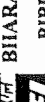


ENQ NO : BENDS:2011-12 DT 23-04-11					
ANNEXURE A- LIST OF ITEMS					
Material Group SA 335 P91- Attachments Gr 91, F91					
Sl.No	Type	Drawing No.	Dia in mm	Tentative Qty Nos.	
1	Loose Bend	Bend-001	219.1 to 406.4	225	
2	Bend with carrier Plate and or Stubs up to 2	Bend-003	219.1 to 406.4	134	
3	Bend with Trunion and or multiple stubs upto 8	Bend-002	219.1 to 406.4	41	
Tentative Project Sites: ADHUNIK POWER, ANPARA, AVANTHA BHANDAR, BOKARO-A, GVK GOVINDWAL, HINDALCO MAHAN, HINDALCO ADITYA, IEPL-BELA, JINDAL DERANG, JINDAL RAIGARH, SATPURA, SHREE SINGAJI, TRIPURA, TUTICORINE, AMARAVATHI, CHHABRA, CHANDWA, KORBA WEST, MARWA, NASIK, SIKKA.					

BIHARAT HEAVY ELECTRICALS LTD PIPING CENTRE, CHENNAI - 17 QUALITY ASSURANCE & CONTROL DEPT.				STANDARD QUALITY PLAN FOR PIPE BENDS WITH BHEL MATERIAL (INCREMENTAL, INDUCTION BENDING) (Material: SA106 GrB/GrC, SA335 P22, P91)				QP NO : QPG 73 REV.NO : 02 DATE : 20.04.2011			
S.No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY		REMARKS
									M	B	
1	2	3	4	5	6	7	8	9	10		11
1.0	Material										
1.1	Seamless steel pipes SA106 GrB / GrC, SA335 P22, P91	Correctness of material : Chemical, Mech. Properties & Soundness	Major	Verification	100%	Correlation with TC and Stamping on the material, BHEL Drawing	TC	✓	P	V	
1.2	Subs / Branches (Pressure Parts) Material as per drg.	Correctness of the components as per drg.	Major	Verification	100%	Correlation with TC and Stamping on the material, BHEL Drawing	TC	✓	P	V	
1.3	Attachments (non-Pressure Parts) Material as per drg.	Correctness of the components as per drg.	Major	Verification	100%	Material issue doc. by BHEL, BHEL Drawing	\$\$	✓	P	V	\$\$ -Material issue doc. by BHEL
2.0	INPROCESS CONTROL										
2.1	Bending	Bending procedure shall be submitted by Vendor for BHEL approval and bending shall be carried out as per approved procedure. Making of two bends in each specn. and attachment welding (or as per P.O.) shall be witnessed by BHEL as first off trail.						Bending M/C Temp. Chart	✓	P	W*/V
2.1.1	Heat Treatment	Time / Temp control	Major	Review of HT Chart / Log	100%	Note 2		HT chart	✓	P	W*/R W*: Witness for FOT
2.1.2	Dimensions	Bend angle, radius, Arm length, Ovality, Thinning & Wrinkles	Major	Measurement & Visual	100%	Drawing and Note 1 & 4		Report	✓	P	W*/V S : Check thickness on tension side & at Ends.
2.1.3	Bend area	a) Surface quality	Major	MPI @	100%	ASME Sec V / ASME B31.1 cl.136.4.3 Also refer Note 6 for P91 Refer Note 15		Report	✓	P	@ : For P91 before HT dry MPI, after HT Wet MPI.
		b) Soundness	Major	UT	100%			Report	✓	P	RW
2.1.4	Hardness	Hardness	Major	Measurement	100%	190-250 BHN for P91; 197 BHN max. for others. Variation within a bend 50 BHN max.		Report	✓	P	W # : 3 replicas in one bend per HT batch.
2.1.5	P91 Bends	Micro Structure	Minor	Insitu Micro	##	No micro fissures, Tempered Martensite structure		Report@@@	✓	P	@@: With photo micro- graphs 500X min.
LEGEND: D* RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER ; B: BHEL / BHEL AUTHORISED INSPECTION AGENCY P: PERFORM W: WITNESS AND V: VERIFICATION R: REVIEW RW: RANDOM WITNESS (10%)											
SIGNATURE  G. PANNEER SELVAM DGM/QA APPROVED BY  P. ELANGO VAN, AGM Q&MS											
PAGE 01 OF 06											

Bharat Heavy Electricals Ltd PIPING CENTRE, CHENNAI - 17 QUALITY ASSURANCE & CONTROL DEPT.				STANDARD QUALITY PLAN FOR PIPE BENDS WITH BHEL MATERIAL (INCREMENTAL, INDUCTION BENDING) (Material: SA106 GrB/GrC, SA335 P22, P91)					QP NO : QPG 73 REV.NO : 02 DATE : 20.04.2011		
Sl.No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY		REMARKS
									M	B	
1	2	3	4	5	6	7	8	9	D*	10	11
2.2	Attachment Welding	Location +, Orientation & EP	Major	Measurement	100%	Drawing		History card		P	W*/V+ : Stubs/attachments shall be 150 mm away from butt joints with 25 mm min clearance between welds.
2.2.1	Marking for Stub Hole drilling / attachments										
2.2.2	NDE on EP a) For P91 b) For P22, GrB, GrC	Discontinuities	Major	MPI LPI/MPI	100%	ASME Sec V / ASME B31.1 cl.136.4.3		Report	✓	P	W
2.2.3	Weld fit up	Discontinuities	Major		100%	ASME Sec V / ASME B31.1 cl.136.4.4/cl.136.4.3		Report	✓	P	V
2.2.4	Stubs & Attachments	Location, Orientation, Dimensions.	Major	Measurement	100%	Drawing		History card	✓	P	V
2.2.5	Welding										
2.2.6	Welding Qualifications	Procedure Qualification	Major	Verification	100%	ASME SEC. IX, WPS approved by BHEL		WPS	✓	P	W
2.2.7	Weld Inspection	Personnel Qualification	Major	Verification	100%	IBR		WQR	✓	P	W
2.2.8	Weld profile, Size & Surface quality		Major	Measurement & Visual	100%	Drawing & SIP:PP:02		Report	✓	P	V
2.2.9	NDE before PWHT										
2.3	Carrier plate Root back gouging/grinding	Discontinuities	Critical	MPI @	100%	ASME Sec V / ASME B31.1 cl.136.4.3		Report	✓	P	V
2.3.1	Post Weld Heat Treatment	ROH, ROC, Soaking temp & Soaking time	Critical	Review of HT charts	100%	Note 4		Report	✓	P	V
2.3.2	NDE after PWHT										
2.3.2	All branch/Stub Welds	Soundness	Critical	MPI / Wet MPI @	100%	ASME Sec V / ASME B31.1 cl.136.4.3		Report	✓	P	V
LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER ; B: BHEL / BHEL AUTHORISED INSPECTION AGENCY P: PERFORM W: WITNESS AND V: VERIFICATION R: REVIEW RW: RANDOM WITNESS (10%)											
PREPARED BY  G. PANNEER SELVAM DGM/QA											
APPROVED BY  P. LANGOVAN, AGM / Q&MS											
SIGNATURE PAGE 02 OF 06											

