



Annexure - 1

TECHNICAL SPECIFICATION FOR PAINTING & COATING OF EQUIPMENT & STRUCTURES



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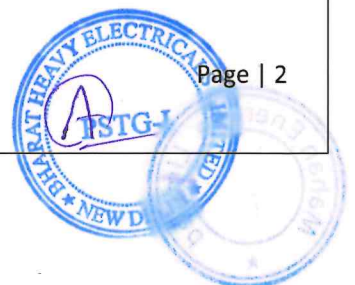
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1.0 INTRODUCTION

1.1 Scope

This specification covers the minimum requirements governing surface preparation, selection, application & inspection of the protective coating system to be used on the interior and exterior exposed surfaces of all types of structural steel placed in thermal power plant to get high durability (above 15 years) in C5-M, C-4 & C-3 environment classified according to ISO 12944- 2.

Individual equipment specifications and /or drawings, when furnished, are to be used with these specifications. If conflict exists, the individual specifications and/or drawings shall govern.

Since maintenance –painting requirements are usually different from that necessary for new construction, salient points for each will likewise be addressed separately.

1.2 Definitions

The following definitions shall apply:

COMPANY shall mean Adani or the designated representative.

CONTRACTOR shall mean the party contracted to perform the work in accordance with the drawings, specifications & work scope.

2.0 CODES AND STANDARDS

2.1 Mandatory Statutory Requirements

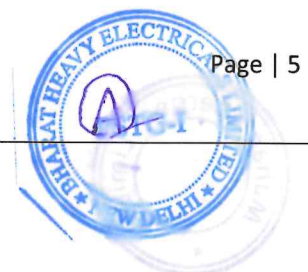
This document has been prepared to the International Standards detailed within. The CONTRACTOR shall ensure that the Work is executed in accordance with international standards, Statutory & Regulatory requirements as per system application.

2.2 Codes and Standards & Regulations

The requirements of the latest published versions of the following listed Codes, Recommended Practices. Specifications and standards shall be met

2.2.1 Steel Structure Painting Council (SSPC)

| | | |
|----------|---|-----------------------------------------------------------|
| SSPC-PA1 | : | Shop, Field and Maintenance Painting of Steel. |
| SSPC-PA2 | : | Measurement of Dry Coating Thickness with Magnetic Gauges |
| SSPC-SP1 | : | Solvent Cleaning |
| SSSC-SP2 | : | Hand Tool Cleaning |
| SSPC-SP3 | : | Power Tool Cleaning |
| SSPC-SP5 | : | White Metal Blast Cleaning |



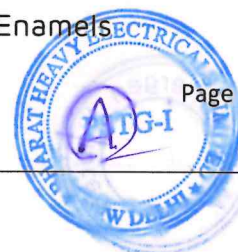
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|--------------|----------------------------------------------------------------------------------------------------------------------------------|
| SSPC-SP6 : | Commercial Blast Cleaning |
| SSPC-SP7 : | Brush –Off Blast Cleaning |
| SSPC-SP10 : | Near White Blast Cleaning |
| SSPC-SP11 : | Power Tool Cleaning to bare metal |
| SSPC-SP12 : | Surface Preparation & cleaning of Steel and Other Hard Material by High and Ultra High Pressure Water Jetting Prior to recoating |
| SSPC-AB1 : | Mineral and Slag Abrasive |
| SSPC-SP20 : | Zinc rich coating Type-I (Inorganic) & Type-II (Organic) |
| SSPC-SP COM: | Surface Preparation and Abrasives Commentary, SSPC Painting Manual, Volume 2, "Systems and Specifications" |
| SSPC VIS-1 : | Visual Standard for Abrasive Blast Cleaned Steel |
| SSPC Vol.2 : | SSPC Painting Manual. |
| | Other equivalent Swedish, BS standard also applicable. |

2.2.2 American Society for Testing and Materials (ASTM)

| | |
|--------------------|---------------------------------------------------------------------------------------------------------------------|
| ASTM D4228: | Standard practice for qualification of coating Applicators for application of coating on steel surfaces. |
| ASTM B117 : | Salt Spray Test |
| ASTM G50 : | Standard practice for conducting atmospheric corrosion test |
| ASTM G53 (Part-B): | Weathering Test |
| ASTM D520 : | Zinc Dust (Metallic Zinc Powder) |
| ASTM D523 : | Specification for Gloss |
| ASTM D1200: | Viscosity |
| ASTM D1640: | Drying time |
| ASTM D1653: | Standard test method for evaluation of painted or quoted specimens subject to corrosive environment. |
| ASTM D2247: | Relative Humidity Test |
| ASTM D2697: | Volume of Solids |
| ASTM D4060: | Abrasion Resistance of Coating |
| ASTM D3359: | Standard test method for measuring adhesion by tape test |
| ASTM D5894: | Standard test method for evaluating drying or Curing during film. Corrosion resistance under Cyclic condensation/UV |

2.2.3 Indian Standards

| | |
|--------|--------------------------------------------|
| IS 5 : | Colours for Ready Mixed Paints and Enamels |
|--------|--------------------------------------------|



2.2.4 International Standards Organization

- ISO –8501 : International Standard for Preparation of Surface
- ISO-8502 : Preparation of steel substrates before application of Paints & related products
- ISO-8502 (1 to 10) : Tests for the assessment for surface cleanliness
- ISO –8504 : Preparation of steel substrates before application of Paints and related products-Surface preparation method Part – 1, 2 & 3
- ISO 14713 : Protection against corrosion of iron and steel structure- Zinc and aluminum coating.
- ISO 4624 : Adhesion test of paint
- ISO 12944 : Corrosion protection of steel structure by protective paint system part 1 to 8
- ISO 4628 : Evaluation of degradation of paint coating
- ISO 4628-6 : Paints & varnishes - Evaluation of degradation of paint coatings - Designation of intensity, quantity & size of common types of defect - Part 6: Rating of degree of chalking by type method.

2.2.5 Occupational Safety and Health Act

OSHA : Occupational Safety and Health Act

2.2.6 NACE Standards

- NACE RP0188: Discontinuity (Holiday) Testing of Protective coating
- NACE RP0287: Surface profile Measurement of abrasive blast Cleaned steel surfaces using a replica tape.

2.2.7 RAL COLOUR CHART

3.0 SURFACE PREPARATION

3.1 General

The surface preparation procedures and requirements except for galvanizing and Cadmium plating shall be in accordance with Steel Structural Painting Council SSPC and ISO–8501.

The method of surface preparation used shall be compatible with the priming coat of Paint and be one or a combination of the following:-

1. Solvent Cleaning- SSPC-SP1
2. Hand Tool Cleaning - SSPC-SP2



- 3. Power Tool Cleaning - SSPC-SP3
- 4. Blast Cleaning refer 3.2 as below

All fabrication and assembly shall be completed before surface preparation begins.

