

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

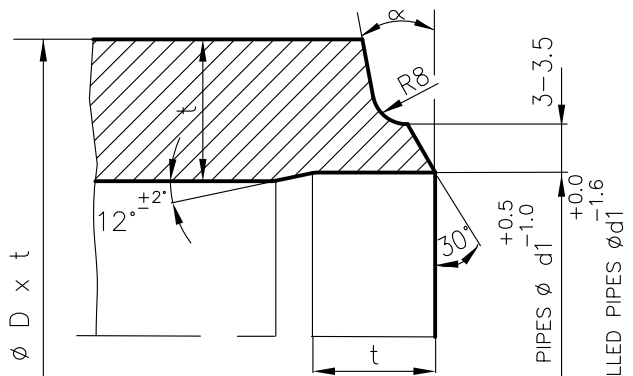


FIGURE - X

- 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)

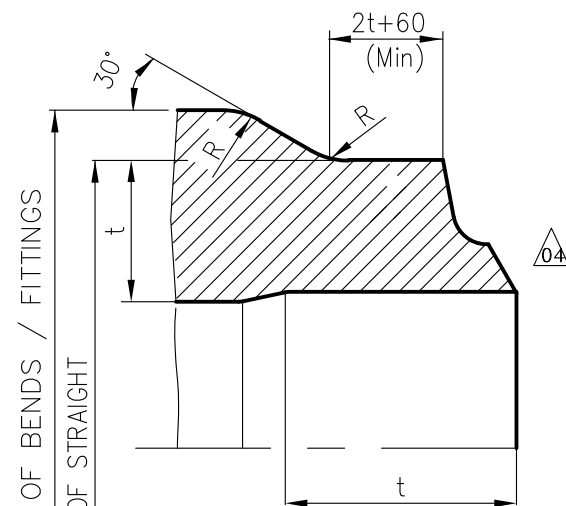
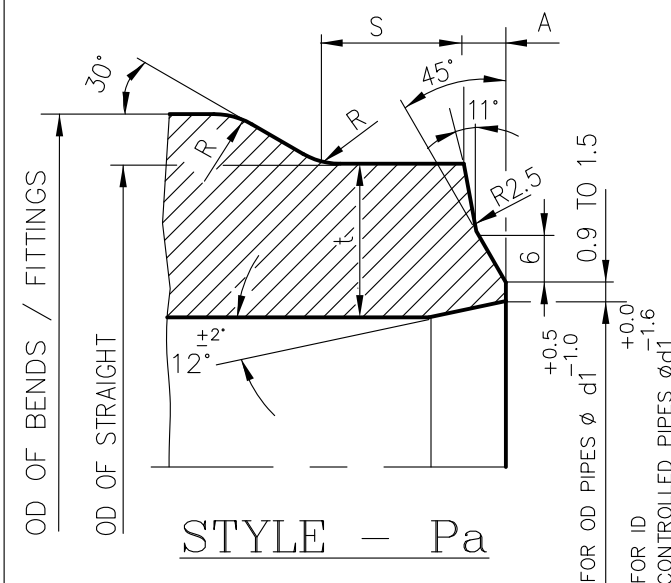


FIGURE - Xa

- 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.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)

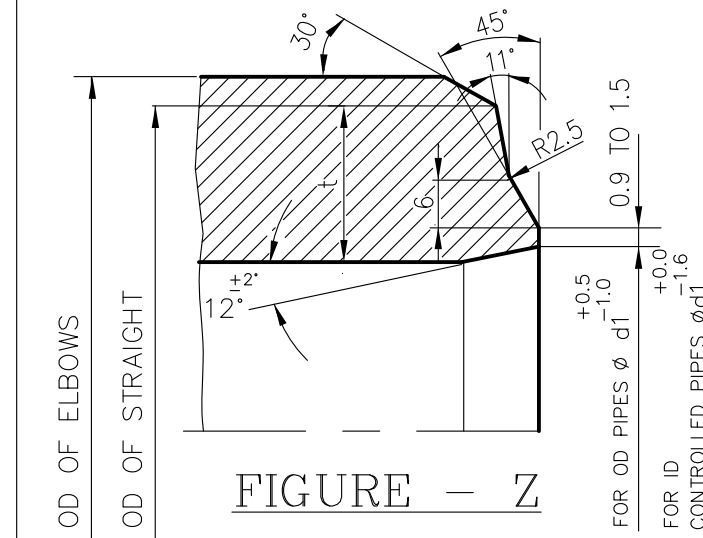


FIGURE - Z

- 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 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

