





**NEELACHAL ISPAT NIGAM LIMITED
IRON AND STEEL PLANT
KALINGA NAGAR INDUSTRIAL COMPLEX
DUBURI, ORISSA - 755026**

**GENERAL SPECIFICATION
ON PAINTING
(GS-02)
NINL-PHASE-II**



**MECON LIMITED
RANCHI - 834002
INDIA**

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01

GENERAL

01.01 This specification covers the materials, tools, facilities and quality requirement for surface preparation and painting of steel structures, equipment, piping, ducts, chutes, wood work etc. required for Neelachal Ispat Nigam Ltd. (NINL), Duburi, Orissa



01.02 This is only a general guideline of the painting scheme to be followed by the Tenderer. However, in case a specific painting procedure is stipulated in any tendering specification, then this general guideline shall be superceded. Any special case which may arise from time to time shall be dealt with individually on the merit of each case

01.03 The term “painting” referred herein covers rust preventive, fungus/insects preventive and decorative coating along with surface protection of the following area but not limited to the areas indicated below.

- i. Structural steel works
- ii. Mechanical equipment
- iii. Electrical equipment
- iv. Instrumentation and control equipment.
- v. Pipe work
- vi. Oxygen plant, etc.

01.04 Surfaces made of asbestos, aluminum, brass, bronze, galvanized steel, stainless steel, cast iron and other corrosion resistant alloys and rubber/synthetic polymer/fiber reinforcement plastic and buried pipe work are not required to be painted unless specified except for aesthetic purposes or for identification bands, wherever relevant.

01.05 All machined mating surfaces (eg. flanges) shall be properly cleaned, greased and protected before dispatch.

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01.06 The complete paint system for any item includes the following basic activities :

- i) Proper surface preparation
- ii) Application of primer coats
- iii) Application of intermediate coats
- iv) Application of finished coats

All the above coats shall be of quality paint products and of approved make. The scope of work shall also include supply of all paint materials as per specification described herein.



01.07 If the contractor desires to adopt alternative paint system for any specific item for an improvement or equivalent to the system specified here-in he may do so subject to purchaser's approval.

01.08 Painting and surface preparation of the equipment to be executed outside India shall be carried out and tested as per the code and practices indicated in the latest specification of steel structures. Painting Council (SSPC) USA or DIN 55928 or as per the National Standards Institution of the country of origin.

02 **SURFACE PREPARATION**

02.01 Surface preparation being a pre requisite for any paint application , shall be such as to clean the surface thoroughly of any material which will be conducive to premature failure of the paint substrates.

02.02 All surfaces shall be cleaned of loose substances, and foreign materials, such as dirt, rust, scale, oil, grease, welding flux, etc. irrespective of whether the same has been spelt out in the standards in order that the prime coat is rigidly anchored to the virgin metal surface. The surface preparation shall conform to pictorial representation of surface quality grade of Swedish Standards Institution SIS – 055900 or equivalent standards such as SSPC – VIS – 1.67 or DIN 55928(Part 4) or BS 4232 or IS 1477 – 1971 (Part I)

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02.03 The acceptable surface preparation quality / grade are described under each paint system. The procedures covered are solvent cleaning, hand tool cleaning, power tool cleaning, blast cleaning, wood surface cleaning, flame cleaning and pickling to attain desired surface quality as required by the specific primer paint. For ready reference surface preparation quality grade to be adopted in respect of SIS 055900 and DIN 55928 (part-4) is given in Annexure-01.

02.03.01 **Solvent Cleaning**



The surface shall be cleaned by wiping, immersion, spraying or vapour contacting of a suitable solvent or washing with an emulsion or alkaline solution to remove oil, grease, dirt, old paint, etc. Solvent cleaning shall not remove rust, scales, mill scales or weld flux. Therefore, before application of paint, solvent cleaning shall be followed by other cleaning procedures as stated in subsequent chapters.

02.03.02 **Hand Tool Cleaning**

The surface shall be cleaned manually by vigorous wire brushing as per grade St-2 quality of Swedish Standard Institution SIS 055900 and DIN 555928. This method effectively removes loosely adherent materials, but would not affect residues of rust or mill scales that are intact and firmly adherent. Finally the surface is to be cleaned with a vacuum cleaner or with clean compressed air or with clean brush. After preparation the surface shall have a faint metallic sheen. The appearance shall correspond to the prints designated St – 2.

