"Gooey Old Grease"

A Basic Understanding Of Lubricating Grease

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"GOOEY OLD GREASE"

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Welcome to this issue of *DPS Technical's "Tech Info*. I thought that I would give some attention to a lubrication subject that is often overlooked, which is the importance of lubricating grease. In this article I wish to bring a basic understanding of the importance of the different types of lubricating grease for automotive, watercraft, motorcycles and general industrial applications.

Grease is often considered as one of the "Fill-For-Life" lubricants, and this may be true, because if grease lubricated components are not maintained, the component may die, resulting in new grease being installed, along with the new part. Sorry, just some lube engineer humor…

Grease is one of those products that performs many very important functions, but is not talked about often. Grease is one of the oldest types of lubrication, and its history dates back to when mechanical devices first required lubrication.

Grease in automotive applications performs many functions; it is used to provide lubrication to moving parts where regular fluid lubrication is not possible or practical. Grease is a "thickened" lubricating product that is manufactured with a consistency to "stay-in-place". Grease also often provides a sealing function to keep contamination out of moving parts, to encapsulate and neutralize foreign materials such as acids, water, and other corrosive or abrasive materials. Grease also is formulated to hold the necessary additives onto the surface to provide proper lubrication & protection, as well as to provide protection from shock loading.

There are *many* different types of greases, with widely varying chemistries and functions, but this article is intended to only give a brief overview of the products that we may use for our vehicles.

In most of our workshops we will usually have 3 types of grease for our vehicles. Generally we will have White Grease, Brown Grease and Dark colored Grease. It is important to have an understanding of some of the primary specifications pertaining to Grease.

The ***Viscosity*** or "thickness" is expressed in a NLGI Number. Liquidizing Temperature or ***Dropping Point***, and the ***Maximum Load Carrying*** capability, usually expressed with a Timken bearing "OK Load rating" of the product. It is also useful to have an idea of what ***Type of Thickener*** is used in the grease.

The NLGI (National Lubricating Grease Institute) has many other standards, specifications, and terms to rate and identify grease, but due to space considerations it is not possible to go into full detail in this article.

The NLGI number indicates the consistency or Viscosity "thickness" of grease. The higher the number, the "stiffer" the grease. The

Automotive application greases are generally a #2 Grade, with the exception of the grease that goes into antique vehicles gear cases and rear ends, and the grease which is used for the CV joints in front wheel drive vehicles or in some equipment. These applications require a thinner type of grease, usually a "00" and additionally, the FWD grease may have special lubricating properties. "00" type greases are more fluid than a #2 grease, and generally will not "cake" and starve the intended lubrication points, however a semi-fluid grease generally requires mechanical assistance to insure that it stays in place. The liquidizing temperature or *Dropping Point* is an important specification because it is an indication of the temperature where the grease thins & turns back into oil, and will start to run. This specification is referred to as the *"Dropping Point"*.

In the event that the lubricating surface gets contaminated or too hot, or if a grease with too low of a Dropping Point is used in a high heat application, the grease may melt, and run away from the required lubrication point, and a lack of lubrication failure may occur.

The load carrying capability of grease is also a very important specification to consider. This is indicated by referring to a load test specification, such as the Timken bearing test, and is identified as ***"Timken OK Load"*** with pounds of load applied. For instance, White grease is a product that is good for use on rubber, plastic or low-load pivot points & linkages. White grease may have a Timken OK Load of 20-30 Lb., and have a dropping point of 275°-350° F.

A "General Purpose" Chassis grease (usually amber-brown in color) may have a Timken OK Load of 30-40 Lb., and a dropping point of 300° -400° F.

An "EP" or Extreme Pressure Bearing Grease (usually very dark in color) may have a Timken OK Load of 60+ Lb. with a dropping point of 375°- 500° F. Some specialty greases will have higher dropping points and might be a requirement for some applications.

The color of the grease is *not* a sure way of knowing what the load carrying capability of the product is, however generally speaking, the darker the product, the higher the concentration of load carriers, friction reducers and anti-wear components, such as Molybdenum, Graphite etc. Be aware that greases are often tinted for identification purposes, and the color is not an accurate way of rating a grease's specifications.

Each type of grease has its own perfect use, and may not be *ideally* suited to interchange with the other types of grease for proper lubrication. It is also important to note that due to the components used in greases, certain other considerations may be a factor in the correct selection of a grease, including clean-up, other grease compatibility, solubility in oil, pollution, health risks etc.

The thickener that is used in different types of grease is a very important factor for greases. ***Lithium Complex*** greases are the most common, with a Lithium Soap type being used as the primary thickener. Aluminum-Complex and Calcium-Complex greases also may be found. Care should be taken when selecting grease because the thickeners may not be compatible, and when mixing greases that have different bases, problems such as thinning may occur.

Presently, "*Synthetic Greases"* are available. These greases are formulated with synthetic oil components, and are gaining popularity in the market place, the synthetic *oil* portion of the product is less prone to thermal (heat) degradation, and synthetic greases will generally last longer in sustained temperature applications. Be aware that synthetic greases typically use conventional thickeners, and are subject to the same precautions as their mineral oil containing counterparts.

The synthetic greases are high quality products, but they should be changed *just as frequently* as petroleum or mineral based greases if they are used in environments where contamination is a possibility.

It is highly recommended to clean grease lubricated components on a fairly regular basis, because like all other types of lubrication, grease gets contaminated & may degrade with long term use, and some basic maintenance is necessary.

For Your Information….

"Gooey Old Grease" additional Information.
Smelling, feeling or tasting may not evaluate grease's quality. Quality greases are difficult to evaluate by using these methods, all greases will have similar odors, colors, and textures. Additionally, some greases contain constituents that when ingested can have health hazards.

"Water resistant grease" does not totally repel water. Water almost always gets into grease during use, water in concentrations between 20%-100% of the grease's volume (depending upon the thickener) in many instances combines through absorption with the grease without diluting it, however, the more water the grease absorbs, the thinner the grease becomes, and eventually the grease gets washed away, or pockets of water become trapped and lubrication and corrosion protection is compromised.

The **Dropping Point** is the temperature where the grease loses its consistency, and will release. It is important to be aware that the grease's *optimum useable temperature range is usually 40°- 60°C (80°-125°F) below the dropping point.* Remember that a high dropping point grease are not always superior to other greases, but the high dropping point grease will take more temperature, and not necessarily more load…

In concluding the grease subject, it is important to note some areas where grease should not be used.

Grease should not be used in many areas where oil products contact the grease, such as in the assembly of engines, hydraulic systems & pumps, transmissions etc. The exception to this is where the equipment manufacturer recommends packing a seal with grease, or lubricating a shaft etc.

Grease should not be used for general assembly due to the fact that if grease is used in assembly it may not melt or dissolve and allow the oil to lubricate the part, and semi-solid grease deposits can plug oil pick-up screens, passages & oil filters. Additionally, the different soap type thickeners in grease may promote oil foaming, and it may be very difficult to completely flush the system of the entire grease residue.

If you are assembling an engine, transmission or hydraulic system, I personally recommend the use of a proper oil soluble & compatible assembly lubricant such as Torco Engine Assembly Lube or Cam Lube PN:A550055 or A380000.

These photos show how grease is not soluble in motor oil, even at temperatures above 375° (F). Left White Lithium Grease, Proper assembly Lube, Extreme Pressure / High Temperature Grease.