Blast and prime of structural items prior to assembly will be permitted. All bolt holes shall be drilled and their edges smoothed prior to blasting.

3.2 Requirements of Blasting

Only dry blasting procedures are allowed. Definitions and requirements for, the various methods of surface cleaning are given below:

- A) White Metal Blast: As per SSPC SP5, & visual reference Sa3 as per ISO 8501-1.
- B) Near-White Blast: As per SSPC SP10, & visual reference Sa2.5 as per ISO 8501-1.
- C) Commercial Blast: As per SSPC SP6, & visual reference Sa2 as per ISO 8501-1.
- D) Brush-off Blast: As per SSPC SP7, & visual reference Sa1 as per ISO 8501-1

3.3 Pre Blasting preparation

3.3.1 Rough Edges

Sharp edges, fillets, corners and welds shall be rounded or smoothed by grinding (minimum radius 2 mm). Hard surface layers (e.g. resulting from flame cutting) shall be removed by grinding prior to blast cleaning.

All surfaces should be washed with clean fresh water prior to blast cleaning.

Any major surface defects, particularly surface laminations or scabs detrimental to the protective coating system shall be removed by suitable dressing. Where such defects have been revealed during blast cleaning, and dressing has been performed, the dressed area shall be re-blasted to the specified standard. Surface pores, cavities etc. shall be removed by suitable dressing or weld repair.

3.3.2 Weld Flux and Spatter

Weld flux, slag spatter, slivers etc. shall be ground smooth before blasting.

Welding surface imperfections shall be removed and surface profile shall be prepared as per ISO 12944-3.



Any surface on which grinding is done shall be spot blast cleaned or power tool cleaned to obtain required anchor pattern.
All welds shall be inspected and if necessary repaired prior to final blast cleaning of the area.

3.3.3 Surface Cleaning

Prior to blasting, all deposits or grease or oil shall be removed from the surface in accordance with SSPC-SP1 Solvent Cleaning using biodegradable water soluble cleaner.

3.3.4 Chemical Contamination

All chemical contamination shall be neutralized and/or flushed off prior to any other surface preparation.

3.4 Blasting Operations

3.4.1 Weather conditions

Blast cleaning shall not be done on any surface that is moist, or that may become moist, before the application of a primer.

Blasting is not permitted when:-

- a) The temperature of steel is less than 3°C above the dew point, as measured by a sling hydrometer,
- b) The relative humidity of the air is more than 60 %.

Relative humidity shall be maintained by an adequately designed Dehumidification system and the record shall be maintained.

3.4.2 Preliminary Blasting

If blasting is performed at night, the surfaces shall be re-blasted the following day to provide the specified surface preparation standard and the anchor profile required for the specified coating system.

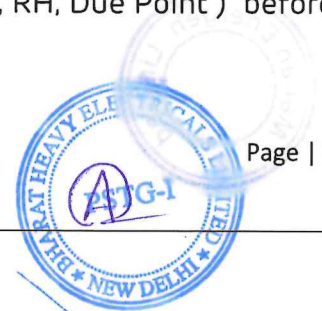
3.4.3 Blasting and Painting

Blasting shall not be done adjacent to painting operations or coated surfaces that are not fully dry. Blasting shall overlap previously coated surfaces by at least 150 mm.

Blasting and Painting shall be done in closed chamber only.

The record of atmospheric conditions (Temp, RH, Dew Point) before the blasting & painting shall be maintained.

The use of silica sand is strictly prohibited



3.4.4 Post – Blasting Procedure

The surface to be coated shall be clean, dry, free from oil/grease, and have the specified roughness and cleanliness until the first coat is applied.

Blast cleaned steel surfaces shall not be touched by bare hands. The blast cleaned surface shall be rendered dust free and coated with the specified primer as soon as possible to avoid formation of oxidation on the surface, but in any case, four one from the time of blasting, and at least one hour prior to sundown of the day it is blasted and before any rusting occurs.

Any steel surface not primed within these limits or that is wet shall be reblasted.

No acid washes or other cleaning solutions or solvents shall be used on metal surfaces after they are blasted. This includes washes intended to prevent rusting.

All areas around the intended paint surface shall be cleaned of blast material prior to coating. Drains shall be purged of blast material and flushed.

Biodegradable water – soluble cleaning solution used to clean previously painted surfaces shall not lift softens or otherwise damages the existing coating.

For determination of chloride surface; relevant ISO 8502 part 2 & 5 shall be applicable. Chloride contamination shall be checked using SCM 400 / bresle patches / quanta strips. Maximum permissible limit is 10 micro gram / sq.cm. for external surface & 5 micro gram / sq.cm. for internal of vessels.

3.5 Blasting Equipment

3.5.1 Compressed Air

The air compressor shall be capable of maintaining a minimum of 700kpa (7 kg/cm² or 100 psi) air pressure at each blasting nozzle. The compressed air supply shall be free of water and oil. Adequate separators and traps shall be provided on the equipment, which shall be regularly purged of water and oil to maintain efficiency.

3.5.2 Nozzle

The nozzle shall be a 10 mm (maximum) internal diameter venture style nozzle.



3.5.3 Power Tools

Power tools may be used to obtain a metal surface finish as per SSPC SP11 where blasting is not possible, or on items which might be damaged by blasting.

3.5.4 Shot Blasting Equipment

Shot blasting equipment may be used for specific applications. Shot shall be changed as required to maintain the angular profile requirement.

3.6 Blasting Abrasive

3.6.1 Abrasive

The abrasive shall be as per SSPC-AB-1. The abrasives shall be copper slag, steel balls shall be free of contamination of dust and chlorides to produce the required anchor profile and graded as to be free from clay, silt or other matter likely to become embedded in the steel surface. Abrasives which have a tendency to shatter and adhere or embed in the steel surface shall not be acceptable. Recycled abrasive shall not be used. The use of sand is prohibited.

3.6.2 Shot Blasting Material

Shot blasting material shall pass through a G-16 to G-40 mesh screen. At least 25% to 30% steel grit shall be mixed with the graded shot to remove any rust, scale or other impurities pined into the surface. Shot blasting material is limited to iron, steel or synthetic shot which is applied by compressed air nozzles or centrifugal wheels. Shot blasting material shall be checked at least two times a week for replacement of abraded material.

4.0 COATING APPLICATION

4.1 General Application

All application, inspection and safety procedures shall be carried out in accordance with SSPC Painting Manuals, Vol. 1 Chapter 14.2 and Vol. 2 Chapter 5) and as set out below.

4.1.1 Supply and Storage

All coatings shall be furnished, mixed and applied in accordance with manufacturer's recommendations and as specified here in. Mixing of different



Manufacturer's coatings or applications on the same surface are not permitted.

