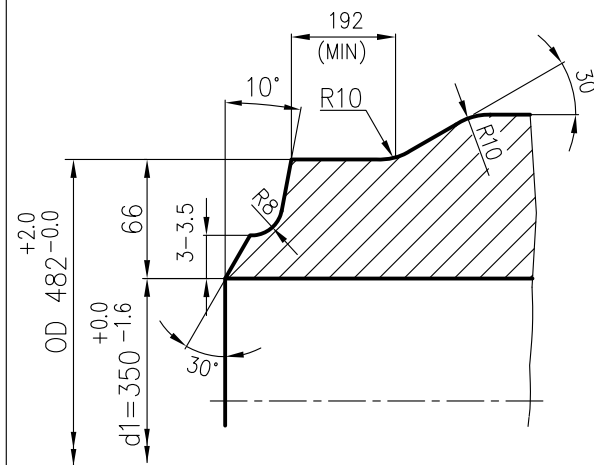
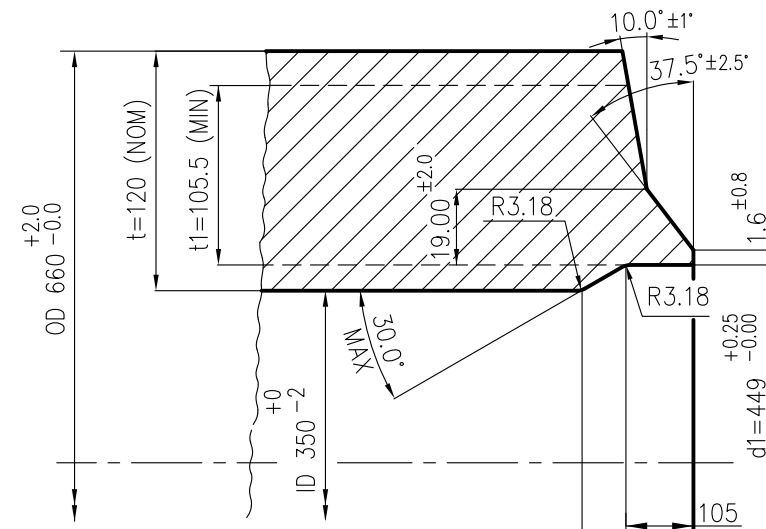


DRAWING No



DETAIL-B



DETAIL-A

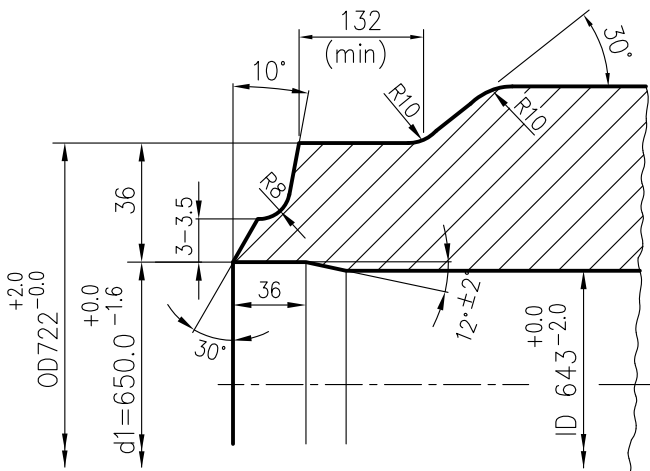
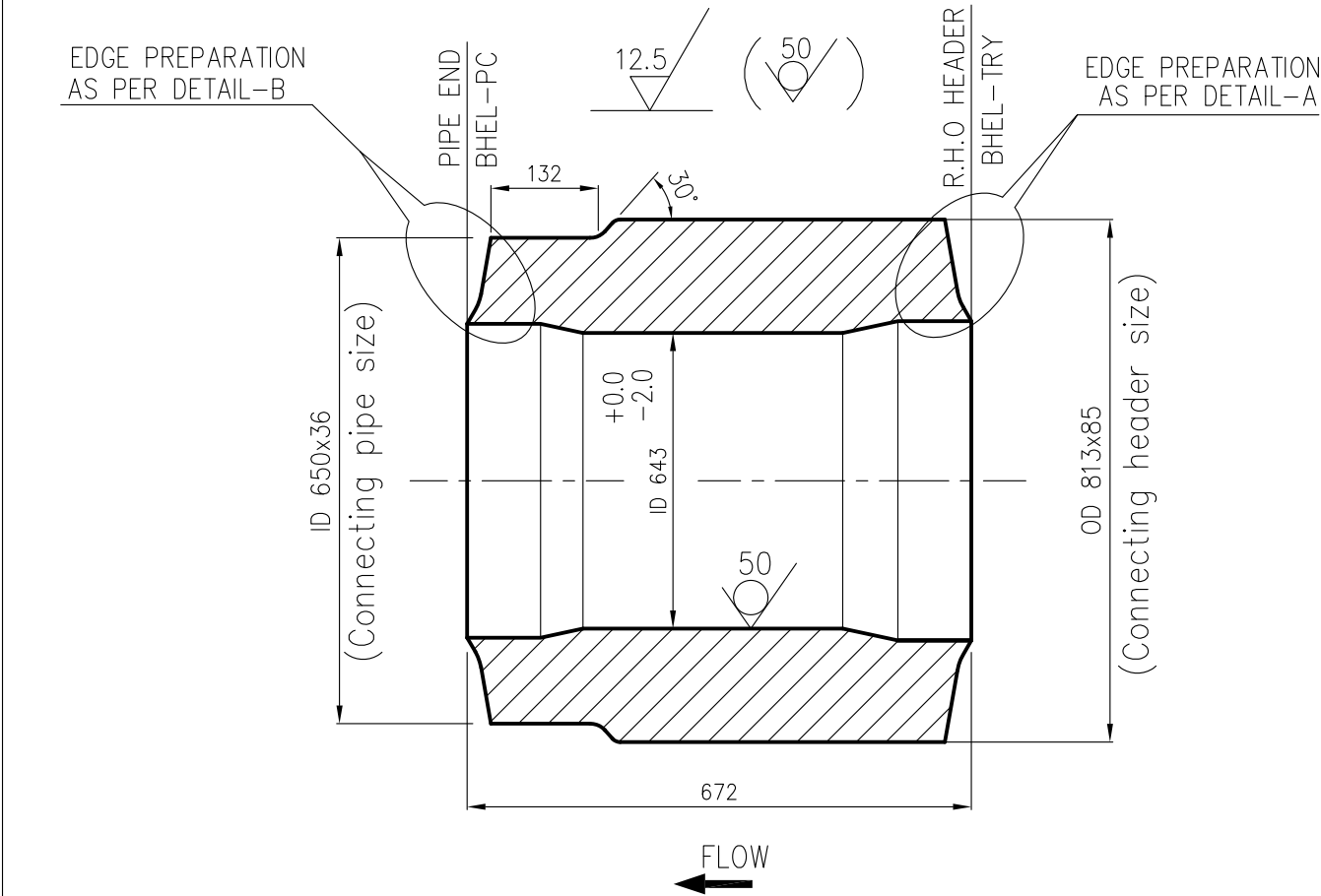
1. DESIGN PRESSURE : **271** Kg/Cm²(g)
2. DESIGN TEMPERATURE : **573** °C
3. PIPE 'SA 335 P91'(A) CAN ALSO BE USED IN PLACE OF 'SA 182 F91'(A)
4. THE FINISHED MATERIAL SPECIFICATION IS 'SA 182 F91'(A)
5. THE FINISHED MATERIAL CODE IS '92 117 245 0000'
6. FOLLOW TDC No. : TDG-104 (LATEST REVISION)
7. WEIGHT INDICATED IS FOR APPROXIMATE FINISHED MATCHING PIECE WEIGHT.

