maintenance pays, but some other department gets the benefit. Proper cost allocations are important.

10. Is there any incentive to use better products or to benchmark performance? Is it working? If not, why not?

Sole Sourcing of Lubricants

Pros

1. **Fewer Suppliers:** There might be fewer companies listed as suppliers. However, with electronic data storage and possible electronic billing, this might be less important. Many sole-sourcing efforts are supply-driven for this reason rather than technical advantages.
2. **Fewer Products:** Product consolidation can be achieved even with numerous suppliers. Reviewing the products used and their applications is a key first step. This is usually associated with a tender submission for sole sourcing.
3. **Easier Tech Support:** Dealing with one company, you are more likely to have only one technical contact. This simplifies determining who to call.
4. **Improved Compatibility:** Products from one company are more likely to be compatible with one another in case of mixing by mistake. However, this will not help if the wrong oil was used.
5. **Better Training:** When a supply company knows what to expect in revenues, it can more easily account for providing seminars. These can be offered in-house, at regional centers, at a company's main office or another suitable location. Tours of laboratories and production facilities can also be informative. Training can also include newsletters or electronic mailings.
6. **Better Trouble-shooting:** With a given revenue stream, suppliers can often provide some degree of analysis as part of trouble-shooting efforts. In most cases, Because the supplier is most familiar with their product, they could know if similar problems had developed at other customer sites. This is assuming that they will share this information.
7. **More Secure Delivery:** Using one company to supply all products also implies that it is large enough to have all products. It is likely that the supplier has the needed products available somewhere.
8. **Health and Safety or Environmental Issues:** Having one supplier should mean greater uniformity to the material safety data sheets (MSDS). If issues do arise, you'll likely get the appropriate assistance.

Cons

1. **Compromises Must Be Made:** No one supplier has the best products for all applications. Consequently, testing may be required before specific products are deemed equivalent or suitable. Obtain claims in writing for each substitution.

2. **More Complicated Trending:** Upon selecting a new vendor, or at least the first time you choose a sole source of lubricants, changing oils with different additives and basestocks will compromise the historical condition-monitoring test data. It is important to keep accurate records of the makeup oil being used, how much is added and when.
3. **Inertia:** Having a contract with one company adds internal pressures to remain with that company. Consequently, it will be more difficult for stations to take advantage of new technology or to adopt new practices offered through other companies. Sole sourcing can also discourage the use of local suppliers.
4. **Higher Risk:** If the company being used undergoes a large organizational change, product reformulations, has a fire or equipment failure that impacts production, or has a key facility damaged by severe weather, then the user can be stuck. Similarly, if a generic problem occurs, it could have greater implications affecting all stations.
5. **Fewer Technical Support Options:** If it is possible to purchase lubricants from more than one supplier, then one can shop around for the best technical advice and testing knowledge. However, when locked into a single company, it is expected that free technical assistance will be harder to obtain.
6. **Compatibility:** When switching oils or greases, this initially adds a risk of incompatibility or performance degradation. Prior laboratory testing can help reduce the risk, but it will always be an issue. This is because it is generally too expensive to conduct all the tests in every ratio. Even if this was possible, lab tests do not always duplicate the field applications. If substituting, do not switch products in all similar units at the same time; rather try one for approximately a year and monitor the performance.
7. **Approvals:** It is not sufficient for lubricants that are mixed or substituted be viewed as equivalent and compatible. In some cases, the lubricants should have original equipment manufacturer (OEM) approval. For pumps and motors, these requirements are often general; however they are specific for gas turbines. Consider that some equipment uses premium products for reasons other than what can be found in the books. Examples include the advantages of severely hydrotreated oils due to lower cloud points that may reduce plugging of filters on cold starts.
8. **Perceptions:** Condoning the practice of mixing oils and greases will necessitate greater education and safeguards for those cases in which it is not all right to mix or use a different product. Examples include environmentally qualified equipment located in nuclear plants, and safety components and equipment with safety, regulatory or licensing implications. Prior testing with an approval process and adequate documentation is required.
9. **Reliability:** Even if a sole source and a tendering process are utilized, it cannot be assumed that current main suppliers will be the suppliers in the future. This can have major implications for safety-related equipment, compromising the applicability of the reliability data to date.
10. **Contact Duration:** Tender contracts are established for set periods of time, which must last long enough to ensure the costs of the periodic tendering process do not exceed the savings. In addition, the term must be long enough for benefits or harm to be discovered, but not long enough that new requirements cannot be

implemented or the supplier becomes complacent. It is a trade-off and should be set with care.