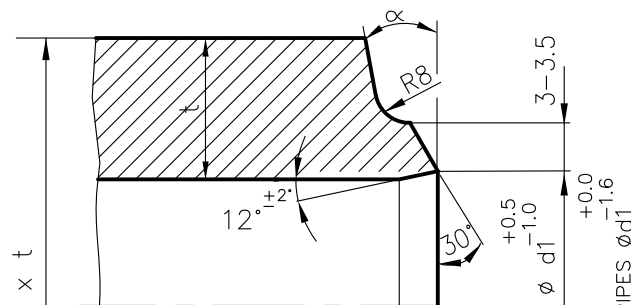


FIGURE - Xb

(BEND END) 03

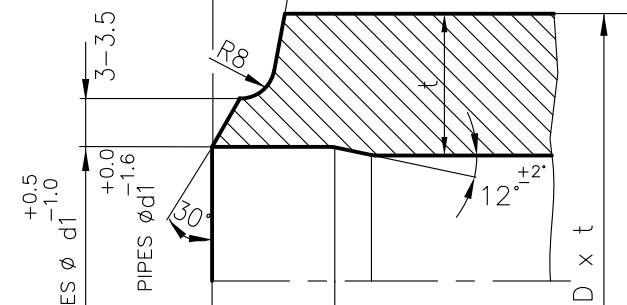
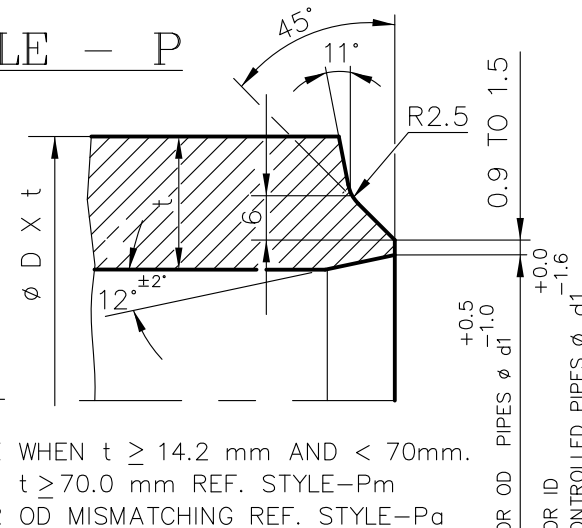


FIGURE - Xc

(STRAIGHT END) 03

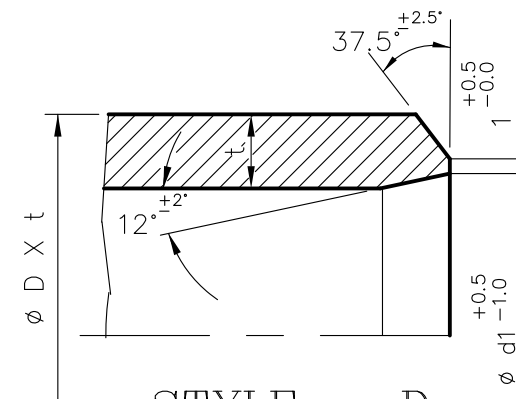
STYLE - P



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

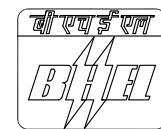
GENERAL NOTES :

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

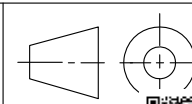
DEPT.

GRADE OF
UN TOL. DIM

CODE

C/M/F

TITLE

EDGE PREPARATION
DETAILS

SCALE

WEIGHT (Kg).

NAME OF ORIGINAL
ORGANISATIONCARD
CODE

DRAWING No.

U 01

3-80-300-19825

SHEET 1 OF 2

REV

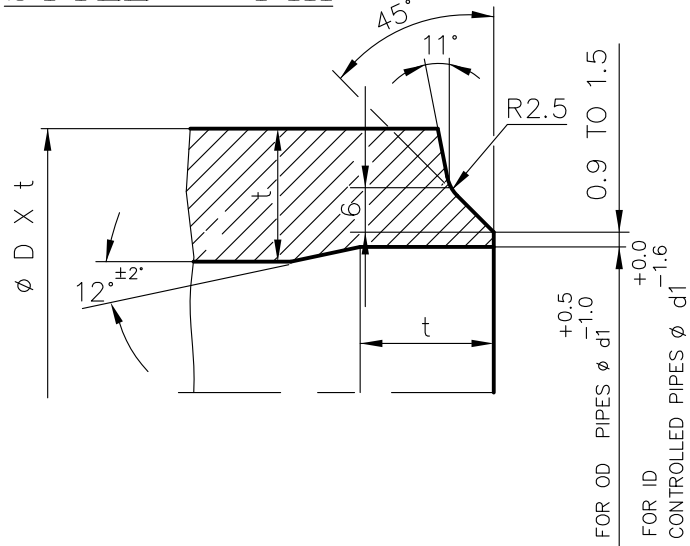
04

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3-80-300-19825

DRAWING No.