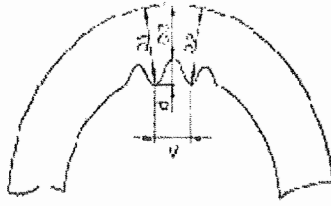
BHARAT HEAVY ELECTRICALS LTD PIPING CENTRE, CHENNAI - 17 QUALITY ASSURANCE & CONTROL DEPT.			STANDARD QUALITY PLAN FOR PIPE BENDS WITH BHEL MATERIAL (INCREMENTAL, INDUCTION BENDING) (Material:SA106 GrB/GrC, SA335 P22, P91)					QP-NO : QPG 73 REV.NO : 02 DATE : 20.04.2011			
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									M	B	
1	2	3	4	5	6	7	8	9	10		11
2.3.3	Carrier plate & Attachment welds	Soundness	Critical	MPI / Wet MPI @	100%	ASME Sec V / ASME B31.1 cl.136.4.3		Report	✓	P	V @ :For P91 after HT Wet MPI
2.3.4	NDE on site weld edge preparation	Discontinuities	Minor	LPI	100%	BHE:NDT:PB:PT - 01		Report	✓	P	V
3.0	FINAL INSPECTION										
3.1	Dimensional Inspection	a) Bend angle, Arm length, Radius of bend, Ovality, Thinning & Wrinkles. b) EP, End to end dimm, Land Weld end dia c) Orientations & height of Stubbs / Attachments d) Flange rotation e) Face out Chemical check	Major	Measurement	100%	As per BHEL Drawing , Note 1 & 4		Report	✓	P	W
3.2	Positive Material Identification for Alloy Steel		Major	Measurement	100%	As per BHEL Drawing		Report	✓	P	W
3.3	Identification & Painting	Identification, Appearance & DFT.	Major	Measurement	100%	Drawing, +/- 3mm		Report	✓	P	W
3.4	Preservation & Protection	End protection	Major	Measurement	100%	Drawing, +/- 2mm 1.2 per 300 mm		Report	✓	P	W
4.00	Documentation	Verification of Records	Major	Spectro/X-Ray fluorescence	100%	As per Required Material (ASME) Specn.		Report	✓	P	W
			Major	Visual & Measurement	100%	Painting as per contract specific Painting scheme; Refer Note 13 for marking.		Report	✓	P	W
			Major	Visual	100%	BHEL Drawing , PO & Note 14.		IR	✓	P	W IR : Inspection Report
			Major	Compilation of Records.	100%	As per QPG 73		IBR TC, RM TC, Reports(NDE, Hardness, PMI), HT Charts, IR	✓	P	V
LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER ; B: BHEL / BHEL AUTHORISED INSPECTION AGENCY P: PERFORM W: WITNESS AND V: VERIFICATION R: REVIEW R.W: RANDOM WITNESS (10%)											
PREPARED BY G. PANNEER SELVAM DGM/QA			APPROVED BY P.ELANGO VAN , AGM /Q&MS								
SIGNATURE			SIGNATURE								
PAGE 03 OF 06			PAGE 03 OF 06								

BIHARAT HEAVY ELECTRICALS LTD PIPING CENTRE, CHENNAI - 17 QUALITY ASSURANCE & CONTROL DEPT.			STANDARD QUALITY PLAN FOR PIPE BENDS WITH BHEL MATERIAL (INCREMENTAL, INDUCTION BENDING) (Material:SA106 GrB/GrC, SA335 P22, P91)						QP NO : QPG 73 REV.NO : 02 DATE : 20.04.2011		
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									M	B	
1	2	3	4	5	6	7	8	9	D*	10	11

NOTES :

1.0 WRINKLES : Acceptance limits for wrinkles are as given below: (Refer Figure 1).

- The depth of valley / OD (d/D) shall be $\leq 3\%$
- Pitch of valley / Depth (A/d) shall be ≥ 12



D = NOMINAL OD OF PIPE

2.0 POST FORMING HEAT TREATMENT :-

- For SA106 GrB/GrC : Normalise at 870 - 900 deg.C
- For SA335 P22 : Normalise at 920 - 960 deg.C & Temper at 695 $\pm$ 15
- For SA335 P91 : Normalise at 1040 - 1060 deg.C & Temper at 760-780 deg.C

For P91, normalizing and tempering shall be carried out within 72 hours after completion of bending. The bends shall be kept dry and stress free. The temperature shall be brought down to room temperature after hot bending before normalizing and also after normalizing before tempering. Tempering shall not be clubbed with PWHT. Normalising and tempering of P91 shall be done encompassing the entire component. P91 soaking shall be 2Hrs minimum for thickness upto 50mm and 4Hrs minimum for thickness 51-100mm

d) Bends shall not be kept one over the other (to avoid deformation).

SIGNATURE G. PANNEER SELVAM, DGM/QA PREPARED BY PAGE 04 OF 06	LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER ; B: BHEL / BHEL AUTHORISED INSPECTION AGENCY P: PERFORM W: WITNESS AND V: VERIFICATION R: REVIEW RW : RANDOM WITNESS (10%)	 APPROVED BY P. ELANGO, AGM /Q&MS

BHARAT HEAVY ELECTRICALS LTD PIPING CENTRE, CHENNAI - 17 QUALITY ASSURANCE & CONTROL DEPT.			STANDARD QUALITY PLAN FOR PIPE BENDS WITH BHEL MATERIAL (INCREMENTAL, INDUCTION BENDING) (Material: SA106 GrB/GrC, SA335 P22, P91)					QP NO : QPG 73 REV.NO : 02 DATE : 20.04.2011		
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1	2	3	4	5	6	7	8	9	M B	11

3.0 POST WELD HEAT TREATMENT

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

Base Material	Thickness	Stub / Attachment material	Preheat	Post Heat	PWHT	
					Weld thickness <= 19mm	Weld thickness > 19mm
SA106 GrB/GrC	t <= 19	SA106 GrB/GrC	Nil	Nil	Nil	610+/-15
	t > 19 & <= 25	SA106 GrB/GrC	150	150 for 2 hrs	Nil	610+/-15
	t > 25 & <= 75	SA106 GrB/GrC	150	150 for 2 hrs	Nil	610+/-15
	t > 75	SA106 GrB/GrC	150	150 for 2 hrs	610+/-15	610+/-15
SA335 P22	All	SA335 P11, P22	150	250 for 2 hrs	All 695 +/- 15	
SA335 P91	All	SA335 P91	150	250 for 2 hrs	All 745 +/- 15	
		SA335 P22, P91	220 ##	280 for 2 hrs	All 760 +/- 10 ##	

: Pre heat shall be maintained for P91 till welding is completed. After Post heating, P91 weldments shall be brought to a temperature of 80-100 deg C and kept for minimum one hour.
The PWHT shall commence immediately thereafter.

