



### EMULSION PAINTS

#### Introduction

During the last decade or so, emulsion paints have found a place among the established decorative finishes for buildings. The reasons for this popularity are their special properties of fast drying, good alkali resistance and freedom from persisting odours. They have, however, certain limitations, which should be appreciated. Emulsion paints based on polyvinyl acetate have recently been introduced into the Indian market and as these paints are quite different from traditional building paints, a brief resume of the fundamental differences between them will not be out of place.

#### Nature of Emulsion Paints

Oil paints and oleoresinous paints (which contain resins also) essentially consist of pigments, binder, solvents and driers. On exposure to air, the binder absorbs oxygen and undergoes complex physico-chemical changes and the wet film is changed into an acceptable paint film. Emulsion paints, on the other hand, consist of pigments and binder, the latter being an emulsion of the appropriate resin in water. Any influence which removes the water from between the resin globules will cause them to come together and fuse or

coalesce giving a continuous mass of plasticised polymer.

#### Types of Emulsion Paints

There are many ways of classifying these paints. The type of the resin is on such basis. For building paints emulsions of three different resins viz. polyvinyl acetate, styrene-butadiene, and acrylic resins, are used. The particle size of the resin polymer is another basis for classification. Three particle size ranges viz. 1-5 microns, 0.5-1.5 microns and 0.25 microns or less, are recognised. The particle size and water resistance are inter-related, decreasing particle size resulting in increased water resistance.

Yet another method of classification is the nature of the resin polymer itself. Depending upon whether it is prepared by polymerisation of one compound alone or by the joint polymerisation of two suitable compounds, the resulting paint is designated as "homopolymer" or "co-polymer".

#### Choice of Emulsion Paints

The advantages and disadvantages of Poly Vinyl Acetate (P. V. A.) paints and indications of their most suitable uses are summarised in Table No. 1. The main properties and uses of the styrene-butadiene and acrylic resin emulsion paints are described in the appendix.

TABLE I-PROPERTIES OF DIFFERENT TYPES OF PVA PAINTS

Type	Advantages	Disadvantages	Uses
Fine particle size PVA.	High exterior durability. Absence of dirt retention. High gloss and clarity.	Water spotting.	General purpose interior and exterior paints, gloss paints and glazes.
Standard PVA	Good exterior durability. Absence of dirt retention at low PVA. Good flow.	Poor exterior durability at High PVC. Water spotting.	General purpose interior paints.
Copolymer.	Excellent exterior durability. Permanence of plasticisation.	High exterior dirt retention.	Where plasticiser migration must not take place, e.g., for emulsion-based undercoats and over oil paints (Old).

#### Preparation of Surfaces and use of Emulsion Paints

The best surface for these paints is offered by a dry, fairly hard and rather porous material like brick, retarded hemihydrate plaster and cement renderings.

Soft distemper and lime wash should always be washed off before applying emulsion paints. Soft and powdery surfaces may be rendered suitable to receive

the paint by washing and or brushing. If, however, this treatment fails the suitability of binding the surface with a penetrating type of primer should be examined in consultation with the decorator/manufacturer.

Emulsion paints can be applied on oil bound distemper or flat oil paint provided these are in sound condition.

Smooth surface should be roughened by abrasion or a pretreatment with a sharp primer may be necessary for obtaining a better key.

It has been observed that lime bloom on emulsion paints is quite common. One of the reasons may be dampness in the interior of the surface which subsequently brings forward the lime liberated during setting of cement through the porous paint film. Permeable emulsion paints sometimes perform well on damp surfaces but under such conditions the paint must be resistant to alkalis. The chances of failure are always higher on damp walls. Therefore it is preferable to allow the surface to dry out as thoroughly as possible.

If the surface to be painted shows signs of efflorescence, then the salts should be brushed off thoroughly and a thin coat of a thin sharp oil primer should be applied before applying the emulsion paint.

Grease or similar contaminants present on the surface, impair the adhesion of emulsion paints as they cause poor wetting of the surface by the emulsion paint. Hence more thorough cleaning is necessary than is required for ordinary paints.

The chances of failure of emulsion paint on smooth surfaces, particularly under damp conditions, are considerable and hence emulsion paints should not be used in kitchens and bath rooms over highly trowelled surfaces.

### General Advantages and Drawbacks

Emulsion paints are easy to work and can be applied by brush, spray or roller. Their covering rate is about 400-500 sq. ft/gallon for two coats. Another feature is that the primer coat is of the same material as the finishing coat, though somewhat diluted. The great advantage is their rapid drying: the second coat can be applied 1½—2 hours after the application of the first. Freedom from persisting odour is yet another advantage—a great boon for restaurants and residential buildings, factories, offices, etc. Although the best surface for application is one perfectly dry, nevertheless emulsion paints tolerate a certain amount of dampness. Fire hazards are minimized and brushes and oil implements can be cleaned with water.

The main drawback of these paints is their high cost. The paints cost about Rs. 50-60 per gallon, which works out to about Rs. 20 per 100 sq. ft. (These figures are based on the current prices of PVA paints.

Oil bound distempers cost Rs. 6.50 per 100 sft). These paints have recently been introduced on the market and hence confident predictions about their exterior durability cannot be made. Their life indoors is between that of a good quality oil distemper and that of a good quality flat oil paint.

## APPENDIX

### Styrene-Butadiene Emulsion Paints

These paints are based on emulsion of the styrene-butadiene copolymer. These were the first emulsion paints to be put on the market (U. S. A.) and are still very popular there. Their main properties are :—

1. Excellent alkali resistance.
2. Can be easily protected from bacterial contamination.
3. Long term stability on storage.

Their main uses are :—

1. Interior flat finishes.
2. Exterior masonry.
3. Roof paints ; these could be used on asphalt shingle or felts.
4. Concrete floor paints.
5. Caustic tank linings.

### Acrylic Emulsion Paints

Acrylic emulsion paints can be prepared from emulsions of a variety of acrylate and other type of monomers. Technically, an emulsion containing 51 per cent of an acrylate monomer could be termed acrylic emulsion. The generally accepted applications for acrylic and PVA copolymer emulsion paints are :—

1. Interior flat finishes.
2. Exterior masonry.
3. Interior primer.
4. Interior-exterior type.

These paints show excellent adhesion to a variety of surfaces. Their drying is fast (faster than PVA paints) and their alkali resistance is also good. Their principal advantage over PVA paints is in low temperature coalescence. The chief drawback is their high cost, as they are costlier than any other type of emulsion paint.

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