Boiler Auxiliary Plant , Bharat Heavy Electricals Limited , Ranipet Tamilnadu- 632406

Purchase Department

Enquiry No: BAP/PUR/OA – I & II/9550640E dt.10.08.2015
Due on:07.09.2015

Item : Outer Arm I & Outer Arm II

Synopsis :

(i) **Annexure-I**
(a) Pre-Qualification Requirement
(b) Description of item , Quantity details , Drawing and Relevant specification

(ii) **Annexure-II:** General terms and conditions of the tender.

(iii) **Annexure-III:** Commercial terms and conditions Annexure, MSME split provision & CA certificate format.

Contact Details

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Annexure–I To Open Tender ref: BAP/PUR/OA-I & II/9550640E dt.10.08.2015
For Supply Of "Outer Arm I & II " , Due on : 07.09.2015
Pre-Qualification Requirement

01. The bidder shall have experience of having successfully executed general fabrication of mild steel components and have successfully manufactured and supplied as per applicable codes and standards and shall submit the reference for BHEL review. The Vendor shall furnish at least one job order executed/under execution for steel fabrication specific requirement of the offered job.
02. The manufacture/supplier must be having their own fabrication shed with adequate plants and machineries to carry out the general fabrication to manufacture and supply of the indented items to ensure quality product with timely delivery. Details such as a) Address b) Contact Person etc. of the should be furnished.
03. The Manufacturer must submit copies of Work Order/ Purchase Order and Client's certificate detailing about (i) Time of Completion, (ii) Quality ofWork & (iii) Value of work completed for the general fabrication the bidder manufactured and supplied.
04. The bidder should procure raw materials from the reputed sources and should be able to furnish the test certificates.
05. The bidder should employ the skilled man power as required for the intended component manufacturing meeting design drawing requirements.
06. The bidder should have necessary quality procedures/quality plans in place to ensure component quality.
07. The bidder should have all required plant and machineries (Viz Welding, Grinding, Drilling, Press of required capacity, Machining, Electrode oven etc.) in house to ensure complete manufacturing and supply of the intended component.
08. Offers of the Vendor/Supplier not agreeing/failing to submit required documents to any of the above will be liable for rejection.

Annexure–I To Open Tender ref: BAP/PUR/OA-I & II/9550640E dt.10.08.2015
For Supply Of "Outer Arm I & II" , Due on : 07.09.2015
Description of Item, Qty , Drawing and Relevant Specification

Sl No	Description of Itrm	Qty	Unit	Delivery Destination
01	942850020000 Outer Arm-I As Per Drg: 6172-0031/Rev 04.	**28000**	**No**	BHEL/Stores/Ranipet
02	942850220000 Outer Arm-II As Per Drg: 6172-0039/Rev 02.	**30000**	**No**	BHEL/Stores/Ranipet

Painting : Please refer "*PRQA 590/Rev 01 , Sl no 4.1 (Page#10)*"

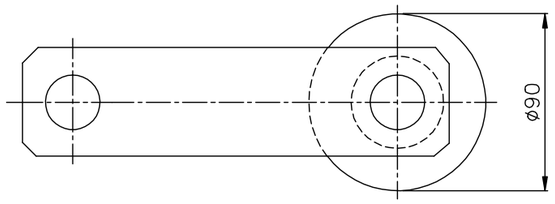
Un Tolerenced Dimension : Please refer QWI "PRQA 500"

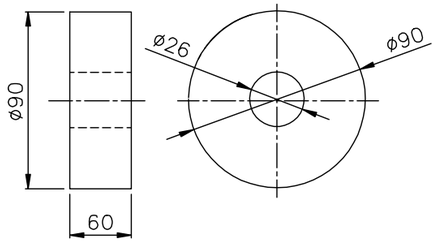
Fabrication : Please refer QWI "QP:ESP:287"

DRAWING NO.

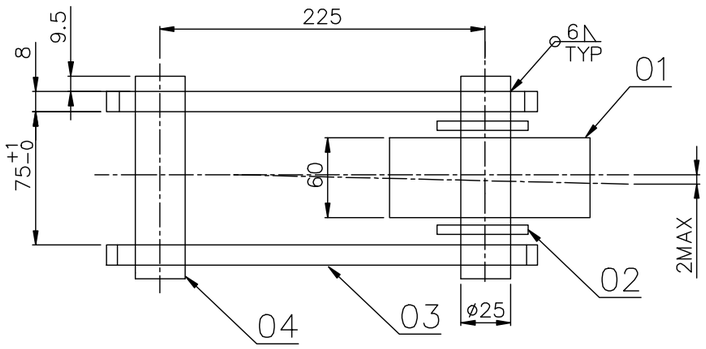
ALL DIMENSIONS ARE IN MILLIMETRES

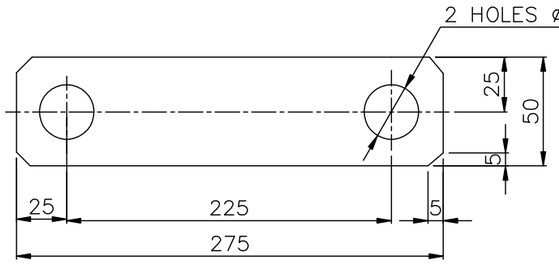
NOTES :–
01. FOR FABRICATION REFER RELEVANT QWI
02. FOR UN TOLERENCED DIMENSIONS REFER RELEVANT QWI





