



Uhde India Limited

**SECTION-9
TECHNICAL SPECIFICATIONS
PAINTING**

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9.1 SCOPE

This specification covers painting of structural steel, varnishing, polishing etc. of both interior & exterior surfaces of Wood work, painting of masonry, concrete, plaster surfaces, structural and other miscellaneous steel items, rain water down comer, floor & roof drains, soil waste & service water pipes and other ferrous & non ferrous metal item as shown on drawings or as directed by the engineer.

9.1.1 APPLICABLE CODES

- 1) IS: 101 Methods of test for ready mixed paints and enamels.
- 2) IS:158 Specification for ready mixed paint, brushing, bituminous black, lead free, Acid alkali and heat resisting.
- 3) IS:348 Specification for French polish.
- 4) IS:427 Specification for distemper dry colour as required.
- 5) IS:428(I&II) Specification for distemper oil emulsion, colour as required
- 6) IS:1477(I&II) Code of practice for painting of ferrous metal in bldgs.
- 7) IS:2074 Specification for Ready mixed paint, air drying, red oxide – zinc chrome, priming.
- 8) IS:2338(I&II) Code of practice for fin-ishing of wood & wood based materials.
- 9) IS:2339 Specification for Aluminium paints for general purpose in dual containers
- 10) IS:2345 Code of practice for painting concrete, masonry & Plaster surface.
- 11) IS:2932 Specification for enamel, synthetic, exterior, type-1
- 12) IS:5410 Specification for cement paint colour as required.

13) IS:5411 Specification for Plastic emulsion Paint : Part I – for interior use.

14) IS:6278 Code of Practice for White washing and Colour washing

9.2 White / Colour wash

9.2.1 White Washing

This shall include providing and applying 3 coats of white wash to plastered surface with all labour, material, plant, tools, scaffolding, etc.

The white wash shall be applied with smooth brushes and not by any other rough equipment. Best approved quality of lime slacked in conformation to IS:1635 shall be used. Required amount of glue and indigo shall be added to produce solution, which, after properly filtering through a fine cloth, will not stick to the fingers when rubbed after drying. Before any lime wash is applied to a surface, it is required that all loose material and dirt shall be removed by a brush and sand paper. Lime putty shall be used to make good all holes and irregularities of surface of minor repairs, which, should be left dry before applying the second coat.

Doors, windows, floors etc. and such other parts of building shall be protected from being splashed upon. Splashing and dropping if any, shall be removed by the contractor at his own cost and the surfaces cleaned.

9.2.2 Colour Washing

The wash shall be prepared by adding required quantity of colouring pigment to the lime wash as prepared for white wash. Indigo, however, shall not be added. Ultramarine blue shall be added in this case. Mineral colours not affected by lime only shall be added to white wash. No colour wash shall be done until a sample of colour wash prepared to the required tint or shade has been approved by Engineer.

The surface to be colour washed shall be first treated with a priming coat of white wash. Minimum three coats of colour shall be applied and the colour shall be of even tint or shade over the whole surface.

The finished dry surface shall not be powdery and shall not come off on the hand when rubbed.

9.3 Oil bound Washable Distemper.

9.3.1 Material

Material for oil bound distemper shall be of approved make and manufacturer. A sealed tin ready mixed distemper of selected make shall be opened in presence of Engineer.

9.3.2 Surface Preparation.

This includes scraping uneven surface, damaged plaster, etc. with carborundum papers of suitable number till hard, clean surface is obtained. This is to be repeated till the work is approved by the Engineer. Putty shall be used to cover holes and unevenness on the surface.

9.3.3 Preparation and application of Putty.

Putty will be prepared as under. It shall be prepared from English whiting chalk, linseed oil, white zinc and plater of paris in the prop. of 7:1:2:1. However, exact proportion shall be decided as per site condition. Water, if required, can be added as per the instructions and requirements to have proper consistency and stickness. Putty should be smooth and free from any coarse ingredient, etc.

Application of putty should be started only after approval of surface area by the Engineer. It should be applied on the whole surface to make the surface smooth. No lumps should be allowed to dry completely.

After drying, the surface should be scraped with sand/emery paper till smooth surface is obtained.

If no proper smoothness is obtained again apply primer, putty, etc. and repeat the process as mentioned above, till the surface is perfect smooth as per instructions.

After application of first coat of putty, the surface shall be allowed to dry for 24 hours. sand papering shall then be done to give smooth surface.

Subsequent applications of putty and sand papering shall be done till the Engineer is satisfied about final surface, which should be absolutely even, levelled and smooth.

9.3.4 Primer application

Primer should be a cement primer, or as per manufacturer's specification (manufacturer same as that of distemper). These tins should be opened in presence of the Engineer. Before applying primer on the surface, its consistency must be approved by the Engineer and shall be same as specified by the manufacturer. Primer should be applied with smooth brushes on surface to cover entire surface properly. There should be no brush marks, stripes, etc. when applied on the surface. This surface should be allowed to dry atleast for 24 hours before next application.