4.0 TOLERANCES FOR BENDS

- Bend angle : $\pm 0.5^\circ$
- Bend radius: ± 5.0 mm
- Arm length (ends): $\pm 5.0/-2.0$ mm
- Twist (gap observed using straight edge plumb) : 1mm/mtr. 10mm Max.
- Ovality shall be within 20 D/R subjected to max. of 8%.
Where R = Radius of bend & D = Diameter of the pipe
% Ovality = $((D_{max} - D_{min})/D \text{ nominal}) * 100$

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	SIGNATURE _____ PAGE 05 OF 06		

BHARAT HEAVY ELECTRICALS LTD PIPING CENTRE, CHENNAI - 17 QUALITY ASSURANCE & CONTROL DEPT.			STANDARD QUALITY PLAN FOR PIPE BENDS WITH BHEL MATERIAL (INCREMENTAL, INDUCTION BENDING) (Material:SA106 GrB/GrC, SA335 P22, P91)							QP NO : QPG 73 REV.NO : 02 DATE : 20.04.2011		
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	2	3	4	5	6	7	8	9	M	B		
1									D*	10	11	

f) Thinning: Thinning shall be limited to as calculated below or as indicated in the drawing whichever is minimum.

$$\% \text{ Thinning} = ((T \text{ nominal} - T_{\text{minimum}}) / T \text{ nominal}) \times 100$$

(i) $R/D \leq 2$

For ID controlled pipes : 20%

For OD controlled pipes : 30% (since a negative tolerance of 12.5 % on thickness is considered in design)

(ii) $R/D > 2$ and ≤ 4

For ID controlled pipes : 10%

For OD controlled pipes : 21.5%

(iii) $R/D > 4$

For ID controlled pipes : 5%

For OD controlled pipes : 17%

5.0 The items shall be manufactured as per BHEL drawing .

6.0 P91 bends shall be visually checked. No hard scales shall be present on inside & outside surfaces.

7.0 Gas cutting & Plasma cutting are prohibited for SA335 P91 material.

8.0 Pre heating of SA335 P91 material by Oxy-acetylene is not permitted.

9.0 Welding Electrodes and Paints used shall be of BHEL approved make

10.0 All items shall be inspected and cleared by BHEL / BHEL authorised Inspection agency & IBR authorities.

11.0 If Customer inspection is involved as per Contract requirements, the Vendor shall get despatch clearance from the BHEL's customer also before despatch of finished material.

12.0 Necessary IBR Requirements shall be fulfilled and IBR documents to be submitted.

13.0 The finished components shall be punched with DU code (14 digit work order DU details), Heat number, material specification, maker's emblem, Inspectors seal & statutory authority's seal.

In addition, the DU code, Heat no. and Material specification shall also be paint stencilled.

Colour coding : Red for SA106-Gr B ; Blue for SA106 GrC ; Blue & Red for SA335 P22; Brown & Red for SA335 P91.

14.0 Machined ends shall be well protected using end caps and suitably packed to avoid transit & other damages. Tack welding is prohibited on P91 material.

15.0 The vendor shall carry out UT as per their procedure approved by BHEL. The procedure shall include the following.

(a) UT shall be done as per ASTM E 213 in both clockwise and anticlockwise directions for longitudinal discontinuities and in both axial direction for transverse discontinuities. Calibrations to be done on both longitudinal and transverse notches of 50mm length and a depth of 5% of wall thickness (Min 0.3 mm ; Max 1.5 mm) placed on both internal and external surfaces. The calibration block shall be a section of the Pipe of same size, heat treatment and specification.

(b) Acceptance norms : Cracks of any dimension and the indications exceeding following limits are not acceptable (i) 50% of DAC incase of longitudinal flaws (ii) 25% of DAC incase of transverse flaws.

(c) Report : A detailed report duly signed by a minimum Level II NDE personnel shall be issued

Records of Revn 01 : Sl.No. 1.2, 1.3 included, Note 3 & 7 are corrected.

Records of Revn 02 : Sl.No. 2.1.3 corrected and Note 15 included.

 PREPARED BY G. PANNEER SELVAM, DGM/QA	LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER ; B: BHEL / BHEL AUTHORISED INSPECTION AGENCY P: PERFORM W: WITNESS AND V: VERIFICATION R: REVIEW RW : RANDOM WITNESS (10%)	 APPROVED BY P. ELANGO, AGM /Q&MS
SIGNATURE		
PAGE 06 OF 06		



Bharat Heavy Electricals Limited

(A Govt. of India Undertaking)

Piping Centre , 80, G. N. Chetty Road, CHENNAI – 600 017

Phone : 91 (044) 28161297/28161245 .Fax-(044)28161341

e-mail: kbalu@bhelmpc.co.in

TERMS & CONDITIONS FOR PROCUREMENT OF BENDS

SL NO	BHEL REQUIREMENT	SUPPLIER CONFIRMATION
1	TYPE OF BID – Offers to be submitted in Two part TECHNICAL - CUM – COMMERCIAL BID AND PRICE BID with break up details as per Price format attached inclusive of packing and forwarding to any site/BHEL Unit price to be quoted on FOR destination(site) basis inclusive of packing, forwarding, freight and insurance. THE BID sealed in a separate cover duly indicating Tender No.& Date, Tender Opening date and to be sent to K.BALASUBRAMANIAN MGR/PURCHASE (SUB DELIVERY) BHEL : PIPING CENTRE 80, G.N. CHETTY STREET T. NAGAR, CHENNAI 600017	YES/NO
2	If you are not interested / not in a position to participate in the tender, please send regret letter for not participating, before due date of the tender.	
3	You are requested to quote only for the sizes / spec within your manufacturing range.	YES/NO
4	CONFIRM COMPLIANCE TO BHEL DRGS, QPG:73 REV 02, Tolerances for dimensions, edge preparation.	
5	Quality DOCUMENTS AS listed below should BE SENT to Purchase / Piping centre BHEL Chennai immediately after the shipment / dispatch of items and not through Bank.	YES/NO
	i) Three sets of original certificates item-wise (ie) Works TC, IBR Form III A, UT Report, MPI report, Dimensional report, Raw Material TC (Xerox copy). THESE CERTIFICATES ARE TO BE DESPATCHED ALONG WITH THE OTHER TC AND NOT THROUGH BANK	YES/NO
6	All the above documents are to be submitted in soft copy apart from the hard copies as above.	
7	If the materials are not ready on the date of visit by BHEL INSPECTOR against specific call for inspection by vendor, all the expenses incurred for the visit shall be liable for recovery from the invoices of THE VENDOR . Further, this will also have an adverse bearing on the performance rating of the vendor.	YES/NO
8	VALIDITY OF THE OFFER :- The quotation shall be valid at least for a period of 120 days from the date of bid opening date. Offer with lesser validity will not be considered.	YES/NO
9	DELIVERY SCHEDULE :- 4 weeks from availability of Pipes at Vendor	YES/NO