ITEM NO. 01





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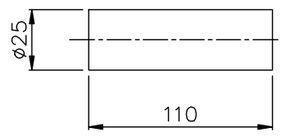


ITEM NO. 04

NOTE: –

01. T C SHALL BE FURNISHED FOR EACH OF RAW MATERIALS PROCURED BY THE VENDOR.
02. IF THE MATERIAL IS PROCURED WITH CORRELATED TCS FROM STEEL MANUFACTURES VERIFICATION OF TCS IS SUFFICIENT OTHERWISE THE VENDOR SHALL ARRANGE FOR SUITABLE SAMPLE CHECKING AS ADVISED BY THE INSPECTOR BEFORE PROCESSING.
03. HARDNESS ON HAMMER SHALL BE 143 BHN MINIMUM.
04. HARDNESS ON ITEM No.03(PLATE) SHALL BE 121 TO 156 BHN.
05. FIRM CODE AND MATL. CODE SHALL BE PUNCHED SUITABLY.
06. RAW MATERIAL FOR HAMMER SHALL BE ANY ONE OF THE FOLLOWING ie:IS :1875 CLASS 4/SA105.
07. WRITTEN CONCURRENCE BY BHEL SHALL BE OBTAINED PRIOR TO PROCESSING IN CASE OF ANY MATERIAL CHANGE.

PAINTING: – 04

08. MANUAL OR MECHANICAL RUST REMOVAL METHOD SHALL BE FOLLOWED BEFORE PAINTING.
09. ONE COAT OF RED OXIDE ZINC PHOSPHATE PRIMER TO IS:12744 (VARNISH MEDIUM ALKYD) MIN DFT=30 AND TWO COATS OF SYNTHETIC ENAMEL PAINT TO IS:2932 MIN DFT=40. TOTAL DFT=70.

VAR NO.	ITEM NO.	DESCRIPTION	STD	DRAWING NO.	ITEM NO. / VAR NO.	MATL CODE / MATL SPECN	A/C	UNIT: DI	UNIT WT. / QTY.	G.S
	04	PIN ø25x110		4–79–016–00036					0.420 / 2	
	03	PLATE 8x50x275				15 011 027 / IS 2062			0.800 / 2	
	02	WASHER PNCHD A24		4–79–016–00037					0.031 / 2	
	01	HAMMER		4–79–016–00044		SEE NOTE			2.746 / 1	

REV	DATE	ALTERED / CHECKED	REMARKS
04	5.7.10	ALTERED : A.PARASU CHECKED : C.GANESH	PAINTING NOTE ADDED.
03	20.8.91	ALTERED : KJA CHECKED : –SD–	01. ITEM NO.02 WASHER PUNCHED A26 WAS CHANGED TO A24. 02. QUALITY POINTS AND HAMMER MATLS WAS ADDED IN THE NOTES.
02	20.4.91	ALTERED : KJA CHECKED : –SD–	01. PL THICKNESS OF ITEM NO.03 WAS CHANGED TO 8mm FROM 10mm AS PER MOM OF BPS COMMITTEE MEETING Dt.23.4.91 AND ACCORDINGLY Wt. CORRECTED.
01	6.5.83	ALTERED : R.K ARUL BABU CHECKED : –SD–	01. WT OF ITEM 03 CORRECTED. 02. IN ITEM 02 WASHER PUNCHED.A26.3 IN ITEM NO.01 ROLLER IS CORRECTED AS HAMMER FORGING IS ADDED. TOTAL Wt. CORRECTED.

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: BOILER AUXILIARIES PLANT.
RANIPET – 632 406.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	K.A.PARASU	K.A. Parasu	03.07.2010	
CHD	C.GANESH			
APPD	C.GANESH			

DEPT	GRADE OF UNTOL.DIM	SCALE	WEIGHT (KG).	REF. TO ASSY/OLD DRG.	ITEM NO.	NO. OF ITEMS
AQCS	∅ / M / ∤		5.248	2–74–316–00146 3–79–016–00048		
CODE 862						

TITLE: OUTER ARM–1

CARD CODE: U 01

DRAWING NO.: 6172–0031

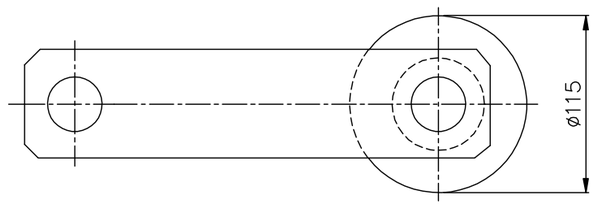
REV: 04

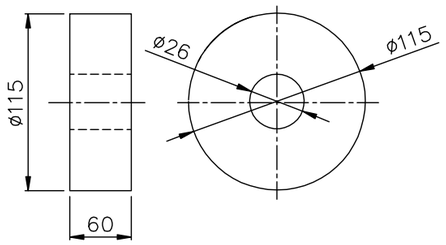
Size A3

DRAWING NO.

