



SURFACE PREPARATION & PANTING SCHEDULE
RUBBER LINED PIPING PACKAGE

ANNEXURE-D TO PEMC-07395
JOB SPECIFICATION FOR RUBBER LINED PIPING PACKAGE
TCL MITHAPUR

	PROJECT:- 14.9 MW STG-TCL Mithapur
	CUSTOMER:- TCL MITHAPUR
	CONSULTANT:- M/s TCE, MUMBAI
	DOCUMENT TITLE:- PAINTING & COATING SCHEDULE
	DOC NO:-PY-IS-3-M117-2001-01-S00-R00

Sl.No.	Equipment/ Surface	Units involved	Area/ Location (Indoor / Outdoor)	Temp.	Surface Preparation	Primer or 1 st Coat			2 nd Coat(Intermediate Paint)			3 rd Coat(Finish Paint)			Total DFT Minimum (microns)	Colour	Remarks
						Paint	No. of Coats	DFT (Microns)	Paint	No. of Coats	DFT (Microns)	Paint	No. of Coats	DFT (Microns)			
1	Above Ground Piping	PESD	Indoor/Outdoor	Ambient	Sa 2 1/2	Inorganic Zinc Silicate Primer	2	80µ	HB MIO Epoxy	1	120µ	Polyurethane	2	60µ	260µ	Sea green shade no.217 of IS-5	

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20.0 PAINTING SCHEME FOR POWER PLANT

1.0 SCOPE

The purpose of this specification is to describe the surface preparation methods, application procedures and type of protective coatings required. This section covers the painting requirements for the power plant equipment, structures, piping etc. and any other surface required to be painted. The painting system should ensure optimal protection of the installation with minimum need for maintenance, environmental friendly & easy to apply.

2.0 CODES AND STANDARDS

Painting of equipment shall be carried out as per the contracts indicated below and shall conform to the relevant IS contract for the material and workmanship.

The following Standards may be referred to for carrying out the painting

IS: 5	:	Colours for ready mixed paints and enamels
IS: 101	:	All Parts and Sections for paint testing
IS: 1303	:	Glossary of terms relating to paints
IS: 2379	:	Colour code for identification of pipelines
IS: 1477	:	Code of practice for painting of ferrous metals in buildings (Parts I & II)
IS: 2524	:	Code of practice for painting of non-ferrous metals in buildings (Parts I & II)
IS: 6278	:	Code of practice for white washing and colour Washing
IS: 13183	:	Aluminium Paint, heat Resistant specification
IS: 158	:	Ready mixed paint, brushing, bituminous, black, Lead free, acid, alkali, water and heat resisting
IS: 2074	:	Ready mixed paint, air drying, red Oxide Zinc Chrome, priming
IS: 104	:	Ready mixed paint, brushing, Zinc Chrome, priming
IS: 2932	:	Enamel, synthetic, exterior (a) undercoating (b) finishing.
IS: 2629	:	Recommended Practice for Hot Dip Galvanising
BS EN ISO 14713	:	Code of practice for protection of iron & steel structure against corrosion
ISO 8501	:	Preparation of steel substrates before application of paint & related Products.

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ISO 8502	: Assessment of dust on steel surface prepared for painting (Pressure sensitive tape method)
ISO 12944	: Paints and Varnishes-Corrosion protection of steel structures by protective paint systems
SSPC	: US Specifications of Steel Structures Painting Council, SSPC Volumes I and II
SSPC-SP-08	: Surface preparation by Pickling
NORSOK M-501	: Surface preparation & Protective coating
ISO 20340	: Pre-Qualification test
ASTM	: American standard test method for paints and coatings
AWWA	: American Water Works Association

Statutory and Local regulations shall be strictly followed in selection and application of paint.

3.0 GENERAL

This specification covers the surface preparation, method of application and material to be used for all coating of equipment, steel structures and piping. Steel material subjected to surface preparation on shop/site shall have minimum requirements in accordance with Rust Grade B (SSPC/SSPM Volume-2).

Coating materials according to SSPC, EN ISO, ASTM, BIS or DIN standards, shall be used. The paint shall comply with applicable laws, regulations, ordinances etc., of the local authority, state or the nation pertains to the work. The materials shall be matched with each other so that they are compatible. Coatings deviating this specification shall be subject to approval. Standards of surface preparation and painting shall give a time to first maintenance of 10 years.