All coating materials and thinners shall be in original, unopened containers being the manufacturers label batch numbers and instructions. For materials having a limited shelf life, the date of manufacture and the length of life shall be shown. Materials older than their stated shelf life shall not be used.

Materials shall be stored in accordance with the manufacturers Recommendations.

Coating materials that have gelled, other than thixotropic materials or materials that have deteriorated during storage shall not be used.

4.1.2 Pot Life

If the coating requires the addition of a catalyst, the manufacturer's Recommended pot life for the application conditions shall not be exceeded.

When the pot life is reached, the spray pot shall be emptied, cleaned and a new material catalyzed. Manufacturer's recommendations to be followed

4.1.3 Mixing

Mixing and thinning directions as furnished by the manufacturer shall be followed. Only thinners specified by the manufacturer shall be used.

All coating materials shall be stirred with a power mixer use, until the pigments, vehicles and catalysts are thoroughly mixed and then strained while being poured into the spray pot. During application the materials shall be agitated according to the manufacturer's recommendations. Different brands or types of paints shall not be intermixed.

4.2. Cleanliness

All Surfaces shall be clean free from dust and dry. Any blast cleaning dust or grit remaining on the surfaces shall be removed by means of compressed air before priming or application of any coating. Any surface with a rust bloom shall be re-blasted as per ISO: 8504.

4.2.1 Temperature



A

Coating shall only be applied when the temperature of the steel is at least 3°C above the dew point; ambient air temperature must be within the limits specified by the manufacturer.

4.2.2 Weather Conditions

No coatings shall be applied during fog, mist or rain or when humidity is not greater than 60% or on to wet surfaces. In case the minimum temperature at the fabrication yard is below 5 deg C, the contractor shall propose alternate coating procedure for Company's approval at the binding stage itself.

The company has the right to suspend application of coating when damage to the coating may result from actual or impending weather condition.

4.2.3 Coats

Each coat shall be applied uniformly and completely over the entire surface. Each coat shall be allowed to dry for the time specified by the manufacturer before the application of a succeeding coat. To reduce the possibility of intercoat contamination and to assure proper adhesion between successive coats, all coats shall be applied as soon as possible after the minimum specified drying time of the preceding coat.

4.2.4 Brush Application (Stripe Coating)

A stripe coat shall be applied by brush or roller after the prime coat has been applied. The stripe coat shall be applied to edges, corners, welding seams, bolt holes, back side of piping, stiffeners, vent and drain holes, notches and any other area that is difficult to reach by spray gun.

4.2.5 Finish Coat

An additional layer of finish coat shall be hand brushed at edges, corners, welds and hard-to spray areas to eliminate holidays in the final coats.

4.2.6 Field Welds

No coating shall be applied within 150 mm of edges prepared either for field welds or to surfaces waiting non-destructive testing.



4.2.7 Inorganic Zinc Primer

It is preferred that intermediate/top coat for inorganic zinc primer coats be applied within minimum of seven (7) days after the primer coat.

4.3 Spray Application

4.3.1 Equipment

- (a) All equipment to be used for spray applications shall be inspected and tested before application begins.
- (b) All equipment shall be maintained in good working order and shall be equal to that described in the manufacturer's instructions.
- (c) All equipment shall be thoroughly cleaned before and after each use and before adding new material.
- (d) An adequate moisture trap shall be installed between the air supply and each pressure pot. The trap shall be of the type that will continuously bleed off any water or oil from the air supply.
- (e) Suitable pressure regulators and gauges shall be provided for both the air supply to the pressure pot and the air supply to the spray gun. Spray equipment and operating pressures shall comply with the recommendations of the manufacturer.
- (f) The length of hose between the pressure pot and spray gun shall not exceed 15 m.

4.3.2 Procedures

- (a) Pressure pot, material hose and spray gun shall be kept at the same elevation where possible. When spraying inorganic zinc, the elevation difference shall not exceed 3m.
- (b) The spray gun shall be held at right angles to the surface.
- (c) Each pass with the spray gun shall overlap the previous pass by 50%.
- (d) The spray width shall not exceed 300 mm.
- (e) All runs and sags shall be immediately brushed out or the surface re-coated.
- (f) Large surfaces shall receive two passes (except when applying inorganic zinc) at right angles to each other (cross hatched).



4.3.3 Airless Spray Equipment

- (a) Airless spray equipment may be used for applying inorganic zinc, epoxy or aliphatic polyurethane coatings.
- (b) The manufacturer's recommendations in selection and use of airless spray equipment shall be followed.

4.4 Brush Application

4.4.1 General Requirements

- (a) Coating shall be applied by brush on all areas, which cannot be properly spray coated such as corners, edges, and welds etc.,
- (b) Inorganic zinc primer coatings shall not be applied by brushing, not even for touch – up repairs.

4.4.2 Equipment for Brush Application

Brushes shall be of a style and quality that will permit proper application of coating. Round or oval brushes are most suitable for rivets, bolts, irregular surfaces and rough or pitted steel. Wide flat brushes are suitable for large flat areas. Brush width shall not be greater than 100 mm. No extension handles shall be used on brushes.

4.4.3 Procedure for Brush Application

- (a) Brushing shall be done so that a smooth coat, uniform in thickness, is obtained. There shall be no deep or detrimental brush marks.
- (b) Paint shall be worked into all crevices and corners.
- (c) All runs and sags shall be brushed out to prevent air pockets, solvent bubbles or voids.
- (d) When applying solvent type, coatings, care shall be taken to prevent lifting of previous coats.

4.5 Safety Equipment

Appropriate safety equipment shall be provided for blasters, painters and other workers involved in the preparation and application of coating systems as per recommendation of paint manufacturer. Work areas shall be adequately ventilated.

5.0 REPAIR OF DAMAGED AREAS



All areas of paintwork that are locally damaged during transportation, handling or erection shall be fully repaired to the satisfaction of the company.

Prior to the application of any coat, damage to previous coat(s) shall be touched-up by removing the damaged coatings, preparing the surface and reapplying the protective coat(s).

5.1 Repair Procedure for Damaged coating

Surfaces where coating is damaged after application of the finish coat shall be repaired as follows;

5.1.1 Top Coat

The top coat damaged, but base coat undamaged and the metal substrate is not exposed:

- (a) Damaged coating shall be removed with a hand file and abraded back to the sound coating using emery paper or a fine grinder.
- (b) The damaged area shall be wiped with a suitable solvent to remove debris. The periphery of repair area shall be feathered back for a minimum distance of 25 mm into the adjacent undamaged coating by light abrasion or grinding to produce a smooth chamfered surface profile.
- (c) Apply a new topcoat as specified.

