Technical Specification
### PAINTING

17.1 **Indian standards**. The following I.S. apply to this section.

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<tr>
<th>I.S. No.</th>
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<td>5-1978</td>
<td>Colours for ready mixed paint &amp; enamels (third revision)</td>
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<tr>
<td>75-1973</td>
<td>Linseed oil, raw &amp; refined (Second Revision)</td>
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<tr>
<td>102-1962</td>
<td>Ready mixed paint, brushing, red lead, nonsetting, priming (Revised)</td>
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<td>104-1979</td>
<td>Ready mixed paint, brushing, zinc chrome, priming (second Revision)</td>
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<tr>
<td>109-1968</td>
<td>Ready mixed paint, brushing, priming, plaster to IS colour No. 361, Light stone &amp; No. 631 Light grey (First revision)</td>
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<td>157-1950</td>
<td>Ready mixed paint, brushing, acid &amp; alkali resistant, lead free, for general purposes, IS colour No. 446 red oxide, No. 537, Signal red No. 632 Dark admiralty grey &amp; black &amp; other colours as required</td>
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<tr>
<td>158-1981</td>
<td>Ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water &amp; heat resisting (Third revision)</td>
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<tr>
<td>159-1981</td>
<td>Ready mixed paint, brushing, acid resisting for protection against acid fumes colour as required. (First revision)</td>
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<td>162-1950</td>
<td>Ready mixed paint, brushing, fire resisting, silicate type for use on wood colour as required.</td>
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<td>164-1981</td>
<td>Ready mixed paint, brushing, for road marking (First Revision)</td>
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<td>212-1983</td>
<td>Crude coal tar for general use (Second revision)</td>
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<td>218-1983</td>
<td>Creosote &amp; anthracite oil for use as wood preservative (Second revision)</td>
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<td>290-1961</td>
<td>Coal tar black-paint (Revised)</td>
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<td>341-1973</td>
<td>Black Japan, type A, B &amp; C (First revision)</td>
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<td>345-1952</td>
<td>Wood filler, transparent, liquid.</td>
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<td>French polish (First revision)</td>
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<td>349-1981</td>
<td>Lacquer, cellulose, nitrate clear, finishing glossy for metal (First revision)</td>
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<td>423-1961</td>
<td>Plastic wood for joiner's filler (Revised)</td>
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<td>430-1972</td>
<td>Paint remover, solvent type, non-flammable (Second Revision)</td>
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<td>431-1972</td>
<td>Paint remover, solvent type, flammable (Second revision)</td>
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<td>524-1983</td>
<td>Varnish, finishing, exterior synthetic (second revision)</td>
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<td>640-1956</td>
<td>Ready mixed red oxide paint for Hessian (colour unspecified)</td>
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<tr>
<td>1232-1964</td>
<td>Ready mixed paint, brushing yellow ochre, semi-gloss for general purposes (Revised)</td>
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17.2 Paints & Allied Materials-Generally:

17.2.1 All paints & allied materials shall be of quality not inferior to that required by the relevant IS specification. Paints, etc. shall be ready mixed. The colour & tints of paints, unless indicated shall be as approved by the EIC.

17.2.2 The contractor shall inform the EIC, well before he places bulk order for the materials, the names of the brands & manufactures of paints he proposes to use in the works & submit samples thereof & obtain prior written approval of the EIC.

17.2.3 The whole of the materials required for the painting work shall be obtained direct from, approved manufacturers or their authorized agents & shall be brought to the site in makers, drums, kgs, etc. with seals unbroken.

17.2.4 Compatibility of paints:

Before considering the application of undercoats, it shall be made sure that those selected are compatible with each other. The primer, filler, undercoating & finishing paints shall be of paints made by the same manufacturer.

17.2.5 Storage of paints:

All containers of paints, thinners & allied materials shall preferably be stored in well ventilated room free from excessive heat, sparks or flame or direct rays of sun. The containers of paint shall be kept covered or properly fitted with lid & shall be kept open except while using. Materials, which have become stale or fat due to improper & long storage shall not be used or mixed with usable stuff.

17.3 Painting Work-Generally

17.3.1 The type of paint & allied material to be the number of coats to be applied, the preparatory treatment appropriate to the surface & any special process or treatment to be adopted shall be as indicated.

17.3.2 Where more than one coat is indicated, each coat shall be approved, in writing, by EIC before the next coat is applied.

17.3.3 No painting work shall be carried out in wet & very humid weather when there is danger of dew or weather is otherwise unfavourable. No painting or any other process likely to be damaged by dust shall be carried out in windy weather.