3.1 Approved Paint Manufacturers

- | | |
|--------------------------------|-----------------------------------|
| i) Asian Paints (I) Ltd. | xii) Coromandel Paints & Chemical |
| ii) Berger Paints India Ltd | xiii) Anupam enterprises |
| iii) Goodlass Nerolac | xiv) VCM Polyurethane Paints |
| iv) Jenson & Nicholson (I) Ltd | xv) International Protective |
| v) CDC carboline (I) Ltd. | Coatings |
| vi) Shalimar Paints Ltd. | viii) Grand Polycoat |
| vii) Addison Paints Ltd. | xvi) Ameron, USA |
| ix) Bombay Paints | xvii) Jotun |
| x) Sigma Coatings | xviii) Cipy Polyurethane |
| xi) Premier Products | xix) M S Corrocoat |

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3.2 Coating materials

The selected coating materials shall be suitable for the intended use and shall be selected after an evaluation of all relevant aspects such as

- Corrosion protective properties
- Requirements to health, safety and environment
- Properties related to application conditions, equipment and personnel
- Experience with the coating materials and coating system.

Performance standard as listed below shall be established by paint manufacturer, the records shall be submitted for review.

- Adhesion test (pull off test)
- Flexibility test
- Salt spray test (min 1000 Hrs)
- Water absorption test
- UV resistance test (external coating)
- Cathodic disbonding test (internal coating)
- Abrasion test (internal coating)
- Impact resistance test
- Sea water immersion test (structures in tidal, splash zone and conveying sea water)

Each product shall have a batch number showing year and month of manufacture and giving full traceability of production. Shelf life shall be included in the technical data sheet. All coating materials and solvents shall be stored in the original container bearing the manufacturer's label and instructions.

The paint manufacturers shall provide coating system data sheet for each coating system to be used containing the following information

1. Surface preparations
2. Film thickness(min and max)
3. Min and max recoating intervals at relevant temperatures
4. Mixing ratio, thinner details and coating repair systems

The composition of the paint shall be at the discretion of the manufacturer, provided that the finished product meets the requirements of, State or Local regulatory bodies for the products. All vehicle components for use in the manufacture of paints and enamels shall meet the ASTM/ ISO Specification except as otherwise stated. Coating systems shall be selected as per corrosivity category. Coating systems are tabulated in ANNEXURE and shall be pre-qualified in accordance with specification. Coating systems/ alternative coating systems may be re-subjected to pre-qualification, at the discretion of OWNER/ ENGINEER. The specified coating systems, the number of coats and the coating film thicknesses given in Annexure are minimum requirements Top coat colors should be in accordance with Annexure.

The paint to be applied shall be approved by Customer / Engineer.

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4.0 Painting System Procedure

All paints & paint material used shall be procured from approved manufacturers. Paint shall be supplied in manufacturers original containers with the description of content, specification No., colour, ref no, date of manufacture, shelf life expiry date & pot life.

All coating materials and solvents shall be protected from ignition sources and shall remain within storage temperatures and storage conditions recommended by the coating manufacturer. All coating materials and solvents shall be stored in the original container bearing the manufacturer's label and instructions.

The sample for testing the paint being used may be taken by the customer at any time. In general Shop manufactured equipment / component will be delivered to the site coated with a shop applied system or the manufacturer's standard finish in accordance with the requirements of this specification. The contractor shall state the extent of shop coating and field coating for the equipments supplied.

For equipment that has received shop prime coat, touch-up prime coat and additional coats shall be applied in accordance with the coating schedule. It is responsibility of the Contractor to ensure compatibility between shop and field applied paint systems.

Necessary Protection shall be provided to the surfaces of all the other equipment, structures, during surface preparation and painting. Damage to other surfaces or equipment shall be repaired by the Contractor.

The Contractor shall submit the following for review and approval by the Customer:

1. Manufacturer's recommended paint scheme for the project
2. Latest published product & instructions for application data,
3. Procedures for surface preparation and application of recommended painting scheme.
4. Pre qualification for equipments and blasting materials, product, procedure and personnel qualifications for the paint and painting systems.
5. Painting repair procedures

The supply of all necessary equipments, weather protection, and scaffolding for painting to ensure work is carried out in accordance with the specification and agreed programme.

Maintenance of the paint work until completion of the contract, this shall include repair of any damaged areas caused by third party.

Disposal of painting waste resulting from painting, shall comply with applicable laws, regulations, ordinances etc., of the local authority, state or the nation pertains to the work and coating materials.

