

**Enquiry No 4102200001 dt 05.01.2022**  
**Procurement of BW Fittings (CS & AS)**

Dear Sir / Madam,

Sub: Procurement of BW Fittings (CS & AS) as per BHEL Enquiry- 4102200001 dt 05.01.2022.

We are pleased to inform that Indigenous Limited Tender Enquiry has been floated for the “**Procurement of BW Fittings (CS & AS)**” as per BHEL Enquiry No 4102200001 dt 05.01.2022. Prospective suppliers are requested to submit their offer thru BHEL’s E-Procurement portal (<https://eprocarebhel.co.in/nicgep/app>) in Two Parts basis (Part I- Techno-Commercial bid; Part II- Price bid) on or before **15.00 HRS IST** on **10.01.2022**. Part I bid will be opened on **16.30 HRS** on the tender due date.

All corrigenda, addenda, amendments, time extensions, clarifications etc (if any) will be hosted on BHEL’s E-Procurement portal, BHEL’s tender notification (<http://www.bhel.com>). Such corrigenda, addenda, amendments, time extensions, clarifications etc will not be published in newspapers or any other media. Bidders shall regularly visit the above websites to keep themselves updated.

The following are enclosed for information-

- |                                           |                                                     |
|-------------------------------------------|-----------------------------------------------------|
| <b>1.0</b> Techno commercial requirements | <b>6.0</b> Applicable items list                    |
| <b>2.0</b> Technical Delivery Conditions  | <b>7.0</b> Annexure A- General Terms & Conditions   |
| <b>3.0</b> Quality Plan                   | <b>8.0</b> NDA format                               |
| <b>4.0</b> Technical Deviation Format     | <b>9.0</b> Make in India declaration format         |
| <b>5.0</b> Packing Procedure              | <b>10.0</b> Edge Preparation and Tolerance Drawings |

Bids on Two Part basis shall be submitted in line with the Terms & Conditions of the NIT. Care shall be given to submit the following documents along with Part I offer without fail-

- Technical deviation sheet (in case of any deviations)
- UDHYAM certificate for MSE and Make in India declaration in formats attached (in case purchase preference is applicable)

Any clarification on technical specifications can be obtained from BHEL before tender opening. Suppliers are welcome to have pre-bid meeting with BHEL Engineers for better understanding our requirements. Please note that as per BHEL’s Policy, **BHEL cannot allow price impact post Part I opening for the requirement / scope of supply which is a part of specifications of our Enquiry.** Hence, please read specification / documents thoroughly and submit your offer as per specifications of Enquiry. In case of any query / un-clarity on any of the clause / requirement of specification, please get them clarified from BHEL before submission of offer. No deviation & request regarding un-clarity / contradictory conditions / ambiguity of specifications would be entertained after opening of Part I bid. Vendors are required to thoroughly understand the scope of supply and submit their quotation before the Enquiry due date indicated above.

**Enquiry No 4102200001 dt 05.01.2022**  
**Procurement of BW Fittings (CS & AS)**

In the event of any Technical or Commercial queries, the same may please be addressed to the following concerned before Part I opening-

- Sandeep, Sr. Engineer / Purchase- [sandeepj@bhel.in](mailto:sandeepj@bhel.in), +91-9445159877, +91-044-28161315
- Shreelekha S Chandar, DM /Purchase -[shreelekha@bhel.in](mailto:shreelekha@bhel.in), +91-044-28161385

In the event of any queries during submission of the tender thru BHEL's E-Procurement NIC portal, you may pls contact-

- NIC Customer Care- [support-eproc@nic.in](mailto:support-eproc@nic.in), 0120-4001002, 0120-4001005, 0120-6277787

General Note-

- BHEL reserves the right to increase or decrease the tendered quantity and split the tendered quantity. BHEL reserves the right to negotiate or re-float the tender opened if L1 price is not the lowest acceptable price to them inter-alia other reasons.
- One agent cannot represent two or more suppliers or quote on their behalf in a particular tender. If so found at any stage, BHEL Piping Centre is likely to cancel bids of such suppliers. Further, such Indian Agent is likely to be de-listed (Black listed for business from BHEL). Any agent representing the supplier shall upload agency agreement along with the part-I bid of the tender.
- Any new supplier may register themselves for the material groups of BHEL Piping centre through online application in supplier registration portal at [supplier.bhel.in](http://supplier.bhel.in).
- In order to protect the commercial interests of BHEL, it becomes necessary to take action against suppliers / contractors by way of suspension of business dealings, who either fail to perform or are in default without any reasonable cause, cause loss of business / money / reputation, indulge in malpractices, cheating, bribery, fraud or any other misconduct or formation of cartels so as to influence the bidding process or influence the price etc. Suspension of Business Dealings could be in the form of "Hold" or "Banning" a supplier / contractor or a bidder or an applicant for registration as a registered supplier. For this purpose, the abridged version of guidelines hoisted at website [http://www.bhel.com/vender\\_registration/vender.php](http://www.bhel.com/vender_registration/vender.php) (Suspension of business dealings with suppliers / contractors) is being followed across all BHEL units. Bidders shall keep themselves aware of these guidelines before submission of their quote.

For BHEL Piping Centre,

Sandeep  
SE / Purchase  
+91-044-28161315  
+91-9445159877

**Enquiry No. 4102200001 dt. 05.01.2022- Procurement of BW Fittings (CS & AS) for HPCL Vizag Project**

Sl No	BHEL requirement	Bidder response (Accepted / Not Accepted, Applicable/ Not Applicable)
1	Quotation no	
2	Quotation date	
3	Currency of quote	
4	Applicable GST % shall be indicated	
5	<p><b>Technical requirements-</b></p> <p>1) TDG 102 Rev 09 is applicable.                  2) Quality Plan as per QPG 46 Rev 01 is applicable.                  3) Manufacturing and Supply as per applicable standard and BHEL Drawing if applicable.                  4) Packing procedure shall be as per PC-PKG-01.                  5) EP shall be as per DRG 3-80-300-19825/04 if not indicated explicitly in the drawing.                  6) Fittings tolerance shall be as per drawing 4-80-301-26192 Rev 01.</p>	
6	<p><b>Technical deviations (if any)-</b></p> <p>Bidders may note that except for the deviations listed in the 'Enquiry Deviation Format', the bid shall be deemed to comply with all the requirement in the bidding documents and the bidders shall be required to comply with all terms, conditions and specifications of the bidding documents irrespective of any mention to the contrary, anywhere else in the bid. Deviations taken by vendors (if any) are subject to BHEL approval. If deviation format is not submitted by bidder, it will be construed that the bidder complies to all the technical requirements of BHEL without any deviation.</p>	
7	<p><b>Bid validity-</b></p> <p>90 days from the date of Part I bid opening</p>	
8	<p><b>Delivery period-</b></p> <p>8 weeks from LOI / PO date. Mandatory to accept else bid shall be rejected</p>	
9	<p><b>Delivery term-</b></p> <p>'FOR' BHEL Trichy / Site (all inc of P&amp;F, F&amp;I, testing, inspection charges etc).</p>	
10	<p><b>Liquidated Damage clause-</b></p> <p>1 % of the price for each week of delay upto a maximum of 15% of the price of delayed / undelivered portion. For the purpose of LD calculation, LR date will be considered .</p> <p><b>In case of deviation to BHEL's standard LD terms, loading will be applicable and will be limited to the extent to which it is not agreed to by the bidder.</b></p>	
11	<p><b>Evaluation &amp; Ordering-</b></p> <p>1. Evaluation will be done based on itemwise rate.                  2. Item wise ordering will be resorted to.                  3. Minimum Order Quantity (MOQ) / Minimum Order Value (MOV) condition will not be accepted. <b>Bids of such bidders (if any) insisting for MOQ / MOV will be rejected.</b></p>	
12	<p><b>Payment term-</b></p> <p>100% payment after 60 days after receipt and acceptance of materials (site acknowledgement to be submitted in case of Direct to Site supplies).                  FOR MSE VENDORS PAYMENT SHALL BE AS PER MSME ACT.                  No other payment terms will be accepted. If vendors propose for any other payment term other than indicated above, such bids will be rejected.</p>	
13	<p><b>Price Bid opening-</b></p> <p>Opening of Part II bid will be thru Sealed Price Bid Opening and Price finalization shall be done by Price Bid opening. BHEL may decide for further negotiation with L1 bidders(refer Annexure A for details).                  Price bids of Techno-Commercially acceptable bidders will only be considered for price bid opening.</p>	
14	<p><b>Cancellation / termination of contract, default / breach of contract and risk purchase-</b></p> <p>As per BHEL's Standard Cost and Risk clause indicated in Annexure A enclosed. By submitting the bid, vendor explicitly accepts to BHEL's requirement.</p> <p><b>Bids deviating from BHEL's standard condition will be rejected.</b></p>	
15	Acceptance to Non-Disclosure Agreement as per Annexure-A. Declaration shall be submitted for same.	
16	<p><b>Purchase Preferences for the Enquiry-</b></p> <p>If Make in India preference is applicable as per Annexure A to NIT, declaration format as per NIT shall be submitted.                  In the event of non-submission of declaration, purchase preference will not be extended to bidders.</p>	
17	<p><b>Purchase Preferences for the Enquiry-</b></p> <p>If MSE preference is applicable as per Annexure A to NIT, supporting documents as per NIT shall be submitted.                  In the event of non-submission of supporting documents, purchase preference will not be extended to bidders.</p>	
18	All other terms and conditions other than those indicated above shall be as per Annexure A- General Terms and Conditions enclosed. Confirm acceptance for the same.	
19	<p><b>General note-</b></p> <p>Any disparity to terms indicated above, Annexure A and bidders offer, only the agreed terms and conditions above / Annexure shall stand valid. Bidders terms and conditions which are in conflict will be ignored and will not be taken into consideration by BHEL.</p>	



**1.0 SCOPE: -**

The fittings shall meet Indian Boiler Regulations (IBR), unless otherwise specified, and the following requirements in addition to the standards specified in the Purchase Order (PO).

**2.0 RAW MATERIALS: -**

- a) All fittings shall be of seamless construction unless otherwise specified in the purchase order. Pipes used for manufacturing of seamless fittings shall be seamless pipes or forgings only.
- b) All pipes used for fittings shall meet the respective specification. The test certificate shall be furnished with Traceability
- c) **For Gr-91 Pipes:** Shall be procured from the Mills listed in document ref.QCP:19(latest revision). For pipe sources not listed in QCP:19, credentials shall be submitted by the vendor along with offer for BHEL review and approval. Indigenous vendors shall procure the raw material for Alloy Steel other than SA 335 P91 from IBR approved "creep resistance steel makers".
- d) Raw material Steel for IBR forging items to be inspected at Mill & test certificate countersigned by IBR approved Authority, if the mill is not approved under IBR as well-known steel maker.
- e) **For Gr-91 Forgings:** The raw material shall be procured from the Mills listed in document ref.QCP:18(latest revision). For raw material sources not listed in QCP:18, credentials shall be submitted by the vendor along with offer for BHEL review and approval. Indigenous vendors shall procure the raw material for Alloy Steel other than SA182 F91 from IBR approved sources.

**3.0 MANUFACTURING & TESTING REQUIREMENTS:**

**3.1 MANUFACTURING PROCESS :**

**(i) Seamless Fittings:-**

- A) Tees & Reducers :** Upto 80mm thickness : Formed Type.  
Above 80mm thickness Formed or Forged type.
- B) Elbows :** Formed type for all thickness

**(ii) Welded Fittings:-** Supplied only if indicated in P.O and shall be of **Two-Half construction.**

**3.2 Machined Fittings (Max size permitted 4"- directly from bar) – Reducers, Couplings & End Caps : Fittings machined from Castings are prohibited.**

<b>Starting material</b>	Heat treatment	CS – Normalised AS – Normalised & Tempered SS & Duplex SS (UNS32205) – Solution Annealed
	Rolled or Forged Bars (Killed Steel)	NDE – UT To be done after Heat treatment. For size above 40mm – to be done as per ASTM A 388 Acceptance to - ASME Sec.VIII Div.2 Cl.3.3.4. Actual measured notch depth to be specified in Test Certificate.
<b>Finished fitting (after machining)</b>	Heat treatment	Not required
	NDE (for all sizes)	<ul style="list-style-type: none"> <li>• MT (100%) - Procedure - As per ASTM E709. No linear indications are acceptable (Linear Indication : Length <math>\geq</math> 3XWidth) For WP91 Wet MPI shall be done</li> <li>• LPI – <b>SS &amp; Duplex SS (UNS32205):</b> Shall be done as per ASTM E165. No linear indications are acceptable.</li> </ul>
	Hardness	Base material Hardness for. WPB, WPC, WP11, WP12, WP22 – 197 HBW max. WP91 - 190-250 HBW – 100% to be checked Duplex SS (UNS32205) – 300BHN max
	Dimension	ASME B16.9 or as per Engineering Drawing indicated in Purchase Order.
	Bend Test (for IBR items)	Specimen: 19mm. Thickness (t) x 25.4mm width - cold bent 180 deg. over thin section without fracture, mandrel radius: CS : $\leq$ 6.35 mm. AS, SS : $\leq$ 1.5 times specimen thick.

Vivekananda Yellu/ QA	Rajitha K / MM	C. Karunakaran / Engg	Madhavankutty.A.P / Quality
Prepared by	Reviewed by		Approved by



### 3.3 Seamless Formed Fittings – Ells, Tees, Reducers, Dished end (End cover / Cap)

<b>Starting material:</b>	Heat treatment shall be as per starting material specification	CS – Normalised AS – Normalised & Tempered SS & Duplex SS (UNS32205) – Solution Annealed																													
1) Tube & Pipe	NDE – UT	UT shall be done as per - ASTM E 213 with longitudinal notch of 5% wall thickness with max.1.5mm and min. 0.3mm. Actual measured notch depth to be specified in Test Certificate.																													
2) Forged blank (For End covers)	NDE – UT	For size above 40mm UT shall be done as per - ASTM A 388 In acceptance to - ASME Sec.VIII Div.2 Cl.3.3.4. Actual measured notch depth to be specified in Test Certificate.																													
3) Plate	NDE – UT	For size above 10mm SA 578, Acceptance Level – B. Actual measured notch depth to be specified in Test Certificate.																													
<b>Finished fitting (cold/hot forming)</b>	Heat treatment after forming	<p>Shall be done as per SA234 and follow below table for heat treatment values.</p> <table border="1"> <thead> <tr> <th rowspan="2">Material</th> <th colspan="2">Heat Treatment Temp, °C</th> <th colspan="2">Soaking time, hr/in</th> </tr> <tr> <th>Normalising</th> <th>Tempering</th> <th>Normalising</th> <th>Tempering</th> </tr> </thead> <tbody> <tr> <td>CS- WPB &amp; WPC</td> <td>870-900</td> <td>-</td> <td>1/2</td> <td>-</td> </tr> <tr> <td>AS-WP11 &amp; WP12</td> <td>920-960</td> <td>640-670</td> <td>1/2</td> <td>1</td> </tr> <tr> <td>AS-WP22</td> <td>920-960</td> <td>680-710</td> <td>1/2</td> <td>1</td> </tr> <tr> <td>AS- WP91</td> <td>1040-1080</td> <td>760-780</td> <td>1/2</td> <td>1</td> </tr> </tbody> </table> <p><b>Stainless Steel - All grades &amp; Duplex SS (UNS32205):</b> - Solution Annealed: 1050-1100 Deg C            Soaking time : ½ hr per inch with minimum 15 minutes  <b>Note:</b> Normalising shall be done for a minimum time of 30 min while tempering to be done for a minimum time of 60min for all materials except SS &amp; Duplex SS (UNS32205).</p>	Material	Heat Treatment Temp, °C		Soaking time, hr/in		Normalising	Tempering	Normalising	Tempering	CS- WPB & WPC	870-900	-	1/2	-	AS-WP11 & WP12	920-960	640-670	1/2	1	AS-WP22	920-960	680-710	1/2	1	AS- WP91	1040-1080	760-780	1/2	1
	Material	Heat Treatment Temp, °C		Soaking time, hr/in																											
		Normalising	Tempering	Normalising	Tempering																										
	CS- WPB & WPC	870-900	-	1/2	-																										
	AS-WP11 & WP12	920-960	640-670	1/2	1																										
	AS-WP22	920-960	680-710	1/2	1																										
	AS- WP91	1040-1080	760-780	1/2	1																										
	NDE (for all sizes) – Except for Plate formed Dished end	<ul style="list-style-type: none"> <li>• MT (100%) - Shall be as per - ASTM E709 No linear indications are acceptable. For WP91 Wet MPI shall be done.</li> <li>• LPI – <b>SS &amp; Duplex SS (UNS32205):</b> Shall be done as per ASTM E165. No linear indications are acceptable.</li> </ul>																													
	NDE–for Plate formed Dished end	For Plate Formed Dished end – 100% MT as per - ASTM E709 on both inner and outer surfaces of Knuckle radius and weld ends. No linear indications are acceptable. UT shall be as per A578 Level-B. Actual measured notch depth to be specified in Test Certificate.																													
NDE – UT For OD >= 200mm <b>or</b> W.T >= 6mm	<p>If made from Pipe &amp; Tube – Shall be done as per - ASTM E 213 with longitudinal notch of 5% wall thickness with max.1.5mm and min. 0.3mm. Actual measured notch depth to be specified in Test Certificate.</p> <p>If made from Forging - Shall be as per - ASTM A 388 In acceptance to - ASME Sec.VIII Div.2 Cl.3.3.4. Actual measured notch depth to be specified in Test Certificate.</p>																														
Hardness	Base material Hardness for WPB, WPC, WP11, WP12, WP22 – 197 HBW max. WP91 - 191-250 HBW – 100% to be checked Duplex SS (UNS32205) – 300HBW max																														
Dimension	ASME B16.9, As per Engineering drawing indicated in Purchase Order. The ends of reducers shall have a straight portion of Minimum 13mm.																														
Bend Test (if starting material is forged blank) (for IBR items)	Specimen: 25.4 mm x 19 mm thick - cold bent 180 deg. over thin section without fracture, internal radius of bend: CS :<=6.35 mm. AS, SS: <=1.5 times specimen thick.																														