17.3.4 Painting except the priming coat shall be taken in hand after all other builder's work is finished.
17.3.5 The paint in the drum shall be thoroughly mixed prior to application. The materials shall be mixed, prepared & applied strictly in accordance with the instructions or recommendations of the manufacturers except where otherwise directed by the EIC. The paints shall be mixed periodically during brushing.

17.3.6 Addition of Thinners:

Thinners (such as mineral turpentine) shall not be added to paints on the feeling that the consistency of the paint supplied by the manufacturer is too thick. If the paint has been manufactured to conform to the specifications, the paint shall have the correct consistency & shall not require further dilution. If there is any doubt, the viscosity of the paint may be checked. If a slight adjustment of viscosity is necessary thinner, recommended by the manufacturer shall be used after prior approval of EIC.

17.3.7 The surface must be thoroughly dry & clean before painting work is proceeded with at all stages or processes of work. All dust, dirt, rust, & grease shall be removed before painting is started. Painting shall follow immediately after pre-cleaning or pre-treatment; any contamination which may occur in the intervening period shall be removed. Every individual coat shall be properly applied, reasonably level smooth & free from runs & holidays (minute uncovered areas).

17.3.8 Drying Time

For paint film to perform in unison, each coat of paint shall be allowed to dry sufficiently but not excessively before a subsequent coat is applied. Manufacturers' instructions for drying time shall be adhered to properly

17.3.9 Flatting down :

Cutting of primer & undercoat shall be done to provide a key for subsequent coats. The primer coat, with or without putty, shall be dry cut & the undercoat with or without putty for spot work, shall be wet cut with waterproof emery paper No. 220/240. In the case of under coatings without putty, surface prior to finishing coat, shall be wet cut with waterproof emery paper No. 280/320. The surface shall be dry, clean & free from dust before subsequent coat is applied.

17.3.10 Appearance:

The painted surface shall have a clean uniformly coloured appearance. No hair marks from the brush or clogging of paint puddles in the corner of panels, angles of moulding etc. shall be left on the work.

17.3.11 Colour

Correct colour matching shall be judged against a sample having the same type of surface as that to which the paint has been applied.

17.3.12 In painting doors & windows, the putty round the glass panes shall also be painted but care shall be taken to ensure that no paint, stains, etc. are left on the glass. Tops of shutters & surfaces in similar hidden locations shall not be left out in painting.

17.4 Scaffolding

The scaffolding as required shall be erected for proper execution of work. If the work can be done safely with a ladder or jhoola these may be permitted in the place of scaffolding.

17.5 Brushing of painting

17.5.1 Generally:

Clean pliable brushes free from loose bristles shall be used. Paints shall not show objectionable pulling under the brush. The brush shall be such that the paint does not show lapping streaks & works satisfactorily under it.

17.5.2 Cleaning of paint containers shall be done only with paint thinners, which are compatible with the paint to be filled.
17.5.3 Brush Application:

While applying the paint, the brush shall be held at an angle of approximately 45 degree to the vertical surface & several light strokes applied in the area to be painted., so as to. first transfer the paint to the surface. During painting, the brush shall also be turned around 180 degree in order to ensure that the paint on both the faces of bristles is utilized completely. The paints are then spread with gentle pressure so as to hide the surface & produce a uniform coating. Ensure that the ends & not the sides of the bristles come in contact with the surface during painting. The paint shall be applied, first using vertical strokes until the surface are covered, & then brushed crosswise for complete coverage with light strokes, so as to smooth out laps & brush marks, & finally laid off with vertical strokes.

17.5.4 Conditioning & Maintenance of Brush:

After each day's work, the brush shall be cleaned in mineral turpentine or any other suitable thinner, ensuring that the paint & pigment are completely removed from the heel of the brush. Warm water & soap shall be used to clean the brushes used in water-bound paints or emulsions.

17.6 Painting Woodwork

Preparing New Surfaces:

17.6.1 All woodwork shall be dry & free from dust, dirt or any other extraneous material. Paint applied over discoloured sapwood is liable to become discoloured resin from knots tends to exude through the paint. Any such unsound portions shall be cut out & replaced with sound wood. Nails shall be punched well below the surface to provide a firm key for stopping.

17.6.1.1 Flat portion shall be smoothed with abrasive paper used across the grain prior to painting & with the grain prior to straining or if the wood is to be left in its natural colour. Mouldings shall be carefully smoothed with abrasive paper & projecting fibres left after machining shall be removed. Quirks need particular attention.

