

AXIS CONSULTANTS

<u>STANDARD CIVIL ENGINEERING SPECIFICATION</u>		
ISSUED: 15-09-2012	PAINTING SPECIFICATION	REV. – 0

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1.0 **SCOPE**

This specification covers the general requirement of white washing, colour washing, distempering, water proof cement based paint, Acrylic emulsion paint, plastic emulsion paint, synthetic enamel paint, painting on wood work, oil paints, etc.

2.0 **APPLICABLE CODES**

Note: - Wherever reference is made to IS Codes, on any page of this Technical Specification, applicable year of publication of IS Code is as stated below.

The Indian standard codes applicable to this section shall include but not limited to the following:

IS: 55-1970	: Ultramarine blue for paints.
IS: 63-1978	: Whiting for paint and putty.
IS 102-1962	: Ready mixed paint, brushing, red lead non-settling, priming.
IS 104-1979	: Ready mixed paint, brushing, zinc chrome, priming.
IS: 110-1983	: Ready mixed paint, brushing, grey filler, for enamels, for use over primers.
IS: 384-1979	: Brushes, paints and varnishes, flat.
IS: 427-1965	: Distemper, dry, colour as required
IS: 428-1969	: Distemper, oil emulsion, colour as required.
IS: 486-1983	: Brushes, sash tool for paints and varnishes.
IS: 712-1984	: Building limes.
IS:1477 (Part 1 & Part 2)-1971	: Code of practice for painting of ferrous metals in buildings Part 1 : Pretreatment Part 2 : Painting
IS:2074-1992	: Ready mixed paint, air-drying and red oxide-zinc chrome priming.
IS:2395-1994	: Painting of concrete, masonry and plaster surfaces - Code of Practice. Part 1 - Operations and Workmanship Part 2 - Schedules
IS:5410-1992	: Cement paint

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- IS:5411 : Plastic emulsion paint
Part 1 - 1974 : For interior use
Part 2 - 1972 : For exterior use
- IS:6278-1971 : Code of practice for white washing and colour washing.
- IS:8629-1977 : Code of practice for protection of iron and steel structures from atmospheric corrosion
Part 1 : General principles of corrosion and its prevention.
Part 2 : Pretreatment
Part 3 : Protection Schemes

3.0 PRIORITY OF REQUIREMENTS

In case of any variation and discrepancy in condition between the special conditions, this specification and codes, order of priority shall be as under :-

- (1) Special conditions
- (2) This specification
- (3) Codes

4.0 GENERAL

- 4.1 In areas wherever the pipes, pipe coverings, conduits, ducts, hangers, supports, anchors are encountered. These shall be painted in the same paint and colour, unless otherwise specified.
- 4.2 The painting of pipes and conduits near the walls or ceilings, having diameter less than 50mm, shall not be measured extra. The painting of ducts shall be however measured in areas. Any painting of hangers and/ or supports, which are free from walls or ceiling and having an area more than 0.3m²/ metre length shall be measured seperately.
- 4.3 Hardware and accessories like lighting fixtures, grills shall be removed during painting operations and refixed after painting. Removal and refixing shall, however be done only as per the instructions of Engineer-in-Charge.
- 4.4 All the work shall be done in a workmanlike manner, leaving the finished surfaces, free from drops, ridges, waves, laps and brush marks.
- 4.5 Unless so specified, by the manufacturer, paint shall not be applied when ambient temperature is more than 32°C.
- 4.6 Sufficient time shall be allowed between the application of successive coats.

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- 4.7 Paints shall be stirred and kept uniformly consistent during continuous operation of painting.

5.0 MATERIALS

- 5.1 The paints shall be of the types as specified on the drawings and shall be the standard products of approved manufacturers.
- 5.2 All materials shall strictly conform to relevant IS Codes and shall be approved by the Engineer-in-Charge prior to use.
- 5.3 All paints and constituents shall be delivered to work site in original sealed containers bearing manufacturers labels, including complete directions of use and date of manufacture. No ready mix paint shall be more than six months old prior to use.
- 5.4 Constituents and additives such as thinners and driers shall be only those recommended by paint manufacturer and shall be used in quantities recommended by him.
- 5.5 To ensure proper workmanship, prime undercoat and finish paint shall be obtained from one manufacturer.
- 5.6 Paints shall be well ground, shall not settle badly, cake or thicken in the containers and shall be readily broken up with a paddle to a smooth consistency and have easy brushing properties.