Vivekananda Yellu/ QA	Rajitha K / MM	C. Karunakaran / Engg	Madhavankutty.A.P / Quality
Prepared by	Reviewed by		Approved by



### 3.4 Forged Fittings –Tees, Reducers, Couplings, Flanges & Dished End (End cover/Cap)

**Shall be forged to the shape with a minimum forge reduction ratio of 1:4. Fitting shall not be machined from a forged block.**

<b>Starting material:</b> Rolled or Forged Bars, Blooms, Billets (Killed steel)	Heat treatment shall be as per starting material specification	CS – Normalised AS – Normalised & Tempered SS & Duplex SS (UNS32205) – Solution Annealed																													
	NDE – UT	To be done for diameter or thickness above 40mm Procedure - As per ASTM A388 In acceptance to - ASME Sec.VIII Div.2 Cl.3.3.4. Actual measured notch depth to be specified in Test Certificate.																													
<b>Finished fitting</b>	Heat treatment	Shall be done as per SA234 and follow below table for heat treatment values.																													
	<b>After forging (cold/hot forging)</b>	<table border="1"> <thead> <tr> <th rowspan="2">Material</th> <th colspan="2">Heat Treatment Temp, °C</th> <th colspan="2">Soaking time, hr/in</th> </tr> <tr> <th>Normalizing</th> <th>Tempering</th> <th>Normalizing</th> <th>Tempering</th> </tr> </thead> <tbody> <tr> <td>CS- WPB &amp; WPC</td> <td>870-900</td> <td>-</td> <td>1/2</td> <td>-</td> </tr> <tr> <td>AS-WP11 &amp; WP12</td> <td>920-960</td> <td>640-670</td> <td>1/2</td> <td>1</td> </tr> <tr> <td>AS-WP22</td> <td>920-960</td> <td>680-710</td> <td>1/2</td> <td>1</td> </tr> <tr> <td>AS- WP91</td> <td>1040-1080</td> <td>760-780</td> <td>1/2</td> <td>1</td> </tr> </tbody> </table>	Material	Heat Treatment Temp, °C		Soaking time, hr/in		Normalizing	Tempering	Normalizing	Tempering	CS- WPB & WPC	870-900	-	1/2	-	AS-WP11 & WP12	920-960	640-670	1/2	1	AS-WP22	920-960	680-710	1/2	1	AS- WP91	1040-1080	760-780	1/2	1
		Material		Heat Treatment Temp, °C		Soaking time, hr/in																									
			Normalizing	Tempering	Normalizing	Tempering																									
		CS- WPB & WPC	870-900	-	1/2	-																									
		AS-WP11 & WP12	920-960	640-670	1/2	1																									
	AS-WP22	920-960	680-710	1/2	1																										
	AS- WP91	1040-1080	760-780	1/2	1																										
<b>Stainless Steel - All grades &amp; Duplex SS (UNS32205):</b> - Solution Annealed: 1050-1100 Deg C Soaking time : ½ hr per inch with minimum 15 minutes  <b>Note:</b> Normalising shall be done for a minimum time of 30 min while tempering to be done for a minimum time of 60min for all materials except SS & Duplex SS (UNS32205).																															
NDE – UT For OD >= 200mm <b>or</b> W.T >= 6mm	UT shall be done as per - ASTM A388 In Acceptance to - ASME Sec.VIII Div.2 Cl.3.3.4. Actual measured notch depth to be specified in Test Certificate.																														
NDE (for all sizes)	MT- (100%) Shall be done as per ASTM E709. No linear indications are acceptable.  For WP91 Wet MPI shall be done.  LPI – <b>SS &amp; Duplex SS (UNS32205):</b> Shall be done as per ASTM E165. No linear indications are acceptable.																														
Hardness	WPB, WPC, WP11, WP12, WP22 – 197 BHN max. WP91 - 191-250 BHN – 100% to be checked Duplex SS (UNS32205) – 300BHN max																														
Dimension	ASME B16.9 or ASME B16.5 or as per Engineering drawing indicated in Purchase order.																														
Bend Test (for IBR items)	Specimen: 19mm. Thickness (t) x 25.4mm width - cold bent 180 deg. over thin section without fracture, mandrel radius: CS :<=6.35 mm. AS, SS : <=1.5 times specimen thick.																														

Vivekananda Yellu/ QA	Rajitha K / MM	C. Karunakaran / Engg	Madhavankutty.A.P / Quality
Prepared by	Reviewed by		Approved by



### 3.5 Welded Fittings– Ells, Tees, Reducers (Two-Half construction):

Pipe made from plate and long seam welded shall not be used as a starting material.

<b>Starting material:</b> Plate	NDE – UT	For thickness above 10mm SA 578, Acceptance Level – B.																													
<b>Finished fitting</b>	Heat Treatment	Shall be done as per SA234 and follow below table for heat treatment values.																													
	<b>After forming</b>	<table border="1"> <thead> <tr> <th rowspan="2">Material</th> <th colspan="2">Heat Treatment Temp, °C</th> <th colspan="2">Soaking time, hr/in</th> </tr> <tr> <th>Normalizing</th> <th>Tempering</th> <th>Normalizing</th> <th>Tempering</th> </tr> </thead> <tbody> <tr> <td>CS- WPBW &amp; WPCW</td> <td>870-900</td> <td>-</td> <td>1/2</td> <td>-</td> </tr> <tr> <td>AS-WP11W &amp; WP12W</td> <td>920-960</td> <td>640-670</td> <td>1/2</td> <td>1</td> </tr> <tr> <td>AS-WP22W</td> <td>920-960</td> <td>680-710</td> <td>1/2</td> <td>1</td> </tr> <tr> <td>AS- WP91W</td> <td>1040-1080</td> <td>760-780</td> <td>1/2</td> <td>1</td> </tr> </tbody> </table>	Material	Heat Treatment Temp, °C		Soaking time, hr/in		Normalizing	Tempering	Normalizing	Tempering	CS- WPBW & WPCW	870-900	-	1/2	-	AS-WP11W & WP12W	920-960	640-670	1/2	1	AS-WP22W	920-960	680-710	1/2	1	AS- WP91W	1040-1080	760-780	1/2	1
		Material		Heat Treatment Temp, °C		Soaking time, hr/in																									
			Normalizing	Tempering	Normalizing	Tempering																									
		CS- WPBW & WPCW	870-900	-	1/2	-																									
		AS-WP11W & WP12W	920-960	640-670	1/2	1																									
	AS-WP22W	920-960	680-710	1/2	1																										
	AS- WP91W	1040-1080	760-780	1/2	1																										
<b>Stainless Steel - All grades &amp; Duplex SS (UNS32205):</b> - Solution Annealed: 1050-1100 Deg C Soaking time : ½ hr per inch with minimum 15 minutes																															
Post Weld Heat Treatment (PWHT)	PWHT shall be done as indicated below.																														
	<table border="1"> <thead> <tr> <th>Material</th> <th>Heat Treatment Temp, °C</th> <th>Soaking time</th> </tr> </thead> <tbody> <tr> <td>CS- WPB-W &amp; WPC-W <b>If weld thk &gt; 19mm</b></td> <td>595-635</td> <td>2.5min per mm of weld thk; Minimum 30minutes.</td> </tr> <tr> <td>AS-WP11-W&amp;WP12-W</td> <td>650-680</td> <td rowspan="3">2.5min per mm of weld thk; Minimum 60minutes.</td> </tr> <tr> <td>AS-WP22-W</td> <td>690-710</td> </tr> <tr> <td>AS- WP91-W</td> <td>760-780</td> </tr> </tbody> </table>	Material	Heat Treatment Temp, °C	Soaking time	CS- WPB-W & WPC-W <b>If weld thk &gt; 19mm</b>	595-635	2.5min per mm of weld thk; Minimum 30minutes.	AS-WP11-W&WP12-W	650-680	2.5min per mm of weld thk; Minimum 60minutes.	AS-WP22-W	690-710	AS- WP91-W	760-780																	
Material	Heat Treatment Temp, °C	Soaking time																													
CS- WPB-W & WPC-W <b>If weld thk &gt; 19mm</b>	595-635	2.5min per mm of weld thk; Minimum 30minutes.																													
AS-WP11-W&WP12-W	650-680	2.5min per mm of weld thk; Minimum 60minutes.																													
AS-WP22-W	690-710																														
AS- WP91-W	760-780																														
NDE (for all sizes)	<ul style="list-style-type: none"> <li>• MT (100%)- Procedure - As per ASTM E709. No linear indications are acceptable For WP91 Wet MPI shall be done</li> <li>• LPI – <b>SS &amp; Duplex SS (UNS32205)</b> : Shall be done as per ASTM E165. No linear indications are acceptable.</li> </ul>																														
NDE – for Weld	• RT (100%)- Acceptance norm shall be UW 51 of ASME Sec VIII DIV-1.																														
Hardness	<b>Base material Hardness</b> for WPB, WPC, WP11, WP12, WP22 – 197 BHN max. WP91 - 191-250 BHN – 100% to be checked Duplex SS (UNS32205) – 300BHN max <b>Weld Hardness</b> WP91 - 300 BHN max. – 100% to be checked																														
Dimension	ASME B16.9 or as per Engineering drawing indicated in Purchase order.																														
Bend Test (for IBR items)	Specimen: 19mm. Thickness (t) x 25.4mm width - cold bent 180 deg. over thin section without fracture, mandrel radius: CS : ≤6.35 mm. AS, SS : ≤1.5 times specimen thick.																														

### 4.0 GENERAL REQUIREMENTS:

- Carbon < or = 0.25% for WPB (all thickness) and WPC (thickness < or = 20mm)
- Carbon < or = 0.30% for WPC (thickness > 20mm)
- If UT not done on the starting material, the same shall be done by the fitting manufactures before forming / fabrication.**

Vivekananda Yellu/ QA	Rajitha K / MM	C. Karunakaran / Engg	Madhavankutty.A.P / Quality
Prepared by	Reviewed by		Approved by



- d) **Mechanical Testing** –Test samples shall be tested in the Heat treatment of fitting delivered condition.
1. **Tensile Test**:- One sample of each specification, heat, heat treatment lot and size shall be subjected to Tension Test as per applicable standard.
  2. The following **supplementary tests** shall be carried out for specifications namely SA 234 WPC / WP11 / WP12 / WP22 / WP91 (No supplementary test applicable for SA 234 WPB)
    - i) Product analysis – one / heat / size.
    - ii) Tension test – one / heat / heat treatment lot / size
- e) **Photomicrograph test for WP91**:- Photomicrograph test shall be carried out on one per heat, per size. Acceptance norms - The Material shall be free from any micro fissures. Microstructure shall show tempered martensite and also to be examined for any grain growth. Photomicrograph with 500x (Min) magnification along with Photomicrograph report to be provided. The actual magnification shall be indicated.
- f) In case of welded fittings, WPS, PQR & welder qualification shall be approved by BHEL, prior to start of welding.
- g) Unless otherwise specified in the P.O SA 234 WP 11/12/22 fittings shall be supplied as per class1.
- h) **Stainless Steel (SS) & Duplex SS (UNS32205)** : Finished fittings shall be checked for radioactive contamination and reported. Survey meter shall be used to measure at 5cm near the surface. Acceptance limits: Shall be less than 0.1 milli Rontgen (MR) per hr or 1 micro Sievert per hr.

#### 5.0 POSITIVE MATERIAL IDENTIFICATION (PMI) FOR ALLOY STEEL FITTINGS.

Each alloy steel fitting shall be checked for the correctness of the material during manufacturing and final inspection using X-ray fluorescence principle or spark emission spectrography.

#### 6.0 WORKMANSHIP, FINISH AND REPAIR

All items shall have smooth, workman like finish, and to be free from scale & defects like laps, seams, folds, cracks, etc. Pickled & Passivated as per ASTM A380 for SS items & Duplex SS (UNS32205). Surface defects can be removed by mechanical means and defective areas smoothly dressed up with the adjacent surface. Minimum dimension after repair shall meet drawing / Specification. Repairs by fusion welding are prohibited.

**Flatness** on curved surfaces of fittings shall be limited to 6% of nominal OD.

**Thickness:** Outer Diameter & Transition: Variation shall be merged smooth to min 1:4 taper.

#### 7.0 PAINTING, COLOUR CODING & MARKING

7.1 **PAINTING:** All fittings (except stainless steel and galvanized) shall be **painted** on the external surface as given below (unless otherwise specified): -

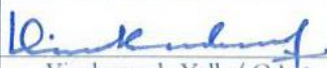
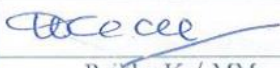

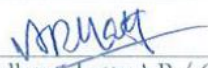
- a) **Surface preparation:** Blast cleaning
- b) **Primer coat:** One coat of 60 microns of In-Organic Ethyl Zinc Silicate primer.
- c) **Finish coat:** Two coats of 20 microns each of Heat Resistance Aluminium paint to IS13183 Gr-1.
- d) **Total DFT:** 100 microns minimum.
- e) **Shade:** Aluminium -- for all fittings.

The internal surface shall be protected with rust preventive coating or rust inhibitor.

Stainless steel and Duplex SS (UNS32205) fittings need not be painted.

7.2 **COLOUR CODING:** All fittings shall be colour coded circumferentially at all ends as given below:

Material Specification	Colour Code
WPB	Red
WPC	Blue
WP11	Green & White

 Vivekananda Yellu/ QA Prepared by	 Rajitha K / MM Reviewed by	 C. Karunakaran / Engg Reviewed by	 Madhavankutty.A.P / Quality Approved by
----------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------



<b>SA 234</b>	WP12	Black & Red
	WP22	Blue & Red
	<b>WP91</b>	Brown & Red
<b>SA 403</b>	WP304	Blue & Yellow
	WP304H	Black, Blue & Yellow
	WP316	Black & Green
	WP316L	Blue, Brown & Yellow
	WP321	Blue & Brown
	WP347	Yellow & Black
<b>SA815 (Duplex Stainless Steel)</b>	Red, White & Green	

### 7.3 MARKING (In English only):

7.3.1 The fittings dispatched to **BHEL Stores** shall be hard punched / etched with Material code, Heat number, material specification, maker's emblem, Inspectors seal, Running Serial number for the P.O. quantity and Statutory authorities seal as applicable.

In addition, the above details along with size shall be paint stencilled on the fittings. If the thickness of the fitting is less than 6 mm, punching is not permitted and the above details shall be paint stencilled. Fittings of size up to 2" (50mm) shall be tied together and the above details shall be punched / engraved in a separate tag and tied to it.

7.3.2 In case of fittings dispatched directly to project site as **DTS**, material code shall be replaced with DU code (14-digit work order du detail) as given by purchase during DTS advice. All other details shall be hard punched & stencilled as indicated in Para 7.3.1.

Sample format for Punching & Stencilling is given below.

Vendor code & Name	:	<div style="border: 1px solid black; padding: 5px; text-align: center;">Makers Emblem Insp. Authority Stamp</div>
Material code / DU details :	:	
Melt No.	:	
Material Specification	:	
Qty.	:	
Serial No	: (Example : 1,2,3,.....& 25)	
Weight.	:	

### 8.0 PACKING AND END PROTECTION:

Machined ends of the fittings shall be well Protected using end caps and fittings shall be suitably packed in box / crate as per the Packaging procedure PC: PKG: 01 to avoid transit & other damages.

### 9.0 INSPECTION & CERTIFICATION (In English only): -

9.1 All fittings are to be Inspected at the manufacturer's works by the Inspection agencies / authorities as per IBR and as indicated in the P.O. Inspection certificate in IBR Form III C & Form III-I for Dished Ends shall be submitted along with the Work Test Certificate countersigned by the above authorities and shall include the following (Three ink signed originals required).

1. Test Certificate Number & date.
2. BHEL P.O Number & Amendment Number
3. BHEL P.O. Serial Number
4. BHEL TDC Number
5. Size-wise Quantity
6. Specification, Grade & Year of code.

Vivekananda Yellu/ QA	Rajitha K / MM	C. Karunakaran / Engg	Madhavankutty.A.P / Quality
Prepared by	Reviewed by		Approved by



7. Heat/Melt Number
8. Starting material details with traceability.
9. Steel making process
10. Ladle Analysis of Raw Material and product analysis of fitting.
- \*11. Supplementary Test (Product analysis, Tension test.) results.
12. Tensile Test Report
- \*13. Guarantee of HTP shall be given as follows:- "Fittings are capable of withstanding without failure, leakage or impairment of their serviceability a hydrostatic test pressure equal to that prescribed for the specified matching pipe of equivalent material".

\*Details furnished in the Tests certificate in lieu of chart/report is acceptable.

9.2 The following reports shall be **furnished separately** along with the IBR Forms & MTC indicated in para 9.1 above.

- i. NDE reports for MT, RT, UT (UT Reports in soft copy + hard copy). Actual measured UT-notch depth to be specified in Test Certificate.
- ii. Positive Material identification (PMI) report for Alloy steel.
- iii. Heat Treatment Chart.
- iv. Hardness Test report.
- v. Photomicrograph test report along with photomicrograph with minimum 500x magnifications.
- vi. Dimensional report (as built drawing with dimensions)
- vii. Thickness Measurement Report for Elbows & Tees as per Doc No : TDG102:001 & TDG102:002

9.3 For CE marking items if indicated in P.O. the TCs with details specified above shall be submitted as per EN-10204 (Latest).

- i. For pressure parts test certificates of type 3.1 or 3.2 is acceptable.  
**Type 3.1** – Suppliers shall have ISO 9001-2008/2015 (with validity as applicable) certification certified by Notified Body recognized by European Community and test certificate certified by suppliers authorized inspection representative.  
**Type 3.2** – Components inspected and test certificates certified by both the supplier's authorized inspection representative and Notified Body recognized by European Community.
- ii. For non-pressure parts test certificates of type 2.2 is acceptable.  
**Type 2.2** – Suppliers test certificates certified by the supplier's authorized inspection representative with test results as required by this TDG.

## 10.0 AUDIT CHECKS AT BHEL

BHEL reserves the right to carry out audit checks for Chemistry, HT condition, Mechanical test and NDT on fittings.

**Supplies found defective during check at BHEL are liable for rejection.**

## 11.0 RECORDS OF REVISION:-

**Rev 01** : a) Fully revised for better clarity.

b) Para 2.0 (e) added.

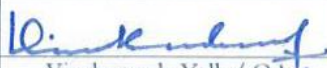
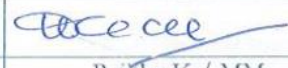

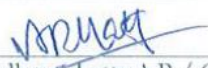
**Rev 02** : a) Para 2.0 (c): UT acceptance norms revised from level A to B.