	works	
10	PRICE : As per Price format enclosed	YES/NO
11	TRANSPORT :- Acceptance to arrange at own cost to any Site basis including Insurance.	YES/NO
12	PRESERVATION :- As per respective Quality documents.	YES/NO
13	INSPECTION :- a) IBR & Third Party inspection agency for CS & AS materials. b)BHEL / QC Inspection	
14	CERTIFICATION: - IBR TC in FORM III A, inspection report of BHEL, Third Party inspection agency, Mfg TC incorporating BHEL Specification requirement /ASME requirement. Mechanical / Hardness & Heat treatment and other Lab test reports to be furnished. Confirmation report to BHEL Specification to be furnished. Inspection Charges:- Inspection charges of BHEL/ Their representative are to BHEL A/c. Any other testing charges and IBR inspection charges should be included in the quoted prices. Inspection documents shall be furnished for each PGMA after dispatch for each consignment.	YES/NO
15	IDENTIFICATION As per Respective Quality/ Drawing/GMS document	YES/NO
16	Bank Gurantee: Successful Vendors Shall execute a Public Sector Bank Guarantee for a value of Rs...10,00,000/= With validity for entire period of execution of the order. GUARANTEE: Vendors shall guarantee the supplies for a period of 24 months from the date of dispatch of materials or 18 months from the date of their commissioning whichever is later. Any rejections of materials under the hold of Vendor in the course of execution, shall be liable for recovering the Total cost as per BHEL Rates applicable with Taxes and Duties.	YES/NO YES/NO
17	PENALTY :- "If the supplier fails to deliver the Raw material / Equipment / Components within the period specified in the contract the purchaser shall deduct Liquidated Damages, a sum equivalent to 0.5% of the price for each week of delay upto a maximum of 10% of the price of delayed/undelivered goods to be reckoned from the contract delivery date to cargo readiness date (i.e., final inspection agency's signed date in the certificate)"	YES/NO
18	RISK PURCHASE: If supplier fails to deliver the items alternatively BHEL at this option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefore. The supplier shall be liable for any loss which the purchaser may sustain by reason of such risk purchases in addition to penalty at the rate mentioned in clause 16 above.	YES/NO
19	TERMS OF PAYMENT : Indigenous vendors: 100% against receipt and acceptance of Materials at the destination specified.	YES/NO
20	GENERAL :- a)The PO copy with all details will be given to successful bidders in soft mode also. However Hard copy will be used for record purpose. b) During the Contract period, any of our sister units of BHEL Piping Centre will be entitled to place order for this item with the same rate, terms and conditions c) BHEL reserves the right to cancel this tender without assigning any reasons what so ever. d)Deviation taken after placement of order will not be accepted (Both technical & delivery Conditions) Suppliers to analyze in detail, at the time of submission of offer with reference to our "delivery" requirement of Pipe	YES/NO

	Bends and confirm compliance or otherwise. e)Vendors To ensure correct & timely submission of all original test certificates including IBR Form III-A. There should not be any discrepancies leading to wastage of time in clarification and revisions. f)BHEL reserves the right to increase or decrease the tendered quantity g)Lowest prices received against BHEL tenders does not mean order will be placed on that Supplier. BHEL reserves the right not to consider the same. h)BHEL reserves the right to negotiate or re-float the tender opened if L1 price /or other details are not acceptable to them I)BHEL reserves the right to order on more than one vendor at the lowest acceptable price to BHEL J)BHEL reserves the right to go for a Reverse Auction instead of Opening the submitted sealed bid, which will be decided after technical evaluation. K)Out sourcing of Part Process is not allowed L) BHEL reserves the right to order in part quantity. No minimum order order condition is acceptable to BHEL.	
20.	Detailed Scope of Work: As per Annexure B Special Terms and Conditions- Attached	YES/NO

Note : Please confirm your acceptance/other wise to all the points indicated above positively and submit this format duly filled, signed & stamped along with the technical bid.

In addition to the confirmation against each point, We confirm that we have read thoroughly the Tender conditions and we here by agree for the same.

(VENDOR) SIGNATURE

ANNEXURE – B
SPECIAL TERMS AND CONDITIONS

Enquiry Ref.No. BEND:2011-12

Dated 23-04-11

Conditions applicable to all enquiries in addition to the Printed sheets and conditions laid down in Technical and commercial specifications:

1.Delivery is the essence of the contract/order. BHEL may accept or reject the Price Bid if delivery is not as specified, or if offered delivery is not suiting Project Plan/Production plan as per BHEL.

2.BHEL Has the right to order partly or fully considering the various requirements. BHEL may short close/cancel an order or divert to another vendor if the performance of the vendor is poor, or the delivery requirement of the item is very critical and not being met, at any time of the contract/order irrespective of the P.O. Delivery date, if there is no response for improvement in delivery from the vendor as per BHEL requirement.

3.BHEL may counter offer the final L1 rate to other eligible vendors for acceptance and decide to distribute the orders fully or partly to the accepting Vendors for ensuring deliveries meeting production/project requirement. BHEL decision will be final in this regard.

4.After receiving the order, any initial delays shall be made good by controlling the subsequent activities by the vendor to contain the overall delivery time.

5.BHEL has the right to reject delayed deliveries or accept on a conditional basis.

6.Vendors who are kept under hold will not be considered.

7.Raw Material(Pipes, plates and forgings) for manufacture of the bends shall be supplied by BHEL. Electrodes and consumables are to be procured by Vendors from BHEL approved sources.

8. Qualified Bending and welding procedures (with appropriate Trial Bends, WPS, and Weld Procedure Qualification Records) shall be submitted for BHEL approval before proceeding with the job. Production jobs can be taken-up only after the above documents are accepted by BHEL. Vendors shall give confirmation for compliance to attached BHEL SQP.