02.03.03 **Power Tool Cleaning**

The surface shall be cleaned by electric or pneumatic tools, such as brushes, sanding machines, disc abrasive grinder, rotary disc scaler etc. to St – 3 quality. The tools shall be used carefully to prevent excessive roughening of surface and formation of ridges and burrs. This method will remove loosely adherent materials but would not affect residues of rust or mill scales that are firmly adherent and intact.

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02.03.04 **Blast Cleaning**

The surface shall be cleaned by impingement of abrasive materials, such as graded sand at high velocity created by clean and dry compressed air blast as per the grade according to Swedish Standard Institution SIS 055900 .This method will remove loosely adherent materials as well as adherent scales and mill scales .Prior to application of blast, heavy deposit of oil and grease are removed by solvent cleaning excessive surface scales are removed by hand tools or power tool cleaning. The extent of removal of adherent scales is varied, depending on the application and are defined by the surface quality grades Sa1, Sa2, Sa2.5 and Sa3 in the order of increasing cleanliness. The blast cleaning is not recommended for sheet metal work.

02.03.05 **Wood Surface Preparation**

All new wood work surfaces shall be dried, cleaned and rubbed down with sand paper followed by removal of all dusts. Resinous knots, resin patches, voids, cracks are to be sealed properly with mix of wood dusts and “Fevicol” or any suitable sealer. Sealers should be allowed to dry after application for a period of at least 16 hrs or so. The wood surface should be rubbed down smooth by abrasive paper followed by fine talc/soapstone powder coating before making ready for priming.

02.03.06 **Flame Cleaning**

The surface is cleaned by rapid heating by means of oxyacetylene flame to loosen the adherent scales, followed immediately by wire brushing. This method will remove loosely adherent materials as well as most of the adherent scales and mill scales. In order to minimize or prevent distortion flame cutting shall not be used on members having thickness of 6 mm and lower.

02.03.07 **Pickling**

In this method the surface is cleaned of mill scales, rust or rust scales by chemical reaction or electrolysis or both.

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03. **PAINT APPLICATION**

03.01 **Paints**

03.01.01 Paint shall be applied in accordance with paint manufacturer's recommendations. The work shall generally follow IS 1477 – 1971 (Part II) for jobs carried out in India and SSPC-PA-1 or DIN 55928 or equivalent for jobs carried out outside India.

03.01.02 General compatibility between primer and finishing paints shall be established by the paint manufacturer supplying the paints.

03.01.03 In the event of conflict between this general procedure on painting and the paint manufacturer's specification, the same shall be immediately brought to the notice of the Purchaser. Generally in cases of such conflicts, manufacturer's specifications/recommendations shall prevail.



03.01.04 Before buying the paint in bulk, it is recommended to obtain sample of paint and establish "Control Area of Painting". On Control Area, surface preparation and painting shall be carried out.

03.01.05 If required, samples of paint shall be tested in laboratories to establish quality of paint with respect to:



- (i) Viscosity
- (ii) Adhesion/Bond of paint in steel surfaces
- (iii) Adhesion/Simulated salt spray test.
- (iv) Chemical analysis (percentage of solids by weight)
- (v) Normal wear resistance as encountered during handling & erection.
- (vi) Resistance against exposure to acid fumes, etc.

03.01.06 Whole quantity of paint for a particular system of paint shall be obtained from the same manufacturer.

03.01.07 The main Contractor shall be responsible for supply of paints and this responsibility shall not be passed on to the sub-contractor.



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- 03.01.08 The painting material as delivered to the Contractor, must be in the manufacturer's original container bearing the manufacturer's name brand and description. Paint/Painting material in containers without labels or with illegible labels shall be rejected, removed from the area and shall not be used.
- 03.01.09 Thinners wherever used shall be those recommended by the paint manufacturers and shall be obtained in containers with manufacturer's name and brand name of thinner legibly printed, failing which the thinner is liable to be rejected and shall not be used.
- 03.01.10 All paint containers shall be clearly labeled to show the paint identification, date of manufacture, batch number, special instruction, shelf life etc. The container shall be opened only at the time of use.
- 03.01.11 All paints shall be stored in accordance with the requirements of laid down procedure by the paint manufacturer.
- 03.01.12 All ingredients in a paint container shall be thoroughly mixed to break-up lumps and disperse pigments before use and during application to maintain homogeneity.
- 03.01.13 The proposed make, quality and shade of the paint shall have the approval of the client.
- 03.01.14 The colour code of the finishing paint to be followed shall be intimated to the successful Tenderer after finalisation of order. The undercoat shall have different tint to distinguish the same from the finishing coat.
- 03.01.15 The Contractor shall furnish paint manufacturer's test report or technical data sheet pertaining to the paint selected. The data sheet shall indicate among other things the relevant standards, if any, composition in weight percent of pigments, vehicles, additives, drying time, viscosity, spreading rate, flash point, method of application, quality of surface preparation required, corrosion resistance properties and colour shades available.
- 03.01.16 For details of paint materials refer Annexure - 02

