

ANNEXURE TO ENQUIRY PC 8014 dt 14.06.08

SNO.	DESCRIPTION	SPECN	QTY	ELBOW DRAWING	CUR	UNIT RATE
01	90 DEG LR ELBOW 660 X 36	SA234WP22CL1	36	4-80-999-93085/00		
02	45 DEG LR ELBOW 660 X 36	SA234WP22CL1	18	4-80-999-93088/00		
03	30 DEG LR ELBOW 660 X 36	SA234WP22CL1	18	4-80-999-93092/00		
04	90 DEG LR ELBOW 711.2 X 40	SA234WP22CL1	33	4-80-999-93086/00		
05	30 DEG LR ELBOW 711.2 X 40	SA234WP22CL1	6	4-80-999-93091/00		

TOLERANCE DRAWING:4-80-301-26192/01
EP DRAWING - FIGURE / STYLE

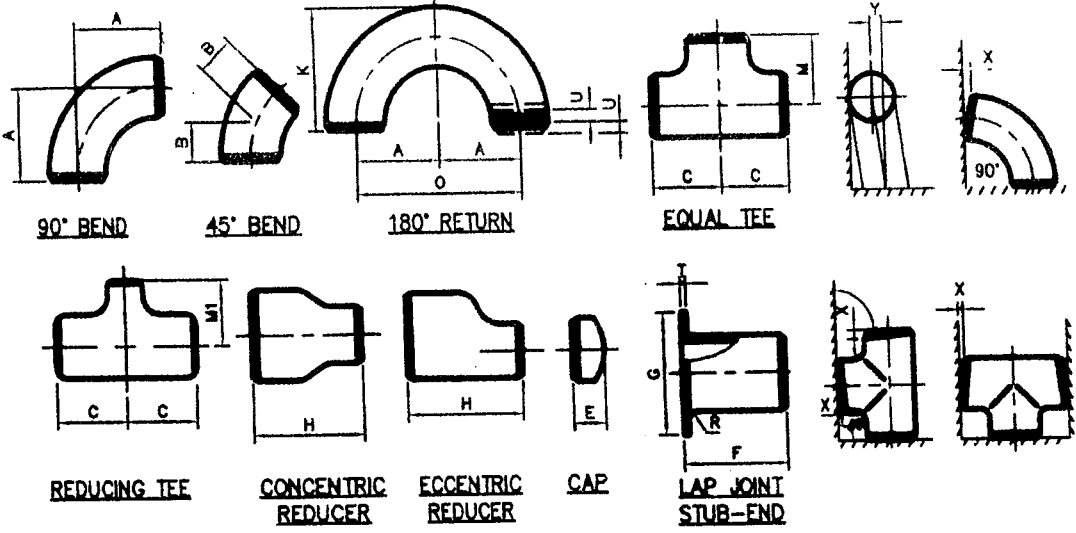
3-80-300-19825/01 / STYLE ' P '

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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	DIA OF LAP G	THICKNESS OF LAP
15 TO 85	+1.6 -0.8	±0.8	NOT LESS THAN 87 % 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

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	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

52861-003-08-3

DRAWING No.

NOTES: -

- 01. APPLICABLE FOR P91 MATERIAL
- 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

