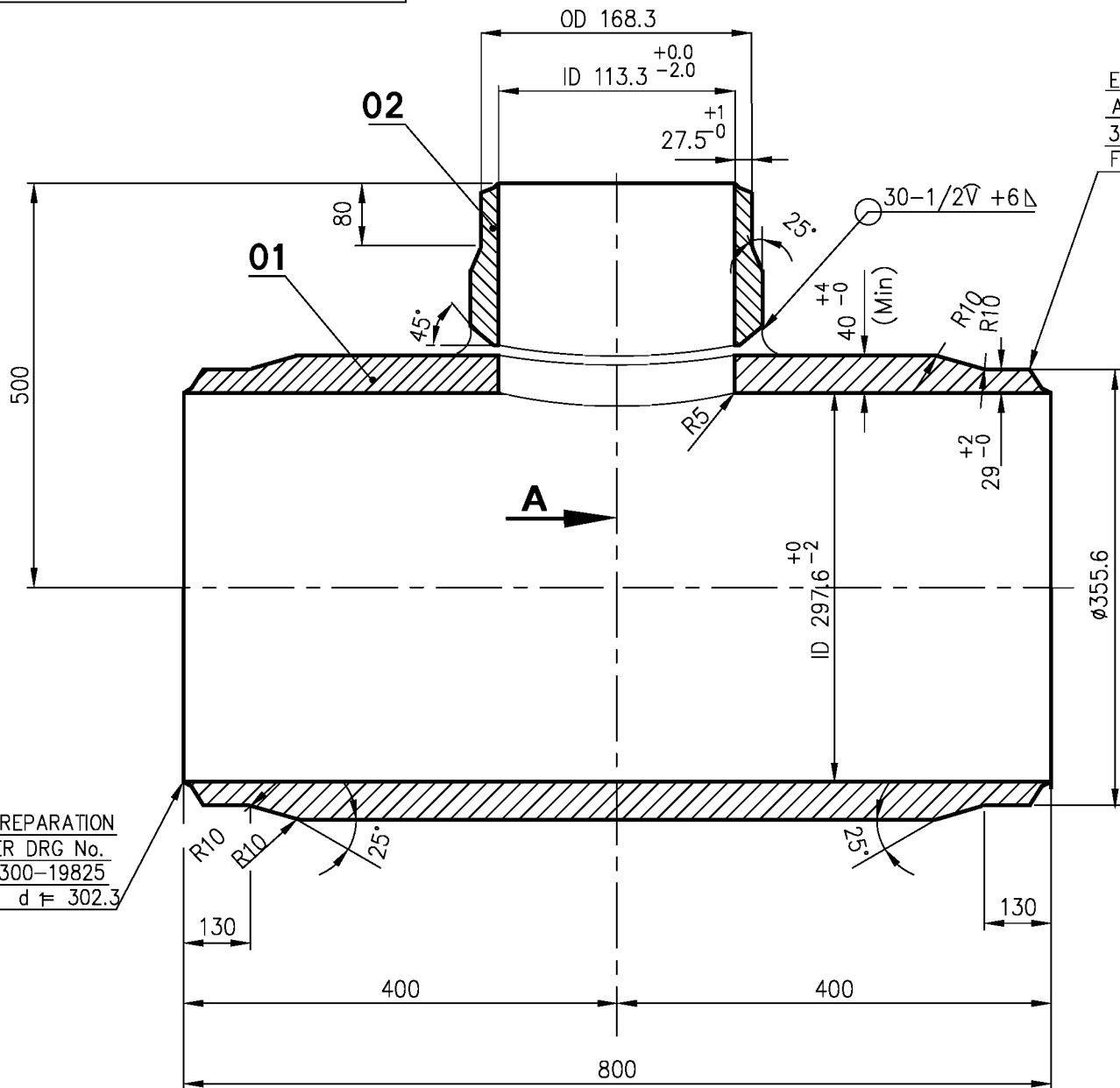
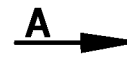


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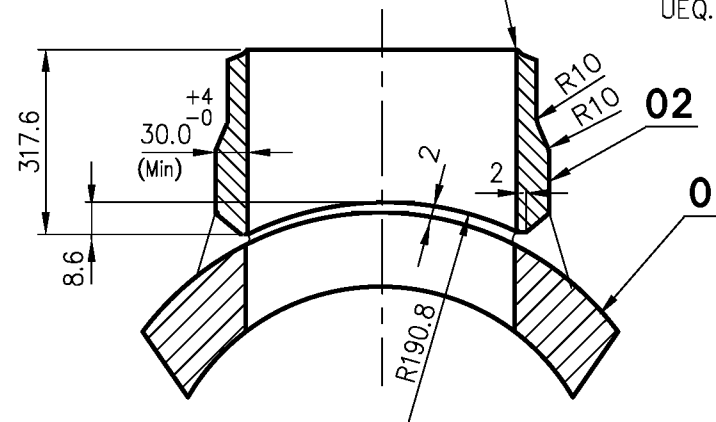
DRAWING No



EDGE PREPARATION  
AS PER DRG No.  
3-80-300-19825  
FIGURE-X d = 302.3

EDGE PREPARATION  
AS PER DRG No.  
3-80-300-19825  
FIGURE-X d<sub>1</sub> = 302.3

EDGE PREPARATION  
AS PER DRG No.  
3-80-300-19825  
FIGURE-X d<sub>1</sub> = 119.3



SECTION-AA

**NOTES :-**

1. DESIGN PRESSURE : 150 Kg/Sq.Cm (g)
2. DESIGN TEMPERATURE : 540° C
3. FOLLOW TDG : 108
4. ELECTRODES TO BE USED ARE,  
a) GTAW : ER90S-B9 (A)  
b) SMAW : E9015-B9 (A)  
VENDOR TO GIVE WPS , PQR FOR BHEL'S APPROVAL.
5. PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).
6. FABRICATION, INSPECTION, TESTING AS PER IBR 1950.
7. THE STOCK CODE FOR THE FINISHED UEQ.TEE IS : "925058540000"

12.5

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ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO.	MATERIAL CODE	A	UNIT WT.	
			VAR NO.	MATERIAL SPEC.	C	QTY.	
02	BRANCH NOZZLE L=317.6 ID 113 x Thk 30 Min	3-80-999-97778		SA 182 F91	A	33,000	
01	BASE PIPE L = 800 ID 297.6 x Thk 40	3-80-999-97778		SA 182 F91	A	266,400	
					C		
BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, CHENNAI 600 017			NAME	SIGN	DATE	NO OF	
			DRN	S.R.MURTHY		02.03.10	ITEMS
			CHD	S.R.MURTHY		02.03.10	
			APPD	C.V.NATHAN		02.03.10	
DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.No:		ITEM No.	
CODE	C/M/F	N.T.S.	299.400				
TITLE			CARD CODE	DRAWING No.		REV	
FABRICATED UN EQUAL TEE OD355.6x29/OD168.3x27.5 F91			U 01	3-80-999-97778		00	

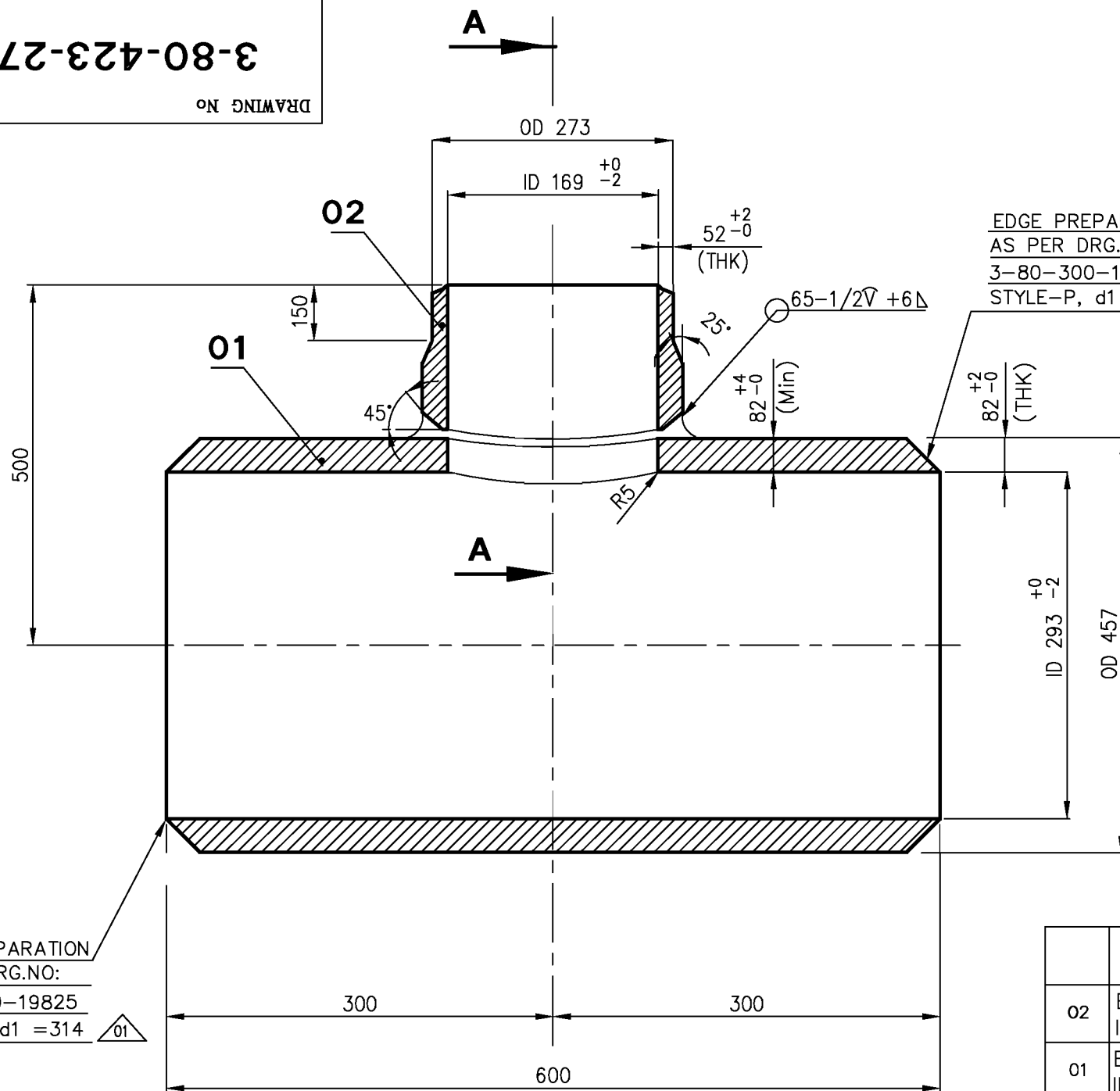
STANDARD

REV	DATE	ALTD	REV	DATE	ALTD
02			01		
ZONE		APPD	ZONE		APPD

3-80-423-27269

DRAWING No

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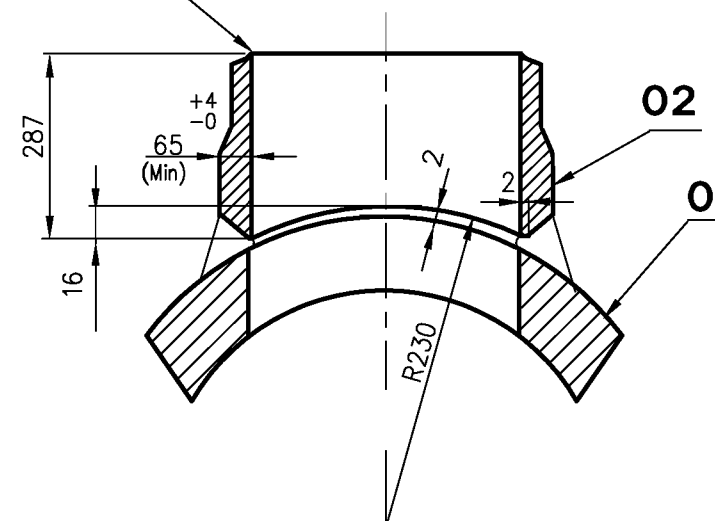
**NOTES :-**

- DESIGN PRESSURE : 480 Kg/Sq.Cm (g)
- DESIGN TEMPERATURE : 200° C
- FOLLOW TDG : 108 LATEST
- PIPE SA106GRC(A) CAN ALSO BE USED IN PLACE OF SA105(A)
- THE STOCK CODE FOR THE FINISHED UEQ. TEE:925058670000

12.5

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1 =314

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1 =184.4



**SECTION-AA**

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1 =314

02	BRANCH NOZZLE L=287 ID 169 x Thk 65 Min	3-80-423-27269		SA 105	A	95,644 1
01	BASE PIPE L = 600 ID 293 x Thk 82 Min	3-80-423-27269		SA 105	A	454,774 1
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	A C	UNIT WT. QTY.

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

DRN	NAME	SIGN	DATE	NO OF ITEMS
CHD	T.RAJASEKAR	-SD.-	10.05.10	
APPD	LALIT	-SD.-	10.05.10	
	C.SARAVANAN	-SD.-	10.05.10	

REV 01	DATE 19.02.11	ALTD: LALIT -SD.- APPD: CS -SD.-
ZONE	d1 VALUE REVISED	
REVISION MARKED AS 01		

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	551		
TITLE			CARD CODE	DRAWING No.	REV
FABRICATED UNEQUAL TEE (OD457x82/OD273x52) SA105			U 01	3-80-423-27269	01



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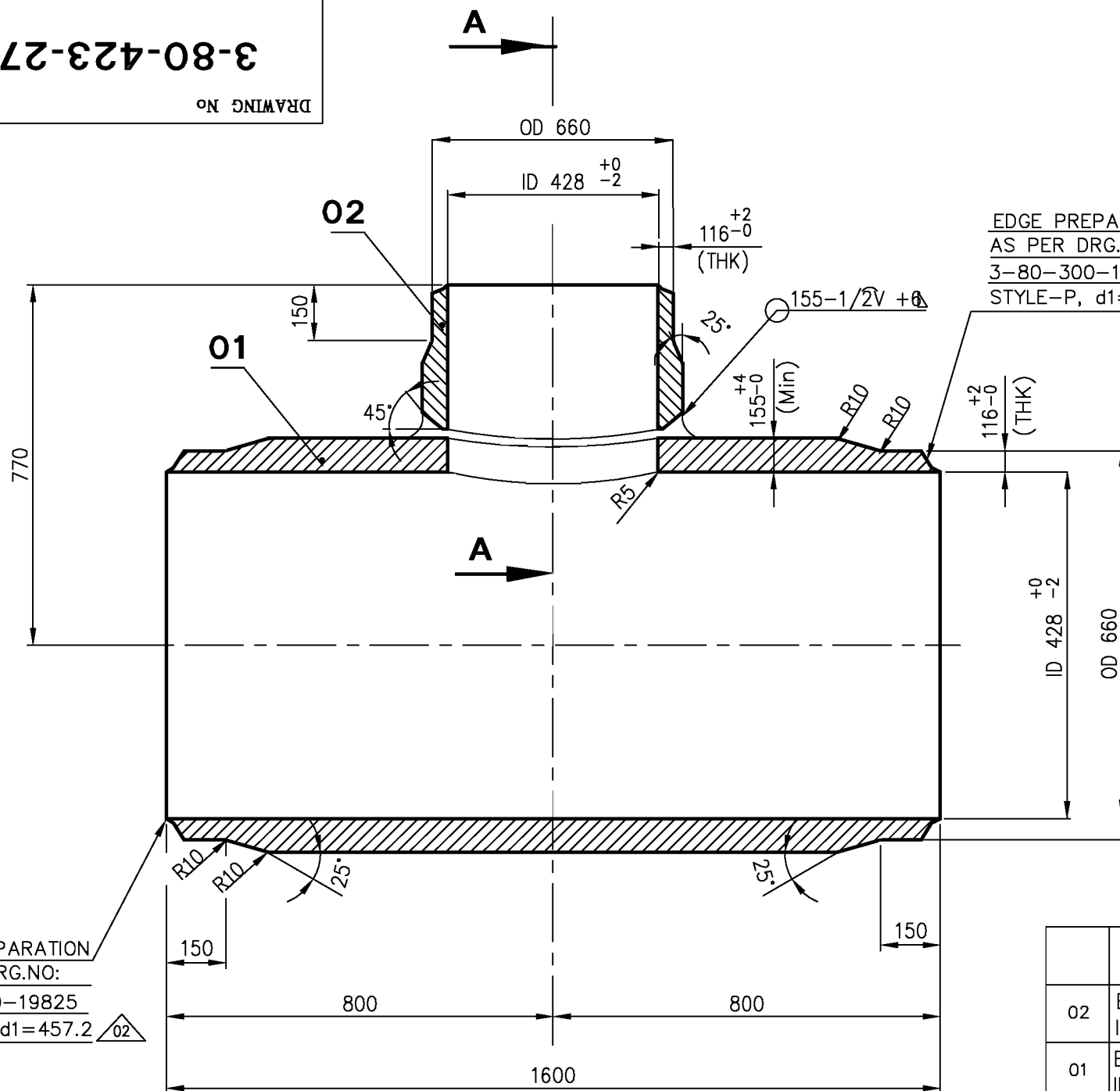
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3-80-423-27270

DRAWING No



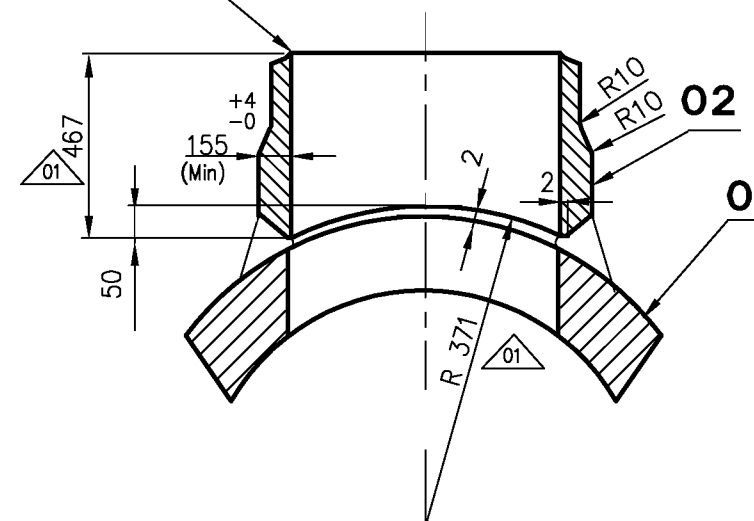
**NOTES :-**

- DESIGN PRESSURE : 480 Kg/Sq.Cm (g)
- DESIGN TEMPERATURE : 200° C
- FOLLOW TDG : 108 LATEST
- PIPE SA106GRC(A) CAN ALSO BE USED IN PLACE OF SA105(A)
- THE STOCK CODE FOR THE FINISHED EQ. TEE:925058680000

12.5

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=457.2

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=457.2



**SECTION-AA**

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=457.2

02	BRANCH NOZZLE L=333 ID 428 X Thk 155 Min	3-80-423-27270	SA 105	A	735,044 1
01	BASE PIPE L = 1600 ID 428 X Thk 155 Min	3-80-423-27270	SA 105	A	3563,851 1
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	UNIT WT. QTY.

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

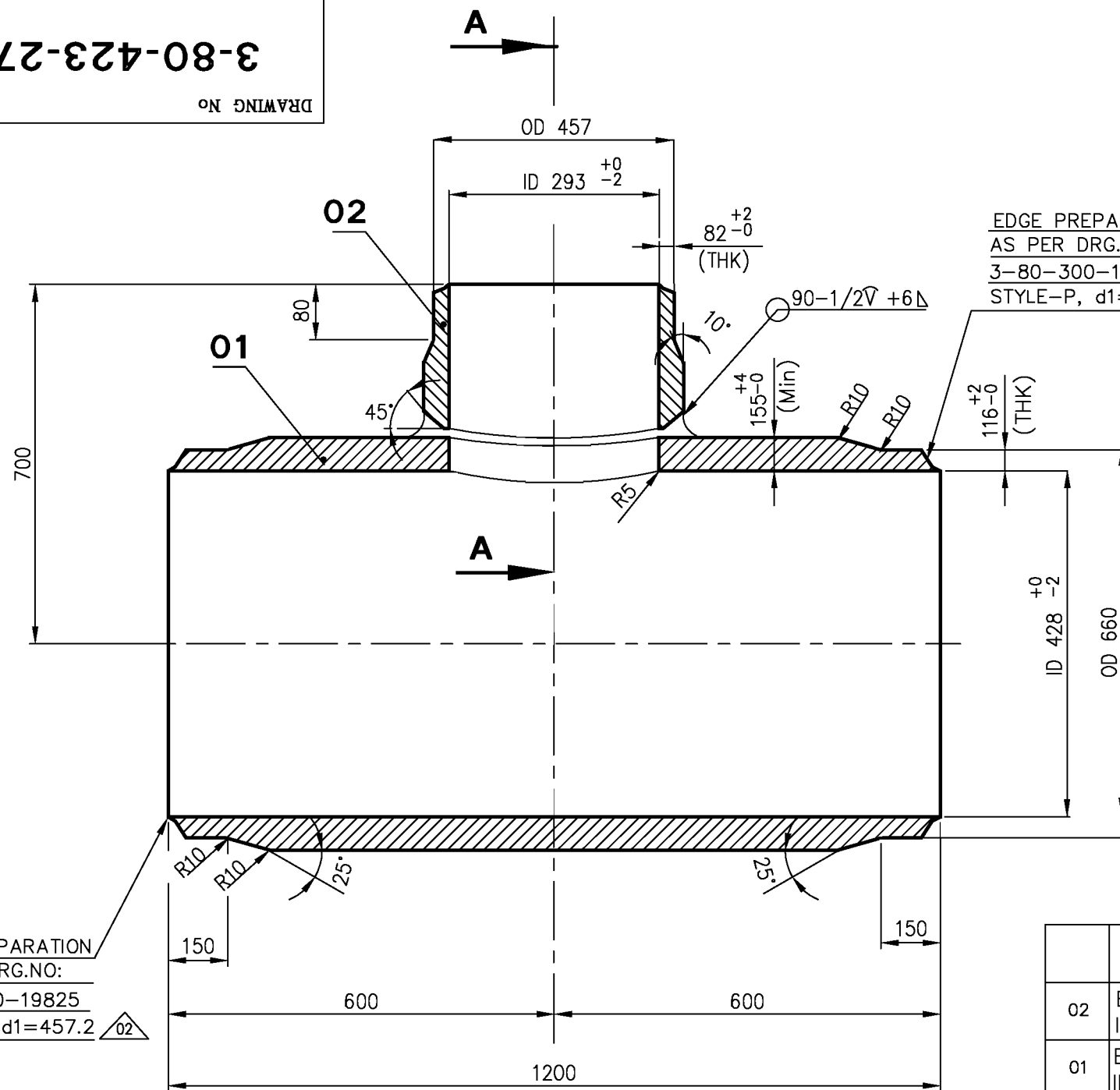
DRN	NAME	SIGN	DATE	NO OF ITEMS
CHD	T.RAJASEKAR	-SD.-	10.05.10	
APPD	LALIT	-SD.-	10.05.10	
	C.SARAVANAN	-SD.-	10.05.10	

REV 02	DATE 19.02.11	ALTD: LALIT -SD.- APPD: CS -SD.-	REV 01	DATE 21.07.10	ALTD LALIT -SD.- APPD C.SARAVANAN-SD.-
ZONE	d1 VALUES REVISED		ZONE	RADIUS OF RUN PIPE REVISED REVISION MARKED AS 01	
	REVISION MARKED AS 02				

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	4300		
TITLE	FABRICATED EQUAL TEE (OD660x116) SA105		CARD CODE	DRAWING No.	REV
			U 01	3-80-423-27270	02

