

The advantages of greases

By R. David Whitby



It is generally accepted that oil is a better lubricant than grease. However, there are a number of circumstances, both for economical and operational reasons, where grease is preferred to oil.

Oil lubrication requires the use of efficient and often expensive sealing arrangements to prevent leakage and the possible contamination of the finished product to prevent the ingress of contaminants such as water and airborne dust, which could result in premature machinery failure. For rolling bearings, the use of lubricating oil may necessitate the use of expensive lubrication systems. Grease lubrication has advantages in this respect, providing efficient sealing with the use of simple sealing arrangements and also having a self-contained lubrication system.

According to the Society of Automotive Engineers (SAE), a satisfactory grease for a given application is expected to provide adequate lubrication to reduce friction and to prevent harmful wear of components, to protect against rust and corrosion and to act as a seal to prevent entry of dirt and water. Greases should also resist leakage, dripping or undesirable throw off from the lubricated surfaces and should retain apparent viscosity or relationship between viscosity, shear and temperature over the useful life of the grease in a mechanical component that subjects the grease to shear forces.

Further, they should not stiffen ex-

cessively to cause undue resistance to motion in cold environments and should possess suitable physical characteristics for the method of application. Greases should be compatible with elastomer seals and other materials of construction in the lubricated portion of the mechanism and should tolerate some degree of contamination, such as moisture, without loss of significant characteristics.

While the SAE statement is concerned primarily with the use of lubricating greases in automotive equipment, the same considerations and performance requirements apply to the use of greases in industrial, mining, marine, aviation and other applications.

Useful characteristics of greases in specialize applications can include:

- **Water-resistant and/or resistant to wash-off by water.**
- **Extreme pressure properties.**
- **Tackiness.**
- **Antisqueak.**
- **Low noise.**
- **Electrically conducting.**

Some greases combine two or more of these specialized characteristics.

Oils and greases have a number of significant differences. Oils are able to transfer heat away from surfaces, via convection and conduction in turbulent flow, much better than greases. Due to the lower internal friction of oils, they can be used in machines that are required to operate at higher rotational speeds. For greases the rotational speed of machines is lim-

ited to 65% to 80% of that allowed using oils as lubricants.

Complete replacement of oil in lubricated parts is easy, whereas it is sometimes difficult with greases. Removal of contaminant particles from greases is not practical, while filtering particles from oils is relatively simple. Greases are unsuitable for use in machines that have very small clearances between rotating or sliding parts such as plain bearings or servo-valves.

With greases the areas surrounding lubricated components are seldom contaminated by leakage of the grease, whereas leakage of oils from machines is always possible, usually accidentally. If lubricant contamination of surrounding areas must be avoided, greases are usually preferred over oils. Lastly, greases have a more limited range of applications than oils.

These differences between oils and greases do not, however, mean that oils are always preferred to greases; there are many applications in which greases provide the most suitable method of lubrication. These applications include rolling bearings, open gears, wire ropes and many special applications in cars, vans, trucks and buses.

Grease lubrication has certain advantages over oil lubrication and is a very efficient lubricant provided that the correct type of grease is used.

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