

BHEL
RANIPET

BHARAT HEAVY ELECTRICALS LTD.
BOILER AUXILIARIES PLANT
RANIPET 632 406

PR:QA:500
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QUALITY DEPARTMENT

PROCEDURE FOR

ALLOWABLE DEVIATIONS FOR
DIMENSIONS WITHOUT SPECI-
FIED TOLERANCES

EFFECTIVE DATE

16/01/93

	NAME	SIGNATURE	DATE
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ISSUED BY : **QUALITY ASSURANCE**

REVISION : **NIL**

DATE :

DOCUMENT CONTROL NO:

72

File Name :PHT.RSU

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1. Table 1 given below indicates the permissible variation in Linear Dimension of fabricated and machined components. The coarse grade is to be followed for fabricated components and medium grade for machined components.
2. Table 2 given below indicates the permissible deviations for Radii & Chamfers for machined components.
3. Table 3 given below indicates the permissible deviations for Angular dimensions for machined components.
4. Table 4 given below indicates the conditions under which the deviations given in this standard are not applicable.
5. Special rulings may be stated for linear dimensions of welded structures consisting of several assemblies.
6. If closer tolerances than those given in this procedure are necessary, the same shall be indicated in the relevant drawings.

TABLE - 1

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Deviations in mm for the nominal size range in mm													
Degree of accuracy	0.5 * up to 3	Over 3 upto 6	Over 6 upto 30	Over 30 upto 120	Over 120 upto 400	Over 400 upto 1000	Over 1000 upto 2000	Over 2000 upto 4000	Over 4000 upto 8000	Over 8000 upto 12000	Over 12000 upto 16000	Over 16000 upto 20000	
f (fine)	± 0.05	± 0.05	± 0.1	± 0.15	± 0.2	± 0.3	± 0.5	± 0.8	-	-	-	-	
m (medium)	± 0.1	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.0	± 2	± 3	± 4	± 5	± 6	
g (coarse)	± 0.15	± 0.2	± 0.5	± 0.8	± 1.2	± 2	± 3	± 4	± 5	± 6	± 7	± 8	
sg (very coarse)	-	± 0.5	± 1	± 1.5	± 2	± 3	± 4	± 6	± 8	± 10	± 12	± 12	

* In the case of nominal sizes below 0.5 mm, the deviations must be specified directly by the side of the nominal size.

TABLE - 2

DEVIATIONS FOR RADII & CHAMFERS

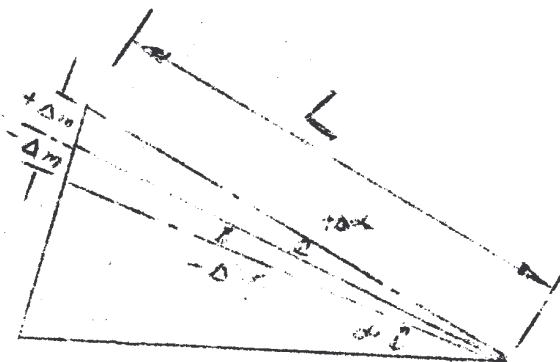
All dimensions are in mm

CLASS OF DEVIATION	RANGE OF NOMINAL DIMENSIONS					
	Above	0.5	3	6	30	120
Fine & Medium	Upto and Including	3	6	30	120	315
		± 0.2	± 0.5	± 1	± 2	± 4

TABLE - 3

DEVIATIONS FOR ANGULAR DIMENSIONS

$\Delta\alpha$ =Angle Tolerance
in angular units
 Δm =Angle Tolerance
in linear units



All Dimensions are in mm

CLASS OF DEVIATIONS	Length (L) of shorter side of angle in mm							
	Above	-	10	50	120	500	800	1250
FINE AND MEDIUM	Upto & including	10	50	120	500	800	1250	2000
	Δm (mm)	± 0.1	± 0.2	± 0.6	± 0.8	± 0.96	± 1.125	± 1.5
	$\Delta\alpha$ (deg or min)	$\pm 1^\circ$	$\pm 30'$	$\pm 20'$	$\pm 10'$	$\pm 4'$	$\pm 3'$	$\pm 2'3''$