**Rev 03** : a) Fully revised for better clarity.

b) Para 4.2, 6.0, 8.0 (11) added.

c) Para 2 (d), 4.1, 5 (d) are revised.

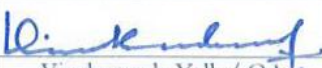
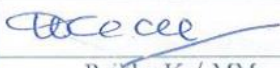

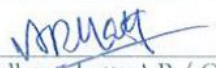
**Rev 04** : a) Para 5.0 (g), 7.0 and 8.0 (17) are revised.

 Vivekananda Yellu/ QA Prepared by	 Rajitha K / MM Reviewed by	 C. Karunakaran / Engg Reviewed by	 Madhavankutty.A.P / Quality Approved by
----------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------



- Rev 05 :** a) New material specification SA 815 Duplex Stainless Steel included.  
b) Para 4.1, 4.2, 5.0 (d), 7.1 & 7.2 are revised.  
c) 5.0 (a), (b), (c), (e), (f), (g), 7.3.1 & 7.3.2 are modified for better clarity.
- Rev 06 :** a) Para 8.2 added.  
b) Para 5.0(d), 5.0(g), 7.1, & 8.1 are revised.  
c) Para 1.0 & 7.2 are modified.
- Rev 07 :** Para 8.2 - vii added.
- Rev 08 :** a) Title revised for better clarity  
b) Para 1.0,2.0(a),5.0(c),8.4,9.1(8) & 9.2(vi) are revised.  
c) From Para 3.0(f),4.2,5.0(d),(f),(g),7.2 forging spec removed  
d) Para 2.0(c),(f),3.0(a),7.0 & 10.0 added  
e) Para 3.0(e) deleted  
f) Document no.TDG102:002 Rev.00 added.
- Rev 09 :** Fully revised for better clarity

\*\*\*\*\*

 Vivekananda Yellu/ QA	 Rajitha K / MM	 C. Karunakaran / Engg	 Madhavankutty.A.P / Quality
Prepared by	Reviewed by		Approved by



**THICKNESS MEASUREMENT REPORT FOR ELBOW**

**Doc No: TDG102:001 Rev.00**

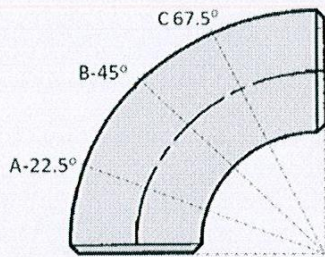
**Date: 03.02.2014**

**PO Number:**

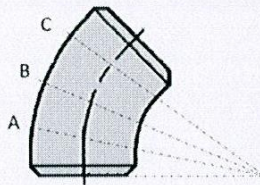
**Work order/Du:**

**Heat no:**

**Size:**



90° Elbow



Less than 90°

Measurement (Extrodus) points

Angle	A	B	C
90	22.50°	45.00°	67.50°
60	15.00°	30.00°	45.00°
45	11.25°	22.50°	33.75°
30	NA	15.00°	NA

Description of item :  
 Material Spec :  
 Material Code :

No	Wall thickness at ends		Wall Thickness at angle			Remarks
	End 1	End 2	A	B	C	
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						

Vivekananda Yellu/ QA Prepared by	Rajitha K / MM	C. Karunakaran / Engg	Madhavankutty.A.P / Quality Approved by
Reviewed by			



**THICKNESS MEASUREMENT REPORT FOR TEE's**

**Doc No: TDG102:002 Rev.00**

**Date: 20.06.2015**

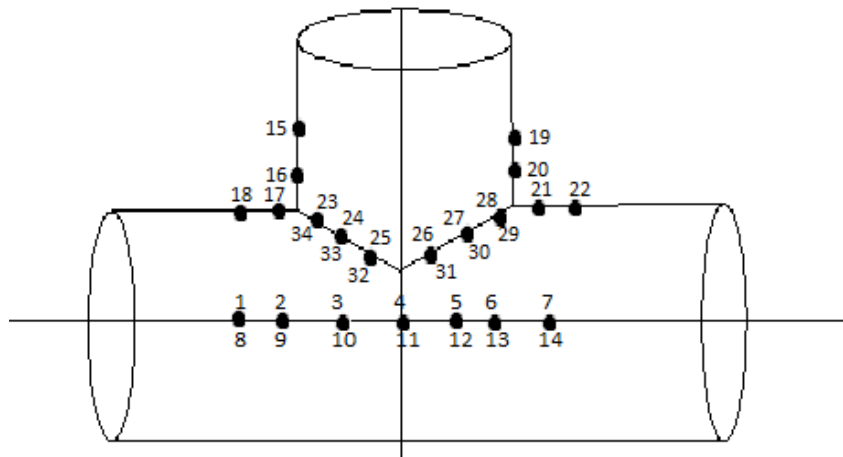
**PO Number:**

**Description of Material:**

**Size:**

**Material Spec.**

**Work order/Du:**



Location	Thickness (mm)	Location	Thickness (mm)	Location	Thickness (mm)
1		13		24	
2		14		25	
3		15		26	
4		16		27	
5		17		28	
6		18		29	
7		19		30	
8		20		31	
9		21		32	
10		22		33	
11		23		34	
12		24			

Vivekananda Yellu/ QA	Rajitha K / MM	C. Karunakaran / Engg	Madhavankutty.A.P / Quality
Prepared by	Reviewed by		Approved by

**STANDARD QUALITY ASSURANCE PLAN FOR BUTT WELDED FITTINGS**  
**CONFORMING TO ASME SA 234**

QP NO : QPG: 46  
 REV.NO : 01  
 DATE : 13-10-2015

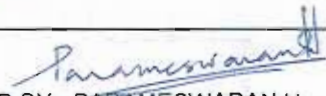
REF: BHEL TDC No. : TDG:102 (latest revision)

SL. NO.	COMPONENT OR OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	TYPE OF RECORD			REMARKS	
								D*	M	B		
1	2	3	4	5	6	7	8	9	10	11	12	15
1.0	Raw material sources for P91 shall be as per QCP:19(Latest Revision); Any other source proposed by the vendor shall be subjected to BHEL approval.. The Test Certificate for all material specifications received from RM manufacturer shall meet IBR requirements.											
1.1	Seamless Pipe	Chemical Composition, Mechanical Properties & HT/UT	Major	Verification of MTC & Ladle Analysis Report	100%	As per Required Material (ASME) Specification	MTC	X	P	V/R	Refer Note:1 MTC - Mill Test Certificate	
1.2		Surface defect	Major	Visual	100%	As per Required Material (ASME) Specification	Report	X	P	V		
1.3		Dimensions Outer Dia., Thk. etc	Major	Measurement	100%	As per Spec	Report	X	P	V		
1.4		Pipe Check (chemical)	Major	PMI	100%	As per Required Material (ASME) Specification	Report	X	P	R/W*	*For 1st off trial at random	
1.5		Hardness Test for P91 material	Major	Measurement	100%	As per Spec	Report	X	P	R/W*		
1.6	Plates	Co-relation & verification of Mill TCs for										
1.7		a) Chemical Composition & b) Mechanical Properties	Major	Verify	100%	BHEL Drawing , Material Spec.	Mill TCs	X	P	V		
1.8		c) Soundness	Major	UT	100%	SA578						
1.9		d) Dimension & Surface finish	Major	Measurement & Visual	100%	BHEL Drawing , Material Spec.						

LEGEND: M:- Manufacturer; B:- BHEL/ BHEL Nominated Agency;  
 D\* - Documents required if marked "X"

P - Perform; V - Verification; R-Review; W - Witness; H - Hold.

PREPARED & REVIEWED BY:  VIVEKANANDA YELLU

APPROVED BY:  PARAMESWARAN.H

**STANDARD QUALITY ASSURANCE PLAN FOR BUTT WELDED FITTINGS**  
**CONFORMING TO ASME SA 234**

REF: BHEL TDC No. : TDG:102 (latest revision)

SL. NO.	COMPONENT OR OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	TYPE OF RECORD		AGENCY		REMARKS
									D*	M	B	
1	2	3	4	5	6	7	8	9	10	11	12	15
2.0	<b>IN PROCESS INSPECTION</b>											
2.1	Fitting Forming Procedure	procedure qualification	Major	Review	100%	ASME SA 234 & BHEL TDG:102 Refer Note : 5	Appd. Procedure	X	P	V		Forming Procedure shall be approved by BHEL.
2.2	MT Procedure	Procedure Review	Major	Review	100%	ASME SA 234 & BHEL TDG:102	Appd. Procedure	X	P	V		MT - Magnetic Particle Test
2.3	UT Procedure	Procedure Review	Major	Review	100%	ASME SA 234 & BHEL TDG:102	Appd. Procedure	X	P	V		UT - Ultrasonic Test
2.4	RT Procedure	Procedure Review	Major	Review	100%	ASME SA 234 & BHEL TDG:102	Appd. Procedure	X	P	V		RT - Radiography Test
2.5	Forming of pipe fittings	Process parameters	Major	Temperature, Measurement & Visual	100%	ASME SA 234 & Appd.Procedure	Internal report	X	P	---		
2.6	Heat Treatment	Rate of Heating, Rate of Cooling & Soaking time	Critical	Temp & Time graph	100%	ASME SA 234 & BHEL TDG:102 Refer Note : 2	HT Chart	X	P	V/ W*		W* : For 1st off trial at random
2.7	Test Piece Marking (TPM)	Selection of Test coupons	Major	Measurement & Marking	One Sample / Heat / Size / HT Batch	As per ASTM A370	Internal report	X	P	V/ W*		
3.0	<b>TESTS</b>											
3.1	Finished product	YS, UTS, % Elongation (Mandatory)	Major	Tensile Strength,	One Sample / Heat / Size / HT Batch	ASME SA 234 & BHEL TDG:102	Test Report	X	P	V		
3.2		Hardness	Major	Hardness test	100% / 10%	ASME SA 234 & BHEL TDG:102	Test Report	X	P	W		100% for WP91 ; 10% for others

**LEGEND:** M:- Manufacturer; B:- BHEL/ BHEL Nominated Agency; P - Perform; V - Verification; R-Review; W - Witness; H - Hold.  
 D\* - Documents required if marked "X"

PREPARED & REVIEWED BY:  VIVEKANANDA YELLU

APPROVED BY:  PARAMESWARAN.H

**STANDARD QUALITY ASSURANCE PLAN FOR BUTT WELDED FITTINGS**  
**CONFORMING TO ASME SA 234**

REF: BHEL TDC No. : TDG:102 (latest revision)

SL. NO.	COMPONENT OR OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	TYPE OF RECORD		AGENCY			REMARKS
									D*	M	B		
1	2	3	4	5	6	7	8	9	10	11	12	15	
3.3		Volumetric Defect	Major	NDE - UT	100% / 10%	ASTM E213 - longitudinal notch of 5% - For Pipe Fittings		Test Report	X	P	W	100% for WP91 ; 10% for others	
3.4		Sub-surface Defect	Critical	NDE - MT	100% / 10%	ASTM E709	ASME B31.1 Cl. 136.4.3	Test Report	X	P	W	100% for WP91 ; 10% for others	
3.5		Volumetric Defect - Welded Fittings	Major	NDE - RT	100%	ASME SEC-V & ASME SecVIII Div-1, UW-51		Test Report	X	P	W		
3.6		Microstructure (Applicable for WP 91 Fittings)	Major	Metallographic test	One Sample / Heat / Size / HT Batch	No micro fissures. Microstructure shall show tempered martensite. Grain growth if any has to be examined further.		Test Report (Magnification at 500x) Refer Note :9	X	P	W	Actual magnification shall be indicated in the photomicrograph. Photomicrographs shall be provided as records for review & acceptance and future in-service reference.	
3.7	Supplementary tests as per TDC on Finished Product	Product Analysis	Major	Chemical Composition	One Sample / Heat / Size	ASME SA 234 & BHEL TDG:102		Test Report	X	P	V/ W*		
		YS, UTS, % Elongation	Major	Tensile Strength,	One Sample / Heat / Size / HT Batch	ASME SA 234 & BHEL TDG:102		Test Report	X	P	V/ W*		
3.8	PMI for AS fittings	Chemical	Major	PMI	100%	ASME SA 234 & BHEL TDG:102		Test Report	X	P	W		

LEGEND: M:- Manufacturer; B:- BHEL/ BHEL Nominated Agency;  
 D\* - Documents required if marked "X"

P - Perform; V - Verification; R-Review; W - Witness; H - Hold.

PREPARED & REVIEWED BY: VIVEKANANDA YELLU

APPROVED BY: PARAMESWARAN.H

**STANDARD QUALITY ASSURANCE PLAN FOR BUTT WELDED FITTINGS**  
**CONFORMING TO ASME SA 234**


REF: BHEL TDC No. : TDG:102 (latest revision)

SL. NO.	COMPONENT OR OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	TYPE OF RECORD			REMARKS	
									D*	M		B
1	2	3	4	5	6	7	8	9	10	11	12	15
3.9	Burst Test	Performance & Design Proof	Critical	Hydro Test	One / Type (on similar Fitting <sup>s</sup> )	ASME B 16.9 & ASME SA 234 Refer Note : 3		Test Report	X	P	R /W#	\$ - As allowed in relevant standard # - WITNESS -If size is not qualified as per Burst Test Report available.
4.0	<b>FINAL INSPECTION</b>											
4.1		Surface check, Bend angle, Radius, End-to-end dimn, Ovality, Thickness, Wrinkles, d1 at ends, Edge preparation & other dimensions as per Drg.	Major	Visual & Measurement	100%	ASME B16.9, BHEL Drg.. & P.O.		Report	X	P	W	Refer Note : 12
4.2		IBR Certification	Major	all tests as per IBR	100%	IBR		FORM-IIIC	X	P	IBR	
4.3		Marking / Color coding	Critical	Visual	100%	BHEL TDG:102 & P.O.		Report	X	P	V	Refer Note : 17
4.4		Surface Protection, Preservation & Packing	Critical	Visual	100%	BHEL TDG:102 & P.O.		Report	X	P	V	Refer Note : 13 & 16
5.0	Inspection clearance	Documentation	Critical	Verification	100%	All reports as required in this QAP		Report	X	P	H	

**NOTES :-**

- 1.0 (a) If the raw materials are received directly from RM Manufacturer's works, the material shall be accepted based on (i)correlation of Heat number on material with TC and (ii)verification of TCs.  
 (b) If the materials are received through Dealers place, check test ( Chemical and Mechanical tests on one sample per Heat/ size) shall be done in addition to the above for accepting the material

LEGEND: M:- Manufacturer; B:- BHEL/ BHEL Nominated Agency; P - Perform; V - Verification; R-Review; W - Witness; H - Hold.  
 D\* - Documents required if marked "X"

PREPARED & REVIEWED BY:  VIVEKANANDA YELLU

APPROVED BY:  PARAMESWARAN.H



**STANDARD QUALITY ASSURANCE PLAN FOR BUTT WELDED FITTINGS**  
**CONFORMING TO ASME SA 234**

REF: BHEL TDC No. : TDG:102 (latest revision)

SL. NO.	COMPONENT OR OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	TYPE OF RECORD		AGENCY		REMARKS
									D*	M	B	
1	2	3	4	5	6	7	8	9	10	11	12	15
2.0	<b>POST FORMING HEAT TREATMENT :-</b>											
	For P91 materials : Normalise at 1040 - 1060 deg.C & Temper at 750-770 deg.C; Soaking shall be 2Hrs minimum for thickness upto 50mm and 4Hrs minimum for thickness 51-100mm											
	Normalising and Tempering shall be carried out within 72 hours after completion of forming. The items 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. Normalising and tempering of Gr91 shall be done encompassing the entire component.											
	SA234 WPB : As per Specn; SA105 & SA234WPC : Normalised; SA234 WP11/WP12/WP22 : Normalised & Tempered.											
3.0	<b>BURST TEST ( Type test ) : Burst test procedure shall be submitted by the vendor to BHEL for approval. Burst test will be witnessed by BHEL.</b>											
	After successful completion of the burst test regular production may be permitted.											
4.0	Seal transfer on pieces to be cut shall be done by BHEL inspector & IBR for Gr-91 materials and IBR for other than Gr-91 materials.											
5.0	Welded Fittings shall be made from Two - Halves.											
6.0	Chemical & Mechanical tests shall be performed at in-house or NABL approved laboratories.											
7.0	Welding consumables shall be approved by BHEL.											
8.0	All NDE procedures shall be submitted to BHEL for review. NDE procedures shall have Level-III certified personnel approval incase of in-house. Incase of non-availability of inhouse facility NDE shall be performed by NABL approved laboratories.											
9.0	Items shall be visually checked. No hard scales shall be present on inside & outside surfaces.											
10.0	Gas cutting & Plasma cutting are prohibited for Gr91 material.											
11.0	3 replicas in one fitting. 1 replica for the size Nb 80 & below. Actual magnification shall be indicated in the photomicrograph. Photomicrographs shall be provided as records for review & acceptance and future in-service reference.											
12.0	Minimum thickness measured at any location on the finished fitting shall be not less than 0.875 of the specified nominal thickness.											
13.0	All fittings shall be Painted as below when not specified in the P.O./Drawing:- Three coats of 20 microns each of total DFT 60 microns minimum of Heat Resistance Aluminium Paint to IS 13183 Gr II, after surface preparation by Blast cleaning (SSPC-SP10).											
14.0	All items shall be inspected and cleared by BHEL / BHEL authorised Inspection agency & IBR authorities.											
15.0	Necessary IBR Requirements shall be fulfilled and IBR documents to be submitted.											
16.0	Machined ends shall be well protected using end caps and suitably packed to avoid transit & other damages. Tack welding is prohibited on P91 material.											
17.0	<b>Marking :- a) Items dispatched to Stores :</b> The finished components shall be punched & paint stencilled with Material code, Heat number, material specification, maker's emblem, Inspectors seal and Statutory authorities seal (as applicable)											
	<b>b) DTS (Direct to Project Site) Items :-</b> DTS shall be hard punched and paint stencilled with DU code (14 digit work order du detail) as given by purchase in addition to marking done as per 15 (a). Colour coding : Red for WPB ; Blue for WPC ; Blue & Red for WP22; Brown & Red for WP91.											
18.0	If the thickness of the fitting is less than 6 mm, punching is not permitted and the above details shall be paint stencilled. Fittings of size up to 2" (50mm) shall be tied together and the above details shall be punched / engraved in a separate tag and tied to it.											