6.0 SURFACE PREPARATION

- 6.1 In-situ concrete surfaces to be painted, shall have aged at least 60 days and shall be dry.
- 6.2 Concrete and masonry surfaces shall be free from oil, grease, moss and other detrimental substances and shall be made clean by use of solvents, wire brushes, abrasive stones. Dust shall be brushed off.
- 6.3 The surfaces, if found alkaline, shall be treated with a solution of 3% Phosphoric Acid and 2% Zinc Chloride in water. It shall be allowed to dry for a minimum period of 24 hours.
- 6.4 Small irregularities and depressions shall be filled with approved materials such as putty or plaster of paris.
- 6.5 Plastered surfaces to be painted shall be aged from 30 to 60 days, depending upon the temperature, humidity conditions and shall be dry.

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- 6.6 Surfaces shall be sand papered and the undulations, cracks and other incidental damages to the surfaces shall be properly filled with putty and/or whiting. The putty shall be coloured to match the final shade to be achieved.
- 6.7 The surfaces shall be again sand papered, after the already filled putty, dries up, to achieve uniform surface.
- 6.8 Initial damage such as peeling of plaster, scar marks shall be rectified to match, prior to application of putty.
- 6.9 In case of lime wash, the finishing may be done with plaster of paris.
- 6.10 All the surfaces shall be examined by the Engineer-in-Charge, prior to painting.

7.0 MIXING OF PAINTS

- 7.1 All paints shall be thoroughly mixed and wherever necessary shall be strained.
- 7.2 Thinners may be used to reduce viscosity, only as recommended by the paint manufacturer.
- 7.3 Thinners and cleaning solvent in which brushes, spray equipment, cans or rags have been cleaned, shall not be used in the paint.
- 7.4 All paints and thinners shall be kept covered when not in use.
- 7.5 Not more than one days requirement of paint, including thinners and driers, cleaning solvents and wiping rags shall be kept at the designated location where paint may be stored and mixed.
- 7.6 Paint colour shall be a visual match with the approved colours. This shall be achieved by samples of approximate size 600mm x 600mm.

8.0 METHOD OF APPLICATIONS

- 8.1 Major parts of the painting work shall be applied by brush applications except where spray techniques would accomplish better results or is not appropriate in the circumstances and shall be decided accordingly.
- 8.2 In case of painting on smooth surfaces, particularly internal surfaces of building, the final coat of paint, shall be finished with roller, for uniform finish and removal of brush marks.
- 8.3 As far as practical, each coat or paint shall be applied as a continuous film of uniform thickness and free from pores.

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- 8.4 No portion shall have lesser thickness than that specified by the manufacturer. Similarly, the thickness shall not be more than specified, which is likely to be detrimental to its appearance and life.
- 8.5 Each coat shall be in a proper state of dryness, before the application of the succeeding coat. Paint shall be considered dry, when the additional coat can be applied without developing any detrimental film irregularities.
- 8.6 Finish coats shall be applied only when the damaged or uneven coats are repaired.
- 8.7 The paint shall not be thinned to cover greater area, than that specified by the manufacturer.
- 8.8 No coating shall be applied during damp weather.
- 8.9 Care shall be taken to prevent contamination of cleaned or partially cleaned surfaces. In case of such contamination, it shall be removed before proceeding further.
- 8.10 Allowable drying time between the coats shall not be less than that recommended by the manufacturer and shall be longer, if necessary, depending upon climatic conditions such as temperature and humidity.

9.0 WHITE WASHING AND COLOUR WASHING

- 9.1 White washing and colour washing shall in general comply with IS 6278. Freshly burnt pure and fat lime conforming to IS 712 shall be used.
- 9.2 The wash shall be thoroughly slacked, mixed and stirred with sufficient water to attain the required consistency. This shall be allowed to stand for a minimum duration of 1 day and then shall be screened through a clean coarse cloth. The approximate quantity of water to be added to pure fat lime shall be 5 litres for 1 kg of lime.
- 9.3 Clean gum of approved quality, dissolved in hot water, at the rate of 4 kg shall be added to each cubic metre of lime cream.
- 9.4 Approved quality of ultra marine blue conforming to IS 55 at the rate of 3 grams per kg of lime shall be added to the solution.
- 9.5 The solution shall be thoroughly stirred before use.
- 9.6 The surface to be white or colour washed shall be thoroughly broomed down, so as to remove all dust and holes if any and shall be stuffed with materials similar to the surface.
- 9.7 Three coats of white wash shall be applied with proper fibre brushes. Each coat shall be allowed to dry and will be subject to inspection before the next coat is applied.