TABLE - 4
NON APPLICABILITY OF THE STANDARD

STANDARD SPECIFICATION	CONDITIONS FOR TOLERANCING	DIMENSIONS	PRODUCTION METHOD	SPECIAL AGREEMENTS
where permissible deviations have been specified	where higher values than those specified in Table 1 and 2 may be allowed.	For dimensions required to give a certain class of it	Casting, forging, pressing, rolling, welding, flame cutting	where variations from this standard are agreed upon between the purchaser and the manufacturer
	Where only positive or only negative deviations are desired Where parts are manufactured separately and are required to be assembled together without any further treatment (selective assembly, spare parts etc)	For dimensions resulting after assembly Where concentricity between parts is required For angular dimensions of a circular division (For example, angular position- ing of teeth of clutches) For angular dimensions in precision taps and in pipe bends For dimensions of welded assemblies (unless the part is to be machined)		

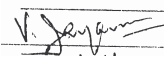
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REV . NO . 01
DATE . 14 .07 .93
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PROCEDURE FOR STORAGE OF SHELF LIFE ITEMS LIKE RUST
PREVENTIVE FLUIDS , PAINTS , RUBBER COMPONENTS ,
GREASE AND ANTISEIZE COMPOUNDS AND SIMILAR
COMPONENTS / ITEMS.

EFFECTIVE DATE : 14 . 07 . 93

	Name	Signature with date
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Reviewed by	P H TAMBAKHE	 14/7/93
Approved by	R N MISRA	 14/7/93

ISSUED BY : SM / QUALITY ASSURANCE

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BHEL : BAP : RANIPET
QUALITY DEPARTMENT

PR : QA : 505
REV . NO . 01
DATE . 14 . 07 . 93
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Record of Revisions

Sl no	Revision carried out	Reason
01	S1 nos 1, 5, 7, 9 & 10 the method of storage revised.	-----

PROCEDURE FOR STORAGE OF LOW SHELF LIFE ITEMS LIKE

ANTI SEIZE / THREAD COATING COMPOUNDS , GREASES , PAINTS ,
RUST PREVENTIVE FLUIDS, RUBBER COMPONENTS

1.0 SCOPE:

This procedure spells out the method of storage of low shelf life items like antisize/thread coating compounds , greases , paints , rust preventive fluids and rubber compounds .

2.0 STORAGE

Please See the table . 1 . The method of storage of low shelf items is given in the table .

TABLE 1

S.No.	Description	Category	Method of storage	Items covered under the category .
01	Anti Seize compound/greases	L	Indoor storage in closed containers well ventilated and dry rooms , away from heat sources sunshine , flames , gas cylinders .	Thread Coating compounds , greases , molysulf lubricants etc.
02	Sealing Compounds	L	Indoor storage closed containers well ventilated and dry rooms , away from heat sources sunshine , flames , gas cylinders / solvents etc. . If containers are damaged, reject the item	All sealing compounds

03	Rust preventive fluids (film forming type)	RPF	Outdoor, undershade Dry condition away from 1)Flame heat 2) Sunshine, 3)Gas cylinders, 4)Petrol Diesel, Kerosene other solvents 5) Near Fire extinguishing equipment .	Collecting Electrode rust preventive fluids, candopeel, strippable Coating.
04	Rust preventive fluids (non film forming type)	RPN	- DO -	APH heating element rust preventive fluids .
05	Natural Rubber Solvents, alkalis ,	RB	Indoor storage well ventilated dry rooms with paper and chalk powder wrappings, Away from oils, acids and flames , sunshine , weld heat.	Gaskets ,washers, forms, shapes, tubes pipes , conduits etc. .
06	Synthetic Rubber	RS	- DO -	- DO -
07	Red Oxide Zinc Chrome paints IS 2074	PR	In sealed containers indoors: In dry and well ventilated rooms Away from heat & flame , gas cylinders, flammable materials like Petrol , Diesel ,Kerosene etc .	- DO -
08	IS 2932 Synthetic enamel paints		- DO -	All Colors shades .

09 . Epoxy Paints	PEPX	In sealed containers. Indoor Dry condition . On separate racks ; Away from heat , flammable materials like Petrol , Diesel Kerosene , solvents .	This category includes Inorganic Zinc Rich paints also .
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10 . Chlorinated rubber paints .	PCLR	In sealed containers. Cool Dry place . Indoor only. Away from flame , heat, flammable materials like petrol , Diesel kerosene.
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PR :QA:509

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GUIDELINES FOR

NDT REQUIREMENTS ON
GAS CUT EDGES

EFFECTIVE DATE

04-08-93

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REVIEWED BY

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APPROVED BY

R N MISTRA



ISSUED BY: QUALITY ASSURANCE

REV. NO.:00

CONTROL NO

1.0 SCOPE :

The procedure specifies the items for which for which Magnetic Particle Testing shall be conducted on gas cut edges.

