Onshore oils
THE NEW WAVE IN OIL TECHNOLOGY

TECHNICAL BULLETIN

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What is grease?

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In this month's technical bulletin, you will be given a general understanding of grease and its many compositions.

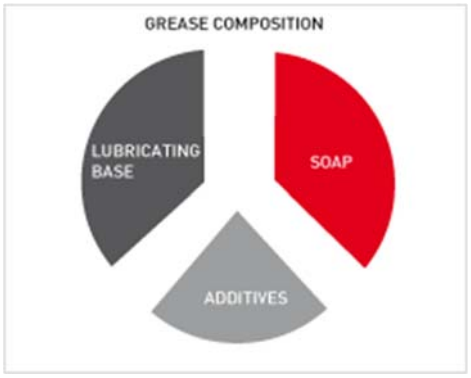
What is grease?

"A solid to semi-solid product of dispersion of a thickening agent in a liquid lubricant. Additives imparting special properties may be included"

Grease can be thought to have been mostly comprised of thickener with a splash of oil, although this is not true. Most greases are primarily oil with a thickener added to give the product its fibrous network needed to do the required lubricating.

Composition:

Grease consists of three components: Thickeners, base stocks (oils) and additives.



Source: http://www.renault-trucks-oils.com/en/menu/products/study-greases.phtml

Thickeners:

Thickeners are needed to give the grease its form/consistency. The type of thickener used will also define and categorise the type of grease. Greases are classified into two major families: Soap and non-soap based. Throughout the world, more than 90% of the thickeners used will be soap based. Soap based thickeners are derived from an acid base reaction. The acid is a fatty and in some cases,

short chain organic complexing acid. Saponification is in which the process for producing a soap base thickener and is as follows:

Acid + Base = Soap + Water.

Base stocks / additives:

Base stocks and additives are added to the thickener depending on the required performance of the finished product. For example, a high temperature thickener grease will not perform to it desired capability if it does not contain a base stock with good oxidative stability.

Category	**Type**
Mineral Oils	Paraffinic & Napthenic
Synthetic	PAO, Ester, PAG & Alkylbenzenes
Natural	Vegetable Oils
High Performance	Silicones & Fluorinated Fluids

Some additives of grease are as follows: Antioxidants (assist retardation of base stock giving longer life to product), rust inhibitors, anti-wear agents, extreme pressure, tackifiers/polymers (assist with metal adhesiveness) and molybdenum disulphide/ graphite (assist in protection at high loads and slow speeds).

Classification of greases:

Greases are classified by their thickener composition and also NLGI grade number. The consistency of grease is determined by a specific test involving a funnel called a penetrometer. This funnel is placed on a smooth cup of grease at a temperature of 25 degrees Celsius, and the rate of which it penetrates in tenths of a millimetre after five seconds is then measured. The greater the penetration the softer in which the grease is comprised. This will give it a lower NLGI grade number. The majority of greases used today fall in the NLGI 1,2 and 3 categories, with NLGI 2 greases being most popular. NLGI 00 and 0 greases are also found and may be needed in colder climates or centralised lubrication systems. Another key fact to remember is the NLGI rating has nothing to do with how much load or heat the grease can handle. All NLGI ratings of grease can have different load bearing capabilities depending on their composition.

Key grease properties:

The table below shows and explains some key properties of grease.

Consistency	NLGI grades are based on the amount of thickener. Consistency describes the stiffness of the grease.
Dropping Point	This is the temperature in which the first drop of oil separates from the thickener. It is the point in which the thickener begins to break down.
Water Resistance	Water washout tests measure the ability of a thickener to remain in place when submerged in water. Water spray off measures the ability of a thickener to remain in place in event of water spray contact. Both tests are measured in percentage of grease removed under test conditions.
Base Oil Viscosity	Depending on the application of the grease, the base oil viscosity will be chosen accordingly.

Load Carrying Ability	Under high load conditions a high viscosity base stock will be used as well as certain extreme pressure additives or solid additives like molybdenum disulphide.
Shear Stability	Grease needs to maintain its consistency under high shear conditions.
Compatibility	When two incompatible thickeners are mixed, grease usually softens and begins to run out of the bearing or location requiring lubrication. Do not mix greases before consulting the manufacturer. Some incompatible thickeners are: aluminium and barium soaps, clay and some polyureas.
Pumpability	This is a very important property of grease as it is the measurement of a greases ability to be pumped. Especially important for centralised lubrication systems.
Oil Separation	For a grease to be effective, an amount of oil usually less than 3 percent must be separate from the thickener.

Below is a table showing some information regarding grease thickeners and their appearance, shear stability, pumpability, heat resistance and water resistance.

Grease Thickener	Appearance	Shear Stability	Pumpability	Heat Resistance	Water Resistance
Calcium	Buttery	Good	Fair	Fair	Excellent
Sodium	Fibrous	Fair	Poor	Good to Excellent	Poor
Barium	Fibrous	Good	Poor	Excellent	Excellent
Lithium 12 OH Stearate	Buttery	Excellent	Good to Excellent	Good to Excellent	Excellent
Lithium Complex	Buttery	Excellent	Good to Excellent	Excellent	Excellent
Calcium Complex	Buttery to Grainy	Good	Fair	Good	Good to Excellent
Aluminium Complex	Buttery to Grainy	Good to Excellent	Good	Excellent	Excellent
Clay (Bentonite)	Buttery	Good	Good	Excellent	Excellent

Polyurea	Buttery	Good	Good	Excellent	Excellent
Calcium Sulfonate	Buttery to Grainy	Good	Good	Excellent	Excellent

Source: http://www.maintenancetechnology.com/2009/07/grease-basics/

Conclusion:

Before selecting a grease, take into account the information detailed above or contact your local Onshore Oils Lubricant expert and they will most definitely assist you with the correct choice.

http://www.onshoreoils.com.au/greases_cat_79.php#greases

Hopefully now you have a general understanding of greases and their composition.

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Gold Coast QLD and Northern Rivers NSW.

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Contact us

Please don't hesitate in contacting your friendly Sales Representative or our Office Staff should you have any technical questions or require further information.

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