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The coats shall be applied alternatively vertically and horizontally.

The finished dry surface shall be of even shade, without any brush marks and shall not show any sign of cracking and peeling nor shall come readily on the hand when rubbed.

- 9.8 The colour wash shall be prepared by adding required quantity of colouring pigment to the lime wash (as prepared for white wash). No ultramarine blue shall be added in this case. Mineral colours not affected by lime, only shall be added to the white wash. The solution shall be gradually stirred, until the required tint is obtained.
- 9.9 For colour wash, a sample shall be first applied, allowed to dry and approved by the Engineer-in-Charge before the work proceeds.
- 9.10 The surface to be colour washed, shall be first treated with a priming coat of white wash. Minimum three coats of colour wash shall be applied and the colour shall be of even tint or shade over the entire surface. The finished dry surface shall not be powdery and shall not come readily, on the hand, when rubbed.

10.0 DISTEMPERING

- 10.1 Approved readily mixed distemper shall comply with IS 427 or IS 428. Dry distemper or oil bound washable distemper of approved brand shall be used. Preparation of distemper from ingredients by the CONTRACTOR shall not be allowed.
- 10.2 The surface shall be cleaned and all cracks, holes, irregularities etc shall be repaired to get a smooth and even surface. It shall be completely dry and dust free before commencement of distempering.
- 10.3 The proportions of the mix shall be as per the approved Manufacturer's instructions. The dry distemper shall be stirred slowly in clean warm water using 0.6 litres of water per kg of distemper or as per Manufacturer's instructions. The mixture shall be well stirred before and during use, to maintain an even consistency.
- 10.4 Thinner of approved manufacturer shall be used in case of oil bound distemper.
- 10.5 A primer coat of whiting shall be applied over the prepared surface, in the case of water bound distemper. Distemper primer or cement primer shall be applied in the case of oil bound distemper. No white washing coat shall be used as a priming coat for distemper.
- 10.6 Minimum two coats shall be applied. The finished surface shall be even, uniform and shall show no brush marks.

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11.0 WATERPROOF CEMENT BASED PAINTS

- 11.1 The waterproof cement paint shall comply with IS 5410 and shall be of an approved manufacturer such as Snowcem, Oricem, Snowcem Plus or equivalent.
- 11.2 Surfaces shall be thoroughly cleaned free from dirt, dust etc. by brushing and washing down with clean water. Any grease, oil paint, vanishes and oil bound washable distemper shall be removed by means of an approved paint remover.
- 11.3 The dry cement paint shall be thoroughly mixed with clean fresh water so as to produce a paint of required consistency. In mixing and application, the CONTRACTOR shall conform to manufacturer's instructions.
- 11.4 Paint for application by brush shall be strained through a paint strainer and paint for spraying shall be twice strained.
- 11.5 The paint shall be kept stirred during use and no paint, which has been mixed for a period longer than one hour shall be used.
- 11.6 The paint to surface other than roughcast may be applied by means of brushes or spraying with low-pressure pot sprayer. Spraying, however, may only be carried out if the Engineer-in-Charge approves. The paint applied to roughcast surface shall be by means of spraying.
- 11.7 Minimum two coats of water proof cement paint shall be applied and the colour shade shall be uniform over the area.
- 11.8 Absorbent surface shall be thoroughly dampened so as to give even suction. Freshly painted surfaces shall be kept damp for at least 2 days and protected from the sun.
- 11.9 Paint shall be applied in dry weather with drying time for each coat being minimum 2 days.

12.0 EXTERIOR ACRYLIC EMULSION PAINT

The paint shall be of an approved manufacturer such as Asian paints, Nerolac, Snowcem India, ICI and shall conform to IS 5411 Part 2.

12.1 Preparatory work

Surfaces shall be dry scrubbed thoroughly by wire brush so as to make the surface free from dirt, dust, fungal growth, etc. Next wash down all the scrubbed dirt with water and whilst this washing is on, scrub once more with wire brush so as to remove any particles still stuck on the surface. Wash the surface once more with water.
All cracks shall be filled with approved acrylic filling compound.