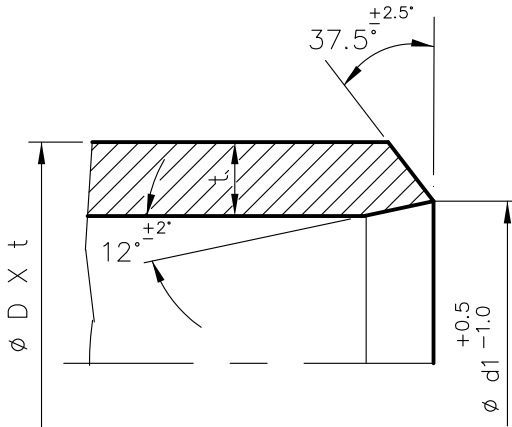
STYLE - P_m



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.

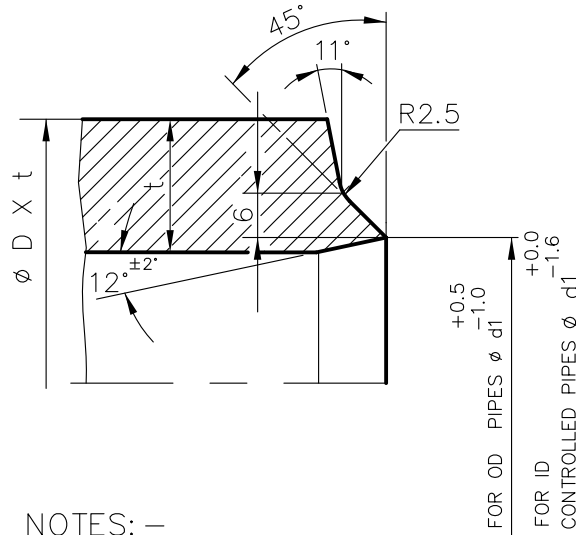
STYLE - D_L



NOTES: -

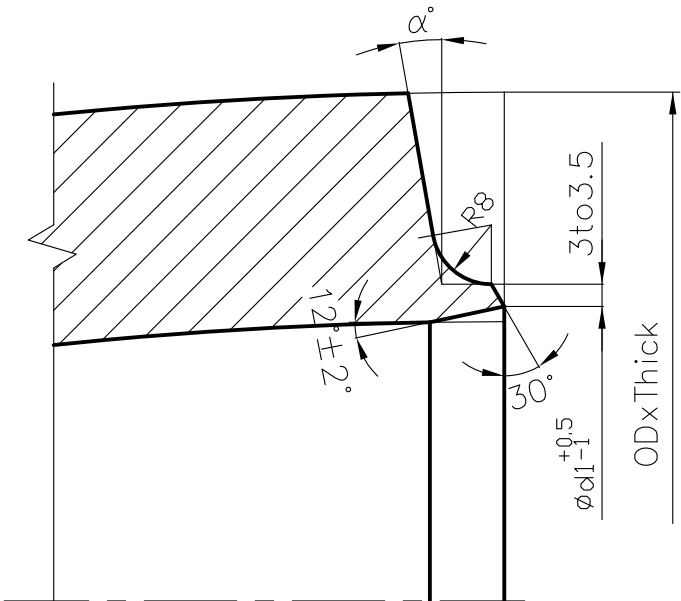
01. USE FOR P91 / P92 PIPES AND FITTINGS WHEN $t < 14.2$ mm (ALL OD/ID).

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

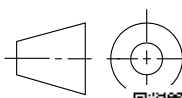


BHARAT HEAVY ELECTRICALS LTD.,
PIPING CENTRE, MADRAS

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
C/M/F



SCALE

WEIGHT (Kg).

NAME OF ORIGINAL
ORGANISATION

ITEM
No.

TITLE

EDGE PREPARATION
DETAILS

CARD
CODE

U 01

DRAWING No.

