



Lubricant Storage and Handling

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- BS, Chemical Engineering
- 39 Years Experience in Lubricants
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 - Oil Monitoring Analyst I
- NLGI Certified
 - Certified Lubricating Grease Specialist
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Agenda

- The Five Keys to Lubricant Storage
 - Lubricant Storage Practices
 - Fluids
 - Grease
 - Lubricant Handling Practices
 - Bulk
 - Packages
 - Lube Room
 - Cold Weather Considerations
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Lubricant Storage and Handling

The Five Keys to Lubricant Storage



The Five Keys to Lubricant Storage

- Keep it Clean
 - Keep it Cool
 - Keep it Dry
 - Know how to Spot Contamination and Instability
 - Practice FEFO Inventory Control
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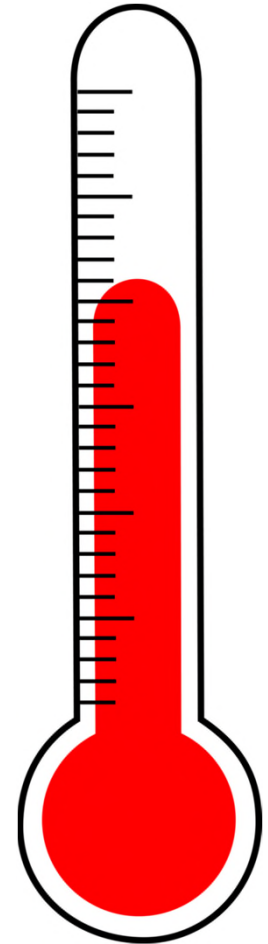
Keep it Clean

- Sources of contamination:
 - Air, airborne particles, and water ingress
 - Dirty transfer containers and equipment
- Label and/or color code containers and funnels
 - Dedicate containers to products or product families
 - Sealable containers are best
- Use separate pumps and hoses for each product type
- Keep clean rags, sampling equipment, and small containers in a storage cabinet



Keep it Cool

- Exposure to extreme high or low temperature shortens shelf life
- Product separation or additive degradation can occur
- Optimum storage temperature is 32 – 77°F
- Products containing water or fatty oils must be kept from freezing
- Avoid storage near heat sources
- Avoid light exposure – keep in original container
- Avoid temperature variation – containers “breathe” when the temperature changes, drawing in air, moisture, and dirt



Keep it Dry

- Water contamination reduces both oil and equipment life
 - Excessive wear
 - Corrosion
 - Filter plugging
 - Oxidation
 - Increased viscosity
 - Additive degradation and depletion
- Lubricants absorb moisture from humid air and condensation
- Transfer containers, funnels, pumps, and hoses must be kept dry



How to Spot Contamination and Instability

- New oil should be bright and clear
- Milky appearance – water contamination
- Color change – oxidation or oil mixing
- Haze or visible sediment – particulate contamination
- Gel or sticky liquid at bottom – additive separation
- Atypical odor – oxidation or microbiological contamination
- Normal lubricant aging:
 - Gradual color change
 - Minor additive settling
 - Minor oil separation from grease



Practice FEFO Inventory Control

- FEFO – First Expired, First Out
- The product with the earliest expiration date in inventory should be used first
- Be aware of product shelf life
- Mark containers with date received
- CITGO Trace Code (Batch Number) format:
 - 12345X6789
 - 12345 – Sequential batch identification from lube plant
 - X – Plant code – C for Cicero, O for Oklahoma City
 - 6789 – Julian Date – Day of year and year
0991 = April 9. 2021

FEFO

Lubricant Storage and Handling

Lubricant Storage Practices

Lubricant Storage Practices - Fluids

Bulk Oils

- Tanks should be designed with a raised suction line, bottom drain, and desiccant filter breather.
- Fill line extends below minimum oil level.
- Best Practice – Dedicated pumps, lines, and hoses for each tank.
- If tanks are manifolded, assign similar products to each manifold.
- Common lines must be well-flushed to minimize cross-contamination.
- Always plug or cover hose connections and store hoses properly.