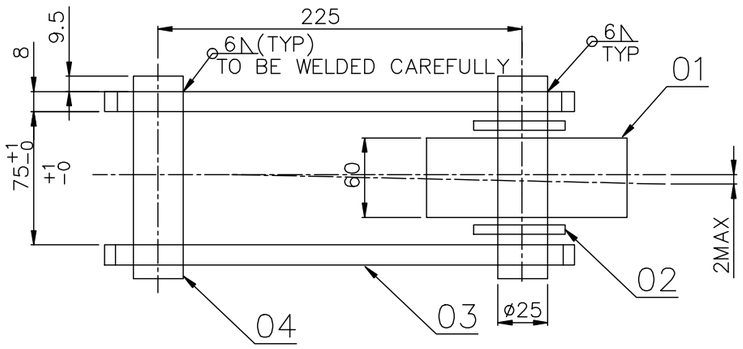
ALL DIMENSIONS ARE IN MILLIMETRES

NOTES :–
01. FOR FABRICATION REFER RELEVANT QWI
02. FOR UN TOLERENCED DIMENSIONS REFER RELEVANT QWI





ITEM NO. 01



NOTE: –

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02. IF THE MATERIAL IS PROCURED WITH CORRELATED TCS FROM STEEL MANUFACTURES VERIFICATION OF TCS IS SUFFICIENT OTHERWISE THE VENDOR SHALL ARRANGE FOR SUITABLE SAMPLE CHECKING AS ADVISED BY THE INSPECTOR BEFORE PROCESSING.
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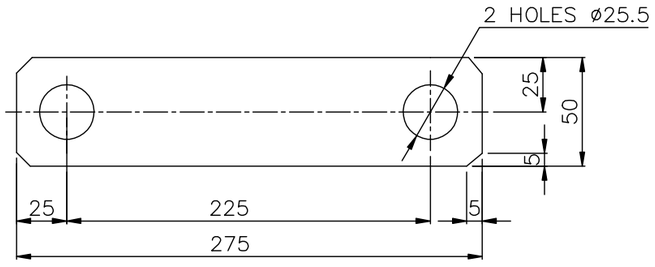
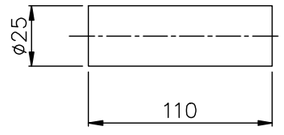
04. HARDNESS ON ITEM No.03(PLATE) SHALL BE 121 TO 156 BHN.
05. FIRM CODE AND MATL. CODE SHALL BE PUNCHED SUITABLY.
06. RAW MATERIAL FOR HAMMER SHALL BE ANY ONE OF THE FOLLOWING ie: IS: 1875 CLASS 4/SA105.
07. WRITTEN CONCURRENCE BY BHEL SHALL BE OBTAINED PRIOR TO PROCESSING IN CASE OF ANY MATERIAL CHANGE.

PAINTING: – 02

08. MANUAL OR MECHANICAL RUST REMOVAL METHOD SHALL BE FOLLOWED BEFORE PAINTING.
09. ONE COAT OF RED OXIDE ZINC PHOSPHATE PRIMER TO IS: 12744 (VARNISH MEDIUM ALKYD) MIN DFT=30 AND TWO COATS OF SYNTHETIC ENAMEL PAINT TO IS: 2932 MIN DFT=40. TOTAL DFT=70.



ITEM NO. 03



ITEM NO. 04

VAR NO.	ITEM NO.	DESCRIPTION	STD	DRAWING NO.	ITEM NO. / VAR NO.	MATL CODE / MATL SPECN	A/C	UNIT / DI	UNIT WT. / QTY.	G.S
	04	PIN ø25x110		4–79–016–00036					0.420 / 2	
	03	PLATE 8x50x275				15 011 027 / IS 2062			0.800 / 2	
	02	WASHER PNCHD A24		4–79–016–00037					0.031 / 2	
	01	HAMMER				SEE NOTE			4.642 / 1	

REV	DATE	
02	5.7.10	ALTERED : A.PARASU CHECKED : C.GANESH
		PAINTING NOTE ADDED.
01	20.4.91	ALTERED : A.PARASU CHECKED : C.GANESH
		01.PLATE THICK OF ITEM NO: 03 WAS CHANGED FROM 10mm TO 8mm AS PER MOM OF BPS COMMITTEE MEETING Dt.23.4.91 AND ACCORDINGLY Wt.CORRECTED. 02.QUALITY POINTS AND HAMMER MATLS WAS ADDED IN THE NOTES.

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: BOILER AUXILIARIES PLANT.
RANIPET – 632 406.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	K.A.PARASU	K.A. Parasu	05.07.2010	
CHD	C.GANESH			
APPD	C.GANESH			

DEPT	GRADE OF UNTOL.DIM	SCALE	WEIGHT (KG).	REF. TO ASSY/OLD DRG.	ITEM NO.	NO. OF ITEMS
AQCS			7.113	3–77–025–00067		
CODE 862	C / M / F					

TITLE: OUTER ARM–2
CARD CODE: U 01
DRAWING NO.: 6172–0039
REV: 02

Size A3

Procedure for Surface preparation and Painting

Prepared By	V SUNDARAM SEF/QA	

Reviewed By	B SRINIVASA RAO DGM/QA	
	S RAGHUNATHAN SM/EDC/APH	
	P JAYAKANTH DGM/EDC/AQCS	
	K GOPALASAMY SDGM /EDC/FANS	
	P RAVIKUMAR DGM/ EDC /G&D AND DP	

Approved By	H ANANTHANARAYANAN AGM/QA&OLI	

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.

