

## Composition

**Base** The base, usually a metallic oxide, is the principal constituent of the paint. It makes the paint film opaque and possesses binding properties which reduce the shrinkage cracks in the film on drying. Some of the examples of base are white lead, red lead, zinc white, aluminium powder, iron oxide, etc. Their detailed description is given in Table Lead based paints are in general affected by atmosphere and are not recommended for final coats. Zinc white is weather resistant. For inferior works Lithophone (barium sulphate chemically combined with zinc sulphide) is used for inside work. Aluminium powder is used as base for all aluminium paints.

**Vehicle** Also known as binder, vehicle is an oil to which the base is mixed. It holds the constituents of paint in suspension and helps spread it over the surface to be painted, imparts durability, toughness and water proofness to the paint film and resistance to weathering and gloss to the painted surface and forms the body of the paint. The examples are natural drying oils such as linseed oil, nut oil, poppy oil and tung oil (Table ); animal, paint, artificial and synthetic glues in glue paints and air slaking lime and polymer in lime water colours and polymer paints respectively.

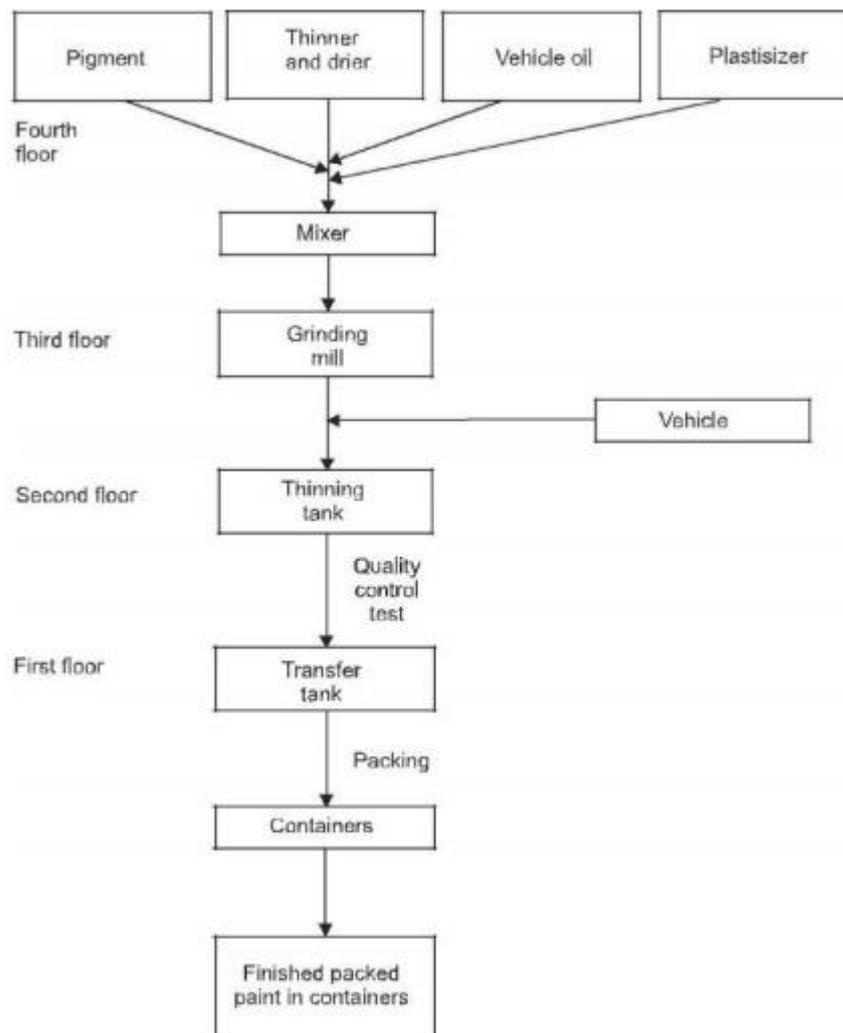
The natural drying oils (glycerides of the unsaturated fatty acids) harden in this layers to form strong and elastic surface coats. These are available in oxidized and polymerized varieties. The former being obtained by blowing air through linseed oil heated to about 160 o C and by introducing a manganese-lead-cobalt drier the latter is obtained by polymerising linseed oil by heating it to about 275 o C and introducing a manganese-lead-cobalt siccative

