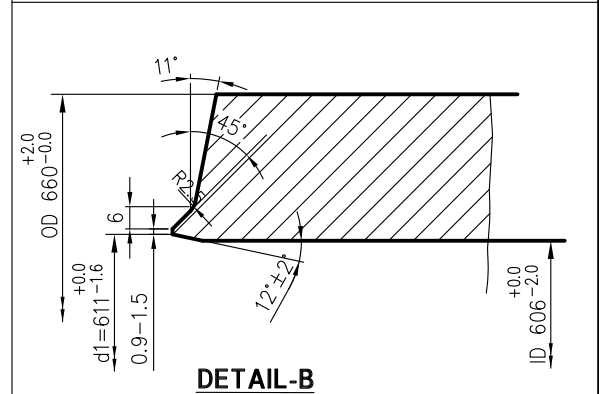
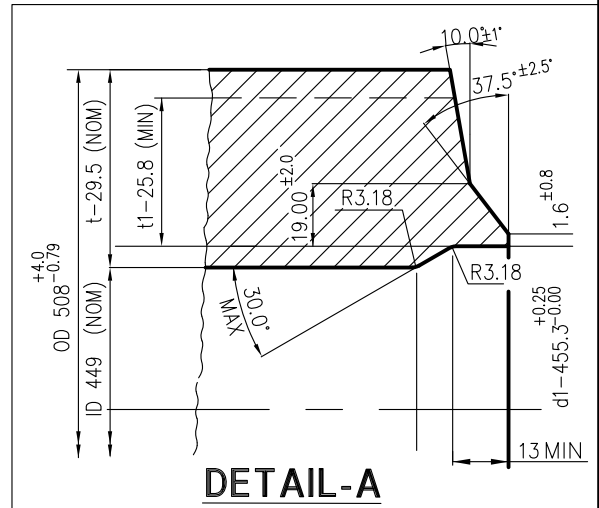
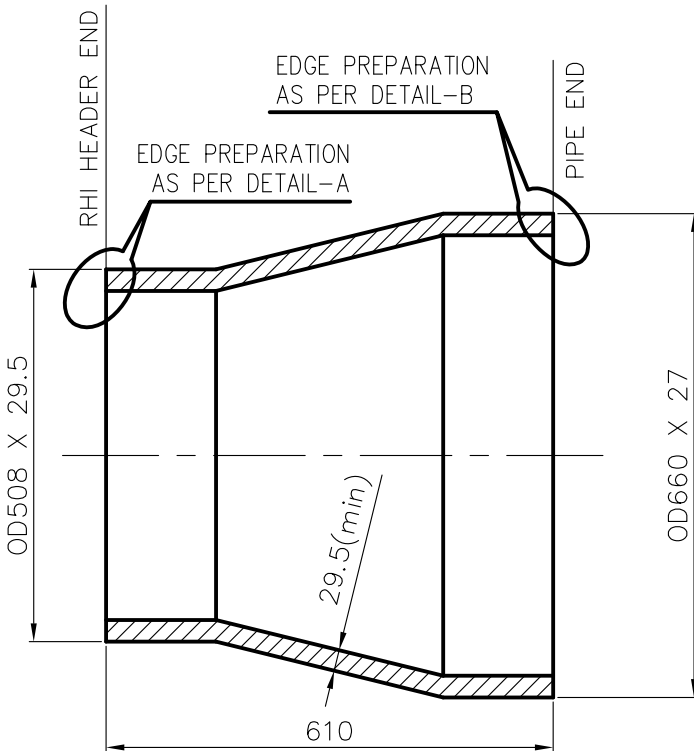
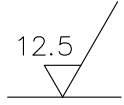


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REV 01	DATE	ALTERED :
		CHD & APPD :

NOTES:

- 1) DESIGN PRESSURE : 73.1 Kg/Cm²(g)
- 2) DESIGN TEMPERATURE : 378 °C
- 3) WORKING MEDIUM : STEAM
- 4) FOLLOW TDC No. : TDG-102 (LATEST REVISION)
- 5) DESIGN, MANUFACTURING, INSPECTION, TOLERANCES AND TESTING SHALL BE AS PER IBR, ANSI B16.9 AND SA 234.