9.3.5

On the surface so prepared, two coats of oil bound distemper of selected shade shall be applied only after inspection by the Engineer. A horizontal and vertical travel of brush together will be considered as one coat of paint. Each coat of paint shall be applied only after inspection of Engineer. No brush marks shall be visible on the surface at the end of final coat. Final surface shall be smooth, even or roller finish and uniform in colour and texture.

9.4 Cement Paint

The specified surface is to be provided with 2 coats of cement paint of approved manufacturer in shade and colour approved by the Engineer.

The surface is to be thoroughly cleaned and rubbed down and all loose particles and dust etc. be removed. Before applying first coat, surface should be watered thoroughly and shall be allowed to drain off. Second coat shall be started after 24 hours of first coat. The entire surface shall then be cured for seven days.

Paint shall be prepared strictly as per manufacturer's specifications & as directed.

9.5 Acrylic Emulsion Paint

Paint shall be of approved quality and shades.

Surface preparation, primer and putty application shall be as per clause 9.3.2, 9.3.3, 9.3.4.

Two coats of Acrylic emulsion paints shall be applied as per manufacturer's specification. The surface on finishing shall present a flat velvety smooth finish.

9.6. Coal Tar Epoxy paint

Concrete surface shall be thoroughly cleaned with wire brush and 3 coats of coal tar epoxy paint shall be applied. Successive coats shall be applied only after the first coat has dried. Usually, the paint will be supplied by manufacturers in 2 packs. The base and hardener shall be mixed as per manufacturer's specification.

No primer paint is necessary. The min dry film thickness (DFT) of each coat shall be 100 microns.

9.7 Chlorinated Rubber paint.

Concrete surface shall be thoroughly cleaned with wire brush and 3 coats of Chlorinated Rubber paint shall be applied as per manufacturer's specifications. Primer as recommended by manufacturer shall be applied.

9.8 Epoxy based paint

Surface shall be thoroughly cleaned with wire brush and 3 coats of epoxy based paint shall be applied as per manufacturer's specifications.

9.9 Aluminium based Heat Resistant Paint

Aluminium based heat resistant painting shall conform to IS:2339. The paint comes in compact dual containers with the paste and the medium separately. The two shall be mixed together to proper consistency before use.

9.10 Painting of Structural Steel work**9.10.1 Scope**

Scope of work shall include surface preparation as specified, procurement and application of primer and coating paints as specified, providing all tools, sandblasting equipments, if required and all labour.

9.10.2 Surface Preparation.

Durability of painting depends upon surface preparation to a great extent. Before application of any primer or finishing paint the surface shall be free of rust, mill scale, grease, oil, dust, sharp points, welding spatter, flux, or any other foreign materials. When the heat resisting paint is to be applied shop primer or any other paint previously applied should be removed completely. The surface preparation shall also depend upon the type of primers to be applied. To achieve the required degree of surface protection any one or more of the following methods in combination shall be used as specified.

9.10.2.1 Hand Cleaning

Hand cleaning shall consist of removing scales by sharp edged tools, hammering, hard steel wire brush scraping, sanding with emery paper, etc. All loose paint, (if previously applied), scale rust, dust, foreign materials, etc. Shall be removed in this way. If the surface is covered with any oil or grease, it should be removed with soap solution and then be washed with clean water. All loose dust, rust, etc. shall be wiped off with clean rag before application of paint or primer.

9.10.2.2 Mechanical Cleaning and Scrapping.

Mechanical cleaning and scrapping shall be done by mechanical striking tool, knurled grinding wheels, abrasive wheels or rotating steel wire brushes. To avoid sparks in inflammable and dangerous zones, stainless steel or brass wire brushes shall be used. The power brush shall be used in such a manner that all scale, rust, foreign material, etc. scraped off from entire surface, outside and inside corners, edges, etc. The interior surface of the structure, equipment, machinery, etc. that can not be reached with power brush shall be cleaned by hand cleaning as described.

The surface so prepared, shall be wiped with clean rags before application of primer or paint.

9.10.2.3 Sand Blasting

The sand blasting of the surface shall be carried out by compressed air and blasting gun. Clean screened sand of uniform size shall be used for blasting purpose.

For sand blasting, the surface shall be made free from mill scale, rust, grease, oil or other foreign material and shall appear to have foreign white base metal roughened texture to form good adhesion of the primer coating, conforming to Swedish Standards "Sa 2 ½".

Compressed air should be free from moisture and oil. The sand blasted surface shall be applied with 1st coat primer within 3 to 4 hours or before any trace of oxidation appears on the cleaned surface.