3-80-423-27271

DRAWING No



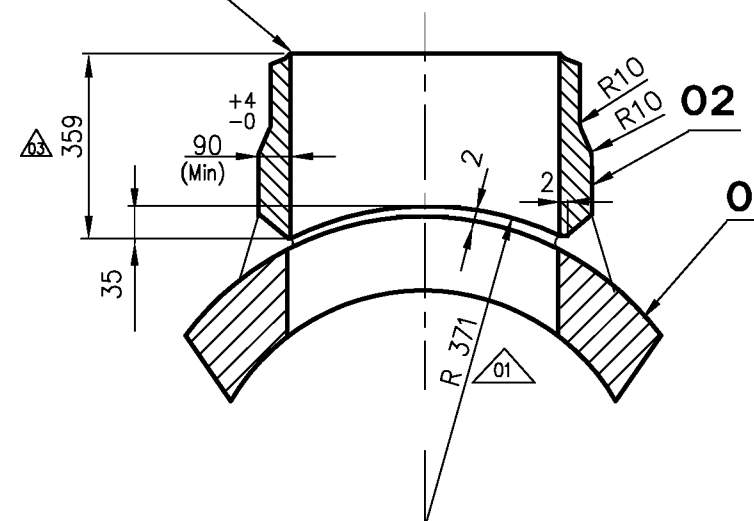
**NOTES :-**

- DESIGN PRESSURE : 480 Kg/Sq.Cm (g)
- DESIGN TEMPERATURE : 200° C
- FOLLOW TDG : 108 LATEST
- PIPE SA106GRC(A) CAN ALSO BE USED IN PLACE OF SA105(A)
- THE STOCK CODE FOR THE FINISHED UEQ. TEE:925058690000

12.5  
▽

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=457.2

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=314



**SECTION-AA**

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=457.2

ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. / VAR NO.	MATERIAL CODE / MATERIAL SPEC.	A / C	UNIT WT. / QTY.
02	BRANCH NOZZLE L=402 ID 293X Thk 90 Min	3-80-423-27271		SA 105	A	339,860 1
01	BASE PIPE L = 1200 ID 428 X Thk 155 Min	3-80-423-27271		SA 105	A	2672,888 1

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

DRN	NAME	SIGN	DATE	NO OF ITEMS
T.RAJASEKAR	T.RAJASEKAR	-SD.-	10.05.10	
CHD	LALIT	-SD.-	10.05.10	
APPD	C.SARAVANAN	-SD.-	10.05.10	

REV	DATE	ALTD	ALTD	REV	DATE	ALTD	ALTD	
03	04.03.11	LALIT -SD.-	LALIT -SD.-	02	19.02.11	LALIT -SD.-	LALIT -SD.-	
		APPD C.S -SD.-	APPD:CS -SD.-			APPD C.SARAVANAN-SD.-	APPD C.SARAVANAN-SD.-	
ZONE	DIMENSION REVISED IN SECTION -AA. REVISION INDICATED AS 03		ZONE	d1 VALUE REVISED REVISION MARKED AS 02		ZONE	RADIUS OF RUN PIPE REVISED REVISION MARKED AS 01	

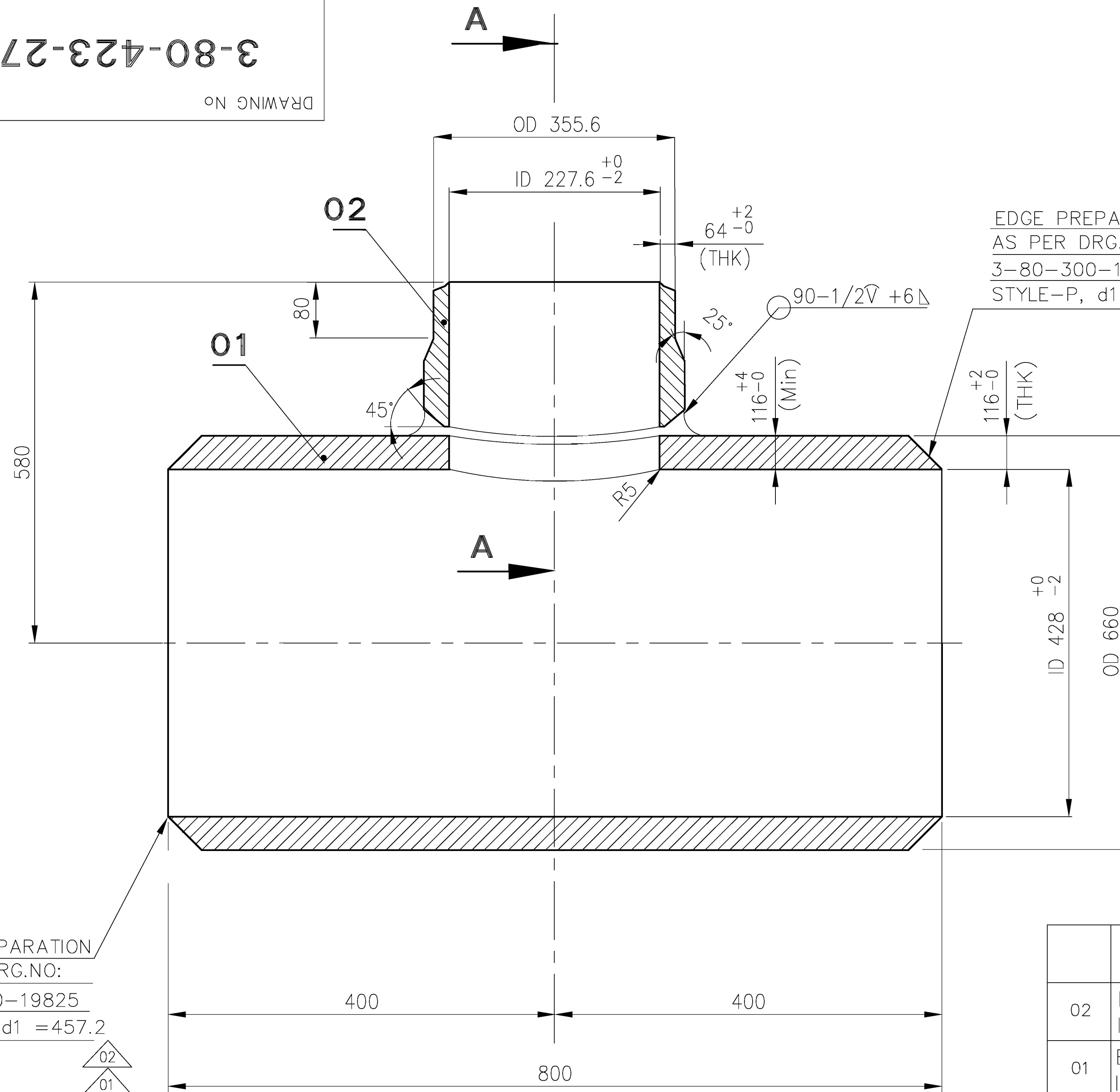
DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
	C/M/F	N.T.S.	3013		
TITLE			CARD CODE	DRAWING No.	REV
FABRICATED UNEQUAL TEE (OD660x116/OD457X82) SA 105			U 01	3-80-423-27271	03

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3-80-423-27272

DRAWING No

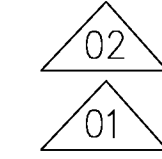


**NOTES :-**

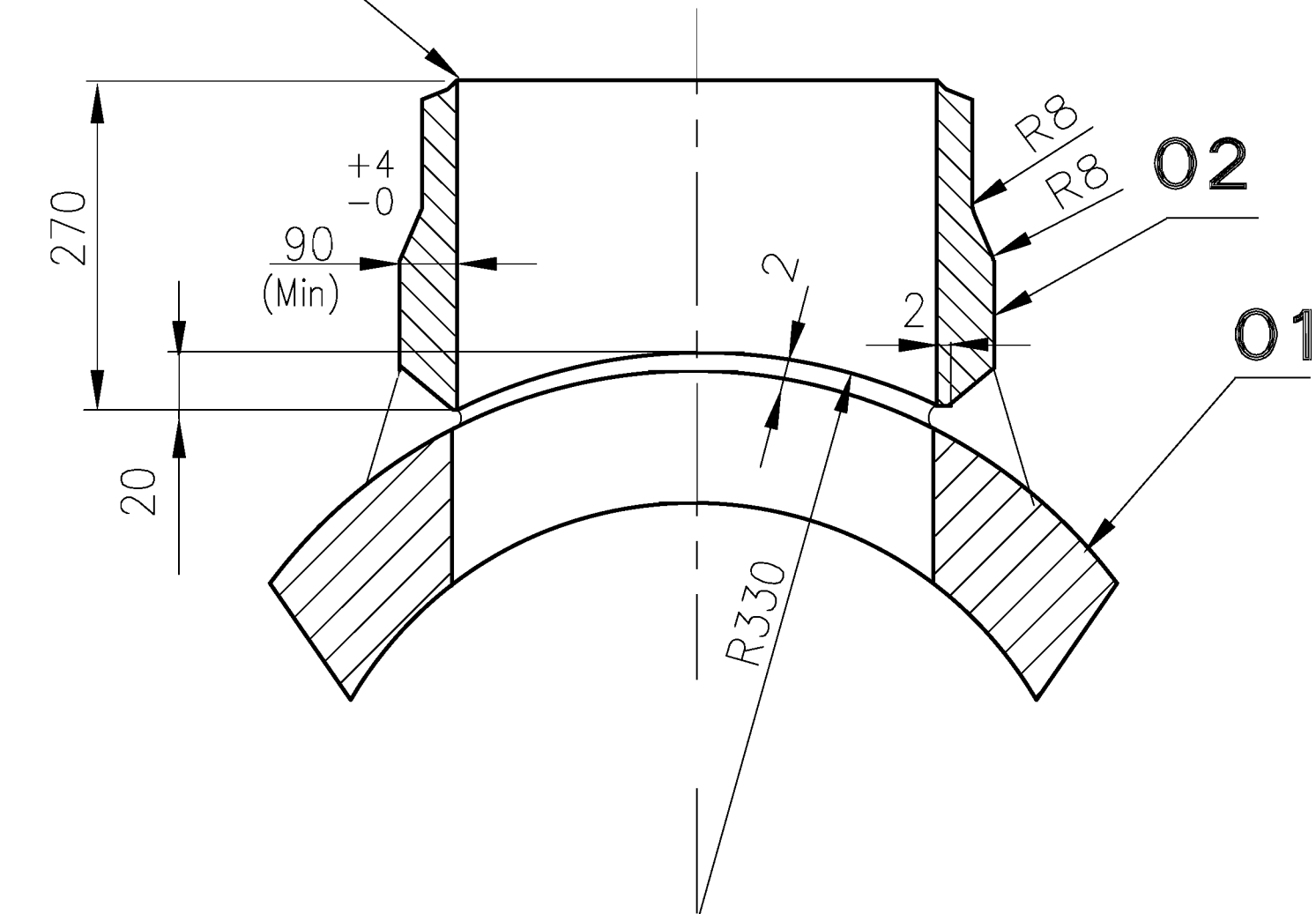
- DESIGN PRESSURE : 480 Kg/Sq.Cm (g)
- DESIGN TEMPERATURE : 200° C
- FOLLOW TDG : 108 LATEST
- PIPE SA106GRC(A) CAN ALSO BE USED IN PLACE OF SA105(A)
- THE STOCK CODE FOR THE FINISHED UEQ. TEE:925058700000

12.5

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1 =457.2



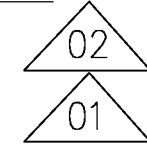
EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1 =231.6



**SECTION-AA**

**STANDARD**

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1 =457.2



ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. / VAR. NO.	MATERIAL CODE / MATERIAL SPEC.	A / C	UNIT WT. / QTY.
02	BRANCH NOZZLE L=270 ID 227.6 x Thk 90 Min	3-80-423-27272		SA 105	A	190,233 1
01	BASE PIPE L = 800 ID 428 x Thk 116 Min	3-80-423-27272		SA 105	A	1244,360 1

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

DRN	NAME	SIGN	DATE	NO OF ITEMS
	T.RAJASEKAR	-SD.-	10.05.10	
CHD	LALIT	-SD.-	10.05.10	
APPD	C.SARAVANAN	-SD.-	10.05.10	

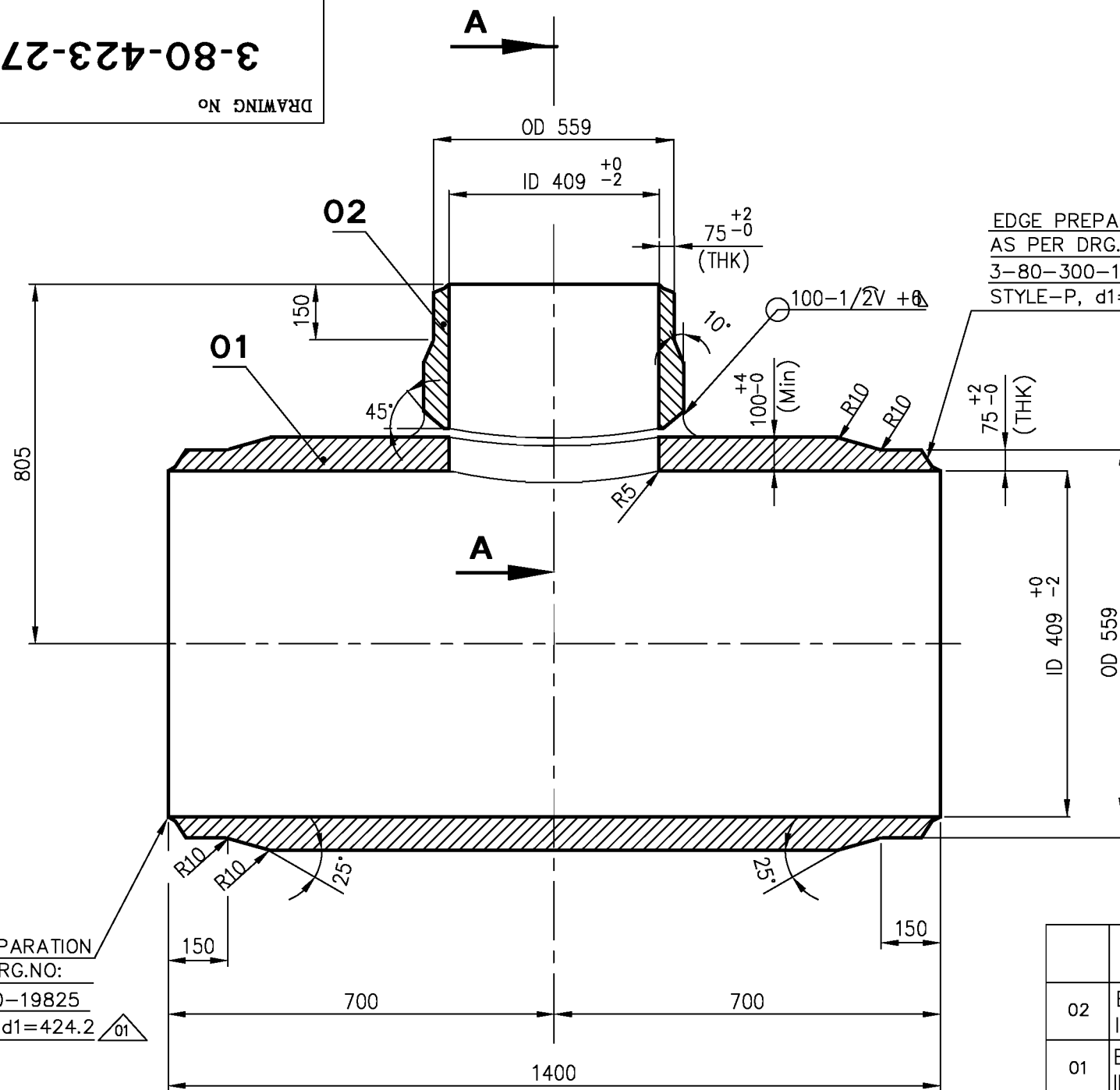
REV	DATE	ALTD: M.MANO	REV	DATE	ALTD: LALIT -SD.-
02	26.09.13	APPD: R.SESHAGIRI	01	10.11.10	APPD: CS -SD.-
ZONE	d1 VALUE OF BASE PIPE REVISED.		ZONE	d1 VALUE OF BASE PIPE REVISED.	
	REVISION MARKED AS 02			REVISION MARKED AS 01	

DEPT.	GRADE OF UN TOL. DIM	SCALE	WEIGHT (Kg)	BHEL PO REF.NO:	ITEM No.
	C/M/F	N.T.S.	1435		
TITLE	FABRICATED UNEQUAL TEE (OD660x116/OD355.6x64) SA105			CARD CODE	REV
				U 01	02
				DRAWING No.	
				3-80-423-27272	

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3-80-423-27273

DRAWING No



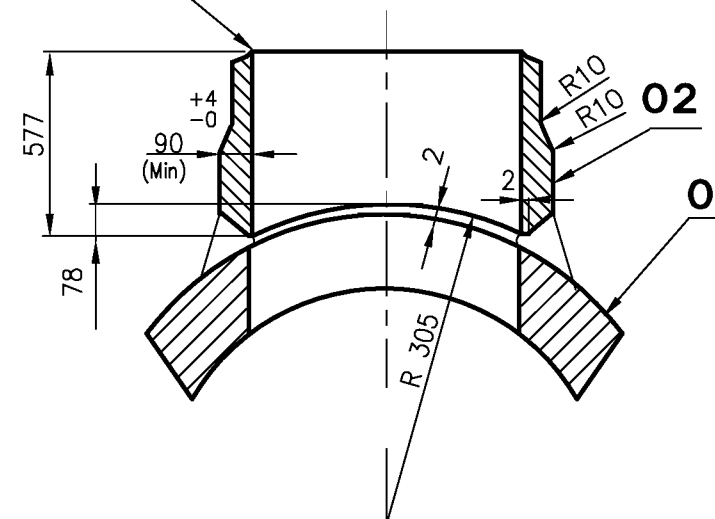
**NOTES :-**

- DESIGN PRESSURE : 350 Kg/Sq.Cm (g)
- DESIGN TEMPERATURE : 300° C
- FOLLOW TDG : 108 LATEST
- PIPE SA106GRC(A) CAN ALSO BE USED IN PLACE OF SA105(A)
- THE STOCK CODE FOR THE FINISHED EQ. TEE:925058710000

12.5

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=424.2

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=424.2



**SECTION-AA**

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=424.2

02	BRANCH NOZZLE L=577 ID 409 X Thk 100 Min	3-80-423-27273		SA 105	A	715,141 1
01	BASE PIPE L = 1400 ID 409 X Thk 100 Min	3-80-423-27273		SA 105	A	1756,487 1
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	A C	UNIT WT. QTY.

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

DRN	NAME	SIGN	DATE	NO OF ITEMS
CHD	T.RAJASEKAR	-SD.-	10.05.10	
APPD	LALIT	-SD.-	10.05.10	
	C.SARAVANAN	-SD.-	10.05.10	

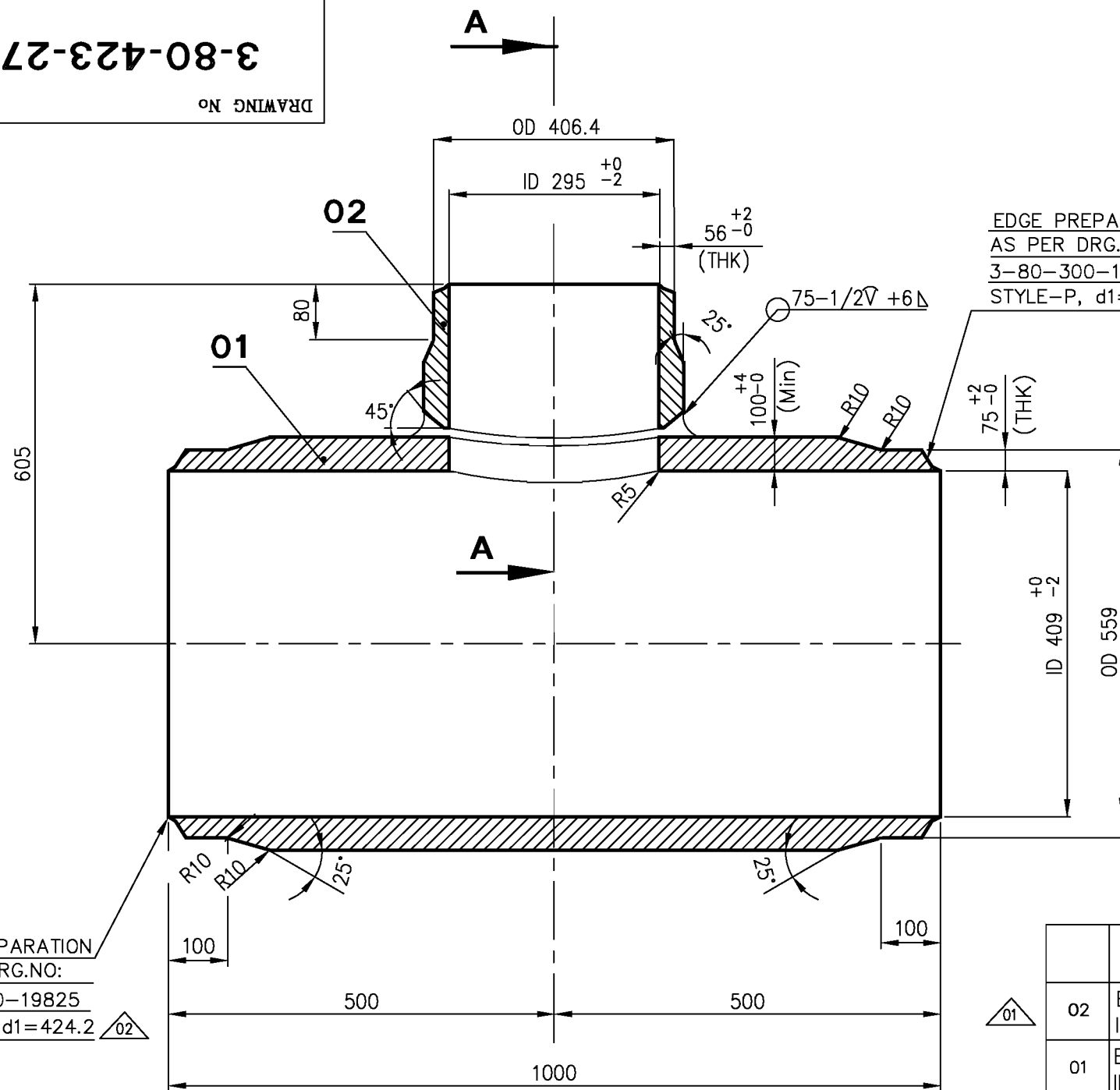
REV	DATE	ALTD: LALIT -SD.-
01	19.02.11	APPD: CS -SD.-
ZONE	d1 VALUES REVISED	
REVISION MARKED AS 01		

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	2472		
TITLE	FABRICATED EQUAL TEE (OD559X75) SA 105		CARD CODE	DRAWING No.	REV
			U 01	3-80-423-27273	01

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3-80-423-27274

DRAWING No



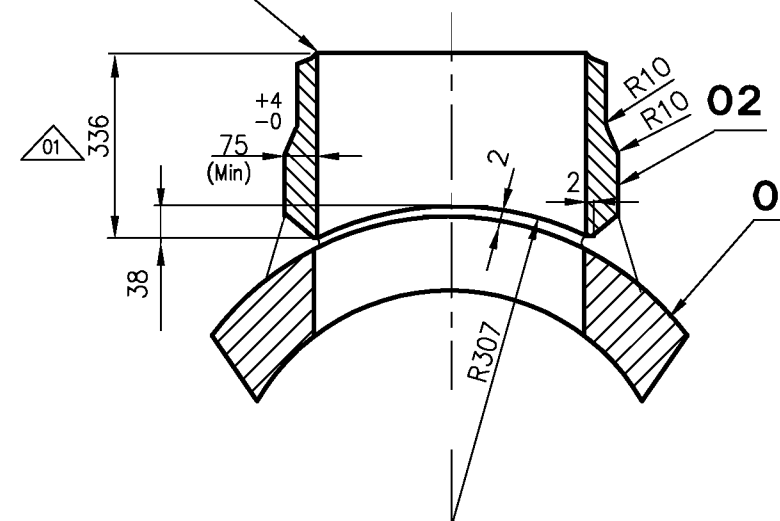
**NOTES :-**

1. DESIGN PRESSURE : 350 Kg/Sq.Cm (g)
2. DESIGN TEMPERATURE : 300° C
3. FOLLOW TDG : 108 LATEST
4. PIPE SA106GRC(A) CAN ALSO BE USED IN PLACE OF SA105(A)
5. THE STOCK CODE FOR THE FINISHED UEQ. TEE:925058720000

12.5

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=424.2

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=306.2



**SECTION-AA**

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1=424.2

02	BRANCH NOZZLE L=336 ID 295 X Thk 75 Min	3-80-423-27274	SA 105	A	229,824 1
01	BASE PIPE L = 1000 ID 409 X Thk 100 Min	3-80-423-27274	SA 105	A	1254,630 1
ITEM NO.	DESCRIPTION	DRAWING NO.	MATERIAL CODE	UNIT WT.	
			MATERIAL SPEC.	QTY.	