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Old surfaces with algal growth shall be given anti-fungal treatment. Effective stabilized household bleach such as calcium hypochlorite with approximate 35% chlorine content shall be used in proportion 2 kg to 50 litres of water. After cleaning down thoroughly by brush to remove as much growth as possible, apply the bleach. Brush it well. Leave for 24 hours. Wash down and allow to dry and then follow application procedure.

12.2 Mixing and application

Recommendations given by the paint manufacturer shall be strictly followed for mixing and application of paint. Minimum two coats of exterior Acrylic Emulsion shall be applied and the colour shade shall be uniform over the area. Paint shall be applied in dry weather. Two strokes vertical and two strokes horizontal over the area shall constitute one coat.

13.0 INTERIOR PLASTIC EMULSION PAINT

The paint shall be of approved manufacturer such as Asian Paints, Nerolac, Jenson and Nicholson, Berger and shall conform to IS 5411 Part 1.

13.1 Preparatory Work

The surface shall be thoroughly cleaned of dust, old white or colour washing and scrubbing. The surface shall then be allowed to dry for at least 2 days. It shall then be sand papered to give a 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 the undulation and then sand papering the same after it is dry.

13.2 Mixing and application

Recommendations given by the paint manufacturer shall be strictly followed for mixing and application of paint.

The prepared surface shall be treated with two coats of primer consisting of cement primer, whiting or as per manufacturer's specifications.

The paint shall be applied with brush or roller.

The paint is dried, by evaporation of the water content and as soon as the water has evaporated, the next coat can then be applied. The time of drying varies from 1 hour on absorbed surface and 2-3 hours for non-absorbed surfaces.

The thinning of the emulsion shall be done with water and not by turpentine.

The surface on finishing shall present a flat, velvety smooth finish.

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Minimum three coats of Plastic Emulsion paint shall be applied and the colour shade shall be uniform over the area.

13.3 Precautions

Old brushes, if they are to be used, shall be completely dried of turpentine or oil paints by washing in warm soap water.

Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

No oil base putties shall be used in filling cracks, holes etc.

Washing of surfaces treated with Emulsion paints shall not be done within 3-4 weeks of application.

14.0 **SYNTHETIC ENAMEL PAINT**

The paint shall be of approved manufacturer and shall be applied to painting of steel doors, windows, ventilators, louvers, grills, rolling shutters, etc.

14.1 Surface preparation

The surface shall be cleaned and degreased. Wherever required the surface shall be derusted and descaled by through wire brushing or other mechanical means or by using chemical rust removal. While cleaning with power wire brush, care shall be taken not to do it excessively. All weld flux, if any shall be removed. The surface shall then be allowed to dry.

14.2 Application

Immediately after preparation of the surface the first coat of primer paint conforming to IS 102, IS 104, IS 2074 as applicable. It shall be applied by brush or by other approved method, so as to ensure a continuous film.

After the first coat is hard dry, a second coat shall be applied as above.

After the second coat of primer is hard dry, the surface shall be rubbed with sandpaper without scratching or damaging the primer coat and cleaned. The deep dents shall be filled with putty of approved type and it shall be allowed to hard dry. It shall be rubbed down with wet rubbing to a smooth finish and the water allowed to evaporate. This operation is repeated till a smooth surface is obtained.

An optimum coat of under coating by brush or spray shall be applied with minimum brush mark. The film should be allowed to hard dry. The surface shall be wet rubbed and water shall be allowed to evaporate.

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The first finishing coat shall be applied either with spray or brush. For the second coat application, the surface shall be rubbed with fine sandpaper to remove the gloss and it shall be cleaned. Then second coat shall be applied.

Care shall be taken to protect the fittings, fixtures, etc., which are not required to be painted. All such fittings and fixtures shall be cleaned of all inadvertent painting.

For structural steel, painting shall be carried out as per specifications conforming to IS 8629.

15.0 PAINTING WOODWORK

15.1 Preparation of surface

The surface shall be rubbed smooth with sandpaper, first with coarse grade and then with medium grade. When finished, no scratches from the coarse paper shall be visible.

15.2 Knotting

Before priming, all the knots in the woodwork shall be filled with an application of two coats of an approved substance through which the resin cannot exude.

15.3 Primer Coat

Primer coat shall be the ready mixed prime coat of approved make and shall be applied as per the specifications of the approved manufacturer.