9.10.2.4 Chemical Cleaning

Chemical cleaning shall be adopted when a surface free from oil, grease, rust, etc. is required and sand blasting or mechanical scrapping and cleaning is not possible. Special chemical cleaners of approved manufacturer shall be used as per manufacturer's specifications. The chemical is first diluted in water and then applied liberally with rag or brush. Allow the solution to remain in contact with surface for 1 to 5 minutes as required, do not allow the solution to dry up, if

it is dried up apply more solution. The solution is then wiped off with a clean cotton rag or by rubbing with dry saw-dust. If any greasy spot are left after 1st application, second application may follow for these spots only.

Engineer's approval of the surface preparation before applying 1st coat of paint or primer will be necessary and his decision in the matter shall be final and binding to the contractor.

9.10.3 Synthetic Enamel Painting

Surface preparation shall be by hand cleaning. Primer shall be zinc cromate or zinc phosphate (pigmented in alkyed or phenolic medium of approved make, British or Asian Paints) of minimum 38 microns dry film thickness. The coats of synthetic enamel paint of approved make, British Luxol-3 or Asian apcolite, of total 100 microns DFT shall be applied as directed by the Engineer.

9.10.4 Epoxy Paint System

Surface preparation shall be with hand cleaning OR sand blasting to sa 2 ½ surface of Swedish Standard and wherever stand blasting is not possible, chemical cleaning shall be permitted.

Primer coat (one coat)

Primer shall be one coat of zinc dust pigment with ethylsilicate binder - 75 microns DFT.

Intermediate coat:[one coat]

The intermediate coat shall be Micacions Iron oxide pigment with epoxy resin binder - 100 micron DFT.

Final coat:[2 coats]

Each final coat shall be Interpigment with Acrylic resin base alliphatic polyurethane binder - 35 micron DFT each coat.

The equivalent paint chart shall be followed for selection of paints manufactured by approved manufactures.

9.11 Inspection & Testing

All the painting materials brought to site for the purpose of application shall be accompanied by the manufacturer's test certificates. In case such certificates are not available, the Engineer may direct the contractor to have the materials tested in accordance with relevant IS specifications or as specified in the tender at outside laboratories and all costs there of shall be borne by the contractor.

The Engineer may call for additional tests in materials accompanied by manufacturer's test certificates. (Contractor shall arrange to have such tests performed but costs thereof shall be born by the owner.)

The work will be subject to inspection by the Engineer at all times. In particular, following staged inspection will be performed and contractor shall offer the work for inspection and approval at every stage before proceeding with the next stage:

- a) Surface preparation
- b) Primer application
- c) Each coat of paint

Final inspection shall include measurement of paint film thickness, check of finish obtained and adhesion test as per IS specification.

The contractor shall provide for the purposes of inspection, Elcometer, access, ladders, lighting, and any other necessary items at his cost.

If with specified number of coats specified Dry Film Thickness (D.F.T) is not obtained, contractor will have to apply additional coat to achieve the required DFT without any extra cost. However, specified number of coats have to be applied even if required DFT is obtained with lesser number of coats.

9.12 Varnishing and Polishing

9.12.1 The Varnish used shall be generally spirit varnish obtained from shellac, Gun Arabic, Resin and Amber.

9.12.2 French polish shall be made by dissolving 1/4 kg of Shellac in ½ liter of methylated spirit or naphtha and staining the solution through a double thickness of coarse muslin.

9.12.3 Method of Application

The prepared wood work shall be applied with a coat of thin clear glue. This shall be allowed to dry and rubbed down with fine sand paper. A second coat of thin clean glue with necessary quantity of staining colour shall then be applied and allowed to dry. Varnish shall be laid on in thin coats over this surface. The application shall be with a polishing pad and not with a brush.

Varnishing shall not be carried out on stormy and rainy days.

9.13 Special Insulating paint having electrical resistance:**9.13.1 On RCC & Masonry Surfaces:****Primer coat:**

Two coats of approved primer, each 30 microns DFT shall be applied.

Final coat:

Two coats of approved paint, each coat 100 microns DFT shall be applied

9.13.2 On Steel Surfaces

The surface preparation shall be as described in clause 9.10.2.

Primer coat

One coat of primer, 100 micron DFT, shall be applied.

Final coat

Two coats of approved paint, each coat 100 microns DFT shall be applied.

- 9.13.3 Paints manufactured by reputed companies may be used subject to adhering of following duty conditions.

Sodium Hydroxide	=	33%
Sodium Chloride	=	25%
Temperature	=	60°C to 90°C.
Electrical resistance	=	50 k.ohms.

9.14 Mode of Measurement

9.14.1 Painting (other than structural steel painting)

The payment shall be on M². basis of finished area and deductions for openings shall be made as per clauses given under plastering item. The rate shall include all materials, surface preparation, labour, tools and tackles, scaffolding, cleaning stairs, etc. complete as specified and as per relevant IS Codes.

9.14.2 Painting (Structural Steel)

The payment shall be on M.T basis. The rate shall include for surface preparation, primer, paints, labour, tools and tackles, scaffolding, etc complete as specified and as per relevant IS Codes.

In case in bill of quantities, surface preparation and application of primer is indicated separately, then the payment shall be made as per BOQ items.