5.1.2 Base Coat

Coating damaged to base metal

- a) The damaged area greater than 0.2 m² in area, the surface of exposed metal shall be prepared to the original specified standard prior to repairing by power tool cleaning as per SSPC-SP3 or spot blasting to SSPC-SP5 and applying primer, intermediate coat and final coat as specified. Alternatively, high solid surface tolerant epoxy coating such may be used in place of primer & intermediate coats, followed by specified topcoat.
- b) The damaged areas less than 0.2 m² in area may be repaired as per manufacturer's recommendation or by preparing the surface of exposed metal by power tool cleaning as per SSPC-SP11 to the original specified standard.



A primer, intermediate and final coat shall be applied as specified. Alternatively, high solid surface tolerant epoxy coating such may be used in place of primer & intermediate coats, followed by specified topcoat. Brush application is acceptable. Even appearance and smooth feathering into surrounding coating in addition to correct dry film thickness and holidays must be achieved. Coating and surrounding repaired areas shall not be damaged and complete tie-in of the coating with surrounding areas shall be obtained. Zinc based products shall not be applied without Blast Cleaning to Sa 2 1/2, instead Surface tolerant epoxy such at 100 microns shall be used as a primer in case blast cleaning is not possible or practical.

6.0 INSPECTION AND TESTING

6.1 Quality Control

Procedures for testing and documenting quality control shall be prepared prior to the initial start up of any work covered by this specification & submitted to company for approval. The procedures shall include methods to assure the specification requirements are met and forms to document environmental conditions, surface temperature, coating applicator, surface(s) being coated, coating applied and status of required examinations and tests.

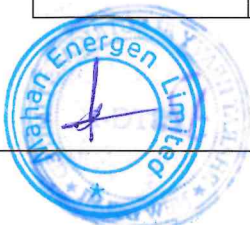
Testing and inspection shall be carried out in accordance with Table-6.2. Surfaces shall be accessible until final inspection is carried out.

6.2 Inspection and testing requirement

| Test type | Test Method | Test Frequency | Acceptance criteria | Consequence |
|--------------------------|-----------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------|------------------------|
| Environmental conditions | Ambient and steel Temperature. Relative Humidity. Dew point. | Before start of each shift + minimum twice per Shift. | In accordance with Specified requirements | No blasting or coating |
| Visual examination | Visual for sharp edges | 100 % of all surfaces | No defects, see Specified | Defects to be repaired |



| | | | | |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| | weld spatter slivers, rust grade, etc. | | requirements | |
| Cleanliness | a) ISO 8501-1 b) ISO 8502-3 | a) 100 % visual of all surfaces b) Spot checks | a) In accordance with specified Requirements b) Maximum quantity and size rating 2 | a) Reblasting b) Recleaning and retesting until acceptable |
| Salt test | ISO 8502-6 and ISO 8502-9 | Spot checks | Maximum conductivity corresponding to 20 mg/m ² NaCl | Repeated washing with potable water & retesting until acceptable |
| Chloride test | ISO 8502-2 ISO 8502-5 | - | 10microgram/sq.cm for external & 5 microgram/sq.cm for internal vessel | - |
| Roughness | Comparator or stylus instrument (see ISO 8503) | Each component or once per 200 m ² | As specified | Reblasting |
| Curing test (for Zn silicate) | ASTM D4752 | Each component or once per 100 m ² | Rating 4-5 | Allow to cure |
| Visual examination of coating | Visual to determine curing,contamination, solvent retention, pinholes/popping, sagging & surface defects | 100 % of surface after each coat | According to specified requirements | Repair of defects |
| Holiday detection | NACE RP0188 and as per *note -1 below | As per coating system specification | No holidays | Repair & retesting. |
| Film thickness | ISO 19840. Calibration on a smooth surface | ISO 19840 | ISO 19840, and coating system data sheet | Repair,additional coats orrecoating as appropriate |
| Adhesion | ISO 4624 using equipment with an automatic centeredpulling force | Each component or once per 200 m ² | *See note-2 below | Coating to be rejected |



| | | | | |
|--|---------------------------------------------------|--|--|--|
| | & carried out when coating system are fully cured | | | |
|--|---------------------------------------------------|--|--|--|

*Note:

1. Holiday Testing
Holiday testing shall be conducted in accordance with NACE SP0188. Minimum 10% of the coated areas, which include weld seams, corners, and edges, shall be holiday detected. Any holiday is unacceptable and shall be marked and repaired according to spot repair procedures.
2. Adhesion test
Adhesion test shall be carried out on separate test plates, minimum adhesion values in accordance with ISO 4624 shall be 5,0 MPa when using automatically centered test equipment.

6.3 Qualification of supervisors, foremen and QC personnel at The Fabrication Yard

The contractor's quality control inspector shall be qualified as a coating inspector in accordance with NS 476 Inspector level I or NACE level-I.

The contractor's quality control inspector shall qualify the tradesman level as blast-cleaner, painter, and applicator etc. for painting application.

The personnel shall have relevant knowledge of health and safety hazard, use of protection equipment, coating materials, mixing and thinning of coatings, coating pot-life, surface requirements etc.

Contractor shall carry out tests in accordance with the company approved Coating Procedure Specification for all coating systems that are planned to be used for this project before commencement of painting work.

The test shall be supervised by the coating manufacturer's Authorized technical representative and the contractor's quality control inspector and shall be witnessed & inspected and accepted by the FQA of Adani. Contractor shall issue an inspection report covering the qualification tests for the company approval.

The test shall be carried out on a test panel (minimum 1 m x 1 m) and at least on one end of, angle, channel, beam and flat bar and an alternative location providing similar complexity on the component to be used.



The acceptance criteria are the requirement to the visual and non – destructive inspection of the coating system described in this specification. Operators failing to meet the requirement shall not be allowed to carry out the work on this project.

6.4 Equipment and Material

Materials, tools or equipment used in the surface preparation and coating applications, shall be inspected regularly and rejected if they do not comply with the Specification.

6.5 Inspection Instruments

The following items shall be inspected using the inspection instruments listed below:

| Instrument Item | Inspection Instrument |
|-------------------------|-----------------------------------------------------------------------------------------------------|
| Surface Profile | Keane-tator Surface Profile Comparator or Testex Press-o-Film Elcometer 124 with 122 testex tape |
| Holidays | Tinker – Razor Model M – 1 |
| Surface Cleanliness | SSPC – Vis – 1 |
| Viscosity | Zahn Viscometer or Ford Cup |
| Wet Film Thickness(WFT) | Nordson Wet Film Thickness Gauge Sheen WFT Gauge |
| Temperature & Humidity | Gardner Certified Hydrometer And Temperature Indicator |
| Surface Temperature | Pandux Surface Temperature Thermometer Elcometer Surface temperature gauge |
| Compressed Air Quality | Dry white cloth |

6.5.1 Calibration

Each test instrument shall be maintained and calibrated as prescribed by the manufacturer.

6.5.2 Dry Film Thickness



The dry film thickness of the coating system shall be determined in accordance with SSPC-PA2 or by a Micro test thickness gauge or comparable instrument in accordance with the following procedure.