2.0 PREFERENCE:

Sheet 7 of 12 of CE spec .M&P spec No.: 5.11.1.1.(s) dated 05-11-84 and review with SM/QA

3.0 GENERAL :

All gas cut edges which are machined later need not be examined by MT (Magnetic Particle Testing)

3.1 Plates above 38.1 mm for the items specified below shall only be tested. Stiffeners need not be non-destructively tested.

3.1 A FANS: Center plate , AP fan impeller hub flanges. Flanges for Conical cover plate, Flange for AP fan cover plate ,Impeller rings made of plate ,Conical cover plate seating rings.

3.1 A APH: Lug plates of lug assembly ,Rotor post header plates.

3.1 C ESP/Structural items: plates used as flanges for floor beams and those structural items for which NDT requirements are specified in other transmittals like QPS, Letters etc.

4.0 Reference standard and acceptance norm for MT shall be as per BHE :NDT:RP:MT:01/ latest revision.

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REV:00
Dt:31.1.94
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PROCEDURE FOR

CONTROL OF SURFACE PREPARATION AND
PAINTING OF FABRICATED COMPONENTS
AT SUB-CONTRACTORS WORKS.

EFFECTIVE DATE

31.1.94

NAME

SIGNATURE & DATE

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ISSUED BY

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CONTROL COPY NUMBER

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PROCEDURE FOR CONTROL OF SURFACE PREPARATION AND PAINTING OF
FABRICATED COMPONENTS AT SUB-CONTRACTORS WORKS.

1.0 SCOPE:

- 1.1 This procedure details out the requirement for surface preparation and painting of all fabricated components at sub-contractors works.

1.1.1 Surface preparation equipment:

The sub-contractor should have the minimum surface preparation equipment as mentioned below:

- a) Wire brush
- b) Emery sheets of rough type
- c) Power wire brush to be used with pneumatic or electrical motors
- d) Brush for cleaning the dust removed by wire brushing power tool cleaning

- 1.2 Whenever any special requirement for surface preparation and painting are required, the same shall be indicated in the drawing or shall be informed separately to sub-contractors.

- 1.3 This PRQA is in line with the requirement of Painting Schedule RP 0674199.

2.0 SURFACE PREPARATION:

2.1 CLEANING OF OIL, GREASE ETC

- 2.1.1 The entire outer surface of the fabricated components shall be thoroughly cleaned using mineral turpentine, wire wheel, grinding wheel to make it free from OIL, GREASE, RUST, MILL SCALES and weld spatters.

2.2 METHOD OF RUST REMOVAL

- 2.2.1 Wire brush, emery sheets of rough type, Power /rotary wire wheel may be used for removing the dust, rust and mill scales from the surface.

- 2.2.2 The "Rustkil" (rust remover/converter) shall be applied whenever the rust cannot be removed by using power tool cleaning.

- 2.2.3 Only after clearance of surface preparation by BHEL Inspection/BHEL Authorised Inspection Agencies the sub-contractor can proceed with painting.

0 PAINTING

1 Only paints from BHEL approved suppliers shall be applied.

2 After visual inspection and clearance by QC BHEL/Authorised Inspection Agency one coat of red oxide Zinc chrome primer as per IS 2074 shall be applied by brushing to a dry film thickness of approx 25 microns.

3 The paint shall be allowed to hard dry and thoroughly before applying the second coat. Second coat shall be applied only after 18 hours.

4 A second coat of IS 2932 Synthetic Enamel smoke grey paint shall be applied over the primer to a coating thickness of 20 microns approximately.

5 The small items shall be dipped in the paint tank.

The final inspection of the component shall be offered to QC BHEL/Authorised Inspection Agency only after hard drying of the enamel paint and stencilling of work order No, D.U.No, details.

All edge prepared areas for welding at shop/site at later stage shall be applied with one coat of weldable primer.