SIZE A3

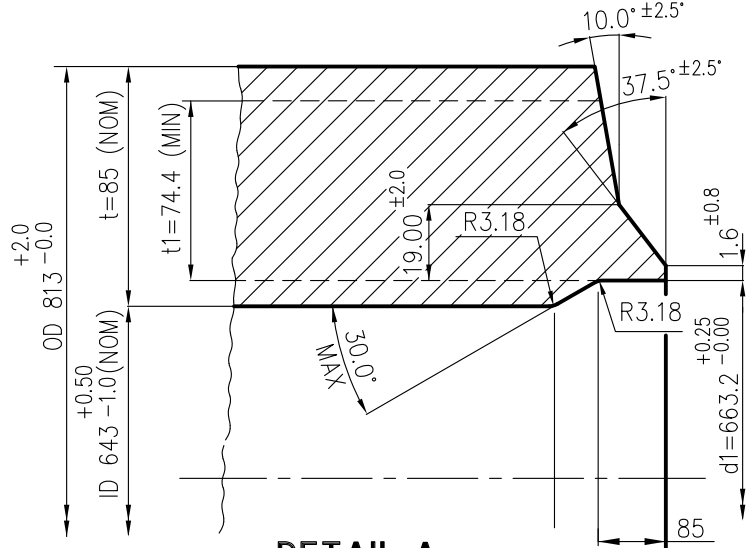
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3-80-310-33570