It is a mandatory requirement that all operatives working to this procedure take full cognizance and implement necessary safety precautions.

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5.0 PREPARATION OF SURFACES

All surfaces to be painted shall be thoroughly cleaned of all grease, oil, loose mill scale, dust, rust, weld spatters, sharp edges and any other foreign matter. Removal of grease and oil contamination shall be in accordance with SSPC-SP1 prior to cleaning process described below.

Mechanical cleaning by power tool and scrapping with steel wire brushes shall be adopted to clear the surfaces. However, in certain locations where power tool cleaning cannot be carried out, hand scrapping may be permitted with steel wire brushes and/or abrasive paper. Cleaning with solvents shall be resorted to only in such areas where other methods specified above have not achieved the desired results. Cleaning with solvents shall be adopted only after written approval of the Engineer.

The blast cleaned surface shall be checked for signs of salt contamination as per ISO 8502-6 & 9. The maximum allowable level of contamination shall be 20 mg/m². Surfaces that do not meet these criteria shall be reprocessed.

Mechanical Cleaning:

Manual/power tool cleaning shall be done as per grade St-2 or St-3, of ISO 8504-3. This method to be used for repair painting or on already painted surface and in case of usage on new construction painting prior approval may be obtained from purchaser/engineer.

	Condition of surface	ISO 8504-3	SIS 055900	SSPC
Hand tool cleaning	Rusted	C St2	C St2	SP2
	Rusted and pitted	D St2	D St2	SP2
Power tool cleaning	Rusted	C St3	C St3	SP3
	Rusted and pitted	D St3	D St3	SP3

i) Grade St-2: Thorough scraping and wire brushing, machine brushing, grinding etc. This grade of preparation shall remove loose mill scale, rust and foreign matter. Finally the surface is to be cleaned with a vacuum cleaner or with clean compressed air or with clean brush. After preparation, the surface should have a faint metallic sheen. The appearance shall correspond to the prints designated St-2.

ii) Grade St-3: very thorough scraping and wire brushing, machine brushing, grinding etc. After preparing the surface, it should have a pronounced metallic sheen and correspond to the prints designated St-3.

Blast cleaning:

Compressors: Compressed air supply for blast cleaning shall be free of water and oil. Air compressors shall not be allowed to deliver air at 110deg C. The blasting activity shall be performed at ambient temperatures above 5°C and relative humidity less than 85%. Steel temperature shall be 3°C above dew point. Necessary safety precautions for equipment and operator shall be adhered to.

Abrasives: Abrasives used for blast cleaning carbon steel and alloy steel shall be as per ISO 8504-2 and SSPC painting manual. Suggested abrasives may be chilled iron grit or shot steel and malleable iron grit and shots non-metallic abrasive (aluminium oxide, copper slag, garnet etc.).

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Removal of mill scale and rust using abrasives such as grit or shot under high pressure. The grade of blasting performed in line with the approved painting scheme.

Surfaces to be coated shall be free of all grease, oil, loose rust, and loose mill scale. Rust, mill scale, weld spatter, flux, shall be removed by the methods indicated in the Coating Schedule. Oil and grease shall be removed by solvent cleaning method as outlined in SSPC - SP - 1 prior to blasting.

The quality and grain size of abrasives and the parameter of their use are to be chosen to obtain the surface profile depth and cleanliness. Abrasives shall comply with applicable laws, regulations, ordinances etc., of the local authority, state or the nation pertaining to the work.

Profile measurements for abrasive blast cleaned surface shall be made with a Profile comparator and permanent record shall be maintained with Testex Press-O-Film.

Surfaces prepared for coating shall be coated the same day and before any visible rusting occurs (the time elapsed between blast cleaning and commencement of painting shall under no circumstances exceed 4 hours, but in any case must commence before signs of degradation occur).

After blasting cleaning, depending on production flow, a weldable, inorganic ethyl zinc silicate shop primer of minimum dry film thickness 25 µm may be used.