Lubricant Storage Practices - Fluids

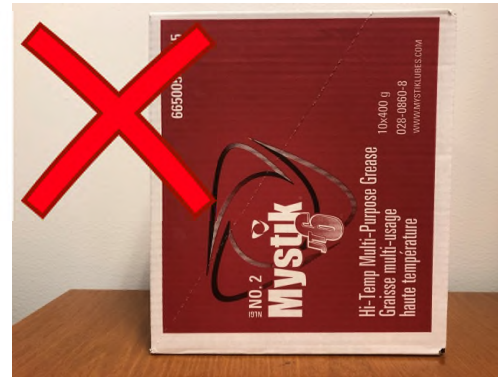
Packaged Products

- Store packages indoors if possible.
- For in-use drums, install a spigot in the 2" opening and a desiccant filter breather in the 3/4" opening.
- If stored outdoors, store drums on their side with bungs at 3 and 9 o'clock positions and keep bungs sealed until use.
- Store kegs and pails indoors in a lube room.
- Keep containers out of wash-down areas.
- Store drums and kegs on pallets or planks to keep off the ground or other damp surface.
- Store totes and other packages away from heat sources and out of direct sunlight.



Lubricant Storage Practices - Grease

- Store grease drums and kegs upright and off the ground or floor on pallets or planks.
- Store pails upright on lube room shelves.
- Store tubes, tubs, cans, etc. upright to prevent oil separation and leakage of oil.
- Store grease containers away from heat sources and out of direct sunlight.



Lubricant Storage and Handling

Lubricant Handling Practices

Lubricant Handling Practices – Bulk Oils

Bulk Product Transfers

- Lubricants are to be transported in appropriate containers or vessels including compartments, manifolds and unloading lines that have been thoroughly drained and flushed in accordance with industry standards.
- When delivery is made, products must be unloaded into proper tank storage.
- Products should be off-loaded in the following order:
 - Hydraulic Oils
 - Automatic Transmission Fluids
 - Ashless Gas Engine Oils
 - R&O Oils
 - Engine Oils
 - Gear Lubes (Sulfur-Phosphorus EP Oils)
- Pumps should be reversible to allow lines to be “blown” or cleared in order to minimize line flush and product contamination.



Lubricant Handling Practices – Bulk Oils

Bulk Product Transfers

- A sample is to be taken either from the compartment or from the manifold after two (2) full manifold volumes have passed through, and inspected for evidence of water or other contamination.
- A retain sample of at least eight (8) ounces of each product delivered shall be retained for a minimum of six (6) months.
- This sample should be labeled with the material code, the product name and grade, the date received, and the CITGO bill of lading number.
- Inspect the sample for evidence of water or other contamination.
- If contamination is detected, drain off additional product until the sample is bright and clear.





Lubricant Handling Practices – Bulk Oils

Bulk Product Transfers

- **Tankage and related equipment** must be constructed and maintained to prevent contamination of the contents and clearly marked for easy identification of contents.
 - Facilities must be provided for pumping tank completely empty and for cleaning when required.
 - When changing tank service, consult with CITGO regarding the need for tank cleaning.
 - **Receiving lines** shall be clearly marked.
 - When a common line or hose is used, it shall be cleaned and flushed to meet product compatibility guidelines.
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Lubricant Handling Practices – Bulk Oils

Bulk Product Transfers

- **Product lines** are to be clearly marked for product identification.
 - Each line should be dedicated to the product, or if a common line, must be drained and flushed between products.
 - **Common pumps** and meters shall be drained and flushed between products to avoid contamination.
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Marketer Packaging Guidelines

CITGO® Lubricants Marketer Packaging Guidelines

Instructions for Proper Handling of CITGO Lubricants

CITGO Lubricants must be handled with care to assure product integrity, package identity and correct fill. Your CITGO customers deserve the type, grade and quantity of lubricant specified. Those engaged in CITGO Marketer packaging operations must ensure all facilities meet acceptable standards and are operated in a careful, professional manner.

1. RECEIVING

Lubricants are to be transported in appropriate containers or vessels including compartments, manifolds and unloading lines that have been thoroughly drained and flushed in accordance with industry standards.