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

DRN	NAME	SIGN	DATE	NO OF ITEMS
CHD	T.RAJASEKAR	-SD.-	10.05.10	
APPD	LALIT	-SD.-	10.05.10	
	C.SARAVANAN	-SD.-	10.05.10	

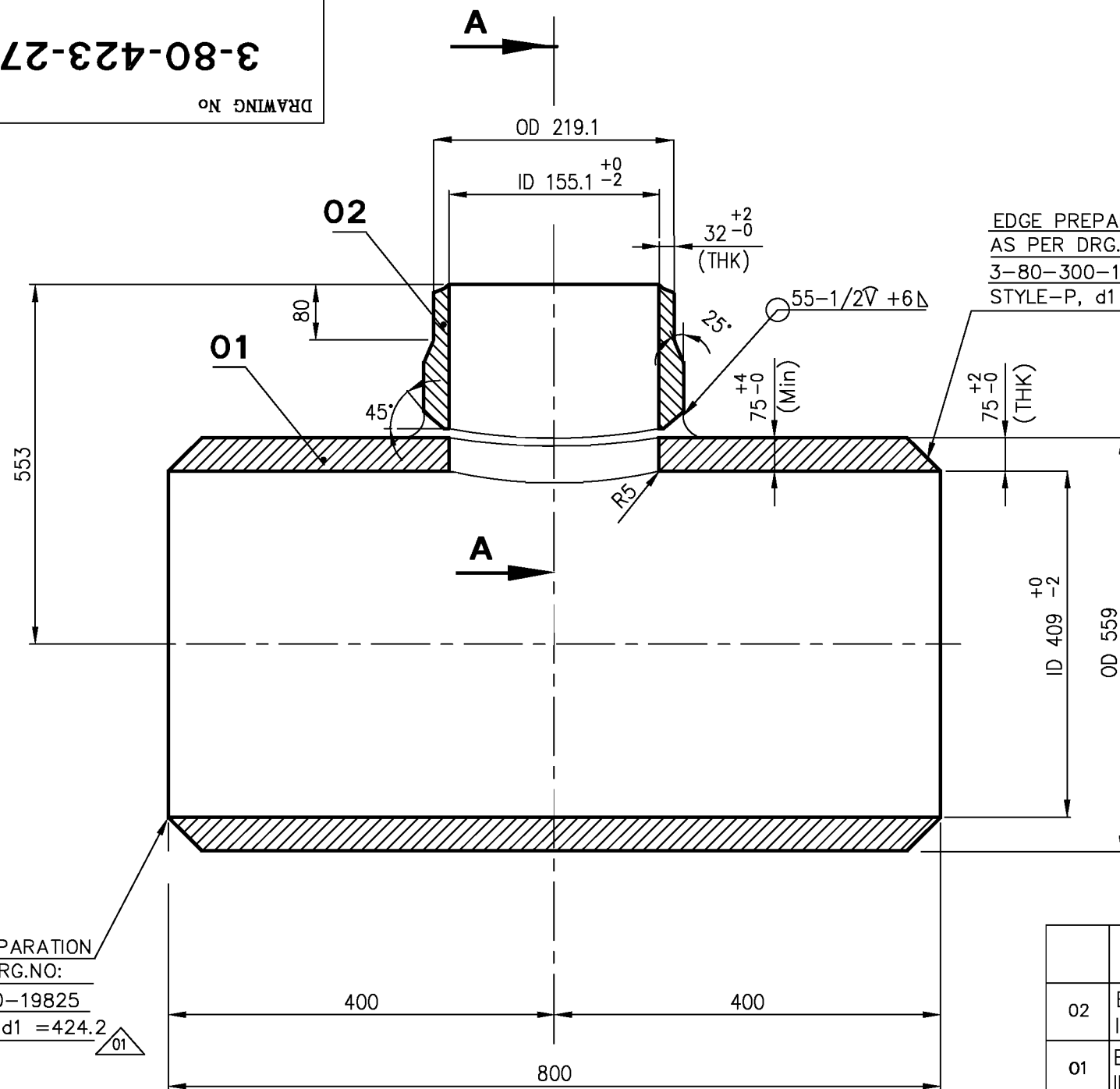
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ZONE	d1 VALUE REVISED		ZONE	LENGTH OF BRANCH NOZZLE CORRECTED.	
	REVISION MARKED AS 02			REVISION MARKED AS 01	

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	1485		
TITLE	FABRICATED UNEQUAL TEE (OD559x75/OD406.4X56) SA 105		CARD CODE	DRAWING No.	REV
			U 01	3-80-423-27274	02

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3-80-423-27275

DRAWING No



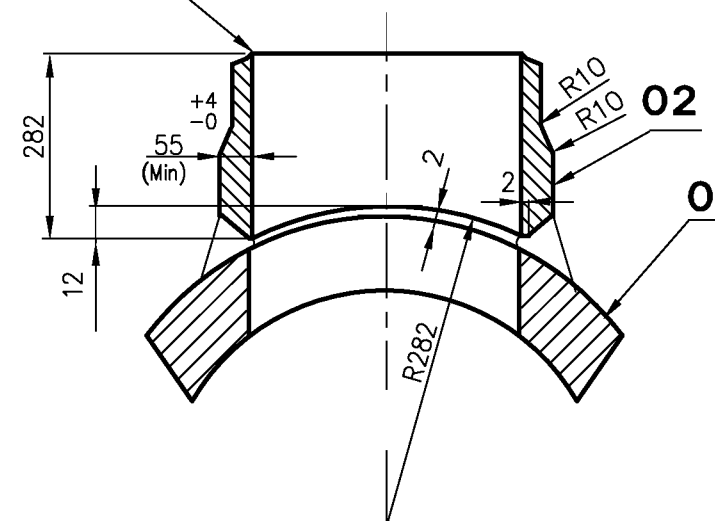
**NOTES :-**

1. DESIGN PRESSURE : 350 Kg/Sq.Cm (g)
2. DESIGN TEMPERATURE : 200° C
3. FOLLOW TDG : 108 LATEST
4. PIPE SA106GRC(A) CAN ALSO BE USED IN PLACE OF SA105(A)
5. THE STOCK CODE FOR THE FINISHED UEQ. TEE:925058730000

12.5

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1 =424.2

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1 =161.3



**SECTION-AA**

EDGE PREPARATION  
AS PER DRG.NO:  
3-80-300-19825  
STYLE-P, d1 =424.2

02	BRANCH NOZZLE L=282 ID 155.1 x Thk 55 Min	3-80-423-27275		SA 105	A	77,759 1
01	BASE PIPE L = 800 ID 409 x Thk 75 Min	3-80-423-27275		SA 105	A	1003,707 1
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	A C	UNIT WT. QTY.

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT

	BHARAT HEAVY ELECTRICALS LTD.,		DRN	NAME	SIGN	DATE	NO OF ITEMS
	PIPING CENTRE,		CHD	T.RAJASEKAR	-SD.-	10.05.10	
	CHENNAI 600 017		APPD	LALIT	-SD.-	10.05.10	
				C.SARAVANAN	-SD.-	10.05.10	

REV	DATE	ALTD: LALIT -SD.-
01	19.02.11	APPD: CS -SD.-
ZONE	d1 VALUES REVISED	
	REVISION MARKED AS 01	

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	1082		
TITLE	FABRICATED UNEQUAL TEE (OD559x75/OD219.1x32) SA 105		CARD CODE	DRAWING No.	REV
			U 01	3-80-423-27275	01



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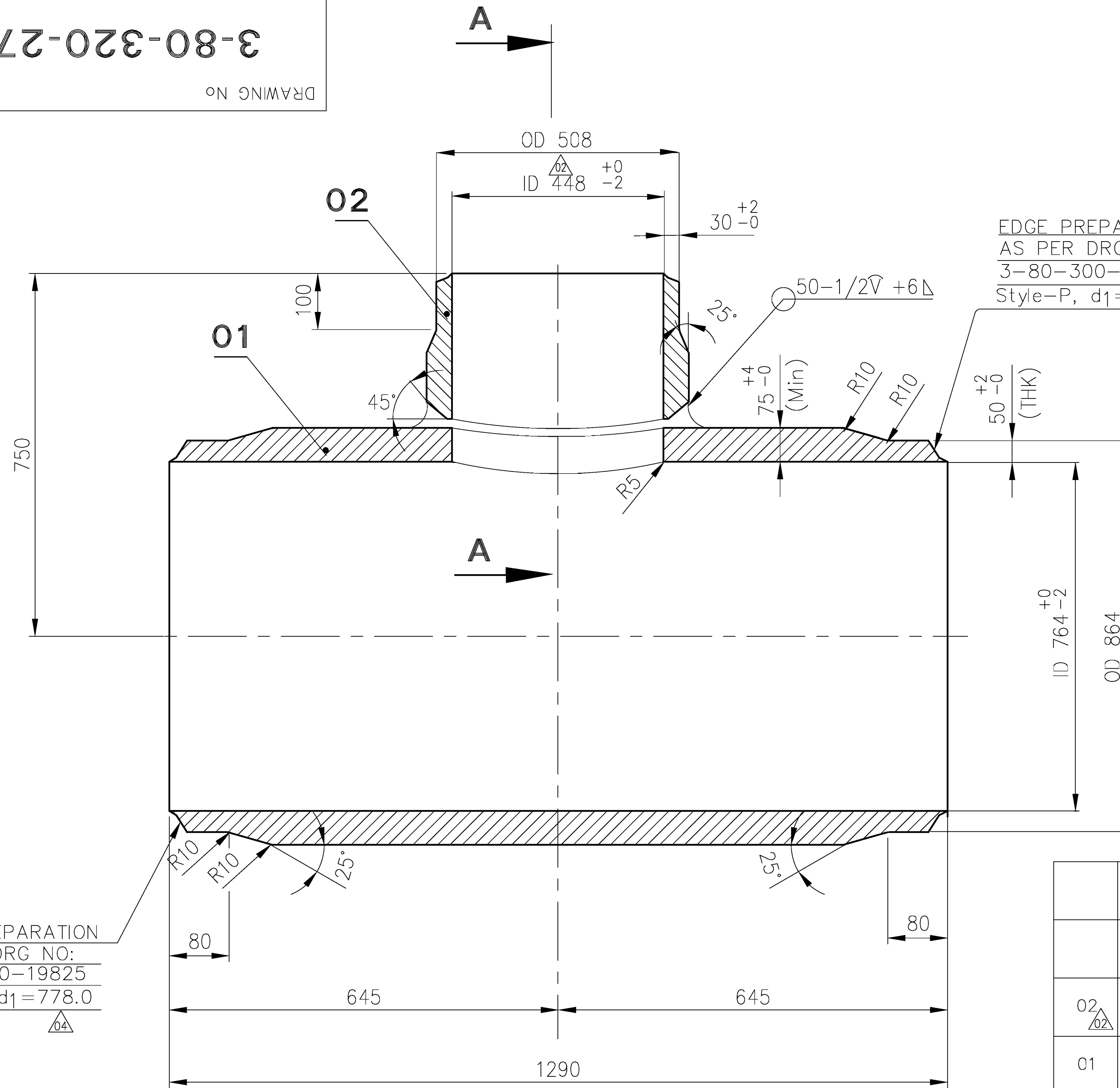
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3-80-320-27188

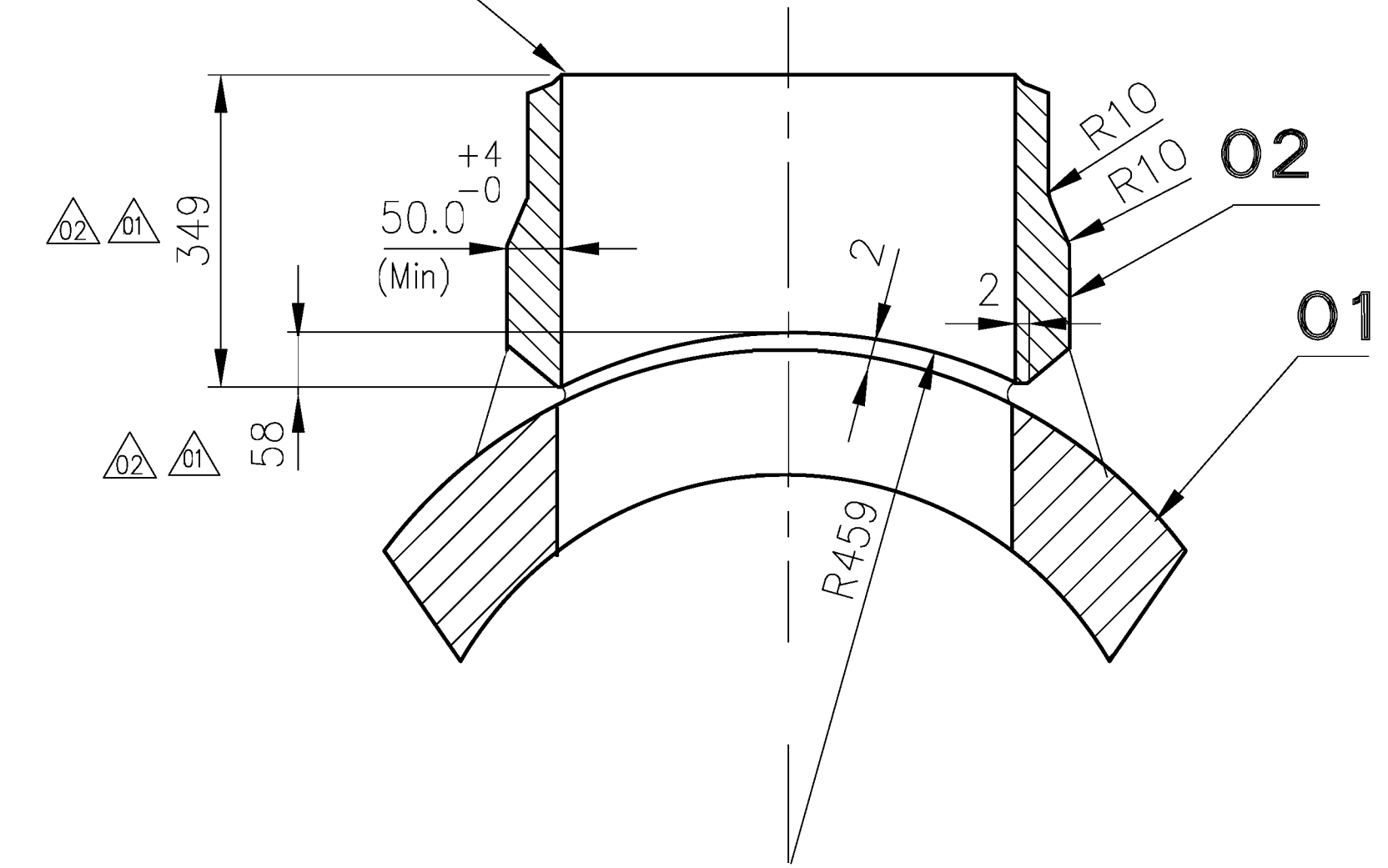
DRAWING No



EDGE PREPARATION  
AS PER DRG NO:  
3-80-300-19825  
Style-P, d1=778.0

EDGE PREPARATION  
AS PER DRG NO:  
3-80-300-19825  
Style-P, d1=778.0

EDGE PREPARATION  
AS PER DRG NO:  
3-80-300-19825  
Style-P, d1=453.2



SECTION-AA

REV 05	DATE 23.08.13	ALTD : M.MANO	REV 04	DATE 03.05.13	ALTD M.MANO -SD.-
		APPD : R.SESHAGIRI			APPD : C.SARAVANAN-SD.-
ZONE	DI DIA ALT FOR OD508 FROM 460 TO 453.2 MM		ZONE	MAIN PIPE EP D1 VALUE ALTERED FROM 808.6 TO 778.0MM	
	REVISION MARKED AS $\Delta_{05}$			REVISION MARKED AS $\Delta_{04}$	
REV 03	DATE 27.08.2012	ALTD :K.BOOPALAN -SD.-	REV 02	DATE 04.03.11	ALTD :LALIT -SD.-
		APPD :S.PANDA -SD.-			APPD :C.SARAVANAN-SD.-
ZONE	DESIGN PRESSURE ALTERED REVISION INDICATED AS $\Delta_{03}$		ZONE	REVISION MARKED AS $\Delta_{02}$	
				REVISION MARKED AS $\Delta_{01}$	

02	BRANCH NOZZLE L=350 ID 448 x Thk 50 Min	3-80-320-27188	SA 182 F 22 CL3	A	217,404
01	BASE PIPE L = 1290 ID 764 x Thk 75 Min	3-80-320-27188	SA 182 F 22 CL3	A	2016,349
ITEM NO.	DESCRIPTION	DRAWING NO.	MATERIAL CODE	A/C	UNIT WT.
			MATERIAL SPEC.		QTY.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT					
		BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, CHENNAI 600 017		DRN	NAME
				CHD	LALIT
				APPD	C.SARAVANAN
				SIGN	-SD.-
				DATE	07.02.10
				NO OF ITEMS	
DEPT.	GRADE OF UN TOL. DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	
CODE	C/M/F	N.T.S.	2234		
TITLE	FABRICATED UNEQUAL TEE		CARD CODE	DRAWING No.	REV
	(OD864.0x50/OD508.0x30) SA182F22CL3		U 01	3-80-320-27188	05

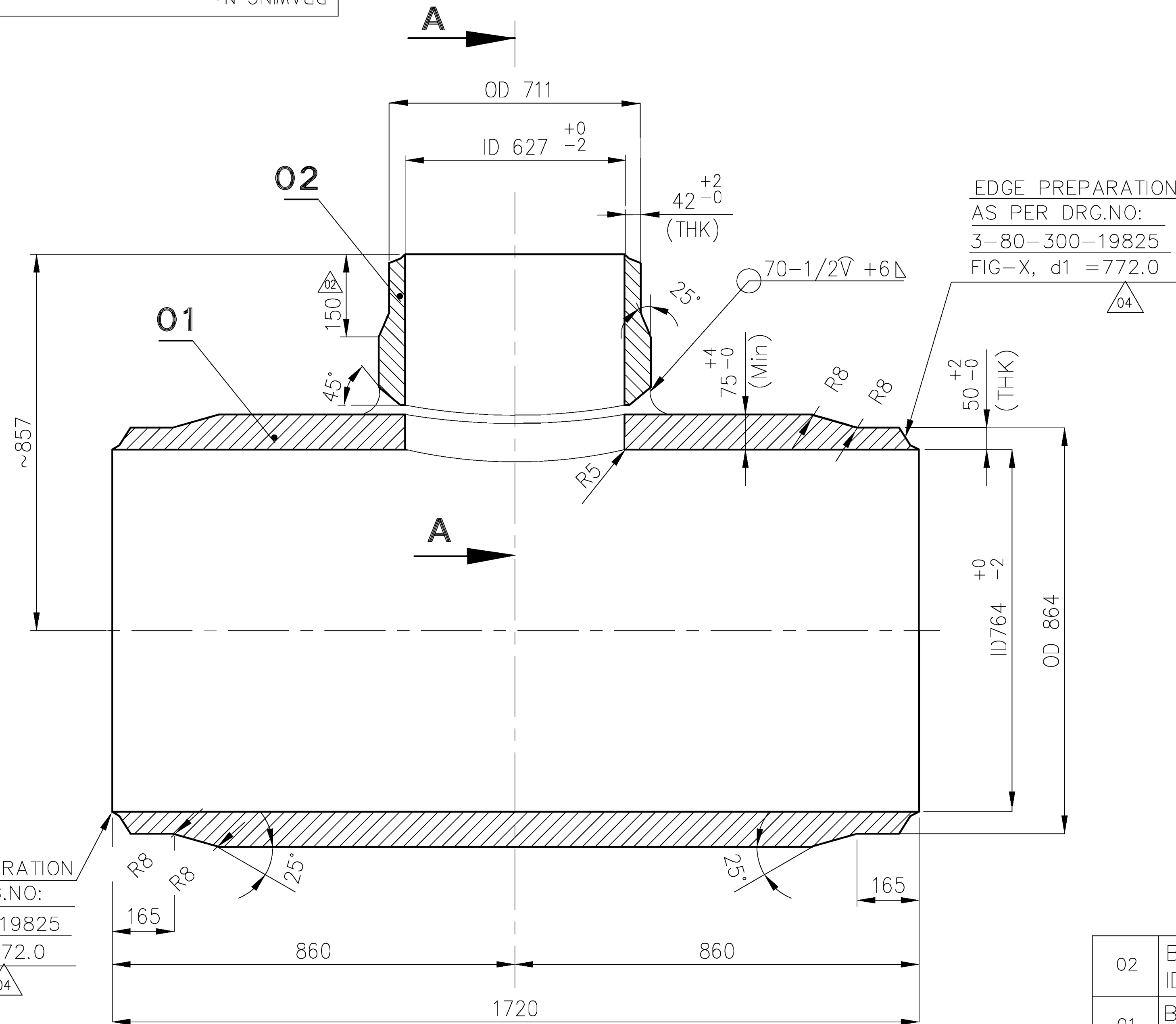
NOTES :-

- DESIGN PRESSURE : 74.6 Kg/Sq.Cm (g) 12.5
- DESIGN TEMPERATURE : 510° C
- FOLLOW TDG : 108 LATEST
- PIPE SA335P22(A) CAN ALSO BE USED IN PLACE OF SA182F22CL2(A).
- THE STOCK CODE FOR THE FINISHED UNEQ. TEE:925058760000

3-80-310-27187

DRAWING No

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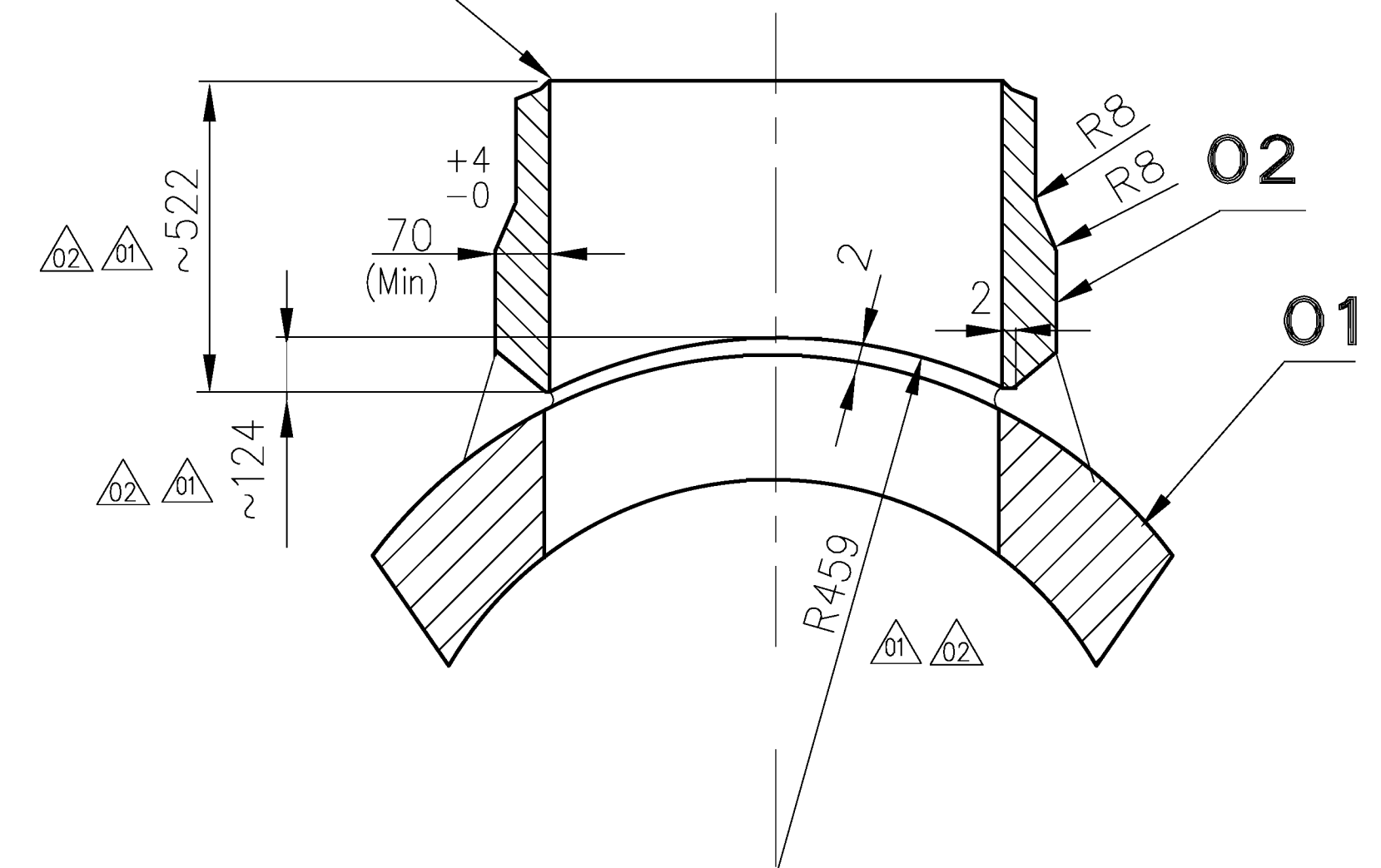