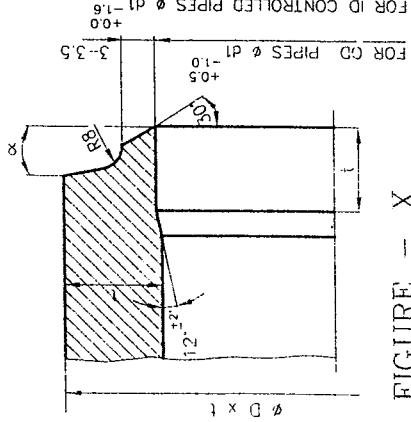


FIGURE - X

MATCHING EDGE PREPARATION FOR MISMATCH OD

DIAMETRICALLY GREATER THAN 8 mm
(ie. OD1 - OD2 > 8mm.) APPLICABLE FOR
ELBOWS OTHER THAN P91 MATERIALS

NOTES: -

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

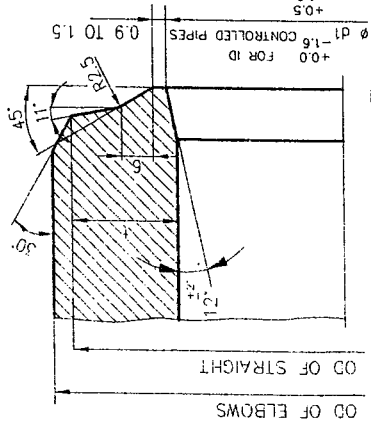


FIGURE - Z

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

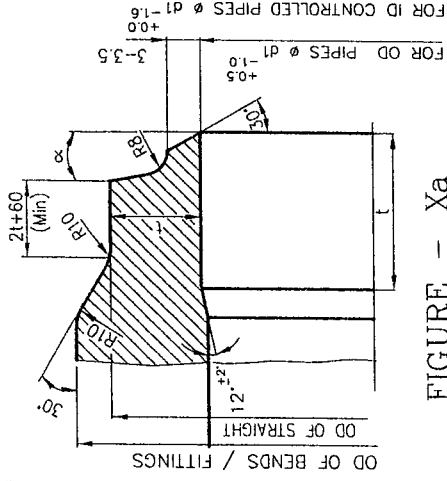


FIGURE - Xa

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.

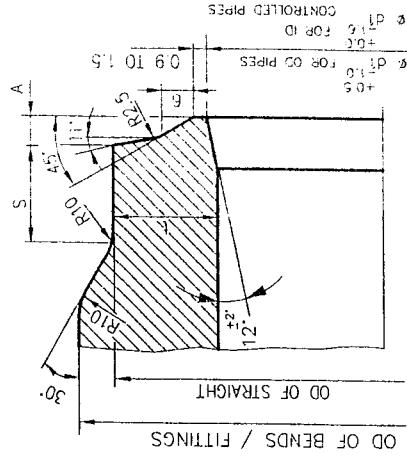
NOTES FOR WELDING: -

- 01. WELD REINFORCEMENT TO BE FLUSH GROUND AND MERGED WITH PARENT METAL WITHOUT ANY UNEVENNESS.

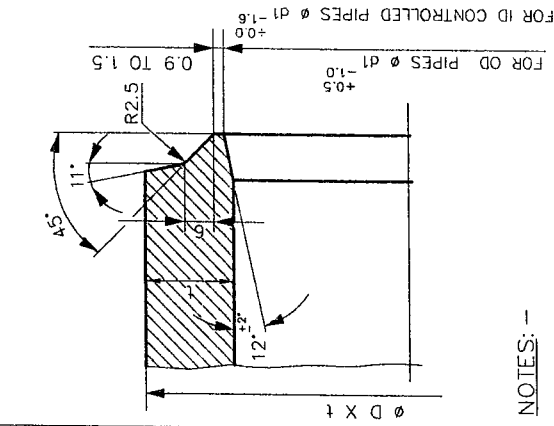
MATCHING EDGE PREPARATION FOR MISMATCH OD
DIAMETRICALLY GREATER THAN 8 mm
(ie. OD1 - OD2 > 8mm.) APPLICABLE FOR
BENDS/FITTINGS OTHER THAN P91 MATERIALS

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

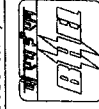


NOTES: -

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

STYLE - P

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,
PIPING CENTRE, MADRAS

DRN K.B.RAGUNATH
CHD M.C.SEKARAN
APPD A VELAYUTHAM

NAME SIGN
DATE 11.10.01
11.10.01
11.10.01

STANDARD

DEPT. CODE

UN TOL. DIM C/M/F

SCALE

WEIGHT (KG.)

NAME OF ORIGINAL ORGANISATION

ITEM No.