When delivery is made, Marketer Packager personnel are to be on-hand to ensure products are unloaded into proper tank storage. *Products should be off-loaded in the following order:*

- Hydraulic Oils
- Automatic Transmission Fluids
- Ashless Gas Engine Oils
- R & O Oils
- Engine Oils
- Gear Lubcs (Sulfur-Phosphorus EP Oils)

Pumps should be reversible to allow lines to be "blown" or cleared in order to minimize line flush and product contamination.

A sample is to be taken either from the compartment or from the manifold after two (2) full manifold volumes have passed through, and inspected for evidence of water or other contamination. A retain sample of at least eight (8) ounces of each product delivered shall be retained for a minimum of six (6) months. This sample should be labeled with the product name and grade, date received and the CITGO bill of lading number.

Inspect sample for evidence of water or other contamination. Drain off additional product until product sample is clear.

2. BULK STORAGE AND HANDLING

Tankage and related equipment must be constructed and maintained to prevent contamination of the contents and clearly marked for easy identification of contents. Facilities must be provided for pumping tank completely empty and for cleaning when required. When changing tank service, consult with CITGO regarding the need for tank cleaning.

Receiving lines shall be clearly marked. When a common line or hose is used, it shall be cleaned and flushed to meet product compatibility guidelines. Refer to the CITGO Lubricants Compatibility Chart.

Lines to filling equipment are to be clearly marked for product identification. Each line should be dedicated to the product, or if a common line, must be drained and flushed between products.

Common pumps and meters shall be drained and flushed between products to avoid contamination.

A schematic of the repackaging facility shall be provided to CITGO. This schematic will clearly illustrate tankage, lines, hoses, valves, pumps, meters and other significant plant features. An update of this schematic is to be provided to CITGO whenever a significant change is made to the bulk or repackaging facility.

3. CONTAINER STORAGE AND INSPECTION

Empty containers shall be stored under cover in a manner to protect the appearance of the containers and prevent rust, corrosion or deterioration of the container. Containers are to be inspected immediately prior to being filled to ensure there has been no accumulation of moisture or solid debris. This inspection shall be performed with lighting adequate to clearly inspect the entire interior.

Color of containers shall conform to CITGO standards per Exhibit "B" of the Lubricant Packaging and Trademark Agreement.

Labels are to be stored indoors.

4. FILLING

Marketer Packager is responsible to fill authorized packages as provided by Exhibit "A" of the Lubricant Packaging and Trademark Agreement with proper quantity to ensure that all applicable federal, state and local weights and measure requirements are met. A screen or filter, 60-mesh or finer, is required downstream from the filling line pump. The filling operation is to be under cover in a dust-free area. A sample (8-oz. minimum) must be retained from each packaging lot for a period of six (6) months.

5. LABELING

Labels are to be purchased from CITGO Petroleum and applied in accordance with CITGO Lubricants container decorating instructions.

6. MEASURING EQUIPMENT

Measuring equipment must be accurate, well maintained and certified by state or local authorities as required. Provisions must be made for temperature correction of volume measurements.

7. RECORDKEEPING

Books or logs shall be kept so that a clear record of the following is maintained:

Every Product	Every Filling Run
Product name and grade	Product name and grade
Date and bill of lading number – carrier	Date and lot number assigned
Receiving tank	Tank drawn from
Volume of tank before and after delivery	Number and type of container

8. STORAGE AT EXTREME TEMPERATURES

Exposure of lubricants to either abnormally high or low temperatures can result in temporary or permanent damage, depending upon the nature and composition of the product. Again, it is the additive-containing products that are most subject to harm.

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Container Decorating Instructions

LABELS
Only CITGO Lubricants authorized container labels are permitted. Labels and product information will be provided by CITGO. The current CITGO approved label specifications are as follows:

Each set = 1 label 8-7/8" x 8-1/4" and 1 label 1-7/8" x 8-1/4"

These labels are printed five colors on computer printable vinyl. The labels use a special permanent adhesive with an application temperature range of 0°F to +100°F, but should be stored in at room temperature controlled environment. Shelf life of these labels should be approximately one (1) year.



FRONT

DRUMS

Layout and Positioning

Labels will be positioned as shown.