**NOTES :-**

1. DESIGN PRESSURE : 70 Kg/Sq.Cm (g)
2. DESIGN TEMPERATURE : 601° C
3. FOLLOW TDG : 108 LATEST
4. ELECTRODES TO BE USED ARE,  
a) GTAW : ER90S-B9 (A)  
b) SMAW : E9015-B9 (A)  
ELECTRODES GIVEN ABOVE ARE INDICATIVE. VENDOR TO GIVE WPS FOR BHEL's APPROVAL.
5. PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).
6. THE STOCK CODE FOR THE FINISHED UEQ. TEE:925058770000

12.5

EDGE PREPARATION AS PER DRG.NO: 3-80-300-19825 FIG-X, d1=630.4



**SECTION-AA**

EDGE PREPARATION AS PER DRG.NO: 3-80-300-19825 FIG-X, d1=772.0

02	BRANCH NOZZLE L=524 ID 627 x Thk 70 Min	3-80-310-27187		SA 182 F91	A	601,312 1
01	BASE PIPE L = 1720 ID 764 x Thk 75 Min	3-80-310-27187		SA 182 F91	A	2667,786 1
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	A C	UNIT WT. QTY.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

REV 04	DATE 21.08.2013	ALTD : M.MANO APPD : R.SESHAGIRI	REV 03	DATE 21.08.2012	ALTD : K.BOOPALAN -SD.- APPD : S.PANDA -SD.-
MAIN PIPE DI ALT FROM 764.1 TO 772.0 REVISION INDICATED AS 04			DESIGN PRESSURE ALTERED REVISION INDICATED AS 03		
REV 02	DATE 04.03.11	ALTD : LALIT -SD.- APPD : C.SARAVANAN-SD.-	REV 01	DATE 21.02.11	ALTD : LALIT -SD.- APPD : C.SARAVANAN-SD.-
ZONE REVISION MARKED AS 02			ZONE REVISION MARKED AS 01		

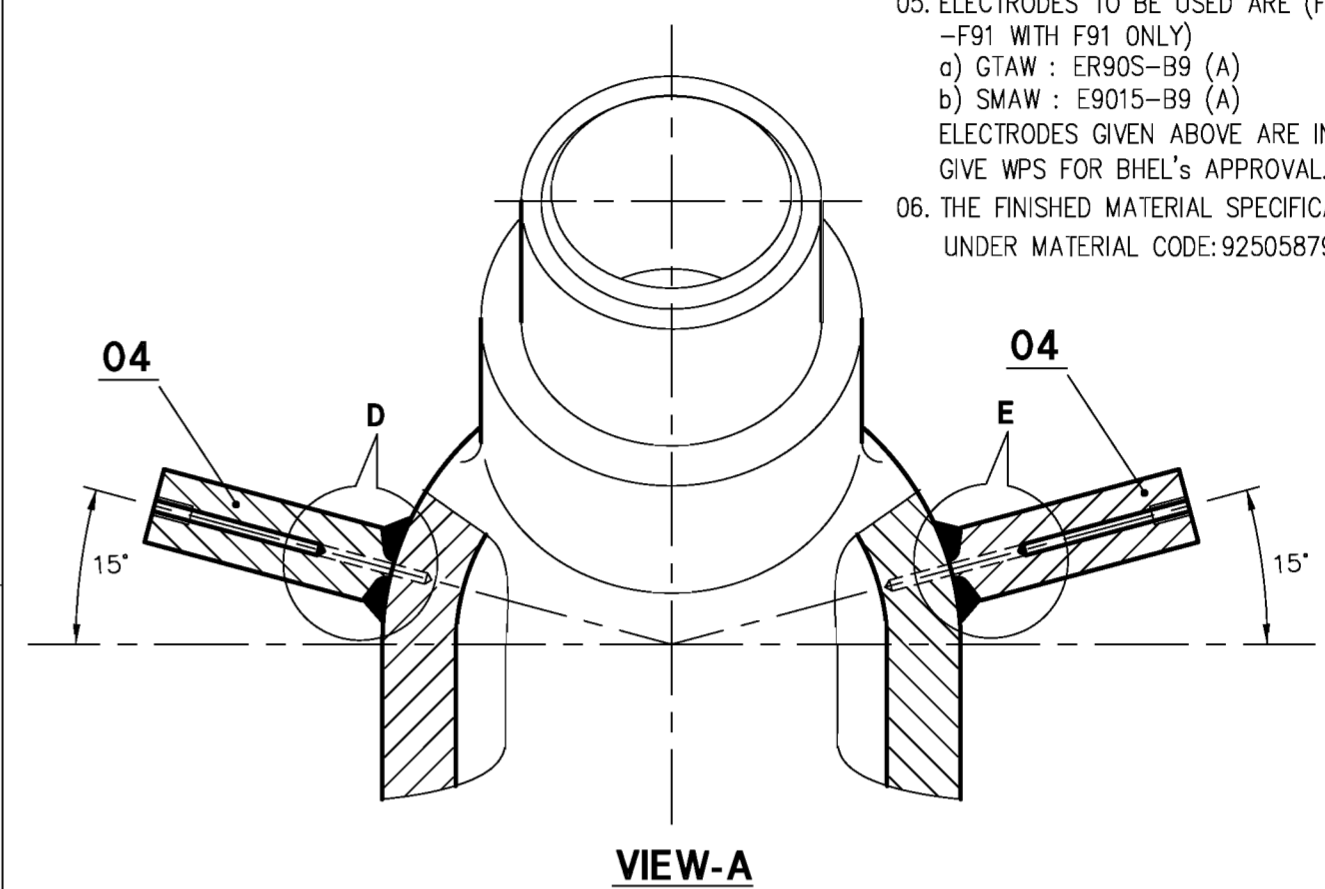
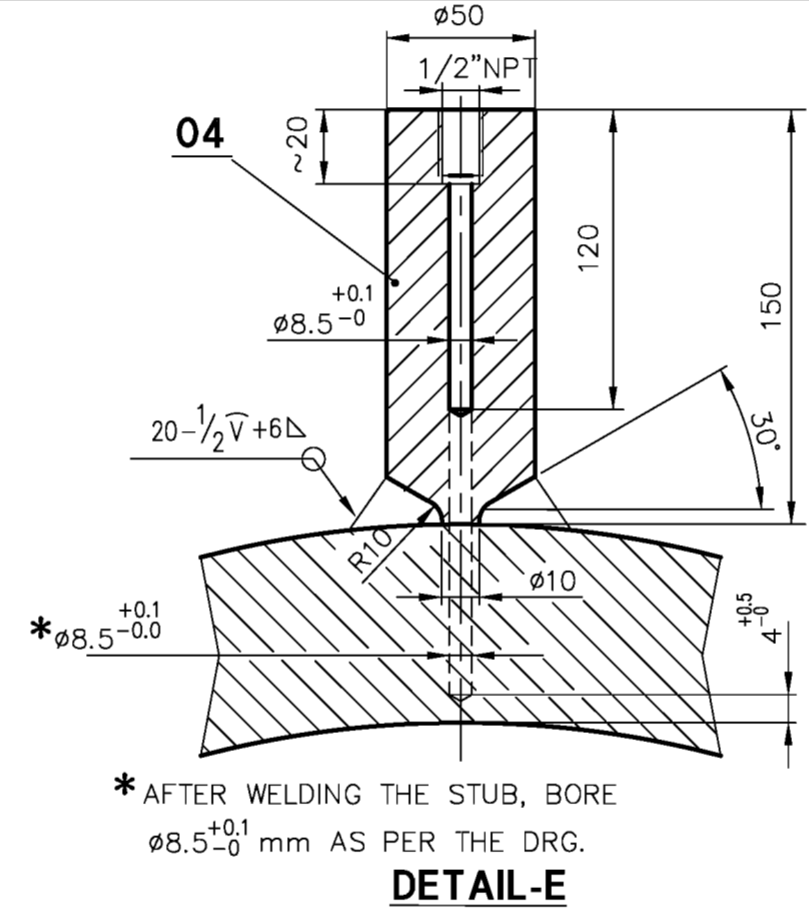
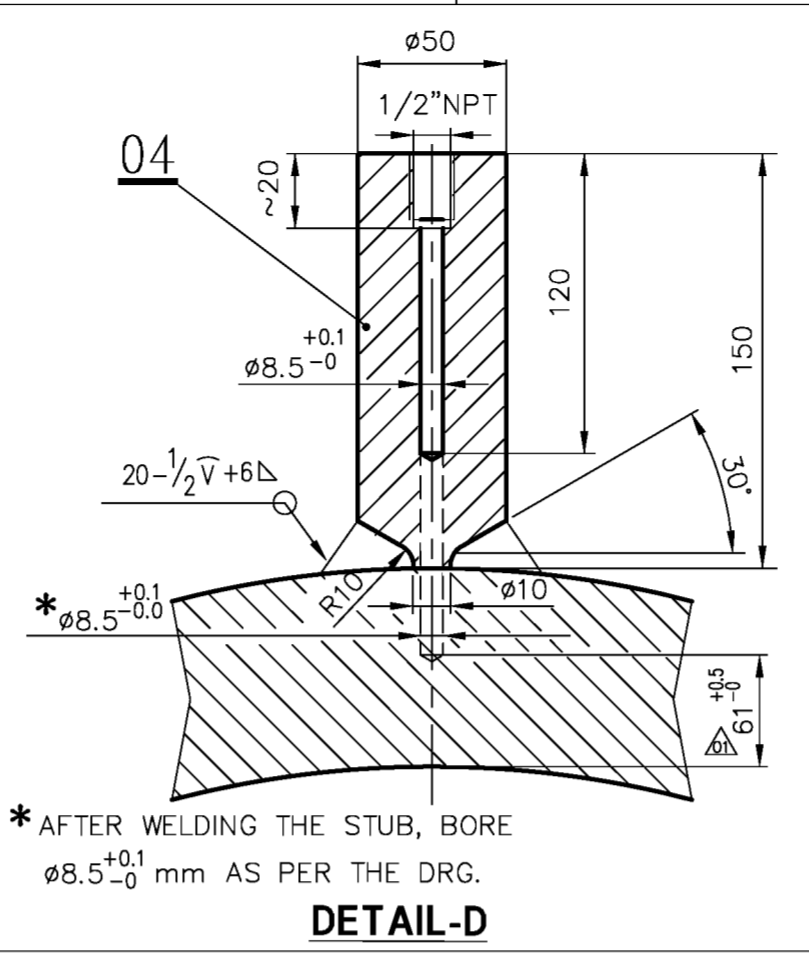
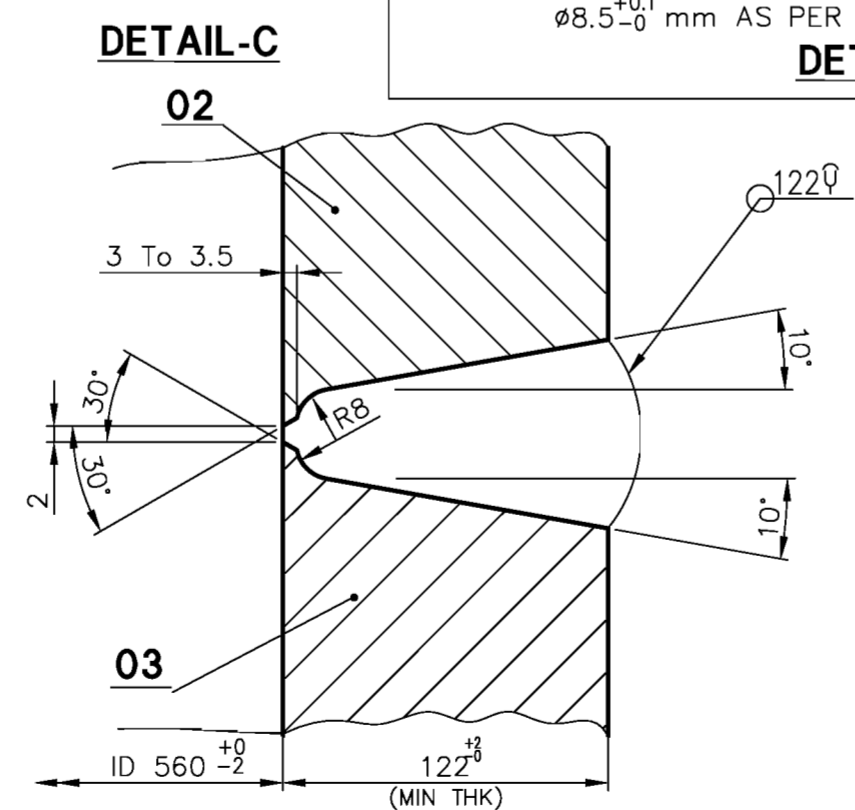
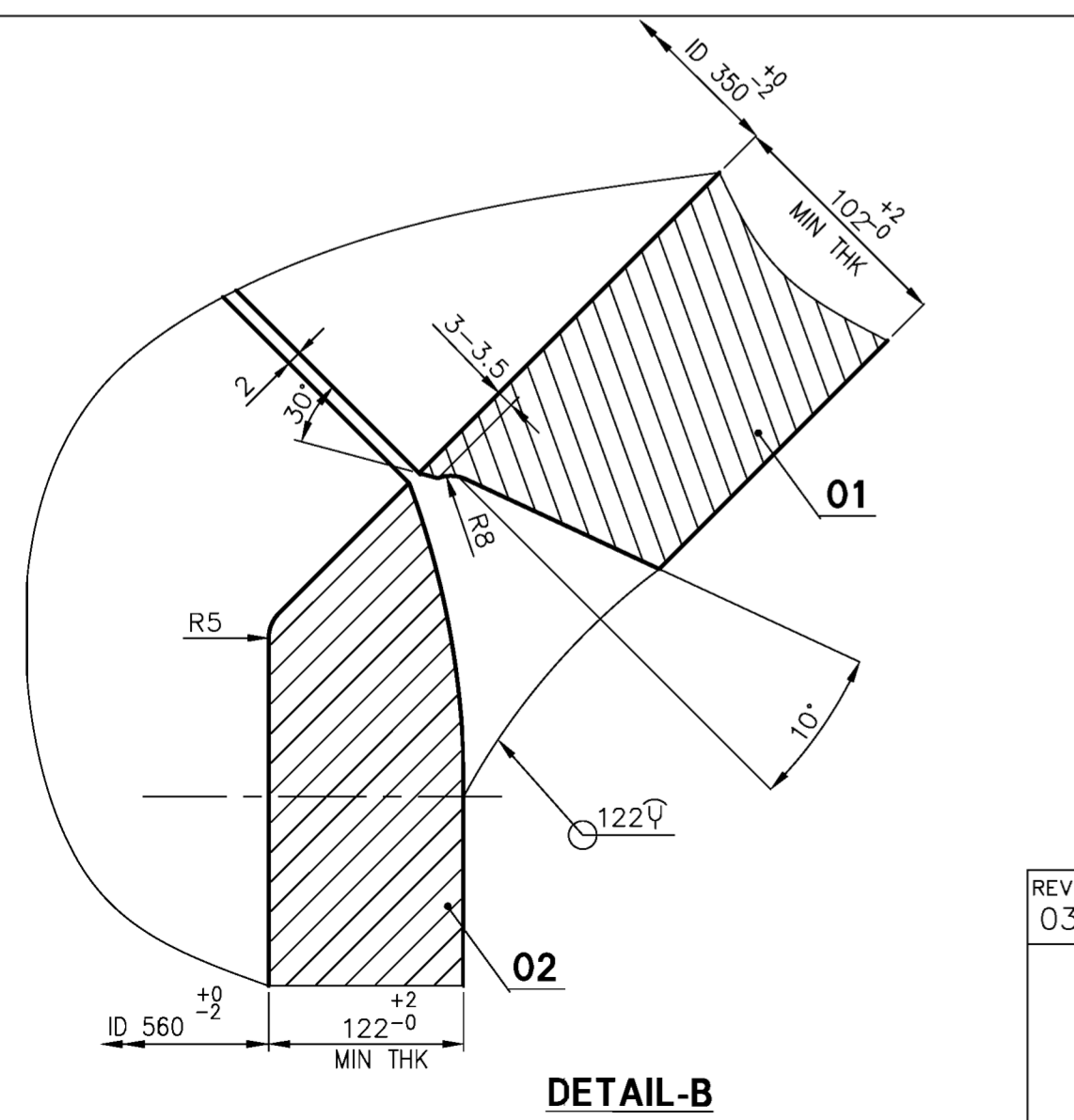
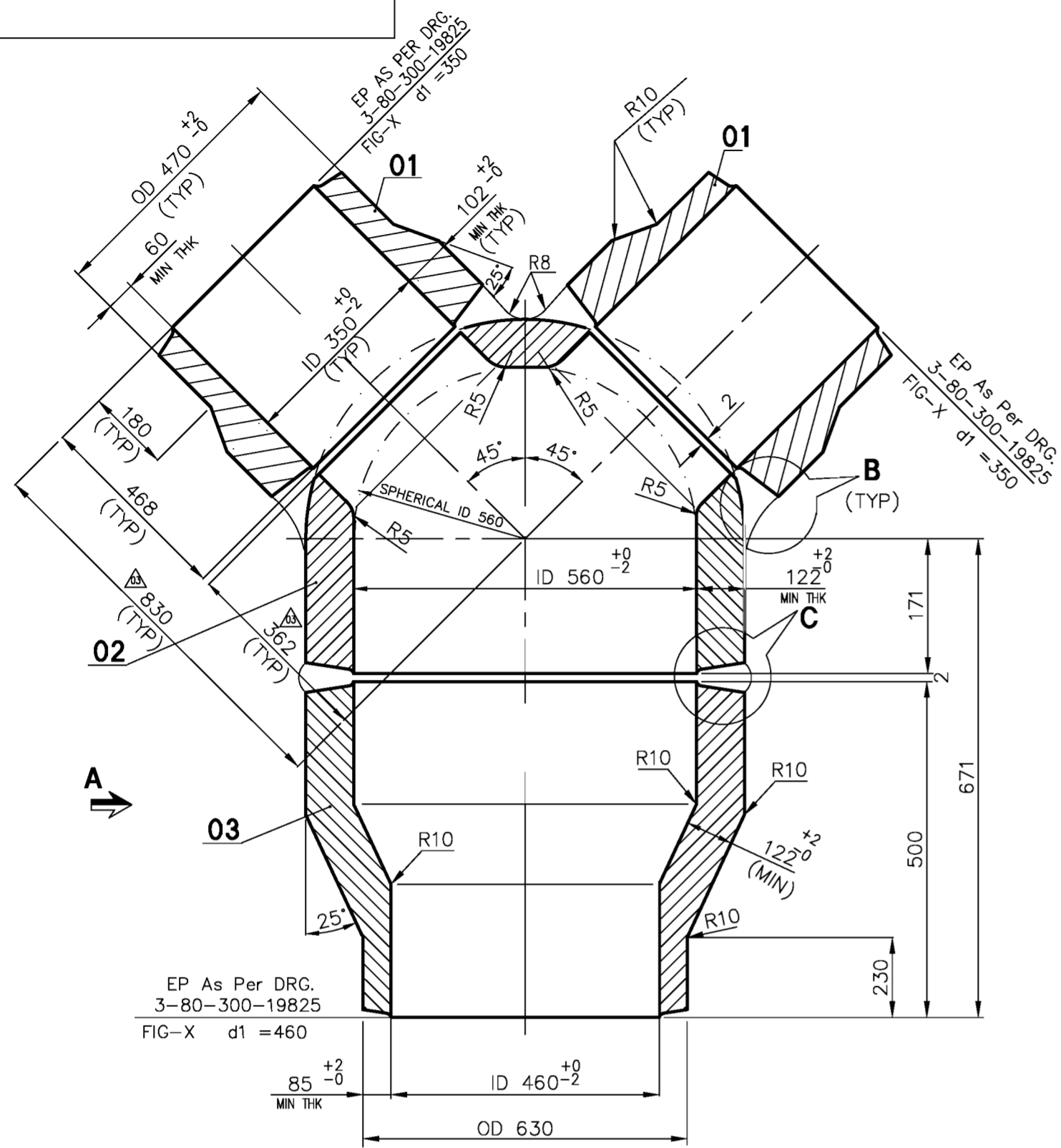


BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

DRN	NAME LALIT	SIGN -SD.-	DATE 07.02.10	NO OF ITEMS
CHD	LALIT	-SD.-	07.02.10	
APPD	C.SARAVANAN	-SD.-	07.02.10	

DEPT.	GRADE OF UN TOL. DIM C/M/F	SCALE N.T.S.	WEIGHT (Kg) 3270	BHEL PO REF.NO.	ITEM No.
TITLE <b>FABRICATED UNEQUAL TEE</b> (OD864x50/OD711x42) SA182F91			CARD CODE U 01	DRAWING No. <b>3-80-310-27187</b>	REV <b>04</b>

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- NOTES :-**
- 01. DESIGN PRESSURE : 272 Kg/Cm<sup>2</sup> (g)
  - 02. DESIGN TEMPERATURE : 568° C
  - 03. FOLLOW TDG:108. LATEST
  - 04. PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).
  - 05. ELECTRODES TO BE USED ARE (FOR WELDING OF -F91 WITH F91 ONLY)
    - a) GTAW : ER90S-B9 (A)
    - b) SMAW : E9015-B9 (A)
 ELECTRODES GIVEN ABOVE ARE INDICATIVE. VENDOR TO GIVE WPS FOR BHEL'S APPROVAL.
  - 06. THE FINISHED MATERIAL SPECIFICATION WILL BE SA182F91(A) UNDER MATERIAL CODE:925058790000

VAR NO	ITEM NO	DESCRIPTION	DRAWING NO	MATERIAL CODE	UNIT WEIGHT
				MATERIAL SPECN	QUANTITY
	04	TEMP. STUB. Ø50 L=150	2-80-301-10066	SA 182 F91	4 000
	03	OUTLET FORGING ID560 x THK122 MIN / ID460 x 85 MIN THK	2-80-301-10066	SA 182 F91	845 000
	02	BODY FORGING ID 560 x THK 122 MIN	2-80-301-10066	SA 182 F91	555 000
	01	INLET FORGING ID 350 x THK 102 MIN	2-80-301-10066	SA 182 F91	312 000