## Description

1. **White lead** : This is a carbonate of lead and forms the base of lead paints. It is dense, permanent and water-proof. It is not suitable for delicate works as lead becomes discoloured when exposed to sulphur vapours. It is most suitable for wood surfaces; Since it does not afford protection against rusting, it is not suitable for iron surfaces.
2. **Red lead** : This is an oxide of lead and forms the base of lead paints. It is most suitable for painting iron surfaces and for providing a priming coat to wood surfaces. It solidifies in a short time with linseed oil and hence, it is used as a drier also.
3. **Zinc white** : This is an oxide of zinc and forms the base of all zinc paints. It is smooth transparent and non-poisonous. It is not discoloured when exposed to sulphur vapours. It is less durable and is difficult to work.
4. **Oxide of iron** : This is an oxide of iron and forms the base of all iron paints. The tint of paint varies from yellowish brown to black. It mixes easily with the vehicle. It is effective in preventing rusting of iron surfaces and is cheap and durable. It is generally used for priming coat of iron surfaces.
5. **Titanium white** : This material possesses intense opacity. It is non-poisonous and provides a thin transparent film. It is used for receiving the coat of an enamel.

6. **Antimony white** : This is almost similar to titanium white.
7. **Aluminium powder** : This forms the bulk of aluminium paints. It keeps moisture content of wood surfaces practically the same and also prevents cracking and warping of wood. It is generally used for a priming coat to new wood work.
8. **Lithophone** : This is a mixture of zinc sulphide and barytes. It is similar in appearance to oxide of zinc. It is cheap and can easily be applied on the surface. However, when exposed to daylight, it changes colour, hence used for interior works only.

## PAINT



**Fig. Flow Diagram of Paint Manufacture**

## Characteristics Of An Ideal Paint

The requirements are uniform spread as a thin film, high coverage, good workability and durability, sufficient elasticity to remain unaffected by expansion or contraction of the surface to be painted or by weathering action of atmosphere. The paints should also be: impervious to air and water, cheap and economical to form a hard surface.

## Preparation Of Paint

The base is ground in a vehicle to the consistency of paste in a stone pestle known as muller. Linseed oil, is intermittently added to the paste in small quantities and the mixture is stirred with a wooden puddle. In case of coloured paints, the pigment is mixed with linseed oil separately and the paste is formed as explained above. Driers are also ground separately in linseed oil. The three pastes so prepared are mixed and a little linseed oil is added further to soften the paste. The mixture is continuously stirred till a consistency of cream is obtained. The mixture is thereafter strained through fine canvas or a sieve. The paint is now ready for use. The paint so prepared can be used by adding oil or a thinner to make it of workable consistency before application.

For commercial manufacturing of paints a four-storey building is used to have gravitational flow of materials. Pigments, oil, thinner, plasticizer, drier, etc. are stored on the fourth floor and are fed by means of chutes in proper proportions, to the grinding mill placed on the third floor and are ground. The thoroughly ground materials are then sent to storage tanks on the second floor. The charge in the tanks is kept in motion by agitation mechanism so that settling of materials does not take place. An additional quantity of vehicle is added here to get the desired composition. The batch is then tested for quality control. The paint material is then strained and sent to first floor, where it is packed in containers. Finally the packed material in containers is sent to the ground floor. A flow diagram of paint manufacture is shown in Fig.

The factors affecting the quality of paint so prepared are quality of ingredients, grinding, intimate mixing and proportioning, straining, packing, etc. Ready mixed paints are also available in the market with different trade names, e.g., Asian, Ducco, Shalimar, Berger Nerolac, etc