The grades of surface finish:

	ISO 8501-1	SIS 055900	SSPC	NACE
White metal	Sa3	Sa3	SP5	1
Near White metal	Sa 2½	Sa 2½	SP10	2
Commercial blast	Sa2	Sa2	SP6	3
Brush off blast	Sa1	Sa1	SP7	4

PAINT APPLICATION

GENERAL:

Paints and other coating materials shall be applied in accordance with the paint manufacturer's instructions. The surface preparation and painting system shall be as described in ANNEXURE with the following exceptions:

Nameplates, code stampings and push buttons

Concrete brickwork, tile, and glass unless specified by the Purchaser / Engineer

Non-ferrous materials

Austenitic stainless steel

Plastic and / or plastic coated materials

Insulated surface of equipment and pipes except colour coating wherever required

Any surface specified by the Purchaser / Engineer not to be painted.

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Painting records shall contain:

- ☐ Equipment/components/location painted
- ☐ Date of painting
- ☐ Paint details such as specification No, colour, date of manufacture, shelf life, expiry date
- ☐ Application equipments
- ☐ Ambient conditions at the time of painting
- ☐ Surface temperature
- ☐ Drying time between coating, DFT and number of coatings
- ☐ Appropriate work plan for painting.

PAINT APPLICATION REQUIREMENTS

The paint shall be applied in accordance with the paint manufacturer's product data sheet, which shall include the mix ratio, the method of application, and the use of thinners and over coating times.

Paint application shall be by brush, roller or spray gun. Local regulations regarding spray and roller coating shall be observed. A smooth uniform film shall be applied to the surfaces to be coated.

Painting shall be performed when the temperature of the surface is greater than 3°C above the dew point of the surrounding air and relative humidity of the air is less than 85% unless local conditions dictate otherwise and the Customer is in agreement. Guidance on the estimation of the probability of condensation can be found in ISO 8502-4. The measurement of these conditions is the responsibility of the Vendor.

In addition, paints shall not be applied under the following conditions:

- When the surface temperature is greater than 60 °C (unless a higher temperature is agreed by the paint manufacturer)
- When the air temperature is less than approximately 5°C, (depending on local conditions)
- When there is the likelihood of an unfavourable change in weather conditions within two hours after painting
- When there is a deposition of moisture in the form of rain, condensation, frost, etc., on the surface.
- When the available light is less than 500 lux.

Paints shall not be applied within 50 mm of edges which will later have to be welded. Such weld areas shall be taped/one coat of weldable primer for distance of 50 mm either side of the weld line.

When zinc rich primers are used, care shall be taken to mask to avoid any possibility of over spraying onto duplex, austenitic stainless steels; nickel alloys or 9% nickel steel components.

Two pack coatings like Air drying epoxy, Polyurethane coatings etc shall be mixed in the ratio recommended by manufacturer to ensure proper and complete curing of the coatings. The base and hardener are to be separately mixed first to obtain a homogenous mixture. The hardener is to be added to the base slowly, with continuous mixing / agitation and not the reverse. Power agitation is preferred over hand mixing.

Any addition of thinner to achieve the application viscosity should be made only after the components are thoroughly mixed. Excess thinner is not recommended, as increase in volume, leads to lower DFT, sagging, longer curing time, etc.

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Coating containing heavy or metallic pigments that have a tendency to settle shall be kept in suspension by continuous use of a mechanical agitator whilst being applied, to ensure uniformity over the surface area (e.g., zinc MIO's pigmented materials).

Transport and erection of painted structures shall be carried out only after the drying time specified by the paint manufacturer has elapsed. Handling & packing of painted material shall be appropriate to avoid damage to painting, such as the use of non-metallic slings, etc for handling and by minimising handling after painting.

All steel equipment shall be provided with priming or coating system to protect the steel surface during transport, storage, installation and construction.

Spray application:

Airless or pneumatic spray applications are preferred methods of application. Spraying shall be carried out keeping the spray gun at the minimum suitable distance from the work piece and consistently at 90° to the surface being painted.

Approval of Purchaser / Engineer shall be obtained during spray painting which may cause interference to other works. If spray painting is to be carried out, the following shall be taken into account:

The correct spray tips, air pressures, etc, as recommended by the equipment supplier, shall be used.

Conventional air spray equipment is used, the correct combination of air volume, air pressure and fluid flow to give good atomisation to be ensured to get a defect free painted surface. The major disadvantage of conventional air spray is that high build coatings can generally not be applied by this method as most paints have to be thinned to a suitable viscosity for satisfactory atomisation, and so lose their high build properties. Vendor shall follow manufacture's instruction.

Air spray (pressure pot) is recommended in cases where large quantities of paint are to be applied as paint in the tank can be prevented from settling, reduces application time and also enables the gun to be turned to any angle to coat objects effectively without spilling paint.