- (a) Ten readings shall be taken for every 10m² of painted areas.
- (b) 90% of all readings shall be within the specified dry film thickness.
- (c) Where thickness accordance with the above procedure fall below the specified minimum an additional coat of the intermediate or finish coat shall be applied.

7.0 PAINT MATERIALS:

The coating manufacturer shall provide a Coating System Data Sheet (CSDS) for each coating system to be used, containing at least the following information for each product:

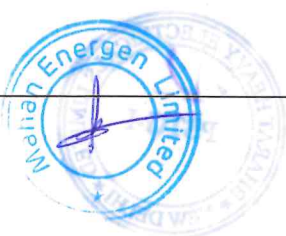
- Surface pre-treatment requirements;
- Dry Film thickness (maximum, minimum and specified);
- Maximum and minimum re-coating intervals at relevant temperatures;
- Information on thinners to be used (quantities and type);
- coating repair system.
- Practical consumption
- Expected life of product with guarantee.
- MSDS

Paint manufacturer shall furnish all the characteristics of paint materials on printed literature, along with the test Certificate with actual test values of supplied batch for all the specified characteristics given in the specifications.

All the paint materials shall be of first quality, should pass all pre qualification testing for corrosive category – C5-M as per ISO 12944 and conform to the following general characteristics as per the tables below:

TABLE 7.1: REQUIRED CHARACTERISTIC OF PAINT MATERIALS

| Technical Name | Type & Composition | Volume of solids (approx.) | DFT (Dry Film thickness) per coat (approx.) | Weight Per liter in kgs/ liters (approx) | Touch Dry at 25°C (approx) | Hard dry at 25°C (approx.) | Over coating Interval (approx.) | Pot life (approx.) 25°C |
|--------------------------------------------|------------------------------|----------------------------|---------------------------------------------|------------------------------------------|----------------------------|----------------------------|----------------------------------|-------------------------|
| Inorganic zinc silicate Coating Containing | A two pack air drying self – | 65 %±2 | 65-75 µ | 2.2+/- 0.02 | 30 mts. | Over night | Min.; 16-24 Hrs Max. Indefinite. | 4 Hrs |



| | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------|---------------|-----------------|---------|------------|--------------------------------------------------|--------|
| minimum 85% ± 2 zinc in dry film by weight & 96% Purity of Zinc. | curingsolvent basedInorganic Zinc silicatecoating. | | | | | | | |
| Epoxy MIO High build containing minimum 50% MIO in dry film. | Two pack, super high build, polyamide cured epoxy, pigmented with natural lamellar micaceousironoxide | Min. 80% ± 2 | 125-150 μ | 1.82 \pm 0.02 | 3 Hrs. | Overnig ht | Min. : 18 Hrs. Max. : Indefinite | 2 hrs. |
| Glossy Aliphatic acrylic Polyurethane Topcoat | Two Components High Build Aliphatic Acrylic Polyurethane. | min 62% ± 2 | 50-75 μ | 1.46 \pm 0.02 | 1.5 hrs | 12 hrs | Min. ;12 hrs Max. ;As per suppliers data | 3 Hr |
| Inorganic zinc silicate Coating Containing minimum 75% ± 2 zinc in dry film by weight & 96% Purity of Zinc. | A two pack air drying self – curing solvent based Inorganic Zinc silicate coating. | Min 60% ± 2 | 65-75 μ | 2.0 \pm 0.02 | 30 mts | Overnig ht | Min.; 16-24 Hrs Max. Indefinite. | 4 Hrs |
| Epoxy MIO High build containing minimum 50% MIO in dry film. | Two pack, high build, polyamide cured epoxy, pigmented with lamellar MIO. | Min 60% ± 2 | 100-125 μ | 1.58 \pm 0.02 | 4 Hrs | 18 hrs | Min. : 18 Hrs. Max. : Indefinite | 5 hrs |
| Epoxy Direct to Metal Primer cum Finish Coating | Two pack, rapid cure, high build epoxy DTM primer cum finish | Min 70% ± 2 | 75-150 μ | 1.63 \pm 0.02 | 30 mts | 60 mts | 60 mts | 2 hrs |
| Rapid cure epoxy high build zinc phosphate primer(16% ZP content) | Two pack, rapid cure, high build polyamide cure, epoxy zinc phosphate primer. | Min 63% ± 2 | 50-100 μ | 1.51 \pm 0.02 | 45 mts | 3 hrs | 3 hrs | 6 hrs |
| Self -priming Surfaceretolerant High build Epoxycoating | Two pack amid amine cured self priming epoxy mastic. | Min. 80% ± 2 | 100-125u | 1.46 \pm 0.02 | 5 Hrs. | 24 Hrs | Min. :24 Hrs Max –As recommended by manufacturer | 2 hrs |

8.0 COATING SYSTEMS

8.1 Scope

The following section outlines the requirement of supply & application of anti corrosive coatings for corrosion protection of steel structural's



exposed to environments classified by ISO 12944-2 as C5-I, C5-M, C- 4 & C-3 and to get long term life (High Durability – above 15 years)

8.2 Surface Preparation

All the parts to be sprayed shall be degreased according to SSPC-SP 1. The absence of oil and grease after degreasing shall be tested by method given elsewhere in the specification.

Grind all sharp edges and corners to a minimum radius of 2 mm. Remove all welding slag, spatter & blend grind all sharp welds & high spots. Remove all salt deposits by jetting with clean (potable) water. Thereafter the surface to be abrasive blasted to near white metal finish as per SSPC-SP 10. Using SSPC VIS 1, it is to be visually assessed that the blast cleaned surface meets requirement of SSPC-SP 10.

Thereafter clear cellophane tape test as per ISO 8502-3 shall be used to confirm absence of dust on the blasted surface. Finally blasted surface shall be tested for presence of soluble salts as per method ISO 8502-9. Maximum allowable salt content shall be considered 50mg/M². (5 micrograms/cm²) In case salt content exceeds specified limit. The contaminated surface shall be cleaned by method as per Annex – C of ISO - 12944-4 (Water Cleaning.) or as per ISO 8501 – 4 (Wa-Wa 2 ½). After cleaning the surface shall be retested for salt content after drying.

The blasting media shall be either chilled iron or angular steel grit as per SSPC-AB-3 of mesh size G-16 to G-40. Copper or Nickel slag or Garret as abrasive will also be suitable having mesh size in the range of G16 to G24, conforming to SSPC-AB-1.

Mesh size shall be required as appropriate to the anchor tooth depth profile requirement and blasting equipment used. The blasted surface should be having angular profile depth of 50 to 75 microns with sharp angular shape. The profile depth shall be measured according to NACE standard RP 0287 (Replica Tape) or ASTM D 4417 method B (Profile depth gauge).