**LEGEND: M:- Manufacturer; B:- BHEL/ BHEL Nominated Agency;**  
**D\* - Documents required if marked "X"**

**P - Perform; V - Verification; R-Review; W - Witness; H - Hold.**

PREPARED & REVIEWED BY: VIVEKANANDA YELLU

APPROVED BY: PARAMESWARAN.H



**PURCHASE / MM / BOI  
ENQUIRY DEVIATION**

429-024

PAGE

**SCHEDULE OF DEVIATION TO  
BOI ENQUIRY NO:**

41022000 01

**DATE**

**DESCRIPTION**

BW Fittings -CS & AS

**SPECIFICATION**

TDG 102 Rev 09 QCP 46 rev 01

**Drawing No**

As enclosed with tender

**QUALITY PLAN**

QCP 46 rev 01

**PACKING PROCEDURE**

PC-PKG-01 Rev 00

**DOCUMENT REFERENCE**

**BHEL CALLED FOR**

**FIRM'S ALTERNATIVE OFFER**

CERTIFIED THAT OTHER THAN THE ABOVE DEVIATIONS, WE ARE ACCEPTING ALL THE OTHER SPECIFICATIONS AND REQUIREMENTS IN FULL TO YOUR ENQUIRY.

STATION:

DATE:

SIGNATURE OF FIRM'S REPRESENTATIVE

FIRM SEAL

- NOTE 1. Deviations should be taken only in the extreme case.  
2. If necessary, use additional sheets with page control number.



**Packaging Instructions for Piping  
Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014


No of Sheets : 24

**PACKAGING INSTRUCTIONS FOR PIPING COMPONENTS  
PC: PKG: 01**

Revision summary

Rev No	Revision Details	Issued on
00	Fresh issue	28-05-2014

Prepared by	Reviewed & Approved by
S.ARUN KUMAR	K.VEDAPRASAD

<b>Bharat Heavy Electricals Ltd.,</b> Piping Centre, Chennai – 600 017		
<b>Packaging Instructions for Piping Components</b>	Doc. No PC: PKG:01	
	Rev No: 00 Date : 28 /05/ 2014	No of Sheets : 24

## Contents

---

1. Scope
2. Packaging
3. Criteria for Selection of Packaging
4. Types of packaging
5. Sling protections
6. Marking and Labelling
7. Packing list
8. General Instructions for packaging
9. Reference drawings
10. Cautionary symbols
11. Packing reference table
12. Check list



**Packaging Instructions for Piping Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

## 1. SCOPE

This procedure elicits the general requirements to be complied with for packaging of piping components. The packaging is intended to preserve and protect the contents.

The handling, storage, cleaning, packaging, and preservation of items shall be controlled to prevent damage or loss and to minimize deterioration.

## 2. PACKAGING

This procedure contains requirements for packaging of items for protection against corrosion, contamination, physical damage, or any effect that would lower the quality or cause the components to deteriorate during the time they are shipped and stored at sites.

Items shall be inspected for cleanliness immediately before packaging. Dirt, oil, residue, metal chips or other forms of contamination shall be removed.


Adequate protection shall be provided against mechanical damage and atmospheric corrosion in transit and, for equipment suitable for outside storage, for prolonged storage at the site prior to installation.

Water proof barrier material – high density polythene shall be used as a resistant to grease and water; it shall protect items from airborne and windblown soils.

Desiccants like silica gel to be used inside pipe components. Silica gel shall conform to IS 3401. The gel is to be packed in sachets placed at different positions inside the components for absorbing moisture. The quantity of silica gel shall be adequate for storage period of one year.

Components to be placed in such a way that metal to metal contact is avoided.

For mechanical components, (1) all openings shall be covered or plugged with substantial (1/2 inch minimum thick) one piece plywood or metal closures, securely fastened and suitable for prolonged exposure prior to final installation; (2) all tapped openings in equipment shall be plugged with plastic plugs to protect internal threads; and (3) all welding end connections shall be provided with adequate weld bevel protectors to protect from corrosion and physical damage.

<b>Bharat Heavy Electricals Ltd.,</b> Piping Centre, Chennai – 600 017		
<b>Packaging Instructions for Piping Components</b>	Doc. No PC: PKG:01	
	Rev No: 00 Date : 28 /05/ 2014	No of Sheets : 24

Austenitic stainless steel and nickel-based alloy materials shall be handled in such a manner that they are not in direct contact with carbon steel materials or with materials containing halogen, sulphur, zinc and lead.

Each components/item of stainless steel materials should be wrapped with high density polythene.

All equipment shall be packed, securely anchored (skid mounted when required) and weather protected for the shipment method adopted.

Temporary bracing or supports, marked and tagged for removal after equipment installation, shall be provided to prevent damage during shipment and shall be painted bright, fluorescent yellow.

### 3. Criteria for Selection of Packaging:

Packages are to be made according to categories listed in Table-6 (see page – 24), depending on the type of materials and size.

## 4. TYPES OF PACKAGING:

### 4.1 CRATES

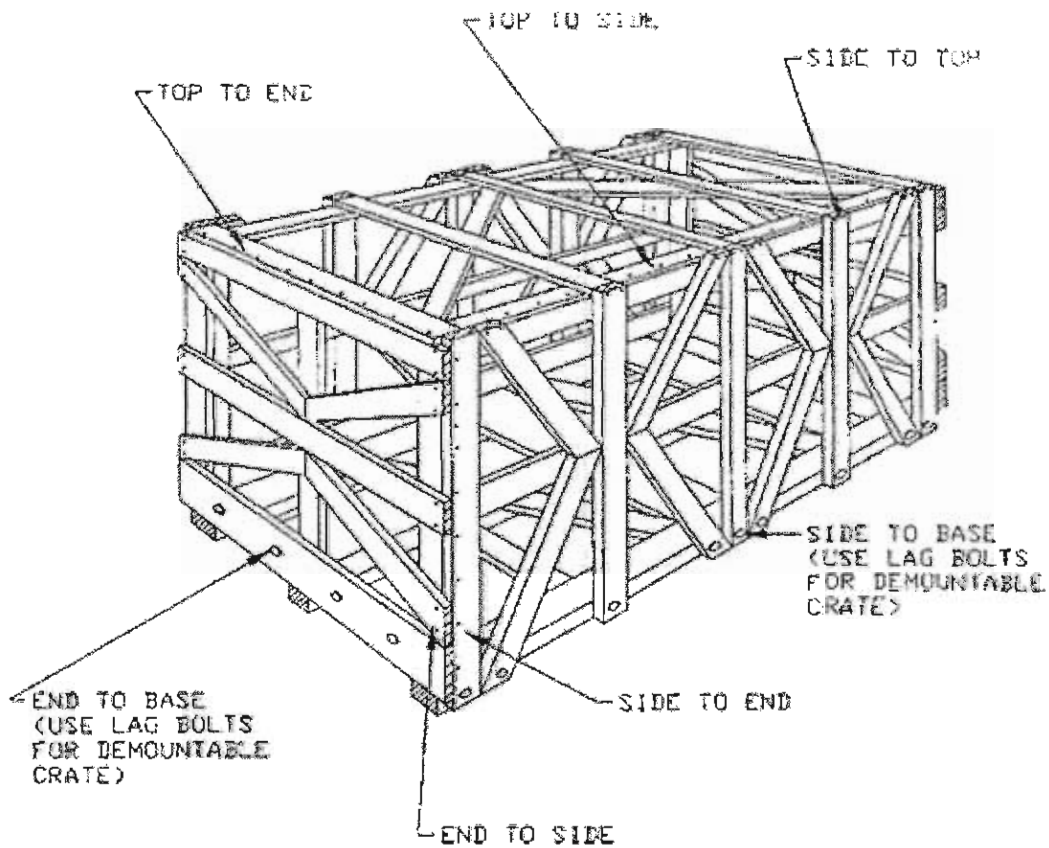
- These are to be made of seasoned wood and are intended for packaging heavy materials Viz., straight pipes and pipes with attachments.
- The crates are to be lined with hi-density polythene, to prevent entry of moisture.
- The dimensions of the crates are to be restricted to 20 x5x5 feet.
- Pipes up to OD 350mm are to be crated.
- Pipes are to be stacked inside the crate so that the weight of the pipe does not rest on branch stubs or carrier plates.
- Contents of the crate should not come in contact with each other or with the crating, and should be adequately cushioned to preserve the painting.
- The gross weight of the crate should not exceed 2 Tons.
- For further instructions refer ASTM D6039 Standard Specification for Open and Covered wood Crates.

**Packaging Instructions for Piping  
Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

## WOODEN CRATE



Max Net Load (KGS)	Length (mm)	Width (mm)	Height (mm)
2000	6096	1524	1524

All the dimensions shown in the above table are maximum inside dimensions.



**Packaging Instructions for Piping Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

#### 4.3 SADDLES

- Saddles are defined as profiled supports made of wood, and are used to cradle and support Tanks, pipe bends and pressure vessels.
- Ensure that the end chamfering of the bends are duly protected for the transit.
- Tanks are to be completely drained and dried.
- Adequate amount of the specified desiccant is to be placed inside the tank/ vessel.
- Ensure that all openings are covered and /or plugged.

#### 4.4 CASES

- Other components such as fittings and Mitres are to be packed inside wooden cases.
- The insides of the cases are to be lined with hi-density polythene.
- Air vents to be provided in the cases for ventilation.
- Components to be placed in such a way that metal to metal contact is avoided.
- Small components like Fasteners, gaskets are to be packed in high density polythene covers and placed inside the wooden cases.
- Holes to be provided in the case floor to act as drains.

#### 4.5 BUNDLES

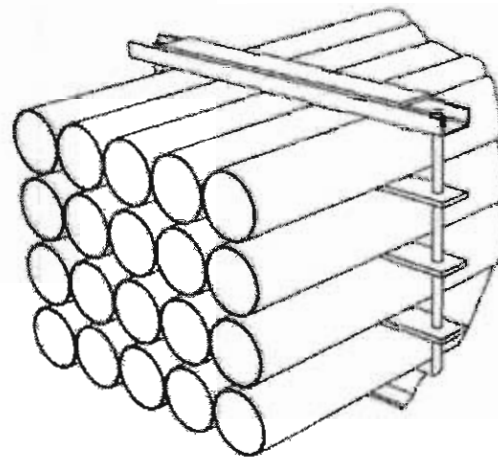
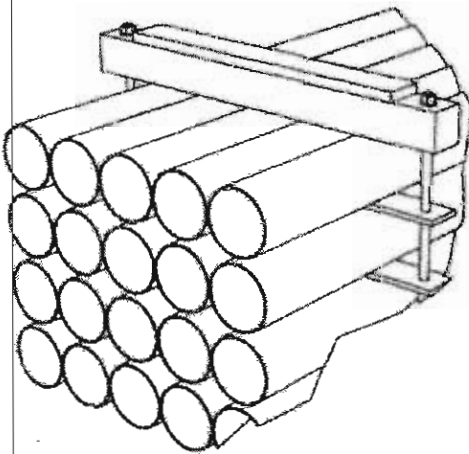
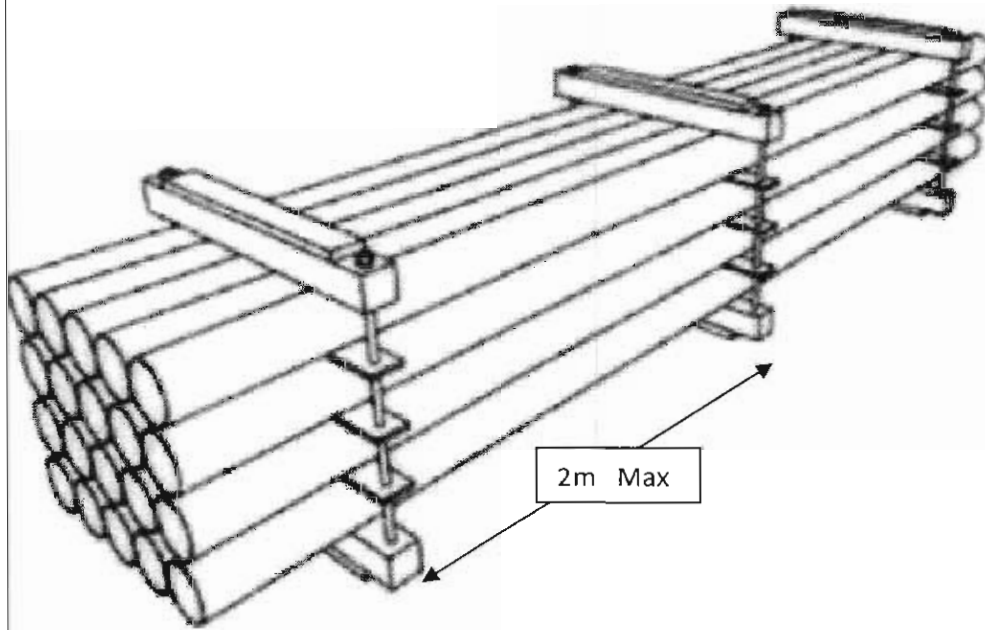
- Bundles are transportable units where a large number of straight pipes of the same diameter and even lengths are arranged securely and are fit to be lifted by cranes and also stacked.
- Pipe ends should be covered fully with plastic end caps.
- Pipes can be bundled only when they can bear the stack compression load without additional support.
- Clamps made of wood or steel clamps with wooden inserts are to be used.
- Clamps must be locked firmly so that the pipes cannot slide out of bundle.
- Bundle must be held together by at least three sets of clamps as indicated in the diagram.




**Packaging Instructions for Piping  
Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24



<b>Bharat Heavy Electricals Ltd.,</b> Piping Centre, Chennai – 600 017		
<b>Packaging Instructions for Piping Components</b>	Doc. No PC: PKG:01	
	Rev No: 00 Date : 28 /05/ 2014	No of Sheets : 24

### 5. SLING PROTECTIONS

The lifting points of the case or crate or bundle must be equipped with sling protections suitable to the respective package gross weight.


### 6. MARKING AND LABELLING

Components and their containers shall be identified by marking. Shipping marks shall be on all sides of package. The shipping marks shall be at least 3 inches high where space permits. Markings are to be in black paint or ink depending on shade of the package surface.

Cautionary symbols to be stencilled in red waterproof paint or ink.

### 7. PACKING LIST

One complete packing list inside a watertight envelope must be affixed outside of each package and be covered by sheet metal. One more copy of the packing slip wrapped in polyethylene bag is to be kept inside the box at the pertinent place.

<b>Bharat Heavy Electricals Ltd.,</b> Piping Centre, Chennai – 600 017		
<b>Packaging Instructions for Piping Components</b>	Doc. No PC: PKG:01	
	Rev No: 00 Date : 28 /05/ 2014	No of Sheets : 24

### 8. General Instructions for packaging

- The quantity of Slides / Runners is selected depending upon the weight and over-all dimension of the Load, to be carried. Table-1 and 2 details out the number of Slides, length and cross sections of the Slides to be provided with their carrying capacity.
- The construction of bottom frame is as shown in the Figure-2.
- The construction of the top frame is, as shown in the figure -3.
- Thickness of the boards, used for sheathing for the top, sides and end panels, shall be 25 mm.
- The top of the Box consist of Beam supported on top traverse bar and sheathing, as shown in the figure- 3.
- The dimension of items 1, 2 f figure - 3 shall be as table - 3.
- Diagonal braces shall be used in packing cases with height, exceeding 600 mm as shown in the figure- 4.
- The angle between the lower (or) upper horizontal supports and diagonal braces, shall be in the range of 20° to 60° and if possible, this angle preferably be kept at 45°.
- If the height of the box exceeds more than 1400 mm the diagonal braces, shall cross each other and when this dimension exceeds 1800mm additional horizontal supports shall be provided as shown in figure-5 and figure- 6.
- Size of upper and lower horizontal supports and vertical supports, shall be as per Table 4 refer figure 7, 8, 9 & 10 for the arrangement.
- The cross section of end traverses bar (item -1) and thickness of bottom boards (item-2), shall be used as per table - 5.
- All boxes measuring more than 600 mm height shall be constructed by assembling end, side and top shooks on a bottom, forming a complete enclosed Box (refer figure-11).
- Angle iron cleats shall be used for strengthening the joints, as indicated in figure -12.
- Boxes will be strengthened by steel bands to withstand transit damages.

**Packaging Instructions for Piping  
Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

**9. Reference drawings**

1. SLIDE
2. LONGITUDINAL UNDER SLIDE BOARD.
3. BOTTOM BOARD
4. CARRIER TRAVERSE BAR
5. INTERMEDIATE VERTICAL SUPPO
6. HORIZONTAL BRACING
7. DRAINAGE HOLES
8. BATTEN
9. SLING PLATE
10. NUT BOLT WASHER
11. END TRAVERSE BAR
12. WATER PROOF LINING OF BITUMHANISED PAPER
13. VERTICAL SUPPORTS
14. END SHEETING BOARD
15. SIDE SHEATING BOARD
16. TOP SHEATING BOARD
17. LONGITUDINAL SUPPORT
18. TOP HORIZONTAL BEAN
19. TOP SHEATING BOARD
20. TOP CORNER STRIPS (FOR STRENGTHENING)
21. OUT SIDE DOCUMENTS CONTAINER.