REVISIONS

REV	DATE	ALTERED
01	11.05.04	APPROVED

PROJECT NAME REMOVED AND STANDARD INCORPORATED IN TITLE BLOCK

CARD CODE

U 01

DRAWING No.

3-80-300-19825

REV

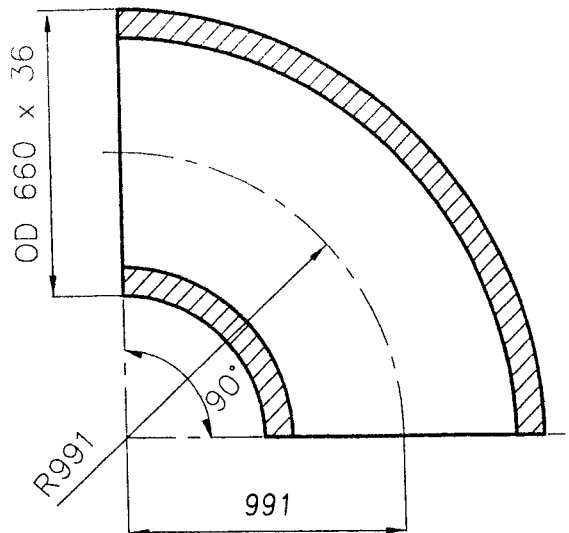
01

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REV	DATE	ALTERED
01		APPROVED

ALL DIMENSIONS ARE IN MILLIMETRES

DESIGN PRESSURE AT 540' : 52.5 Kg/sq.cm(g)
 RAW MATL SPECN.: SA 335 P22 (A).
 FITTING SPECN. : SA 234 WP22 (A).
 FINISHED FITTING MATERIAL CODE:



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=595
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. (31.5 to 40.5)
07. ALTERNATE RAW MATERIAL CAN ALSO BE USED.

PIPE D 660 x 45 L=1957	15 991 707 5300	1335.653
	SA 335 P22	
DESCRIPTION	RAW MATL. CODE	UNIT WT.
	MATL. SPECN.	QTY

STANDARD



BHARAT HEAVY ELECTRICALS LTD

PIPING CENTRE
CHENNAI 600 017

	NAME	SIGN	DATE
DRN	M.C.SEKARAN		12-06-08
CHD	C.SARAVANAN		12-06-08
APPD	S.JAYAKUMAR		12-06-08

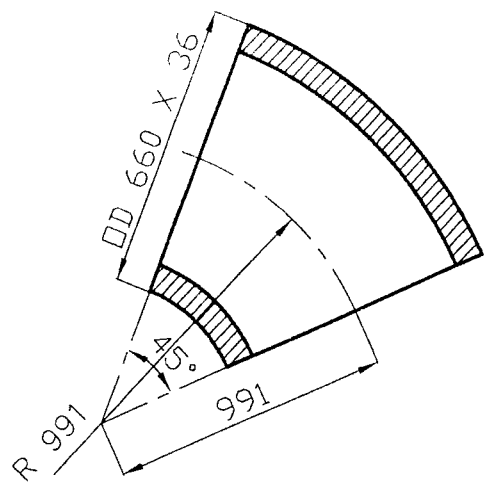
DEPT	GRADE OF UNTOL DIM	SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.
CODE	C / M / F		1335.653	
TITLE	BW LR 90 DEG. ELBOW OD 660 x 36		CARD CODE U 01	DRAWING NO. 4-80-999-93085 REV 00

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REV	DATE	ALTERED
01		APPROVED

ALL DIMENSIONS ARE IN MILLIMETRES

DESIGN PRESSURE AT 540° : 52.5 Kg/sq.cm(g)
 RAW MATL SPECN.: SA 335 P22 (A).
 FITTING SPECN. : SA 234 WP22 (A).
 FINISHED FITTING MATERIAL CODE:



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=595
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. (30.5 to 40.5)
07. ALTERNATE RAW MATERIAL CAN ALSO BE USED.