Suitable enclosure shall be provided to carry out the blast cleaning operation. The contractor shall put up minimum three temporary sheds each of size 15m x 30m with handling facilities at site to carry out abrasive blasting. If required prior approval from the factory inspector/pollution



control board etc. shall be obtained regarding the method of blast cleaning and abrasives used therein.

For manual blasting one profile depth measurement shall be taken every 10-20 M² of blasted surface. Surface preparation shall be completed in one abrasive blast cleaning operation wherever possible. If rust bloom (visual appearance of rust) appears on the blast cleaned surface before priming, the affected area shall be re-blasted to achieve specified degree of cleanliness after which only application of inorganic zinc silicate.

Air blasting pressure at nozzle shall be normally maintained at 100 psi. Air pressure and media size should be reduced and adjusted to preclude damage/distortion to thin gauge materials. Blasting time on work piece should be adjusted to only clean the surface and cut required anchor tooth with minimum loss of metal. Blast angle should be as close to perpendicular as possible but in no case greater than $\pm 30^\circ$ from perpendicular to work surface. Blasting media must be free of debris, excessive fines, contaminants such as NaCl and sulfur salts (Ref. SEC 13.2.1.6 of this Spec).

F-Tests for blasting media, blasting air & surface contamination.

F-1- Blasting Media

(For every fresh batch of media and one random test during blasting)

- a) Blasting Media shall be visually inspected for absence of contamination and debris using 10 X magnification.
- b) Inspection for the absence of oil contamination shall be conducted using following procedure:
 - Fill a small clean 200 ml bottle half full of abrasive.
 - Fill the bottle with potable water, cap and shake the bottle.
 - Inspect water for oil film/slick. If present, the blasting media is not to be used.
- c) Soluble salt contamination if suspected shall be verified by method ASTM D4940. If present, media to be replaced.
- d) Clean blasting equipment, especially pot and hoses, then replace blasting media and retest.

F-2 Test for Blasting Air

(Once Daily before start of blasting & once at random during blasting)



The air for blasting shall be free from moisture and oil. The compressor air shall be checked for oil and water contamination per ASTM D 4285.

F-3-Test for presence of oil/grease and contamination

The steel substrate after degreasing as per SSPC-SP 1 shall be tested as per following procedure to validate absence of oil and grease contamination.

- a) Visual inspection - Continue degreasing until all visible signs of contamination are removed.
- b) Conduct a solvent evaporation test by applying several drops or a small splash
Of residue-free trichloromethane on the suspect area especially pitting, crevice corrosion areas or depressed areas. An evaporation ring formation is indicative of oil and grease contamination. Continue degreasing and inspection till test is passed.

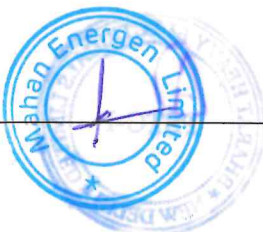
8.3 Paint Systems

8.3.1 For C5-M Environment Classification

Primer Coat: 1 coat of inorganic ethyl self curing zinc silicate primer (coating) at 75 microns DFT/Coat to be applied by airless/pressure pot for high durability >15 yrs. The primer should meet the requirements of SSPC-SP 20 performance standard. Minimum Metallic Zinc in the dry film by weight must be 85%. Volume solids of the primer must be 65% .

Intermediate coat – 1 coat of Super High build epoxy MIO coating cured with polyamide hardener at 150 microns DFT/ Coat to be applied by airless spray. Minimum Natural Lamellar Micaceous Iron Oxide content in the dry film must be 50% by weight. Volume solids of the product must be 80% .

Finish Coat- Two coats of High Build Gloss Aliphatic Acrylic Polyurethane at 50 micron/coat dry film thickness to be applied by brush/airless spray. Total thickness of the finish coat will be 100 microns. Volume Solids of the product must be 62% .



Total DFT minimum: 325 Microns and maximum: 350 Microns.

Notes:

1. This paint system is equivalent to the protective paint system no's (S7.14 & S 6.08) recommended for corrosion category C5-M & C5-I in ISO 12944-5.
2. This system is satisfactory for surface temperatures to 90° C continuous dry temperature.
3. Colour for final coat shall be as per colour code.
4. All material shall be supplied in the manufacturers original cans, durably & legibly marked with the description of the contents. This shall include the batch number, date of manufacturing & the manufacturer's name.
5. All coating materials used shall confirm to the composition clauses given against each product in the specification. In meeting the composition clauses, the manufacturer shall provide evidence of compliance from approved third party lab before start of the job & internal test report along with every supplied batch.
6. Material containing cadmium, lead or any other toxic material to environment/personnel shall not be used.

8.3.2 For C-4 Environment Classification

Primer Coat: 1 coat of inorganic ethyl self curing zinc silicate primer (coating) at 75 microns DFT/Coat to be applied by airless/pressure pot. The primer should meet the requirements of IS - 14946 performance standard. Minimum Metallic Zinc in the dry film by weight must be 75%. Volume solids of the primer must be 60% .

Intermediate coat – 1 coat of High build epoxy MIO coating cured with polyamide hardener at 100 microns DFT/ Coat to be applied by airless spray. Minimum Natural Lamellar Micaceous Iron Oxide content in the dry film must be 50% by weight. Volume solids of the product must be 60% .

Finish Coat- One coat of High Build Gloss Aliphatic Acrylic Polyurethane at 50 micron/coat dry film thickness to be applied by brush/airless spray. Volume Solids of the product must be 62%.



Total DFT minimum: 225 Microns.

Notes:

1. This paint system is equivalent to the protective paint system no S4.30 recommended for corrosion category C-4- in ISO 12944-5.
2. This system is satisfactory for surface temperatures to 90° C continuous dry temperature.
3. Colour for final coat shall be as per colour code.
4. All material shall be supplied in the manufacturers original cans, durably & legibly marked with the description of the contents. This shall include the batch number, date of manufacturing & the manufacturer's name.
5. All coating materials used shall confirm to the composition clauses given against each product in the specification. In meeting the composition clauses, the manufacturer shall provide evidence of compliance from approved third party lab before start of the job & internal test report along with every supplied batch.
6. Material containing cadmium, lead or any other toxic material to environment/personnel shall not be used.

8.3.3 For C-3 Environment Classification

Covered Areas like TG Shed etc:

Primer cum Top Coat: Two coat of DTM – Direct to Metal epoxy primer cum finish with optimum loading of Zinc Silicate anti corrosive pigments at 75 microns DFT/Coat to be applied by airless/pressure pot. The total thickness of the system will be 225 microns. Volume solids of the DTM coating must be 70%.

Total DFT minimum: 225 Microns.

Uncovered Areas – Exposed to UV Rays:

Primer Coat: 2coat of Rapid Cure, High Build, Epoxy Polyamide Cure Zinc Silicate Primer with optimum loading of Zinc Silicate anticorrosive pigment at 175 microns DFT/Coat to be applied by airless/pressure pot. Minimum Zinc phosphate pigment in the dry film by weight must be 16%. Volume solids of the primer must be 63%.