The top edge of the large CITGO label should be placed 1/2" below the flange of the small bung. The top edge of the small label should be placed 1" below the top drum rim, lined up with the large label on top. (Note: For drums filled on pallets: The top edge of the small label should be placed 1" below the top drum rim, centered below the small bung.)

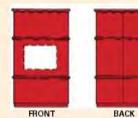
Container Color Code

55 Gallon/400 Pound
ALL, unless otherwise noted: Bottom, body and chimes Steel Shipped Container Institute (SSCI) Tomato Red (Red #103) with white head.



DRUM FLANGE SEALS

Drum seals provided by CITGO at its option. When not available, plain or non-embossed seals may be used.



FRONT

BACK

KEGS

Layout and Positioning

Labels will be positioned as shown.

16 Gallon/120 Pound Drums
The large CITGO label should be placed in the middle of the drum between the two rolling hoops. The small label should be placed in the middle of the drum head lined up with the large label.

Container Color Code

16 Gallon/120 Pound
SSCI Tomato Red (Red #103) for body and head.



PAILS

Center and apply CITGO pail label on one side of the pail between bail handle. Center and apply form label on opposite side of the pail between bail handle. Dispose of strip label.

Container Color Code

5 Gallon/25 Pound
SSCI Tomato Red (Red #103) for body and head

For further technical assistance or questions, please contact the CITGO Lubricants Product Answer Line at 800-248-4884 or lubshelp@CITgo.com.

For label assistance or questions, please contact CITGO Lubricants Customer Service at 800-455-0007, option 2 (West Region) or 800-331-4068, option 2 (East Region) or lubserv@CITgo.com.

Lubricant Handling Practices - Packages

- Drums and kegs should be stored indoors on pallets or planks.
- Pails and smaller packages should be stored on lube room shelving.
- Store away from heat sources and out of direct sunlight.
- Store with labels visible.
- Always use oldest product first, respecting shelf life.



Proper Storage and Handling of Grease

Grease is packaged into a variety of containers:

- 3-oz. tube
- 14-oz. tube
- 1-lb. can
- 4-lb. tub
- Aerosol can
- 35-lb. pail
- 120-lb. keg
- 400-lb. drum
- 2400-lb. tote
- Bulk



Proper Storage and Handling of Grease

- Grease should be stored indoors, out of direct sunlight and where water cannot accumulate on the container lid.
- Containers should be stored upright.
- Minor oil separation may occur at the grease surface during storage.
- Separated oil should be remixed with a clean tool before use.
- When grease is removed from a container, the surface of the remaining product should be smoothed flat to minimize oil separation.
- Inclusion of air bubbles in grease should be avoided.





Lube Room Best Practices

- A clean, well organized lube room promotes proper lubricant handling and application.
 - Bulk oil should be stored in elevated bins fitted with desiccant filter breathers.
 - Each bulk oil bin should be clearly labeled and possibly color coded.
 - Drums should be on racks or cradles, with desiccant filter breathers attached to the small opening.
 - Smaller packages should be arranged neatly on shelves.
 - Do not store solvents, cleaners, etc. with lubricants.
 - Funnels, dispensing containers, etc. should be kept clean, possibly inside plastic zipper bags.
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Lube Room Best Practices



Cold Weather Considerations



- Recommended storage temperature range: 32 - 77°F
- Low temperature exposure can cause additive separation.
- Products containing water (MW soluble oils and coolants) and fatty oil (cylinder oils) degrade below 32°F and must be kept from freezing.
- Best Practice – Keep lubricants and greases indoors in a warm place during cold weather.
- Alternative – bring drums, kegs, etc. indoors overnight before using the next day.
- NEVER place a band heater on a grease drum or keg.



How to Contact Us

- Lubes Answer Line

800-248-4684

8:00 AM - 12:00 PM, 1:00 PM – 5:00 PM CT
Monday through Thursday

8:00 AM - 12:00 PM, 1:00 PM – 4:30 PM CT
Friday

lubeshelp@citgo.com



Future Webinars

April 30, 2021

Tips for Selling Grease

May 21, 2021

Hydraulic Fluids Selection and Sales

May 28, 2021

Off-Road Products

June 11, 2021

Tractor Hydraulic Fluids

June 25, 2021

Clarion Lubricants for the Food and Beverage Industries