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.

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.

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)

a) Steel surface largely covered with adhering mill scale but little, if any rust.
b) Steel surface, which has begun to rust, and from which the mill scale has begun to flake.
c) 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.
d) 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 Through 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.

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.

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 alkyd)	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 alkyd)	60	NIL	NIL	60

(*) Specification as per PRQA 522/Rev 00

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

Sl.No.	Component/PGMA	Surface preparation	Primer	DFT in μm (Min)	Finish	DFT in μm (Min)	Total DFT (Min)
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 alkyd)	30	Two coats of synthetic enamel paint to IS 2932 shade 692 of IS 5 unless specified otherwise.	40	70
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 alkyd)	60	--	--	60
2.2	Machined surfaces, tubes of TAPH, Tube plates and intermediate plates	---	(**) Temporary rust preventive oil Dry type	20	NIL	NIL	20

Sl.No.	Component/PGMA	Surface preparation	Primer	DFT in μm (Min)	Finish	DFT in μm (Min)	Total DFT (Min)
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	Components exposed to atmosphere 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 alkyd)	30	Two coats of synthetic enamel paint to IS 2932 shade 692 of IS 5 unless specified otherwise.	40	70
3.3	Components in AIR/GAS and under insulation 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 alkyd)	60	NIL	NIL	60
3.4	Journal area Of shaft (55-1XX, 56-1XX, 55-2XX, 56-2XX, 55-3XX, 56-3XX 56 4XX				**Refer PRQA 341/ Latest**		
3.5	All machined surfaces shall be applied with rust preventive.						

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

Sl.No.	Component/PGMA	Surface preparation	Primer	DFT in μm (Min)	Finish	DFT in μm (Min)	Total DFT (Min)
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 alkyd)	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 alkyd)	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 alkyd)	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

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 alkyd).	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 alkyd)	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 componenents covered under different PGMAs are to be painted .In case any component is left out, the same shall be deemed to be included under relevant section.

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: *Procedure for Surface Preparation and Painting*

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	
	QA	

BHEL
RANIPET

BHARAT HEAVY ELECTRICALS LTD.
BOILER AUXILIARIES PLANT
RANIPET 632 406

QUALITY DEPARTMENT

PROCEDURE FOR: ALLOWABLE DEVIATIONS FOR DIMENSIONS WITHOUT SPECIFIED TOLERANCES

EFFECTIVE DATE: 16/01/93

	NAME	SIGNATURE	DATE
PREPARED BY	K NITHIANANDAM		16/1/93
REVIEWED BY	S ANIL KUMAR		16/1/93
APPROVED BY	P H TAMBAKHE	P H Tambakhe	16/1/93

ISSUED BY	: QUALITY ASSURANCE
REVISION	: NIL
DATE	:

DOCUMENT CONTROL NO: [ ]

File Name :PHT.RSU

1. Table 1 given below indicates the permissible variation in Linear Dimension of fabricated and machined components. The corase 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

Degree of accuracy	Deviations in mm for the nominal size range in mm											
	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

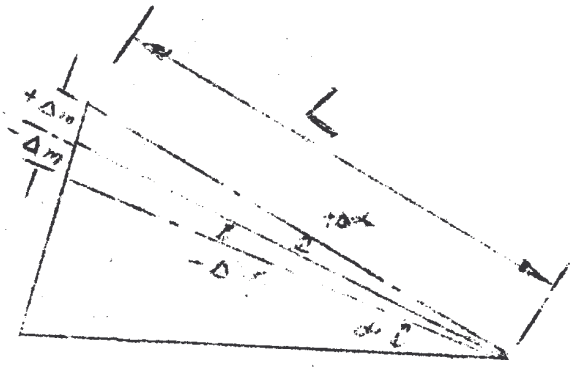
All dimensions are in mm

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

TABLE - 3

DEVIATIONS FOR ANGULAR DIMENSIONS

$\Delta\alpha$=Angle Tolerance in angular units
Δ m=Angle Tolerance in linear units



All Dimensions are in mm

	Length (L) of shorter side of angle in mm							
CLASS OF DEVIATIONS	Above	-	10	50	120	500	800	1250
	Upto & including	10	50	120	500	800	1250	2000
FINE AND MEDIUM	Δm (mm)	± 0.1	± 0.2	± 0.6	± 0.8	± 0.96	±1.125	± 1.5
	$\Delta\alpha$(deg or min)	± 1°	± 30'	± 20'	± 10'	± 4'	± 3'	±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	For dimensions resulting after assembly		
	Where parts are manufactured separately and are required to be assembled together without any further treatment (selective assembly, spare parts etc)	Where concentricity between parts is required		
		For angular dimensions of a circular division (For example, angular positioning 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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QUALITY DEPARTMENT

AMENDMENT TO QUALITY WORK INSTRUCTIONS (SQP)

QWI NO: QP:ESP:287 REV 00 DATE : 20 06 98
AMENDMENT NO. A 1 DATE : 18.09.00

DESCRIPTION: INNER ARM & OUTER ARM, SHOCK BARS, VERTICAL STAY, VERTICAL BEAM, SUPPORT BEAM AND HAND RAILS, RIDGES AND SHOCK BEAM.