Any scratches and soil sticking on the surfaces during handling shall be repaired before despatch to BHEL/Shipping.

K. S. S. S.

RECORDS:

The firm shall record the make/brand name and batch number of the approved paint used in the dimension report.

1. The sub-contractors shall maintain records of the primer paints procured, the source of the primer paints namely dealer, the manufacturer of the primer paints, the batch number of the primer paints and the delivery chalan reference for the paint procured along with the quantity and also copy of the test certificates certifying the quality of the paint. These records shall be verified by BHEL inspector immediately on procurement of the paint by sub-contractor and shall be countersigned by BHEL inspector. This record is subject to audit by Quality Assurance.

4.2 The firm shall show the details/evidence for procurement of approved paints to QC personnel (BHEL)/Authorised Inspection Agency whenever required during surveillance checks/audits. The sub-contractor before use of primer paints shall verify the correctness of specification of the primer paints before opening the drums. The drum shall be rolled roughly 20 times before opening the seal and stirring the contents. The contents shall be thoroughly stirred using a steel rod and shall be checked for any settling of pigment. If any pigment settlement is observed the process of resealing, rolling, stirring thereby redispersal of the paint pigment into the medium is to be ensured. Now a small quantity can be transferred to painting cans and applied by neat brushes of width at least 3 inches.

4.3 The sub contractor shall ensure that the required number of primer coats are given on the components as per the painting schedule RP 0674199. Visual inspection shall be done for checking damages, poor paints, improper finish. After the paint films dry the inspector will randomly check the coating thickness with coating thickness gauge for the correctness of the thickness of the paint in case of any doubt.

5.0 TESTING OF PAINT SAMPLES

5.1 QC BHEL personnel shall collect random samples of paint (approx 1 litre) and submit the same to Quality Assurance for testing. Such random samples may be collected whenever any doubt arises about the quality of paint while carrying out visual inspection. Alternately QC/OLI may scrape dried paint film from painted surfaces for testing at paint test lab.

5.2 In case any batch of paint is found not conforming to requirement, the concerned brand of paint shall be removed from the approved list of paint suppliers of BAP, Ranipet.

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Procedure for Surface preparation and Painting

Prepared By	V SUNDARAM SEF/QA	<i>V Sundaram</i>
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Record of revision

Rev No.	Effective Date	Details of revision
00	10 10 02	RP0674199 Rev 05 requirements and PRQA 590 rev 12 requirements were fully reviewed and this document is released as Rev 00 taking care of painting requirements of BAP projects. For project specific painting schemes respective CIS or contract specific painting schemes to be referred.
01	22 05 07	Painting requirement are fully reviewed. Red oxide Zinc chromate for primer application (IS 2074) is corrected as Red oxide Zinc phosphate primer (IS 12744) and also number coats & DFT corrected.

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1.0 SCOPE

- 1.1. This procedure specifies requirements for surface preparation and painting and coating, for APH, Fan, ESP, Gates & Dampers and Chimney. (For WEG and Desalination, please refer PRQA: 518/Latest and PRQA: 526/Latest respectively).
- 1.2. Section I deals with surface preparation schedule and section II deals with painting and coating.
- 1.3. Special contractual requirements, if any, will be indicated through a separate contract specific documents with customer approval, when required. The linkage will be provided in the CQR issued by QA.

2.0 GENERAL

- 2.1 This procedure specifies painting requirements to provide adequate protection up to one year in open yard at site.
- 2.2 No painting shall be applied on the stainless steel, galvanized and any plated surfaces. For estimation of requirements of painting, the approximate area of coverage on non-absorbing surface is as given below: -

SL. No.	Generic nature of paint	Theoretical covering area (Sq.M/litre)	DFT /Coat (Min)	Shade
1	Red oxide zinc phosphate primer to IS 12744	10	30	Red oxide
2	Synthetic enamel paint to IS 2932	10	20	Smoke grey
3	Heat resistant aluminum paint to IS 13183	10	20	Aluminium

- 2.3 For bought out items, the painting scheme shall be as per purchase specification. If this is not specified in purchase specification, the following is the minimum requirement
 - a) Primer: One coat of red oxide zinc Phosphate primer to IS 12744- DFT 30 microns
 - b) Finish: Two coats of synthetic enamel to IS 2932 smoke grey shade No.692 of IS 5. -DFT 20 microns per coat

Section –I

3.0 SURFACE PREPARATION REQUIREMENTS FOR PAINTING AND COATING

- 3.1. The effectiveness and duration of the protection provided by organic, inorganic and metallic coatings for corrosion protection depends among other things decisively on proper surface preparation. This section deals with the methods of surface preparation, their effectiveness and fields of application.
- 3.2. This section largely based on ISO 8501 – 1: 1988 that in turn is based on the Swedish standard SS 05 59 00.