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03.02 General

- 03.02.01 Each coat of paint shall be continuous, free of pores and of even film thickness without thin spots.
- 03.02.02 Each coat of paint shall be sufficiently dry before application of next coat.
- 03.02.03 Paint shall be applied at manufacturer's recommended rates. The number of coats shall be such that the minimum dry film thickness specified is achieved. The dry film thickness of painted surfaces shall be checked with ELCOMETER of measuring gauges to ensure application of specified DFT.
- 03.02.04 Zinc rich primer paints which have been exposed several months before finishing coat is applied shall be washed down thoroughly to remove soluble zinc salt deposits.
- 03.02.05 The machine finished surfaces shall be coated with white lead and tallow before shipment or before being put out into the open air.
- 03.02.06 Areas which become inaccessible after assemble shall be painted before assembly (after obtaining painting clearance from the inspecting authority) after requisite surface cleaning as specified.
- 03.02.07 Paint shall not be applied when the ambient temperature is 5 deg C and below or 45 deg C and above. Also paint shall not be applied in rain, wind, fog or at relative humidity of 80 % and above unless the manufacturer's recommendations permit. Applications of paint shall be only be spraying or brushing as per IS 486 – 1983 and IS 487 – 1985.
- 03.02.08 Primer paint shall be applied not later than 2 – 3 hours after preparation of surface, unless specified otherwise.
- 03.02.09 Edges, corners, crevices, depressions, joints and welds shall receive special attention to ensure that they receive painting coats of the required thickness.

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03.02.10 Surfaces which cannot be painted but require protection shall be given a coat of rust inhibitive grease according to IS 958 – 1975 or solvent deposited compound according to IS 1153 – 1975 or IS 1674 – 1960.

03.02.11 Surfaces in contact during shop assembly shall not be painted. Surfaces which will be inaccessible after assembly shall receive minimum two coats of specified primer.

03.02.12 Surfaces to be in contact with wood, brick or other masonry shall be given one shop-coat of the specified primer.

03.02.13 For wood surfaces the paint application shall be as per paint manufacturer's recommendation



03.03 **Site/Field Painting**

03.03.01 Wherever shop primer painting is scratched, abraded or damaged, the surface shall be thoroughly cleaned using emery paper and power driven wire brush wherever warranted, and touched up with corresponding primer. Touching up paint shall be matched and blended to eliminate conspicuous marks.

03.03.02 If more than 50% of the painted surface of an item requires repair, the entire item shall be mechanically cleaned and new primer coats shall be applied followed by intermediate and finishing coats as per painting specification.

03.03.03 All field welded areas on shop painted items shall be mechanically cleaned (including the weld area proper, adjacent areas contaminated by weld spatter or fumes and areas where existing primer paint is burnt) Subsequently, new primer and finishing coats of paint shall be applied as per painting specification.

03.03.04 The first coat of finish paint at site shall be applied preferable within three months of the shop paint.

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03.04 **Structural**

03.04.01 All fabricated steel structure, fabricated steel pipes, etc. shall have a minimum of two coats of primer paint before dispatch to site.

03.04.02 Parts of steel structures embedded in concrete shall be given a protective coat of portland cement slurry immediately after fabrication and after surfaces of this part is thoroughly cleaned from grease, rust, mill scales, etc. No paint shall be applied on this part.

03.04.03 All structures shall receive appropriate number of primer and finishing coats in order to achieve overall DFT as per design drawings/specification.

03.05 **Electrical Equipment**

03.05.01 Small machinery, motors, electrical equipment and instruments, etc. shall be painted in the shop.



03.05.02 Large machinery, large motors, cranes, conveyors, etc. shall be shop painted as per the painting scheme.

03.06 **Hot Surfaces**

03.06.01 Total DFT for heat resistant paints should not exceed 100 – 120 microns, otherwise flaking occurs (as per paint manufacturer's recommendations).

