



**Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)**

Piping Centre , 80, G. N. Chetty Road, CHENNAI – 600 017
Phone : 91 (044) 28161297, e-mail: kbalu@bhelimpc.co.in

REF: ENQ NO: 4601200019

DT: 13.06.2012

Sub: Fabrication SA387GR91 clamps on conversion basis with BHEL materials

Ref: Enquiry No: 4601200016 dt. 15-05-12

Please find the following tender documents for reference.

1. List of items

Scope of work :

- Vendor should collect raw material from BHEL, Trichy stores and transport it to their works at his cost.
 - Manufacture the item as per drgs, quality plans and inspections.
 - Offer the finished product to BHEL / Customer as applicable for inspection.
 - Deliver the finished product to BHEL, Trichy shipping department.
 - Material accounting to be done by returning the material issued in excess as per the approved cutting plan to BHEL, Trichy stores.
2. Quality Plan.
3. Sample drawings.

New vendors may take note of the items of the enquiry, satisfy themselves of their ability to meet the requirements and apply for registration with BHEL. After qualifying for registration, the new vendors may be considered for future requirements, in line with BHEL system and policy. Such vendors will not be considered for this enquiry.

This is a limited tender and only vendors who are contacted through e-mail / courier may submit their offers.

The New vendors may download vendor registration forms from BHEL web site www.bhel.com and relevant data for formal registration.

Manager / OS
BHEL / Piping Centre
80,GN Road, T.Nagar
Chennai-600017
Ph:28161297

LIST OF ITEMS Enquiry No: 4601200019 dt. 13-06-12

ENQ SL NO	Description	Unit	Qty
1	BEARING CLAMP [APPROX - 70- NOS]	KG	19642.710
2	HORIZONTAL CLAMP [APPROX - 585 NOS]	KG	127842.385
3	RISER CLAMP [APPROX - 260 NOS]	KG	224429.410
4	SHOCK ABSORBER CLAMP [APPROX - 160 NOS]	KG	147298.350
5	TRUNNION CLAMP [APPROX - 145 NOS]	KG	131572.290



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Questionnaire to be filled up by vendor and sent along with necessary documentary evidence.

SL NO	DESCRIPTION	VENDOR'S RESPONSE [YES / NO]	DETAILS OF DOCUMENTS ENCLOSED.
01	Availability of in-house facility for forming of Gr.91 material clamps with requisite dies/toolings		
02	Availability of in-house facility for welding of Gr.91 material and approved WPS / PQR for the same.		
03	Availability of in-house facility for heat-treatment using a furnace calibrated upto 1100 degrees C to carry out normalising, tempering and PWHT for Gr.91 material. Vendor shall also have knowledge of above HT cycles.		
04	Vendor shall have prior experience in forming of Alloy steel material and welding of Gr.91 material.		
05	Accept to manufacture clamps as per BHEL QP Ref.: QPG:76 Rev.:01 and BHEL drawing.		
06	Willing to execute Bank Guarantee for 10 Lakhs to take care of material cost of Gr. 91 material in case of loss/ damage valid for the complete duration of the execution of the contract.		
07	Vendor shall have a production capacity of minimum 100 tonnes/month and a turnover of Rs. 8 crores per annum.		
08	Vendor should furnish willingness to recover the cost of material in case of faulty fabrication / damage / loss of material.		



SHARAT HEAVY ELECTRICALS LTD
PIPING CENTRE, CHENNAI - 17
QUALITY ASSURANCE & CONTROL DEPT.

STANDARD QUALITY PLAN
ITEM : PIPE CLAMPS MADE OF SA387 G91 CLASS-2 PLATES
 (With BHEL Material)

QP No : QP-G-76
 Rev No : 01
 Date : 20.12.2010

S.No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY			REMARKS
									M	C	G	
1	2	3	4	5	7	8	9	D*	**	10	11	