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3.3. SURFACE PREPARATION METHODS

3.3.1. Surface preparation depends on initial condition of uncoated surfaces. The details of rust level, rust removal methods and characteristics surfaces are given in table 1.0.

3.4. DEFINITIONS AND METHODS OF CLEANING

3.5. CLEANLINESS OF SURFACES.

3.5.1. Cleaning requirements and levels of cleanliness, contaminants such as dirt, oil that will interfere with the adhesion or effectiveness of the proposed coating must be removed. Coats of materials related to the metal (scale, rust) and coats of different materials (e.g. existing coating) should be removed until the agreed level of cleanliness is attained.

3.5.2. Contaminants/coats, both of related material and of materials different from the metal may be removed in one operation if the nature, level and thickness permit this. The required level of cleanliness depends on

- The corrosion protection system selected
- The type of corrosion exposure expected
- The initial condition of the surface being prepared
- The possible rust removal method
- Economic considerations

3.5.3. Generally, the standard levels of cleanliness as in table 1.0 should be used as a basis. This does not cover the removal of weld spatter, weld or flame cutting slag or chips, repair grinding of rolling defects (laminations) deburring and similar operations.

3.6. MECHANICAL METHODS OF REMOVING RUST

3.6.1. Manual rust removal:

3.6.1.1. This applies to standard levels of cleanliness St 2, St3 as per table 1.0 manual cleaning uses wire brush, stripping knife, Swedish scraper, rust removing hammer etc., The method must not damage the metal being derusted. Subsequent cleaning by sweeping or brushing off or by blowing off with dry air.

3.6.2. Mechanical rust removal:

3.6.2.1. This applies to standard levels of cleanliness St2, St3 as per table 1.0 cleaning can be done by mechanically driven rust removing tools viz., rotating wire brush, impact piston devices or rotary descalers, sanding discs etc. The surface areas where the power driven tool cannot enter, manual cleaning should be done. The method must not damage the metal being derusted. Subsequent cleaning by sweeping or brushing off or blowing off with dry air.

3.6.3. Blast cleaning

3.6.3.1. This applies to standard levels of cleanliness Sa 1, Sa 2½, Sa 3 as per table- 1.0. Chemically contaminated surfaces must be pre-washed. Surfaces having coarse rust must be pre-cleaned with impact tools prior to blast cleaning.

3.6.3.2. Compressed air blasting is generally recommended for our operations. It is a freely directed air blasting in blasting cubicles, Rooms or sheds with re-circulation of blasting abrasives.

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3.6.4. REMOVAL OF CONTAMINANTS/COATS OF MATERIAL DIFFERENT FROM THE METAL

3.6.4.1. Surface of metal contaminated with cutting fluid (machine coolant) oil or grease shall be wiped with mineral turpentine/tri-chloroethylene prior to applying any methods of mechanical surface preparation.

3.6.4.2. If any old paint film or rust preventive films are present they may be removed with paint removing jelly.

3.6.4.3. As far as possible the cleaning method should be so chosen that all the scale is removed from the metallic surface to be coated. For heavily scaled metallic surfaces either blasting or pickling may be adopted over and above the requirements called for in the table 1.0.

3.6.5. NOTES TO TABLE 1.0

3.6.5.1. Initial condition of uncoated surfaces (rust grade as per SS 05 59 00)

- Steel surface largely covered with adhering mill scale but little, if any rust.
- Steel surface, which has begun to rust, and from which the mill scale has begun to flake.
- Steel surface on which the mill scale has rusted away or from which it can be scrapped, but with slight pitting visible under normal vision.
- Steel surface on which the mill scale has rusted away and on which general pitting is visible under normal vision.

3.6.5.2. Standard level of cleanliness equivalent to steel structures painting council of US (SSPC) also given in brackets in table 1.0.