Airless spray is recommended as high build coatings can be applied without thinning, very rapid application is possible, giving an economic advantage, compared to conventional spray, overspray and bounce-back are reduced, leading to reduced losses of material and less dust and fume hazards.

Each coat shall be applied uniformly and completely over the entire surface. All runs and sags shall be brushed out immediately or the paint shall be removed and the surface re-sprayed.

Very complex structures should be painted by brush instead of spray gun to avoid overspray, dry spray and unacceptable paint losses.

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Brush application:

Brush application may be used under the following circumstances:

- When areas cannot be properly coated by spraying for reasons such as material or environmental considerations
- For the initial coat of paint to corners, edges, crevices, holes, welds or irregular surface prior to spray application
- For "touch up" or repairs to localize damaged paint or areas of incorrectly applied paint
- Where the paint manufacturer considers the coating material suitable for brush application.

Brushes shall be of a style and quality that will permit the proper application of paint. Brush applications should be done in two passes that are perpendicular to each other 'wet on wet' so that a smooth coat, as near uniform in thickness as possible, is obtained there by avoiding running and droplets. There should be no deep or detrimental brush marks. Paint shall be worked into all crevices and corners. Runs and sags shall be brushed out.

During the application of each coat, all areas such as corners, edges, welds, small brackets, bolts, nuts and interstices shall receive additional paint to ensure that these areas have at least the minimum specified dry film thickness and to ensure continuity of coating.

Roller application:

Roller application shall only be used on relatively large surface areas and only if spraying is not an option. Roller application shall only be used if the first or priming coat of paint has been applied by brush. Roller application shall be in accordance with the paint Manufacturer's instructions.

Galvanising:

Gratings and step threads

i) Surface preparation

Gratings and step threads shall be cleaned by acid pickling as per SSPC-SP-08.

ii) Hot dip galvanising

The hot dip galvanising shall be done as per IS 2629 .The average mass of coating shall be 610 gms/m².

iii) Post galvanising treatment

Immediately after galvanising, post treatment such as chromating shall be applied to retard white rust attack.

iv) Touch up mechanical damages

The repair of damages coatings shall be done as per the recommended practice ASTM A 780.

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CORROSIVITY OF ENVIRONMENTS

Corrosivity category	
C2	Low
C3	Medium
C4	High
C5	Very High Industrial & marine
IM 1	Immersion in Fresh Water
IM 2	Immersion in Sea or brackish water
IM 3	Buried in Soil

Tests required for evaluation of acceptance of coating materials:

TABLE -1
PERFORMANCE TEST OF PAINT

SL. No.	TEST	ASTM TEST METHOD
1.0	Abrasion Resistance: (topcoat only)	ASTM D4060
2.0	Adhesion:	ASTM D4541
3.0	Dry Heat Resistance:	ASTM D2485
4.0	Flexibility: (topcoat only)	ASTM D522, 180° bend
5.0	Pencil Hardness: (topcoat only)	ASTM D3363
6.0	Salt Fog Resistance:	ASTM B117, 1000 hours
7.0	Weather Resistance:	ASTMG23 Type D
8.0	Test	ASTM Test Method
9.0	Density	D 1475
10.0	Dipping properties	D 823
11.0	Drying time	D 1640
12.0	Flexibility	D 1737/D 522
13.0	Hardness	D 3363
14.0	Adhesion (pull off test)	D 4541
15.0	Abrasion resistance	D 968/D 4060
16.0	DFT/Coat	As per SSPC Guidelines
17.0	Storage Stability	D 1849
18.0	Resistance to	
19.0	i) Humidity for 2000 hrs.	D 2247
20.0	ii) Salt Spray for 2000 hrs.	B 117
21.0	iii) Accelerated Weathering	D 822

INSPECTION:

Inspection will be performed by an inspector authorised by Purchaser / Engineer. Paint materials including primers and thinners brought to site by contractor for application shall be procured directly from manufactures as per specification and shall be accompanied by manufacturer's test certificates.

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The painting work shall be subjected to inspection by purchaser / engineer at all times.
The vendor shall offer following stage of inspection:

- ☐ Surface preparation
- ☐ Primer application
- ☐ Subsequent coats
- ☐ Paint qualification test

Vendor shall provide the expert technical services of the paint manufactures as and when required by purchaser / engineer to ensure both the surface preparation and applications are carried out as per their recommendations. This service shall be provided without any obligation to purchaser.