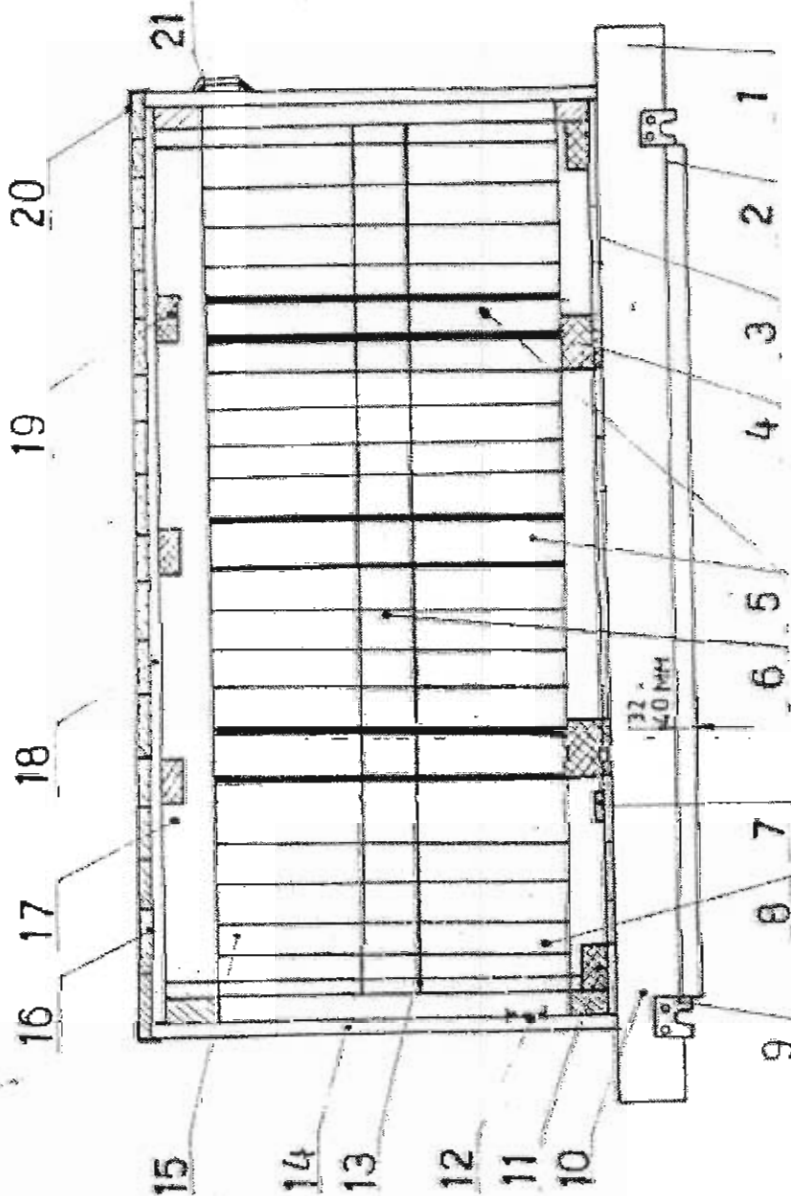


FIG. 1

**NOMENCLATURE OF PARTS OF PACKING**

Packaging Instructions for Piping  
Components

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

BOTTOM FRAME ARRANGEMENTS FOR TYPES  
633, 654, 966, 1296, 1122, 1144, 1399, 1577

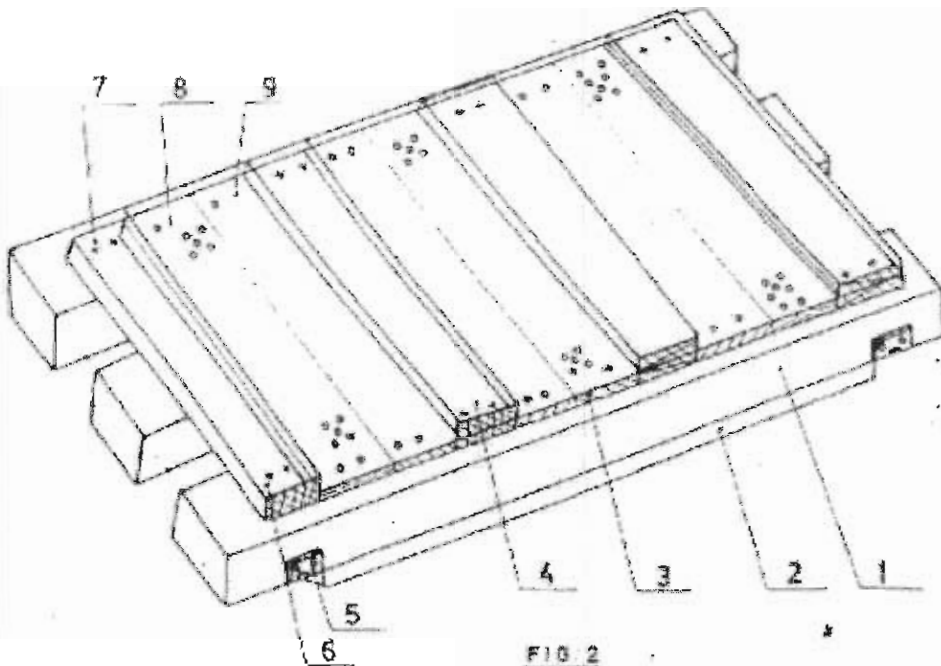


FIG 2

1. SLIDE
2. UNDER SLIDE BOARD
3. BOTTOM BOARD
4. CARRIER TRAVERSE BAR
5. SLING PLATE
6. TRAVERSE BAR
7. BOLT, NUT & WASHER
8. DRAINAGE HOLES
9. NAILS

**Packaging Instructions for Piping  
Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

TOP FRAME ARRANGEMENT FOR TYPES  
633, 654, 966, 1296, 1122, 1144, 1399 & 1577

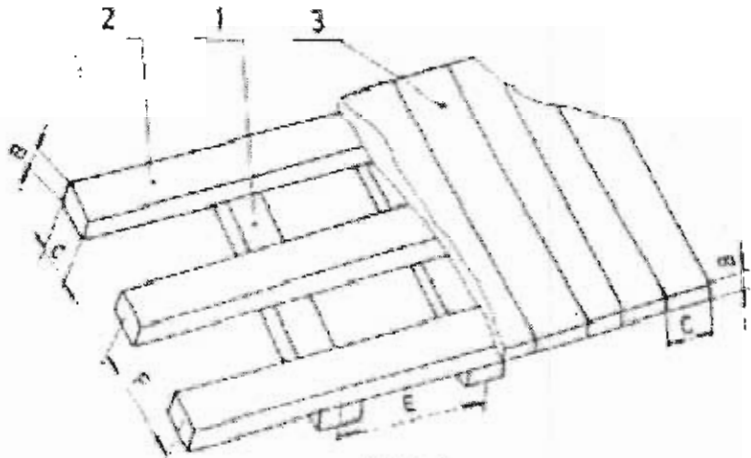


FIG-3

- 1 - Transverse Bars
- 2 - Horizontal Beams
- 3 - Top Board

PROVISION OF DIAGONAL BRACING ARRANGEMENT

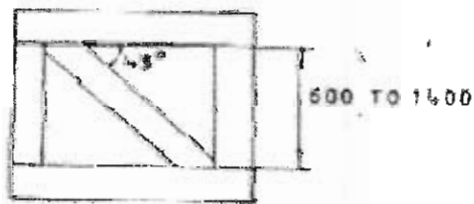


FIG-4



**Packaging Instructions for Piping Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

ARRANGEMENT OF DIAGONAL BRACING & HORIZONTAL SUPPORT

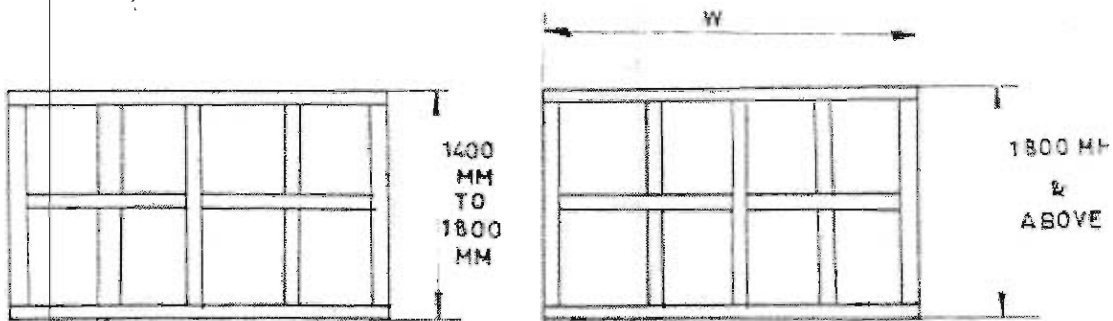


FIG. 5

FIG. 6

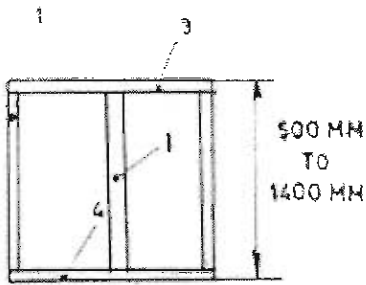


FIG : 7

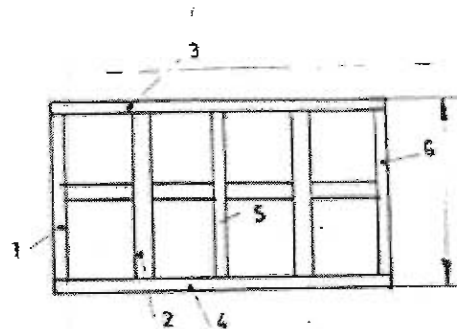


FIG. 8

1. VERTICAL SUPPORT

1, 2, 5, 6 - VERTICAL SUPPORT

3. UPPER HORIZONTAL SUPPORT

3 - UPPER HORIZONTAL SUPPORT

4. LOWER HORIZONTAL SUPPORT

4 - LOWER HORIZONTAL SUPPORT

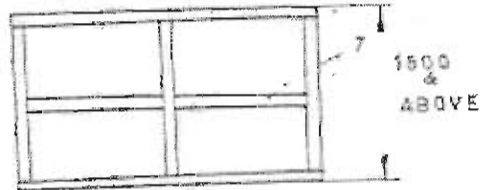
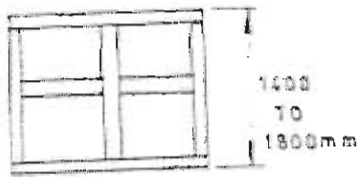


**Packaging Instructions for Piping  
Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

ARRANGEMENT OF DIAGONAL BRACING AND  
HORIZONTAL SUPPORT



7 - MIDDLE HORIZONTAL SUPPORT



**Packaging Instructions for Piping  
Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

ARRANGEMENT OF PACKING CASE

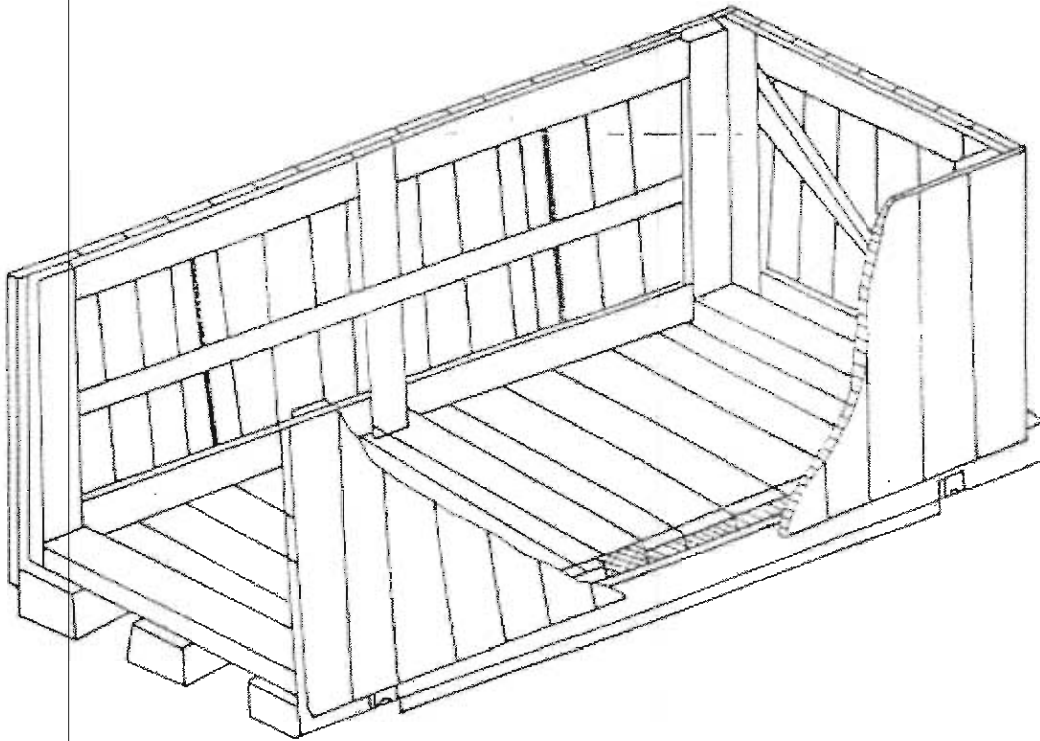


FIG : 11

**Packaging Instructions for Piping  
Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

ARRANGEMENT OF ANGLE IRON CLEATS

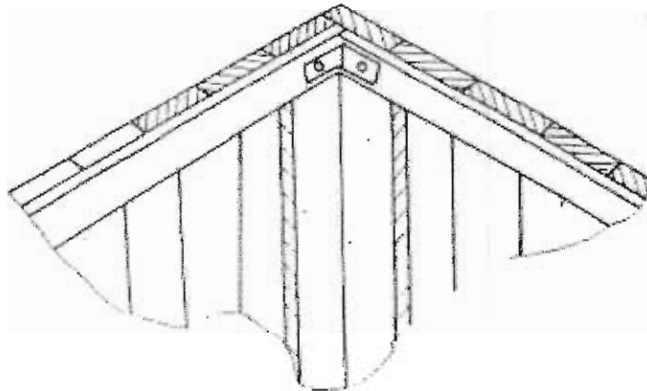


FIG:12

ARRANGEMENT OF C-CLAMPS AROUND CASES

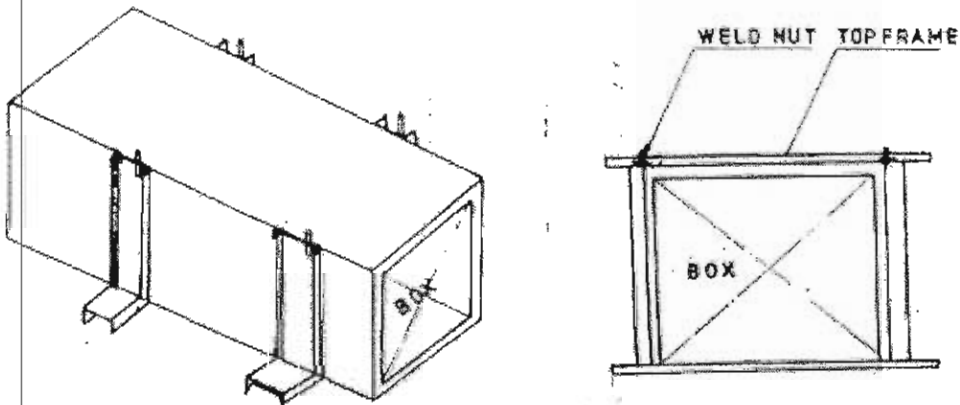


FIG:13

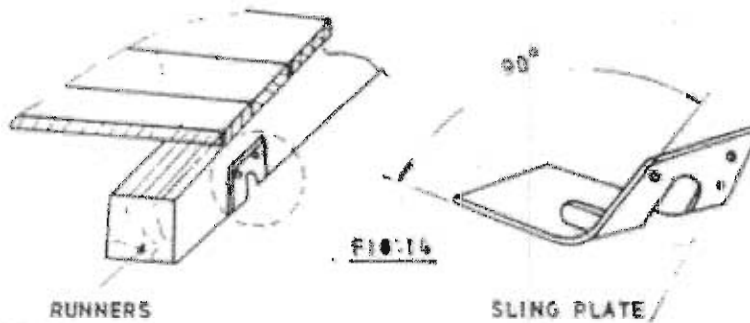


**Packaging Instructions for Piping Components**

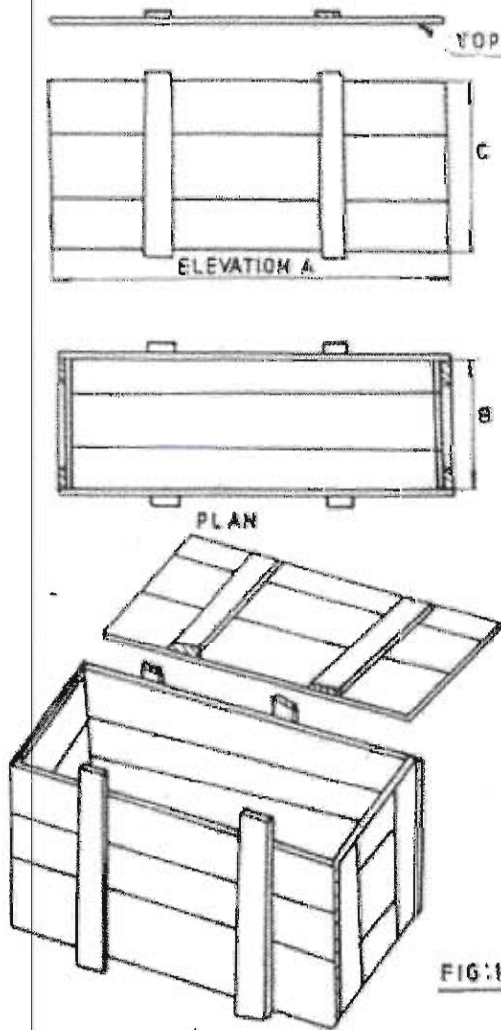
Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

ARRANGEMENT OF SLING - PLATE ON CASES



ARRANGEMENT OF SMALL CASES



TYPE 654, 633

DMS TYP	A	B	C
654	600	500	400
633	600	300	300

IN MM ONLY

1. BOTTOM BOARD
  2. CROSS TRAVERS BOARD
- A. UNIFORMLY DISTRIBUTED  
B. CONCENTRATED LOAD



**Packaging Instructions for Piping Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

The sizes of boxes given below are indicative. Actual sizes may vary according to size and positioning of component inside.

ANNEXURE – A

**WOODEN BOXES**

TYPE	L X B X H (MM)	CARRYING CAPACITY IN KGS
633	600x300x300	200
654	600x500x400	500
966	900x600x600	1000
1296	1200x900x600	2000
1122	100x200x200	300
1144	110x400x400	300
1399	1300x900x900	2500
1577	1500 X 700 X 700	1500

TABLE - 1

No. of slides	Length of slides	Weight in (kgs)	Types of loading
2	600 - 1800 mm	0 - 1000	Two slides for central loading near the ends or uniformly distributes load.
3	1801 - 2500 mm	1001 - 5000	Three slides with load concentrates near the end or uniformly distributed load.



