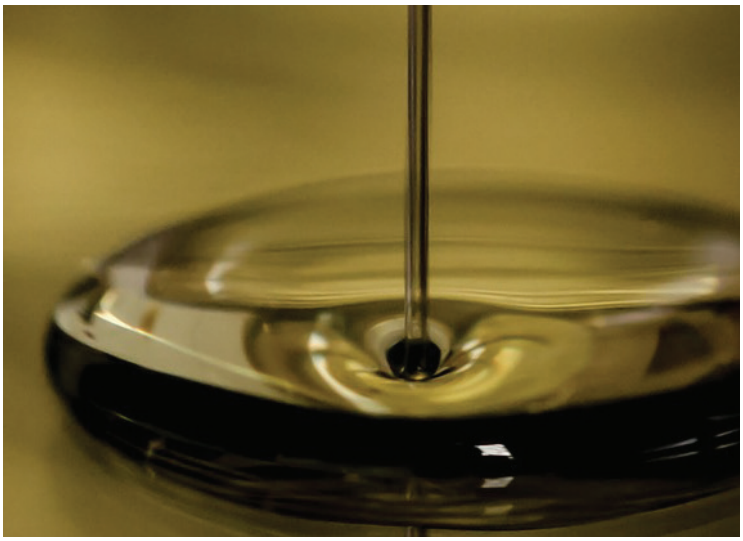
BEST PRACTICES:
LUBRICATION STORAGE AND HANDLING



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Poor storage conditions, container mishandling, and mismanagement of lubricant inventory can make for costly consequences, such as cross-contamination and disorganized upkeep. It is crucial to invest in equipment and maintenance practices that preserve lubricant cleanliness and improve productivity when filling and topping off systems. Good habits begin in a lubrication room that is set up for clean, easy handling. Shop for storage equipment here.

IS YOUR LUBRICANT ROOM SET UP FOR EFFICIENCY?

One indoor storage room (and one outdoor shelter if absolutely necessary) is the simplest way to ensure that inventory access is carefully managed. Moving between too many storage areas can cost time and make it difficult to log and track inventory. The best method for rotating lubricants is a "first-in, first-out" basis to avoid lubricant deterioration. Lubricants that were received earliest should be labeled as such and kept in a more accessible spot for future use.

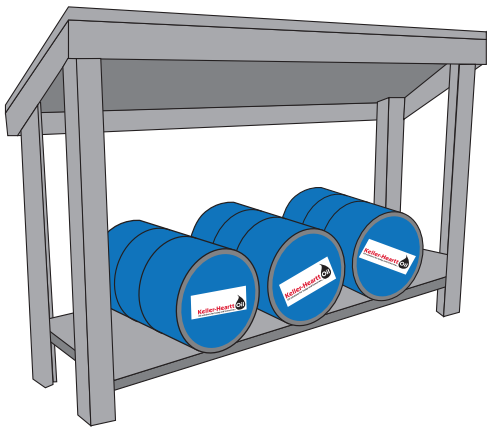
The room should be spacious enough to receive containers and move lubricants on and off racks, and this space should include a landing area for new lubricants once they are delivered. This working space should remain clean to avoid injury, and lubricants should not be stored near heaters or areas with excessive moisture (this includes the floor).

Indoor spaces must be clean and dry to keep dust and moisture from entering open, and closed, containers. Temperature consistency is also important in maintaining lubricant quality. Hot temperatures can create moisture and humidity, and cold temperatures can cause precipitation in lubricants with rust inhibitors. A well-ventilated room with racks that allow for horizontal stacking will keep moisture off the top of drums and away from the bungs so that water cannot enter the container.

OUTDOOR SPACE

Outdoor storage is not ideal for maintaining lubricants. Hot and frigid temperatures, rain, snow, dirt, and other elements can contaminate oil and grease and cause costly damage. Outdoor spaces, if necessary, should have a roof or overhead shelter to protect from rain and snow. If possible, keeping lubricants in a moderate temperature is the best way to protect from chemical degradation. If lubricants are water-based, this makes them vulnerable to evaporation and changes with extreme temperatures.