The following coating inspection & test shall be carried out:

1. Ambient and steel temperature, relative humidity and dew point min twice in a shift.
2. Surface finish & profile check each component or once per 10 m² after surface preparation.
3. Salt contamination test - Free from salt contamination.
4. Dry Film Thickness as per ISO 2808 No.6.
5. Holiday Test as per ASTM D 5162/ NACE RP 0188.
6. Adhesion Test as per ISO 2409 for cross-cut test, or a pull-off test as per ISO 4624/ ASTM D 4541.

6.0 SUGGESTED COLOUR CODES FOR PAINTING:

SL. NO.	ITEM/SERVICE	COLOUR	IS-5	COLOUR (BAND)	IS-5
1.0	Structures, platforms, ladders and handrails	Dark Admiralty Grey	632	-	-
2.0	Boiler casing, ESP and ducting	Nut Brown	413	-	-
3.0	Fans, pumps, motors,	Light Grey	631	-	-
4.0	Tanks (without insulation and cladding)				
4.1	Outdoor	Aluminium	-	-	-
4.2	Indoor	Light grey	631	-	-
5.0	Vessels & all other proprietary equipment (without insulation & cladding)	Light grey	631	-	-
6.0	Switchgear	Light grey	631	-	-
7.0	Control & relay panels	Light grey	631/70 78 of IS 1650	-	-
8.0	Turbine	Golden Yellow	356	-	-
9.0	Generator & exciter	Light grey	631	--	-
10.0	Transformers	Aluminium	-	-	-
11.0	Machinery guards	Signal red	537	-	-
12.0	Piping (without insulation and cladding)				
12.1	Water System				
	Boiler feed	Sea green	217	-	-
	Condensate	Sea green	217	Light brown	410
	Bearing cooling water	Sea green	217	French blue	166

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Notes:

1. This colour code basically refers to IS: 2379 for piping with necessary modifications.
2. Where band colour is specified, same shall be provided at 30 meter intervals on long uninterrupted lines and also adjacent to valves and junctions.

ANNEXURE

Sl no	Description	Surface Preparation	Primer		Intermediate paint		Finish coat		Total DFT
			paint	no of coats	DFT	paint	no of coats	DFT	
1	Boiler Structure, Uninsulated ducts, superheaters, hangers temperature < 120 °C	Sa 2 ½	Inorganic Zn silicate	2	80 µ	HB MIO epoxy	1	120µ	250µ
2	Boiler Structure	Sa 2 ½	HB Zn Phosphate	2	80 µ	HB MIO epoxy	1	120µ	200µ
3	Insulated parts exposed to temp > 120 °C	Sa 2 ½	Inorganic Zn silicate	2	60 µ				60 µ
4	Work Shop	Sa 2 ½	HB Zn Phosphate	2	80 µ	HB MIO epoxy	1	120µ	200µ
5	Water Treatment Plant (external)	Sa 2 ½	Zn rich epoxy	2	80µ	HB MIO epoxy	2	200µ	360µ
6	Coal Handling Plant	Sa 2 ½	Inorganic Zn silicate	2	80 µ	HB MIO epoxy	1	120µ	250µ
7	Fuel pipings	Sa 2	Ethyl Zn silicate	1	40µ				80 µ
8	Un insulated silencer steel stacks > 120 °C	Sa 2 ½	Ethyl Zn silicate	1	40µ				80 µ
9	Above Ground piping	Sa 2 ½	Inorganic Zn silicate	2	80 µ	HB MIO epoxy	1	120µ	250µ
10	Buried Piping (External)	Sa 2 ½	Coal tar primer, coal tar enamel, inner wrap of fibre glass, final outer wrap of enamel impregnated fibre						4.0 mm
11	Buried Piping (Internal)	Sa 2 ½	solid rigid poly urethane 500µ						500µ
12	storage Tanks External	Sa 2 ½	In organic Zn silicate	2	80 µ	HB MIO epoxy	1	120µ	250µ
13	storage tanks Internal	Sa 2 ½				5 coats of amine adducts			400µ
14	DM water piping internal	Sa 2 ½				hard rubber lining min 4 mm thickness			4.0 mm
15	DM water tank internal	Sa 2 ½	In organic Zn silicate	2	80 µ	HB coal tar epoxy	1	150µ	340µ
16	Fuel Oil Tanks Internal	Sa 2 ½	In organic Zn silicate	2	80 µ	HB coal tar epoxy	1	150µ	340µ
17	Insulated parts continuously exposed to condensing water	Sa 2 ½	In organic Zn silicate	2	75 µ				75 µ
18	For insulated piping < 125 °C	Sa 2 ½	Polyamide cured epoxy coating	2	250 µ				250 µ
19	Electrical parts, control panels, valves, pumps & motors (Indoor)	Sa 2 ½	Zn phosphate epoxy	2	80 µ			Chlorinated rubber	80µ
20	Electrical parts, control panels, valves, pumps & motors (Outdoor)	Sa 2 ½	Zn phosphate epoxy	2	80 µ			Chlorinated rubber	100µ
21	Switch Yard floor grills, walk ways	Sa 2 ½				hot dip galvanising 80 µ			80µ

