* **Definition:** Organic coatings involve a relatively thin barrier between substrate material and the environment.

The substances used for organic coatings are Paints, Varnishes enamels and lacquers etc. Organic coatings doubtless protect more metal on a tonnage basis than any other method of combating corrosion.

As a general rule, organic coatings should not be used where the environment would rapidly attack the substrate metal. For example a paint would not be used to line the inside of the tankers for shipping hydrochloric acid.

Approximately 2 billion dollars per year are expended by in the united states on organic coatings.

* Discuss the factors considered for organig coatings.
* Discuss the steps for the preparation of organic coatings

⇒ Aside from proper application, the three main factors to consider for organic coatings, listed in order to of importance are

① Surface preparation; ②
② Selection of primers or priming coats
③ Selection of top coat or coats.

If the metal surface is not properly prepared, the paint may peel off because of poor bonding. If the primer does not have good adherence or is not compatible with the top coat, early failure occurs. If the first two factors are wrong, the system will fail regardless of the top coat used. Poor paint performance is, in most cases, due to poor application surface preparation

Surface Preparation: It involves surface roughening to obtain mechanical bonding as well as removal of dirt, rust, mill scale, oil, grease, welding flux, crayon marks, wax and other impurities.

Roughen (রাফেন) = অমসৃণ করা, কর্কশ করা

Aside from = Except for

Primer- প্রাইমার(ন) — A type of paint that you put on a wooden surface before the main paint is put on
Compatible - (কম্পাটিবল) — able to exist, live together, work success fully with sth/ so

* Pickling - Preserve or season with salt or vinegar
* Scraping - v. To remove something from a surface by rubbing with a knife
* chiseling - a tool with a sharp flat edge at the end. used for shaping wood, stone or metal

The methods used for surface preparation are pickling and other types of chemical treatments like scraping, wire brushing, flame cleaning, chiseling, and chipping. Other chemical methods are solvent degreasing, hot or cold alkali treatments, phosphatizing, chromate treatment, and electrochemical treatments. The selection of surface preparation method depends upon the metal to be painted, shape, size and accessibility of the structure, the coating system and the surface conditions.

(Accessible - that can be reached, entered, used, seen etc)

* **Primers:** These are substances containing rust-inhibitive pigments such as zinc chromate and zinc dust, and thereby provide another function in addition to acting as barriers. Wettability is needed so that crevices and other surface defects will be filled rather than bridged. Short drying times are conveniences to preclude contamination before the top coats are applied.

Top-Coat: Many times paint is applied primarily for appearance — it might be cheaper to provide corrosion allowance by making the steel thicker in the first place such type of coating is known as top coat. Selection of top-coat is important. Good appearance and good corrosion protection (even severe atmosphere) can be obtained at very little extra cost by selecting a good top coat material.

* **Nature of organic coatings:** The coating thickness must be so that no bare metal is exposed. It is almost impossible to apply one coat of a paint and have it completely free of pinholes or other defects. For this multiple coats are needed so that a pinhole in one coat will be covered by a complete film of another. Thickness is important also because paint deteriorates with time.

* The two main functions of surface coatings are decoration and protection. Often these functions are combined. The organic surface coatings are called paints, varnishes and lacquers are of the order of 1 → 2 mils thick, and it is upon these thin films that such great reliance is placed to beautify our surroundings and retard the ever active forces of corrosion and decay.

In these two dimensional films, surface forces and phenomena are prime considerations, and since they are usually expected to have a protracted service life, long time chemistry is also a vital factor. (An inherent characteristic of organic surface coatings is that complex combinations of high polymers and resins are used in their manufacture.)

Fundamental types of Surface coatings.

⇒ Surface coatings are applied as fluid dispersons and must dry to thin, continuous, adherent solid films. Depending on the mechanism involved in drying they are of two fundamental types.

1. Lacquer type coatings:

These are distinguished by the fact that drying involved purely the evaporation of the solvents and thinners originally present. No chemical reactions accompany the drying. All polymeric constituents are present in fully polymerised form at the time of application.

2. Varnish type coatings:

In these, drying involves not only the evaporation of solvents but also polymerization reactions, which lead to the formation of molecules in the dried film that are larger and often different from those present at the time of application.

Surface coatings, further may be further subdivided into straight air-drying types, which dry at ordinary room conditions, and baking types, which require elevated temperature. As might be expected, lacquer types are generally quicker drying than varnish types.