3-80-300-19825

SHEET 2 OF 2

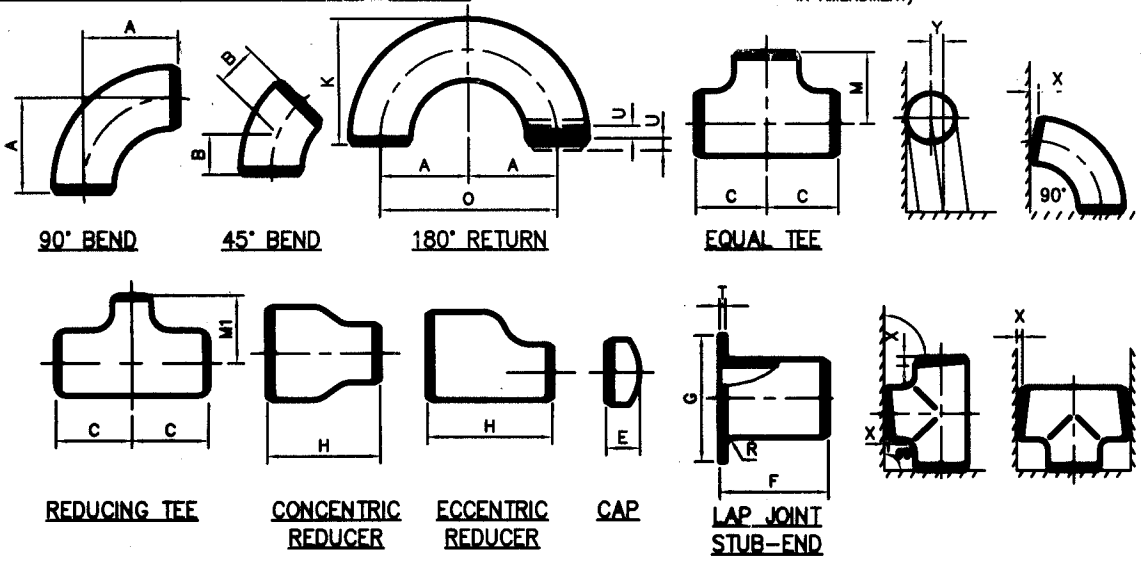
REV

04

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REV	DATE	ALTERED
01	05.02.05	APPROVED 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

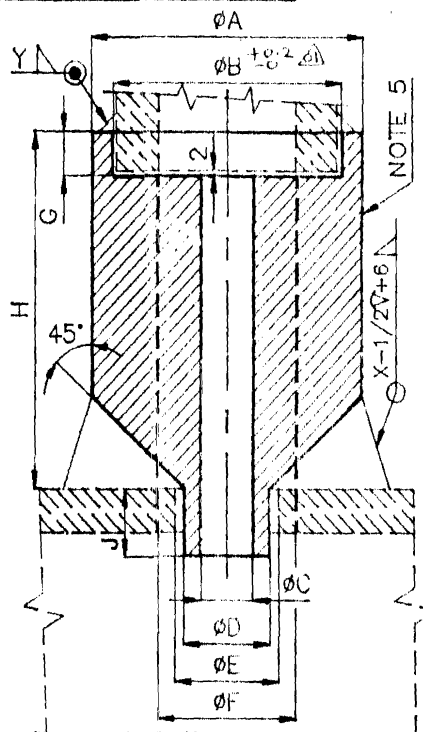
STANDARD

		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

97333-08-80-3

DRAWING NO.