Note: Manufacturer to specify details of painting system capable of withstanding environmental conditions for a period of 10 years before first maintenance

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ANNEXURE

A. Painting scheme for C4 and C5 environment

Sl no	Description	Surface Preparation	Primer		Intermediate paint		Finish coat		Total DFT
			paint	no of coats	paint	no of coats	paint	no of coats	
1	Boiler Structure, un-insulated ducts, superheaters, hangers temperature < 120 °C	Sa 2 ½	HB Zn Phosphate	2	80 µ	HB MIO epoxy	2	200µ	360µ
2	Indoor Structure	Sa 2 ½	HB Zn Phosphate	2	80 µ	HB MIO epoxy	1	120µ	260µ
3	Insulated parts exposed to temp > 120 °C	Sa 2 ½	In organic Zn silicate	2	60 µ				60 µ
4	Work Shop	Sa 2 ½	HB Zn Phosphate	2	80 µ	HB MIO epoxy	1	120µ	260µ
5	Water Treatment Plant (external)	Sa 2 ½	Zn rich epoxy	2	80µ	HB MIO epoxy	2	200µ	360µ
6	Coal Handling Plant	Sa 2 ½	HB Zn Phosphate	2	80 µ	HB MIO epoxy	2	200µ	340µ
7	Coal Fuel pipings	Sa 2	Ethy Zn silicate	1	40µ				80 µ
8	Un insulated silencer, steel stacks > 120 °C	Sa 2 ½	Ethy Zn silicate	1	40µ				80 µ
9	Above Ground piping	Sa 2 ½	In organic Zn silicate	2	80 µ	HB MIO epoxy	1	120µ	260µ
10	Buried Piping (External)	Sa 2 ½	Coal tar primer, coal tar enamel, inner wrap of fibre glass, final outer wrap of enamel						4.0mm
11	Buried Piping (Internal)	Sa 2 ½	Coal tar primer, coal tar enamel, inner wrap of fibre glass, final outer wrap of enamel						500µ
12	storage Tanks External	Sa 2 ½	In organic Zn silicate	2	80 µ	HB MIO epoxy	2	200µ	340µ
13	storage tanks Internal	Sa 2 ½	In organic Zn silicate	2	80 µ	HB MIO epoxy	2	200µ	400µ
14	DM water piping internal	Sa 2 ½				3 coats of amine adducts			4.0 mm
15	DM water tank internal	Sa 2 ½	In organic Zn silicate	2	80 µ	HB coal tar epoxy	1	150µ	380µ
16	Fuel Oil Tanks Internal	Sa 2 ½	In organic Zn silicate	2	80 µ	HB coal tar epoxy	1	150µ	380µ
17	Insulated parts continuously exposed to condensing water	Sa 2 ½	In organic Zn silicate	2	75 µ				75 µ
18	For insulated piping < 125 °C	Sa 2 ½	Polyamide cured epoxy coating	2	250 µ				250 µ
19	Electrical parts, control panels, valves, pumps & motors (indoor)*	Sa 2 ½	Zn phosphate epoxy	2	80 µ			Chlorinated rubber	160µ
20	Electrical parts, control panels, valves, pumps & motors (outdoor)*	Sa 2 ½	Zn phosphate epoxy	2	80 µ			Chlorinated rubber	180µ
21	Switch Yard floor grills, walk ways	Sa 2 ½							80µ
			hot dip galvanising coating Wt.610 gms/M ² (coating thickness of 80 µ)						

* Note: Manufacturer to specify details of painting system capable of withstanding environmental conditions for a period of 10 years before first maintenance