17.6.1.2 All loose knots shall be removed & the holes filled with well-fitted sound timber set in red or white lead paint & securely pinned. Any knots, resinous streaks or bluish sapwood that are not large enough to justify cutting out, shall be treated with two coats of pure shellac knotting, applied thinly & extended about 25 mm beyond the actual area requiring treatment. Aluminium primer may be used in place of shellac knotting. If the area is small & the wood is not highly resinous,. it is permissible, instead of applying two coats of knotting, to apply one coat slightly pigmented with aluminium powder.

17.6.2 Priming:

On clean prepared surfaces, a priming coat of paint, shall be applied by brushing. Unless otherwise directed, the priming coat shall be applied before the woodwork is fixed in position. In case there is already a primer coat but an unsatisfactory one, it shall be rubbed to bare wood & the surface re-primed.

17.6.3 Stopping & Filling:

Stopping & filling shall be done after priming.

17.6.3.1 For deep holes, stopping shall be done with plastic wood conforming to IS 423-1961, Specification for plastic wood for joiner's filler. Stopping shall be to the consistency of stiff paste & all holes, cracks & crevices, etc, shall be stopped carefully to a true & level surface.

17.6.3.2 For stopping slight irregularities of surface & shallow indentation, filler conforming 426-1961 Specification for paste filler for colour coats shall be used. For enamel finishes, filler conforming to IS 110-1968, Specification for ready mixed paint brushing, grey filler, for enamels for use over primers shall be used.

Filler coat, where indicated, shall be applied with a putty knife & subsequently rubbed down to a level surface with abrasive paper or pumice stone. The filler coat shall be of an optimum thickness & shall be allowed to fully harden flatten before subsequent coat is applied. As many layers or filler as necessary shall be applied allowing each coat to harden & flatten before next coat is applied.
17.6.4 Under Coating:

Under coat shall be applied by brush after the surface has been primed, stopped, filled & rubbed down to a smooth surface. After drying, the under coat shall be carefully rubbed down & wiped clean before the next coat is applied.

17.6.5 Finishing Coat:

The finishing coat shall be applied by brush. The extend of gloss shall be as directed by the EIC. The finished surface shall be free from hair or brush marks, streaks clogging of paint, puddles in the corner or paving angle of moulding.

17.7 Clear Finishes to Wood Work

17.7.1 Filling:

On hard wood, with large open vessels, filler conforming to IS 345-1952, Specification for wood filler transparent, liquid shall be used. On fine textured wood having minute pores that do not require filling, unfilled drying oils, thin varnishes, lacquer of shellac shall be used. For special stain effect coloured fillers shall be used.

17.7.1.1 Fillers where indicated, shall be heavily applied, to the wood surface by hand using Hessian or jute rag across the grain. It may be rubbed when still wet to get better penetration. After 5 to 10 minutes it shall be wiped off by hand across the grain followed by a light wipe with the grain: The filled surface shall be dried preferably overnight & smoothened with abrasive paper. Finally wipe with a clean soft rag to remove dust & nubs.

17.7.2 Staining:

17.7.2.1 Spirit Stains:

They shall be applied quickly skillfully to avoid patchy effects. If applied to damp wood the dyes in the stains are liable to be thrown out of solution & cause discolouration.

17.7.2.4 Oil Stains:

Oil stains consist of solutions of oil soluble dyes in linseed oil or of insoluble semitransparent pigments ground in linseed oil & thinned with turpentine or other solvent. Wax may be added to make the stain less penetrating if so directed by EIC. If applied to damp wood they are likely to develop a milky effect or bloom.

Preparation of Surface for Staining:

Surface to be stained shall be scrupulously clean & free from greasy finger marks. It shall be prepared by careful smoothening with fine abrasive paper used in the direction of the grain; scratches across the grain are likely to become stained darker than the rest of the surface. Small cracks or nail holes may be stopped with plastic wood or other suitable, stopping, if spirit stain is to be used. The stopping shall be rubbed down with fine abrasive paper when hard & touched with a little thinned knotting before staining. Where oil stain is to be used stopping shall preferably be done after staining, using tinted or wood filler.

Sizing:

For sizing, where indicated or directed softwood shall be treated with hot weak size of thinned shellac varnish before staining to prevent undue absorption of stain, but an excess of size shall be avoided. To control the depth of colour, however, diluted stain may be made to soak well into the wood. Where size is used, the surface shall be allowed to dry thoroughly before staining. In general, flat surface shall be treated first & mouldings & edges the last.

Application of Stains:

Stains shall be applied by brushing & wiped. The stain shall be so thinned that it can be applied fairly liberally without over-staining. Care shall be taken, especially, on absorbent soft-woods, to stain evenly & without overlapping, spirit stains, in particular require careful & quick applications as they dry very quickly.