03.06.02 Heat resistant paints should be applied by brush.

03.06.03 Primer coat is not necessary for the surfaces having temperature condition more that 120 deg C.

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04 **PAINING SCHEMES**



For a complete painting scheme of any item being printed, all types of paints are to be procured from the same manufacturer as approved by the purchaser.

04.02 **Legend**

- SP - Surface preparation quality as per SIS standard
- 2P1 - Two (2) coats of Primer paint type P1
- 1I1 - One (1) coats of Intermediate paint type I1
- 2F1 - Two (2) coats of Finish paint type F1
- DFT- Dry Film Thickness in microns developed
- CRT- Clean and Retouch



Type of paint products like P1 to P9, I1 to I4 and F1 to F10 have been specified under Annexure-02.

04.03 The painting scheme to be followed for various structure/equipment exposed to different condition is briefly given in Annexure-03 for guidance to the tenderer.

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GUARANTEE

- 05.01 The Contractor shall guarantee that the physical and chemical properties of the paint materials conforms with the specification of paint products.
- 05.02 The Contractor shall submit internal test reports from paint manufacturers regarding the quality of paint whenever asked by the Purchaser/Consultant.
- 05.03 Guarantee period shall commence from the date of completion of finishing coat of paint. The guarantee period will be indicated depending on the type of surface preparation and system of painting. To fulfill this obligations the Contractor may obtain from the painting manufacturer, guarantee for the performance of paint/painted surfaces.

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Annexure-01

Surface Preparation Grade

Sl. No.	Surface Preparation	Swedish Std SIS 055900	DIN Std. Din 55928 (Part 4)
1	<u>Blast cleaning to white metal</u> Removal of all visible rusts, mill-scales, paint and foreign matters.	Sa 3	Sa 3
2	<u>Blast cleaning to near white metal:</u> 95% of any section of surface area is free from all rusts, mill-scales and visible residues.	Sa 2.5	Sa 2.5
3	<u>Blast cleaning to commercial quality:</u> At least 2/3 of any section of the surface area is free from all rusts, mill-scales and visible residues.	Sa 2	Sa 2
4	<u>Brush-off blast cleaning:</u> Removal of all loose mill-scales, rust and foreign matters etc.	Sa 1	Sa 1
5	<u>Power tool cleaning:</u> Very thorough scrapping and wire brushing to remove loose mill-scale, rust and foreign matters to have pronounced metallic shine.	St 3	St 3
6	<u>Hand tool cleaning:</u> Removal by hand brushing of loose mill-scale, loose rust and foreign matters.	St 2	St 2

PAINT MATERIALS

01. PRIMER PAINTS (P)

Primer paint products shall be applied only on dry and clean surfaces.

01.01 Primer Paint – P1 (Phenolic – Alkyd Based)

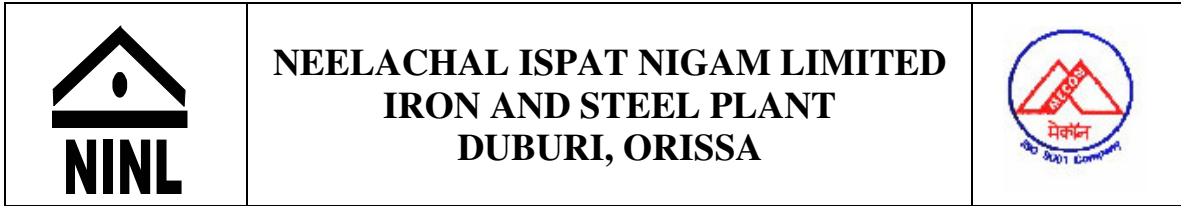
A single pack air drying phenolic modified alkyd composition with zinc phosphate as a primer paint conforming generally to IS : 2074.

- | | |
|-------------------------------|------------------------------------|
| Air drying time | - About 60 minutes (touch dry) |
| | - Overnight (hard dry) |
| Dry film thickness (DFT)/Coat | - 40 microns (min) |
| Temperature resistance | - Upto 100 ⁰ C dry heat |

01.02 Primer Paint – P2 (Chlororubber Based)

A single pack air drying high build chlorinated rubber based zinc phosphate primer.

