



Lubricant Storage and Handling and Shelf Life Guidelines

Key Storage and Handling Tips

Proper storage and handling of lubricants is crucial to maintaining the product integrity. There are five key factors to proper lubricant storage: keep it clean, keep it cool, keep it dry, know how to spot contamination, and practice FEFO (first expired, first out) inventory management.

Keep It Clean

Contamination is generally thought of as particulate (dust, dirt, etc.) and water. It can come from ambient air, precipitation, or dirty transfer equipment. All transfer equipment should be labeled or color coded for a specific product and dedicated to that product. Pumps and hoses should be dedicated or well flushed between product transfers. Store product handling equipment in a cabinet to minimize the chance of contamination. Keep drums indoors. In-use drums should have a desiccant filter breather attached to the drum's small bung opening. Drums stored outdoors should be stored on their sides and have the bungs positioned at the 3:00 and 9:00 positions to reduce drum "breathing" during temperature cycles.

Keep It Cool

The optimum storage temperature for most lubricants is 32–77°F. Temperature extremes and proximity to sources of heat should be avoided. Products containing water (emulsifiable metalworking fluids, fire resistant hydraulic fluids) must be kept from freezing. Exposure to direct sunlight should be avoided. Temperature cycling will cause drums to "breathe," when they expand and contract, which can draw in dirt and moisture from the air during contraction. This can occur even when drums are sealed.

Keep It Dry

Water contamination reduces oil life and equipment life through increased wear, corrosion, oxidation, additive depletion, increased viscosity, and filter plugging. Pumps, hoses, and other transfer equipment must be kept dry. Lubricants can absorb water from humid air and condensation. Do not wash down drums that are in storage. Drums stored on the ground or bare concrete will rust more quickly. Drums should be stored on racks, wooden blocks, or pallets.

Know How to Spot Contamination

New oil should be bright and clear. Contamination with water can cause a hazy or milky appearance, especially as the oil cools. Hazy appearance or significant sediment in the bottom of the container can indicate particulate contamination. A significant change in color may indicate oxidation or mixing with a different oil. The presence of gel or a sticky residue at the bottom of a container may indicate additive separation. A pungent odor may indicate oxidation or bacterial contamination (especially water-containing metalworking products). Normal lubricant aging is typically indicated by a gradual color change, minor settling of additives, or minor surface oil separation in grease.

Practice FEFO (First Expired, First Out) Inventory Management

The stock with the earliest expiration date should be used first, regardless of when it was received, to avoid excessive aging of product. Follow the shelf life guidelines below. The CITGO trace code includes date information. The trace code format is four or five numbers (batch number), letter (usually O or C indicating the blend plant location), and four digits indicating the date. The date format is the Julian date – the three-digit numerical day of the year followed by the last digit of the year.

Best in Class Storage and Handling Considerations

Lube Room Design

A well-designed lube room is one which holds the right amount – enough to cover the needs plus some contingency, but not so much that the product is held beyond its shelf life. The lube room should be well-organized, with space for totes and drums, shelves for storage of pails, cans, tubes, etc., and storage cabinets for in-use containers and grease guns.

Bulk Oil Storage

Bulk oil storage tanks should be sized to hold the appropriate volume. Tank size can be determined by analyzing the rate of consumption, based on normal use and any emergency situation that might arise. It should also take into account the normal product delivery time. This information allows for proper bulk oil tank sizing.

Packaged Lubricant Storage

Packaged lubricants should be stored indoors, out of exposure to precipitation, and out of direct sunlight. Climate controlled storage is best, but not always possible. The storage location must be away from any heat sources. Drums should be stored on their sides, with the bungs at the 3:00 and 9:00 positions to keep them covered with lubricant, reducing the breathing of atmospheric air as the drums warm and cool. Metal containers should not be placed directly on bare ground or concrete. Wood blocks or pallets should be used to keep containers elevated. If the containers must be stored outdoors, a lean-to cover or waterproof tarpaulin can be used to protect them from weather and sunlight. Product containers should be positioned to make all labels visible. Follow FEFO (first expired, first out) inventory management practices.

Packaged lubricants must be handled safely. Drums of oil or grease typically weigh about 450 pounds. Grease kegs weigh about 130 pounds. Use hydraulic lifts, chain-operated hoists, forklifts, drum dollies, etc. to handle drums. Pails of oil or grease weigh about 35 pounds. Never allow drums to be dropped. Dropping can cause the welded seams to leak. Workers handling drums and other containers should wear steel-toe shoes to protect against possible injury from a drum or other container dropped or rolled on their foot.

New Oil Receiving

It is important to keep accurate records of the receipt of oil deliveries. There should be a written receiving procedure. As a minimum, keep a record of the following information: Date, Material Code and Full Product Name, Volume Received (Bulk), Number and Size of Containers, Person Performing the Receipt. A current SDS for each product should be on file. Storage areas for packaged product should be labeled with the material code and product name of the product to be stored. Bulk storage tanks, nozzles, and valves should be labeled with the material code and product name.

Product Dispensing

Bulk oil containers should be fitted with a sight glass or other level measuring device, a desiccant filter breather to keep particulate and moisture contamination out of the container, and dry-break hose connectors. Containers used for transport and top-up of lubricants should be labeled with the material code and product name. The container should have a built-in spout and the capability of being sealed when not in use.