9.Materials will be dispatched by BHEL on BHEL Transport to Vendor works at BHEL cost. Necessary coordination has to be done by Vendors.

10.Overall Scope of Work is as follows:

- (i)Procedure qualifications including materials used.
- ~~(ii)Establishing capability by the trials.~~
- (iii)Bending by approved procedure
- (iv)Normalising as per recommended procedure
- (v)Edge Preparation by machining
- (vi)Welding of attachments as per approved WPS by Qualified Welders.
- (vii)Post weld Heat Treatment
- (viii) Inspection and Documentation including IBR formalities
- (viii)Blast Cleaning(Inside and Outside) and Painting with Stenciling Details.
- (ix)Despatching to sites including Transportation(Freight as finalized)
- (x)Unless specified Work shall be carried out as per Drawings and Quality Plans submitted.

11.Technical offers will be opened first and Price offers of Technically accepted vendors will be considered and opened subsequently.

12.Cost of rejected materials will be fully recovered from the bills at applicable rate with taxes and duties.

13. A Bank Guarantee for an amount of Rs 10,00,000/=(Rs 10 Lakhs) from a Bank acceptable to BHEL shall be furnished with a validity for entire period of execution of the full order.

14. This will be a **Rate Contract Enquiry**. The price should remain firm for a period of one year from the date of final reverse auction/price bid opening.

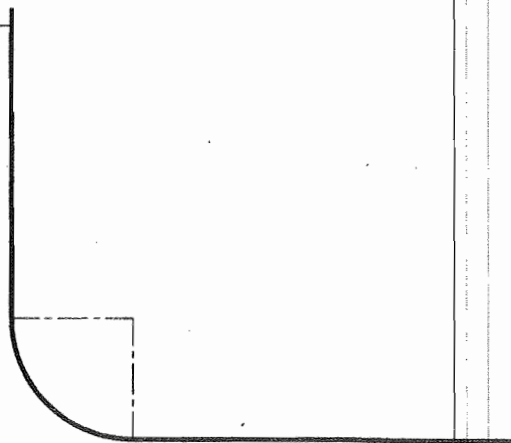
15. The quantity mentioned in the enquiry is only tentative. BHEL will place order for the items as and when requirement arises. The total ordering quantity for each item may be less or more than the enquiry quantity.

16. L1 Rates shall be counter offered to other vendors. Ordering quantity will be distributed upto 60% on L1 vendor and the remaining 40% equally among other counter offer accepted vendors subject to performance and delivery requirement.

17. No deviation of terms and conditions and no revision of rates are allowed after reverse auction/ price bid opening.

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REFER
NOTE:02,03



NOTES:

01. FOR EDGE PREPARATION REFER DRG NO:3-80-300-19825.
02. RADIOGRAPHIC PLUG IS TO BE GIVEN FOR ALL BENDS AS PER BHEL PRACTICE EXCEPT FOR P91 BENDS.
03. FOR RADIOGRAPHIC PLUG, REFER DRG NO: 6108-0022-REV06 IT IS TO BE PROVIDED AS INDICATED IN ISOMETRIC DRG.
04. ALL BENDS ARE UNDER THE PURVIEW OF IBR AND TO BE SUPPLIED WITH FORM-3A
05. RAW MATERIAL FOR PIPE BENDS AND OTHER FITTINGS WILL BE SUPPLIED SUPPLIED BY BHEL AS FINISHED COMPONENTS.
06. FOLLOW TDC:
07. FOLLOW BHEL QP: SQP:PP:06-REV 06, AND QCP:001:05
07. ϕ INDICATES RG PLUG.

VAR. NO	OD RANGE in mm	THICKNESS RANGE in mm	R/D RATIO RANGE	MATERIAL	REMARKS
01	219.1 - 406.4	25-42	1.4-5.7	SA 335 P91	
02	219.1 - 406.4	28-62	1.4-5.7	SA 335 P22	INCLUDED FOR FUTURE REQUIREMENT
03	219.1 - 406.4	12.7	4.6	SA 106 GRB/GRC	
04	457 - 564	42-58	1.5-5.1	SA 335 P91	
05	457 - 564	25-32	1.5-4	SA 335 P22	
06	457 - 564	14.27-15.09	3.0-4.7	SA 106 GRB/GRC	
07	610 - 711	25-30	1.5-4.5	SA 335 P91	
08	610 - 711	45	1.5	SA 335 P22	
09	610 - 711	19.05-22	1.5-3.9	SA 106 GRB/GRC	

DRAWING NO

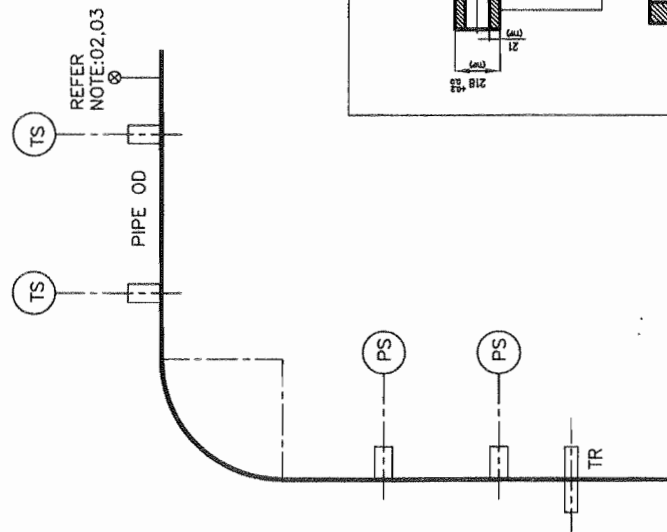
DRAWING NO

BHEL-PIPING CENTRE-ENGINEERING

LOOSE PIPE BENDS

BEND-001

CAUTION
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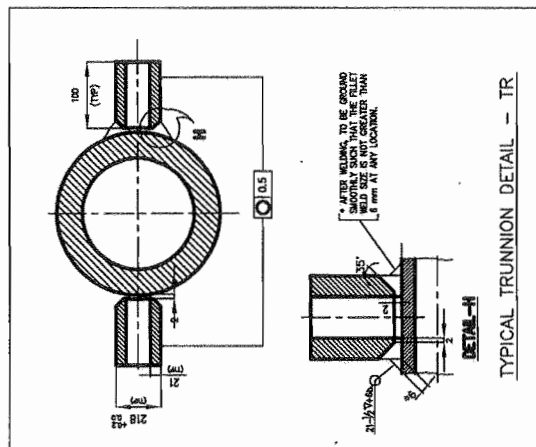


