

LUBRICANTS

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LUBRICANTS

- **Lubricant may be defined as the substance which reduces the friction between the two moving surfaces or parts of a machine.**
- The process of applying the lubricant in between the two moving or sliding surfaces is called as lubrication.

Purpose of a lubrication

- To reduce the loss of energy due to friction
- Increase the efficiency of a machine
- Reduce the maintenance cost of machine
- Reduce large amount of energy is dissipated in the form of heat
- Reduce surface deformation

Classification of lubricants

Lubricants may be broadly classified as follows.

- Solid lubricants
- Semi-solid lubricants
- Liquid lubricants

Solid lubricants

- The most widely used solid lubricants are graphite and molybdenum sulphide.

Solid lubricants are used in the following areas.

- For heavy machinery working as a crude job at very high loads.
- When the operating temperature or load is very high.
- Where a liquid or semi-solid lubricant film cannot be maintained.

1. Graphite

- Graphite is an allotrope of carbon.
- Graphite has a layered structure of carbon atoms. The carbon atoms are joined together by strong covalent bonds. The adjacent layers are held together by the weak Vanderwall's force.
- It is used as a lubricant in the form of powder or as suspension in oil or water. It fills the cavities and prevents the friction.
- It is used as a lubricant in IC engines, air compressors, lathes, food- stuff industry, railway track joints, general machine job works, etc.

2. Molybdenum sulphide

- Fine powder of molybdenum sulphide is used as lubricant. It has the capacity to withstand very high temperature. It is stable in air upto 500°C.
- It is used as lubricant in high-speed machines.

Semi-solid lubricant

Grease

- It is a mixture of mineral oil and soap. It is used for heavy load and low speed machines. It is mainly used in bearing and gears.
- Grease is a semi- solid lubricant obtained by thickening of lubricating oil by the addition of a metallic soap. The thickener is usually sodium, calcium, and lithium or aluminium soap.
- Greases are manufactured by saponification of fats with alkali followed by adding hot lubricant oil under severe agitation.
- Their properties depend on both the base used for saponification and the fatty acid present in the oil.

Liquid lubricants

Vegetable oils

- They are commonly used liquid lubricants. Examples: Castor oil, coconut oil, etc.
- They are classified as drying and semi-drying oils. They are easily oxidized by atmosphere.

Animal oils

- They are oils of animal origin. They are mainly animal fats.
- Examples: Tallow oil, whale oil, lards oil, coconut oil and olive oil etc.,
- They are very costly. Hence, they find little use as lubricants. They are also easily oxidized by atmosphere.

Mineral oil

- Hydrocarbons with higher molecular mass obtained by the fractional distillation of petroleum are used as lubricants. They are obtained from the paraffin residue.
- Examples: Paraffin oil, lubricating oil, etc.

Blended oils

- They are mixture of vegetable oils and petroleum products. They show improved properties. Different oils are suitably mixed depending on the requirement. They are synthetic lubricants

QUESTIONS

- What is a lubricant?
- How are lubricants classified? Give examples.
- Write a note on semi-solid lubricant.
- List the purposes of lubrication.
- Write a note on solid lubricants.
- Write a note on liquid lubricants
- Mention the uses of graphite.
- Mention the uses of molybdenum sulphide.