Grease Handling and Storage

Store grease containers in a cool, clean, dry indoor area. Keep containers tightly covered. Wipe off container edges before opening to remove product. Minor separation of oil from grease is normal and expected. The oil that may separate from grease upon storage can be mixed back into the grease using a clean spatula or similar tool. If grease becomes cold in storage, place it in a warm location for a sufficient time to bring it to a satisfactory temperature for dispensing. Never use a drum heater or place grease in a hot room. All grease handling tools (spatulas, pumps, follower plates, etc.) must be clean before using in contact with grease. The surface of grease in a partially used container should be level and smooth, with any void spaces filled in. Grease tubes should be stored upright with the removable cap up.

Shelf Life Guidelines

Lubricant shelf life is very sensitive to storage and handling. Air, light, moisture, and temperature can all have negative effects on the condition of unused lubricants.

Even if a stored product still meets its original specifications, consideration should be given to whether it meets the OEM, licensing, or performance requirements of the equipment in which it will be used, particularly if the equipment is under warranty, as specifications and performance categories change over time.

The below chart should be used as a starting point for considering the suitability of stored products. The CITGO Product Answer Line is available by phone and email to help you make such assessments.

Type of product	Expected shelf life in optimal conditions	Special considerations	Common signs of possible storage instability
Heavy Duty Engine Oils (Diesel Engines)	5 years	Ensure product meets specifications for intended use	Significant sediment (more than a trace) Cloudy appearance (moisture) Strong odor (oxidation, contamination)
Passenger Car Motor Oils (Gasoline Engines)	5 years	Ensure product meets specifications for intended use	Significant sediment (more than a trace) Cloudy appearance (moisture) Strong odor (oxidation, contamination)
4-Cycle Small Engine Oils	5 years	Ensure product meets specifications for intended use	Significant sediment (more than a trace) Cloudy appearance (moisture) Strong odor (oxidation, contamination)
2-Cycle Small Engine Oils	2 years	Ensure product meets specifications for intended use	Thickening or volume loss due to evaporation of solvent

Industrial Gas Engine Oils	5 years	Ensure product meets specifications for intended use	Significant sediment (more than a trace) Cloudy appearance (moisture) Strong odor (oxidation, contamination)
Railroad Engine Oils	5 years	Ensure product meets specifications for intended use	Significant sediment (more than a trace) Cloudy appearance (moisture) Strong odor (oxidation, contamination)
Manual and Automatic Transmission Fluids	5 years	Ensure product meets specifications for intended use	Significant sediment (more than a trace) Cloudy appearance (moisture) Strong odor (oxidation, contamination)
Automotive Gear and Axle Lubricants	5 years	Ensure product meets specifications for intended use	Significant sediment (more than a trace) Cloudy appearance (moisture) Strong odor (oxidation, contamination)
Tractor Transmission / Hydraulic Fluids	5 years	Ensure product meets specifications for intended use	Significant sediment (more than a trace) Cloudy appearance (moisture) Strong odor (oxidation, contamination)
Process Oils	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
General Purpose Oils	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Bearing and Circulating Oils	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Mineral and Synthetic Turbine Oils	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Mineral and Synthetic Hydraulic Fluids (except food grade)	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Fire-resistant Water Glycol Hydraulic Fluids (including food grade)	2 years	Avoid freezing temperatures, as water component may separate	Product Separation
Mineral and Synthetic Industrial Gear Oils (except food grade)	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Cylinder Oils	2 years	Avoid freezing temperatures, as water component may separate	Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Open Gear Lubricants	2 years		Loss of volume due to solvent evaporation
Air Compressor Lubricants (except food grade)	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)

Natural Gas Compressor Lubricants	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Industrial Gas Compressor Lubricants	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Refrigeration Compressor Lubricants (except food grade)	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Metalworking Fluids (neat)	3 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Metalworking Fluids (emulsifiable)	2 years	Avoid freezing temperatures, as water may separate	Product separation
Greases: Lithium, Lithium Complex, Calcium, Calcium Sulfonate	3 years	Store containers upright to minimize oil separation Store tubes upright to prevent leakage	Excessive oil separation Significant change in consistency from original NLGI grade Color or odor change
Greases: Aluminum Complex	1 year	Store containers upright to minimize oil separation Store tubes upright to prevent leakage	Excessive oil separation Significant change in consistency from original NLGI grade Color or odor change
Food Grade Lubricants	5 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Food Grade Greases: Aluminum Complex	1 year	Store containers upright to minimize oil separation Store tubes upright to prevent leakage	Excessive oil separation Significant change in consistency from original NLGI grade Color or odor change
Food Grade Greases: Calcium and Calcium Sulfonate	3 years	Store containers upright to minimize oil separation Store tubes upright to prevent leakage	Excessive oil separation Significant change in consistency from original NLGI grade Color or odor change
Vegetable Oil Based Biodegradable Lubricants	2 years		Cloudy appearance (moisture) Color or odor change (oxidation, contamination)
Other types of lubricants not listed	Contact the CITGO Product Answer Line at 800-248-4684 or lubeshelp@citgo.com		