DRAWING No



DETAIL-B



DETAIL-A

NOTES

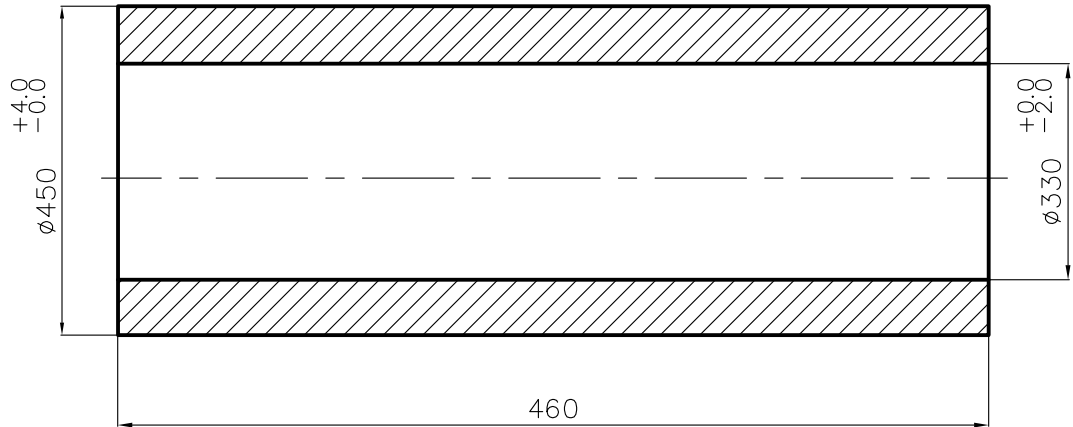
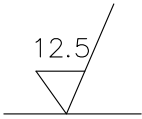
- DESIGN PRESSURE : 68 Kg/Cm²(g)
- DESIGN TEMPERATURE : 601 °C
- PIPE 'SA 335 P91'(A) CAN ALSO BE USED IN PLACE OF 'SA 182 F91'(A)
- THE FINISHED MATERIAL SPECIFICATION IS 'SA 182 F91'(A)
- THE FINISHED MATERIAL CODE IS '92 117 227 0000'
- FOLLOW TDC No. : TDG-104 (LATEST REVISION)
- WEIGHT INDICATED IS FOR APPROXIMATE FINISHED MATCHING PIECE WEIGHT.

01	FORGING OD813x85 L=672	3-80-310-33570		—	A	846,000
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO.	MATERIAL CODE	A	UNIT WT.
			VAR NO.	MATERIAL SPEC.	C	QTY.
SPACE FOR IBR APPL.						
 BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, CHENNAI 600 017			NAME	SIGN	DATE	NO OF ITEMS
			DRN	DINESH	Sd/-	19.6.2017
			CHD	I.BISWAS	Sd/-	19.6.2017
			APPD	S.RAMAMURTHY	Sd/-	19.6.2017
DEPT.	GRADE OF UN TOL. DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:		ITEM No.
CODE	C/M/F	N.T.S.	846	—		—
TITLE			CARD CODE	DRAWING No.		REV
MATCHING PIECE (OD813x85/ID650x36) L=672			U 01	3-80-310-33570		00

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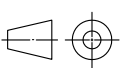
REV	DATE	ALTERED
01		APPROVED

ALL DIMENSIONS ARE IN MILLIMETRES

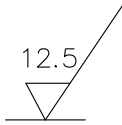


	BRANCH NOZZLE L = 460 ID 330.0 x Thk 60.0 Min		92 525 185 0002	A		265	400
			SA 182 F91				
VAR NO.	DESCRIPTION	STD	MATL. CODE	A C	UNIT	UNIT.WT.(Kg)	
			MATL. SPECN.		DI	QTY.	

STANDARD

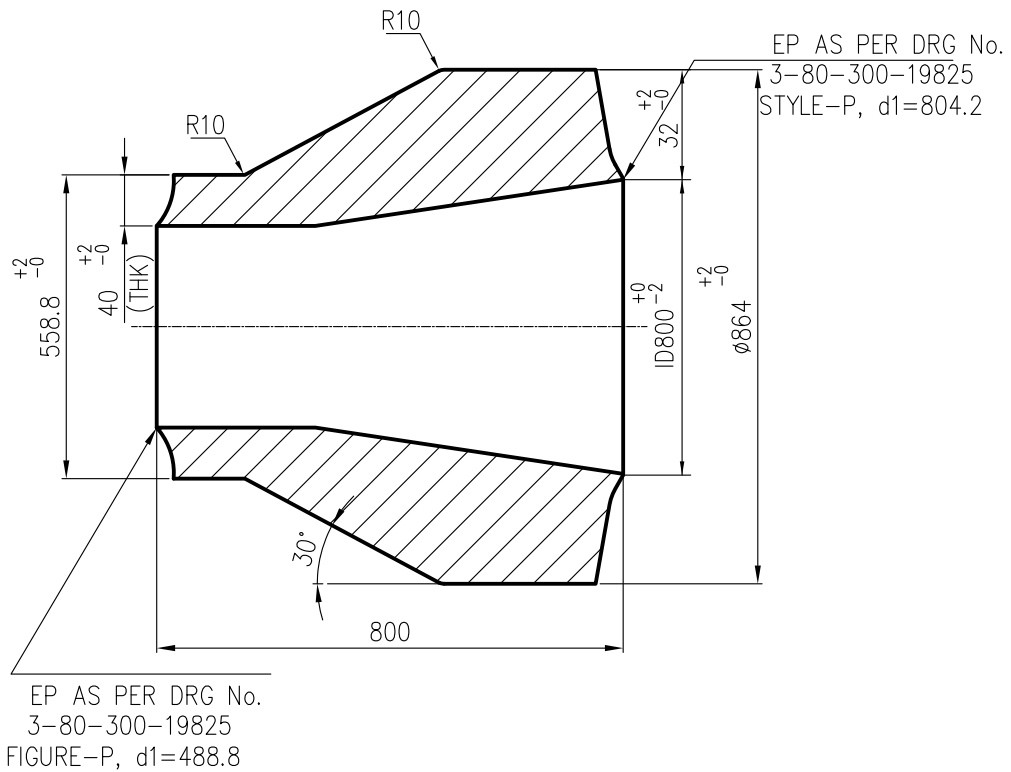
 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE CHENNAI 600 017				NAME R. VIJAY		SIGN		DATE 19-07-06		NO.OF VAR									
DRN		T.N.ELANGO VAN		19-07-06															
CHD		A.VELAYUTHAM		19-07-06															
APPD																			
DEPT CODE		GRADE OF UNTOL.DIM C / M / F				SCALE N.T.S		WEIGHT (KG). 265.400		BHEL PO REF NO: 3-80-301-23658				ITEM NO.		NO. OF ITEMS			
TITLE BRANCH NOZZLE ID330.0 x Thk60.0 Min FOR FABRICATED UNEQUAL TEE OD559.0x54.0/OD406.4x38.0										CARD CODE U 01		DRAWING NO. 4-80-301-62558						REV 00	