Table 1.0

Standard level of cleanliness	Rust removal method	Initial condition of steel surfaces (Uncoated ref.4.5)	Essential Characteristics of the prepared steel surface
St 2 (SSPC-SP 2)	Thorough hand and power tool cleaning	B, C, D	When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from poorly adhering mill scale, rust coatings and foreign matter.
St 3 (SSPC SP 3)	Very Thorough hand and power tool cleaning	B, C, D	As for St 2, but the surface shall be treated much more thoroughly to give a metallic sheen arising from the metallic substrate.
Sa 1 (SSPC SP 7)	Light blast cleaning	B, C, D	When viewed without magnification, the surface shall be free from visible oil, great and dirt, and from poorly adhering mill scale, rust, paint coatings and foreign matter.
Sa 2 (SSPC SP 6)	Thorough blast cleaning	B, C, D	When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from most of the mill scale, rust, paint coatings and foreign matter. Any residual contamination shall be firmly adhering.

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Standard level of cleanliness	Rust removal method	Initial condition of steel surfaces (Uncoated ef.4.5)	Essential Characteristics of the prepared steel surface
Sa 2 ½ (SSPC SP 10)	Very Through blast cleaning	B, C, D	When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from the mill scale, rust, paint coatings, and foreign matter. Any remaining traces of contaminations shall show only as slight stains in the form of spots or stripes
Sa 3 (SSPC SP 5)	Blast cleaning to visually clean steel.	A,B, C, D	When viewed without magnification, the surface shall be free from visible oil, grease and dirt, and from mill scale, rust, paint coatings and foreign matter. It shall have a uniform metallic colour.

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Section -II

4.0 SCHEDULE OF PAINTING AND COATING:

Table 2.0

Sl.No.	Component/PGMA	Surface preparation	Primer	DFT in µm (Min)	Finish	DFT in µm (Min)	Total DFT (Min)
1.0	Regenerative Air Pre-Heaters						
1.0.1	Heating element baskets (without elements) 52 010, 024, 025	Power tool cleaning to ST-3 (SSPC SP3)	One coat of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	30	NIL	--	30
1.0.2	Heating elements (with elements) 52 010, 024, 025	--	(*) Temporary rust preventive oil non dry type (Dipping)	--	NIL	--	--
1.0.3	Rotor post assembly machined items of (52 011), Pin rack assembly (52 012) seals (52 013,054,055), sector plates (52 041,042) and machined components of APH.	--	(**) Temporary rust preventive oil Dry type	20	NIL	--	20
1.0.4	Components in flue gas path and insulated Rotor post assy (52 011), T bars (52 013), Rotor housing assy. (52 030), Hot and cold connecting plate assy. (52 041,042),	Power tool cleaning to ST-3 (SSPC SP3)	Two coats of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	60	NIL	NIL	60

(*) Specification as per PRQA 522/Rev 00

(**) Specification as per PRQA 523/Rev 00



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Sl.No.	Component/PGMA	Surface preparation	Primer	DFT in μm (Min)	Finish	DFT in μm (Min)	Total DFT (Min)
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1.0.5	Components exposed to Atmosphere Rotor drive assy (52 100), Access door (52 210, Air seal piping (52 211), observation port other than glass part (52 212), Rotor stoppage alarm other than aluminum (52 217), Loose items of Air receiver (52 220), Guide bearing assy (52 261), Support bearing assy (52 262), Oil piping GB, SB (52 271,272) oil circulation unit (52 274), Deluge and wash pipe assy. (52 301,302,401,402) Cleaning device assy (52 325, 326), Cleaning device drive (52 329,429), Thermo couple pipe assy. Other than SS (52 360)	Power tool cleaning to ST-3 (SSPC SP3)	One coat of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	30	Two coats of synthetic enamel paint to IS 2932 shade 692 of IS 5 unless specified otherwise.	40	70
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2.0	TUBULAR AIRPREHEATER						
2.1	Side walls (external surfaces and internal surfaces).	Power tool cleaning to ST-3 (SSPC SP3)	Two coats of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	60	--	--	60
2.2	Machined surfaces, tubes of TAPH, Tube plates and intermediate plates	---	(**) Temporary rust preventive oil Dry type	20	NIL	NIL	20

Issued by: Quality Assurance Dept BHEL Ranipet.