-	OD660x27/OD508x29.5 L=610	92 117 845 0000	A	250	000
				1	
VAR No.	DESCRIPTION	STD	A/C/P	UNIT	UNIT WT. (KG)
					QUANTITY



BHARAT HEAVY ELECTRICALS LIMITED
PIPING CENTRE
CHENNAI 600 017

	NAME	SIGNATURE	DATE
DRN	POONGKODI.V	..sd..	07/08/2013
CHD	SUKUMAR.B	..sd..	07/08/2013
APPD	C.V.NATHAN	..sd..	07/08/2013

DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG
CODE			N.T.S	250	

TITLE	DRAWING NO :	REV
ASME B16.9 BW CON REDUCER OD660x27/OD508x29.5	4-80-320-77261	00

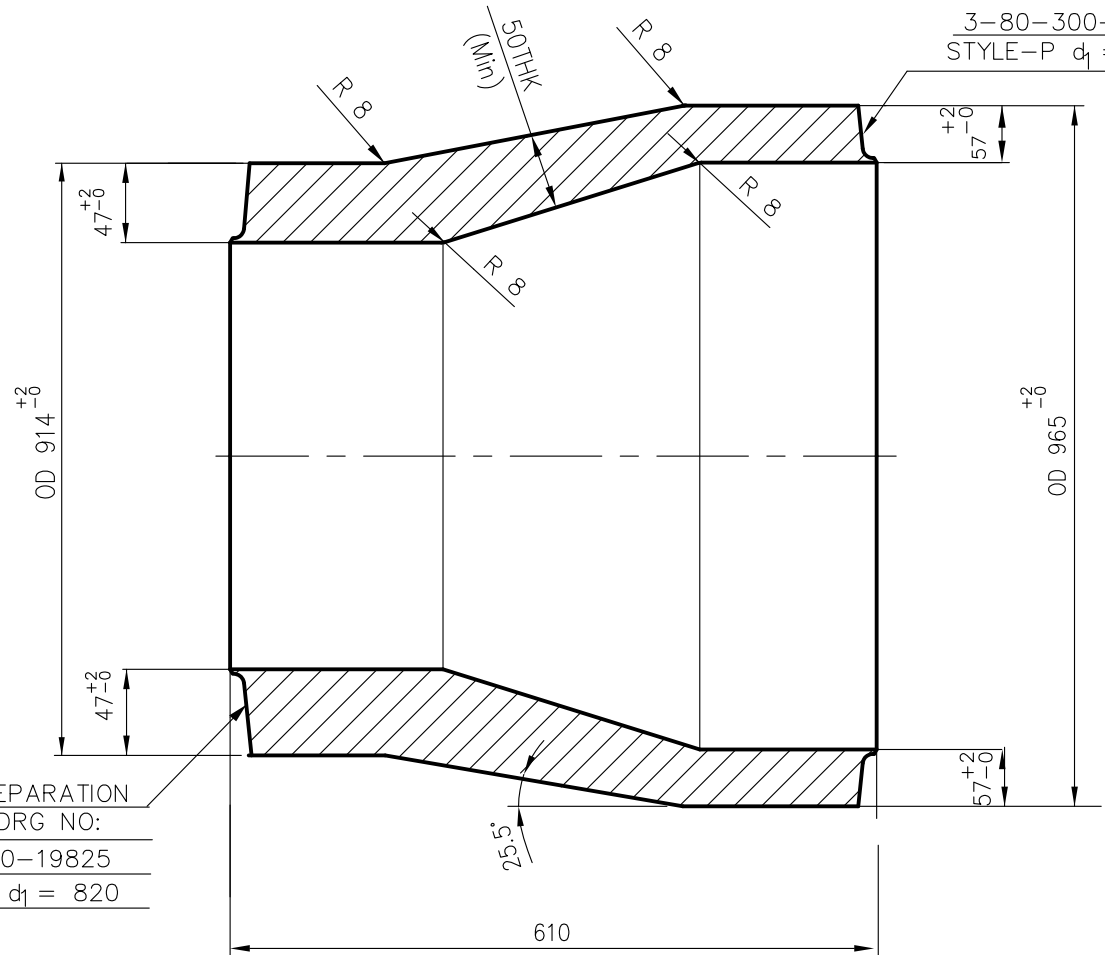
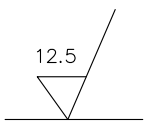
CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

REV	DATE	ALTERED
01		APPROVED

NOTES :- ALL DIMENSIONS ARE IN MILLIMETRES

01. DESIGN PRESSURE : 75.0 Kg/Cm² (g)
02. DESIGN TEMPERATURE : 510° C
03. FITTING SHALL CONFORM TO ALL THE REQUIREMENTS OF ASME B16.9 & A 234(LATEST).
04. FOLLOW APPLICABLE TDG
05. THIS DRAWING IS FOR INDICATING THE OVER ALL DIMENSIONS, CONNECTING PIPE SIZE AND MATERIAL SPECIFICATION.