17.7.6.1 Plywood:

Plywood is similar to solid wood in its finishing characteristics.

17.7.6.2 Hard Board:

To prevent swelling under the influence of oil paint, a coat of plastic emulsion paint thinned with water or
shellac varnish shall be applied as the first coat & when dry, rubbed down with fine grade abrasive paper & followed, with required undercoating & finishing coats as for the solid wood.

17.7.6.3 **Particle Board:**

The surface shall be filled with thin brushable filler & finished as for solid wood.

17.7.6.4 **Insulation Board:**

Two thin coats of plastic emulsion paint or any other water based paints shall be applied after dusting off the surface as finished for solid wood.

17.8 **Painting Steel & Iron work:**

17.8.1 **Preparing new surfaces**:

The surface shall be thoroughly cleaned of dirt, fluxing material, other foreign matter & scrapped thoroughly with hand scraper followed by wire brushing first with coarse & then with fine wire brushes & finally sand papering the surface to remove all mill scale & rust. The surface shall then be wiped finally with mineral turpentine to remove oil, grease & perspiration left by hand marks.

17.8.1.1 Temporary rust protective materials applied to steel sheets to protect during transport & storage shall be removed with suitable solvent as a preliminary to other preparatory treatment.

17.8.1.2 Surfaces already pretreated or primed in a factory shall be carefully inspected and damaged areas shall be thoroughly degreased and cleaned of all rust and touched up.

17.8.2 **Application of Mordant Solution over Galvanized Surfaces:**

Mordant solution shall be composed of soft water 64 parts and copper chloride, copper nitrate, aluminium chloride and hydrochloric acid, each one part; all by weight. New galvanized surfaces and also old galvanized surfaces where ordered by the EIC, shall be treated with mordant solution at the rate of about 5 litres per 100' sq.m, rubbing the solution on generously with brush or a bundle of rags on a stick. After about half an hour, the surface will turn grey, any part remaining bright shall be retreated and the entire surface washed down thoroughly with clean cold water and allowed to dry before applying primer.

17.8.3 **Primer Coat:**

Immediately after the preparation of the surfaces priming coat shall be applied by brush, working in the paint into the fine dents and ensuring a continuous film without runs and holidays.

17.8.4 **Filler coat:**

After primer coat is hard dry, the surfaces shall be rough sanded without scratching or in any way damaging the primer coat and surfaces cleaned free from dust. Deep dents and scratches, if any shall be filled with paste filler using a good putty knife pressing firmly into the dents and applying in optimum layers. Each layer shall be allowed to dry hard and then cut down by wet rubbing to a smooth finish.

17.8.4.1 Where indicated, after the paste filler is hard dry, a coat of liquid filler shall be applied by brush to fill all fine dents, allowed to hard dry and then wet rubbed to a smooth finish.

17.8.5 **Under Coating:**

An optimum coat or under coating shall be applied by brush. The film shall be allowed to hard dry, wet rubbed and cut down to a smooth finish ensuring that at no place the under coat is completely removed.

17.8.6 **Finishing Coat:**

Finishing Coat shall be applied by brush. Special care shall be taken while painting over bolts, nuts rivets and overlaps etc.

17.9 **Painting Asbestos Cement Building Products, Plaster, Concrete, Brick and stone Surfaces**

SIGNATURE OF TENDERER WITH SEAL

EMPLOYER
17.9.1 Preparation of Asbestos Cement Surfaces:

The surface shall be cleaned by rubbing with sand paper. Any glazed area shall be roughened. Lapse powdery material after rubbing shall be brushed off. Wire brushes shall preferably be avoided in cleaning operations as they often lead to difficulties from deposited particles of iron causing iron stains.

17.9.2 Preparation of Cement and cement concrete surfaces:

New surfaces to be painted should be dried thoroughly. Before painting the surface shall be thoroughly brushed to remove all dirt and other foreign matter incidental to building operation.

17.9.2.1 Any loose or uneven areas or any major cracks or defects in the cement concrete or plaster background shall be cut out and made good and the repairs allowed to dry thoroughly. Cracks may be wetted thoroughly prior to filling or priming paint may be applied to the sides of cracks to avoid undue absorption of water & subsequent shrinkage & filling. Minor cracks may be filled with cement mortar. Fine cracks in lime plaster may be filled with a mixture of linseed oil putty & white lead.

17.9.3 Preparation of Masonry surface:

All mortar joints shall be brought to a sound condition before painting operations are started. In the case of new brick work painting shall be deferred for at least three months after completion of masonry work & longer if the weather during the period becomes unfavourable for drying. Dirt may be removed by washing with water.

