

GREASE APPEARANCE: DOES THE COLOR OF GREASE MATTER, AND WHAT DOES OIL SEPARATION MEAN?

Lubricating greases use a thickener to deliver a formulation of base oil and additives when lubricating oils alone are not practical i.e., open gears, bearings, pins and bushings, etc. Grease is mostly composed of base fluid, 75-95%, followed by 5-30% thickener, and 0-15% additives. The additives help provide most of the unique features of the grease. The base fluid portion of the grease is typically composed of Group I and Group II mineral base stocks. The percentage of each base fluid depends, in most cases, on the desired base oil viscosity of the finished product.

The critical properties of a lubricating grease thickener depends on the application, but consistency (hardness/softness), dropping point, corrosion and wear protection, water resistance, and protection from extreme pressure and shock loads are common considerations. It is important to understand that no specific color ever reflects any of these critical properties just mentioned.

Grease Color

Lubricating greases are available to consumers in a variety of different colors, shades and opacities. These colors are achieved by the addition of an appropriate dye that does not affect the lubricating properties of the grease. The principal reason for adding color to a grease is for easy identification by the end user;

hence, the color does not necessarily indicate a particular application. While red greases are often used in automobile chassis points, electric motors, or even wind turbines, it is important to confirm by reviewing the label or product data sheet.

As the major components of the grease formulation, the base oils used at grease production facilities are secured locally when possible. There is color variability within base fluids from different refineries, even those having the same properties. Therefore, the same grease product from two different manufacturing locations can show differences in color intensity or tone. This can be seen in greases that contain dye but is especially true of greases that do not. The color differences of base oils and grease products yielding the same properties can be seen in Figure I and II.

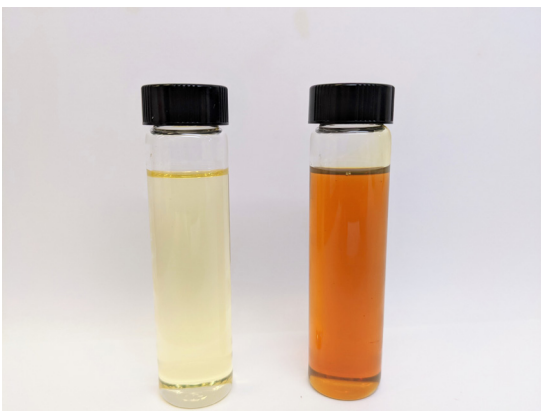


Figure I Two different Group I Base Fluids



Figure II The same grease from two different manufacturing locations



Grease Oil Separation

Texture and Appearance During Storage

Changes in grease properties during storage are dependent upon the thickener type and concentration, the base fluids, and the additives used. The grease may also exhibit a slightly “lumpy” or “grainy” texture or develop minor surface cracking, often in association with some oil separation as it ages, usually after a period of several weeks to several months. Again, no loss of lubricating performance is associated with this texture change. The texture of the grease is restored by simply stirring the grease or by the action of a grease pump in dispensing the grease.

Oil separation can accelerate when stored in temperatures over 43°C (110°F). If grease is removed from a drum or pail, the grease surface should be smoothed to prevent oil separation into the cavity. Any divots or potholes increases surface area that allow more oil to separate. Oil separation values of up to three percent have been observed.

Polyurea greases are especially prone to separation, which is normal, but guidelines are in place to determine acceptable limits. See Chevron SRI Grease NLGI 2 – A Users Guide, for more information.

If separated oil is found in new, unopened containers and is not found to be excessive, take the following actions:

- The oil can simply be poured off (or can be removed by means of an absorbent bag or other absorbent material) and the container resealed. Grease performance will not be harmed.
- The oil can be stirred back into the first few centimeters and inches of grease using a large spatula, the surface of the grease can then be smoothed and the container resealed.

If excessive oil separation is observed, contact your Chevron Representative.

Oil separation observed in cartridges can be poured off and dispensed as normal. When storing the cartridge in the dispenser, it should be depressurized and stored horizontally to mitigate oil from coming out of the nozzle creating a housekeeping issue.

Recommended Storage Conditions and Practices for Greases

1. Store greases in a cool dry indoor area where airborne particles are at a minimum. Indoor storage also prevents label and container deterioration from exposure to weather. The ideal storage temperature range is between 0°C (32°F) to 25°C (77°F).
2. Cartridges should be stored vertically, cap end on top, to lessen oil separation.
3. If drums must be stored outside, use plastic covers or tip oil drums to direct water and contamination away from the bungs. Always store greases upright to mitigate oil separation.
4. When necessary, bring grease to satisfactory dispensing temperature just prior to use.
5. Rotate inventory. Check the container fill date and use the oldest container first.
6. Keep containers tightly covered or closed to avoid contamination.
7. Wipe off the tops and edges of containers before opening to avoid contamination.
8. Use clean tools and equipment when pumping or handling greases.

Oil Separation During Service

It is necessary to have oil separation from the thickener during service because again, the thickener serves as the mode of delivery of the lubricating oil. When the metal parts move and apply pressure to the grease, the base oil and additives release from the thickener matrix to lubricate the moving parts. When the parts stop, the oil is reabsorbed back into the thickener. In some cases, if significant oil does not reabsorb back into the thickener, this is also known as “bleeding” and some of the causes are due to using the wrong grease, gross contamination, or incompatibility.

When changing an application over to another grease, there is a risk of incompatibility. While greases with the same thickener are likely compatible, other additives within the formula might not be. This can result in consistency or performance changes. Conversion to a grease with different thickener should especially proceed with caution. Also, while lithium thickener remains the most prolific, a greater variety of other thickeners are becoming available due to lithium demands for batteries. Refer to Grease Compatibility and Grease Lubrication Practices for more information on grease compatibility.