EDGE PREPARATION
AS PER DRG NO:
3-80-300-19825
STYLE-P d₁ = 860



EDGE PREPARATION
AS PER DRG NO:
3-80-300-19825
STYLE-P d₁ = 820

	REDUCER L=610 OD 965 x thk57min/ OD 914X47	92 117 931 0000	A	695	000
VAR NO.	DESCRIPTION	STD	MATL. CODE SA 234 WP22CL1	UNIT	UNIT.WT.(Kg)
			MATL. SPECN.	DI	QTY.

		BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE CHENNAI 600 017		DRN	NAME	SIGN	DATE	NO.OF VAR
DEPT		GRADE OF UNTOL.DIM	SCALE	CHD	S.R.MURTHY	-sd-	31.12.13	
CODE		C / M / F	N.T.S	APPD	S.R.MURTHY	-sd-	31.12.13	
TITLE			WEIGHT (KG).	BHEL PO REF.NO:		ITEM NO.	NO. OF ITEMS	
REDUCER (OD965Xthk57min/OD914X47)SA234WP22CL1			CARD CODE	DRAWING NO.		REV		
			U 01	4-80-320-77640		00		

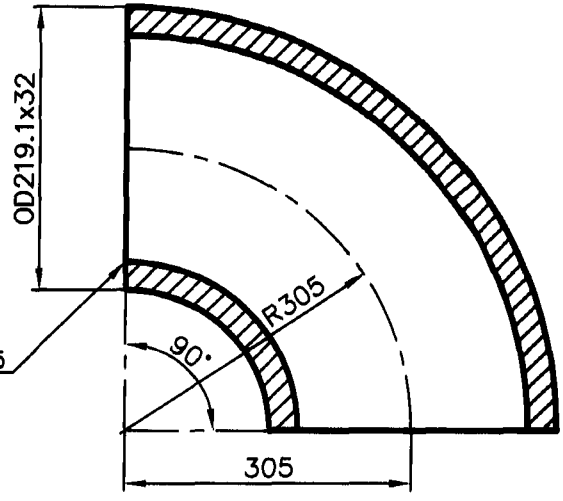
CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

REV	DATE	ALTERED
01		APPROVED

ALL DIMENSIONS ARE IN MILLIMETRES



RAW MATL SPECN. : SA 106 Gr.C (A).
 FITTING SPECN. : SA 234 WPC (A).
 FITTING CODE. : 92 524 670 0000



NOTES: -

01. ALL DIMENSIONS ARE FINISHED DIMENSIONS.
02. FOR TOLERANCES REFER STANDARD DRG.4-80-301-26192.
03. MANUFACTURING, INSPECTION AND TESTING SHALL BE AS PER IBR, ASME B16.9 & SA234.
04. FLOW AREA SHALL NOT BE LESS THAN 80% OF NOMINAL FLOW AREA.
05. MINIMUM THICKNESS SHALL NOT BE LESS THAN 28.00mm
06. IN CASE THE RAW MATERIAL THICKNESS IS MORE THAN THAT SPECIFIED, THEN THE PIPE IS TO BE MACHINED TO THE RAW MATERIAL THICKNESS INDICATED WITH A TOLERANCE OF $\pm \frac{1}{8}$ ON THICKNESS BEFORE FORMING.

STANDARD

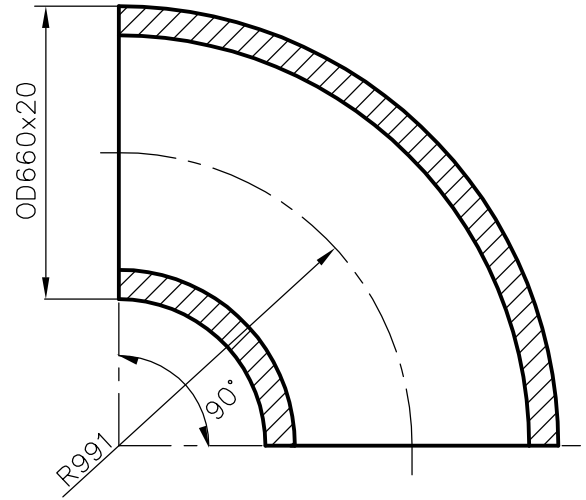
PIPE OD 244.5 x 35 min L=865	15 983 558 0000	A	150.000
	SA 106 Gr.C		
DESCRIPTION	RAW MATL CODE	A	UNIT WT.
	MATL. SPECN.	C	QTY