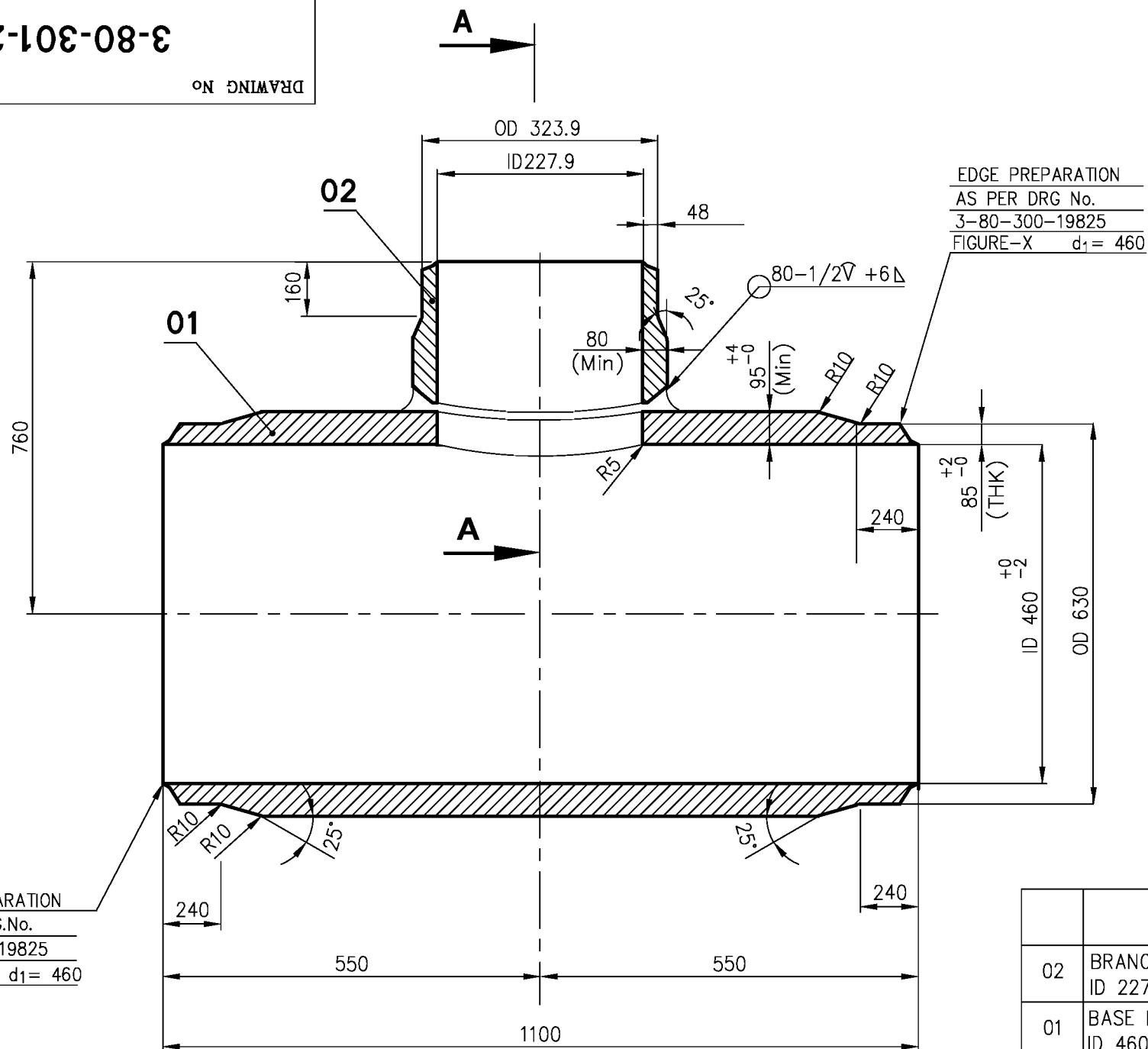
REV	DATE	ALTD	BY	REVISION
04	14.08.2012	ALTD	K.BOOPALAN	-SD.-
		APPD	S.PANDA	-SD.-
03	04.03.11	ALTD	LALIT	-SD.-
		APPD	C.SARAVANAN	-SD.-
02	17.10.10	ALTD	LALIT	-SD.-
		APPD	C.SARAVANAN	-SD.-
01	17.09.10	ALTD	LALIT	-SD.-
		APPD	C.SARAVANAN	-SD.-

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		BPHL		BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, CHENNAI 600 017	
DRN	NAME	SIGN.	DATE	NO OF ITEMS	
CHD	C.SARAVANAN	-SD.-	04-05-10		
APPD	C.SARAVANAN	-SD.-	04-05-10		
DEPT.	GRADE OF UN TOL. DIM	SCALE	WEIGHT (Kg)	BHEL PO REF. NO.	ITEM No.
	C/M/F	N.T.S.	1632.000		
TITLE			CARD CODE	MSE DRAWING NO.	REV
Y-PIECE (ID460x85/ID350x60) SA182F91			U 01	2-80-301-10066	04

3-80-301-27186

DRAWING No

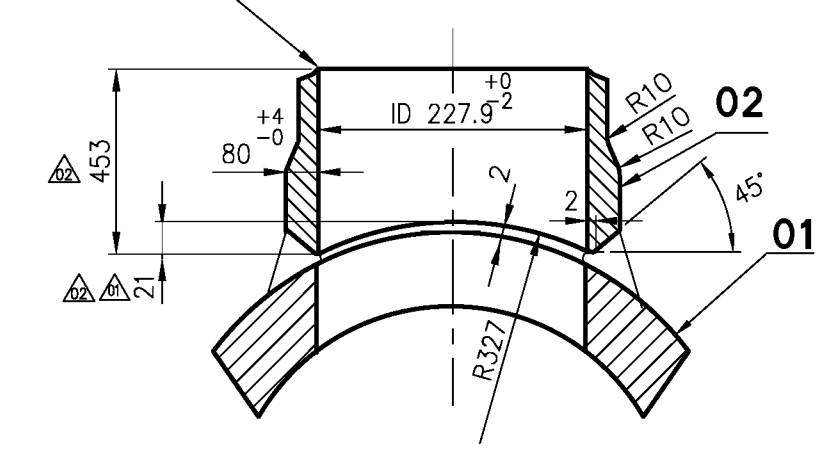
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EDGE PREPARATION  
AS PER DRG.No.  
3-80-300-19825  
FIGURE-X d<sub>1</sub>= 460

EDGE PREPARATION  
AS PER DRG No.  
3-80-300-19825  
FIGURE-X d<sub>1</sub>= 460

EDGE PREPARATION  
AS PER DRG No.  
3-80-300-19825  
FIGURE-X d<sub>1</sub>= 231.3



SECTION-AA

NOTES :-

1. DESIGN PRESSURE : 272 Kg/Sq.Cm (g)
2. DESIGN TEMPERATURE : 573° C
3. FOLLOW TDG : 108 LATEST
4. ELECTRODES TO BE USED ARE,  
a) GTAW : ER90S-B9 (A)  
b) SMAW : E9015-B9 (A)  
ELECTRODES GIVEN ABOVE ARE INDICATIVE. VENDOR TO GIVE WPS FOR BHEL's APPROVAL.
5. PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).
6. THE STOCK CODE FOR FINISHED UEQ. TEE: 925058800000.

12.5

02	BRANCH NOZZLE L=459 ID 227.9 x Thk 80 Min	3-80-301-27186		SA 182 F91	A	278,684
01	BASE PIPE L = 1100 ID 460 x Thk 95 Min	3-80-301-27186		SA 182 F91	A	1429,580
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	A C	UNIT WT. QTY.

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT

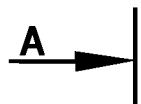
	BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, CHENNAI 600 017				NAME	SIGN	DATE	NO OF ITEMS
	DRN	LALIT	-SD-	07.05.10				
	CHD	C.SARAVANAN	-SD-	07.05.10				
APPD	C.SARAVANAN	-SD-	07.05.10					

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg)	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	1709.000		
TITLE			CARD CODE	DRAWING No.	REV
FABRICATED UNEQUAL TEE (ID460x85/OD323.9x48) (SA182F91)			U 01	3-80-301-27186	03

REV 03	DATE 14.08.2012	ALTD : K.BOOPALAN -SD- APPD : S.PANDA -SD-	REV 02	DATE 04.03.11	ALTD : LALIT -SD- APPD : C.SARAVANAN-SD-	REV 01	DATE 21.02.11	ALTD : LALIT -SD- APPD : C.SARAVANAN-SD-
ZONE	DESIGN PRESSURE ALTERED REVISION INDICATED AS $\Delta_{03}$		ZONE	DIMENSION REVISED IN SECTION-AA REVISION INDICATED AS $\Delta_{02}$		ZONE	REVISION MARKED AS $\Delta_{01}$	

3-80-301-27185

DRAWING No



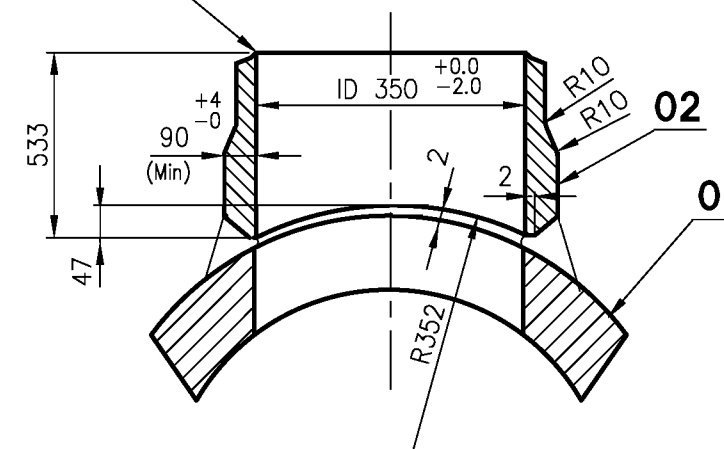
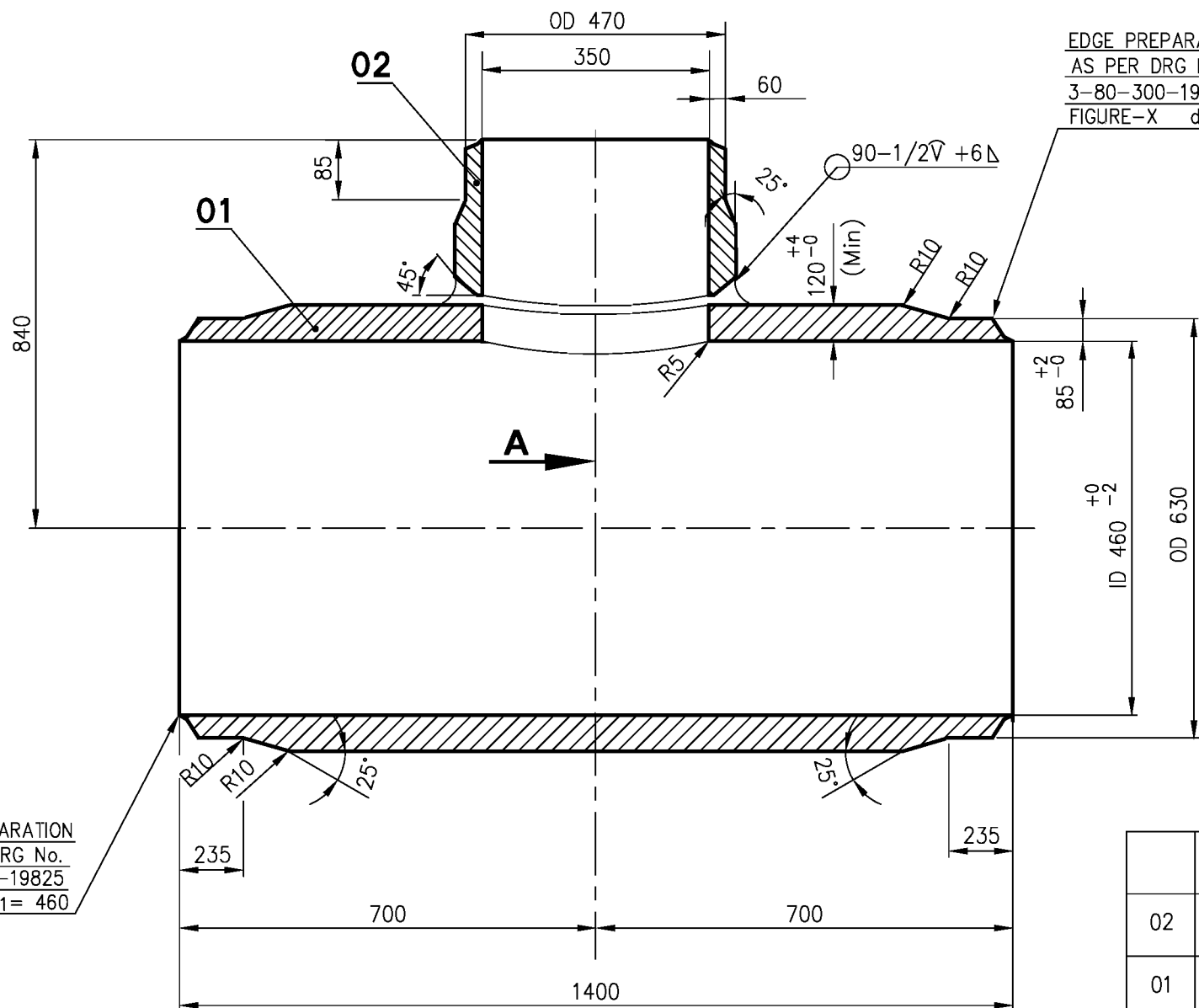
**NOTES :-**

1. DESIGN PRESSURE : 272 Kg/Sq.Cm (g)
2. DESIGN TEMPERATURE : 573° C
3. FOLLOW TDG : 108 LATEST
4. ELECTRODES TO BE USED ARE,  
a) GTAW : ER90S-B9 (A)  
b) SMAW : E9015-B9 (A)  
ELECTRODES GIVEN ABOVE ARE INDICATIVE. VENDOR TO GIVE WPS FOR BHEL'S APPROVAL.
5. PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).
6. THE STOCK CODE FOR FINISHED UEQ. TEE: 92508810000

12.5

EDGE PREPARATION  
AS PER DRG No.  
3-80-300-19825  
FIGURE-X d<sub>1</sub> = 460

EDGE PREPARATION  
AS PER DRG No.  
3-80-300-19825  
FIGURE-X d<sub>1</sub> = 350



**SECTION-AA**

EDGE PREPARATION  
AS PER DRG No.  
3-80-300-19825  
FIGURE-X d<sub>1</sub> = 460

02	BRANCH NOZZLE L=531 ID 350 x Thk 90 Min	3-80-301-27185		SA 182 F91	A	518,310 1
01	BASE PIPE L = 1400 ID 460 x Thk 120 Min	3-80-301-27185		SA 182 F91	A	2401,800 1
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	A C	UNIT WT. QTY.

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

	NAME	SIGN	DATE	NO OF ITEMS
DRN	LALIT		07.05.10	
CHD	C.SARAVANAN		07.05.10	
APPD	C.SARAVANAN		07.05.10	

REV 02	DATE	ALTD APPD	REV 01	DATE 14.08.2012	ALTD K.BOOPALAN -SD.- APPD S.PANDA -SD.-
ZONE			ZONE		DESIGN PRESSURE ALTERED REVISION INDICATED AS $\triangle_{01}$

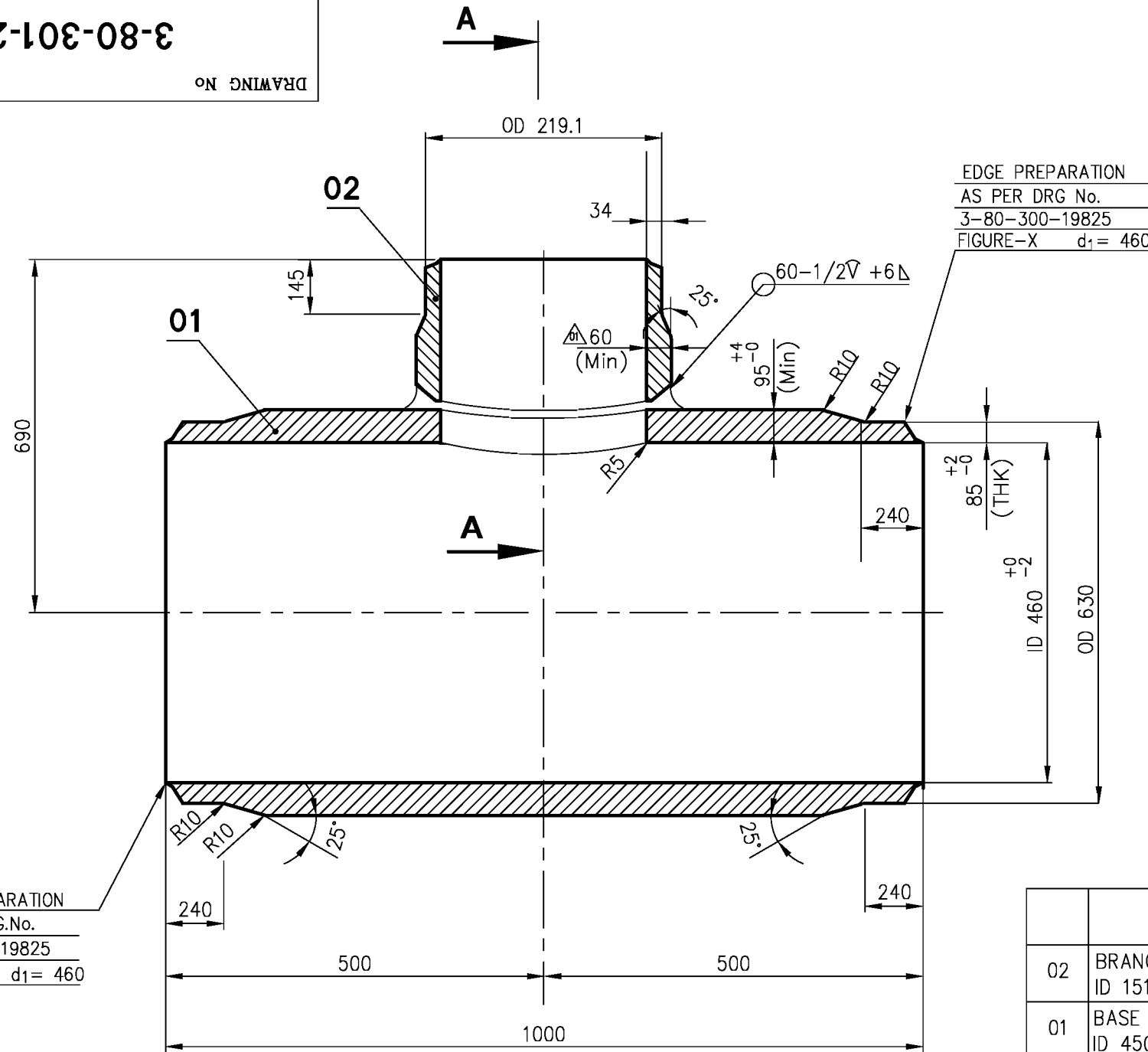
DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg)	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	2921.000		
TITLE <b>FABRICATED UNEQUAL TEE (ID460x85/ID350x60) (SA182F91)</b>			CARD CODE	DRAWING No.	REV
			U 01	<b>3-80-301-27185</b>	<b>01</b>

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3-80-301-27192

DRAWING No

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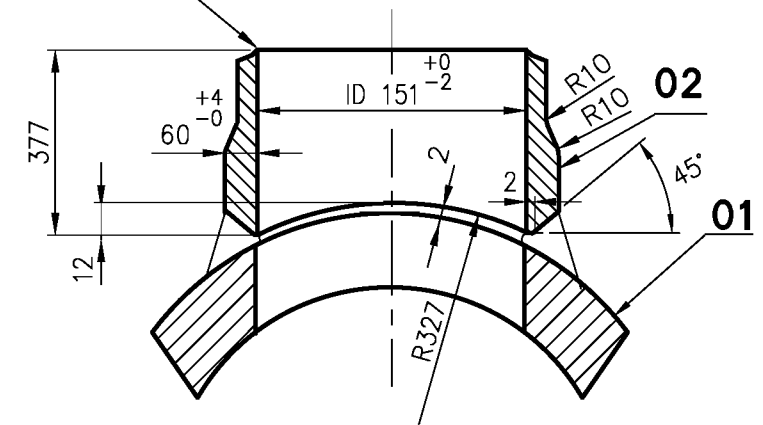


**NOTES :-**

1. DESIGN PRESSURE : 272 Kg/Sq.Cm (g)
2. DESIGN TEMPERATURE : 573° C
3. FOLLOW TDG : 108 LATEST
4. ELECTRODES TO BE USED ARE,
  - a) GTAW : ER90S-B9 (A)
  - b) SMAW : E9015-B9 (A)
 ELECTRODES GIVEN ABOVE ARE INDICATIVE. VENDOR TO GIVE WPS FOR BHEL's APPROVAL.
5. PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).
6. THE STOCK CODE FOR FINISHED UEQ. TEE: 925058820000

12.5

EDGE PREPARATION AS PER DRG.No. 3-80-300-19825 FIGURE-X d<sub>1</sub> = 156.4



**SECTION-AA**

EDGE PREPARATION AS PER DRG.No. 3-80-300-19825 FIGURE-X d<sub>1</sub> = 460

02	BRANCH NOZZLE L=377 ID 151 x Thk 60 Min	3-80-301-27192		SA 182 F91	A	117,700 1
01	BASE PIPE L = 1000 ID 450 x Thk 95 Min	3-80-301-27192		SA 182 F91	A	1299,610 1
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	A C	UNIT WT. QTY.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