DETAILS

CLAUSE NO	AMENDED AS	BASIS FOR AMENDMENT/ REMARKS
Note 3.4	This clause note3.4 is Added for Transver ridges: Transverse ridges (7X - X43) - only one joint in each member of the ridges is allowed after obtaining prior approval from engg.	Feed back from engg. (CTQ mom dt:29-4-200)

Prepared by	Reviewed by		Approved by
	Engg/AQCS		
	QC/OLI		
	QA		

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QUALITY DEPARTMENT		
Amendment to Quality Work Instructions (SQP)		
QWI NO: SQP:ESP:287	REV:00	DT. 20/06/98
Amendment no: A 2		DT. 25/01/2001
Description: Inner arm & Outer arm, Shock Bars, Vertical Stay, Vertical Beam, Support Beam, Hand Rails, Ridges and Shock Beam.		

Details of Amendment

CLAUSE NO	AMENDED AS	BASIS FOR AMENDMENT
Note 4.1.1	E 6013 electrode shall be dried in baking oven at 120-130°C until they are used, if the packing were found to be damaged or the electrodes were kept exposed to atmosphere for prolonged period.	Feed back of CTQ MOM dt:12/10/2000

Prepared by	Reviewd by		Approved by
	Engg/AQCS		
	QC/OLI		
	QA	B. Srinivasan	

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BHEL RANIPET	STANDARD QUALITY PLAN FOR ESP(MECHANICAL)	
REF.NO.	REVISION NO.	EFFECTIVE DATE
QP:ESP:287	00	20 06 . 98

TITLE : INNER ARM & OUTER ARM,SHOCK BARS,VERTICAL STAY, VERTICAL BEAM,SUPPORT BEAM AND HAND RAILS,RIDGES AND SHOCK BEAM.

		SIGNATURE
PREPARED BY	:A ELANGOVAN/QA	
REVIEWED BY	:K NITHIANANDAM/QA	
	:P RAJASEKARAN/QC-OLI	
	:T. GNANAPRAKASAM/AQCS	
APPROVED BY	:H ANANTHANAYANAN/QA	

ISSUED & CONTROLLED BY :QUALITY ASSURANCE,BHEL,RANIPET-632406

DOCUMENT STATUS
ISSUED TO:
Mr

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DEPARTMENT: ☐ CONTROLLED COPY NO ☐

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BHEL RANIPET	STANDARD QUALITY PLAN FOR ESP(MECHANICAL)	
REF.NO.	REVISION NO.	EFFECTIVE DATE
QP:ESP:287	00	20 06 98

TITLE : INNER ARM & OUTER ARM,SHOCK BARS,VERTICAL STAY, VERTICAL BEAM,SUPPORT BEAM AND HAND RAILS,RIDGES & SHOCK BEAM

RECORD OF REVISION

REF	DETAILS OF REVISION	DATE AMENDED/ REVISED
REVISION 00	TOTALLY REVIEWED. MERGED SQP:ESP 264, 267,268,270 & 275 ISSUED AS SQP:ESP:287	20 06 98

	MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN	QP:ESP:287	STANDARD QUALITY PLAN
	BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT RANIPET - 632 406. (INDIA) QUALITY ASSURANCE DEPARTMENT	ITEM :INNER ARM & OUTER ARM SHOCK BARS,VERTICAL STAY, VERTICAL BEAM,SUUPORT BEAM, HAND RAILS,RIDGES&SHOCKBEAM	REV : 00 DATE: 20 06 98 PAGE: 03 OF 11	

S.No.	COMPONENT & OPERATION	CHARACTE-RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY M **	AGENCY C	AGENCY E	REMARKS
1	2	3	4	5	6	7	8	9	D*	10		11
1.0	RAWMATERIALS											
	PLATES/ANGLES SQ,HALLOWS/ TUBES/CHANNEL BEAMS.$$	CHEMICAL AND MECHANICAL PROPERTIES	MAJOR	REVIEW OF TC/RANDOM TESTING	EACH HEAT /LOT AS PER SPECI FICATION	RESPECTIVE MATERIAL SPECIFICATION AS PER THE DRAWING.		TC		V		RAW MATERIALS ARE TAKEN TO STOCK ON VERIFICATION OF TCS/RANDOM TESTING
2.0	INPROCESS CONTROL											NOTE:$$(1)IN THE CASE OF SHOCK BARS HOLLOWS OF VERTICAL BEAM NO JOINT IS PERMITTED FOR LENGTH BUILT UP OF ANGLE/FLAT. (2)VERTICALITY OF VERTICAL BEAMS SHALL BE VERIFIED AND CONTROLLED WITHIN THE LIMITS.
2.1	FLAME CUTTING END TRIMMING& FACING	LAMINATION, CRACKS,DIS-CONTINITIES& END SQUARENESS ON CUT EDGES OF RAW MATERIALS	MAJOR	VISUAL	100%	AS PER AWS D1.1,DRAWING NO CRACKS & LAMINATIONS ARE PERMITTED		R		P	V	
2.2	PRESSING/ MARKING/DRILL ING/MACHINING	LENGTH,PROFI LE,RADIUS,HO LES LOCATION, SIZE,ORIENTA ION,PITCHES	MAJOR	MEASURE MENT/VERI FICATION IN FIXTURE VERTFICATI ON OF CHARACTERI CS (HAND RAILS)	100%	DRAWING		R		P	V	

