AN ISO 9001 COMPANY

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M. MURUGIAH, SR DGM/MM/MFG

Ref: MM/Mfg/C&F/Bifurcates
Date: 14.07.2008

Notification regarding empanelment of new vendors/fabricators for supply of "Welded tube bifurcates"

BHEL, Trichy intends to register / develop vendors / fabricators with experience in the manufacture / fabrication of Pressure Parts for the supply of "Welded tube Bifurcates" as per the sketch (A & B) and Technical Delivery Conditions (TDC) attached.

Scope:

The vendors/fabricators are requested to study the drawings and TDC and confirm their willingness and capability to supply the bifurcates for the following options:

Option 'A' : Supply with all the materials to be arranged under the scope of vendor.
Option 'B' : Main raw material (Tubes) alone to be supplied by BHEL and the fabrication & testing (as per TDC & drg) including transportation of raw materials & finished components under the scope of vendor/fabricator.

Business potential :

Approximately, Rs.3 to 4 crores for 2008-09, including cost of raw materials. Continuous business potential is expected every year.

Quantity :

The tentative (estimated) quantity of bifurcates required for current year are given below.

1. T22 'U' Bend + T22 third leg
2. T22 'U' Bend + T91 third leg
3. T11 'U' Bend + T11 third leg

The total quantity is about 8000 Nos for 2008 - 09.

The quantity is likely to increase in subsequent years.

Major Operations involved:

1. 180 ° bending – ("U bend" including prebend, squeezing & sizing)
2. Flaring up & machining operations for third leg welding followed by Heat Treatment.
3. Third leg welding.
4. 100% RT for weld joints.
5. Post-weld Heat Treatment.
6. Hydro Test.

How to apply:

Vendors/Fabricators may express their interest by mail/letter to BHEL to the following address along with their company profile, Product Profile, Quality accreditations, experience, customer list, list of important machineries and Testing equipments, contact persons, phone no. mail ID and other relevant data. The option (A or B as indicated under scope)preferred by the vendor also may be indicated without fail.

Address for communication:

Sr. Manager / Purchase / C&F
Building 24, IV Floor,
BHEL, Tiruchirappalli,
PIN : 620014, Tamil Nadu

Phone : 0431 - 2577331

Fax : 0431-2520719

e-mail : srchandran@bheltry.co.in
: avjr@bheltry.co.in

RECORD OF REVISIONS

Rev 00 : FRESH ISSUE

1.0 SCOPE

1.1 This Technical Delivery Condition specifies the requirements for the manufacture inspection and testing requirements of of bifurcates reheaters and low temperature superheaters of 500 MW boilers.

1.2 The dimensions and tolerances given in the drawing enclosed to the purchase order shall Strictly be adhered to by the manufacturer.

1.3 The size and quantity shall be as specified in the purchase order.

2.0 Materials used in the bifurcates:

The materials used in the bifurcates shall be as given in the purchase order and drawing(s)

or

SA 210 Gr C, SA 213 T11 , SA 213 Gr T22 or SA 213 GrT91 And SA 213 TP 347H As given in the respective bifurcate drawings.

2.1 The chemical composition and mechanical properties and supply conditions shall be as Per the respective specifications of the tubes AND 5 % NOTCH for ut test shall be the acceptance criteria for the acceptance of tubes by the bifurcates manufacturer.

2.3 Inspection of bends for bifurcates

2.3.1 The bends shall be 180 deg bends with the bend radius as given in the drawing.

2.3.2 There shall not be any twist in the bends manufactured.The Bends shall be subjected to heat treatment as given in Table–A if the material of the bends is SA 213 T 22 or T91.

2.4 Pulling out/ machining of the bend at the bent area

2.4.1 Initial boring and pull out before edge preparation Shall be F.O.T TEST and this shall be shown to BHEL/AIA Before proceeding with weld edge preparation.