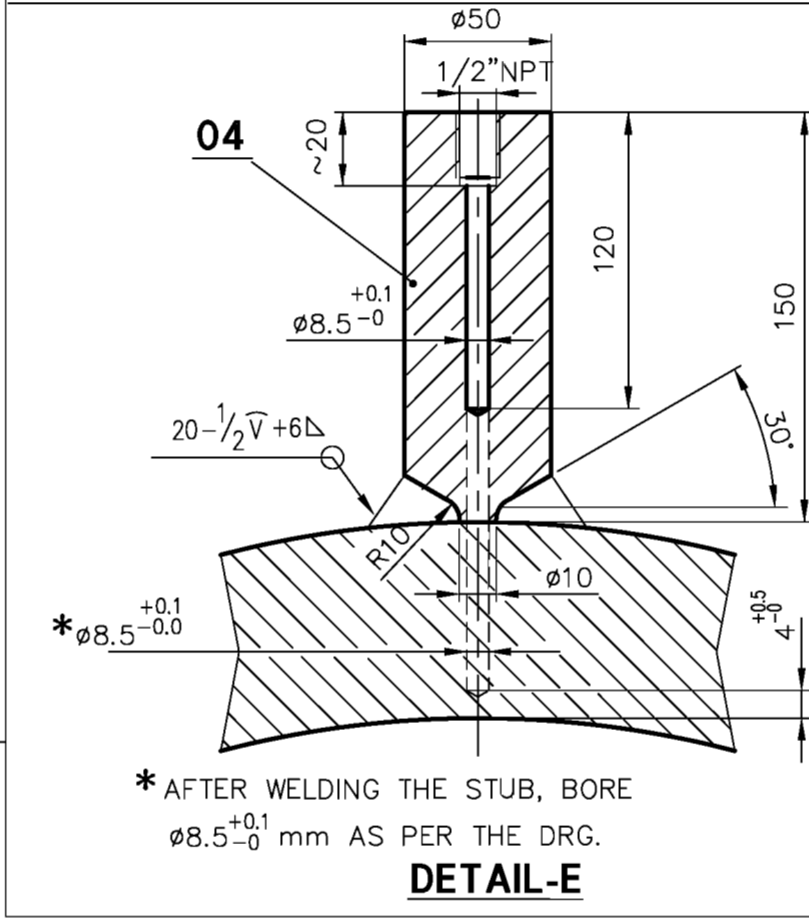
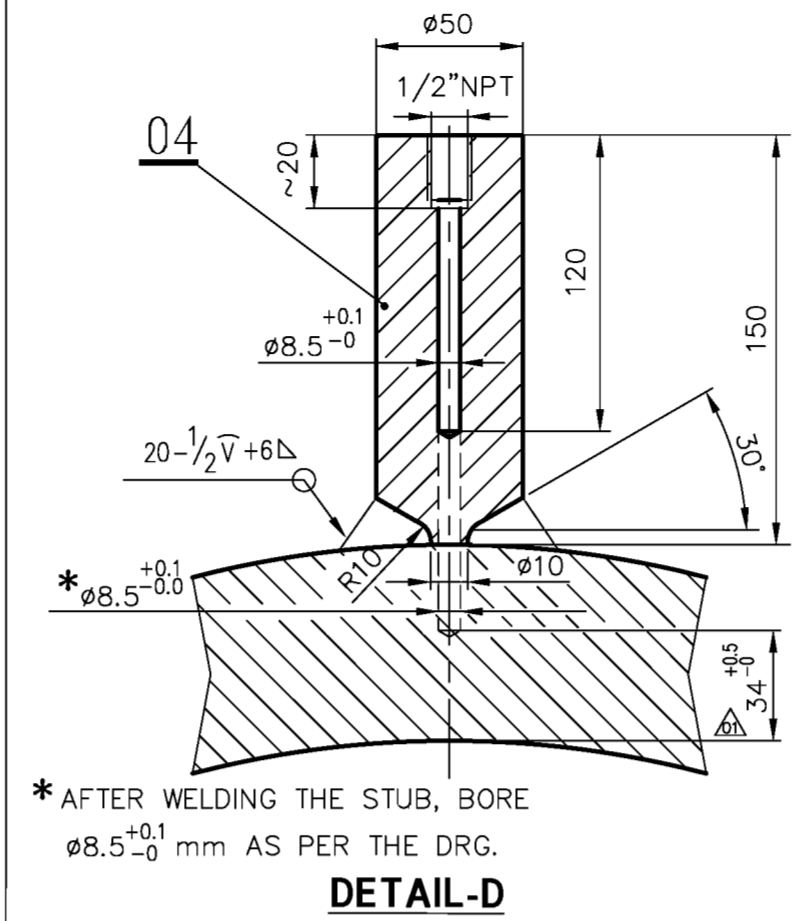
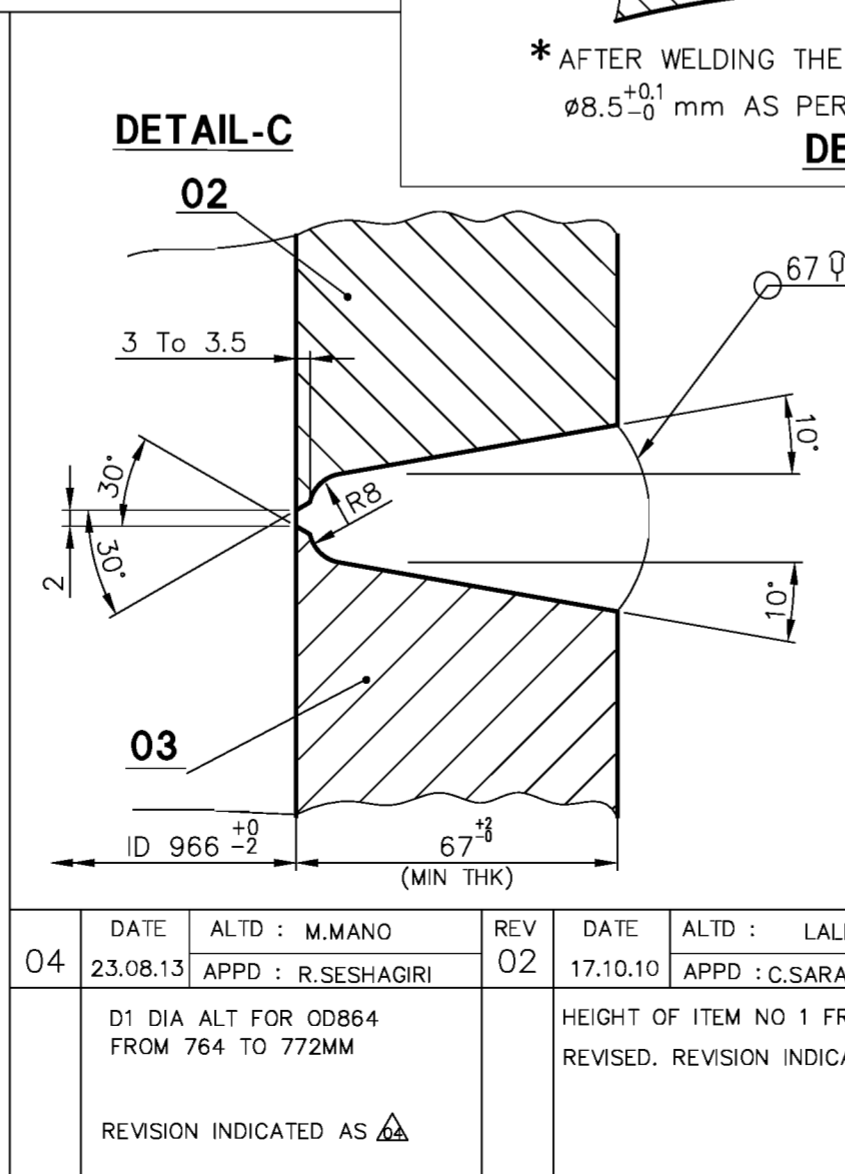
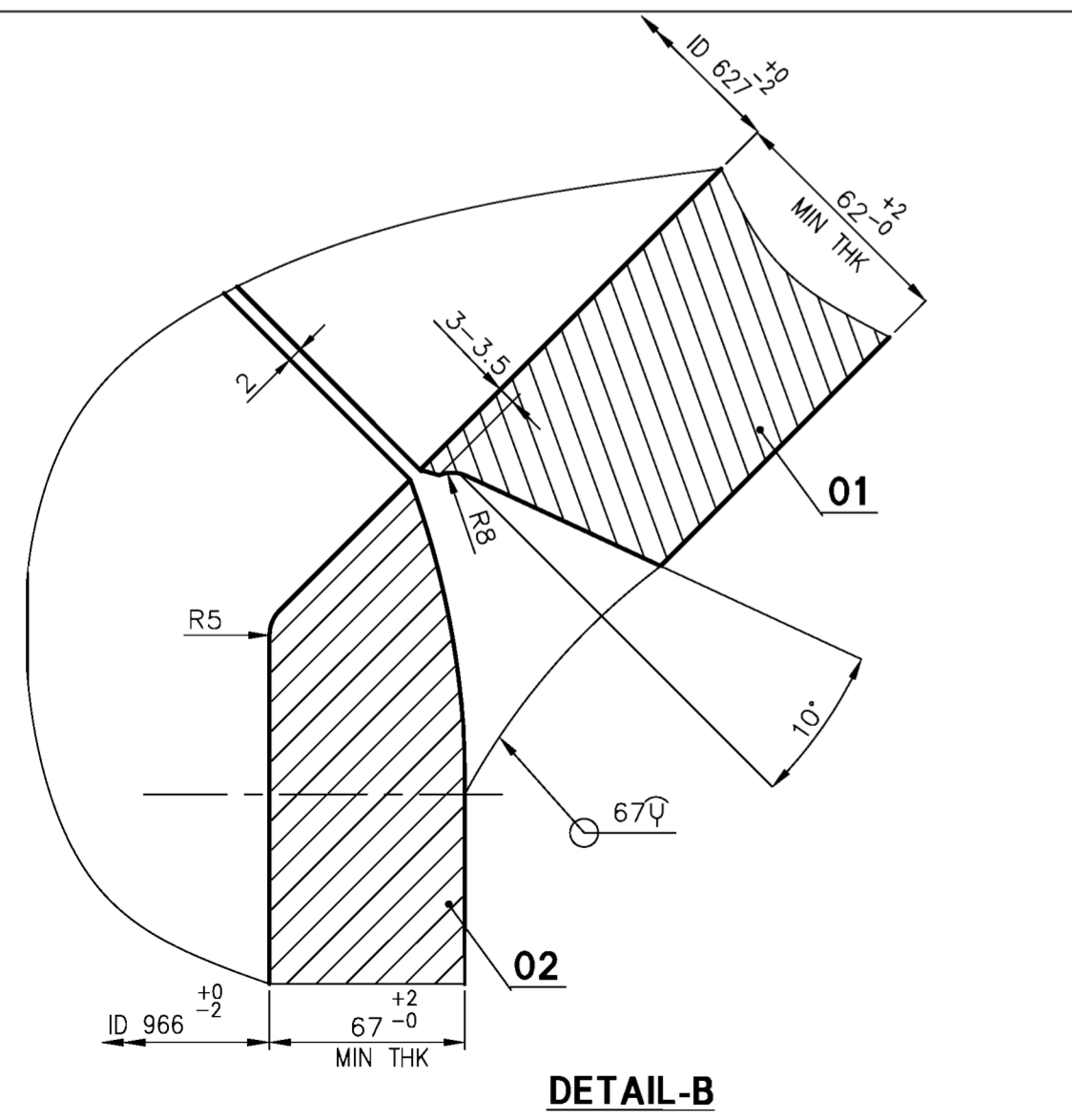
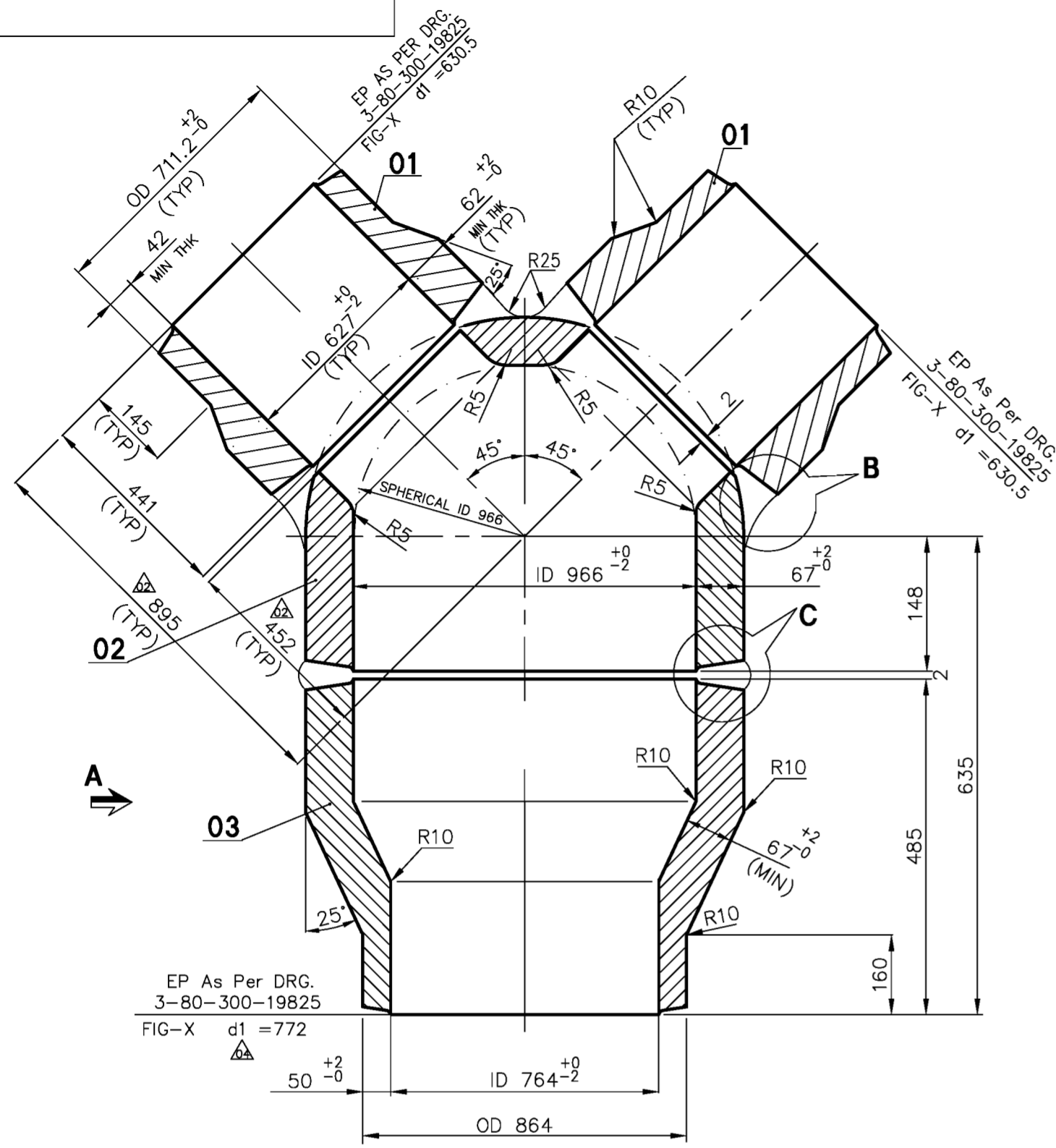
NAME	SIGN.	DATE	NO OF ITEMS
DRN LALIT	-SD-	07.05.10	
CHD C.SARAVANAN	-SD-	07.05.10	
APPD C.SARAVANAN	-SD-	07.05.10	

REV 02	DATE 14.08.2012	ALTD K.BOOPALAN -SD.- APPD S.PANDA -SD.-	REV 01	DATE 04.03.11	ALTD LALIT -SD.- APPD C.SARAVANAN-SD.-
ZONE	DESIGN PRESSURE ALTERED REVISION INDICATED AS $\triangle$ <sub>02</sub>		ZONE	DIMENSION REVISED AS MARKED. REVISION INDICATED AS $\triangle$	

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	1418.000		
TITLE <b>FABRICATED UNEQUAL TEE (ID460x85/OD219.1x34) (SA182F91)</b>			CARD CODE	DRAWING No.	REV
			U 01	<b>3-80-301-27192</b>	<b>02</b>

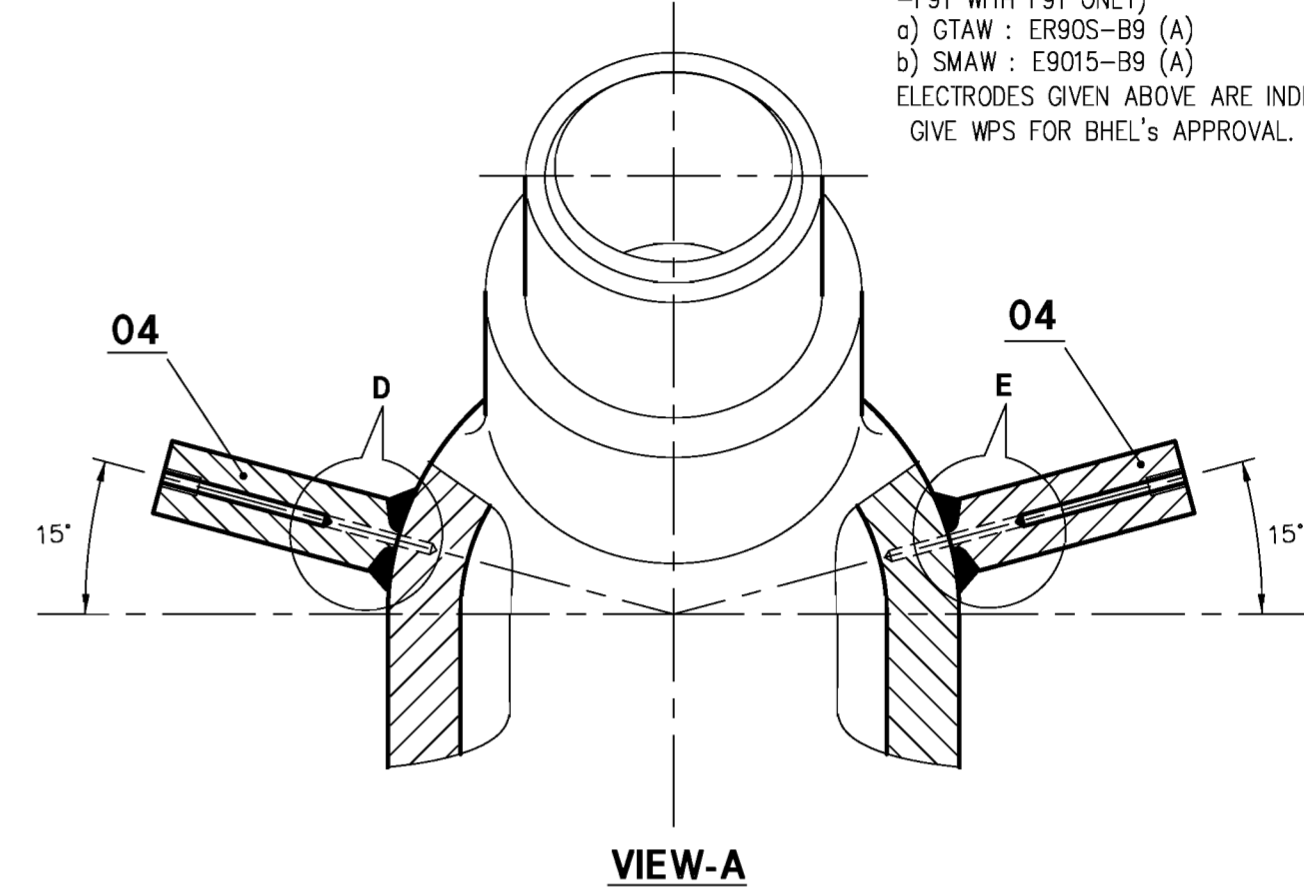
2-80-310-10067

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06. THE FINISHED MATERIAL SPECIFICATION WILL BE SA182F91(A) UNDER MATERIAL CODE: 925058830000

- NOTES :-**
- DESIGN PRESSURE : 70 Kg/Cm<sup>2</sup>(g)  $\Delta_{63}$
  - DESIGN TEMPERATURE : 596° C
  - FOLLOW TDG:108. LATEST
  - PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).
  - ELECTRODES TO BE USED ARE (FOR WELDING OF -F91 WITH F91 ONLY)
    - GTAW : ER90S-B9 (A)
    - SMAW : E9015-B9 (A)
 ELECTRODES GIVEN ABOVE ARE INDICATIVE. VENDOR TO GIVE WPS FOR BHEL'S APPROVAL.



VAR NO	ITEM NO	DESCRIPTION	DRAWING NO	MATERIAL CODE	A	UNIT WEIGHT
				MATERIAL SPECN	C	QUANTITY
	04	TEMP. STUB. $\varnothing$ 50 L=150	2-80-310-10067	SA 182 F91	A	4 000
	03	OUTLET FORGING ID966 x THK67 MIN / ID764 x 50 THK	2-80-310-10067	SA 182 F91	A	600 000
	02	BODY FORGING ID966 x THK67 MIN	2-80-310-10067	SA 182 F91	A	1222 000
	01	INLET FORGING ID 627 x THK 62 MIN	2-80-310-10067	SA 182 F91	A	464 000

JOB NO.	REL NO.	DATE

SPACE FOR IBR APPROVAL

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

**BHARAT HEAVY ELECTRICALS LTD.,**  
PIPING CENTRE,  
CHENNAI 600 017

DRN	NAME	SIGN	DATE	NO OF ITEMS
CHD	C.SARVANAN	-Sd-	06.05.10	
APPD	C.SARVANAN	-Sd-	06.05.10	

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg)	BHEL PO REF. NO.	ITEM No.
	C/M/F	N.T.S.	2758		

TITLE: **Y-PIECE**  
(OD864x50/OD711x42) SA182F91 U 01

CARD CODE: **2-80-310-10067**

REV: **04**

REV	DATE	ALTD	BY	REVISION
03	21.08.2012	ALTD : K.BOOPALAN -SD-	APPD : S.PANDA -SD-	DESIGN PRESSURE ALTERED REVISION INDICATED AS $\Delta_{63}$
04	23.08.13	ALTD : M.MANO	APPD : R.SESHAGIRI	D1 DIA ALT FOR OD864 FROM 764 TO 772MM REVISION INDICATED AS $\Delta$
02	17.10.10	ALTD : LALIT	APPD : C.SARAVANAN	HEIGHT OF ITEM NO 1 FROM CENTRE REVISED. REVISION INDICATED AS $\Delta$
01	17.09.10	ALTD : LALIT	APPD : C.SARAVANAN	DIMENSION REVISED IN DETAIL D REVISION INDICATED AS $\Delta$

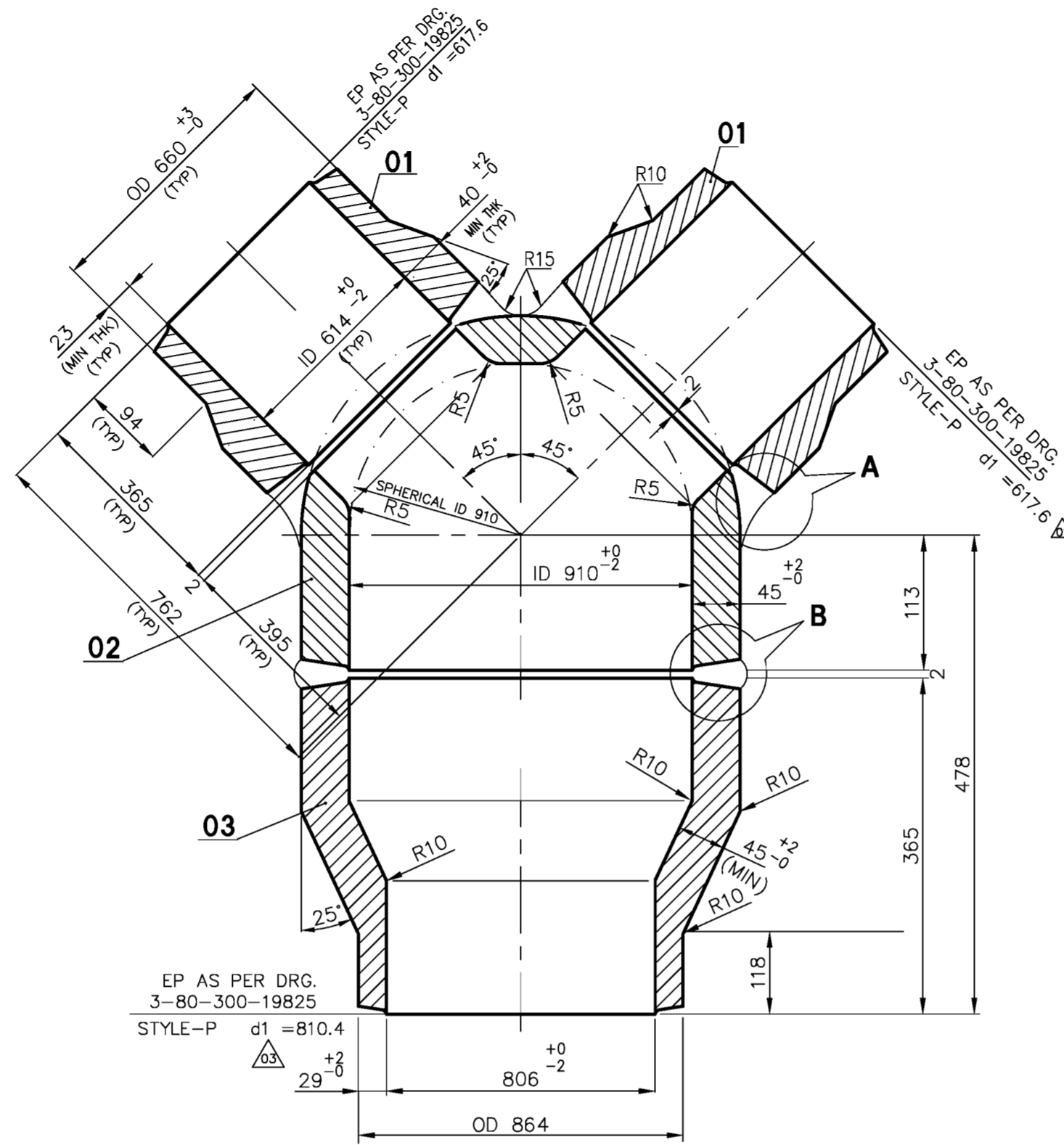
89001-073-08-7

DRAWING No.