17.9.4 Preparation of surfaces Generally:

17.9.4.1 Any existing paint showing extensive flaking, bleaching, or saponification (as shown by stickiness or the presence of yellow soapy runs) shall be removed by scraping & washing & the surface allowed to dry completely.

17.9.4.2 Any existing fungus or mould growth shall be completely removed. The surface shall be thoroughly scraped & rubbed down with bristle & brush sand paper & then washed down with clean water & allowed to dry.

17.9.4.3 If efflorescence appears, painting shall be deferred until it ceases. Efflorescence shall be removed by -drying brushing, in no case the efflorescence salts shall be removed by washing.

17.9.4.4 Dry distempers and lime wash shall be totally removed prior to re-painting. It may sometimes be necessary to wet the surface before scraping. This shall not be overdone and all surfaces shall be perfectly dry prior to the application of any priming coat.

17.9.4.5 Local defective patches shall be treated individually by removing all loose or softened paint and bringing forward the treated patches with primer and undercoating before applying a fresh coating over the whole area.

17.9.4.6 Minor defects are frequently more apparent once the priming or the first coat has been applied and if any further stopping or filling is done over the first coat, The area must be brought forward with appropriate paint to restore even porosity over the surface.

17.9.5 Priming Coat:

New surfaces shall be given a printing coat of alkali resistant priming paint conforming to IS 109-1968 or any other primer as recommended by the manufacturer and allowed to dry for at least 48 hours.

17.9.6 Under coating stopping or filling as required shall be carried out before the painting is done. Any crack in between the plaster ad woodwork shall be securely filled; if such cracks are wide, caulking with hemp or similar material may be necessary to support the filling. Undercoat shall then be applied by brush. After drying the coat shall be carefully rubbed down and wiped clean before the next coat is applied.

17.9.7 Finishing Coats:
Finishing coat shall be applied by brush. The extent of gloss shall be as directed by the EIC.

17.15 **Wall painting with plastic emulsion paint:**

17.15.1 The plastic emulsion paint shall confirm to IS 5411 (part-I) -1974 or IS 5411 (part II) -1972 as indicated

17.15.2 The surface shall be thoroughly cleaned off dust. The surface shall then be allowed to dry for at least 48 hours. It shall then be sandpapered to give smooth and even surface. Any unevenness shall be made good by applying putty made of plaster of Paris with water on the entire surface including filling up of undulation and then sand papering the same again when surface is dry.

17.15.3 The paint shall then be applied either by brush or by roller.

17.15.4 Each coat of paint shall be allowed to dry before the next coat is applied.

17.15.5 The thinning of emulsion shall be done with water. The quantity of water to be added as per manufacturer's instruction.

17.15.6 No washing shall be done within 3 to 4 week of application.

17.15.7 **Precaution:**

17.15.7.1 The brush shall be completely dried of Turpentine oil paint by washing with warm soap water before use

17.15.7.2 The brushes shall be washed in water after use.

17.15.7.3 No oil-based putty shall be used for filling cracks.

17.15.7.4 Splashes in floor shall be cleaned immediately

17.16 **Wall painting with Acrylic Emulsion Paint (Interior / Exterior Walls) Material**

17.16.1 The Acrylic emulsion paint shall be of manufacturer as indicated or as approved by GE and of premium quality. The paint shall be 100% Acrylic and semi Acrylic paint shall not be used in the work.

17.16.2 **Preparation of Surfaces**

17.16.2.1 The surfaces to be applied with Acrylic emulsion paint shall be cleaned to remove loose dirt or dust, lichen, algae, fungi or any organic growth by use of stiff brush. Then the surface is washed well and allows water to dry. All cracks, voids and minor damages shall be patched/ repaired prior to application of paint with white cement putty or with Plaster of Paris.

17.16.2.2 In case of old surfaces where excessive fungal/ algal growth is observed the surface should be bio washed as per manufacturer's instructions. This product is diluted in water before application as per manufacturer instructions and shall be applied with brush. The coat of bio wash shall be allowed to dry for 12-24 hours and then washed with clean water. Allow the wall to dry before it is ready for painting.

17.16.3 **Primer Coat**

Over this prepared surface apply a coat of acrylic primer as per manufacturer's instructions. This shall be allowed to dry for 4 to 6 hours before application of final paint.

17.16.4 **Finishing Coat**

Acrylic paint of premium quality 100% Acrylic shall be applied in at least two coats as per manufacturer instructions. The Acrylic paint shall be prepared as per manufacturer's instructions by adding water in
proportions as suggested No other thinner shall be used. Paint shall be applied with brushes or roller and shall be allowed to dry for 3 to 4 hours between subsequent coats.