6.3



VAR NO.	NB	CLASS	CONN. PIPE SIZE	ØA	ØB	ØC	ØD	ØE	ØF	G	H	J	RAW MATL SIZE	MATL CODE	WEIGHT (kg)	X	Y
01	15	3000	21.3x3.73	32	21.8	6	10	11	16	10	34	10	36	15 339 280 0000	0.18	11	4
02	15	6000	21.3x4.78	34	21.8	4	7	8	12	10	34	10	36	15 339 280 0000	0.21	14	6
03																	
04	20	3000	26.7x3.91	38	27.2	10	15	16	21	13	38	10	40	15 339 141 0000	0.26	12	5
05	20	6000	26.7x5.56	42	27.2	6	10	11	16	13	38	10	50	15 339 142 0000	0.35	16	6
06																	
07	25	3000	33.4x4.55	46	33.9	16	22	23	27	13	44	10	50	15 339 142 0000	0.43	12	5
08	25	6000	33.4x6.35	50	33.9	10	15	16	21	13	44	10	63	15 339 143 0000	0.57	18	7
09	25	9000	33.4x9.09	58	33.9	6	11	12	15	13	44	10	63	15 339 143 0000	0.81	24	10
10	40	3000	48.3x5.08	62	48.8	30	35	36	41	13	48	15	63	15 339 143 0000	0.75	14	6
11	40	6000	48.3x7.14	68	48.8	22	28	29	34	13	48	15	80	15 339 144 0000	1.07	20	8
12	40	9000	48.3x10.15	76	48.8	16	22	23	28	13	48	15	80	15 339 144 0000	1.46	27	11
13	50	3000	60.3x5.54	76	61.2	40	46	47	53	16	60	15	80	15 339 144 0000	1.33	15	6
14	50	6000	60.3x8.74	84	61.2	32	37	38	43	16	60	15	100	15 339 134 0000	1.96	24	10
15	50	9000	60.3x11.07	90	61.2	26	32	33	38	16	60	15	100	15 339 134 0000	2.44	28	12

NOTES:

- 1) TOLERANCE ON DIAMETERS $\pm 0.1\text{mm}$, EXCEPT ON ϕB .
- 2) TOLERANCE ON LENGTH: $+1\text{mm}$, -0mm .
- 3) BORES SHALL BE CONCENTRIC WITHIN $\pm 0.4\text{mm}$.
- 4) COINCIDENCE OF AXES: THE MAXIMUM ALLOWABLE VARIATION IN THE ALIGNMENT OF FITTING BORE AND SOCKET BORE AXES SHALL BE 0.5%.
- 5) STAMP IDENTIFICATION MARK: Ex. FOR VAR. NO. 01: "SA105 A B16 CL 3000-15".
- 6) DRILL TO ϕF AFTER WELDING.
- 7) THE WELDMENTS SHOWN ARE ONLY FOR THE PURPOSE OF INFORMATION AND GUIDANCE ONLY.
- 8) RAW MATERIAL OF DIFFERENT SIZE IS ACCEPTABLE IF THE FINAL DIMENSIONS ARE MAINTAINED.
- 9) THE ABOVE STUBS ARE IN LINE WITH ASME B16.11 (HALF COUPLING).

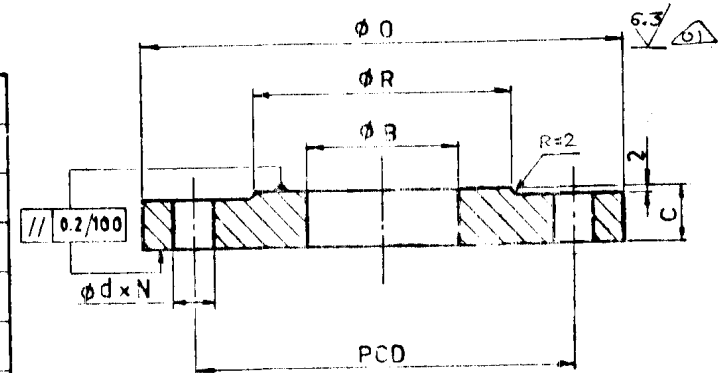
MATERIAL: SA105(A)

STANDARD

		BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, MADRAS, 600 017		NAME R. ANANTH	SIGN 	DATE 15-08-95
				DRN R. ANANTH	SIGN 	DATE 15-08-95
				APPD S. JAYAJUMAR	SIGN 	DATE 15-08-95
REV 01	DATE 14/01/95	ALTERED APPROVED	SIGN 	GRADE OF IN TOL. DIM C/M/F	SCALE N.T.S.	WEIGHT (Kg) 0.18
ZONE	NOTE 1 ALTD: TOLERANCE ON ϕB ALTD FROM $\phi B \pm 0.1$ TO $\phi B + 0.2$			TITLE SOCKET WELDED STUBS GS	CARD CODE U 01	DRAWING No. 3-80-999-97333
						REV 01

