



Mineral or Synthetic?

Very often there is confusion over which lubricant is best for a particular application, should we use oil or grease or perhaps a dry film lubricant would be better.

If we use an oil, should it be a mineral oil or a synthetic? If we should use a grease what sort of grease is best?

There is no easy answer to this as there are so many factors that should be considered however we can simplify the situation if we understand the different types of lubricants and how they are composed.

Quite often we hear engineers say we need a lithium grease, or a silicone grease would be better or even a moly grease...

So what are we actually talking about here?

In Roman times the first 'greases' were animal fats used to lubricate the wheels of their chariots, so this idea has been around a while. In simple terms a grease is a thickened oil, the thickener is there to act as a sponge and hold the oil in place. Under pressure the 'sponge' releases the oil film to lubricate the contacts. So we've now determined that it is the oil that does the lubrication, so it is the oil that we should consider first.

There are many different types of oil from which to form a grease, mineral oils, synthetic oils such as polyalphaolefins (PAOs), Poly Glycols, Esters, and even Silicone & Fluorinated (PFPE) oils. Each of these oils has different chemical properties and performance characteristics which can also be enhanced with the addition of additives to prevent oxidation, corrosion inhibitors to improve protection from rust or extreme pressure EP additives to help under load.

Now lets say we have chosen our base oil. Which thickener should we use? Well there are many different options, a simple fine Silica powder (gelling agent) or Bentonite (Clay)

thickener can be used to form a grease paste. In some cases PTFE or 'Teflon' can be added to thicken the grease and improve low friction performance.

In most cases however a metallic soap is used to thicken the grease, Lithium, Calcium, Aluminium and many other soaps & complex soaps can be reacted with the oil at elevated temperature to form a grease.

Each of these thickeners (sponges) have different properties and often the limiting temperature of the grease can be the melting point of the thickener, without the sponge it simply runs out.

To complicate things further other solid additives such as graphite or Molybdenum di-sulphide (Moly) are added, this adds boundary lubrication or reinforcement to the oil film under extreme loads or where there is slow movement of the surfaces. The addition of Moly or Graphite also turns the grease black in colour.

We now know what we are talking about with a 'silicone' grease, this is referring to the Silicone base oil. With a Lithium grease, this refers to one type of popular thickener that is used. When people refer to a Moly grease, this is a grease reinforced with a black Moly powder which gives better load carrying capacity at low speeds.

It is easy however to now see that in order to select the correct grease for a particular application we must consider all components. The base oil type, viscosity and additives package as well as it's operating temperature range, load, speeds, and material compatibility, the thickener type, melting point and characteristics and any other solid additives PTFE, Moly, Graphite that may be required.

IKV Group are specialists in selecting the correct lubricant for the application, we wont simply say you need a 'Lithium grease' or a 'Moly grease', we consider the lubricant as an critical engineering component.

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