1.0	Material	Co-relation & verification of Mill TCs for Class 2 procured as per TDC no:TDG:110 (Latest Revn.)	Major	Verification	100%	Material Spec, TDG 110.	Mill TCs	✓	P	✓	TC - Test Certificate	
1.11	Positive Material Identification.	Chemical check	Major	Spectro/X-Ray fluorescence	100%	Material Specification.	Report	✓	P	✓		
1.20	Rounds as per drg.	Co-relation with BHEL's material issue document.	Major	Verification	100%	BHEL Drawing, Material Spec.	Report	✓	P	✓		
1.21	Positive Material Identification for AS items	Chemical check	Major	Spectro/X-Ray fluorescence	100%	Material Specification.	Report	✓	P	✓		
1.30	Fasteners (Nut, Bolt, Pin, Stud, Spacer ring etc..)	Co-relation with BHEL's material issue document.	Major	Verification	100%	BHEL Drawing.	Report	✓	P	✓		
1.31	Positive Material Identification for AS items	Chemical check	Major	Spectro/X-Ray fluorescence	100%	Material Specification.	Report	✓	P	✓		
2.0	IN-PROCESS INSPECTION											
2.1	Material receiving inspection	Marking & transfer of identification	Major	Visual	100%	BHEL Drawing	Report	✓	P	✓		
2.2	Forming of clamps	Procedure for Hot Forming shall be submitted by Vendor for BHEL approval and forming shall be carried out as per approved procedure. First lot shall be witnessed by BHEL.										

LEGEND:
 * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
 ** M. MANUFACTURER, B. BHEL
 P. PERFORM W. WITNESS R. REVIEW AND V. VERIFICATION

APPROVED BY: *[Signature]*
 P. ELANGO VAN AGM / QA

PREPARED BY: *[Signature]*
 G.PANNER SELVAM DGM / QA

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SIGNATURE



BHARAT HEAVY ELECTRICALS LTD
PIPING CENTRE, CHENNAI - 17
QUALITY ASSURANCE & CONTROL DEPT.

STANDARD QUALITY PLAN
ITEM : PIPE CLAMPS MADE OF SA387 Gr1 CLASS-2 PLATES
 (With BHEL Material)

QP No : QP-G:76
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 Date : 20.12.2010

REMARKS	AGENCY	M	C
	FORMAT OF RECORDS	D*	**10

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1	2	3	4	5	7	8	9	D*	**10	11	
2.2.1	Heat Treatment	ROH, ROC, Soaking temp & Soaking time	Major	Review of HT Chart / Log	100%	Refer Note 2	HT Chart	√	P	W*/V	W*: Witness for First of Trail (FOT).
2.2.2	Hardness	Hardness	Major	Measurement	100%	190-250 BHN	Report	√	P	W	
2.2.3	Dimensions	Dimensions	Major	Measurement & Visual	100%	BHEL Drawing	HC	√	P	W*/V	
2.2.4	Bend area	a) Surface quality	Major	Wet MPI	100%	ASME Sec V / ASME B31.1 cl.136.4.3	Report	√	P	W	@: With photo micrographs 500X min. # : 3 replicas in one bend per HT batch.
2.3	Attachment Welding	b) Micro Structure	Minor	In situ Micro	#	No micro fissures, Tempered Martensite structure	Report@@	√	P	W	
2.3.1	Welding / Welder Qualification	Procedure & Performance Qualification details	Major	Verify	100%	ASME Sec. IX	WPS, PQR	√	P	V	WPS, PQR shall be approved by BHEL
2.3.2	NDE on EP For Gr91	Discontinuities	Major	LP/MPI	100%	ASME Sec V / ASME B31.1 cl.136.4.4 / ASME B31.1 cl.136.4.3	Report	√	P	W*/V	
2.3.3	Weld Inspection	Weld profile, Size & Surface quality	Major	Measurement & Visual	100%	BHEL Drawing	HC	√	P	V	
2.3.4	Post Weld Heat Treatment	ROH, ROC, Soaking temp & Soaking time	Critical	Review of HT charts	100%	Refer Note 6	HT chart	√	P	W*/R	
2.3.5	Hardness on Weld	Hardness	Critical	Measurement	100%	190-250 BHN	Report	√	P	W	
2.3.6	NDE after PWHT for Fillet Welds	Soundness	Critical	Wet MPI	100%	ASME Sec V / ASME B31.1 cl.136.4.3	Report	√	P	W	

[Signature]

PREPARED BY
 G PANNER SELVAM DGM / QA

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 ** M. MANUFACTURER, B. BHEL
 P. PERFORM W. WITNESS R. REVIEW AND V. VERIFICATION

APPROVED BY
 P. ELANGO VAN AGM / QA

[Signature]



BHARAT HEAVY ELECTRICALS LTD

PIPING CENTRE, CHENNAI - 17

QUALITY ASSURANCE & CONTROL DEPT.