ATTACHMENT DESIGNATION

TS - TEMP. STUB
PS - PRESSURE STUB
CR - CARRIER PLATE

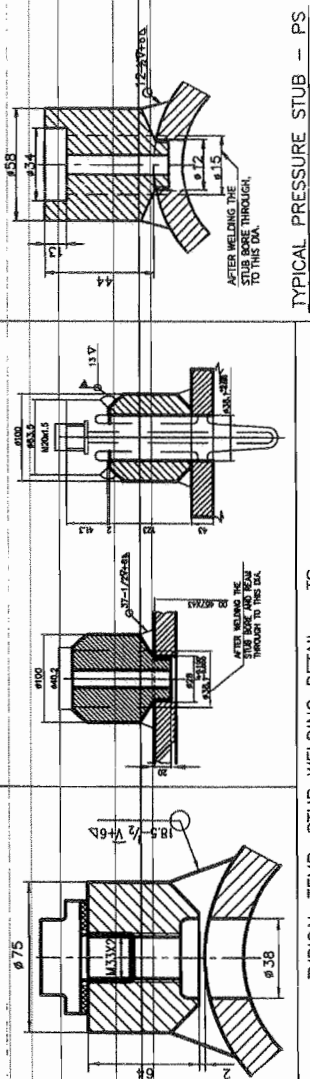
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06. FOLLOW TDC:
07. FOLLOW BHEL QP: SQP:PP:06-REV 06, AND QCP:001:05
07. ϕ INDICATES RG PLUG.



TYPICAL TRUNNION DETAIL - TR

PIPE MATERIAL	TEMP/PR. STUB MATERIAL	TRUNNION MATERIAL
SA106Gr-B	SA 105	SA106Gr-B
SA106Gr-C	SA 105	SA106Gr-C
SA335P22	SA182F22CL3	SA335P22
SA335P91	SA182F22CL3	SA182F91



TYPICAL PRESSURE STUB - PS

TYPICAL TEMP. STUB WELDING DETAIL - TS

ALL DIMENSIONS SHOWN HERE ARE INDICATIVE ONLY. ACTUAL DIMENSIONS ARE AS INDICATED IN THE RESPECTIVE ISOMETRIC DRAWING.

DRAWING NO

DRAWING NO

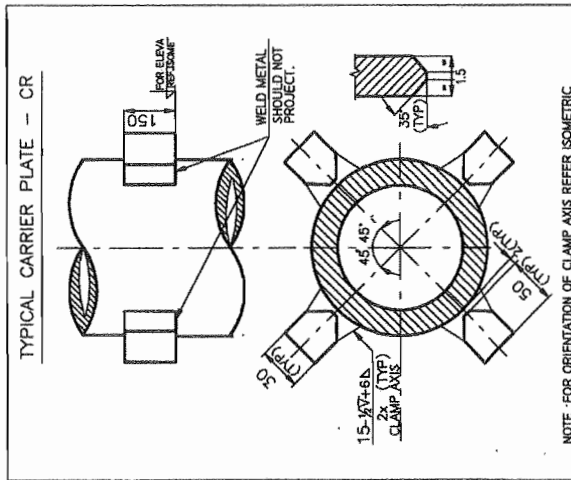
BHEL-PIPING CENTRE-ENGINEERING

PIPE BENDS WITH TRUNNION AND/OR STUBS

BEND-002

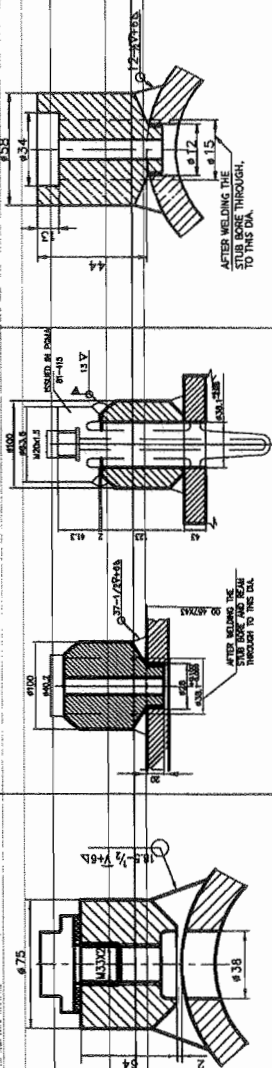
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03. FOR RADIOGRAPHIC PLUG, REFER DRG NO: 6108-0022-REV06 IT IS TO BE PROVIDED AS INDICATED IN ISOMETRIC DRG.
04. ALL BENDS ARE UNDER THE PURVIEW OF IBR AND TO BE SUPPLIED WITH FORM-3A
05. RAW MATERIAL FOR PIPE BENDS AND OTHER FITTINGS WILL BE SUPPLIED BY BHEL AS FINISHED COMPONENTS.
06. FOLLOW TDC:
07. FOLLOW BHEL QP: SQP:PP:06-REV 06, AND QCP:001:05
07.  INDICATES RG PLUG.



NOTE -FOR ORIENTATION OF CLAMP AXIS REFER ISOMETRIC

PIPE MATERIAL	TEMP / PR. STUB MATERIAL	CARRIER PLATE MATERIAL
SA106GrB	SA 105	SA 515 Gr 70
SA106GrC	SA 105	SA 515 Gr 70
SA335P22	SA182F22CL3	SA387Gr22
SA335P91	SA182F22CL 3	SA335P91



TYPICAL TEMP. STUB WELDING DETAIL - TS

TYPICAL PRESSURE STUB - PS

ALL DIMENSIONS SHOWN HERE ARE INDICATIVE ONLY. ACTUAL DIMENSIONS ARE AS INDICATED IN THE RESPECTIVE ISOMETRIC DRAWING.

BHEL-PIPING CENTRE-ENGINEERING

G NO
PIPE BENDS WITH CARRIER PLATES AND/OR STUBS

DRAWING NO

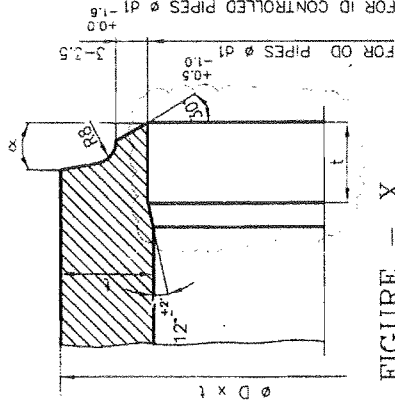
BEND-003

92861-003-08-C

DRAWING NO.

