LUBRICANTS AND PAINTS

1. Definition of Lubricants and Paints
2. Classification of Lubricants and Paints
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LUBRICANTS

- Lubricants – Any substance introduced between two moving or sliding surfaces which minimize the frictional resistance.
- Lubrication – The process of introducing the lubricant between two metallic surfaces in order to minimize frictional force.
- Lubricity – The property of reducing the friction is known as Lubricity.

FUNCTION OF LUBRICANT

- Reduces frictional resistance
- To reduce wear and tear, surface deformation
- Acts as a coolant by absorbing heat
- Reduce maintenance and running cost of machinery tool
- Protection against corrosion
- Acts as a seal to prevent the leakage of gases
- Improves the efficiency of the machine
- Reduces expansion of metal
- Absorbs shocks between moving parts to reduce engine noise
- Increases the durability of the machinery tool

CLASSIFICATION OF LUBRICANT

On the basis of physical state, it can be classified into three types:

a) Liquid lubricant(lubricating oil)
b) Semi- Solid lubricant (grease)
c) Solid lubricant

Liquid Lubricant

- It reduces by providing the continuous fluid film in between the moving surfaces.

- It acts as a cooling medium to reduce friction

Characteristics of a good lubricating oil

- High boiling point
- Low freezing point
- Low pressure
- Thermal stability
- Least neutralization point
- Suitable viscosity and high viscosity index
- Corrosion preventive
- High resistance to oxidation
- Safe storage and handling etc.

Types of Liquid Lubricants

1. Animal oil and vegetable oil
2. Petroleum oil (mineral oil)
3. Blended oil (compounded oil)
4. Synthetic oil

Animal oil and vegetable oil

- Used as a lubricant before the development of petroleum industry
- They have good oiliness
- Glycerides of higher fatty acid
- Less in use at present because of high cost, easily oxidized and high tendency to hydrolyze
- Mainly used as blending agent for mineral oils
- For e.g. Animal oils- Lard oil(pork), whale oil
  Vegetable oils- Mustard oil, Olive oil, castor oil

Petroleum Oil(Mineral Oil)

- Obtained by fractional distillation of crude petroleum
- Lower molecular mass hydrocarbon (12 to 50 carbon atoms)
- Widely used because they are cheap, easily available and quite stable under operating condition
- Oiliness is improved by the addition of oleic acid and stearic acid

Blended Oil

- Single Oil cannot operate well for many of the modern machinery
- Some specific additives are added into oils to improve their typical properties and impart desired property
- Oils obtained after adding additives are called blended oils.
- Some additives are :

1. Oiliness carrier – Coconut oil, castor oil, fatty acid
2. Oxidation inhibitors – aromatic, phenolic or amino compound
3. Antifoaming agent- Glycerol
4. Viscosity index improver- hexanol
5. Corrosion inhibitor- Organic P, S, Cl etc.

Synthetic Oil

- Petroleum lubricants can be synthesized by adding different additives like fluorocarbon, silicones, polypropylene, organic amines etc.
- In certain operating conditions mineral lubricants cannot work satisfactorily, so to meet such special requirements some synthetic lubricants are prepared.
- Have capacity to work at high temperature (50 to 250°c
- They can exits in aircraft engine

Semi-Solid Lubricant (Soap + Liquid lubricant)

- It is also called grease.
- It is semi-solid combination of a lubricating oil and soap of lithium, sodium, calcium and barium (thickening agent).
- It is manufactured by saponification of fats with alkali by adding a hot lubricating oil.
- Vaseline- Prepared by blending together a mixture of mineral oil, paraffins and micro-crystalline waxes.

Situation/Condition in which grease(semi-solid) are used:

- Lubricating oil is not suitable for machine.
- It is necessary to seal the bearing or joint part against the dirt and dust particle or moisture.
- Machine is worked at low speed under high load.
- The contamination of lubricating oil is unacceptable and harmful for products.
- Used in gear that works at high temperature.

Solid Lubricants

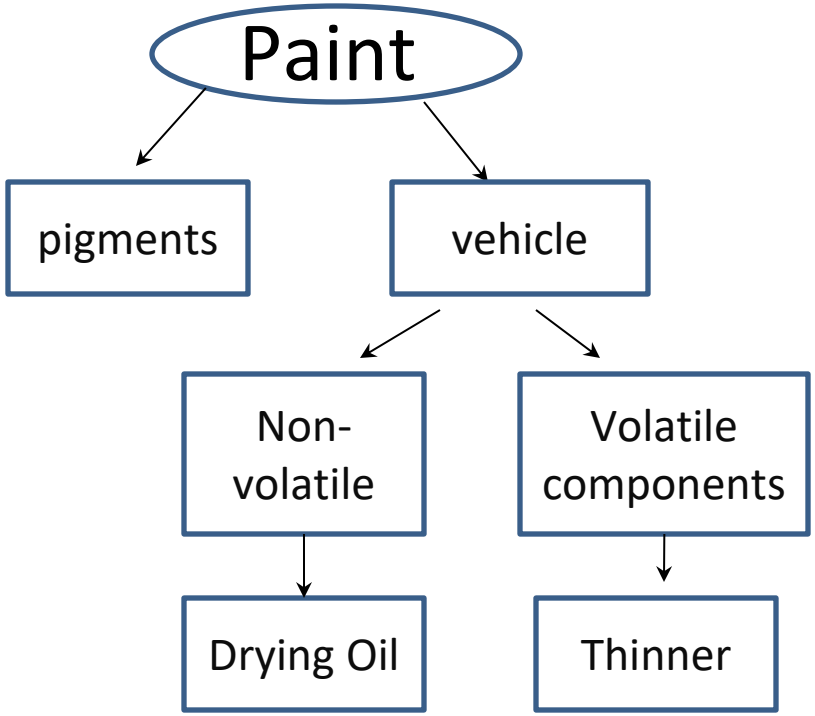
- Used either in dry (powdered) or as suspension. For eg. Graphite, molybdenumdisulphide, mica, soap stone, etc.
- Graphite is soapy to touch, non-inflammable and not oxydized in air up to 375 °c .
- Can either used as powdered or as colloidal dispersion in water(aquadag) or in oil (oildag).
- Molybdenum disulphide has sandwich like structure in which a layer of Mo atom lies between two layer of sulphur atom.
- It is soft and smooth and not oxidized in air up to 400 °c.