65066-666-08-2

VAR NO	NOM SIZE	ϕO	C	ϕB	ϕR	PCD	ϕd	N	MATL CODE/ MATL SPECN	WEIGHT IN KG.
17	600	815	48.0	614.0	692.2	749.5	36	20	15-011-216	76.0
16	500	700	43.0	512.0	584.2	635.0	33	20	15-011-106	54.0
15	450	635	40.0	461.0	533.4	578.0	33	16	15-011-106	42.0
14	400	600	37.0	410.5	469.9	540.0	30	16	15-011-184	40.0
13	350	535	35.0	359.0	412.8	476.0	30	12	15-011-184	31.0
12	300	485	32.0	327.0	381.0	432.0	26	12	15-011-124	23.0
11	250	405	30.5	276.0	323.8	362.0	26	12	15-011-124	14.5
10	200	345	29.0	221.5	269.9	298.5	22	8	15-011-130	11.5
09	150	280	25.5	170.5	215.9	241.5	22	8	15-011-130	7.0
08	100	230	24.0	116.0	157.2	190.5	18	8	15-011-130	5.3
07	80	190	24.0	90.5	127.0	152.5	18	4	15-011-130	3.8
06	65	180	22.5	74.5	104.8	139.5	18	4	15-011-081	3.5
05	50	150	19.5	62.0	92.1	120.5	18	4	15-011-081	2.0
04	40	130	17.5	49.5	73.0	98.5	14	4	15-011-150	1.4
03	25	110	14.5	34.5	50.8	79.5	14	4	15-011-150	0.9
02	20	100	13.0	28.0	42.9	70.0	14	4	15-011-026	0.7
01	15	90	11.5	22.0	34.9	60.5	14	4	15-011-026	0.5



NOTE -

1. TOLERANCE ON OUTSIDE DIAMETER (ϕO) ± 2
2. TOLERANCE ON PITCH CIRCLE DIAMETER ± 2
3. TOLERANCE ON THICKNESS (C)
 - UPTO NB 450 ± 3
 - NB 500 AND ABOVE ± 5
4. TOLERANCE ON BORE (ϕB)
 - UPTO NB 250 ± 1
 - NB 300 AND ABOVE ± 3
5. TOLERANCE ON ECCENTRICITY BETWEEN PCD AND MACHINED FACING DIAMETER
 - UPTO NB 65 ± 1
 - NB 80 AND ABOVE ± 2

MATERIAL: BM C20 / BM C16

STANDARD



Bharat Heavy Electricals Ltd.,
BOILER PLANT UNIT
TIRUCHIRAPALLI-620 014

DRN.	NAME CKUMAR	SIGN
CHG.	RANGHITHA	
APPD.	PARAYANAN	

REV 01	DATE 24/8/87	ALTERED CHECKED
SURFACE FINISH ALTERED TO 6.3/		

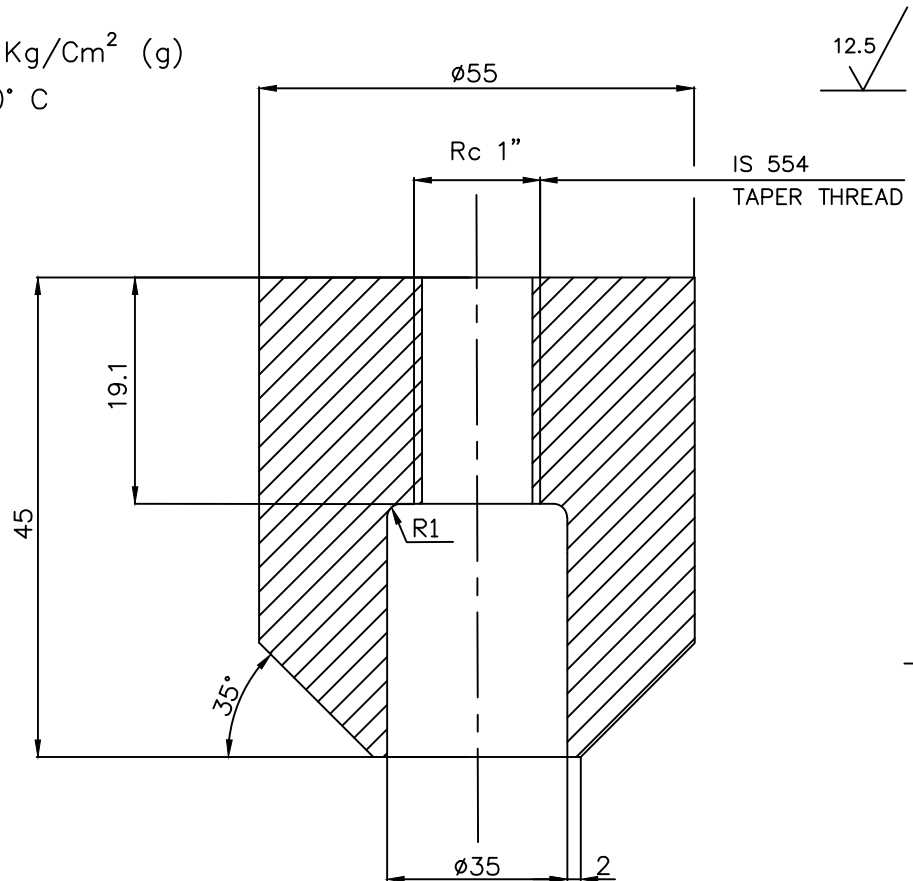
DEPT	GRADE OF UNTOOL DIM C/M/F	SCALE	WEIGHT (N)	REF TO ASSY OLD DRG
CODE				
TITLE	FLANGE-CLASS 150 (DRILLING PLAN AS PER ANSI B16.5) CS			REV.
CARD CODE	DRAWING NO.	3-80-999-99059		
U.C				