2.4.2 The dimensions X,Y,Z,(M+/-tolerance),K and L shall be as per drawing And no deviation in these dimensions is permitted.

2.4.3 The bore in the u bend shall be so centred that there is Perfect overlap of the centre of the bore and the intersection of the plane of the bend with that of the centerline of the bend as shown.

2.4.4 The land dimension “s” shall not be less than given in the drawing.

2.5 Machining of the straight tube for perfect fitup with the bore on the “U” bend.

2.5.1 The fit up dimensions as given in the drawing for the straight tube shall be met. Any deviating straight tubes shall be rejected.

2.6 **Fit Up of U bend with straight tube.**

A LAYOUT SHALL BE MADE ON FLAT SHEET METAL LEVELLED FOR PERFECT PLANARITY.THE U TUBE AND STARIGHT TUBES SHALL BE FITTED ON THIS LAY OUT AND TACKED.

2.7 **WELDING OF THE STRAIGHT TUBES WITH BORED U BEND**

2.7.1 THE WELDERS ENGAGED IN THE WELDING OF THIS PRESSURE JOINT SHALL BE QUALIFIED AS PER IBR / ASME SEC IX. The Welder and the welding procedure shall be qualified before allowing the above bifurcate weld joints.

2.7.2 Root weld shall be made using TIG and finish weld may be by TIG or MMAW using the qualified welding procedure and consumables.Weld reinforcements shall not exceed 1.5 mm and shall be ground smooth and without any notches.

2.8 Heat treatment of the weld joint

The weld joint shall be given post weld stress relief hest treatment in the case of SA 210 Gr C , SA 213 T11, SA 213 T22 and in the case of T91 normalising and tempering heat treatment shall be given for the joint before taking up for Radiography.

2.9 Radiography of the weld joint

The weld joint shall be radiographed 100 % as PER ASME SEC – V by two shots technique due to the unique nature of the “U” to straight tube joint

2.10 Hydraulic test of the finished bifurcate

Each finished bifurcate shall be hydro tested to 1.5 times the design pressure given in the respective bifurcate drawings

3.0 Cleaning and preservation of the finished bifurcates

3.1 The bifurcates so made shall be thoroughly power tool cleaned and painted with one coat of red oxide zinc phosphate primer to spec IS 12744 latest to a dry film thickness of min 25 microns.

3.2 The bifurcates shall be identified by circumferential colour band of the appropriate color as per table B given below.

4.0 IDENTIFICATION MARKING:

4.1 THE FOLLOWING IDENTIFICATION MARKING SHALL BE ENGRAVED ON THE BIFURCATES BELONGING TO THE SAME SPECIFICATION.

1.0 Specification , heat number(BEND & LEG)
2.0 Size
3.0 Radiography joint Number
4.0 HT cycle number for bend and finished bifurcate as applicable
5.0 Hydro test pressure.

4.2 IF U PORTION AND STRAIGHT PORTION OF THE BIFURCATES ARE HAVING DIFFERENT SPECIFICATIONS THIS SHALL BE SPECIFICALLY ENGRAVED AND IDENTIFIED BY THE COLOR BANDS AT THE ENDS 100 MM AWAY FROM THE ENDS.

TABLE – A

Guidelines for selecting soaking temperature for PWHT unless specified otherwise in relevant WPS

MATERIAL GROUP (ASME SEC IX)	**TEMPERATURE deg. C**
P1, P9 B _ SA 210 Gr C	595-625
P3 SA 210 Gr T 11	620-660
P5A SA 213 Gr T 22	680-720
P5B SA 213 Gr T 91	750-770

Rate of heating / cooling for Stress Relief and rate of heating for tempering shall be as below unless otherwise specified. Incase of SR, cooling shall be in furnace up to 400 deg. C (350 deg. C for X20 and P91) and further in Air.