REV 01	DATE	ALTERED : CHD & APPD :
-----------	------	---------------------------



NOTES:

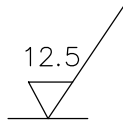
- 01 DESIGN PRESSURE : 75 kg/sq.cm(g)
02 DESIGN TEMPERATURE : 380 °C
03 FOLLOW APPLICABLE TDC



	MATCHING PIECE OD864X32/OD558.8X40 L=800		92 117 238 0000	A		1095	219
			SA 105				
VARIANT NUMBER	DESCRIPTION	STD	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT(KG)	
			MATERIAL SPECN			QUANTITY	

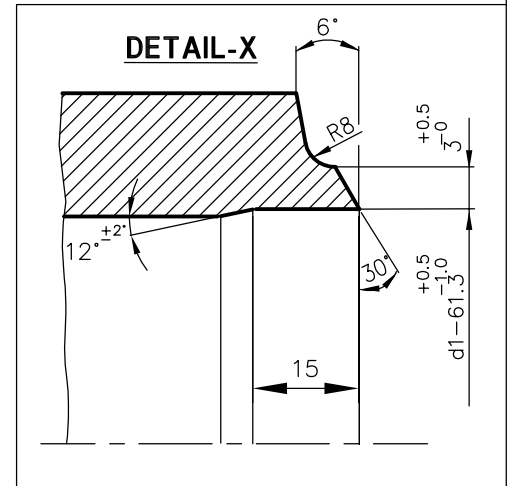
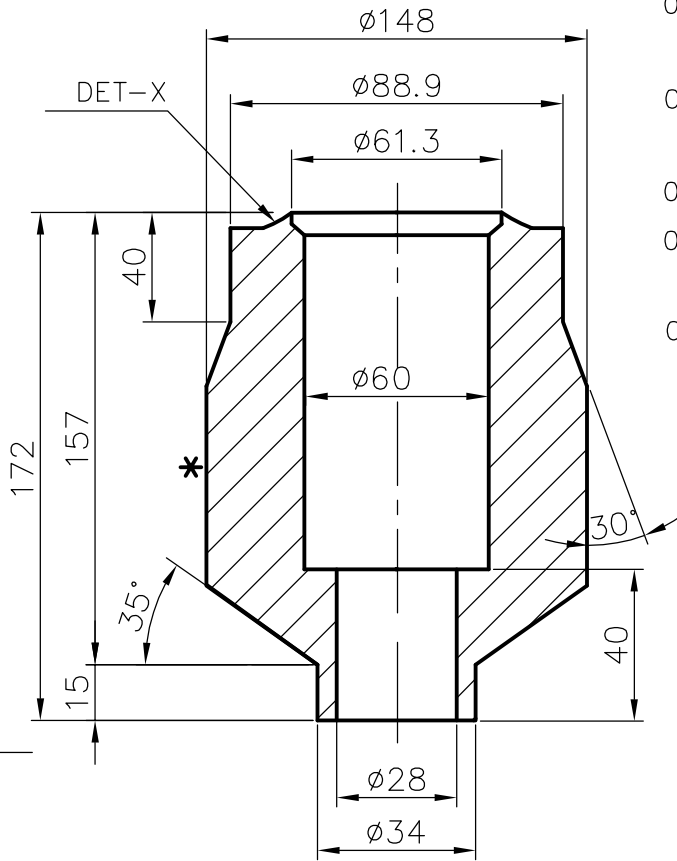
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REV	DATE	ALTERED :
01		CHD & APPD :



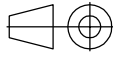
NOTES:

- 01 DESIGN PRESSURE : 272 kg/sq.cm(g)
- 02 DESIGN TEMPERATURE : 568 °C
- 03 HARD PUNCH "F91" AT PLACE MARKED WITH *
- 04 FINISHED COMPONENT CODE IS 925167180000
- 05 ALTERNATE/SUITABLE SIZE OF SA182 F91 FORGING CAN ALSO BE USED.
- 06 FOLLOW TDC: TDG:104, REV.03
- 07 THIS STUB IS REQUIRED FOR MS SYSTEM START UP VENT OF 660/800 MW UNITS.
- 08 RAW MATERIAL CODE IS 15 339 407 0000