NOTES:-

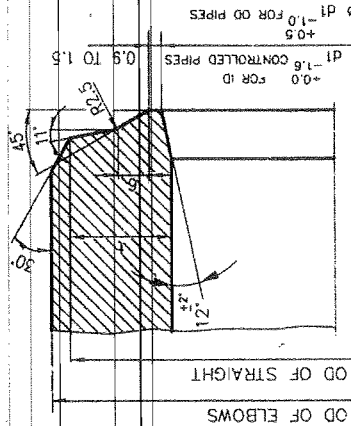
01. APPLICABLE FOR P91 MATERIAL
02. FOR OD MISMATCHING REF. FIGURE - Xa
03. $\alpha = 6^\circ$ FOR WALL THICKNESS ≤ 30 mm
04. $\alpha = 10^\circ$ FOR WALL THICKNESS > 30 mm



MATCHING EDGE PREPARATION FOR MISMATCH OD
DIAMETRICALLY GREATER THAN 8 mm
(ie OD1 - OD2 > 8mm.) APPLICABLE FOR
ELBOWS OTHER THAN P91 MATERIALS

NOTES:-

01. OD = OUTSIDE DIA OF CONNECTING PIPE (STRAIGHT) TO BE PHYSICALLY MEASURED/VERIFIED.
02. $t =$ THK OF CONN. PIPE (STRAIGHT)



MATCHING EDGE PREPARATION FOR MISMATCH OD
DIAMETRICALLY GREATER THAN 8 mm
(ie OD1 - OD2 > 8mm.) APPLICABLE FOR
BENDS/FITTINGS OF P91 MATERIALS

NOTES:-

01. OD OF STRAIGHT TO BE PHYSICALLY MEASURED/VERIFIED.
02. $\alpha = 6^\circ$ FOR WALL THICKNESS ≤ 30 mm
03. $\alpha = 10^\circ$ FOR WALL THICKNESS > 30 mm

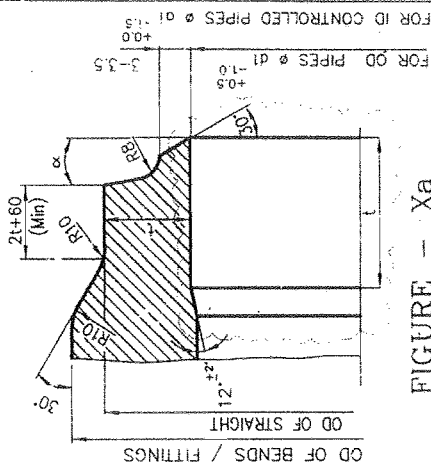
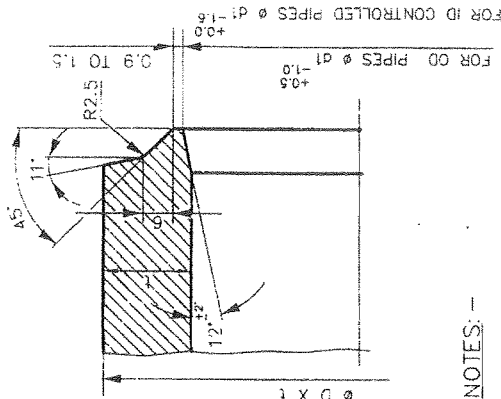


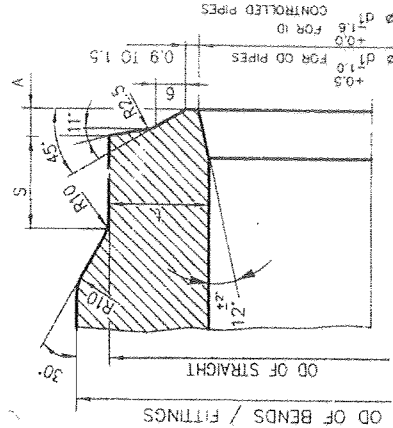
FIGURE - Xa



NOTES:-

01. USE WHEN $t \geq 14.2$ mm.
02. FOR OD MISMATCHING REF. FIGURE - Pa

STYLE - P



STYLE - Pa

GENERAL NOTES:-

01. THE MINIMUM THICKNESS AT WELD END SHALL NOT BE LESS THAN
 - a) 0.875 TIMES t NOM. FOR OD PIPES.
 - b) t MIN. FOR ID CONTROLLED PIPES.
 02. t NOM & t MIN SHALL BE AS PER SPECIFIED PIPE SIZE.
- NOTES FOR WELDING:
01. WELD REINFORCEMENT TO BE FLUSH GROUND AND MERGED WITH PARENT METAL WITHOUT ANY UNEVENNESS.

STYLE - D

NOTES:-

01. USE WHEN $t < 14.2$ mm.

STANDARD

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

DEPT.
CODE

GRADE OF
UN TOL DIM
C/M/F

SCALE

WEIGHT (kg)

NAME OF ORIGINAL
ORGANISATION

DATE

NO OF
ITEMS

REV

ITEM
No.

REV

ITEM
No.

REV

ITEM
No.

REV

ITEM
No.

REV

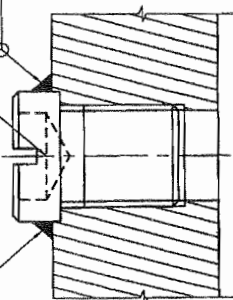
ITEM
No.

REV

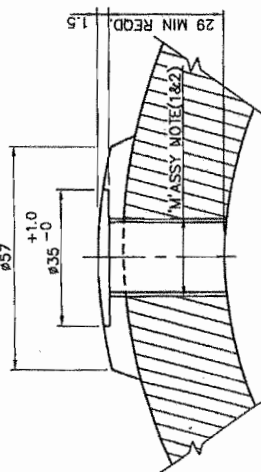
ITEM
No.

AFTER 7 Δ SEAL WELD IS COMPLETED
WELD UP COUNTERBORE MIN 2 PASSES

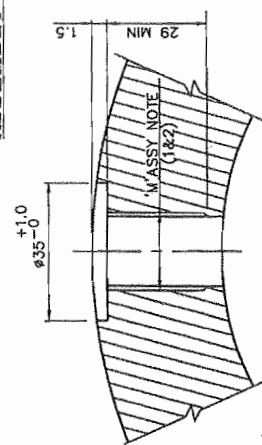
7 Δ NOTE-9



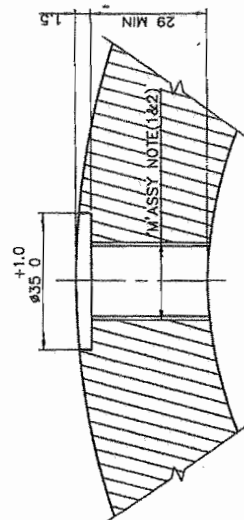
PLUG WELD IN POSITION



SEE SHOP GUIDELINES
DETAIL-Z



DETAIL Y
SEE NOTE 7(a)