		BHARAT HEAVY ELECTRICALS LTD PIPING CENTRE CHENNAI - 600 017		NAME DRN M.C.SEKARAN. <i>[Signature]</i> CHD M.C.SEKARAN. <i>[Signature]</i> APPD A.VELAYUTHAM <i>[Signature]</i>	SIGN <i>[Signature]</i> <i>[Signature]</i> <i>[Signature]</i>	DATE 28-11-05 28-11-05 28-11-05
DEPT	GRADE OF UNTOL DIM	SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.		
CODE	C / M / F		150.000			
TITLE			CARD CODE	DRAWING NO.		REV
BW LR 90 DEG ELBOW OD 219.1 x 32			U 01	4-80-421-61035		00

ALL DIMENSIONS ARE IN MILLIMETRES

REV	DATE	ALTERED
01		APPROVED

DESIGN PRESSURE AT 370°C :60 Kg/sq.cm(g)
 RAW MATL SPECN.: SA 106 GRC (A).
 FITTING SPECN. : SA 234 WPC (A).
 FINISHED FITTING MATERIAL CODE:
 WEIGHT OF FINISHED FITTING: 491kg.



NOTES: -

01. ALL DIMENSIONS ARE FINISHED DIMENSIONS.
02. FOR TOLERANCES REFER STANDARD DRG.4-80-301-26192.
03. MANUFACTURING, INSPECTION AND TESTING SHALL BE AS PER IBR, ASME B16.9 & SA234.
04. EDGE PREPARATION DETAIL SHALL BE AS PER DRAWING No: 3-80-300-19825 STYLE P d1=624
05. O.D AT ANY SECTION SHALL NOT VARY MORE THAN 4mm(656 to 664)
06. ACTUAL THICKNESS AT ANY POINT SHALL NOT VARY MORE THAN 12.5% OF THE NOMINAL THICKNESS. (17.5 to 22.5)
07. ALTERNATE RAW MATERIAL CAN ALSO BE USED.

STANDARD

PIPE OD 660 x 22 L=1957	15 983 548 6000	A	677.000
	SA 106 GRC		
DESCRIPTION	RAW MATL. CODE	A	UNIT WT.
	MATL. SPECN.	C	QTY



BHARAT HEAVY ELECTRICALS LTD
 PIPING CENTRE
 CHENNAI 600 017

	NAME	SIGN	DATE
DRN	R.ANANTH		24-11-08
CHD	R.ANANTH		24-11-08
APPD	M.N.VASUDEVAN		24-11-08

DEPT	GRADE OF UNTOL DIM		SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.	
CODE	C / M / F			677.000		
TITLE				CARD CODE	DRAWING NO.	REV
BW LR 90 DEG. ELBOW OD660x20 WPC				U 01	4-80-999-93176	00

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.

3-80-300-19825

DRAWING No.

NOTES: -

- 01. APPLICABLE FOR P91/P92**
i) STRAIGHT WITH STRAIGHT/FITTING
ii) BEND WITH BEND/FITTING
 02. FOR OD MISMATCHING REF. FIGURE-Xa.
 03. $\alpha = 6^\circ$ FOR WALL THICKNESS ≤ 30 mm
 04. $\alpha = 10^\circ$ FOR WALL THICKNESS > 30 mm

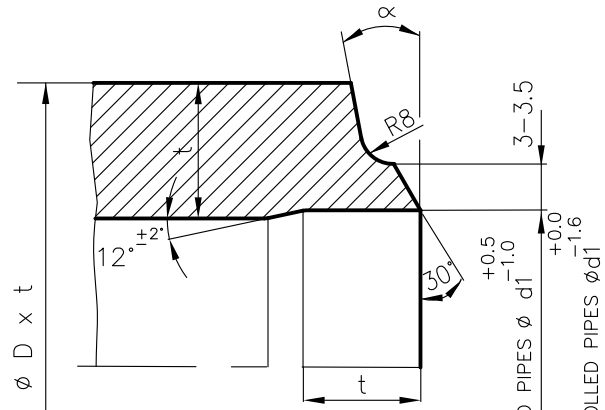


FIGURE - X

FOR OD PIPES ϕ d1
 FOR ID CONTROLLED PIPES ϕ d1

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. $\alpha = 6^\circ$ FOR WALL THICKNESS ≤ 30 mm
 03. $\alpha = 10^\circ$ FOR WALL THICKNESS > 30 mm
 04. t = THK OF CONNECTING PIPE (STRAIGHT)