15.4 Final Coats

After priming, all small holes, cracks, open joints etc. shall be closed with approved putty consisting of pure whiting, mixed with linseed oil to a proper consistency and white lead for hardening. Putty shall not be used before application of priming coat.

After applying priming coats, the surface shall be lightly rubbed down smooth with sandpaper and the subsequent coats of paint of the specified shade and finish approved by the Engineer-in-Charge, shall be applied. It shall be spread as smoothly as possible with brush by means of crossing at right angles to the grains and then laying off with the brush in the direction of the grain over the crossing. The final coat shall be very carefully crossed and laid off so that no brush marks are visible. Each coat of paint shall be allowed to dry thoroughly and shall be lightly rubbed down before the application of the next coat. Each coat shall be got approved before the application of the next. The finished surface shall be free from any hair marks, ridges, puddles and other defects.

Unless otherwise specified, three coats of paint exclusive of primer coat shall be applied for all timberwork.

If the final coat is not approved, an extra coat of paint shall be applied at no extra cost so as to get the specified finish.

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15.5 Painting old woodwork

The surface shall be cleaned down and rubbed with sandpaper or with pumice. All holes and uneven surfaces shall be filled with putty. Two coats of under coating of paint shall be applied, each coat being sand-downed before the application of the next coat. The surfaces shall be smooth and dry before applying the final coats.

15.6 Polishing Woodwork

The woodwork to be polished shall be prepared as specified under painting for woodwork. No priming coat is required. Approved quality of putty consisting of 1 part of whiting and 0.53 part of methylated spirit shall be applied on entire surface so as to fill all cracks, open joints and other defects.

A thin coat of approved French polish or other varnish shall be applied and allowed to dry. Any straining required shall be used as per the instructions of Engineer-in-Charge. Two additional coats of polish shall be given so as to obtain even polishing.

16.0 **EQUIPMENT AND SAFETY**

16.1 Scaffolding, staging or any other auxiliary equipment required for painting shall be of good quality and free from detrimental defects. Such structures shall be made strong and stable from safety point of view.

16.2 Proper accessories shall be provided wherever required.

16.3 Brushes, rollers, etc shall be of good quality and size as required and directed by Engineer-in-Charge.

16.4 The drop cloths shall be of sizes, so as to provide complete protection to surfaces other than those painted at the particular time.

16.5 Safety belts and masks shall be used whenever necessary.

16.6 Provision of all the items stated above, shall be at no extra cost.

17.0 **WORKMANSHIP**

17.1 Workmanship shall be the best, that can be normally achieved. The paints shall be applied with good clean brushes, approved rollers and approved spraying equipment.

17.2 Initial coat on any surface may be applied by brush. Work shall be performed in such a manner that it does not spoil and damage areas. Any damages done so, shall be borne by the CONTRACTOR.

17.3 Exterior paints shall not be applied in foggy and rainy weather.

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17.4 Wherever scaffolding is necessary, it shall be erected in such a way that, as far as possible, no part of the scaffolding shall rest against the surface to be painted.

18.0 SPECIAL REQUIREMENTS

18.1 Materials shall be stored in approved locations. The storage area shall be clean and free from fire hazards.

18.2 Oily and paint stained rags shall be kept in covered metal containers.

18.3 Painting shall be done at times and sequences, approved by Engineer-in-Charge and shall generally conform to the sequence of construction.

18.4 Surfaces inaccessible after erection shall be painted when they are accessible.

18.5 Any surface painted, which becomes damaged prior to acceptance shall be touched and finished at CONTRACTOR's own cost.

18.6 All misplaced paint and drippings shall be removed and cleaned from all surfaces.

18.7 All surfaces which do not require paint shall be protected from drips and spray, the cost of which shall be borne by the CONTRACTOR.

19.0 PERIODS BETWEEN THE VARIOUS COATS

The primer shall be allowed to harden for a minimum period of 48 hours before application of the final paint. The periods between successive coats shall be minimum 24 hours or as recommended by the manufacturer. When oil paints are used, the minimum period between finish coats shall be four days or as specified by the manufacturer.

20.0 COLOUR SCHEME

The colour scheme shall be provided prior to taking up the painting works. Prior to finalising of colour scheme, the CONTRACTOR shall prepare samples of all finished paints as per the direction of Engineer-in-Charge. The cost of such samples shall be borne by the CONTRACTOR.