Situation/Condition in which Solid Lubricant is used:

- In machines where semi-solid and liquid lubricants are not suitable .
- In machines which are operated under very heavy loads and at low speed.
- Combustible lubricants are to be strictly avoided.
- Contamination of lubricating oil or grease are not acceptable . For eg. In textile industry , food stuff industry.

Paints

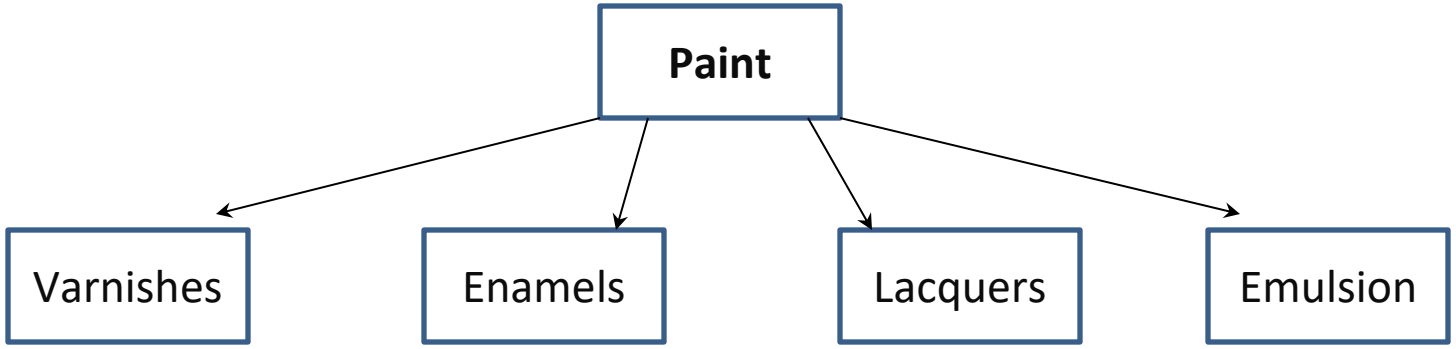
- Liquid or mastic composition which after application to a substrate in a thin layer is converted to an opaque solid film.
- It is mechanical dispersion mixture of one or more pigments in a vehicle.

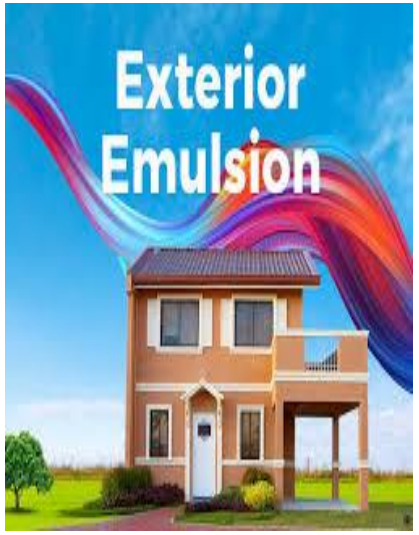


Requisites of good paint

- It should be fluid enough to be spread over the applied surface.
- It should form quite tough, uniform and adherent and impervious film.
- It’s film should not get cracked on drying .
- It should protect the surface from corrosion.
- It should be quite stable to the effect of atmosphere.
- High addition capacity.

Types of Paint





Varnishes

- Homogeneous colloidal dispersion solution of natural or synthetic resin in oil or thinner or both.
- Hard, transparent, glossy, lustrous and durable film.

Enamel - Pigmented varnish.

Lacquers

- Colloidal dispersion solution of a cellulose derivative, resin and plasticizer insolvent and diluents.
- Transparent, hard and waterproof film.

Emulsion – Rubber like resin in water, may contain stabilizer, preservative, drier antifoaming agent, less odorous, non-inflammable, quick drying and easy to apply.

Special Paint

Special Paint

- Luminescent
- Fire retardant
- Distemper
- Cellulose
- Anti-fouling

Function of Paint

- Protection of article from corrosion.
- For the decorative purpose.
- For specific function representation.
- Giving finishing coat to automobile bodies.

THANK YOU