STANDARD

	ROD DIA:150 L=172				10	100
		SA 182 F91	A			
VARIANT NUMBER	DESCRIPTION	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT	QUANTITY
		MATERIAL SPECN				

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE CHENNAI 600 017				DRN	NAME LALIT	SIGNATURE	DATE 20.10.10
				CHD	SVR.KALAISELVAN		20.10.10
				APPD	AP.MADAHVANKUTTY		20.10.10
DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION 	SCALE N.T.S.	WEIGHT (Kg) 10.100	REF TO ASSY / OLD DWG 4-80-300-66381		
CODE	TITLE STUB OD88.9x15.24 SA182F91				DRAWING NO : 4-80-999-93310		REV 00

DRAWING No. 3-80-300-19825

NOTES: — 01. APPLICABLE FOR P91/P92
03 i) STRAIGHT WITH STRAIGHT/FITTING
03 ii) BEND WITH BEND/FITTING

- 04 02. FOR OD MISMATCH, REFER FIGURE-Xa
04 03. REFER STYLE-DL FOR THICKNESS <14.2mm (FOR ALL OD/ID)
04 04. REFER STYLE-PL
i) WHEN THICKNESS IS ≥ 14.2 mm & <20mm (FOR ALL OD/ID)
ii) WHEN THICKNESS ≥ 20 mm & OD <219.1mm.
04 05. $\alpha = 6^\circ$ FOR WALL THICKNESS ≥ 20 mm AND ≤ 30 mm
06. $\alpha = 10^\circ$ FOR WALL THICKNESS > 30 mm

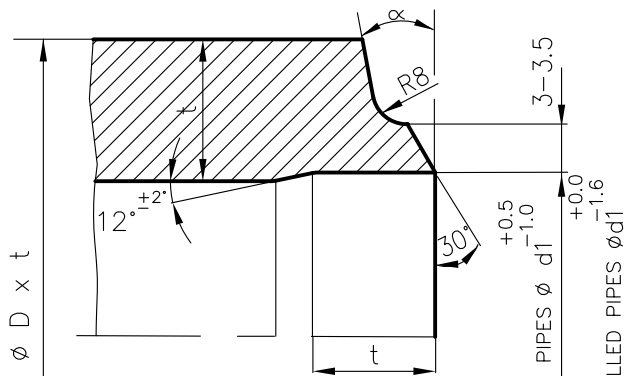


FIGURE - X

- MATCHING EDGE PREPARATION
02 FOR MISMATCH OD APPLICABLE FOR
BENDS/FITTINGS OF P91/P92 MATERIALS 03
NOTES: —
01. OD OF STRAIGHT TO BE PHYSICALLY MEASURED/VERIFIED.
02. t = THK OF CONNECTING PIPE (STRAIGHT)

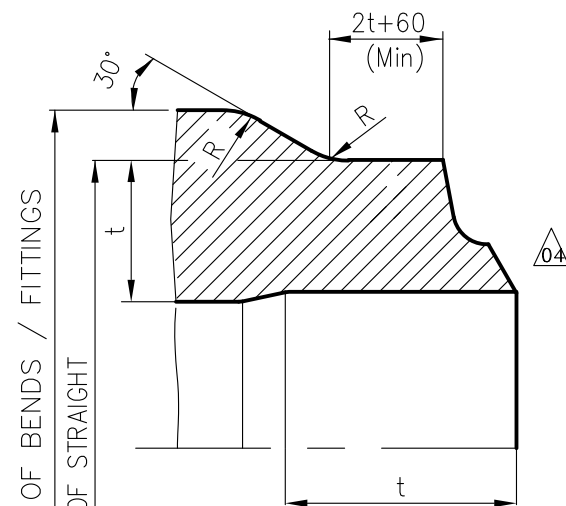
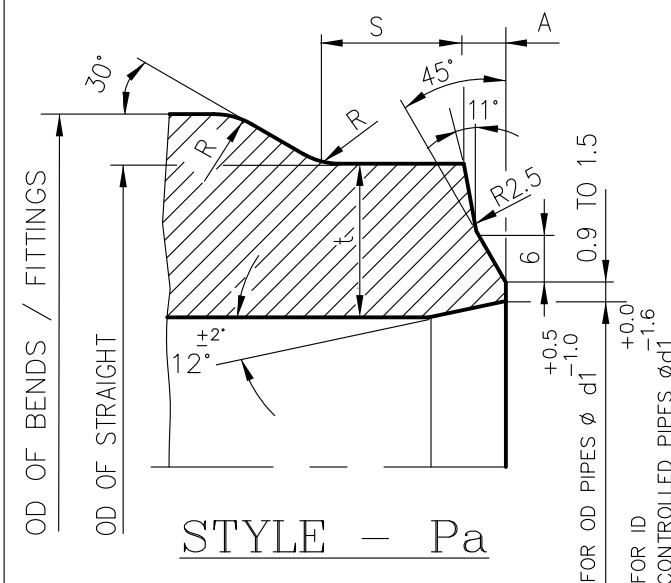