**Packaging Instructions for Piping Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

TABLE - 2

LOAD	Length of slides						
	600	800	1000	1200	1300	1500	2000
	CROSS SECTION						
	B x C		c				
			b				
500	30 x 100	30 x 100	30 x 100	30 x 100	30 x 100	30 x 100	30 x 100
800	30 x 100	30 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100
1000	30 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100
1500	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100
2000	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100
2500	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	120 x 150	120 x 150
3000	100 x 100	120 x 150	120 x 150	120 x 150	120 x 150		

TABLE - 3

Distance between top horizontal scans dim 'f'	Distance between the axis of the traverse bar dimension 'E' in fig -3				
	500	600	700	800	900
	Size b x c				
700 – 1000 mm	30 x 100	30 x 100	30 x 100	30 x 100	30 x 100



**Packaging Instructions for Piping Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

TABLE-4

End and side panels	Width of the panels	Distance Between Longitudinal Support DIM 'D'						
		600	800	1000	1200	1400	1600	1800
		Cross section ( b x c) Item 1 to 7						
Fig - 7	600 to 1200	30 x 100	30 x 100	30 x 100	30 x 130	30 x 130	30 x 130	30 x 130
Fig - 8	1201 to 1600	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130
Fig - 9	1601 to 2000	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130
Fig - 10	2001 to 3000	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	40 x 150
	3001 to 4000	30 x 130	30 x 130	40 x 150	40 x 150	40 x 150	40 x 150	40 x 150

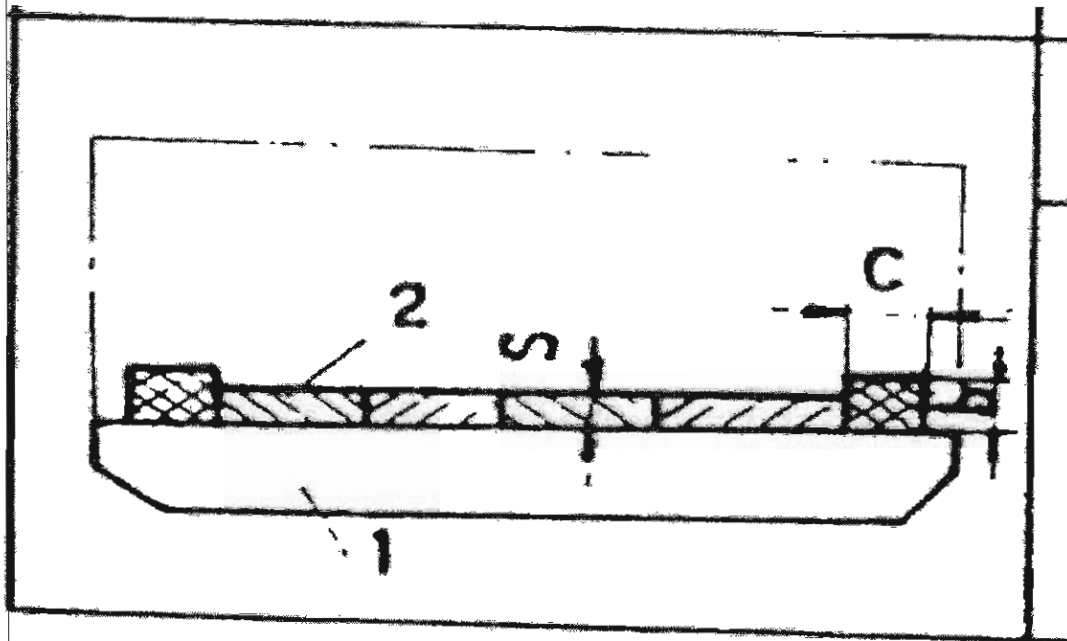
**Packaging Instructions for Piping  
Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

**TABLE-5**

**BOTTOM TRAVERSE:**



Cross section of end traverse bar item 1 fig. X and thickness of bottom board (item – 2)

Load in kg	Width of the box	Cross section	S
Up to 3000	Above 1000 mm	100 x 100	25



**Packaging Instructions for Piping Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28/05/2014

No of Sheets : 24

**10. Cautionary symbols**



**FRAGILE, HANDLE WITH CARE**



**PROTECT FROM HEAT AND RADIOACTIVE SOURCES**



**USE NO HOOKS**

NOTE: The design of heavy goods packages cannot always resist top lifting by grabhooks.



**KEEP DRY**

NOTE: Not all cases have waterproof internal liners; plywood used in the construction may not have a waterproof gluing.



**THIS WAY UP**

NOTE: Certain designs of small cases make it difficult to distinguish top from bottom.



**CENTRE OF GRAVITY**

NOTE: This should be stencilled as a minimum on the two longest case sides (this information will normally be supplied by the manufacturer of the item(s) packed).



**KEEP AWAY FROM HEAT**

... kg max.



**STACKING LIMITATION**

NOTE: The maximum load in kilograms should be marked above the arrow.



International 'slings here' symbol



**Packaging Instructions for Piping Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

**11. Packing Reference Table**

TABLE-6

No	Description	Packing Method ->						Remarks
		Wooden Crates	Bundles	Saddle supports	HD Polythene Sheet Wrapping	Wooden boxes (Cases)	Spider	
1	Straight Pipes	✓	✓					Crates for random length
2	Pipes with attachments	✓						
3	Pipes with Fittings	✓						
4	Tanks			✓				
5	Mitre bends			✓		✓		Saddle or cases to be used
6	Fasteners					✓		
7	Hanger components					✓		
8	Clamps					✓		
9	Fittings >nb200/ Flanges					✓		Fittings <200 shall be packed in boxes
10	Plates(Cut to size)					✓		
11	SS Pipes		✓		✓			Wrap SS pipes before bundling
12	SS fittings / Flanges	✓				✓		Fittings <200 shall be packed in boxes
15	SS Fasteners					✓		
16	CW piping(>900mm)						✓	To maintain circularity of pipes
17	CW fittings(>900mm)						✓	
18	CW fittings(<900mm)							
19	Structurals(<200mm)		✓					



**Packaging Instructions for Piping Components**

Doc. No  
PC: PKG:01  
Rev No: 00  
Date : 28 /05/ 2014

No of Sheets : 24

**12. CHECK LIST**

S No	VENDOR TO PROVIDE DETAILS	
1	On despatch of components/items , vendor has to provide the following information for each package of despatched items: 1. Contents of package (Packing list) 2. Corrosion Prevention: Rust-preventive coating /protective painting/Silica gel/ other corrosion inhibitors ( please mention) 3. Lifting Instructions: Crane using slings/Fork lift/any other means (please mention) 4. Dimensions ( LxBxH) mm: 5. Gross Weight (Kgs): 6. Net Weight (kgs):	
S No	VENDOR TO CONFIRM	
1	Where ever items are despatched as a bundle, they should be clamped together with bolted timber block clamps or bolted steel section clamps with timber block inserts. Adequate number of clamps should be provided along the length of the bundle with sufficient projection of the clamps beyond the width and height of the bundle.	
2	Only such materials which can withstand corrosion and environmental conditions are allowed to be packed in wooden crates or bundles.	
3	In case of wooden packing, planks of 20-25 mm thick and 100-150mm wide needs to be suitably placed at close intervals for giving rigidity to packing appropriately.	
4	Wood used for packing should be seasoned & shall be free of termites.	
5	Damages, if any, resulting due to improper/inadequate packing will be to vendors account. It will be the responsibility of the vendor to identify suitable and adequate packing for his supplies to protect it from damage and/or deterioration during storage, stacking, transport and handling.	
6	All packing should be suitable for loading/unloading by cranes/forklifts & suitable for transport by road. Suitable marking should be made on the packing indicating the lifting positions.	

List of Items- Unpriced Bid-Enquiry 4102200001									
Enq Sl No	Material Code	Description	Net qty (Nos)	Specification	Construction	Technical Requirements	Fitting D1 value	Drawing (if any)	Quoted / Regretted
1	925042540000	BW LR 90DEG ELL OD88.9X5.49 SA234WP22CL1	11	SA234WP22CL1	Seamless	TDG102 REV09 & QPG46Rev01	D79	As per ASME B16.9	
2	925194990000	BW CAP OD88.9X7.62 SA234WP22CL1	3	SA234WP22CL1	Seamless	TDG102 REV09 & QPG46Rev02	D 73.7	As per ASME B16.9	
3	921054790000	BW EQT OD114.3X6.02 SA234WPB	2	SA234WPB	Seamless	TDG102 REV09 & QPG46Rev03	D103.5	As per ASME B16.9	
4	925052090000	BW EQT OD168.3X7.11 SA234WPB	2	SA234WPB	Seamless	TDG102 REV09 & QPG46Rev04	D155.6	As per ASME B16.9	
5	921044310200	BW 90 DEG LR ELBOW 168.3X7.11 SA234WPB	17	SA234WPB	Seamless	TDG102 REV09 & QPG46Rev05	D155.6	As per ASME B16.9	
6	925043530400	BW LR 90DEG ELL OD457.2X9.53 SA234WPB	2	SA234WPB	Seamless	TDG102 REV09 & QPG46Rev06	D 437.2	As per ASME B16.9	
7	925042190000	BW LR 90DEG ELL OD508X9.53 SA234WPB	3	SA234WPB	Seamless	TDG102 REV09 & QPG46Rev07	D 488.9	As per ASME B16.9	
8	925240060000	BW LR 90DEG ELL OD88.9X11.13 SA234WPC	24	SA234WPC	Seamless	TDG102 REV09 & QPG46Rev08	D69.2	As per ASME B16.9	
9	921044290200	BW LR 90DEG ELL OD88.9X5.49 SA234WPB	10	SA234WPB	Seamless	TDG102 REV09 & QPG46Rev01	D79	As per ASME B16.9	
10	925057670000	BW UEQT 508X12.7/273X9.27 SA234WPB	1	SA234WPB	Seamless	TDG102 REV09 & QPG46Rev01	D482.8/D254.5	As per ASME B16.9	

Note-

1. Unit rate to be quoted (all inc of inspection charges, P&F, freight, insurance etc)
2. Rate shall be submitted 'FOR' BHEL Trichy / Site basis
3. Inspection as per TDC / QP is under vendor scope. Inspection charges (if any) will not be borne by BHEL.
4. Quantity of items may vary (full/partial) at later stage and same shall be informed before price bid opening

## **Annexure A – General Terms & Conditions**

### **1. PURCHASE PREFERENCE FOR MAKE IN INDIA**

"For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local Supplier/ Nonlocal Supplier and purchase preference to Class I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before finalization of contract / PO / WO against this NIT". In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and / or local content in respect of this procurement, same shall be applicable.

'Local content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the Item procured (excluding net domestic indirect taxes) minus the value of imported. Content in the item (including all customs duties) as a proportion of the total value, in percent.

'Class-I local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%, as defined under this Order.

'Class-II local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%, as defined under this Order.

'Non-Local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than or equal to 20%, as defined under this Order.

In case item is divisible, following procedure will be followed-

- Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract for full quantity will be awarded to L 1.
- If L1 bid is not a 'Class-I local supplier', 50% of the order quantity' shall be awarded to L1. Thereafter, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price for the remaining 50% quantity subject to local supplier's quoted price falling within the margin purchase preference, and contract for that quantity shall be awarded to 'Class-I local supplier' subject to matching the L 1 price. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher 'Class-I local supplier' within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some Quantity is still left uncovered on Class-I local suppliers, then such balance quantity may also be ordered on the L 1 bidder.

In case item is not divisible, following procedure will be followed-

- Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a 'Class-I local supplier', the contract will be awarded to L1.
- If L1 is not from a local supplier, the lowest bidder among the 'Class-I local supplier', will be invited to match the L1 price subject to 'Class-I local supplier's' quoted price falling within the margin of purchase preference, and the contract shall be awarded to such 'Class-I local supplier' subject to matching the L1 price.
- In case such lowest eligible 'Class-I local supplier' fails to match the L1 price, the 'Class-I local supplier' with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the 'Class-I local supplier' within the margin of purchase preference matches the L1 price, then the contract may be awarded to the L1 bidder.
- Any item wherein the net quantity is less than 2 (i.e. if qty is 1 No.) will be considered as not divisible for the purpose of operating purchase preference.

## **Annexure A – General Terms & Conditions**

"Class-II local supplier" will not get purchase Preference in any procurement.

### **Document certifying local content and penal action in case of wrong declaration by suppliers.**

- The 'Class-I local supplier' / 'Class-II local supplier' at the time of tender, bidding or solicitation shall be required to provide self-certification on their letter head certified by the authorized signatory of the bidder that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.
- In cases of procurement for a value in excess of Rs. 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
- False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.
- A supplier who has been debarred by any procuring entity for violation of this order shall not be eligible for preference for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, the debarment takes effect prospectively from the date of uploading on the website(s) of The Department of Expenditure, GOI in such a manner that ongoing procurements are not disrupted.
- The onus of submission of appropriately certified documents lies with the bidder and BHEL shall not have any liability to verify the contents and will not be responsible for the same. However, in case BHEL has any reason to doubt the authenticity of the Local Content, BHEL reserves the right to obtain the complete back up calculations before award of contract failing which the bid shall be rejected.

### **2. PRICE FINALIZATION**

*"Price shall be finalized by opening price bids of all the techno-commercially qualified bidders.*

*BHEL may decide for further negotiation with L1 bidders"*

### **3. PURCHASE PREFERENCE FOR MSE SUPPLIERS.**

- Purchase preference for local MSE's quoting in the tender will be 25%.
- Within the 25% reservation for local MSE's, 3% reservation will be applicable for women owned MSE's and 6.25% reservation will be applicable for MSE's owned by SC / ST.
- Payment for MSE Indigenous vendors will be as per MSMED Act, 2006

### **Document to be submitted as proof of MSE.**

MSE suppliers can avail the intended benefits only if they submit **UDHYAM CERTIFICATE** along with the offer.

Non submission of documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for the Enquiry if any deficiency in the above required documents are not submitted before price bid opening. However, credentials of all MSE suppliers will be verified before considering the intended benefits for MSE suppliers at the time of tender evaluation.

In case item is not divisible, following procedure will be followed-

## **Annexure A – General Terms & Conditions**

- Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a MSE supplier, the contract will be awarded to L1.
- If L1 is not from a MSE supplier, the lowest bidder among the MSE suppliers, will be invited to match the L1 price subject to MSE supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such MSE supplier subject to matching the L1 price.
- In case such lowest eligible MSE supplier fails to match the L1 price, the MSE supplier with the next higher bid within the margin of MSE preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the MSE suppliers within the margin of purchase preference matches the L1 price, then the contract may be awarded to the L1 bidder.
- Any item wherein the net quantity is less than 2 (i.e. if qty is 1 No.) will be considered as not divisible for the purpose of operating purchase preference.

Note: - In case of L1 vendor is having any one of MSE OR Make in India preference, but vendor is falling in MSE/MII price range with both MSE and Make in India preference then quantity will be counteroffered to the vendor who is giving both the preferences.

#### **4. BHEL STANDARD GUARANTEE CLAUSE**

The materials are to be guaranteed for satisfactory performance for a period of 24 months from the date of dispatch or 18 months from the date of commissioning / putting into use whichever is earlier and if any defect is noticed during the above period, the same shall be rectified / replaced free of cost on FOR destination basis within a reasonable time, maximum limited to the agreed delivery period. To this effect a guarantee certificate should be sent along with the dispatch documents in the event of an order.

#### **5. Force Majeure**

If at any time during the continuance of this contract the performance in whole or part by either party of any obligation under this contract shall be prevented or delayed by reason of war, hostilities, acts of public enemy, civil commotions, sabotage, fire, flood, explosion, epidemic, quarantine restrictions or acts of God( here in referred to as events), then provided the notice of the happenings of any such event is given by either party to other party within 21(twenty one)days from the date of occurrence thereof, either party shall reason of such event, not be entitled to terminate this contract nor shall either party have any claim for damages against other in respect of such non-performance and delay in performance and delivery under the contract shall be resumed soon as practicable after such event has come to an end or ceased to exist and the decision of the BHEL as to whether the deliveries, have been so resumed or not shall be final and conclusive. If the performance in whole or part of any obligation under the contract is for extension of time shall be granted for periods, considered reasonable by the Vendor to the BHEL subject to prompt notification by the Vendor to the BHEL of the particulars of the events and supply to the BHEL if required of any supporting evidence. Any waiver of time in respect of particular part and thereof shall not be deemed to be a waiver of time in respect of remaining deliveries.

## **Annexure A – General Terms & Conditions**

### **6. Arbitrations & Conciliation**

Resolution of Disputes:

The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the contract/tender which the Parties are unable to settle mutually), arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof.

Notes:

No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.

Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Annexure X to this Enquiry Conditions.

The Annexure together with its appendices will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in these Enquiry Conditions.

Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the parties, in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract ; or , in any manner touching upon the Contract, then, either Party may , by a notice in writing to other Party refer such dispute or difference to sole arbitration of an arbitrator appointed as per the Arbitration and Conciliation Act, 1996 (India) or statutory modification or re-enactment thereof and the rules made thereunder and for the time being in force .

The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the parties. Subject as aforesaid, the provision of Arbitration & Conciliation Act 1996 (India) or statutory modification or re-enactment thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceeding under this clause.

The seat of arbitration shall be Chennai, Tamil Nadu, India. The cost of arbitration shall be borne as per the award of the Arbitrator. Subject to arbitration in terms of clause above, the Courts at Chennai, Tamil Nadu, India shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract.

## **Annexure A – General Terms & Conditions**

Notwithstanding the existence or any dispute or difference and/or reference for the arbitration, the vendor shall proceed with and continue without hindrance the performance of its obligation under this Contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.

In Case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/Port Trusts inter se and also between CPSEs and Government Departments/Organizations (Excluding disputes concerning Railways, Income Tax, Customs & Excise Departments, such dispute or difference shall be taken up by either party for resolution through AMRCD as mentioned in DPE OM No. 4(1)/2013 –DPE (GM)/FTS-1835 dated 22-05-2018.

### **7. Laws Governing the Contract:**

- a. The contract shall be governed by the Laws of the Government of India in force.
- b. Irrespective of the place of execution of the contract, place of delivery, place of payment under the contract, the contract shall be deemed to have been made at the place at which the Acceptance of the tender has been issued.

### **8. Jurisdiction of the Court**

The Courts of the place from where the acceptance of the tender has been issued shall alone have jurisdiction to decide any dispute arising out of or in respect of the contract.

### **9. Non-Disclosure Agreement (NDA)**

The bidders shall enter into the Non-disclosure agreement totally voluntarily, with full knowledge of its meaning and without duress. (Format attached).

10. "**Price to be firm** during the execution of scope of work".

### **11. Cartel Formation:**

All the firms should desist from forming cartel as the practice is prohibited under Section 3(3) (a) & (d) of the competition Act 2002.

If any such instance is observed during this tender will attract disciplinary action as per BHEL policies.