PIPE D 660 x 45 L=1178	15 991 707 4450	A	803.985
	SA 335 P22		
DESCRIPTION	RAW MATL. CODE	A	UNIT WT.
	MATL. SPECN.	C	QTY

STANDARD



BHARAT HEAVY ELECTRICALS LTD
 PIPING CENTRE
 CHENNAI 600 017

	NAME	SIGN	DATE
DRN	M.C.SEKARAN		12-06-08
CHD	C.SARAVANAN		12-06-08
APPD	S.JAYAKUMAR		12-06-08

DEPT	GRADE OF UN TOL. DIM	SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.
CODE	C / M / F		803.985	

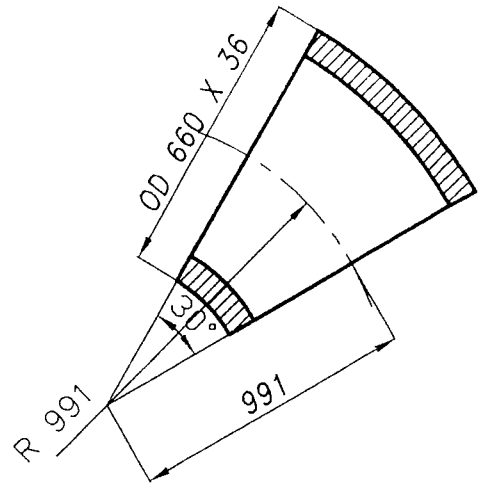
TITLE	CARD CODE	DRAWING NO.	REV
BW LR 45 DEG. ELBOW OD 660 x 36	U 01	4-80-999-93088	00

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REV	DATE	ALTERED
01		APPROVED

ALL DIMENSIONS ARE IN MILLIMETRES

DESIGN PRESSURE AT 540° : 52.5 Kg/sq.cm(g)
 RAW MATL SPECN.: SA 335 P22 (A).
 FITTING SPECN. : SA 234 WP22 (A).
 FINISHED FITTING MATERIAL CODE:



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=595
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. (39.38 to 50.63)
07. ALTERNATE RAW MATERIAL CAN ALSO BE USED.

PIPE OD 660 x 45 L=919	15 991 707 4200	A	627.218
	SA 335 P22		
DESCRIPTION	RAW MATL CODE	A	UNIT WT.
	MATL SPECN.	C	QTY

STANDARD



BHARAT HEAVY ELECTRICALS LTD

PIPING CENTRE
CHENNAI 600 017

	NAME	SIGN	DATE
DRN	M.C.SEKARAN		12-06-08
CHD	C.SARAVANAN		12-06-08
APPD	S.JAYAKUMAR		12-06-08

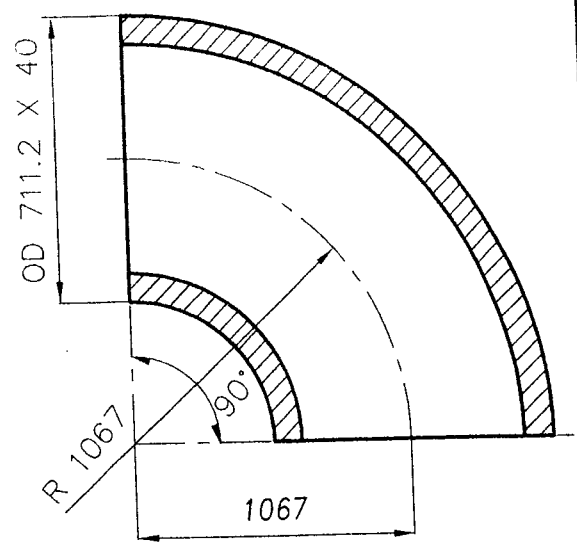
DEPT	GRADE OF UNTOL DIM		SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.
CODE	C / M / F			627.218	
TITLE				CARD CODE	REF. TO ASSY./OLD DRG.
BW LR 30 DEG. ELBOW				U 01	DRAWING NO.
OD 660 x 36					4-80-999-93092
					REV
					00