DETAIL U
SEE NOTE 7(b)

ASSY NOTE: -

1. TOLERANCE CLASS FOR INTERNAL THREADS ON HEADER PIPE SHOULD BE AS PER "H" OF CORPORATE STD/AA 0231816 (BPS 412515)
2. DRILL SIZE FOR INTERNAL THREAD W27 & W24 ARE D24 & D21 RESPECTIVELY.
3. HEADER/PIPE MATERIAL SHALL GOVERN THE SELECTION OF PLUG MATERIAL
4. WELDING PREHEAT, POSTHEAT ETC. AS PER RELEVANT QUALITY CONTROL PROCEDURES
5. THE PLUG SHOULD REST ON THE SHOULDER IN HEADER/PIPE
6. ENSURE ENGAGEMENT OF MINIMUM 7 THREADS

DESIGN GUIDE LINES

- (7) (a) WHEN $t_n > 30.5$ mm, THE DETAIL -Y- TO BE FOLLOWED.
(b) WHEN $t_n = 30.5$ mm, THE DETAIL -Y- TO BE FOLLOWED.
(c) WHEN $t_n < 30.5$ mm, SEE SHOP GUIDE LINES.
(d) WHEN t_n IS THE MINIMUM WALL THICKNESS OF HEADER/P/PE, SHOP GUIDELINES IN CONTINUATION OF DESIGN GUIDELINES-
SHOP SHOULD MEASURE THE ACTUAL WALL THICKNESS OF
HEADER/P/PE. IF THE ACTUAL WALL THICKNESS IS LESS THAN
30.5 mm, ADDITIONAL MATERIAL SHALL BE ADDED BY SHOP
AS PER DETAIL -Z-.

8. AFTER RADIOGRAPHY, SCREW UP PLUG TIGHTLY PRIOR TO SEAL WELDING
9. AFTER THE SHOP RADIOGRAPHIC TEST OVER, THIS SEAL WELD IS TO BE DONE WITH MINIMUM TWO PASSES.
10. AFTER THE SITE RADIOGRAPHIC TEST OVER, THIS SEAL WELD IS TO BE DONE WITH MINIMUM TWO PASSES.

REV 06	DATE 03.07.05	ALTERED : P.S.	REV 05
zone		CHD & APPD : R.T. <i>R. S. M. S.</i>	zone
		DRG. RETRACED.	
		NOTE Nos. 6 & 7	
		REVISED IN LINE WITH	
		IBR REC. 387 AMENDMENT	
		DL. 09.04.2002	

DATE	ALTERED :	REV	DATE	ALTERED :	REV	DATE	ALTERED :
04.01.04	CHD & APPD :	04	23.04.91	CHD & APPD :	03	26.08.91	CHD & APPD :
NOTE--# ADDED		NOTE No. 6 & 7 ADDED IN BOM DIAMETER "Y" THICK "Y" ADDED FOR VAR.NO. 01 & 02		RETRACTED, NOT ALTERED MATERIAL CODE ADDED.		A SLOT GIVEN IN THE HEAD OF THE PLUG	

QTY	UNIT	DESCRIPTION	ITEM NO	DRAWING NUMBER	ITEM NO	MATERIAL CODE	UNIT WEIGHT	QUANTITY
02		RG PLUG AS M2-(D=24, T=24)	5108 0022 22		94 331 008	A	0.300	
					S182 F22 CL3	1		
01		RG PLUG CS M27-(D27, T=24)	5108 0022 21		94 331 008	A	0.300	
					SA 105	1		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		Bharat Heavy Electricals Ltd		DATE	
		UNIT: HIGH PRESSURE BOILER PLANT		05/84	
TIRUCHIRAPPALLI - 620014		SCALE		BOILERHOUSE	
		N.T.S.		05/84	
300T PP		WEIGHT (kg)	S.K.		DATE
CODE	121	REFLECTOR UNIT	G.U.		05/84
		WT	S.V.		05/84
		FOR TO ASSTY / TO DISM			
		6108-0022-02			
TITLE		DRAWING NO :		REV	
PLUG FOR RADIOGRAPHIC		6108-0022		06	
TEST ACCESS HOLE					

ENQ NO : BENDS:2011-12 DT 23-04-11

ANNEXURE C- PRICE FORMAT

Bend Type List and Price Format: Rates to be quoted per Piece as per Type Drawing, Finished with EP as per Drawing in Rupees including Transportation to Site (FOR Site)

Material Group SA 335 P91- Attachments Gr 91, F91								
Sl.No	Type	Drawing No.	Dia in mm	Tentative Qty Nos.	Exworks Price/Piece in Rs	Transport Charges in Rs	Taxes applicable @.... % including service Tax if any Amount in Rs	Total Price/Piece in Rs
1	Loose Bend	Bend-001	219.1 to 406.4	225				
2	Bend with carrier Plate and or Stubs up to 2	Bend-003	219.1 to 406.4	134				
3	Bend with Trunion and or multiple stubs upto 8	Bend-002	219.1 to 406.4	41				

Tentative Project Sites:

ADHUNIK POWER, ANPARA, AVANTHA BHANDAR, BOKARO-A, GVK GOVINDWAL, HINDALCO MAHAN, HINDALCO ADITYA, IEPL-BELA, JINDAL DERANG, JINDAL RAIGARH, SATPURA, SHREE SINGAJI, TRIPURA, TUTICORINE, AMARAVATHI, CHHABRA, CHANDWA, KORBA WEST, MARWA, NASIK, SIKKA.

ANNEXURE – D TO BHEL ENQUIRY NO. BENDS:2011-12 DT. 23-04-11

PIPES FOR BENDS MAY BE ISSUED IN RUNNING METER TO COVER REQUIREMENTS OF MORE THAN ONE ITEM. SCOPE INCLUDES CUTTING AFTER GETTING APPROVAL OF THE CUTTING PLAN. COST OF SCRAP WILL BE RECOVERED FROM VENDOR AT BHEL APPLICABLE RATES. FULL COST OF MATERIAL [PIPE COST AS APPLICABLE PER METER PLUS BHEL OVERHEADS AS APPLICABLE] WILL BE RECOVERED FROM THE VENDOR IN CASE OF ANY DAMAGE / DEFECT DURING HANDLING AND MANUFACTURE BY THE VENDOR. OFF-CUTS [LENGTH OF 500 MM AND ABOVE] ARE TO BE RETURNED TO BHEL / TRICHY ON FREIGHT TO BE BILLED AT BHEL BASIS. MATERIAL ACCOUNTAL TO BE DONE WITH IN 30 DAYS AFTER THE DISPATCH OF ALL THE ITEMS FOR THE PURCHASE ORDER.

MANAGER/ PURCHASE