- | | |
|------------------------|---|
| Percent chlororubber | - 20 to 22 (% Chlorine above 65% in chlororubber) |
| Air drying time | - About 15 minutes (touch dry) |
| | - Overnight (hard dry) |
| DFT/ Coat | - 50 microns (min) |
| Temperature resistance | - Up to 65 ⁰ C dry heat |



01.03

Primer Paint – P3 (PVC Copolymer Alkyd Based)

Polyvinyl chloride (PVC)	- Alkyd zinc phosphate – redoxide based primer
Ratio	: PVC copolymer + alkyd resin (1:1)
Pigments	: Zinc phosphate & Fillers
Air drying time	- 24 hours
DFT/Coat	- 80 microns
Temperature resistance	- Upto 80 ⁰ C dry heat

01.04

Primer Paint – P4 (Epoxy Based)

A two pack air drying Epoxy polyamide resin based red oxide-zinc phosphate primer.

Epoxy content (% wt.)	- 15 to 18
Air drying time	- About 30 minutes (touch dry) - overnight (hard dry)
DFT/Coat	- 30 microns (min)
Temperature resistance	- Upto 120 ⁰ C dry heat



01.05 **Primer Paint – P5 (Epoxy Based)**

A two pack air drying Epoxy polyamide with zinc dust of at least 92% zinc dust on the dry film

- | | |
|------------------------|--|
| Epoxy content (% wt.) | - 8 to 10 |
| Air drying time | - Less than 10 minutes (touch dry)
- Less than 2 hours (hard dry) |
| DFT/Coat | - 40 microns (min) |
| Temperature resistance | - Upto 300 ⁰ C dry heat |

01.06 **Primer Paint – P6 (Poly – Vinyl Butyral Resin Based)**

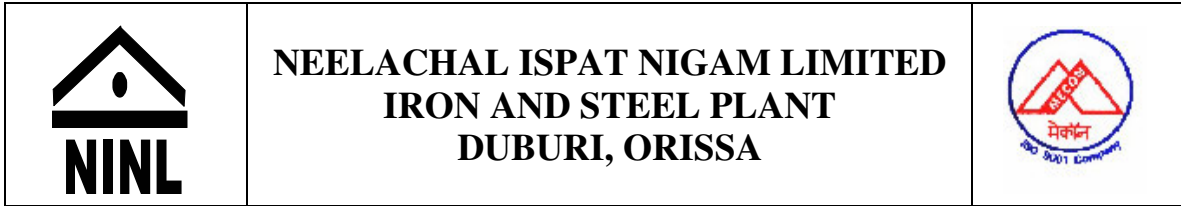
A two pack air drying polyvinyl butyral resin based wash primer with rust inhibitive pigments.

- | | |
|------------------------|--|
| Air drying time | - 5 to 7 minutes (touch dry)
- 2 hours (hard dry) |
| DFT/Coat | - 8 microns |
| Temperature resistance | - Upto 65 ⁰ C dry heat |
| Application for | - Galvanised iron, aluminium, light alloys etc. on which the adhesion of conventional paints are poor. |

01.07 **Primer Paint – P7 (Ethyl Zinc Silicate, EZS Based).**

A two pack heavy duty zinc dust rich silicate primer which protects the surface with just a single coat.

- | | |
|------------------------|---------------------------|
| Total solids (3 wt) | - 84 +/- 2 |
| Density (g / cc) | - 3.07 +/- 0.05 |
| Air drying time | - To top coat 16 hours |
| DFT / coat | - 60 microns |
| Temperature resistance | - Upto 450 deg C dry heat |



01.08 **Primer Paint – P8 (High Build Coal Tar Epoxy)**

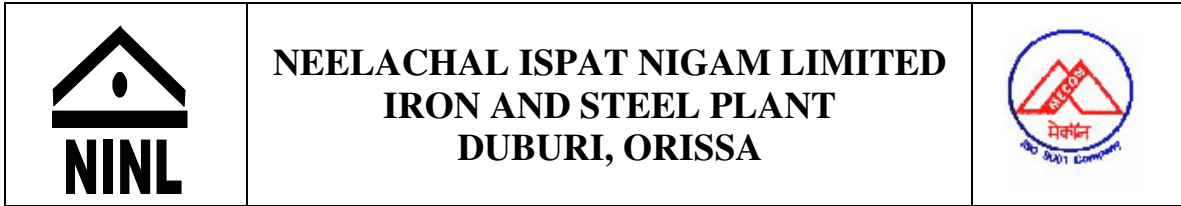
A two pack cold cured H.B. epoxy coal tar coating – no primer is required.