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Sl.No.	Component/PGMA	Surface preparation	Primer	DFT in μ m (Min)	Finish	DFT in μ m (Min)	Total DFT (Min)
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3.0	Fans						
3.1	Foundation materials 55 0XX, 56 0XX	Power tool cleaning to ST-3 (SSPC SP3)	Temporary Rust preventive	20	--	--	20
3.2	<u>Components exposed to atmosphere</u> a) Bearing Pedestals, Base frame, Servomotor assy, shaft with Bearing assy, OGV, IGV (55-1XX, 55-2XX 55-3XX). b) Bearing Pedestals, Base frame, Shaft with bearing assy, RVC, IGV, Support for Seal, shaft protecting tube, Spiral casing (if no insulation is applicable), Damper (56-1XX, 56-2XX 56-3XX, 56-4XX) c) Coupling guard (56-8XX, 55-8XX). Tools (56-000, 55-000)	Power tool cleaning to ST-3 (SSPC SP3)	One coat of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	30	Two coats of synthetic enamel paint to IS 2932 shade 692 of IS 5 unless specified otherwise.	40	70
3.3	<u>Components in AIR/GAS and under insulation</u> a) Suction chamber, diffuser, housing, OGV, impeller (55-1XX, 55-2XX, 55-3XX), b) Spiral casing, damper, IGV, RVC, impeller, shaft (56-1XX, 56-2XX, 56-3XX 56-4XX). c) Silencer (56-9XX, 55-9XX)	Power tool cleaning to ST-3 (SSPC SP3)	Two coats of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	60	NIL	NIL	60
3.4	Journal area Of shaft (55-1XX, 56-1XX, 55-2XX, 56-2XX, 55-3XX, 56-3XX 56 4XX						
3.5	All machined surfaces shall be applied with rust preventive.						

Refer PRQA 341 / Latest

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Sl.No.	Component/PGMA	Surface preparation	Primer	DFT in μm (Min)	Finish	DFT in μm (Min)	Total DFT (Min)
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4.0 Electro static precipitator

4.1	GD drive Arrangement (7X X10), Drive arrangement for emitting system (7X X17), Inspection doors (7X X23), Drive arrangement for CE rapping (7X X26), Outer roof (7X X42), ESP pent House (7X X55), ESP test equipment (7X X61) Water washing system (7X X66) Tools and tackles (7X 996), Lifting beam (7X X20), Columns (7X X81) Hopper approach platform (7X X 65), Stringer and Guard plates (7X 610).	Power tool cleaning to ST-3 (SSPC SP3)	One coat of red oxide zinc phosphate primer to IS 12744 (Varnish medium alkyd)	30	Two coats of synthetic enamel paint to IS 2932 shade 692 of IS 5 unless specified otherwise.	40	70
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4.2	Insulator Housing assy.(7X X06), Gas distribution assy.(7X X08),GD rapping mechanism(7X X09), Gas screening (7X X11), Emitting system suspension (7X X13), Emitting electrode rapping (7X X16), Suspension arrangement for CE (7X X19), Frame of Emitting system Top & Bottom and Middle.(7X X21,X22,X32),Shock bars(7X X24), CE Rapping mechanism (7X X25), Ridges(7X X43), Hopper upper and Lower & Middle part (7X X44, X45),Insulator support panel (7X X46), Roof panel assy. (7X X47), Casing structure (7X X28, X48), Casing shell (7X X49), ESP Funnel (7X X50), Splitter&Guidevane (7X X57)	Power tool cleaning to ST-3 (SSPC SP3)	Two coats of red oxide zinc phosphate primer to IS 12744 (Varnish medium alkyd)	60	NIL	--	60
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Sl.No.	Component/PGMA	Surface preparation	Primer	DFT in µm (Min)	Finish	DFT in µm (Min)	Total DFT (Min)
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4.3	Hand rails, post, step treads, Floor grills (89 610,611,7X X65)	Power tool cleaning to ST-3 (SSPC SP3) *	One coat of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	30	Two coats of synthetic enamel paint to IS 2932 black shade	40	70
4.4	EE (7X X15)EE hook, EE suspension hook (7X X13), CE (7X X20)CE, CE suspension hook (7X X19), Foundation material foe ESP structures& ducts (7X X80).	--	(**) Temporary rust preventive oil Dry type	20	--	--	20

