

**Greases**

Greases are the result of dispersing a thickening agent in a liquid lubricant. Depending on the type of thickener and the type of base oil and the additive technology used, properties of greases vary. There can be very specific circumstances which require fine tuning or even a complete new formulation. It is our challenge to provide you with the right lubricant (grease) for the right application, so please feel free to contact us.

**Why the use of Grease?**

There are a number of reasons why grease is preferred over oil:

- Grease can act as a sealant to prevent lubricant leakage and keep deteriorated seals effective in cases where oil would leak out of the application
- It avoids corrosive contaminants and foreign material to enter
- Solids such as graphite, calcium carbonate, molybdenum disulphide, PTFE and hBN will be held in suspension, while these solids tend to settle out of oil
- Grease-demanding equipment is simple in design, requires less space and they weigh substantially less than similar equipment. This will result in reducing the cost of the equipment, both for purchase and maintenance
- Grease has a much longer service life than liquid lubrication before replenishment is required. This is a critical benefit for hard-to reach or hazardous locations

A typical lubricating grease general contains 80-85% base oil, 10-15% thickener and 5-10% additives.

**Grease Thickeners**

The most easy way to illustrate the working of a grease thickener is the comparison with a sponge. It is a structure which holds the base oil. The nature of the thickener is essential for the final product. Properties such as dropping point, mechanical stability, water resistance, lubricity, relubrication, intervals, running temperature and sealing properties can all be attributed to the thickener system.

Thickener can be divided into two different types

- 1 Soap Base
- 2 Non Soap Base

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| 1 Soap Base | a) Straight                      Lithium , Calcium, Aluminium, Na<br>b) Mixed                            Lithium , Calcium, Aluminium, Na<br>c) Complex                        Lithium , Calcium, Aluminium, Na, CAS |
|-------------|--|

- 2 Non Soap
- a) Inorganic
- b) Organic

- Inorganic
- a) Clay (Bentonite)
  - b) Silica

- Organic
- a) Polyurea
  - b) PTFE

**Soap Base Description**

1 Calcium Base	Drop Point
a) Hydrated Calcium Soap	90-100
b) Chassis Grease	90-100
c) Calcium Anhydrous Grease	140-150
d) Calcium -Lithium Mix Grease	180-200
e) Calcium Complex Grease	260+
2 Lithium Base Grease	
Regular Lithium Base Grease	190-200
Lithium Complex Grease	225-260
Lithium -Calcium Mix Grease	170-180
3 Sodium Base Grease	180-200
4 Aluminium Complex Grease	240+

**Calcium Soap Grease**

Tallow (Animal fat) based calcium greases were the earliest lubricants developed during 1845. As a result, calcium greases were relatively inexpensive to manufacture and are still in use since then. While there are three types of calcium greases but anhydrous calcium grease is the most economical multipurpose grease. Besides, the other two greases are hydrated calcium and calcium complex. In addition to multipurpose anhydrous calcium, hydrated calcium or lime greases is one of the most economical greases for general purpose wet application.

**Hydrated calcium soap grease**

Hydrated calcium grease has mineral oil, animal fat (tallow), and lime in its composition. Grease has a 90°C (194°F) dropping point, whereas the useable temperature is around 65°C (149°F). Still being manufactured on a large scale, it is one of the most economical greases. Due to the chemical reaction of hydrated lime with tallow, lime greases need water to retain their grease structure. A small amount of water acts as a stabilizer. Lime greases have limited use because of lower useable temperatures and the need for water to stay as grease.

**Lithium Grease**

Lithium grease was invented in the early 1940s. It was made by reacting lithium hydroxide with fatty acids. At this time, modern lithium soap (thickener) consists of 12HSA (12-hydroxystearic acid, or triglycerides) with lithium hydroxide monohydrate in a base fluid. Grease is one of the oldest lubricants used by humans dating back to 1400BC. [3]. It reduces friction as well as resists water and provides sealing. More than 90% of all bearings have grease as a lubricant. [2] Base oils can be mineral oils or synthetic fluids, or a blend of any or both. Many fats and fatty acids are suitable to make lithium soaps. But the use of 12HSA along with HCO (hydrogenated castor oil) is most preferred. **lithium 12-hydroxystearate grease** is probably the best multipurpose grease ever developed.

According to a recent NLGI survey, the production of lithium greases is higher than all other greases combined. Lithium grease has excellent water resistance (not as good as calcium), superior mechanical or shear stability, excellent thermal stability and, excellent storage stability. Along with 130°C (266°F) continuous operating temperature and 190-200°C dropping point. It is the most preferred bearing grease in almost all industrial sectors.

Lithium greases are expensive due to the high price of raw materials. Such as the price of lithium hydroxide monohydrate and the requirement of rust protection additives.

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