Finish Coat- One coat of High Build Gloss Aliphatic Acrylic Polyurethane at 50 micron/coat dry film thickness to be applied by brush/airless spray. Volume Solids of the product must be 62% .



Total DFT minimum: 225 Microns.

Notes:

1. This paint system is equivalent to the protective paint system no S3.18 recommended for corrosion category C-3- in ISO 12944-5.
2. This system is satisfactory for surface temperatures to 90° C continuous dry temperature.
3. Colour for final coat shall be as per colour code.
4. All material shall be supplied in the manufacturers original cans, durably & legibly marked with the description of the contents. This shall include the batch number, date of manufacturing & the manufacturer's name.
5. All coating materials used shall confirm to the composition clauses given against each product in the specification. In meeting the composition clauses, the manufacturer shall provide evidence of compliance from approved third party lab before start of the job & internal test report along with every supplied batch.
6. Material containing cadmium, lead or any other toxic material to environment/personnel shall not be used.

9 COLOUR SCHEDULE

9.1 EQUIPMENT AND PIPING STANDARD COLOUR CODE FOR MECHANICAL

EQUIPMENT

| S. No. | Description | Ground Colour |
|---------------|------------------------------------|----------------------|
| A | CLOSED COOLING WATER SYSTEM | |
| 1 | Closed cooling water pumps | Sea Green |
| 2 | Plate heat exchanger | Sea Green |
| 3 | Closed cycle cooling water pump | Sea Green |
| 4 | CCCW Expansion tank | Sea Green |
| 5 | CCCW chemical dosing tank | Sea Green |



| | | |
|----------|-----------------------------------------|---------------------|
| B | WATER TREATMENT PLANT | |
| 1 | River water & Raw water | |
| a | Raw water pump | Sea Green |
| b | Clarifier | Sea Green |
| c | - Raw / Fire water storage tank | Sea Green |
| d | DM plant supply pump | Sea Green |
| e | Filter air blower | Sea Green |
| f | Filter back wash pump | Sea Green |
| g | Lime slaking tank & agitator | Sea Green |
| h | Lime slurry transfer pump | Sea Green |
| i | Lime solution tank | Sea Green |
| j | Lime solution dosing pump | Sea Green |
| k | Alum solution tank | Sea Green |
| l | Alum solution metering pump | Sea Green |
| m | Polyelectrolyte solution tank | Sea Green |
| n | Polyelectrolyte solution metering pump | Sea Green |
| o | Sludge feed pump | Sea Green |
| p | Filter press | Sea Green |
| q | Service water tank for DM building | Sea Green |
| r | Service water tank for control annex | Sea Green |
| 2 | Demineralisation system | |
| a | Activated carbon filter | Sea Green |
| b | Cation exchanger | Sea Green |
| c | Anion exchanger | Sea Green |
| d | Degasser tower | Sea Green |
| e | Air blower for degasser tower | Sea Green |
| f | Strong base anion exchanger | Sea Green |
| g | Degassed water transfer pump | Sea Green |
| h | Strong base anion exchanger | Sea Green |
| i | Mixed bed polisher | Sea Green |
| j | Air blower for mixed bed polisher | Sea Green |
| k | DM Water Storage tank | Sea Green |
| l | DM water transfer pump | Sea Green |
| m | Acid unloading cum transfer pump | Dark Admiralty Grey |
| n | Bulk acid storage tank | Dark Admiralty Grey |
| o | Acid measuring tank for SAC | Dark Admiralty Grey |
| p | Acid measuring tank for MB | Dark Admiralty Grey |
| q | Regeneration water pump | Dark Admiralty Grey |
| r | Caustic Lye unloading cum transfer pump | Dark Violet |
| s | Bulk caustic storage tank | Dark Violet |
| t | Caustic regeneration tank & agitator | Dark Violet |
| u | Caustic solution filter | Dark Violet |

| S.No. | Description | Ground Colour |
|----------|---------------------------------------------|---------------|
| v | Caustic dilution tank for SBA/WBA | Dark Violet |
| w | Caustic dilution tank for MB | Dark Violet |
| x | Caustic pump for regeneration for WBA/SBA | Dark Violet |
| y | Waste water recirculation cum disposal pump | Sea Green |
| C | CRANE & HOIST | |
| 1 | Power house EOT crane | Canary Yellow |
| 2 | CW pump house EOT crane | Canary Yellow |
| D | COMPRESSED AIR PLANT | |
| 1 | Air compressor | Sky Blue |



| | | |
|----------|------------------------------------------------|---------------------|
| 2 | Compressed air dryer | Sky Blue |
| 3 | Air receiver | Sky Blue |
| E | Chemical Dosing | |
| 1 | Hydrazine preparation tank | Dark Admiralty Grey |
| 2 | Ammonia preparation tank | Dark Admiralty Grey |
| 3 | Hydrazine & ammonia dosing tank | Dark Admiralty Grey |
| 4 | Hydrazine & ammonia dosing pump | Dark Admiralty Grey |
| 5 | Phosphate preparation tank | Dark Admiralty Grey |
| 6 | Phosphate dosing tank | Dark Admiralty Grey |
| 7 | Phosphate dosing pump | Dark Admiralty Grey |
| 8 | - Sampling system | Dark Admiralty Grey |
| F | FIRE PROTECTION SYSTEM | |
| 1 | Diesel engine driven pump | Fire red |
| 2 | Fuel tank for diesel engine driven pump | Fire Red |
| 3 | Main hydrant pump (Electrical) | Fire Red |
| 4 | Jockey pump | Fire Red |
| 5 | Fire Water Storage tank | Fire Red |
| 6 | CO2 cylinder | Fire Red |
| G | FUEL OIL SYSTEM | |
| 1 | Fuel oil pumps skid | Light Brown |
| 2 | Fuel oil Storage tank | Light Brown |
| 3 | Fuel oil strainer | Light Brown |
| H | ASH DISPOSAL SYSTEM | |
| 1 | Ash transmitting vessel | Aluminium |
| I | AIR CONDITIONING AND VENTILATION SYSTEM | |
| 1 | Refrigerant compressor | Sky Blue |
| 2 | Chilled / condenser pumps | Sea Green |
| 3 | Condenser water pipe | Sea Green |
| 4 | Fans | Grey |



9.2 STANDARD COLOUR CODE FOR ELECTRICAL EQUIPMENT

| Sl. No. | Description | Colour | Colour No. |
|---------|-----------------------------------------------------------------|-----------------------|-----------------------|
| 1 | Transformers | Light grey | Shade 631 of IS : 5 |
| 2 | Bus ducts | Light grey | Shade 631 of IS:5 |
| 3 | Junction boxes. | Light grey | Shade 631 of IS:5 |
| 4 | HT/LT Switchboards, Distribution boards, Control & Relay panels | | |
| | a) Indoor | Siemens | RAL 7032 |
| | b) Outdoor | Light grey | Shade 631 of IS:5 |
| 5 | UPS Panel, charger panels | Siemens | RAL 7032 |
| 6 | DG Alternator | Onan Green | - |
| 7 | NGR | Light grey | Shade 631 of IS : 5 |
| 8 | Motor | Light grey | Shade 631 of IS : 5 |
| 9 | Lighting fittings | As per manufacturer's | As per manufacturer's |
| 10 | Cable trays | Galvanized | |

Note: 1. All panels that are to be erected at CCR floor shall be painted using RAL 7032 (exterior colour). All Electrical, C&I, Fire alarm or any other panel shall have this colour.