Similar to indoor spaces, outdoor spaces should have proper racks and shelving to store lubricants horizontally or, at the very least, in a tilted position. Drums should be covered or have bungs at the three and nine o'clock position to keep moisture out. Bulk tanks can benefit from filter breathers to prevent contamination. It is most important to keep the minimal amount of oil outside (including lubricants for emergencies), because excess inventory can deteriorate while idle on shelves.



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LUBRICATION CONTAINERS

Lubricants are packaged in four types of containers: Pails (up to 20L), Drums (up to 200L), Totes (up to 1600L), and Bulk Tanks. Deciding which containers are best for your operation depends on several factors:

1. What is the amount of storage space available? Is there enough area for bulk tanks? Or do you only have capacity for 55-gallon drums? There should be extra room for emergency lubricants in case of delayed delivery time of new oil and grease.

2. What is the average consumption rate? Based on previous experience, does oil get used up quickly? Are you filling up larger vehicles or machinery? A bulk tank may be the best option for high average consumption.

3. Supplier delivery time can alter the amount of lubricant stored at once. If suppliers deliver frequently, then it is not necessary to store more lubricant than is necessary to operate for that short period of time, especially if storage conditions are not ideal.

4. What does the manufacturer recommend for shelf life? If the shelf life is longer than six months, this will bode well for some lubricant that is not used immediately.

Once container capacity is determined, attention to lubricant packaging is vital to preserving the lubricant. The lubricant is not protected solely by the container. These containers, though manufactured to be leak-proof, can still absorb contaminants or leak if damaged by improper or rough handling. Maintenance personnel must compensate for container pitfalls with extra attention and upkeep, especially in regards to thermal siphoning.

Thermal siphoning, in which air moves between the atmosphere and the container's headspace above the oil, happens with temperature fluctuations. Essentially, the container breathes, inhaling air and available moisture as temperatures warm. When water enters a drum, it settles below the oil and increases the volume of the liquid in the container. This thermal siphoning can happen to new, unopened containers; therefore, a clean, dry environment is best for storage to avoid contamination and oxidation.

NEW LUBRICANTS AND ORGANIZING A SYSTEM

Unloading new lubricants requires careful handling. Drums can exceed 400lbs, so they should be unloaded from delivery trucks using lifts or skids to avoid injury to maintenance personnel and to keep the container from being damaged or perforated. Once unloaded, the container should be transferred to storage using a rounded fork jaw, a drum dolly, pallet, or by very carefully rolling the container on a flat, smooth floor space (requires two people).

It is easy to overlook newly arrived lubricants by assuming they are uncontaminated, because the containers are sealed and unopened. However, newly received lubricant can actually be dirtier than the desired standards of your facility due to the delivery process and other potential instances of contact with contaminants. When receiving lubricants, it is beneficial to filter them before use to extend product life and maintain efficiency.

LABELS

Organization is key for a productive, cost-effective operation. A "first-in, first-out" rotation system is only effective if containers and their appropriate dispensing and transfer equipment are labeled correctly. Not only should the labels be correct, they should also be easy to read and interpret. They can include a numerical system or be color coded, though color codes should be maintained where moisture or the elements cause fading, especially outdoors. The colors should also be accompanied by other indicators for maintenance personnel with color blindness.

The following information is useful for labeling and organizing your storage system:

- **Include the lubricant delivery date and estimated shelf life.**
- **Indicate the type of lubricant (i.e. synthetic oil versus conventional, grade, etc.).**
- **Label or record containers that have sustained damage or rust.**
- **Record initial oil analysis results and subsequent oil analysis results with dates to keep track of additive concentration and changes to the oil's quality.**

After containers are fitted with filters, liquid level gauges, hand pumps, and transfer equipment, and dispensing lines, a corresponding label should match transfer and dispensing equipment to the appropriate lubricant to prevent cross contamination and make dispensing as streamlined as possible.

TIPS FOR GREASE AND OIL STORAGE

Grease is vulnerable to dust and other contaminants, so good cleaning habits are valuable. Like oil, grease containers should be covered. Snap or Velcro covers will keep contaminants out, and opened grease tubes can be stored vertically in resealable containers for future use.