Mixing ratio	- Base: Hardener (4:1 by vol.)
Air drying time	- 48 hours (hard dry)
	Full cure 7 days
DFT / Coat	- 100 microns

01.09 **Wood Varnish-P9**

Treated oil based primer pigmented with suitable pigments :

Air drying time	- 16 hours for application of top coat.
Coverage	- 10 to 14 sq. m/litre



02. **INTERMEDIATE PAINTS (I)**

These paints shall be applied over primer coats as an intermediate layer to provide weather proof seal of primer coats.

02.01 **Intermediate Paint-II (Phenolic alkyd based)**

A single pack high build phenolic based paint with micaceous iron oxide (M10) .

Air Drying Time	-	4 to 6hours (touch dry)
	-	2 days (hard dry)
DFT /Coat	-	75 microns (min)
Temperature resistance	-	Upto 100 deg C dry heat
Compatible with	-	Primer P1

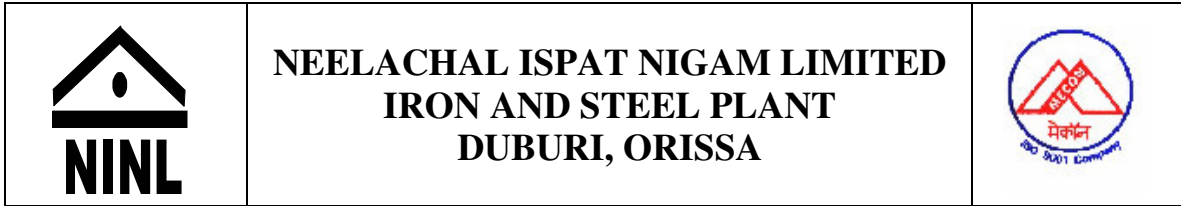
02.02 **Intermediate Paint-I2 (Chlororubber based)**

A single pack air drying high build chloro based paint with MIO.

Air Drying Time	-	15 minutes (touch dry)
	-	24 hours (hard dry)
DFT/Coat	-	70 microns (min)
Temperature resistance	-	Upto 65 deg C dry heat
Compatible with	-	Primer P2,P3 & P4

02.03 **Intermediate Paint-I3 (PVC – Alkyd Based)**

PVC Coploymer	-	Resin 1 : 1
Pigments	-	Micaceous iron oxide (MIO)
DFT/Coat	-	80 microns (min)
Temperature resistance	-	Upto 80 deg C dry heat
Compatible with	-	Primer P2 & P3



- 05 -

02.04 **Intermediate paint-I4**

A two pack air drying high build epoxy resin based paint with MIO.

Air drying time	-	6 to 8 hours (touch dry)
	-	7 days (full cure)
DFT / coat	-	100 microns
Temperature resistance	-	Up to 180 ⁰ C dry heat
Compatible with	-	Primer P4 & P5

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03. **FINISH PAINTS (F)**

Finish paint costs shall be applied over primer coats and intermediate coats after proper cleaning and touch up of primed surface.

03.01 **Finish Paint – F1**

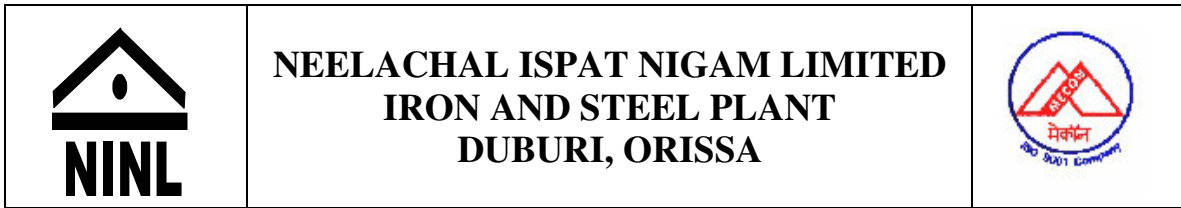
A single pack air drying high gloss phenolic alkyd modified synthetic enamel paint suitably pigmented.

Air drying time	- 3 to 4 hours (touch dry) - 24 hours (hard dry)
DFT/Coat	- 25 microns (min)
Temperature resistance	- Upto 100 ⁰ C dry heat
Compatible with	- Primer P1 Intermediate I1
Colour	- Generally all shades

03.02 **Finish Paint – F2**

A single pack air drying polyurethane enamel of high gloss and hard finish suitably pigmented.

Air drying time	- 2 to 2 ½ hours (touch dry) - 6 hours (hard dry)
DFT/Coat	- 30 microns (min)
Temperature resistance	- Upto 100 ⁰ C dry heat
Compatible with	- Primer P1 & P8 and Intermediate I1
Colour	- Generally all shades



03.03

Finish Paint – F3

A two pack air drying bituminous aluminum paint.