### **12. CANCELLATION / TERMINATION OF CONTRACT, DEFAULT / BREACH OF CONTRACT AND RISK PURCHASE**

In case of abnormal delays (beyond the maximum late delivery period as per Penalty clause) in supplies / defective supplies or non-fulfilment of any other terms and conditions given in Purchase Order as enumerated subsequently in this clause, Purchaser shall be entitled to cancel the Order / Contract either in whole or portion thereof without compensation to Seller / Contractor and if the Purchaser so desires, may procure upon such terms and in such manner as deemed appropriate, stores not so delivered or others of similar description where stores exactly complying with particulars are not, in the opinion of the Purchaser, which shall be final, readily procurable, at the risk and cost of the Seller / Contractor and the Seller / Contractor shall be liable to the Purchaser for any excess costs provided that the Seller / Contractor shall continue the performance of the Order / Contract to the extent not cancelled under the provisions of

## Annexure A – General Terms & Conditions

this clause. The Seller / Contractor shall on no account be entitled to any gain on such repurchases. If bidder does not agree to the above Risk Purchase Clause, BHEL reserves the right to reject the offer.

Risk & Cost Clause, in line with Conditions of Contract may be invoked in any of the following cases:

- a. Contractor / supplier's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor/ supplier including unexecuted portion of work / supply does not appear to be executable within balance available period (#) considering its performance of execution.
- b. Withdrawal from or abandonment of the work by contractor before completion of the work as per contract.
- c. Non completion of work / Non-supply by the Contractor / supplier within scheduled completion / delivery period as per Contract or as extended from time to time, for the reasons attributable to the contractor / supplier.
- d. Termination of Contract on account of any other reason (s) attributable to Contractor / Supplier.
- e. Assignment, transfer, subletting of Contract without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.
- f. Non-compliance to any contractual condition or any other default attributable to Contractor / Supplier.

### Risk and Cost amount against Balance Work

Risk & Cost Amount=  $[(A-B) + (A \times H/100)]$

Where,

**A**= Value of Balance scope of Work / Supply (\*) as per rates of new contract

**B**= Value of Balance scope of Work / Supply (\*) as per rates of old contract being paid to the contractor / supplier at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

**H**= Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

**\*(Balance scope of work / supply)**

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work / Supply for calculating risk & cost amount.

Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities.

Substitute / extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute / extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions.

However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose.

Note: In case portion of work is being withdrawn, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work / supply' for calculating Risk & Cost amount.

### LD against delay in executed work / supply in case of Termination of Contract in case of Risk and Cost Option

## **Annexure A – General Terms & Conditions**

LD against delay in executed work / supply shall be calculated in line with LD clause of the contract for the delay attributable to contractor / supplier. For limiting maximum LD value, contract value shall be taken as Executed Value of work / supply.

Method for calculation of “LD against delay in executed work / supply” is given below.

- a. Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor / supplier= T1
- b. Let the value of executed work / supply till the time of termination of contract= X
- c. Let the Total Executable Value of work / supply for which inputs / fronts were made available to contractor / supplier and were planned for execution till termination of contract= Y
- d. Delay in executed work / supply attributable to contractor/supplier i.e. T2= (1- X/Y) \* T1
- e. LD shall be calculated in line with LD clause of the Contract for the delay attributable to contractor / supplier taking “X” as Contract Value and “T2” as delay attributable to contractor / supplier.

Note: In case portion of work / supply is withdrawn, no LD shall be applicable for portion of work / supply withdrawn.

### **Recovery from Supplier**

Recoveries from contractor / supplier on whom risk & cost has been invoked shall be made from the following:

- a. Dues available in the form of Bills payable to contractor / supplier, SD, BG’s against the same contract.
- b. Dues payable to contractor / supplier against other contracts in the same Region / Unit / Division of BHEL.
- c. Dues payable to contractor / supplier against other contracts in the different Region / Unit / division of BHEL.
- d. Legal Options for recovery of dues payable by the supplier / contractor.

### **13.SUSPENSION OF BUSINESS DEALING**

In order to protect the commercial interests of BHEL, it becomes necessary to take action against suppliers / contractors by way of suspension of business dealings, who either fail to perform or are in default without any reasonable cause, cause loss of business / money / reputation, indulge in malpractices, cheating, bribery, fraud or any other misconduct or formation of cartels so as to influence the bidding process or influence the price etc. Suspension of Business Dealings could be in the form of “Hold” or “Banning” a supplier / contractor or a bidder or an applicant for registration as a registered supplier. For this purpose, the abridged version of guidelines hoisted at website [http://www.bhel.com/vender\\_registration/vender.php](http://www.bhel.com/vender_registration/vender.php) (Suspension of business dealings with suppliers / contractors) is being followed across all BHEL units. Vendors shall keep themselves aware of these guidelines before submission of their bid.

### **14.FRAUD PREVENTION POLICY**

The Bidder along with their associates / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL fraud prevention policy displayed on BHEL website at [www.bhel.com/pdf/BHEL\\_Fraud\\_Prevention\\_Policy.pdf](http://www.bhel.com/pdf/BHEL_Fraud_Prevention_Policy.pdf) and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice.

### **15.FORWARDING OF TEST CERTIFICATES & INSPECTION REPORTS**

Test certificates (TC) along with Inspection Reports (IR) as called for in the TDC (Three ink signed originals) / approved Quality Plan shall be sent to Manager / Purchase (Fittings), BHEL Piping Centre immediately after the shipment / dispatch of items. Forthcoming section may please be refereed for detailed list of documents to be submitted to respective agencies in BHEL.

## **Annexure A – General Terms & Conditions**

TC & IR shall be furnished for each batch of shipment / dispatch. If entire PO quantity is manufactured in one lot but dispatched in phased manner, original "IBR Form" should be submitted with the first consignment. For subsequent consignments, attested Xerox copy of IBR along with copies of TC and IR indicating invoice detail against which original TC and IR was handed over to BHEL shall be submitted. Soft copies of the all the test certificates shall also be submitted through email.

Year of code for the technical standards shall be latest and the specific year shall be indicated in the MTC's as well as applicable IBR Forms.

Additionally foreign vendors shall indicate the item description as "Boiler Components- Fittings" in all the dispatch documents like Bill of Lading, Invoice, Packing list, Country of origin certificate etc. Vendor shall negotiate the documents with bank only "For the net shipment value" (ie. invoice value excluding the LD value).

### **16.PAYMENT DOCUMENTS**

Payment shall be made against submission of the following documents-

- a. Original GST compliant invoice and 2 copies of the same.
- b. Original site acknowledged Lorry Receipt (Goods Receipt (GR) date for in case of BHEL Trichy stores).
- c. Original inspection report and all original documents as called for in TDC / approved QP.

If one original certificate / LR is applicable for more than one invoice quantity / invoice, Xerox copy is acceptable with original correlation details on the Xerox copy with attestation by suppliers Quality in charge.

GST compliance-

- a. Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GST registration No (GSTIN) which should be clearly mentioned in the offer. If the dealer is exempted from GST registration, a declaration with due supporting documents need to be furnished for considering the offer. Dealers under composition scheme should declare that he is a composition dealer supported by the screen shot taken from GST portal. The dealer has to submit necessary documents if there is any change in status under GST.
- b. Supplier shall mention their GSTIN in all their invoices (incl. credit Notes, Debit Notes) and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No. which is linked/uploaded in GSTN network shall be clearly indicated), Billed to party (with GSTIN) & Shipped to party details, item description as per PO, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, Place of Supply etc.
- c. All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).
- d. Invoices will be processed only upon completion of statutory requirement and further subject to following:
  - o Vendor declaring such invoice in Form GST ANX-1
  - o Receipt of Goods or Services and Tax invoice by BHEL
- e. As the continuous uploading of tax invoices in GSTN portal (in GST ANX-1) is available for all (i.e. both Small & Large) tax payers under proposed new GST Return System, all invoices raised on BHEL may be uploaded immediately in GST portal on dispatch of material /rendering of services. The supplier shall ensure availability of

## **Annexure A – General Terms & Conditions**

Invoice in GST portal before submission of invoice to BHEL. Invoices will be admitted by BHEL only if the invoices are available in GSTN portal (in BHEL's GST ANX-2).

- f. In case of discrepancy in the data uploaded by the supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note or debit note (details also to be uploaded in GSTN portal) for the shortages or rejections in the supplies or additional claims, within the calendar month informed by BHEL.
- g. In cases where invoice details have been uploaded by the vendor but failed to remit the GST amount to GST Department (Form PMT-08 or Form GST RET-01 to be submitted) within stipulated time, then GST paid on the invoices pertaining to the month for which GST return not filed by the vendor will be recovered from the vendor along with the applicable interest (currently 24% p.a) and all subsequent bills of the vendor will not be processed till filing of the GST return by the vendor
- h. In case GST credit is denied to BHEL due to non-receipt or delayed receipt of goods and/ or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount claimed in the invoice shall be disallowed to the vendor.
- i. Where any GST liability arising on BHEL under Reverse Charge (RCM), the vendor has to submit the invoices to BHEL well within the timeline prescribed in GST Law, to enable BHEL to discharge the GST liability. If there is a delay in submission of invoice by the vendor resulting in delayed payment of GST by BHEL along with Interest, then such Interest payable or paid shall be recovered from the vendor.
- j. Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contracts. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this Tax Invoice will be issued by BHEL indicating the respective supply invoice number.
- k. GST TDS will be deducted as per Section 51 of CGST Act 2017 and in line with Notification 50/2018 – Central Tax dated 13.09.2018. GST TDS certificate which will be generated in GST portal subsequent to vendor accepting the TDS deduction in the GST portal, will be issued to the vendor.

**BHARAT HEAVY ELECTRICALS LIMITED**  
PIPING CENTRE, PURCHASE  
BHEL / CHENNAI – 600 017

THIRD PARTY NON-DISCLOSURE AGREEMENT

I, \_\_\_\_\_, on behalf of the \_\_\_\_\_ (Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL, Piping Centre, Chennai on contract is confidential and that the nature of the business of the BHEL, Piping Centre, Chennai is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL, Piping Centre, Chennai Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.
- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data.

On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL, Piping Centre, Chennai all documents and property of BHEL, Piping Centre, Chennai, including: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL, Piping Centre, Chennai's business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing.

This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, Piping Centre, Chennai and are reasonable given the nature of the business carried on by the BHEL, Piping Centre, Chennai I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

Dated at \_\_\_\_\_, this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

Name

Company

Signature

## Declaration to be issued on Company letter head

In line with Government Public Procurement Order (Preference to Make in India) Order (PPP-MII Order), 2017 vide No. P-45021/2/2017-PP (BE-II) dated 04.06.2020, issued by DPIIT, Ministry of Commerce and Industry, we hereby certify that we, ..... (Supplier name) are

- a) 'Class-I local supplier' meeting requirement of local content equal to or more than 50%,
- b) 'Class-II local supplier' meeting requirement of local content more than 20% but less than 50%,
- c) 'Non local supplier' meeting requirement of local content equal to or less than 20%,

### **(Strike off whichever is not applicable)**

As defined under above referred Order for the following Enquiry Item SI Nos of BHEL Enquiry No 4102200001 dt 05.01.2022.

- Enquiry Item No./ (s) -

Details of location at which local value addition will be made is as follows:

.....  
.....

By issuing this declaration, we understand and are in acceptance to the following-

- False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.
- In case of debarment by any procuring entity for violation of the provisions of the Public Procurement (Preference to Make in India), Order 2017 we shall not be eligible for preference for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, the debarment takes effect prospectively from the date of uploading on the website(s) of The Department of Expenditure, GOI in such a manner that ongoing procurements are not disrupted.
- We undertake the onus of responsibility of submission of appropriately certified documents. We understand that BHEL is not at liability to verify the contents and will not be responsible for the declaration made by us. However, in case BHEL has any reason to doubt the authenticity of the local content, BHEL reserves the right to obtain the complete back up calculations before award of contract and we are liable to submit the same if requested by BHEL. We also understand that our bid is liable for rejection in case we fail to submit the details as requested by BHEL.

Seal and Signature of authorized signatory

Special Note-

In cases of procurement for a value in excess of Rs. 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

2861-003-08-3  
DRAWING No.

- NOTES: -
- 01. APPLICABLE FOR P91/P92
    - i) STRAIGHT WITH STRAIGHT/FITTING
    - ii) BEND WITH BEND/FITTING
  - 02. FOR OD MISMATCH, REFER FIGURE-Xa
  - 03. REFER STYLE-DL FOR THICKNESS <14.2mm (FOR ALL OD/ID)
  - 04. REFER STYLE-PL
    - i) WHEN THICKNESS IS  $\geq 14.2$  mm & <20mm (FOR ALL OD/ID)
    - ii) WHEN THICKNESS  $\geq 20$ mm & OD <219.1mm.
  - 05.  $\alpha = 6^\circ$  FOR WALL THICKNESS  $\geq 20$ MM AND  $\leq 30$  mm
  - 06.  $\alpha = 10^\circ$  FOR WALL THICKNESS > 30 mm

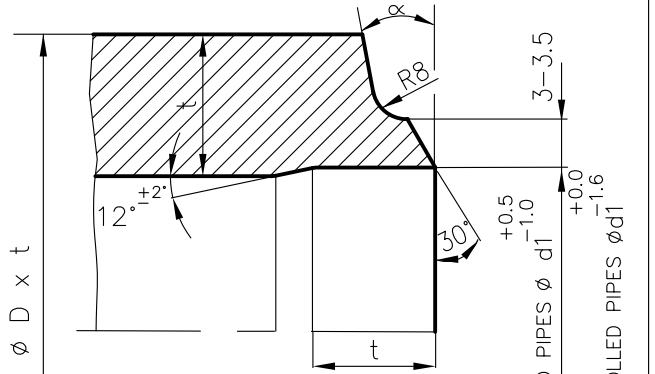


FIGURE - X

MATCHING EDGE PREPARATION FOR MISMATCH OD APPLICABLE FOR BENDS/FITTINGS OF P91/P92 MATERIALS

- NOTES: -
- 01. OD OF STRAIGHT TO BE PHYSICALLY MEASURED/VERIFIED.
  - 02. t = THK OF CONNECTING PIPE (STRAIGHT)

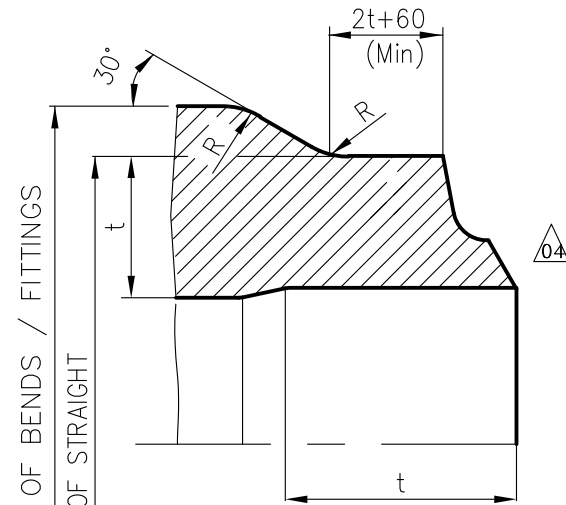
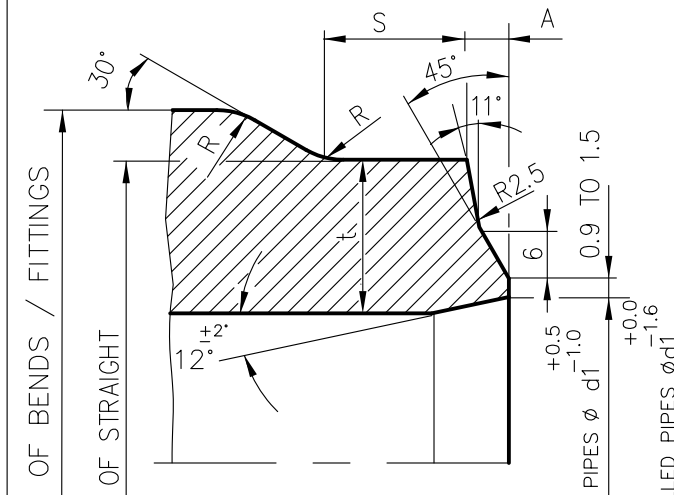


FIGURE - Xa

MATCHING EDGE PREPARATION FOR MISMATCH OD DIAMETRICALLY GREATER THAN 8 mm (ie OD1 - OD2 > 8mm) APPLICABLE FOR BENDS/FITTINGS OTHER THAN P91/P92 MATERIALS

- NOTES: -
- 01. OD OF STRAIGHT TO BE PHYSICALLY MEASURED/VERIFIED.
  - 02. WHEN  $t < 65$ ,  $S+A = 65$  Min. &  $t > 65$ ,  $S=65$  Min. WHERE t=THK OF CONN.PIPES (STRAIGHT).