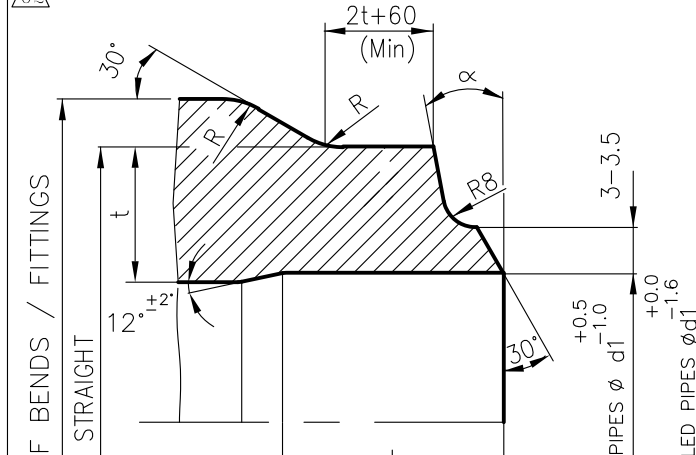


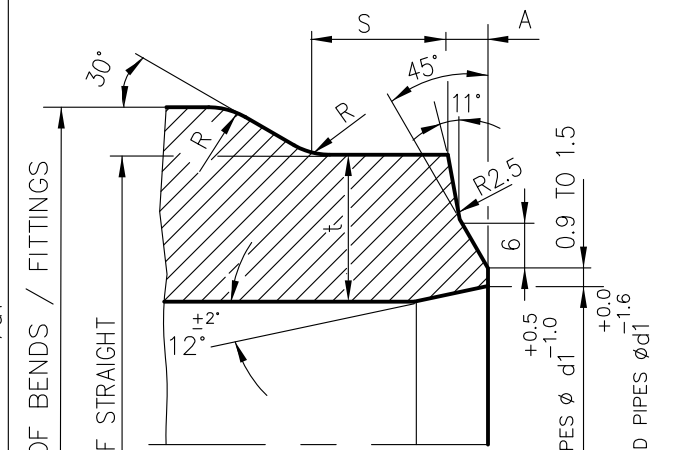
FIGURE - Xa

FOR OD PIPES ϕ d1
 FOR ID CONTROLLED PIPES ϕ d1

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

FOR OD PIPES ϕ d1
 FOR ID CONTROLLED PIPES ϕ d1

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)

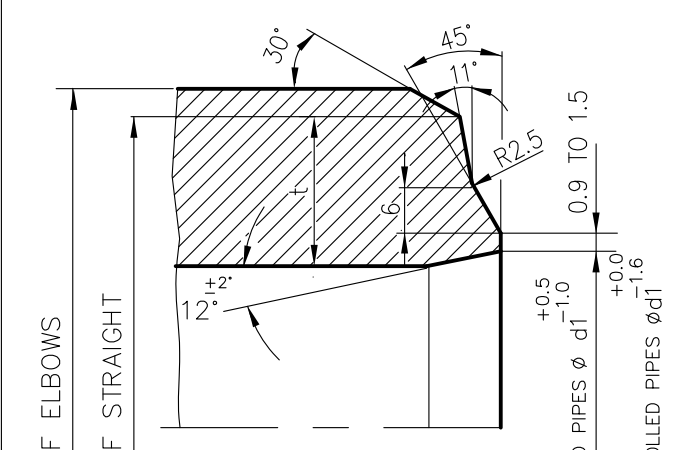


FIGURE - Z

FOR OD PIPES ϕ d1
 FOR ID CONTROLLED PIPES ϕ d1

NOTES: -

01. APPLICABLE FOR P91 PIPE BEND WELDED WITH P91 STRAIGHT PIPE FOR THICKNESS ≤ 30 mm AND OD ≥ 558 mm.

02. $\alpha = 6^\circ$ FOR WALL THICKNESS ≤ 30 mm
 03. FOR OD MISMATCH, REFER THE OD MACHINING ONLY SHOWN IN FIGURE-Xa
 04. FIGURE-Xb AND FIGURE-Xc ARE NOT APPLICABLE FOR P92 MATERIALS.