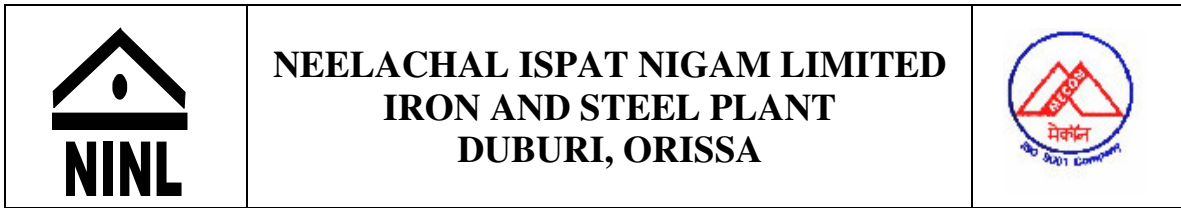
Air drying time	- 1 to 2 hours (touch dry) - 21 hours (hard dry)
DFT/Coat	- 25 microns (min)
Temperature resistance	- Upto 100 ⁰ C dry heat
Compatible with	- Primer P1 and Intermediate I1
Colour	- Bright metallic

03.04

Finish Paint – F4

A ready mixed oil-alkyd based synthetic enamel paint of high gloss and hard wearing properties.

Air drying time	- 6 to 8 hours
Coverage	- 14 to 16 Sq. m /litre
Temperature resistance	- Upto 60 ⁰ C dry heat
Compatible with	- P8
Colour	- Generally all shades



03.05

Finish Paint – F5

A single pack air drying plasticized chlororubber paint suitably pigmented.

Air drying time	- 30 minutes (touch dry) - 24 hours (hard dry)
DFT/Coat	- 35 microns (min)
Temperature resistance	- Upto 65 ⁰ C dry heat
Compatible with	- Primer P2 & P3, Intermediate I2 & I3
Colour	- Nearly all shades except few.

03.06

Finish Paint – F6

A PVC – Copolymer alkyd based enamel.

Density	- 1.17 ± 0.05
Total solids (1 wt)	- 55 ± 2
DFT/Coat	- 40 microns
Compatible with	- P2 and P3



03.07

Finish Paint – F7

A two pack air drying epoxy polyamide enamel suitably pigmented.

- | | |
|------------------------|--|
| Air drying time | - 2 to 3 hours (touch dry)
- 7 days (full cure) |
| DFT/Coat | - 40 microns (min) |
| Temperature resistance | - Up to 130 ⁰ C dry heat |
| Compatible with | - Primer P4 & P5,
Intermediate I4 |
| Colour | - Generally all shades. |

03.08

Finish Paint – F8

A single pack synthetic rubber based aluminium paint.


- | | |
|------------------------|--|
| Air drying time | - 2 hours (touch dry)
- 24 hours (hard dry) |
| DFT/Coat | - 25 microns (min) |
| Temperature resistance | - Upto 200 ⁰ C dry heat |
| Compatible with | - No Primer paint except primer P6 is applicable in case of non-ferrous substrate. |
| Colour | - Smooth aluminium. |

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Annexure-03

PAINING SCHEME

Sl. No.	Description	Painting Scheme		Total DFT
		At Shop	At Site	
1.0	Steel Structures (Temp. not exceeding 80 ⁰ C)			(Refer Note-1)
1.1	Technological steel structures for plant and equipment			
	Indoor	SP – Sa 2.5 2P1	CRT 2F1	130
	Outdoor	SP – Sa 2.5 2P1 1I1	CRT 2F1	205
1.2	Fabricated steel structures at site for rung ladders, cat-ladders, gates, rolling shutters, etc. (Springs/rubbing surfaces excluded)			
	- Indoor / Outdoor	SP – St-2 and / or St-3 2P1	CRT 2F1	130
1.3	Walkways, stairs, platforms etc. which are of wearing surface			
	- Indoor	SP – St-2 and / or St-3 2P1	CRT 2F1	130
	- Outdoor	SP- St2 and/ or St-3 2P1 1I1	CRT 2F1	205
1.4	Steel doors and windows			
	- Indoor / outdoor	SP – St-2 and / or St-3 2P1 1I1	CRT 2F2	215