ALL DIMENSIONS ARE IN MILLIMETRES

05-228/C

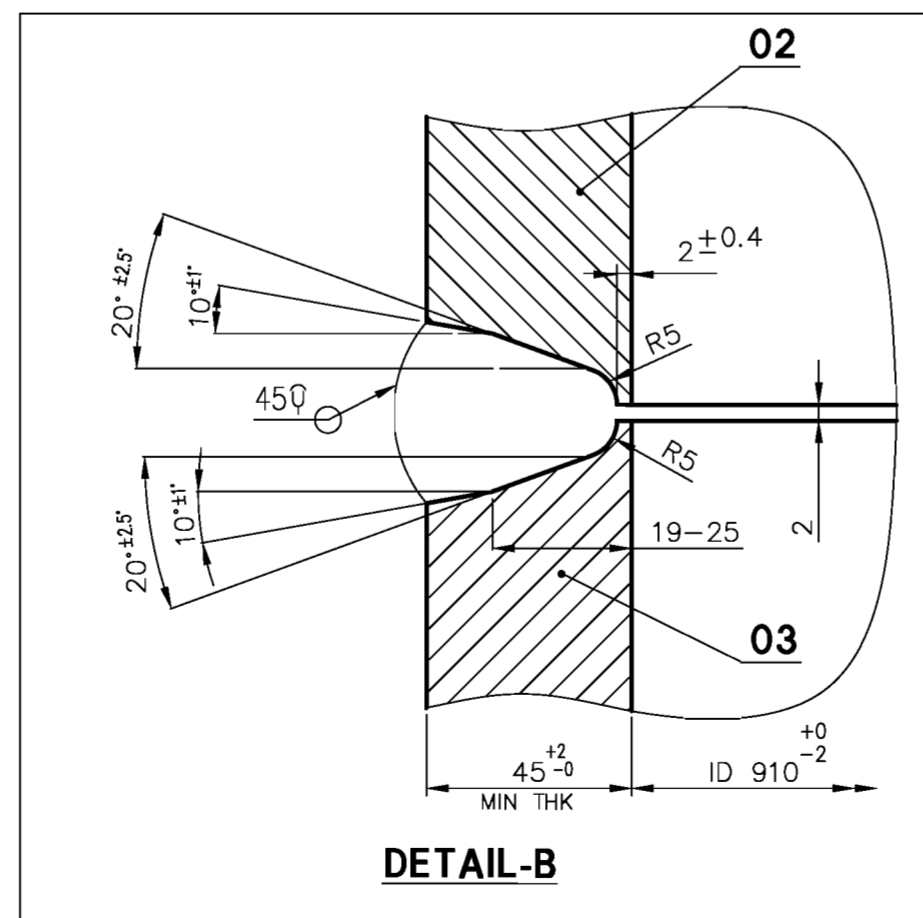
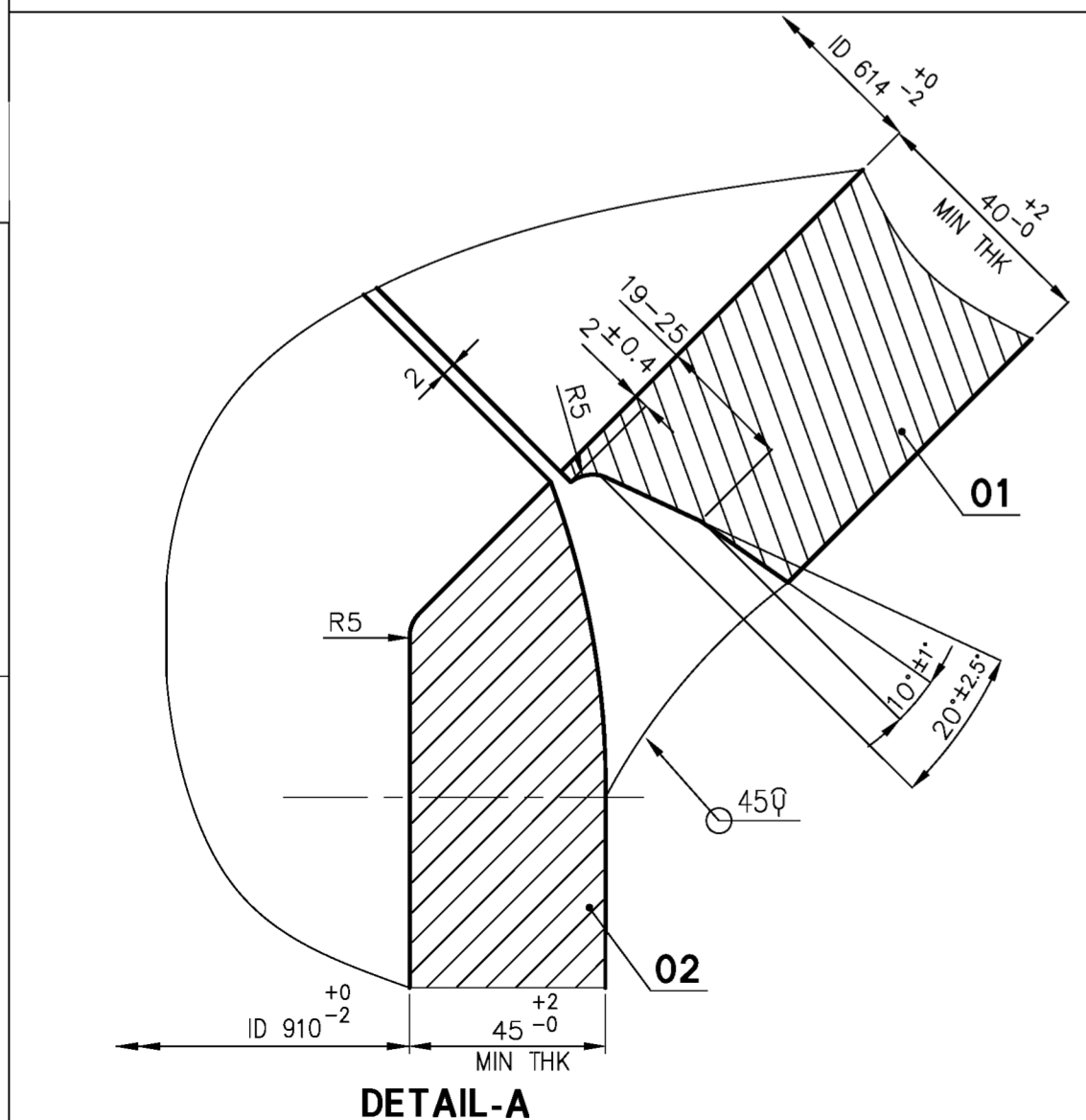
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**NOTES :-**

- 01. DESIGN PRESSURE : 74.6 Kg/Sq.Cm (g)
- 02. DESIGN TEMPERATURE : 370° C
- 03. FOLLOW TDG : 108 LATEST
- 04. PIPE SA106GRC(A) CAN ALSO BE USED IN PLACE OF SA105(A).
- 05. THE FINISHED MATERIAL SPECIFICATION WILL BE SA105 (A) UNDER MATERIAL CODE:925058840000

EP AS PER DRG.  
3-80-300-19825  
STYLE-P d1 = 810.4



VAR NO	ITEM NO	DESCRIPTION	DRAWING NO	MATERIAL CODE	MATERIAL SPECN	UNIT WEIGHT	QUANTITY
	03	OUTLET FORGING ID 910 x THK45 MIN / ID 806 x 29 THK	2-80-320-10068	SA 105	A	257.040	1
	02	BODY FORGING ID 910 x THK45 MIN	2-80-320-10068	SA 105	A	340.695	1
	01	INLET FORGING ID 614 x THK40 MIN	2-80-320-10068	SA 105	A	144.000	2

JOB NO.	REL NO.	DATE

REV	DATE	ALTD :	M.MANO
03	23.8.13	APPD :	R.SESHAGIRI

D1 DIA ALT FOR OD864 FROM 806 TO 810.4 MM REVISION INDICATED AS 03

REV	DATE	ALTD :	K.BOOPALAN -SD.-
02	27.08.2012	APPD :	S.PANDA -SD.-

DESIGN PRESSURE & TEMP. ALTERED REVISION INDICATED AS 02

REV	DATE	ALTD:	LALIT
01	01.08.10	APPD:	C.SARAVANAN

ZONE d1 VALUE CORRECTED REVISION INDICATED AS 01

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

DRN	NAME	SIGN	DATE	NO OF ITEMS
CHD	C.SARAVANAN	-Sd-	06.05.10	
APPD	C.SARAVANAN	-Sd-	06.05.10	

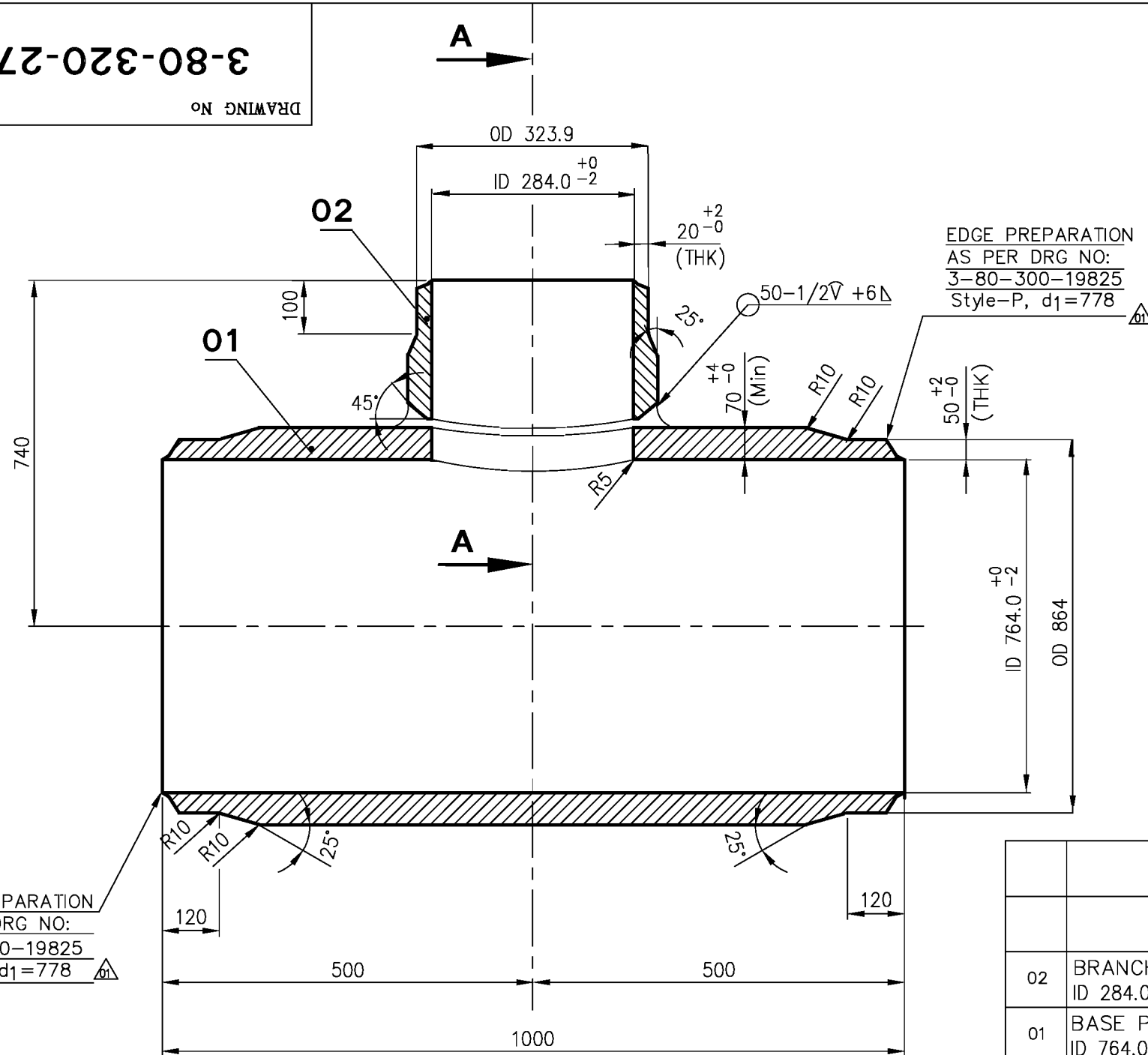
DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF. NO.	ITEM No.
	C/M/F	N.T.S.	1200		
TITLE		CARD CODE		REV	
Y-PIECE (OD864.0x29/OD660.0x23)SA105		U 01		2-80-320-10068 03	

3-80-320-27198

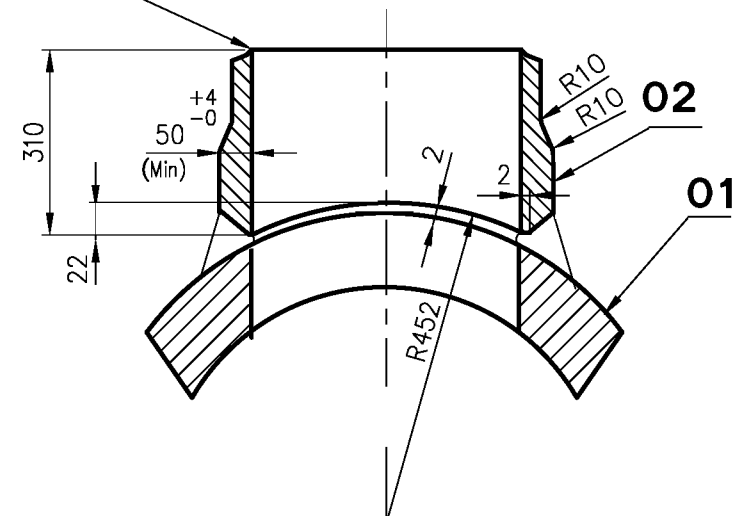
DRAWING No

**NOTES :-**

1. DESIGN PRESSURE : 74.6 Kg/Sq.Cm (g) 12.5
2. DESIGN TEMPERATURE : 510° C
3. FOLLOW TDG : 108 LATEST
4. PIPE SA335P22(A) CAN ALSO BE USED IN PLACE OF SA182F22CL3(A).
5. THE STOCK CODE FOR FINISHED UEQ. TEE:925058850000



EDGE PREPARATION  
AS PER DRG NO:  
3-80-300-19825  
Style-P, d1=778



**SECTION-AA**

EDGE PREPARATION  
AS PER DRG NO:  
3-80-300-19825  
Style-P, d1=778

ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO.	MATERIAL CODE	A	UNIT WT.
			VAR NO.	MATERIAL SPEC.	C	QTY.
02	BRANCH NOZZLE L=310 ID 284.0 x Thk 50.0 Min	3-80-320-27198		SA 182 F22 CL3	A	127,607 1
01	BASE PIPE L = 1000 ID 764.0 x Thk 70.0 Min	3-80-320-27198		SA 182 F22 CL3	A	1439,003 1

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

DRN	NAME	SIGN	DATE	NO OF ITEMS
LALIT	C.SARAVANAN	-SD.-	07.05.10	
CHD	C.SARAVANAN	-SD.-	07.05.10	
APPD	C.SARAVANAN	-SD.-	07.05.10	

REV	DATE	ALTD : K.BOOPALAN -SD.-	REV	DATE	ALTD: LALIT -SD.-
02	27.08.2012	APPD : S.PANDA -SD.-	01	14.06.12	APPD: C.SARAVANAN-SD.-
		DESIGN PRESSURE ALTERED REVISION INDICATED AS $\Delta$	ZONE		d1 VALUE REVISED. REVISION INDICATED AS $\Delta$

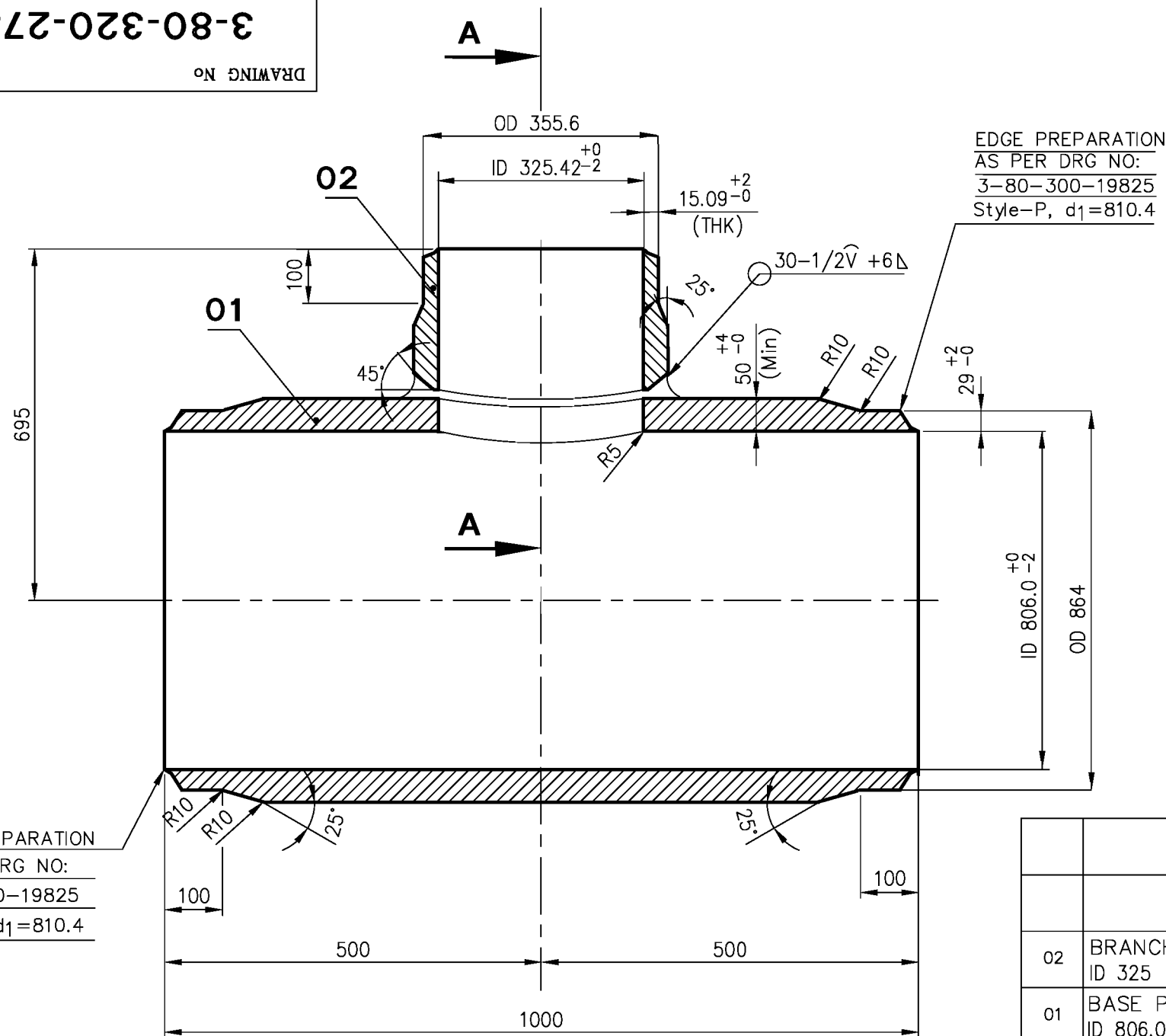
DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
	C/M/F	N.T.S.	1567.00		
TITLE			CARD CODE	DRAWING No.	REV
FABRICATED UNEQUAL TEE (OD864.0x50/OD323.9x20.0) (SA182F22CL3)			U 01	3-80-320-27198	02

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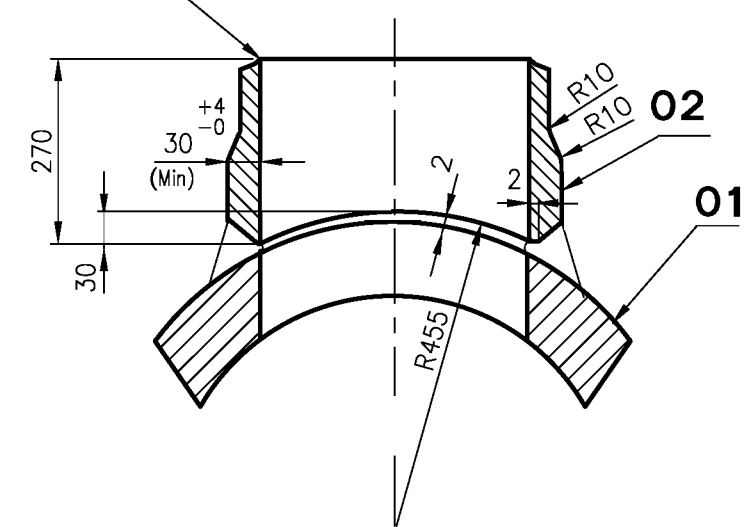
3-80-320-27303

DRAWING No

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- NOTES :-**
- 1. DESIGN PRESSURE : 74.6 Kg/Sq.Cm (g) 12.5
  - 2. DESIGN TEMPERATURE : 370° C
  - 3. FOLLOW TDG : 108 LATEST
  - 4. PIPE SA106GRC(A) CAN ALSO BE USED IN PLACE OF SA105(A).
  - 5. THE STOCK CODE FOR THE FINISHED UEQ. TEE:
- EDGE PREPARATION AS PER DRG NO: 3-80-300-19825 Style-D, d1=328.2



**SECTION-AA**

02	BRANCH NOZZLE L=270 ID 325 x Thk 30 Min	3-80-320-27303		SA 105	A	70,962 1
01	BASE PIPE L = 1000 ID 806.0 x Thk 50 Min	3-80-320-27303		SA 105	A	1054,980 1
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	A C	UNIT WT. QTY.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

	BHARAT HEAVY ELECTRICALS LTD.,		DRN	NAME	SIGN	DATE	NO OF ITEMS
	PIPING CENTRE,		CHD	LALIT		07.05.10	
	CHENNAI 600 017		APPD	C.SARAVANAN		07.05.10	

REV 01	DATE 27.08.2012	ALTD : K.BOOPALAN -SD.- APPD : S.PANDA -SD.-	DEPT.	GRADE OF UN TOL DIM C/M/F	SCALE N.T.S.	WEIGHT (Kg). 1126.00	BHEL PO REF.NO.	ITEM No.
DESIGN PRESSURE & TEMP. ALTERED REVISION INDICATED AS 01			TITLE <b>FABRICATED UNEQUAL TEE (OD864.0x29/OD355.6x15.09) SA105</b>		CARD CODE U 01	DRAWING No. <b>3-80-320-27303</b>		REV <b>01</b>

97876-666-08-3

DRAWING No



**NOTES :-** 1. DESIGN PRESSURE : 200 Kg/Sq.Cm (g)

2. DESIGN TEMPERATURE : 545° C

3 FOLLOW TDG : 108

4. ELECTRODES TO BE USED ARE,

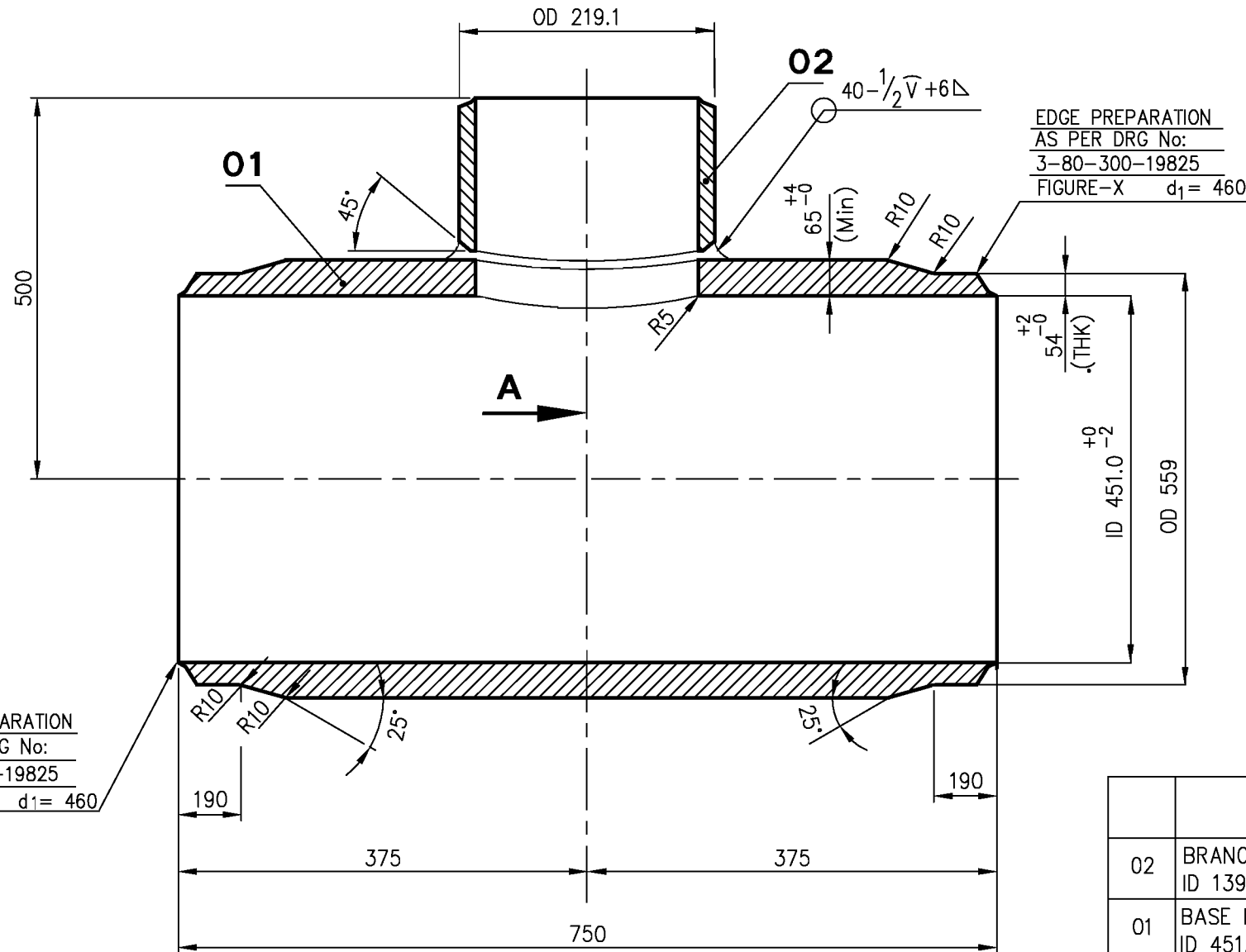
F91 TO F91 WELD	
a) GTAW :	ER90S-B9 (A)
b) SMAW :	E9015-B9 (A)

ELECTRODES GIVEN ABOVE ARE INDICATIVE. VENDOR TO GIVE WPS FOR BHEL'S APPROVAL.