LEGEND: * RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.
** M:MANUFACTURER/SUB-CONTRACTOR,C:CONTRACTOR/NOMINATED INSPECTION AGENCY,E:CUSTOMER.
R:REPORT,IR:INSPECTION REPORT "P" PREFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE

MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN	QP:ESP:287	STANDARD QUALITY PLAN
BHARAT HEAVY ELECTRICALS LTD BOILER AUXIALIARIES PLANT RANIPET - 632 406. (INDIA) QUALITY ASSURANCE DEPARTMENT	ITEM :INNER ARM & OUTER ARM SHOCK BARS,VERTICAL STAY, VERTICAL BEAM,SUPORT BEAM, HAND RAILS,RIDGES&SHOCKBEAM	REV : 00 DATE: 20 06 98 PAGE: 04 OF 11	

S.No.	COMPONENT & OPERATION	CHARACTE-RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFFRENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY M **	C	F	REMARKS
1	2	3	4	5	6	7	8	9	D*	10		11
2.3	WELDING	a)PROCEDURE QUALIFICATION	MAJOR	REVIEW OF DOCUMENTS	100%	PRE QUALIFIED WELDING PROCEDURE AS PER AWS D1.1		R	P	V	V	
		b)PERSONNEL QUALIFICATION	DO	DO	100%	AWS D1.1		R		P	V	V	
2.4	NDT [I]i)	BUTT WELDS ON STRUCTURES SUPPORT BEAM	DO	LPI	#20%RANDOM	AWS D1.1		R		P	V	V	#:IN CASE OF DEFECTS %AGE SHALL BE INCREASED
	@ &ii)	FILLET WELDS BETWEEN TUBES IN CASE OF PLAIN HAND RAILS	DO	LPI	#10%RANDOM	AWS D1.1		R		P	V	V	NOTE:@ BUTT JOINTS ON TUBES TO BE DONE WITH 45oFF ANG
	[II]i)	FILLET WELDS ON STRUCTURES	DO	LPI	#10%RANDOM	AWS D1.1		R		P	V	V	WELDED & THEN TO BE FLUSH
	& II) @	BUTT WELDS ON PLAIN HAND RAILS	DO	LPI	100%	AWS D1.1		R		P	V	V	GROUND

LEGEND: * RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.
** M:MANUFACTURER/SUB-CONTRACTOR,C:CONTRACTOR/NOMINATED INSPECTION AGENCY,E:CUSTOMER,
R:REPORT,IR:INSPECTION REPORT,"P" PERFORM,"W" WITNESS AND "V" VERIFICATION OF DOCUMENTS,
TC:TEST CERTIFICATES,"CHP"(CUSTOMER HOLD POINT):CUSTOMER SHALL IDENTIFY IN COLUMN "F"

MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN	QP:ESP:287	STANDARD QUALITY PLAN
BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT RANIPET -- 632 406. (INDIA) QUALITY ASSURANCE DEPARTMENT	ITEM :INNER ARM & OUTER ARM SHOCK BARS,VERTICAL STAY, VERTICAL BEAM,SUPPORT BEAM, HAND RAILS,RIDGES&SHOCKBEAM	REV : 00 DATE: 20 06 98 PAGE: 05 OF 11	

S.No.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY M **	C	E	REMARKS
1	2	3	4	5	6	7	8	9	D*	10		11
2.4	CONTD..	DIMENSION AND SIZE	MAJOR	VISUAL & MEASUREMENT	100%	DRAWING		R		P	V	V	
2.5	HEAT TREATMENT & HARDNESS IN THE CASE OF OUTER ARM												
	HAMMER AND PLATE	HARDNESS	MAJOR	MEASUREMENT	AS PER IS 2500 PART I IL -III,AQL -4%	DRAWING		R		P	V	V	
3.0	DIMENSIONAL CONTROL												
		TUBEØ & THICKNESS,OVERALL DIMENSIONS OF ASSY,HOLES LOCATION, SIZE, ORIENTATION AS PER DRG. TWIST,BEND, STARIGHTNESS ##	CRITICAL	MEASURMENT. VERIFICATION IN FIXURE/ LAYOUT DEPENDING UPON THE CASE	100%	DRAWING		R		P	V	V	##:VERIFY FRAME ANGLE (Ø)(W.R.T FIXING PLATE) IN THE CASE OF HAND RAILS DURING FITUP ASSY