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Sl. No.	Description	Painting Scheme		Total DFT
		At Shop	At Site	
2.0	<u>MECHANICAL EQUIPMENT</u>			
2.1	Mechanical equipment (Temp. not exceeding 80°C)			
2.1.1	Static equipment like storage tanks, vessels, bins, bunkers, heat exchangers, coolers, cyclones, scrubbers, etc. - Indoor - Outdoor	SP – Sa 2.5 2P2/2P3 SP – Sa 2.5 2P2/2P3+1I2/1I3	CRT 2F5/2F6 CRT 2F5/2F6	170/240 240/320
2.1.2	Rotary/moving equipment and machineries like crushers, mills, vibratory screens, bin activators, blowers, fan, air/gas compressors, pumps, gear boxes, machine housings etc. - Indoor - Outdoor	SP – Sa 2.5 2P3/2P4 SP-Sa 2.5 2P3 + 1I3/1I4	CRT 2F6/2F7 CRT 2F6/2F7	240/140 320/340



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IRON AND STEEL PLANT
DUBURI, ORISSA**




Sl. No.	Description	Painting Scheme		Total DFT
		At Shop	At Site	
3.0	<u>ELECTRICAL EQUIPMENT</u> (Temperature upto 80 deg c)			
3.1	Electric drives below 10 kw rating -- indoor / outdoor	Stove Enamelling	CRT	110
3.2	Electric drives above 10 kw rating - Indoor	SP – Sa 2.5 2P4	CRT 2F7/2F2	140/120
	- Outdoor	SP – Sa 2.5 2P4 + 1I4	CRT 2F7/2F2	240/220
3.3	Transformer/Rectoformers			
3.3.1	Small units - Indoor / outdoor	Stove Enamelling	CRT	110
3.3.2	Large Units (air / oil cooled) - Indoor	SP-Sa 2.5 2P4	CRT 2F7/2F2	140/130
	- Outdoor	SP – Sa2.5 2P4 + 1I4	CRT 2F7/2F2	240/230
3.4	Switch Gears, Structures -Indoor / outdoor (if not galvanized)	SP – St2 and / or St3 2P2	CRT 2F5	170





**NEELACHAL ISPAT NIGAM LIMITED
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Sl. No.	Description	Painting Scheme		Total DFT
		At Shop	At Site	
3.5	Motor control centres cubicles	Stove enamelling	CRT	110
3.6	Cable vaults, cable trays, etc.	SP – St2 and / or St3 2P1	CRT 2F1	130
3.7	Electric transmission towers	To be hot-dip galvanised	CRT with P5	120
4.0	<u>Instrumentation and Controls</u> (Temperature up to 80 ⁰ C)			
4.1	All field mounted instrument & control valves and fixtures	Stove enamelling	CRT	110
4.2	Control panel, desks etc.	SP – St2 and / or St3 2P1	CRT 2F1	130
5.0	Pipe / Duct work (Overground)			
5.1	Non – insulated (temperature up to 80 ⁰ C) - Indoor - Outdoor	SP – St2 and or St3 2P1 SP – St2 and / or St3 2P1 + 1I1	CRT 2F1 CRT 2F1	130 205
5.2	Insulated (hot) - Indoor/Outdoor	SP- St2 and/ or St3 1P1	Remove paint and insulate	

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Sl. No.	Description	Painting Scheme		Total DFT
		At Shop	At Site	
6.0	<u>Oxygen Plant</u>			
6.1	Outdoor steel structures	SP – St2 and / or St3 2P1 + 1I1	CRT 2F3	205
6.2	Rotary equipment like air compressors	Sa 2.5 2P4	CRT 2F7	140
7.0	<u>Others</u>			
7.1	Standard mobile equipment like chasis of trucks, dumpers, crawler cranes bulldozers, railway rakes, chasis of slag cars, ladle cars, etc.	As per manufacturer's standards		
7.2	Laboratory equipment like ovens, screens, magnetic stirrers, samplers, etc.	Stove enamelling	CRT	110
7.3	Wood works	SP 2P9	CRT 2F4	-
7.4	Steel structures partly immersed in water	SP – Sa 2.5 2P8	CRT	200

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Notes: -

1. Painting scheme of all fabricated steel structures, fabricated pipe work, building structure, conveyor galleries, pipe trestles etc. is indicated in the Technical Specification of steel structures.

2. **Primer Paint**

Primer coat shall be suitable for intended temperature applications as per manufacturer's recommendation. The primer selection shall be generally in line with the specification laid down in Annexure-02.

3. **Finish Paint**

In case of Aluminium cladding final painting will not be required.