FIGURE - Xa

- 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. PIPE (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. PIPE (STRAIGHT)
03. t = THK OF CONN. PIPE (STRAIGHT)

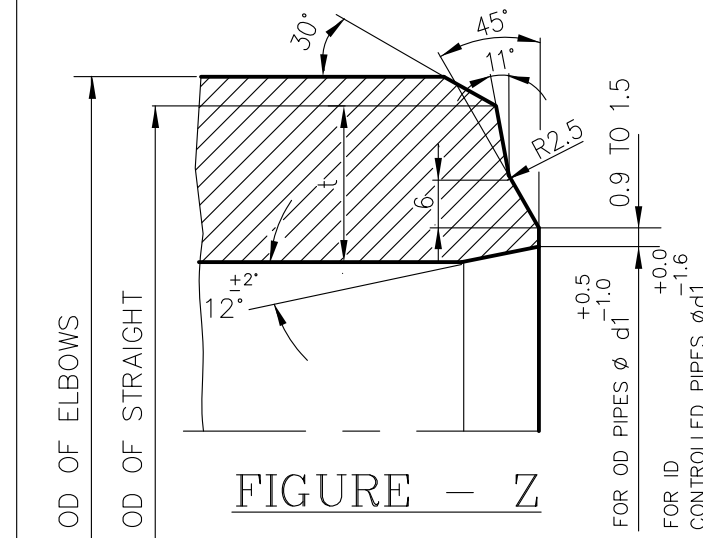


FIGURE - Z

- 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 04. REFER STYLE-PL
i) WHEN THICKNESS IS ≥ 14.2 mm AND <20 mm FOR ALL OD/ID.
ii) WHEN THICKNESS ≥ 20 mm AND OD < 219.1 mm.
05. $\alpha = 6^\circ$ FOR WALL THICKNESS ≥ 20 mm AND ≤ 30 mm
06. $\alpha = 10^\circ$ FOR WALL THICKNESS > 30 mm

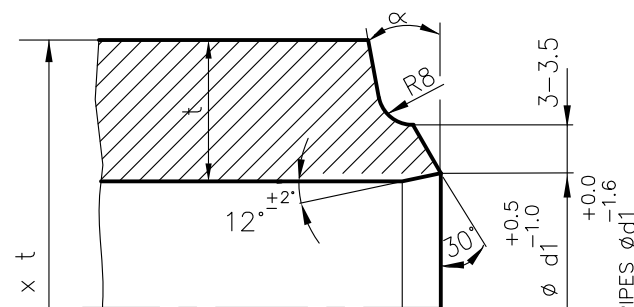


FIGURE - Xb

(BEND END) 03

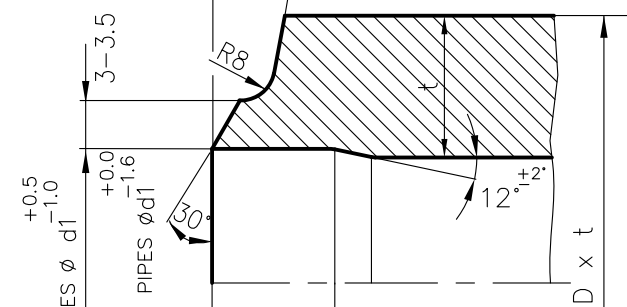
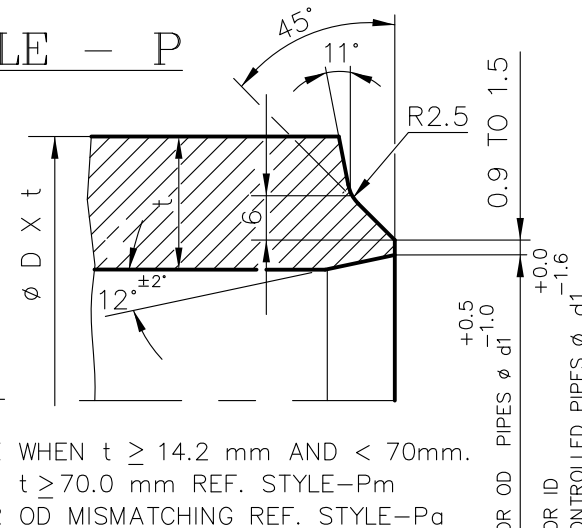


FIGURE - Xc

(STRAIGHT END) 03

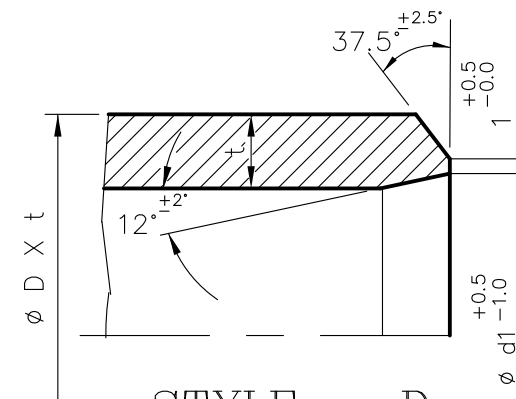
STYLE - P



NOTES: —

- 04 01. USE WHEN $t \geq 14.2$ mm AND < 70mm.
04 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

01 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. 02

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.,
PIPING CENTRE, MADRAS

DEPT.

