

Properties of liquid lubricants

There are different physical and chemical properties of lubricants

- a. **Viscosity**- It is rate of flow of liquid or resistance to flow of liquid. A good lubricant should have moderate viscosity.
- b. **Viscosity index**- Viscosity index Indicates change of viscosity with temperature. As temperature increases viscosity index decreases.

Viscosity index for oil under test may be calculated with reference to following standard selected Pensilvium oil = VI = 100

Gulf oil = VI = 0

Therefore, V.I. = $(L-U / L-H) \times 100$

Where, L= Viscosity of gulf oil

U= Viscosity of oil under test

H= Viscosity of Pensilvium oil

- c. **Flash point**- The flash point is the lowest temperature at which vapours of a volatile material will ignite, when introduced to an ignition source. A good lubricant should have high flash point.
Fire point = flashpoint+5 to 400°C
If flash point < 140°F = Flammable liquids
And if flash point > 140°F =Combustible liquids.
- d. **Fire point**- The fire point of a fuel is the lowest temperature at which the vapour of that fuel will catches fire to burn for at least 5 seconds after ignition by flame. A good lubricant should have high fire point.
- e. **Cloud point**- Cloud point refers to the temperature below which the oil forms a cloudy or hazy appearance. A good lubricant should have high cloud point.
- f. **Pour point**- Pour point of a liquid is the temperature at which it becomes semi solid and loses its flow characteristics. A good lubricant should have high pour point.
- g. **Aniline point**- It is the Minimum temp at which oil is miscible with equal amount of aniline

- Aniline Point is a measure of aromatic content of the lubricating oil.
- Higher Aniline point means low %age of hydrocarbons (desirable).
- Thus Aniline Point is used as an indication of possible deterioration of rubber sealing etc.

Chemical properties of lubricants

1. **Acidity-** Acid value is the amount of potassium hydroxide (KOH) in milligrams (mg) that is required to neutralize one gram of oil sample. A good lubricant should have high acid value.

Acidity of lubricating oil can be determined by neutralization number i.e. titration experiment. It is also known as neutralization number or acid number.

2. **Emulsification-** It is the property of oil to get mixed with water easily.
 - Emulsions can be oil in water emulsion or water in oil emulsion.
 - Good lubricating oil should form such an emulsion with water which breaks easily this property is called demulsification.
 - Good lubricating oil should have lower demulsification number.
 - Quicker the oil separates out from the emulsion formed, better is the lubricating oil. In cutting oils the higher the emulsification number, better the oil is. This is because the emulsion acts as a coolant as well as a lubricant.
3. **Saponification-** Saponification value of oil is defined as the number of milligram of KOH required to saponify fatty material present in one gram of oil.
 - Saponification value gives an estimation of non-fatty impurities present in an oil fat i.e. the extent of adulteration.
 - Saponification value is used to distinguish between vegetable and animal oil, fatty and mineral oils.
 - Saponification value is used to identify given fatty oil, because every fatty oil has its own characteristic value.