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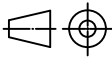
ALL DIMENSIONS ARE IN MILLIMETRES

REV	DATE	ALTERED	REV	DATE	ALTERED
01		APPROVED	02		APPROVED

1. PRESSURE : 5 Kg/Cm² (g)
2. TEMPERATURE : 50° C



	ROD ø63; L=45	15 339 143 0000	C	0	500
		SA 105			
VAR NO.	DESCRIPTION	MATL. CODE	A	UNIT	UNIT.WT.(Kg)
		MATL. SPECN.	C	DI	QTY.

		BHARAT HEAVY ELECTRICALS LIMITED		DRN	NAME	SIGN	DATE	NO. OF
		PIPING CENTRE		CHD	JITENDRA		26.04.22	VAR
		CHENNAI 600 017		APPD	IDB RAJU		26.04.22	
					VENKAT		26.04.22	
DEPT	GRADE OF		SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.		ITEM NO.	NO. OF
CODE	UNTOL. DIM		N.T.S	0.500				ITEMS
TITLE				CARD	DRAWING NO.			REV
TEMPERATURE STUB				CODE	4-80-468-84580			00
Rc 1" L=45 CS				U 01				

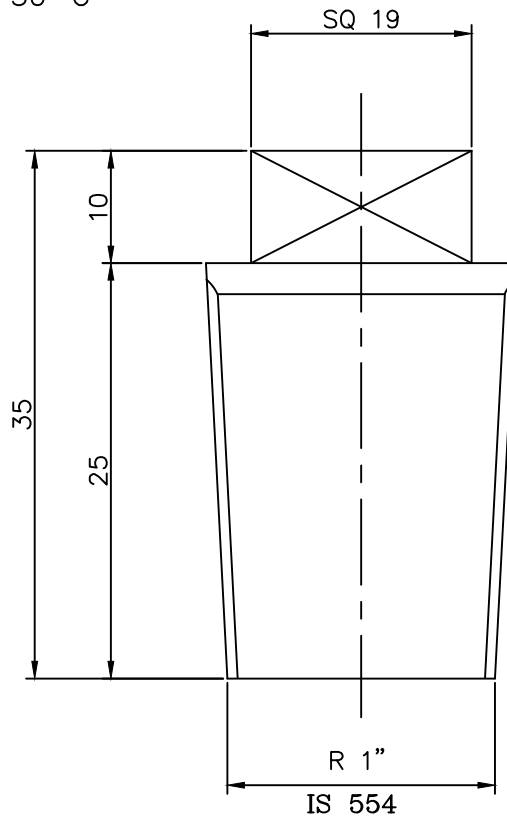
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ALL DIMENSIONS ARE IN MILLIMETRES

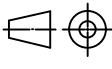
REV	DATE	ALTERED	REV	DATE	ALTERED
01		APPROVED	02		APPROVED

NOTE: -

- 01 ALL SHARP CORNERS ARE TO BE ROUNDED OFF.
02. PRESSURE : 5 Kg/Cm²(g)
03. TEMPERATURE : 50° C



	ROD ø40 ; L=35		15 339 141 0000	A		0	200
			SA 105				
VAR NO.	DESCRIPTION	STD	MATL. CODE	A	UNIT	UNIT.WT.(Kg)	
			MATL. SPECN.	C	DI	QTY.	