Grease guns should be cleaned regularly and stored in a clean, fire-proof cabinet along with grease rags and other equipment. These guns should also be calibrated regularly to make sure that grease is pumped from the gun at the same rate over time.

When water finds its way into either a grease or oil container, the water must immediately be pumped out or siphoned from the top of the grease container to prevent oxidation and rusting. Intermittent filtration is also important to keep oil clean over time. A filter cart can simplify this process.

Finally, paying attention to the makeup of your storage containers can prevent damage to your oil. For example, galvanized containers with zinc plating can react with additives to form harmful sludge and metal soaps that clog machinery. Understanding and researching common chemical reactions in storage can save time and money in extra maintenance.

TRANSFERRING AND DISPENSING

There are many measures that can be taken when transferring and dispensing lubricant to minimize cross-contamination and protect the quality of the lubricant. Before oil is removed from storage, the first step is to check the suspension of its additives. If the additives are not evenly distributed, or they have settled, then agitating the container or using a circulating rig for larger, bulk containers will redistribute those additives to maintain oil efficiency.

The oldest lubricants, or the lubricants that were stored earliest, should be used first. Before transferring or dispensing, filtration is necessary to remove contaminants that have been absorbed during storage. In the event that the lubricant comes into contact with moisture during the transfer process, filtration can be performed twice—once for dirt and dust, and a second time with a water filter to remove moisture.

If equipment is labeled properly, then matching lubricants with their appropriate dispensing equipment is a simple process. Proper labeling (plus cleaning or flushing between uses ensures that a hand pump, for example, does not dispense more than one type of oil back-to-back. If mixing is inevitable, and a piece of equipment must be used for more than one lubricant without proper cleaning, then maintenance personnel should research lubricant compatibility to see which lubricants can come into contact with the minimal amount of debasement.

Capped and sealed containers are best for transferring lubricant and topping up. Open containers will expose recently-filtered lubricant to dirt and impurities. Top-up containers that are washable, resealable, and include built-in pumps or spouts make topping up faster and easier. If the top-up requires a large volume of oil, a filter cart is the easiest option to move the oil from storage to the machine.

Even if lubricants have been carefully stored and filtered before use, adhering to best practices during the transfer and top-up processes guarantees that lubricants maintain their quality. Good storage techniques are wasted when precautions are not taken while readying lubricants for dispensation.

SAFETY AND THE ENVIRONMENT

Keeping maintenance personnel safe is just as important, if not more important, than protecting lubricants from the elements and contamination. So, what should you look out for?

1. Beware of spills. Handling drums, pails, and bulk containers with care will prevent spills caused by dropped and damaged containers. In case of spills, keep pads and granules ready, and clean floors and other equipment immediately with solvents and degreasers.

2. Drums and bulk containers are heavy. Never roll drums with less than two people, and protect maintenance personnel with back support and steel-toed shoes.

3. Remember, lubricants are chemicals. Eye and skin contact can be harmful, as can ingestion and inhalation. Hazardous materials should be visibly labeled, and dirty rags should be kept away from skin. Gloves, safety goggles, and proper ventilation are crucial for safety and protection. Information sheets with chemical safety guidelines should also be posted in and around the facility.

4. Some lubricants can be flammable or become flammable under certain conditions. Lubricants with a flashpoint below 55° C should be stored and kept away from heat. While many lubricants are not flammable, they can become flammable when contaminated with sawdust and other materials. In case of emergency, CO2 and other dry chemical extinguishers should be on hand.

ENVIRONMENTAL AWARENESS

Government regulations should be followed and enforced in the case of storing, dispensing, and removing waste lubricants. Spills should be safely and properly contained, and containment structures must be used when required by law.

When lubricants can no longer be used, they must be disposed of properly at approved sites or pre-treated and burned if appropriate. If the facility has floor drains, they must not connect to sewer lines, because hazardous materials will enter the environment in an illegal, uncontrolled way.

CONCLUSION

Storing and handling lubricants with concern for safety, contamination, organization, and productivity gives any operation a positive, competitive edge. Creating an environment that promotes proper labeling, cleanliness, and disciplined practices will prove to be fruitful both financially and with time management.