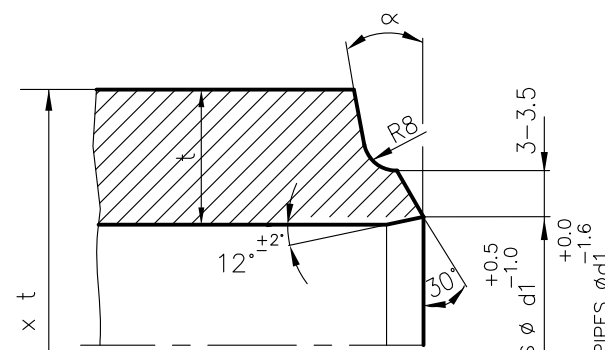


FIGURE - Xb
(BEND END)

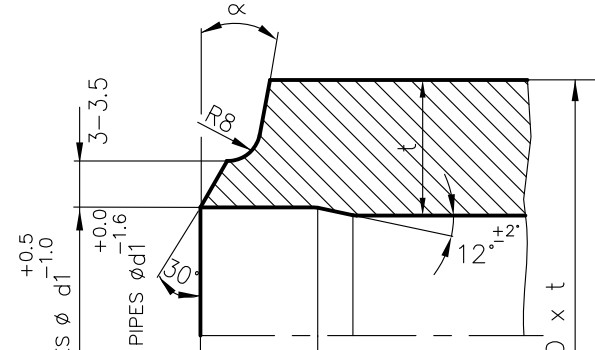
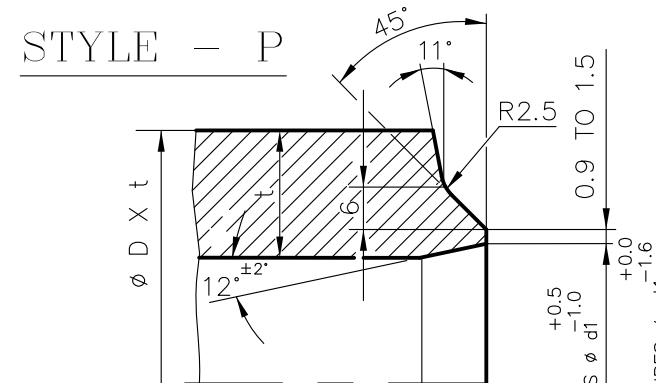


FIGURE - Xc
(STRAIGHT END)

FOR OD PIPES ϕ d1
 FOR ID CONTROLLED PIPES ϕ d1

STYLE - P



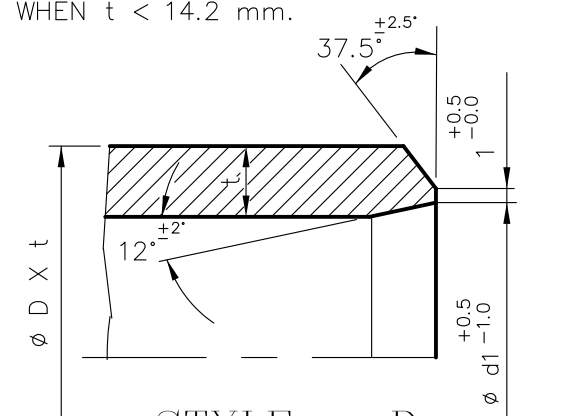
NOTES: -

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

FOR OD PIPES ϕ d1
 FOR ID CONTROLLED PIPES ϕ d1

NOTES: -

01. USE WHEN $t < 14.2$ mm.



STYLE - D

FOR OD PIPES ϕ d1
 FOR ID CONTROLLED PIPES ϕ d1

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	DATE	ALTERED: M.R.K
03	10.04.13	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	DATE	ALTERED: M.R.K
02	10.01.13	APPROVED: C.K.N
ZONE	IN FIG.Xa, NOTE 04 ADDED. GENERAL NOTES 03 ADDED. IN FIG.Xa, 8MM OD MISMATCH IS REMOVED	
REV	DATE	ALTERED: R.SENDHIL
01	11.05.04	APPROVED: A.VELAYUTHAM
ZONE	PROJECT NAME REMOVED AND STANDARD INCORPORATED IN TITLE BLOCK	

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

STANDARD

	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	
				APPD	A.VELAYUTHAM	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	03