5.0	Gates and Dampers						
5.1	Gates and dampers temperature ≤ 95°C (57 XXX)	Power tool cleaning to ST-3 (SSPC SP3)	One coat of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	30	Two coats of synthetic enamel paint to IS 2932 shade 692 of IS 5 unless specified otherwise.	40	70
5.2	Gates and dampers temperature > 95°C (57 XXX)	Power tool cleaning to ST-3 (SSPC SP3)	Two coats of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	60	NIL	--	60
5.3	Gate blades, Machined components of G&D	---	(**) Temporary rust preventive oil Dry type	20	NIL	NIL	20

6.0	Chimney						
6.1	Foundation bolt (87 010)	Power tool cleaning to ST-3 (SSPC SP3)	(**) Temporary Rust preventive	20	--	--	20
6.2	Shells-Inside and Un insulated side, base plate (87 100),	Blast Cleaning to Sa 2 ½ (Near white metal with Surface profile 35 – 50 µm)	Two coats of Heat resistant aluminum paint as per IS 13183 (GR I -Up to 600°C,GR II 200°C to 400°C,GR III Up to 200°C)	40	NIL	--	40
6.3	Ducts un insulated, Strakes, (87 150), Painter trolley (87 200)	Power tool cleaning to ST-3 (SSPC SP3)	Two coats of Heat resistant aluminum paint as per IS 13183 (GR I -Up to 600°C,GR II 200°C to 400°C,GR III Up to 200°C)	40	NIL	--	40

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Sl.No.	Component/PGMA	Surface preparation	Primer	DFT in μm (Min)	Finish	DFT in μm (Min)	Total DFT (Min)
6.4	Shells –out side insulated (87 100), Ducts- Insulated (87 150)	Power tool cleaning to ST-3 (SSPC SP3)	Two coats of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl).	60	--	--	60
6.5	Ladders, Hand rails, floor grills, platforms (87 300)	Power tool cleaning to ST-3 (SSPC SP3)	One coat of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyl)	30	Two coats of synthetic enamel paint to IS 2932 black shade	40	70

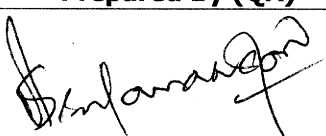
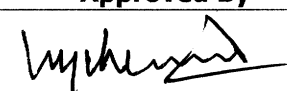
7.0	Products meant for overseas application						
7.1	Internal and External parts of APH, ESP, Fan and Gates and Damper	Blast Cleaning to Sa 2 ½ (Near white metal with Surface profile 35 – 50 μm)	Epoxy red oxide Zinc phosphate primer to IS 13238	30	Epoxy polyamide cured paint to IS 14209	30	60

Note: All components covered under different PGMA are to be painted .In case any component is left out, the same shall be deemed to be included under relevant section.

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QUALITY ASSURANCE	
QWI NO: PR:QA:590 Rev.01 Dtd.02.02.2008	
Amendment to Quality Work Instruction (QWI)	
Amendment No: A1	Date:11.10.2013
Title: <i>Procedure for Surface Preparation and Painting</i>	

Details of Amendment		
Clause No	Amended As	Basis for Amendment
Refer Clause no 4.0 – Table 2 and further clause no. 3.2 a) and 3.3 a) of Table.	AP Fan components like Servo Motor Assy, Shaft with Bearing Assy (refer clause 3.2 a) and impeller (refer clause 3.3 a) of table 2.0 Presently Existing Painting Scheme: 1. Primer: one coat of red oxide zinc phosphate primer to IS 12744 (varnish medium alkyd) DFT = 30 µm. 2. Two coats of synthetic enamel paint to IS 2932 shade 692 of IS 5 Unless specified otherwise Finish= 40 µm(Primer+Finish: total DFT- 30+40=70 µm) The above painting scheme has been modified as below - only for AP fan components like Servo Motor Assy, Shaft with Bearing Assy (refer clause 3.2 a) and impeller (refer clause 3.3 a) of table 2.0 • Epoxy based Zinc Phosphate Primer (Two Pack system) as per IS:13238 – Two coats and each coat min. 30µm and total DFT will be 60 µm • Finish Paint : Not Applicable	Feedback from RCA Sub-Committee Meeting. Dt- 14.05.2013 (For quick drying of paint)

Prepared By (QA)	Reviewed By	Approved By
	QC-Shop 197 	
	QA 