		BHARAT HEAVY ELECTRICALS LIMITED		DRN	NAME	SIGN	DATE	NO. OF VAR	
PIPING CENTRE		CHD	IDB RAJU				26.04.22		
CHENNAI 600 017		APPD	SARAVANAN				26.04.22		
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	0.200					
TITLE				CARD CODE	DRAWING NO.			REV	
PLUG R 1" CS				U 01	4-80-468-84581			00	

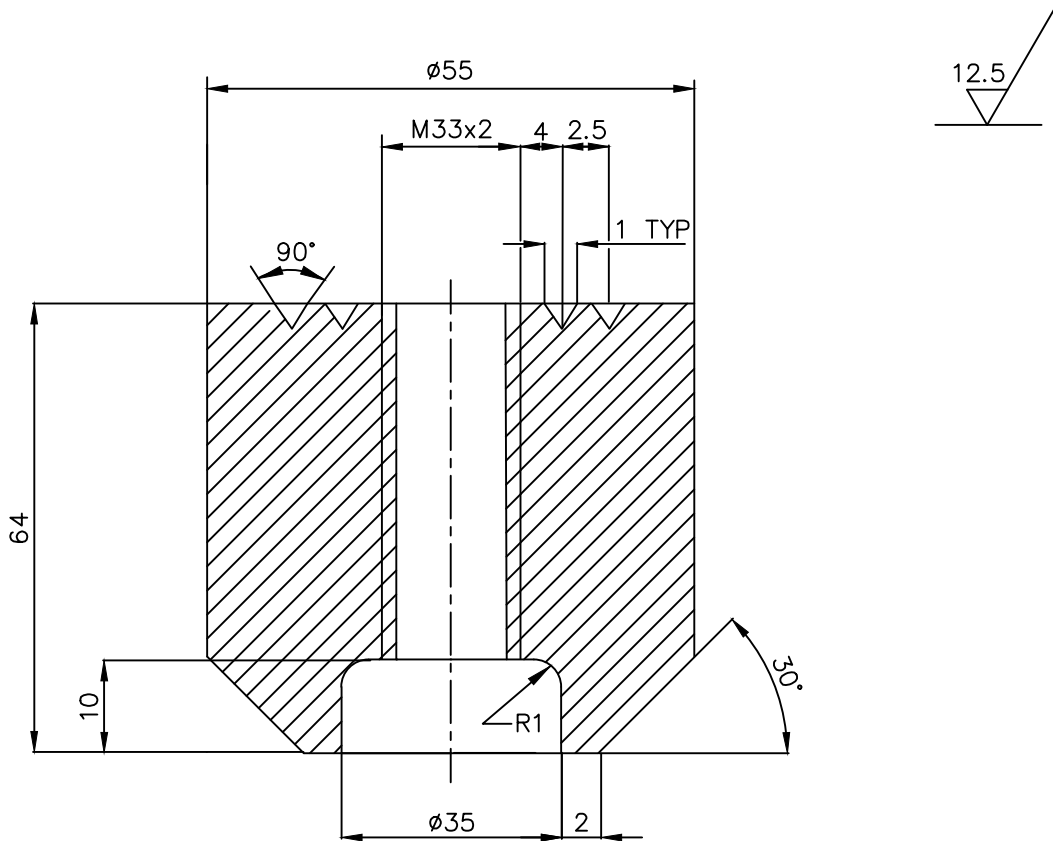
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ALL DIMENSIONS ARE IN MILLIMETRES

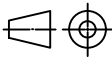
REV	DATE	ALTERED
01		APPROVED

NOTES: -

DESIGN PRESSURE : 5 Kg/Sq.Cm (g)
DESIGN TEMPERATURE : 50° C



	ROD ϕ 63 L=64	15 339 143 0000	C		0 700
		SA 105			
VAR NO.	DESCRIPTION	MATL. CODE	A	UNIT	UNIT.WT.(Kg)
		MATL. SPECN.	C	DI	QTY.

		BHARAT HEAVY ELECTRICALS LIMITED		DRN	NAME	SIGN	DATE	NO. OF
		PIPING CENTRE		CHD	JITENDRA	-SD-	05.05.22	VAR
		CHENNAI 600 017		APPD	IDB RAJU	-SD-	05.05.22	
					SARAVANAN	-SD-	05.05.22	
DEPT	GRADE OF		SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.		ITEM NO.	NO. OF
CODE	UNTOL. DIM		N.T.S	0.700				ITEMS
		C / M / F						
TITLE				CARD	DRAWING NO.			REV
TEMPERATURE STUB				CODE	4-80-468-84584			00
M33x2 L=64 (CS)				U 01				