Thickness of Material	**Maximum Rate of Heating & Cooling above 400 deg. C**
Up to 25mm	220°C/Hr
Over 25 - 50mm	110°C/Hr
Over 50 - 75mm	75°C/Hr
Over 75mm	55°C/Hr

TABLE –B

SPEC OF TUBE/PIPE	FIRST COLOR BAND	2ND COLOR BAND	3RD COLOR B
Sa 210 Gr C	BLUE	GREEN	----
SA 213 GR T11	ALUMINIUM	YELLOW	
SA 213 GR T22	GREEN	RED	
SA 213 GR T91	GREEN	YELLOW	

4.3 EVERY BIFURCATE PRODUCED SHALL HAVE A SEPARATE IBR CERTIFICATE DULY SIGNED BY THE BOILER INSPECTORATE OR IF THE FIRM MAKING THE BIFURCATE IS A WELL KNOWN BOILER MANUFACTURER THE IBR CERTIFICATE DULY SIGNED BY THE MAKER'S REPRESENTATIVE IN IBR FORMAT (FORM III-C) SHALL BE GIVEN.

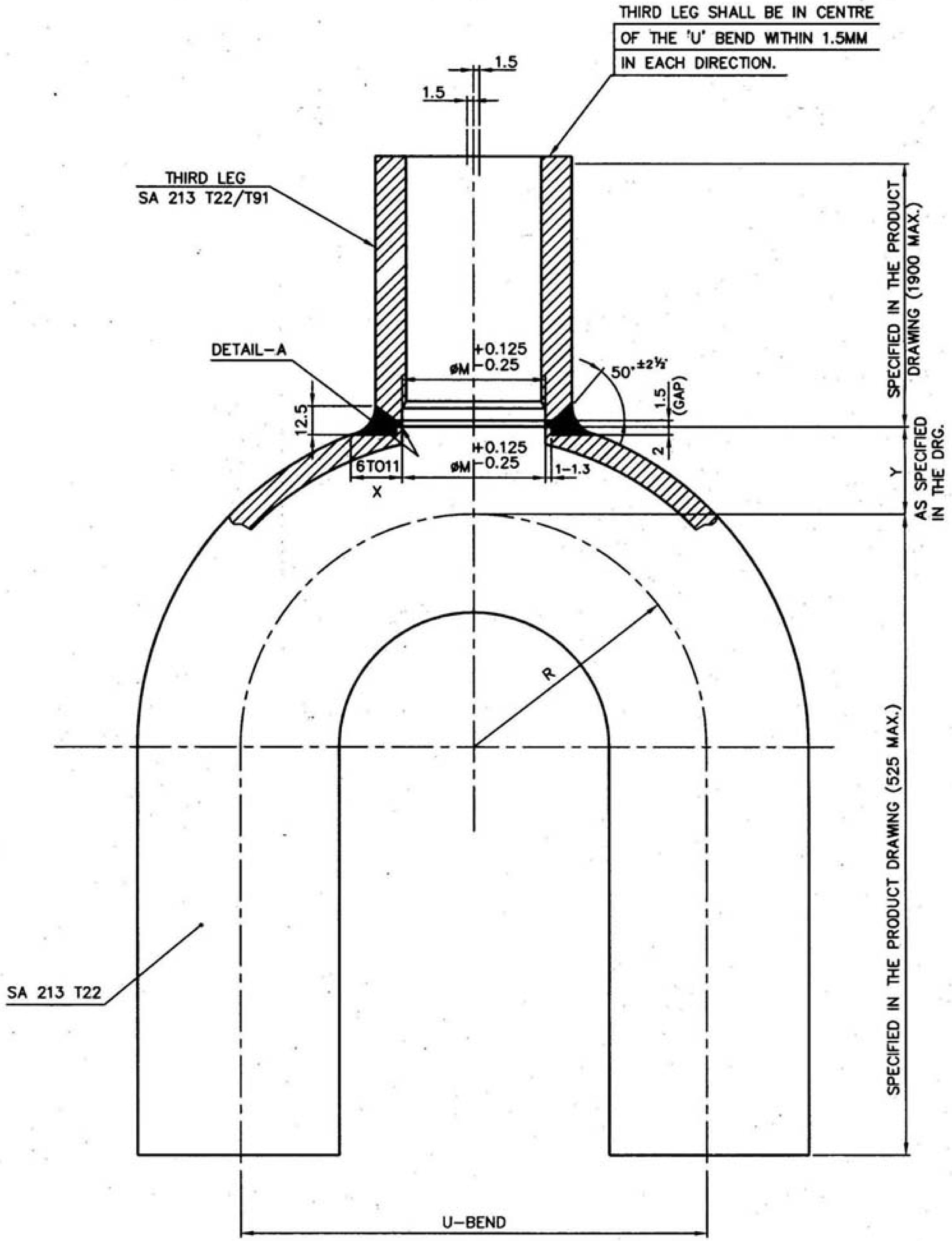
4.4 THE DIMENSIONAL REPORTS OF THE BIFURCATES SHALL BE SUBMITTED FOR EACH BIFURCATE.