11. **Further Testing:** One cannot assume that problems will be evident because many difficulties remain hidden. Consequently, there should be a formalized data gathering and test program to determine if products are working as intended.
12. **Verification:** Part of the tender process may include oil testing by the vendor, which is not as desirable as on-site sampling and testing. The test data must be made available to the stations in an electronic form. Therefore, if the vendor changes with a future contract, the data can still be trended. This requires conversion software for each site and duplicate testing at each change to determine if correction factors are required for tests performed at different labs. Testing of samples taken on-site is important for tanker deliveries because contamination can occur during delivery.
13. **Adequate Testing:** In a tendering process based on the lowest cost, extra performance measures ensure delivery of what has been agreed upon. Depending on the ISO 9000 series of standards, this is not sufficient because it says little about whether the product works, only how it is made. Because there are likely no standards for most existing lubricants, considerable work is required to develop yardsticks. At the least, take initial benchmark samples for all of the products.
14. **Complete Drains:** When lubricants are mixed, it is not known how they will interact, making it difficult to identify the root cause of problems. Consequently, there is a greater tendency to drain all of the old oil first or to clean out old grease. Considerable costs are associated with this including labor, dose, new oil, solvents and disposal. Because the total cost of changing oil is estimated to be about five times the cost of the new oil, any short-term benefit of a slightly lower purchase price is negated. Most oils have service lives longer than the one to three-year terms of many contracts; therefore oil consumption could rise considerably.
15. **"Freebies":** These are not free, but the specific services that are added benefits as part of a sole-source contract must be determined. For example, major oil companies have provided, at no charge, some or all of the following: lube surveys, technical material, periodic mailings, seminars, trouble-shooting and testing. Unfortunately because of reorganizations and personnel changes at user locations, it is unlikely that a single individual is responsible for lubricants. Even though these services might not have been used for the last few years, it does not mean they are not currently available.

Other Options

A variation is to arrange for one or just a few supply houses to provide all the lubricants. This has the above advantages for supply of one billing contact, but adds a layer for technical support. The pros and cons can vary greatly depending on the efficiency of your contact person.

The cost of the equipment, downtime and equipment maintenance far exceeds the purchase price of lubricants. Consequently, while there are benefits in streamlining the purchase process, care must be taken to guarantee the equipment is not compromised

and that the costs are less. Greater benefits might be accomplished by ensuring the required lubricants are used correctly and are achieving their maximum life.

Regarding dollar values, the cost of the lubricant is usually many times less than the consequential cost if problems were to occur. Even minor problems such as filter plugging, cloudiness or other nonfatal consequences have implications. A filter change takes time and money. Additive interactions, at the least, means that some additives considered necessary have been depleted. One must be aware that the lubricant is working but also know what is required to keep it working and how to test it if something goes wrong. A large power station might spend \$100,000 on lubricants per year, but a single unit downtime can cost more than that in a single day or less.

Therefore, do not consider only the cost of the lubes, but all other aspects associated with getting the right lubricant into the right application for the longest time with minimum problems and for the lowest overall cost.

Preventing Repeats and Rework

When equipment or a component fails or must be downrated, a single occurrence may be devastating. However, the cause of the failure should be identified and corrected because it will likely be necessary to prevent it from recurring or creating more severe consequential damage. This has many approaches, including root cause analysis, and may include the formation of teams involving maintenance, engineering, operations and suppliers. It may also be beneficial to invite third parties for direct involvement or for initial input or an appraisal to help guide future efforts. A second opinion on the cause and the need for rectification can also be helpful.

Choose a lube or bearing or seal supply company that is able to provide services to assist with determining the root cause of problems - one who works with the customer to determine an effective course of action. This also applies to the examination of used parts, such as bearings and filters, to determine if they provide any information on developing problems or optimizing maintenance. Services may include:

- Initial phone survey to gather information on the problem.
- Review of technical data and communication with other users, suppliers and/or manufacturers. Typed records will be prepared if necessary.
- Visit to the site to meet the customer and to examine the equipment and/or parts and technical data.
- Follow-up by phone and/or fax with appropriate suppliers.
- Determining what is required or performing additional testing as agreed with the customer, such as fluid analysis, metallurgical examinations, stress analysis, vibration analysis, bearing load-carrying analysis, etc.
- Preparing a short report containing technical data, photographs, discussion and recommendations as required. A draft will be sent to the customer for comment before the final report is issued.
- Optional: Working with the client to implement any recommendations, to arrange training or to participate in any further efforts to resolve the matter.
- Follow-up after a set period of time to clarify any recommendations and to obtain feedback.

The above work typically takes only one or two days, particularly if the plant is nearby, and verbal recommendations can often be given the same day. Completion of the final report depends on the effort required, but should be finished within 30 days. Thanks to digital cameras, it is easy to include photos, which can be extremely valuable. Preset dollar limits are the norm.

Brown's First Law of Applied Tribology

If it's running, it's wearing. If it's not running, it's probably worn.

Result 1: If not the above then it may be on standby in case something else wears out.

Result 2: If the equipment is not economical to run, this is likely due to a loss of efficiency as a result of wear.