GRADE OF
UN TOL. DIM

CODE

C/M/F

TITLE

EDGE PREPARATION
DETAILS

DRN	NAME K.B.RAGUNATH	SIGN	DATE 11.10.01	NO OF ITEMS
CHD	M.C.SEKARAN		11.10.01	
APPD	A.VELAYUTHAM		11.10.01	

WEIGHT (Kg).

NAME OF ORIGINAL
ORGANISATIONITEM
No.CARD
CODE

DRAWING No.

REV

3-80-300-19825

04

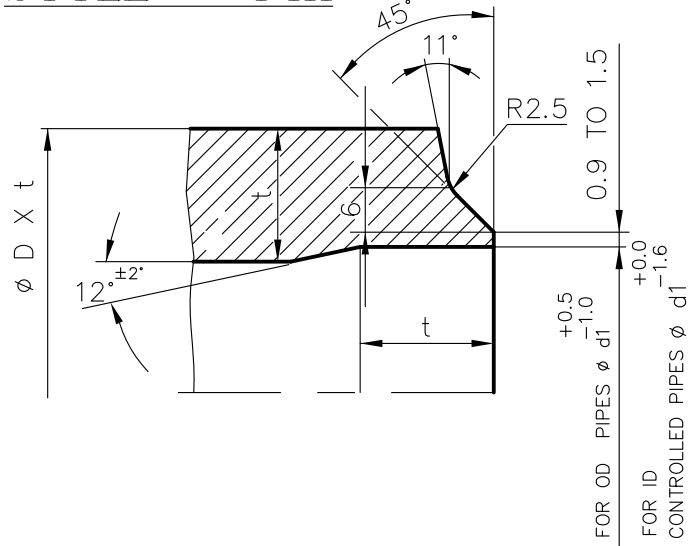
SHEET 1 OF 2

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3-80-300-19825

DRAWING No.

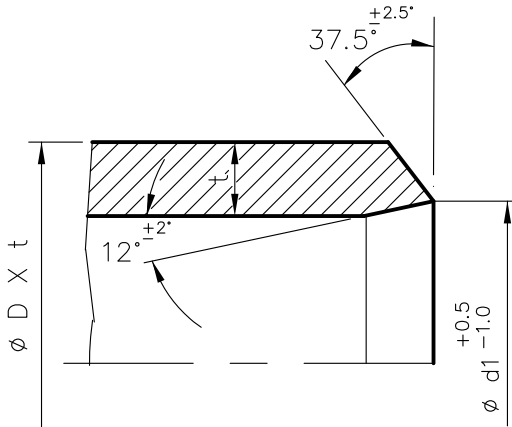
STYLE - P_m



NOTES: -

01. USE FOR SA106GRC PIPES WHEN $t \geq 70.0$ mm.
02. FOR OD MISMATCHING REF. FIGURE-P_a
03. FOR FITTINGS USE STYLE-P.

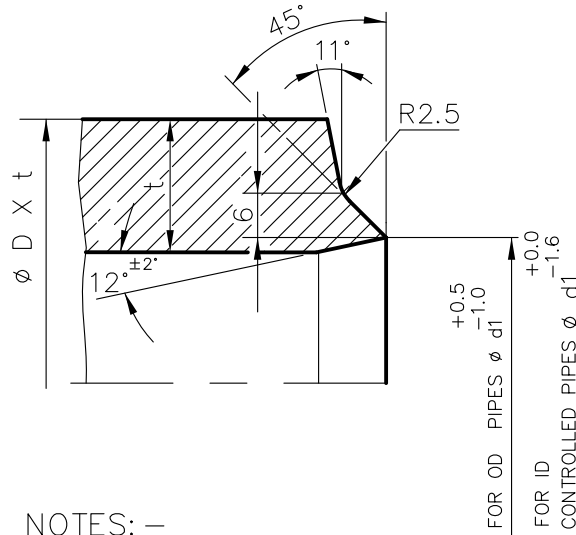
STYLE - D_L



NOTES: -

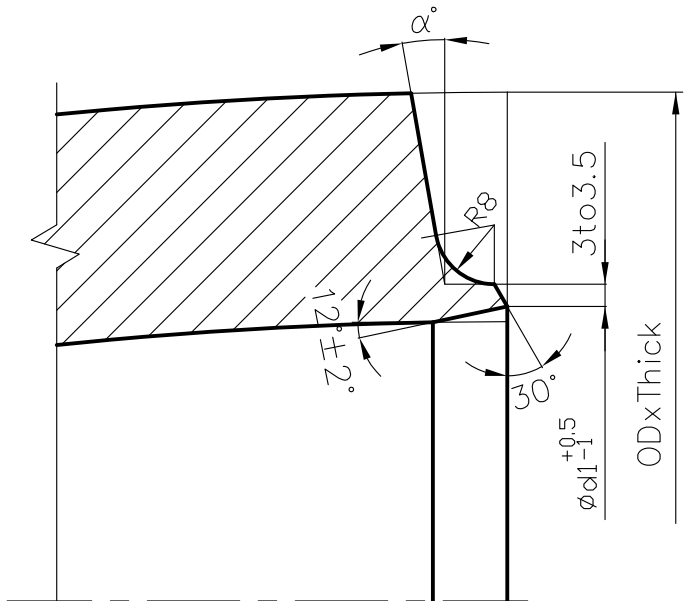
01. USE FOR P91 / P92 PIPES AND FITTINGS WHEN $t < 14.2$ mm (ALL OD/ID).