4.5 THE VENDOR SHALL TAKE CARE OF THINNING DURING BENDING AND PULL OUT IN SUCH A MANNER THAT FINAL DIMENSIONS OF THE FINISHED BIFURCATES ARE ACHIEVED.

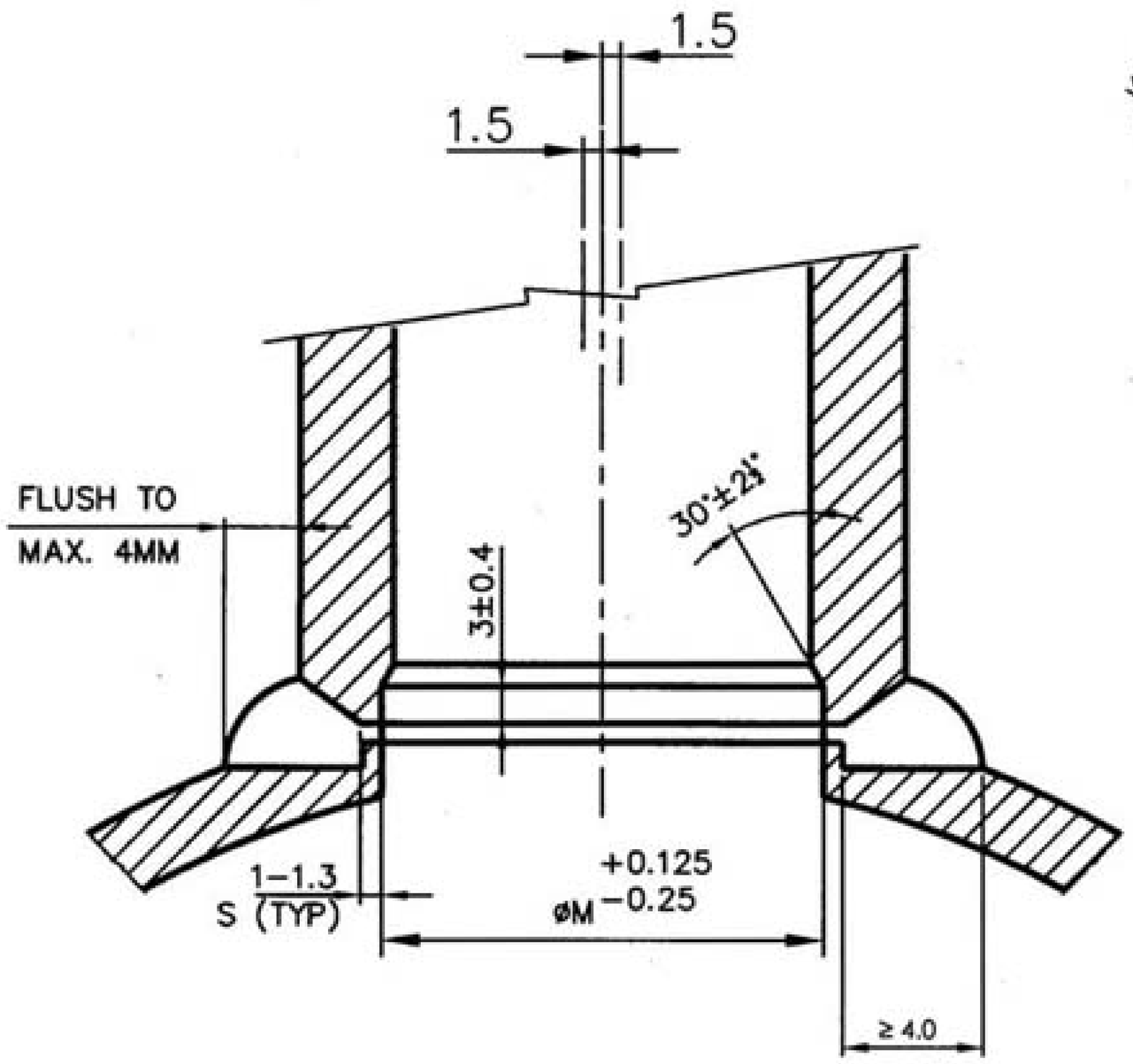
5.0 END USE

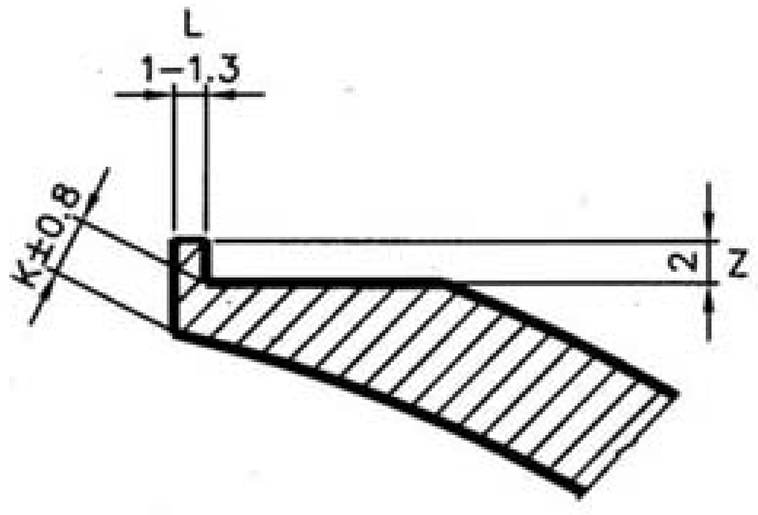
5.1 These bifurcates are intended for use in boilers of 500 mw 600 mw, 660 mw and 800 mw design.

Prepared by	Reviewed by			Approved by
V.JAYARAMAN	K RENGACHARI	R.EASWARAN	K. SRINIVASAN	C.R.RAJU


THIRD LEG SHALL BE IN CENTRE
OF THE 'U' BEND WITHIN 1.5MM
IN EACH DIRECTION.
1.5
1.5
THIRD LEG
SA 213 T22/T91
DETAIL-A
+0.125
ØM -0.25
50°±2½°
1.5 (GAP)
12.5
2
6TO11
X
+0.125
ØM -0.25
1-1.3
Y
AS SPECIFIED IN THE DRG.
SPECIFIED IN THE PRODUCT DRAWING (1900 MAX.)
SPECIFIED IN THE PRODUCT DRAWING (525 MAX.)
R
SA 213 T22
U-BEND

SKETCH - A





DETAIL– A

NOTE:

HEIGHT IN THE U–LEG & THIRD LEG WILL BE SPECIFIED LATER IN CONTRACT DETAILED DRAWING.

SKETCH - B