LEGEND: * RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.
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R:REPORT,IR:INSPECTION REPORT,"P" PERFORM,"W" WITNESS AND "V" VERIFICATION AS APPROPRIATE.
TC:TEST CERTIFICATES,"CHP"(CUSTOMER HOLD POINT):CUSTOMER SHALL IDENTIFY IN COLUMN "E"

	MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN	QP:ESP:287	STANDARD QUALITY PLAN
	BHARAT HEAVY ELECTRICALS LTD BOILER AUXIALIARIES PLANT RANIPET - 632 406. (INDIA) QUALITY ASSURANCE DEPARTMENT	ITEM :INNER ARM & OUTER ARM SHOCK BARS,VERTICAL STAY, VERTICAL BEAM,SUUPORT BEAM, HAND RAILS,RIDGES&SHOCKBEAM	REV : 00 DATE: 20 06 98 PAGE: 06 OF 11	

S.No.	COMPONENT & OPERATION	CHARACTE-RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY M **	C	E	REMARKS
1	2	3	4	5	6	7	8	9	D*	10		11
3.0	CONTD.. IN THE CASE OF INNER ARM:	STRESS RELIEF GAP BET FLATS$	MAJOR	TEMPERATURE CONTROL	100%	DRAWING		R		P	V	IN THE CASE OF SHOCK BARS OF FLAT TYPE $:WITH TEMP PLATE ##:SMALLER & BIGGER HOLES SHALL BE MACHINED KEEPING TWO HALVES TOGETHER AND DRILLING SHALL BE DONE IN FIXURE
	MACHINING/ DRILLING	DIMENSIONS/ FINISH ##	MAJOR	MEASUREMENT	100%	DRAWING		R		P	V	V
	DIMENSION	OVERALL DIMN OF ASSY	MAJOR	DO	AS PER IS 2500 PART I IL-III,AQL 4%	DRAWING		R		P	V	V
4.0	FINAL INSPECTION,SURFACE CLEANING AND PAINTING	MARKING AND PRESERVATION	MAJOR	VISUAL	100%	DRAWING,PAINTING SCHEDULE RP0674199 LATEST,PRQA:590		R		P	V	V
5.0	PACKING	STURDINESS OF PACKING, GROSS WEIGHT,NO OF PIECES INDICATION	MAJOR	VISUAL	100%	AS PER PACKING DRAWING		R		P	V	V

LEGEND: * RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.
** M:MANUFACTURER/SUB-CONTRACTOR,C:CONTRACTOR/NOMINATED INSPECTION AGENCY,E:CUSTOMER.
R:REPORT,IR:INSPECTION REPORT,"P" PERFORM,"W" WITNESS AND "V" VERIFICATION AS APPROPRIATE.
TC:TEST CERTIFICATES,"CHP"(CUSTOMER HOLD POINT):CUSTOMER SHALL IDENTIFY IN COLUMN "E"

1.0 NOTE.1.0 GENERAL REQUIREMENTS

1.1 Any additional requirement for a specific contract shall be referred separately.

1.2 Raw materials used shall conform to the grades specified in the drawing & GMS.

1.3 Raw material shall be free from harmful visual defects like cracks,seams,laps,laminations,heavy pittings etc.

1.4 Fabricators shall check all the supplied raw materials for dimensions, bend , camber etc. , Straightening wherever necessary must be carried out before assy and welding.

1.5 Substitution of materials and Joints (For Support Beam) shall be done with the prior approval of EDC/AQCS.

1.5.1 No joint is permitted on the angle or flat to make up length in the case of shock bar. No joint is permitted to make up the length in the case of vertical beam and stay also.

1.6 Fabricator to impose sufficient process control,necessary stage inspection so that the components made are consistent in quality and conforms to the drawing and specification. It is the responsibility of the fabricator to adopt sufficient measures to avoid Non conformances.

1.7 Plates having deviations like bend, out of flatness etc shall be corrected before taking up for fabrication.

NOTE 2.0INPROCESS CONTROL

2.1 The general requirements for process control during fabrication are as detailed in QCP:002 (Latest) read along with amendment 1.

NOTE 3.0 MARKING,CUTTING AND PREPARATION

3.1 Angles, tubes, sheets,hollows, Channels, Plates and sheets shall be preferably machine or gas cut. Cut edges shall be dressed smooth to remove all the undulations. Gas cut notches if any shall be filled up and dressed. The edges shall be straight and square.

3.2 SHOCK BARS:Holes on angle meant for fixing huck bolt shall be marked correctly.Orientation,location of first hole ref back mark and pitches shall be verified in advance.In the plates holes shall be located at the centre of the plate. Centre of all holes in the angle shall be in one line. Holes can either be punched or drilled.

3.3 Profiles meant for fixing hand rail tubes shall be marked correctly. The profiles of the Ends of the Railings for joints shall be edge prepared with 45o correctly.

NOTE 4.0. WELDING REQUIREMENTS & WELD INSPECTION

4.1 Electrodes : E6013 Electrodes shall be used for Welding.

4.1.1 E6013 electrodes shall be dried in backing ovens at temperature 100o C , until they are used, If the packing were found to be damaged or the electrodes were kept exposed to atmosphere for prolonged period.