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ALL DIMENSIONS ARE IN MILLIMETRES

REV	DATE	ALTERED
01		APPROVED

DESIGN PRESSURE AT 540° : 54 Kg/sq.cm(g)
 RAW MATL SPECN.: SA 335 P22 (A).
 FITTING SPECN. : SA 234 WP22 (A).
 FINISHED FITTING MATERIAL CODE:




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=635
05. O.D AT ANY SECTION SHALL NOT VARY MORE THAN 4mm(707.2 to 715.2)
06. ACTUAL THICKNESS AT ANY POINT SHALL NOT VARY MORE THAN 12.5% OF THE NOMINAL THICKNESS. (35 to 45)
07. ALTERNATE RAW MATERIAL CAN ALSO BE USED.

PIPE OD 720 x 49 L=2076	15 991 708 5400	A	1683.221
	SA 335 P22		
DESCRIPTION	RAW MATL. CODE	A	UNIT WT.
	MATL. SPECN.	C	QTY

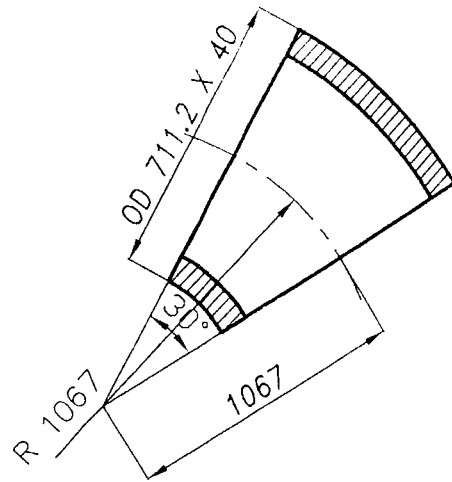
STANDARD

 BHARAT HEAVY ELECTRICALS LTD PIPING CENTRE CHENNAI 600 017		NAME	SIGN	DATE
DEPT	GRADE OF UNTOL. DIM	DRN	M.C.SEKARAN	12-06-08
CODE	C / M / F	CHD	C.SARAVANAN	12-06-08
		APPD	S.JAYAKUMAR	12-06-08
SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.		
	1683.221.			
TITLE	CARD CODE	DRAWING NO.		REV
BW LR 90 DEG. ELBOW OD 711.2 x 40	U 01	4-80-999-93086		00

ALL DIMENSIONS ARE IN MILLIMETRES

REV	DATE	ALTERED
01		APPROVED

DESIGN PRESSURE AT 540° : 54 Kg/sq.cm(g)
 RAW MATL SPECN.: SA 335 P22 (A).
 FITTING SPECN. : SA 234 WP22 (A).
 FINISHED FITTING MATERIAL CODE:



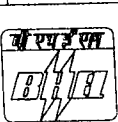
NOTES: -

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04. EDGE PREPARATION DETAIL SHALL BE AS PER DRAWING No: 3-80-300-19825
STYLE P d1=635
05. O.D AT ANY SECTION SHALL NOT VARY MORE THAN 4mm(707.2 to 715.2)
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07. ALTERNATE RAW MATERIAL CAN ALSO BE USED.

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PIPE OD 720 x 49 L=959	15 991 708 4250	A	777.557
	SA 335 P22		
DESCRIPTION	RAW MATL CODE	A	UNIT WT.
	MATL. SPECN.	C	QTY

STANDARD



BHARAT HEAVY ELECTRICALS LTD
 PIPING CENTRE
 CHENNAI 600 017

	NAME	SIGN	DATE
DRN	M.C.SEKARAN		12-06-08
CHD	C.SARAVANAN		12-06-08
APPD	S.JAYAKUMAR		12-06-08

DEPT	GRADE OF UNTO L DIM	SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.
CODE	C / M / F		777.557	
TITLE	BW LR 30 DEG. ELBOW OD 711.2 x 40		CARD CODE U 01	REV 00
			DRAWING NO. 4-80-999-93091	