PAINTS

A paint is a mixture of opaque or semiopaque solid substances with liquids, suitable for application to surfaces by brushing, spraying, or dipping and of such nature that it eventually dries or solidifies to an adherent coating. Paints may be either of the lacquer of of the varnish type.

In other word, Paints are stable mechanical mixtures of of one or more pigments. The main function of pigments is to impart the desired colour and to protect the film from penetrating radiation like U.V. rays. The pigments and the extenders are carried or suspended in a drying oils called vehicles. The vehicle or drying oil is a film forming material, to which other ingradients are added in varing amounts. The purpose of paint maybe protective or decorative or both. The paint is applied by brushing, dipping spraying or roller coating. Some of the various drying oils that have been used in making paints are linseed oil, tung oil, caster oil, tall oil etc. Generally linseed oils is used widely.

Driers: act to promote the process of film formation and hardening. Thinners maintain the uniformity of the film through a reduction in the viscosity of the blend.

The important varieties of paints are emulsion paints, latex paints, metallic paints, epoxide resin paints, oil paints, water paints or distempers. etc

Required properties of a paint.

1. It should have high hiding power and the required colour.
2. It should be able to resist the atmospheric conditions to which it will be put.
3. The films produced by the paint should be washable.
4. It should resist corrosion when applied on a metal.
5. Paint should have the necessary ~~conditions~~ consistancy for a particular purpose for which the paint is to be used.
6. The film produced by applying the paint on a surface should have gloss →
7. It should be chemically inert to secure stability and hence long life
8. Pigment should be opaque to ensure good covering power.

Special Applications of Paints:

(i) Paints are extensively used in acid resisting coats.
(ii) Oil bound water paints or distempers are widely used for interior decoration of walls.
(iii) Coal tar products dissolved in mineral spirits have been used as protective coatings of pipes under the name bituminous paints.
(iv) Ship bottoms are protected by antifouling paints which are prepared by mixing iron oxide, Hg_2O, and copper resinate dispersed in tung oil.
(v) A paint with damp resisting properties can be prepared by mixing paraffin wax, rosin, bitumen and gutta percha dispersed in tung oil.

* Bitumen: A mixture of solid or semi-solid hydrocarbons obtained from coal or oil
* Rosin. : A solid resin used in the preparation of lacquors, plasticizers and floatation agents, Occurs in oil from pine trees.
* Tung oil : A oil which dries rapidly and obtained from the nuts of

* Coal Tar: A bi product obtained by heating coal in absence of oxygen. A mixture of organic compounds such as benzene, toluene and naphthalene

* Corrosion causes and prevention / Speller / 3rd edition page – 306.

* CONSTITUENTS OF PAINTS & THEIS FUNCTIONS

The constituent of paint are.

(i) Pigment.: e.g. Tale, chalk, clays, mica, Iron ores etc & ZnO, TiO_2

(ii) Pigment extender or Inerts.: chaina clay, tale, asbestos, silica, gypsum, whiting, mica, barytes etc.

(iii) Film forming materials: Lin-seed oil, Soxabean oil, Tung oil, Dehydrated castor oil, fish oil, casein, latex emulsion, etc. and also called vehicle or drying oil.

(iv) Thinners.: (A) Aliphatic hydrocarbons. e.g. - miniral spirits, naphthas. and other petroleum functions.
(B) Aromatic hydrocarbons. e.g. toluol, xylol, methylated naphthalene.

(v) Driers: Heavy metallic soaps. e.g. naphthenates, resinates, octoates linoleates of Co, Mn, Pb & Zn.

(vi) Anti-skinning agents: They are generally poly hydroxy phenols e.g. cresol, sorbitols etc. Their function is to prevent gelling and skinning of the paint.

(vii) Plasticizers: Some oils are used as plasticizers.

They are used to give elasticity to the film and thus minimise or prevent cracking.

Thinners maintain the uniformity of the film through a reduction in viscosity of the blends.

Pigments impart a desired colour and protect the film from the penetration of radiations like, uv light.

Pigments – Colours	Primary orbitals involved (for L to M charge trans fer transitions)
Cadmium Sulfide (CdS) – Yellow	L π_p — M 5s
Vermilion (HgS) – Red.	L π_p — M 6s
Naples – $[Pb_3(SbO_4)_2]$ Yellow	L π_p — M 5s or 5p.
Massicot (PbO) —	L π_p — M 6s
Chrome yellow $[PbCrO_4]$ Yellow	L π_p — M 3d
Red and Yellow ochres (iron oxides)	L π_p — M 3d.

L = Ligand
M = Metal.