4.2 Pre qualified welding procedure as per AWS D 1.1 (Latest) shall be used.

4.3. Welders employed shall be qualified as per AWS D 1.1 latest . Welders qualified to other codes may also be permitted to carryout welding at the discretion of Inspection Engineers.

4.4 Fillet and butt welds shall be done with a minimum of two layers ,and 6mm fillet or less can be done in single run ensuring complete root fusion.

4.5 Sequence of welding shall be so chosen to balance applied heat and to minimise the distortion.

4.6 NDT as required shall be carried out on splice joints before cover plate welding.

4.7 Arc strike shall not be done straight on the job. Welder shall have a separate piece for striking the arc.

4.8 Weld procedures and welder's qualification are detailed in SIP:NP:07 (Latest)

4.9 All welds shall undergo thorough visual examination to detect the weld defects like undercuts, non-uniform beading,overlaps, excessive concavity or convexity etc.

4.10 Welds shall be neither undersize nor excess than specified, shall be as per drg. Smooth contour shall be maintained.

4.11 Only BHEL approved brands of electrodes shall be used.

4.12 Cleaning of the items shall be thoroughly examined before painting.

NOTE 5.0 FABRICATON AND TOLERANCES

1.) VERTICAL BEAM

5.1 The holes in the square tube shall be drilled right through in one setting.

5.2 The welding of angles with the square tube shall be done carefully maintaining perpendicularity. Welds of the angles with the square hollows shall be ground flush.

5.3 In the square hollows of 80x80 for vertical beams, the fabricator shall exercise proper care to ensure that the drilling is done on the sides where there is no weld seam.

5.4 The beam shall be straight throughout the length. Maximum out of straightness permitted 3mm,which is to be checked in the fixture.

.5 Maximum twist permitted in the vertical beam shall be 2mm.

.6 Hole pitches: within ± 1.0mm

2.) SUPPORT BEAM

.1a) All the dimensions like hole pitches and positions of lifting brackets shall be maintained with referance to the centre of the beam. Transverse centre line (Vertical axis) of the beam as well as centrelines of each bracket shall be punched.

.2b) Supporting beam shall be straight throughout the length. Camber or bow permitted 0.5mm/metre length limited to 5mm max.

.3c) The hole dia shall be within ± 0.5mm.

.4d) Position of holes on Web,with referance to flange shall not deviate more than ± 1mm from Specified.

5e) The total length of beam shall be within ± 3mm.

6f) The deviation on hole pitches must not Exceed ± 1mm.

3) SHOCK BARS

Following tolerances shall be applicable on different dimensions of the shock bar (Angle type)

a) Out of alignment of centre of the hole shall be max. 2mm
b) Shock bar angles shall be straight . Out of straightness shall be within 3mm (Max)
c) No twist is permitted.
d) Shock bar slots to be checked with templates for ensuring gap, width and length between flats(Flat type).

4) VERTICAL STAY

Following tolerances shall be applicable on different dimensions of the VERTICAL STAY
a) Length :+0.0/-2.0mm.
b) Both the ends of the vertical stay shall be in the same axis.Maximum out of alignment of the ends shall be within 2.0mm.
c) Out of straightness 1mm/metre limited to 3mm Max.
d) Both the ends shall be square to the tube axis.

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5) PLAIN HAND RAILS

Following tolerances shall be applicable on different dimensions of the plain hand rails.
a) Length ±3.0mm, b) Bow 2mm/metre.and c) Notwist is permitted.

NOTE 6.0 CLEANING,PAINTING AND MARKING

6.1 All the finished products shall be thoroughly cleaned to remove burrs, weld slag, spatters,rust,grease and other foriegn materials.

6.2 Cleaned products except plain hand rails shall be coated with two coats of paints as indicated below.

1. A primer coat of red oxide zinc chrome primer confirmng to IS 2074 shall be applied. Minimum coating thickness of 1st coat 25 microns.

2. A finish coat of synthetic eanamel long oil alkyd confirming to IS 2932 (smoke grey shade) shall be applied. Minimum coating thickness of the 2nd coat 20 microns.

6.2.1 Cleaned plain hand rails shall be coated with two coats of paints as indicated below.

1. A primer coat of red oxide zinc chrome primer confirmng to IS 2074 shall be applied. Minimum coating thickness of 1st coat 25 microns.

2. A finish coat of black eanamel over the primer confirming to IS 2932 shall be applied. Minimum coating thickness of the 2nd coat 20 microns.

Adequate drying time is to be allowed between each coat.

6.3 MARKING

6.31 Each piece shall have the following details stenciled: Stenciling shall be covered with one coat of transperant varnish.

1. Sub-Contractors Code
2. W.O.Number
3. DU Number
4. Gross weight of the packing
5. SI. No

NOTE 7.0 PACKING & PRESERVATION

7.1 All the products shall be packed as per the packing drawing mentioned in GMS.

7.2 Adequate support has to be provided during storage to avoid bending/sagging of vertical beams.

7.3 In each packing the following details shall be legibly stenciled at two places.
wo no: project: du no: Qty in packing:
weight of packing: Fabricator's code:

In addition to the above,sub contracter's code shall be welded/punched and bordered in white paint.

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