9.3 COLOUR CODING FOR IDENTIFICATION OF PIPELINES USED IN THERMAL POWER PLANTS

| Sl.No | Medium | Ground Shade | | Band Shade | | Remarks |
|-------|----------------------------|---------------|-----------------------|--------------|-----------------------|--------------------------------------|
| | | Color | Color No. as per IS:5 | Color | Color No. as per IS:5 | |
| 1 | Water system | | | | | |
| a) | Untreated or raw / service | Sea green | 217 | White | - | White is not included in IS - 5-2007 |
| b) | Treated/dematerialized | Sea green | 217 | Light orange | 557 | |
| c) | Condensate | Sea green | 217 | Light brown | 410 | |
| d) | Potable water | Sea green | 217 | French blue | 166 | |
| e) | RO water | Sea green | 217 | Light orange | 557 | |
| f) | Service & clarified water | Sea green | 217 | French blue | 166 | |
| 2 | Steam system | | | | | |
| a) | Auxiliary steam | Aluminium | - | Signal red | 537 | with aluminium |
| 3 | Air system | | | | | |
| a) | Instrument | Sky Blue | 101 | White | - | White not included in IS-5 - 2007 |
| b) | Service/Plant | Sky Blue | 101 | White | - | |
| c) | Vacuum pipes | Sky Blue | 101 | Black | - | |
| 5 | Gas system | | | | | |
| a) | Hydrogen | Canary yellow | 309 | Signal red | 537 | White is not included in |
| b) | Chlorine | Canary yellow | 309 | Dark violet | 796 | |
| c) | Carbon dioxide | Canary yellow | 309 | Light grey | 631 | |
| e) | Oxygen | Canary yellow | 309 | White | 218 | |



| Sl.No | Medium | Ground Shade | | Band Shade | | Remarks |
|-------|------------------------------------------|---------------------|-----------------------|-----------------|-----------------------|----------------------|
| | | Color | Color No. as per IS:5 | Color | Color No. as per IS:5 | |
| 6 | Oils | | | | | |
| a) | LDO/HFO | Light brown | 410 | Brilliant green | 221 | |
| b) | Transformer oil | Light brown | 410 | Light orange | 557 | |
| 7 | Chemical feed | | | | | |
| a) | Acid piping (in water treatment plant) | Dark admiralty grey | 632 | Signal red | 537 | Hazard mark is given |
| b) | Alkali Piping (in water treatment plant) | Dark violet | 796 | Golden yellow | 356 | Hazard mark is given |
| 8 | Fire services | Fire red | 536 | - | - | |
| 9 | Effluent pipes | Black | - | - | - | |

9.4 COLOUR CODE FOR STRUCTURAL STEEL

| SL. NO | ITEM/SERVICE | COLOR | COLOR No. as per IS:5 |
|--------|---------------------------------------------------------------------------------------------------------------|---------------------|-----------------------|
| 1 | Gantry girder & monorail | Brilliant green | 221 |
| 2 | Gantry girder & monorail stopper | Signal red | 537 |
| 3 | Building structural steel columns brackets, beams bracings, roof truss, purlin, side grit, louvers, stringers | Dark admiralty grey | 632 |
| 4 | Pipe rack structure & trestle | Dark admiralty grey | 632 |
| 5 | Chequered plate (Plain Face) | Black | - |
| 6 | Grating | Black | - |
| 7 | Ladder | Dark admiralty grey | 632 |
| 8 | Hand railing Hand rail | Signal red | 537 |
| 9 | Middle rail | Signal red | 537 |
| 10 | Toe Plate | Signal red | 537 |
| 11 | Vertical post | Black | - |
| 12 | Structural steel for Silo | Smoke grey | 692 |



10 RECOMMENDED LIST OF PAINT MANUFACTURER

- 1.Asian Paints India Ltd
2. Shalimar Paints
- 3.Jotun
4. Akzonobel
5. Berger Paints
6. Good lass Nerolac Paints
7. Bombay Paints
8. Jenson & Nicholson

11 PROCEDURE OF APPROVAL OF NEW COATING MATERIAL

Following procedure recommended is to be followed for approval materials Manufactured by new manufactures (indigenous and foreign):

1. Sample shall be selected by adani and the manufacturer should arrange testing of the coating materials as per the List of tests given in Para 5 below from one of the reputed Government Laboratories. Testing charge shall be borne by manufacturer.
2. Samples of coating materials should be submitted to the Govt. Laboratory in sealed containers with batch number and test certificate on regular format of manufacturer's testing laboratory.
3. All test panels should be prepared by the Govt. testing agency colored photographs of test panels should be taken before and after the test and should be enclosed along with test report.

Sample batch number and manufacturers test certificate should be enclosed along with the report. Test report must contain detail of observations and rating if any as per the testing code.

Suggested Govt. laboratories are:

RRL, Hyderabad
HBTI, Kanpur
DMSRDE, Kanur
IIT, Bombay
BIS, Laboratories
UDCT, Mumbai



4. Manufacturers should intimate the company, details of samplesubmitted for testing, name of Govt. testing agency, date. Contactpersonnel of the Govt. testing agency. At the end of the test themanufacturer should submit the test reports to the Company forapproval. The manufacturer(s) shall be qualified based on the resultsof these tests and the Company's decision in this regard - shall be Finaland binding on the manufacturer.
5. All tests required for evaluation of acceptance coating materials forstructural steel in thermal power plant shall be as per C5-M classification in ISO 12944 – 2 relevant ISO/ASTM standards.



Types of Environment

| ISO 12944 classification | Typical Environments |
|--------------------------|---------------------------------------------------------------------------------------------------------|
| C1 & C2 | Rural areas, low pollution. Heated building/neutral atmosphere. |
| C3 | Urban and industrial atmospheres. Moderate sulphur dioxide levels. Production areas with high humidity. |
| C4 | Industrial and coastal. Chemical processing plants. |
| C5I | Industrial areas with high humidity and aggressive atmospheres. |
| C5M | Marine, offshore, estuaries, coastal areas with high salinity. |