STYLE - Pa

MATCHING EDGE PREPARATION FOR MISMATCH OD DIAMETRICALLY GREATER THAN 8 mm (ie OD1 - OD2 > 8mm) APPLICABLE FOR ELBOWS OTHER THAN P91/P92 MATERIALS

- NOTES: -
- 01. OD = OUTSIDE DIA OF CONN. PIPE (STRAIGHT) TO BE PHYSICALLY MEASURED/VERIFIED.
  - 02. t = THK OF CONN.PIPES (STRAIGHT)
  - 03. t = THK OF CONN.PIPES (STRAIGHT)

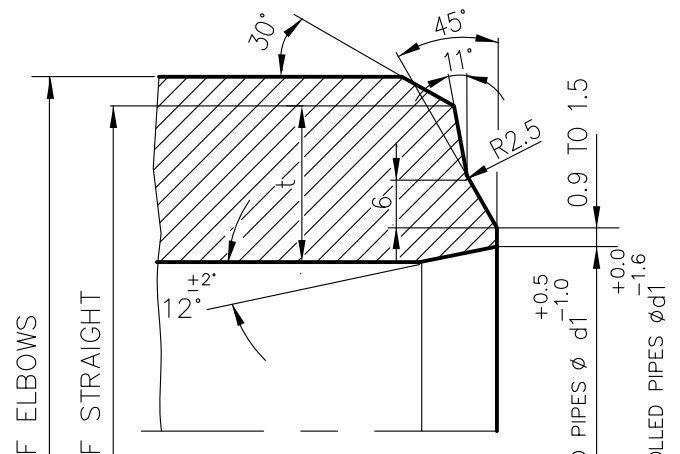


FIGURE - Z

- NOTES: -
- 01. APPLICABLE FOR P91/P92 ZERO ARM PIPEBEND WELDED WITH P91/P92 STRAIGHT PIPE
  - 02. FOR OD MISMATCH, REFER FIGURE-Xa
  - 03. REFER STYLE-DL FOR THICKNESS <14.2mm (FOR ALL OD/ID)
  - 04. REFER STYLE-PL
    - i) WHEN THICKNESS IS  $\geq 14.2$  mm AND < 20 mm FOR ALL OD/ID.
    - ii) WHEN THICKNESS  $\geq 20$ mm AND OD < 219.1 mm.
  - 05.  $\alpha = 6^\circ$  FOR WALL THICKNESS  $\geq 20$ MM AND  $\leq 30$  mm
  - 06.  $\alpha = 10^\circ$  FOR WALL THICKNESS > 30 mm

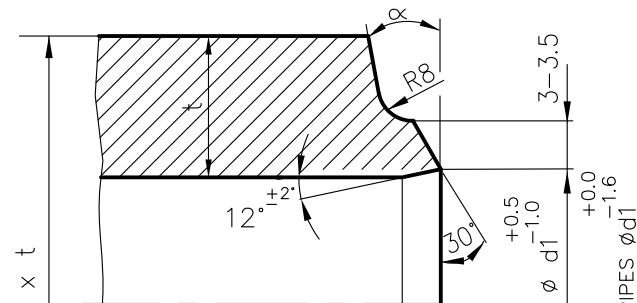


FIGURE - Xb  
(BEND END)

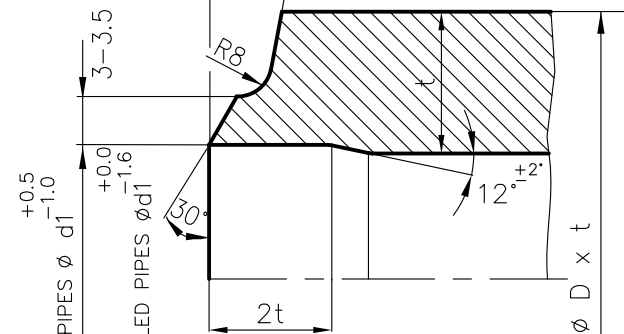
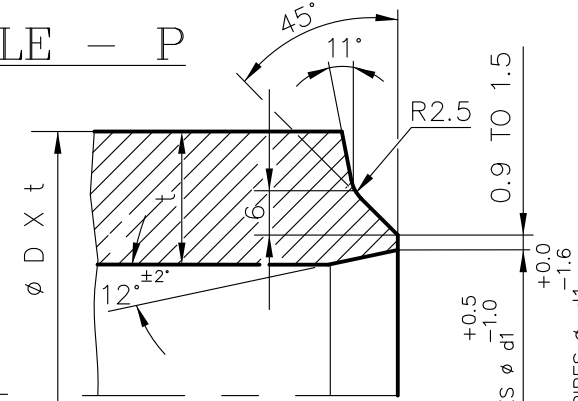


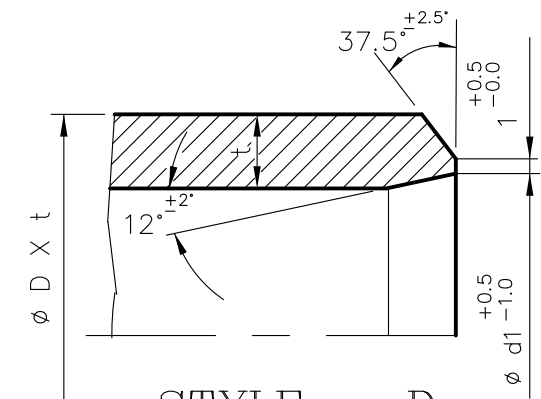
FIGURE - Xc  
(STRAIGHT END)

STYLE - P



- NOTES: -
- 01. USE WHEN  $t \geq 14.2$  mm AND < 70mm.
  - 02. FOR  $t \geq 70.0$  mm REF. STYLE-Pm
  - 03. FOR OD MISMATCHING REF. STYLE-Pa

- NOTES: -
- 01. USE WHEN  $t < 14.2$  mm.



STYLE - D

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

STANDARD

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.
  - 03. SHARP CORNERS SHALL BE ROUNDED OFF WHEREEVER 'R' IS INDICATED.
- NOTES FOR WELDING:
- 01. WELD REINFORCEMENT TO BE FLUSH GROUND AND MERGED WITH PARENT METAL WITHOUT ANY UNEVENNESS.

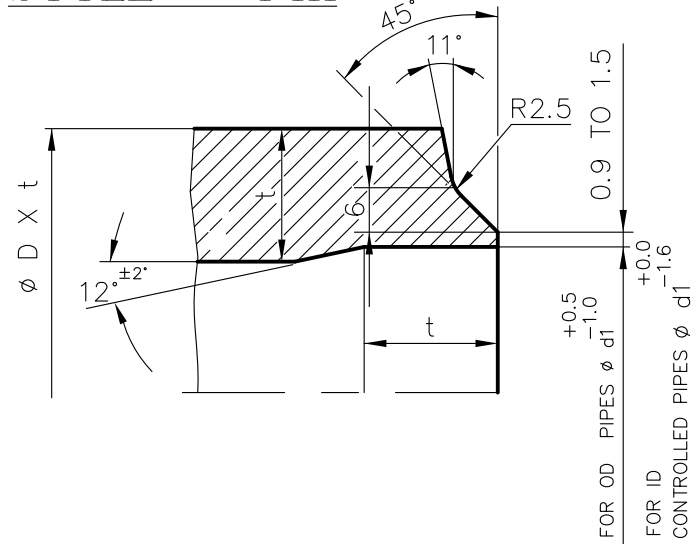
REV 04	DATE 07.12.16	ALTERED: P SURESH APPROVED: R SESHAGIRI
ZONE	SHEET 2 OF 2 IS ADDED. NOTES ADDED, MODIFIED AND DELETED IN FIGURE-X, Xa, Xb, Xc AND STYLE-P	
REV 03	DATE 10.04.13	ALTERED: M.R.K APPROVED: C.K.N
ZONE	FIG Xb AND FIG Xc ADDED. IN FIG.X, NOTE 01 MODIFIED. IN FIG.Xa, STY-Pa, FIG.Z, P92 MATERIAL ADDED	
REV 02	DATE 10.01.13	ALTERED: M.R.K APPROVED: C.K.N
ZONE	IN FIG.Xa, NOTE 04 ADDED. GENERAL NOTES 03 ADDED. IN FIG.Xa, 8MM OD MISMATCH IS REMOVED	
REV 01	DATE 11.05.04	ALTERED: R.SENDHIL APPROVED: A.VELAYUTHAM
ZONE	PROJECT NAME REMOVED AND STANDARD INCORPORATED IN TITLE BLOCK	

	BHARAT HEAVY ELECTRICALS LTD.,		DRN	NAME	SIGN	DATE	NO OF ITEMS
	PIPING CENTRE, MADRAS		CHD	K.B.RAGUNATH		11.10.01	
			APPD	M.C.SEKARAN		11.10.01	
DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	NAME OF ORIGINAL ORGANISATION		ITEM No.	
CODE	C/M/F						
TITLE			CARD CODE	DRAWING No.		REV	
EDGE PREPARATION DETAILS			U 01	3-80-300-19825		04	
						SHEET 1 OF 2	

3-80-300-19825

DRAWING No.

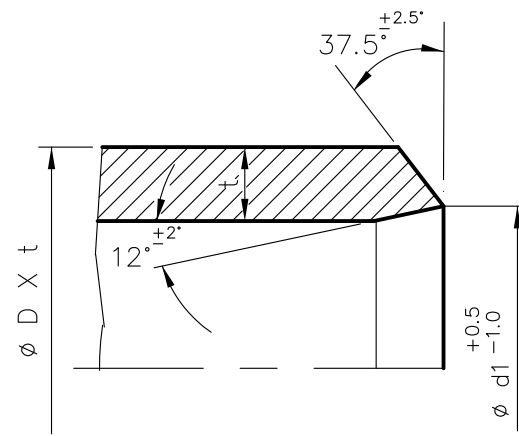
STYLE - P<sub>m</sub>



NOTES: -

01. USE FOR SA106GRC PIPES WHEN  $t \geq 70.0$  mm.
02. FOR OD MISMATCHING REF. FIGURE-P<sub>a</sub>
03. FOR FITTINGS USE STYLE-P.

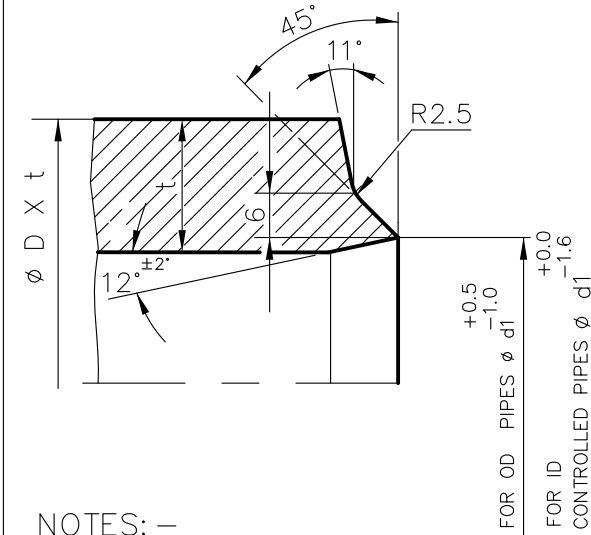
STYLE - D<sub>L</sub>



NOTES: -

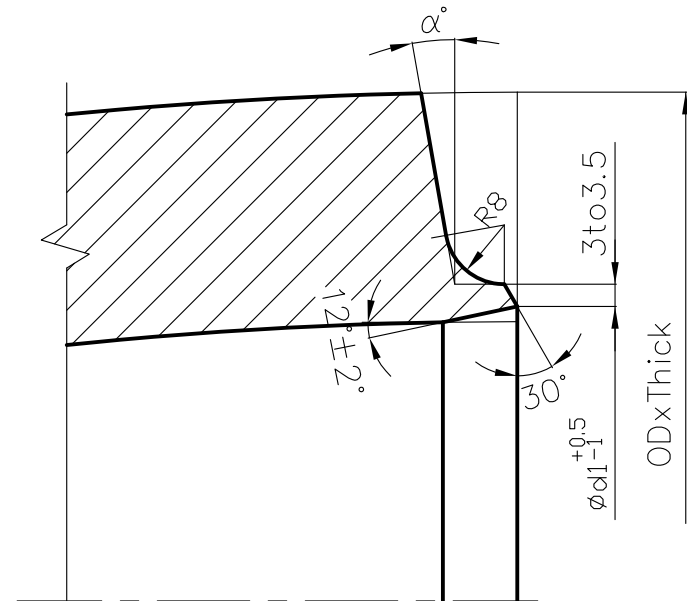
01. USE FOR P91 / P92 PIPES AND FITTINGS WHEN  $t < 14.2$  mm (ALL OD/ID).

STYLE - P<sub>L</sub>



NOTES: -

01. USE FOR P91 / P92 PIPES AND FITTINGS
  - i) WHEN THICKNESS IS  $\geq 14.2$  mm AND  $< 20$  mm FOR ALL OD/ID.
  - ii) WHEN THICKNESS  $\geq 20$ mm AND OD  $< 219.1$  mm.
02. FOR OD MISMATCHING REF. FIGURE-P<sub>a</sub>


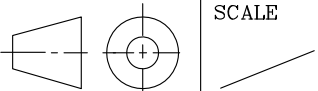


01. USE FOR P91 / P92 FITTINGS
02. REFER STYLE-D<sub>L</sub> FOR THICKNESS  $< 14.2$ mm FOR ALL OD/ID.
03. REFER STYLE-P<sub>L</sub>
  - i) WHEN THICKNESS IS  $\geq 14.2$  mm AND  $< 20$  mm FOR ALL OD/ID.
  - ii) WHEN THICKNESS  $\geq 20$ mm AND OD  $< 219.1$  mm.
04.  $\alpha = 6^\circ$  FOR WALL THICKNESS  $\geq 20$ MM AND  $\leq 30$  mm
05.  $\alpha = 10^\circ$  FOR WALL THICKNESS  $> 30$ mm.
06. FIGURE-Xf IS APPLICABLE FOR ALL BUTT WELDED FITTINGS NOT COVERED IN NOTES 02 & 03

FIGURE-Xf

NOTE :

01. FOR GENERAL NOTES AND NOTES FOR WELDING REFER SHEET 1 OF 2.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		STANDARD				
 BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, MADRAS	DRN	NAME P SURESH	SIGN	DATE 07.12.16	NO OF ITEMS	
	CHD	R SESHAGIRI		07.12.16		
	APPD	C KARUNAKARAN		07.12.16		
DEPT.	GRADE OF UN TOL DIM		WEIGHT (Kg).	NAME OF ORIGINAL ORGANISATION		ITEM No.
CODE	C/M/F					
TITLE		CARD CODE	DRAWING No.		REV	
EDGE PREPARATION DETAILS		U 01	3-80-300-19825		04	
					SHEET 2 OF 2	

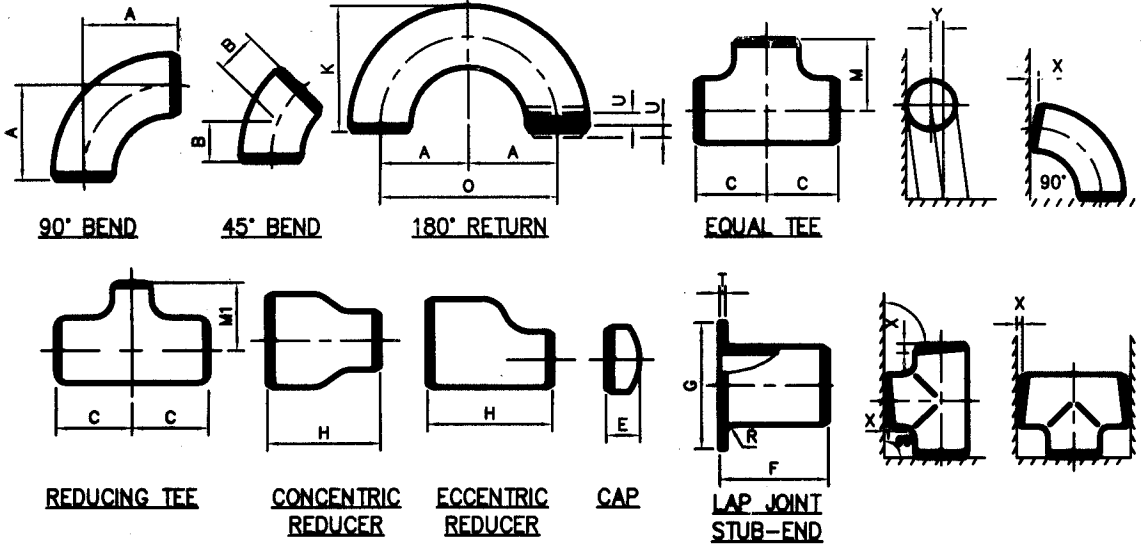
CAUTION THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LTD. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

REV	DATE	ALTERED	<i>[Signature]</i>
01	05.02.05	APPROVED	<i>[Signature]</i> APMK

TITLE BLOCK AND DRAWING ALTERED

(REFERENCE : ISIRI REG.NO 361(A) INCLUDED IN AMENDMENT)



ALL FITTINGS				90° & 45° ELBOWS AND TEES	REDUCER	180° RETURNS			CAPS	LAP-JOINT		STUB END		
DN.	O.D AT BEVEL	I.D AT END	WALL THICKNESS	CENTER TO END A,B,C,M,M1	OVERALL LENGTH H	CENTER TO CENTER O	BACK TO FACE K	ALIGNMENT OF END U	OVER ALL LENGTH E	END TO END F	RADIUS R	DIAM OF LAP G	THICKNESS OF LAP	
15 TO 65	+1.6 -0.8	±0.8	NOT LESS THAN 87 1/2% OF NOMINAL THICKNESS	±1.6	±1.6	±6.4	±6.4	±0.8	±3.2	±1.6	+0 -0.8	+0 -0.8	+1.6 -0	
80 TO 90	±1.6	±1.6		±1.6	±1.6	±6.4	±6.4	±0.8	±3.2	±1.6	+0 -0.8	+0 -0.8	+1.6 -0	
100	±1.6	±1.6		±1.6	±1.6	±6.4	±6.4	±0.8	±3.2	±1.6	+0 -0.8	+0 -0.8	+1.6 -0	
125 TO 200	+2.4 -1.6	±1.6		±1.6	±1.6	±6.4	±6.4	±0.8	±6.4	±1.6	+0 -0.8	+0 -0.8	+1.6 -0	
250 TO 400	+4.0 -3.2	±3.2		±2.4	±2.4	±9.5	±6.4	±1.6	±6.4	±2.4	+0 -1.6	+0 -1.6	+1.6 -0	
500 & ABOVE	+6.4 -4.8	±4.8		±2.4	±2.4	±9.5	±6.4	±1.6	±6.4	±2.4	+0 -1.6	+0 -1.6	+1.6 -0	

OFF-SQUARE TOLERANCES		
NOMINAL SIZE OF FITTING	OFF SQUARE TOLERANCE, X	OFF SQUARE TOLERANCE, Y
UP TO AND INCLUDING 100	0.8	1.6
125 TO 150	1.2	2.4
200 TO 550	1.6	3.2
600 & ABOVE	3.2	6.4

NOTES : 1. ALL DIMENSIONS ARE IN MILLIMETRES

**STANDARD**

		<b>BHARAT HEAVY ELECTRICALS LIMITED</b> PIPING CENTRE CHENNAI 600 017		DRN	NAME	SIGN	DATE	NO. OF VAR
				CHD	ENGG. ENTERPRISES	Sd	15.10.1986	
				APPD	R. ANANTH	Sd	15.10.1986	
DEPT	GRADE OF UNTOL DIM		SCALE	WEIGHT (KG)	REF. TO ASSY./OLD DRG.		ITEM NO.	NO. OF ITEMS
CODE	C / M / F		N.T.S	-	-		-	
TITLE				CARD CODE	DRAWING NO.			REV
TOLERANCES ON FITTINGS				U 01	4-80-301-26192			01