STANDARD QUALITY PLAN

ITEM : PIPE CLAMPS MADE OF SA387 G91 CLASS-2 PLATES

(With BHEL Material)

QP No. : QPG:76

Rev No : 01

Date : 20.12.2010

S.No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY		REMARKS
									M	C	
3.0	FINAL INSPECTION	Overall Dimensions	Major	Measurement	100%	As per BHEL Drawing. Also refer Note 7 for Tolerance.	Report	✓	P	W	
3.1	Positive Material Identification for all AS components.	Chemical check	Major	Spectro/X-Ray fluorescence	100%	As per Required Material (ASME) Specn.	Report	✓	P	W	
3.2	Identification & Painting	Identification, Appearance & DFT.	Major	Visual & Measurement	100%	Painting as per Note 9 & Marking as per Note 10	IR	✓	P	W	IR - Inspection Report
3.3	Packing & Protection	Protection	Major	Visual	100%	BHEL Drawing & PO. Also refer Note 11	IR	✓	P	V	
3.4	DOCUMENTATION	Verification of Records	Major	Completion of Records	100%	As per QPG 76	RM TC, Hardness, Reports(NDE, Charts, IR	✓	P	V	
1	2	3	4	5	7	8	9	D*	**	10	11

NOTES:

- Seal transfer on pieces to be cut shall be done by BHEL inspector.
- POST FORMING HEAT TREATMENT For SA387 G91: Normalise at 1040 - 1060 deg C & Temper at 750-770 deg C. Soaking time for both Normalising & Tempering shall be min 2Hrs for thickness upto 50mm and min 4Hrs for thickness 51-100mm. For G91, normalizing and tempering shall be carried out within 72 hours after completion of forming. The clamps shall be kept dry and stress free. The temperature shall be brought down to room temperature after hot forming before normalizing and also after normalizing before tempering. Tempering shall not be clubbed with PWHT. Normalising and tempering of G91 shall be done encompassing the entire component.
 - The rate of heating & cooling shall be as below.

Thickness of Material	Max. rate of heating & cooling above 300deg.C
Up to 25mm	220° C/Hr
Over 25-50mm	110° C/Hr
Over 50-75mm	75° C/Hr
Over 75mm	55° C/Hr

PREPARED BY 	G PANNER SELVAM DGM/QA PAGE 03 OF 04 SIGNATURE
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APPROVED BY 	P. BLANGOVAN AGM/QA



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1	2	3	4	5	6	7	8	9	D*	** 10	11

3) The product shall be manufactured as per BHEL drawing.

4) Welding Electrodes and Paints used shall be of BHEL approved make

5) All items shall be inspected and cleared by BHEL/BHEL approved inspecting agencies & Customer (If applicable)

6) Preheat, Post heat and Post weld heat treatment (PWHT) temperatures (Deg. C) for Attachment welds

Base Material	Thickness	Attachment material	Preheat	Post Heat	PWHT
SA387 G91	All	SA335 P91	220 SS	280 for 2 Hrs	760 +/- 10 SS

7) The PWHT shall commence immediately thereafter. Soaking time shall be min 2Hrs for thickness ≥ 50 mm and min 4Hrs for > 50 mm. Rate of heating & cooling shall be as per Para 2 (a) above. The PWHT shall be maintained for SA387 G91 till welding is completed. After Post heating, G91 weldments shall be brought to a temperature of 80-100 deg. C and kept for minimum one hour. Dimensional tolerances shall be as per drawing / P.O. when not specified in drawing / P.O. the tolerances shall be as below:

a) Radius of curvature : - 1mm + 1mm

b) Distance between both hole centers : - 0mm + 2 mm

c) Over all length : - 0 mm + 2 mm

d) Axis variation of holes : - 0 mm + 1mm

e) Slot width : - 0 mm + 1mm

8) Cutting of SA387 G91 plates shall be done by Hacksaw/Power saw only. Gas cutting & Plasma cutting are prohibited for SA387 G91 material.

9) All Clamps shall be Painted as below when not specified in the P.O./Drawing:-

10) Two coats of 20 microns each of Heat Resistance Aluminium Paint to IS 13183 Gr I, after surface preparation by power tool cleaning (SSPC-SP9).

11) The finished components shall be punched with DU code (14 digit work order du details), Heat number, material specification, maker's emblem and Inspectors seal. In addition, the DU code, Heat no. and Material specification shall also be paint stencilled. Threaded portions of the fasteners shall be applied with rust preventive oil to avoid rusting. The total clamp assembly shall be well packed to avoid transit & other damages.

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