STYLE - P_L



NOTES: -

01. USE FOR P91 / P92 PIPES AND FITTINGS
i) WHEN THICKNESS IS ≥ 14.2 mm AND < 20 mm FOR ALL OD/ID.
ii) WHEN THICKNESS ≥ 20 mm AND OD < 219.1 mm.
02. FOR OD MISMATCHING REF. FIGURE-P_a



01. USE FOR P91 / P92 FITTINGS
02. REFER STYLE-D_L FOR THICKNESS < 14.2 mm FOR ALL OD/ID.
03. REFER STYLE-P_L
i) WHEN THICKNESS IS ≥ 14.2 mm AND < 20 mm FOR ALL OD/ID.
ii) WHEN THICKNESS ≥ 20 mm AND OD < 219.1 mm.
04. $\alpha = 6^\circ$ FOR WALL THICKNESS ≥ 20 mm AND ≤ 30 mm
05. $\alpha = 10^\circ$ FOR WALL THICKNESS > 30 mm.
06. FIGURE-X_f IS APPLICABLE FOR ALL BUTT WELDED FITTINGS NOT COVERED IN NOTES 02 & 03

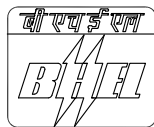
FIGURE-X_f

NOTE :

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

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

STANDARD

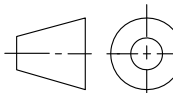


BHARAT HEAVY ELECTRICALS LTD.,
PIPING CENTRE, MADRAS

DRN	NAME	SIGN	DATE	NO OF ITEMS
CHD	P SURESH		07.12.16	
APPD	R SESHAGIRI		07.12.16	
	C KARUNAKARAN		07.12.16	

DEPT.

GRADE OF
UN TOL. DIM



SCALE

WEIGHT (Kg).

NAME OF ORIGINAL
ORGANISATION

ITEM
No.

CODE

C/M/F

TITLE

EDGE PREPARATION
DETAILS

CARD
CODE

U 01

DRAWING No.

3-80-300-19825

SHEET 2 OF 2

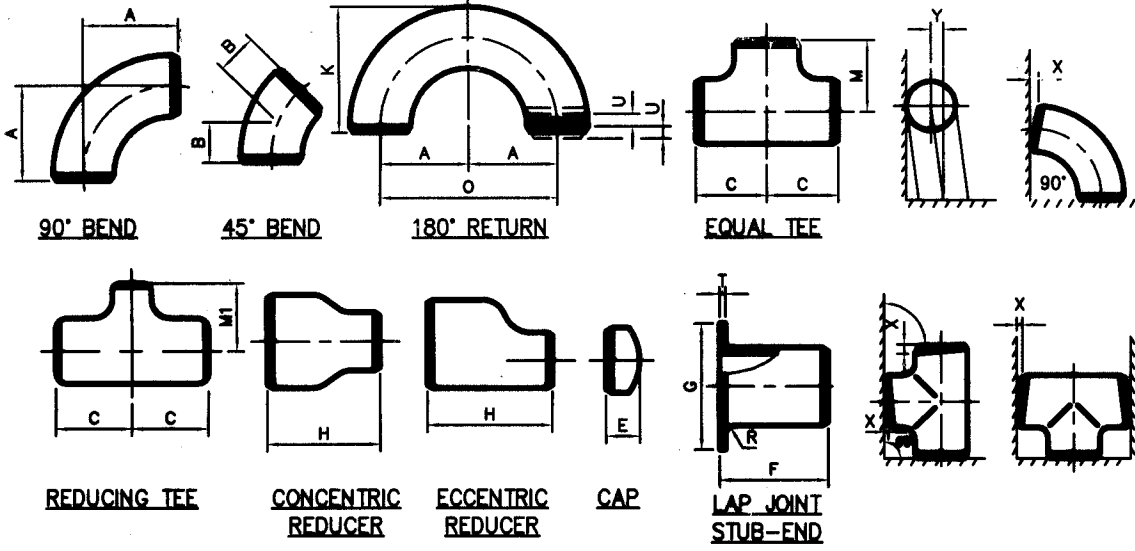
REV

04

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REV	DATE	ALTERED
01	05.02.05	APPROVED <i>[Signature]</i> APMK
TITLE BLOCK AND DRAWING ALTERED		

(REFERENCE : IBR ,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	DIA 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

		BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE CHENNAI 600 017		DRN	NAME	SIGN	DATE	NO.OF VAR
				CHD	ENG.G.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