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Технические характеристики

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Lubricants

Lubricants are used for lubrication and to reduce friction and wear, as well as for power transmission, cooling, vibration damping, sealing, and corrosion protection. Lubricants are subject to various influences:

- mechanical influences (pressure and shear stresses at the lubrication point)
- thermal influences (heat supply and removal)
- chemical interactions with other substances (blow-by gases, nitration by fuels, friction partners, seals ...) and the environment (e.g. air, water, humidity)
- Lubricant aging

Classification

- liquid lubricants (e.g. lubricating oil),
- lubricating greases,
- Solid lubricants (e.g. graphite) and
- gaseous lubricants (for example air).

Lubricating oil

Lubricating oils are the most important technical lubricants. They reduce friction, which causes noise and, in particular, material wear . Furthermore, the use of lubricating oil also facilitates heat dissipation. Lubricating oil forms a lubricating film between moving surfaces, such as in a hinge ; more on this in the article on lubrication. In demanding environments exposed to rain or dust, for example, lubricating greases are used, which can also shield the bearings or rolling bearings from external influences and remain in the lubrication point longer because they are more viscous (thicker) . A grease jug serves as a container for lubricating oil on a machine.

A distinction is made between lubricating oils.

- by origin:

- vegetable oils
- animal oils
- mineral oils
- synthetic oils

- according to viscosity

- according to application:

- Engine oil
- Chain oil
- Oil for precision engineering devices, e.g. sewing machine oil

Lubricating greases are pasty lubricants consisting of a lubricating oil and a thickener (soap, bentonite, polyurea, PTFE, etc.). Lubricating greases are used to prevent mechanical wear caused by friction. If, for example , a machine or bearing is operated without lubricating grease or oil , so-called hot running occurs. This means that the metal parts that come into contact with each other become hot, which can lead to seizure. The grease forms a film between the components, thus preventing direct contact between the moving surfaces. Friction is greatly reduced , allowing the machine or bearing to run more smoothly and generating less frictional heat.

Pastes

Lubricating pastes contain a high proportion of solid lubricants. An important selection criterion for pastes is the temperature range and the individual requirements for lubricating effect, release effect, pressure resistance, media, and material pairing. Influence of temperature on the selection of lubricating pastes:
If lubricating pastes are used at high temperatures where the base oil slowly evaporates, approximately above 120 °C, the dry lubrication behavior of the solid lubricant packages must be considered.

Pastes can be divided into the following types:

- Lubricating and assembly pastes
- Screw pastes
- High-temperature pastes

Depending on their composition, lubricating pastes are also approved for food use, water-resistant, and have good corrosion protection properties. Due to their solid lubricant composition, lubricating and assembly pastes are designed to improve the lubrication properties of the base oil; their primary function is to provide lubrication. Screw pastes enable more precise adherence to the specified tightening torques and thus the correct adjustment of the clamping force. High-temperature pastes enable dry lubrication up to +1,400 °C. The base oil (carrier oil) is responsible for transporting and distributing the solid lubricants to the friction points .

Solid lubricants

Solid lubricants are substances that, due to their structure and chemical-physical properties, form continuous lubricating and separating films on metal surfaces, either alone or in combination with other substances . These films are so thin that fits and tolerances in mechanical engineering do not need to be changed . Solid lubricants form primary lubricating films at high concentrations and secondary lubricating films at low concentrations in lubricant systems. They prevent extreme wear during the critical phases of solid-state and mixed friction.

Anti-friction coatings

Anti-friction coatings are friction- and wear-reducing lubricants with extensive applications in tribology. They form firmly adhering, dry lubricating films of high effectiveness. Anti-friction coatings enable the pretreatment and storage of ready-to-assemble lubricated parts. They are extremely pressure- and temperature-resistant, do not age or resinify, and are also clean to handle. Anti-friction coatings have excellent lubricating and protective properties: they improve running-in processes and protect against surface damage. At the same time, they prevent cold welding (for example, in stainless steel), support the flow process during molding, and prevent stick-slip during slow, oscillating movements. In addition, anti-friction coatings ensure optimal screw connections. For the production of ready-to-assemble, robot-compatible machine elements, contract coating is often the most cost-effective method.

Lubricating greases

Lubricating greases contain active ingredients that combat wear and corrosion, and reduce friction. The synthetic base increases oxidation stability, resistance to water, steam, and other media, and improves low- and high-temperature performance.

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