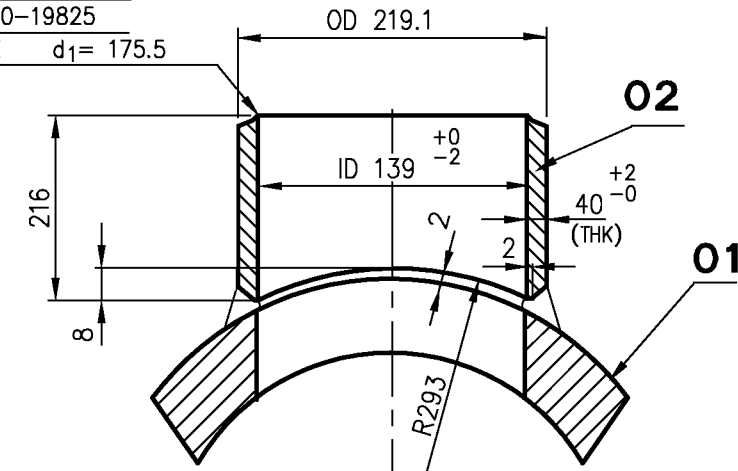
5. PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).

6. THE FINISHED MATERIAL SPECIFICATION WILL BE SA182F91(A) UNDER MATERIAL CODE : **925059480000**

12.5



EDGE PREPARATION  
AS PER DRG No:  
3-80-300-19825  
FIGURE-X d1= 175.5



**SECTION-AA**

**STANDARD**

EDGE PREPARATION  
AS PER DRG No:  
3-80-300-19825  
FIGURE-X d1= 460

ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. / VAR NO.	MATERIAL CODE / MATERIAL SPEC.	A / C	UNIT WT. / QTY.
02	BRANCH NOZZLE L = 216 ID 139.0 x Thk 40.0 Min	3-80-999-97826		SA 182 F91	A	41,000 1
01	BASE PIPE L = 750 ID 451.0 x Thk 65.0 Min	3-80-999-97826		SA 182 F91	A	636,870 1

TYPE OF PRODUCT  
OR NAME OF  
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

NAME	SIGN	DATE	NO OF ITEMS
DRN M.MANO		28.03.11	
CHD M.MANO		28.03.11	
APPD C.KARUNAKARAN		28.03.11	

REV 01	DATE	ALTD APPD
ZONE		

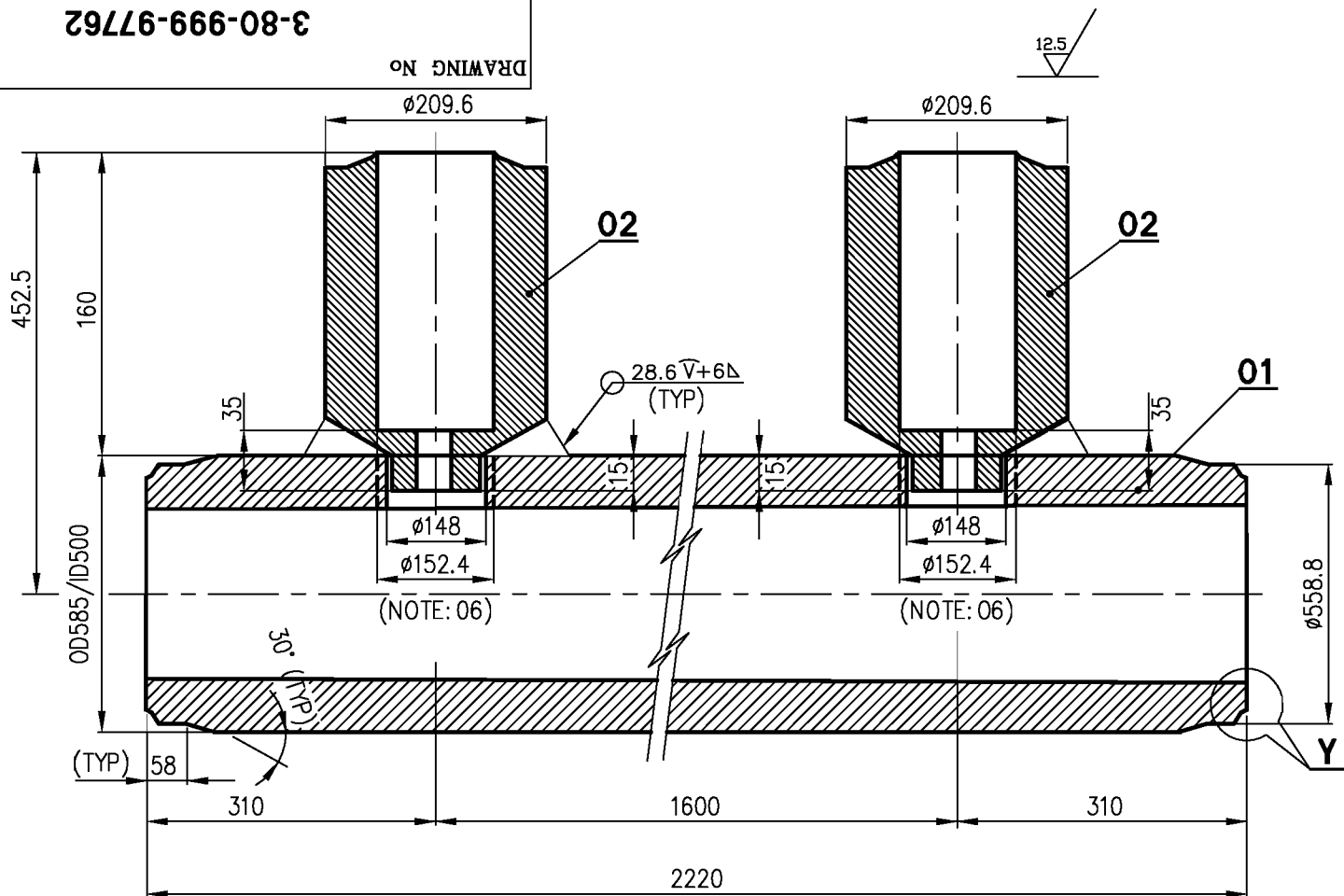
DEPT. CODE	GRADE OF UN TOL DIM C/M/F	SCALE N.T.S.	WEIGHT (Kg) 677.870	BHEL PO REF.NO: 3-80-999-97712/01	ITEM No.
TITLE <b>FABRICATED UNEQUAL TEE</b> (OD559.0x54.0/OD219.1x25.0)			CARD CODE U 01	DRAWING No. <b>3-80-999-97826</b>	REV <b>00</b>

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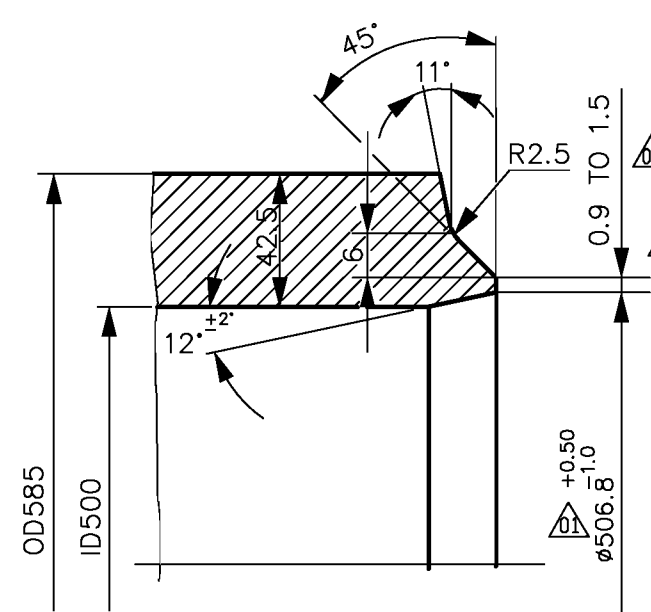
3-80-999-97762

DRAWING NO

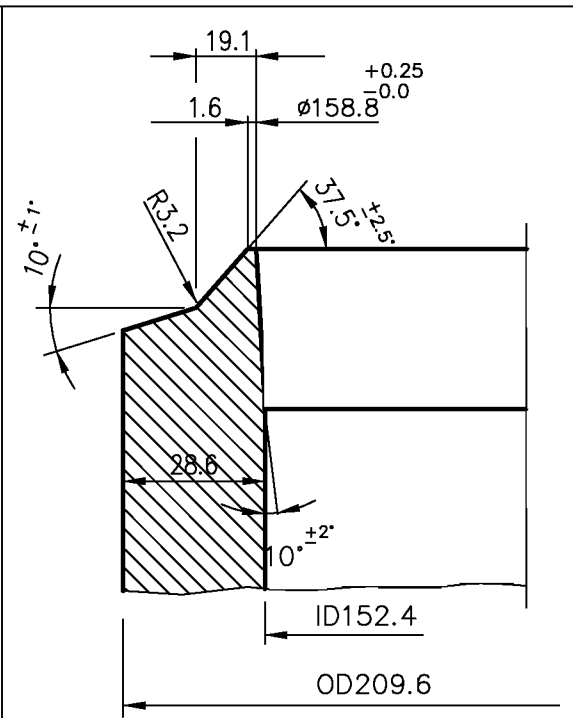
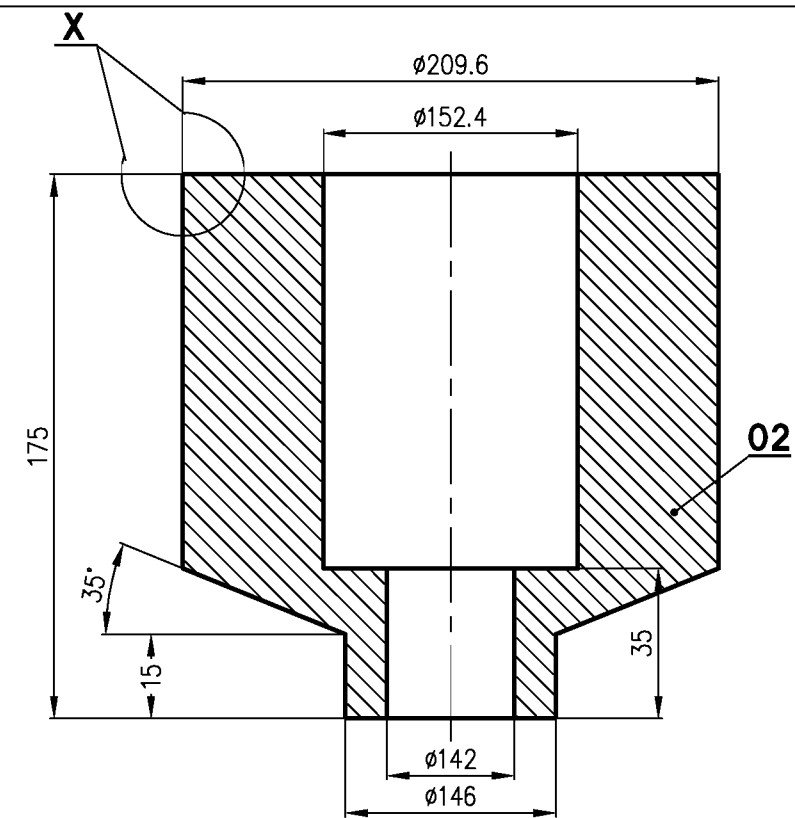


**NOTES :-**

1. DESIGN PRESSURE : 45 Kg/Sq.Cm (g)
2. DESIGN TEMPERATURE : 540° C
3. FOLLOW TDG : 109
4. ELECTRODES TO BE USED ARE,
  - a) GTAW : ER 90 SG 2 1/4 Cr 1 Mo(A)
  - b) SMAW : E9018 B3 (A)
 VENDOR TO GIVE WPS,PQR FOR BHEL'S APPROVAL
5. PIPE SA335P22(A) CAN ALSO BE USED IN PLACE OF SA182F22CL3(A).
6. AFTER WELDING THE STUB, BORE THROUGH TO  $\phi 152.4$
7. FABRICATION, INSPECTION, TESTING AS PER IBR 1950.
8. THE STOCK CODE FOR THE FINISHED COMPONENT IS : "925166960000"



DETAIL-Y



DETAIL-X

STANDARD

ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO.	MATERIAL CODE	A	UNIT WT.
			VAR NO.	MATERIAL SPEC.	C	QTY.
02	SV.STUB OD230/230 L=175	3-80-999-97762		SA 182 F22 CL3	A	22 000 2
01	FORGING OD585/ID500 L=620	3-80-999-97762		SA 182 F22 CL3	A	1260 000 1

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

	BHARAT HEAVY ELECTRICALS LTD.,		DRN	NAME	SIGN	DATE	NO OF ITEMS
	PIPING CENTRE,		CHD	S.R.Murthy		01.02.10	
	CHENNAI 600 017		APPD	C.V.Nathan		01.02.10	

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	REF TO ASSY / OLD DRG	ITEM No.
CODE	C/M/F		1304.000		

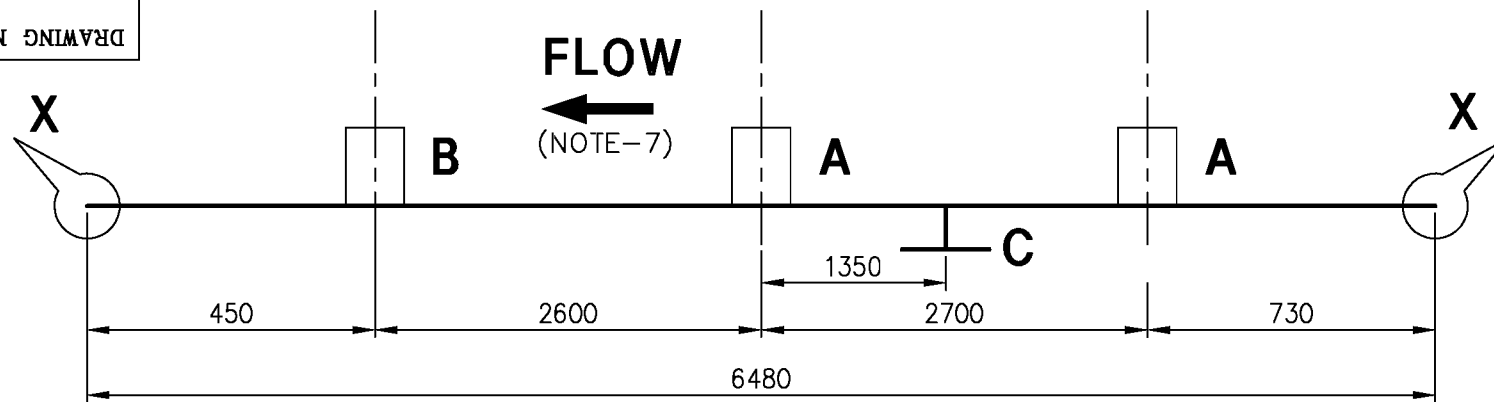
TITLE	CARD CODE	DRAWING No.	REV
<b>PIPE WITH STUBS (HRH-SV) F22 ( NB550 )</b>	U 01	<b>3-80-999-97762</b>	<b>02</b>

REV	DATE	ALTERED	S.RAJU	REV	DATE	ALTERED	S.RAJU
02	05.03.10	APPROVED	S.R.MURTHY	01	24.02.10	APPROVED	S.R.MURTHY
ZONE	TITLE REVISED.TDG AND ELECTROD DATA INDICATED			ZONE	TITLE REVISED.d1 VALUE REVISED		

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3-80-999-97763

DRAWING NO



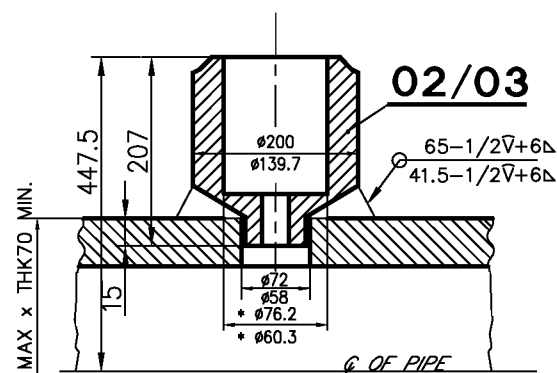
**NOTES :-**

- DESIGN PRESSURE : 191.0 Kg/Sq.Cm (g)
- DESIGN TEMPERATURE : 540° C
- FOLLOW TDG : 109
- ELECTRODES TO BE USED ARE,

12.5

MATERIAL SPECN. (A)	ELECTRODE DATA(A)	
MATERIAL SPECN. (A)	ROOT RUN	FURTHER RUN
SA335P91	ER90SB9	E9015B9
SA335P91	ER90SB3	E9018B3

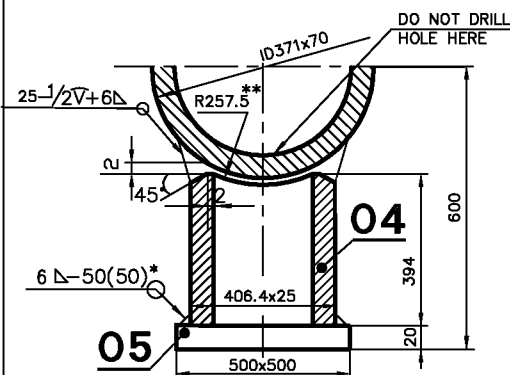
- VENDOR TO GIVE WPS,PQR FOR BHEL'S APPROVAL.
- FABRICATION, INSPECTION, TESTING AS PER IBR 1950
  - PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).
  - HARD PUNCH FLOW DIRECTION.
  - THE FINISHED MATERIAL CODE : 925166990000



**DETAIL-A/B**

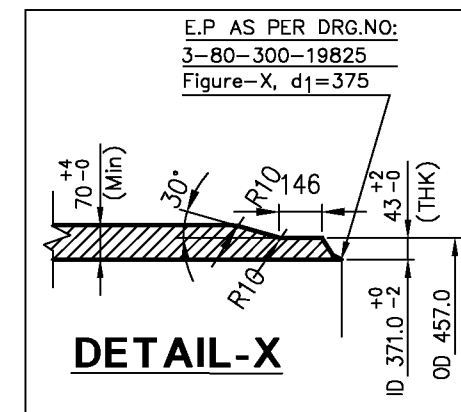
\* AFTER WELDING THE STUB, BORE THROUGH  $\phi 76.2/\phi 60.3$

\*\* SUPPORT PIPE SHALL BE CUT TO SUIT THE OUTER SURFACE OF THE MAIN PIPE SUCH THAT A UNIFORM GAP OF 2mm IS MAINTAINED THROUGHOUT

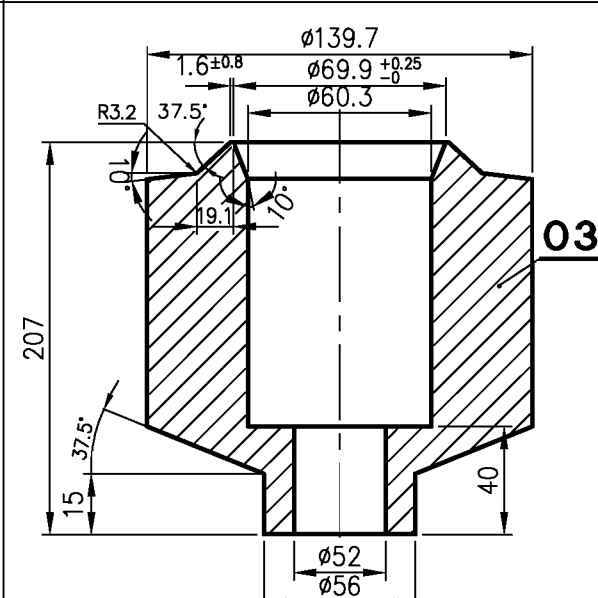
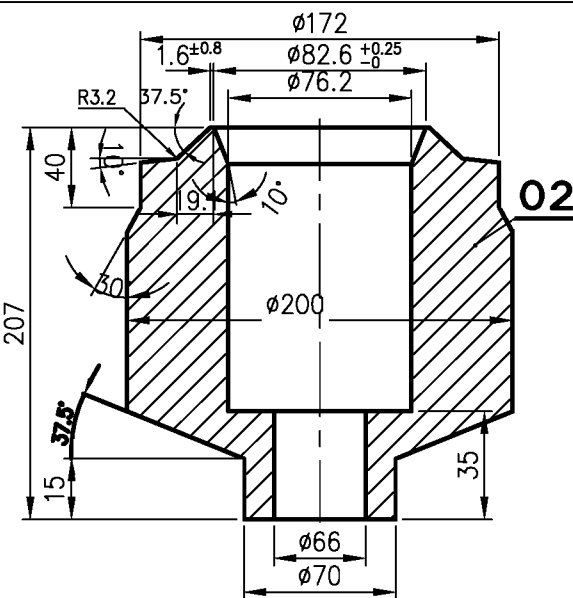


**DETAIL-C**

\* DO NOT WELD CONTINUOUSLY LEAVE A GAP OF 50 MM ALTERNATELY



**DETAIL-X**



**STANDARD**

ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO.	MATERIAL CODE	UNIT WT.
05	BOTTOM PLATE 20X500X500	3-80-999-97763	15 942 254 0000	SA387GR22CL2	39,250
04	PIPE OD406.4X25 L=394	3-80-999-97763	15 091 315 0000	SA 335 P22	92,629
03	SAFETY VALVE STUB F91 OD139.7 d1=69.9 L207	3-80-999-97763	-	SA 182 F91	16,000
02	SAFETY VALVE STUB F91 OD200/172 d1=82.6 L207	3-80-999-97763	-	SA 182 F91	33,000
01	PIPE ID371xThK 70Min L=6480	3-80-999-97763	15 958 149 6500	SA 335 P91	4932,900

ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO.	MATERIAL CODE	UNIT WT.

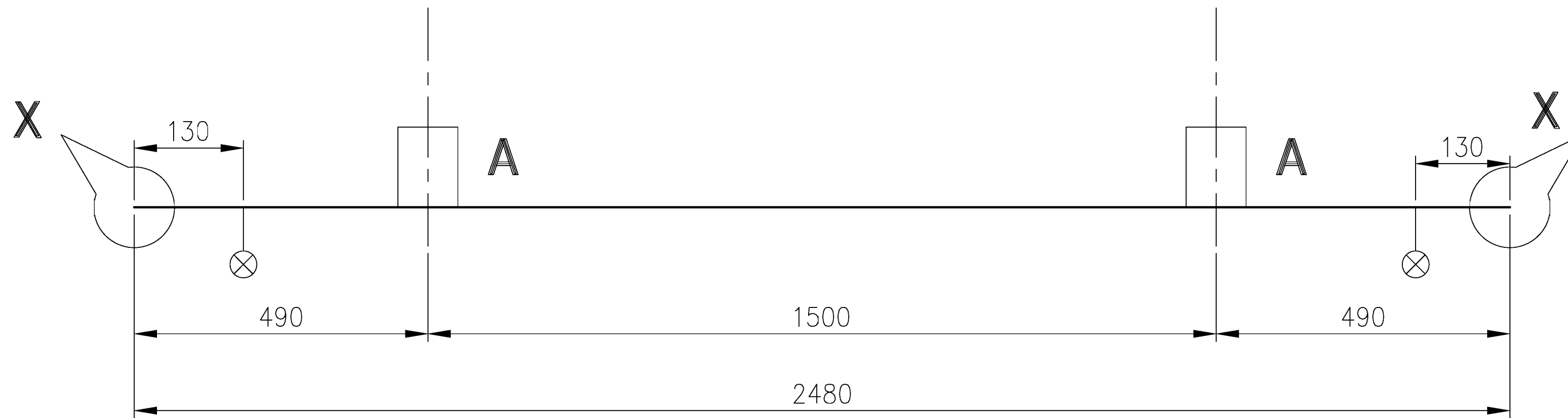
DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	5146.779		
TITLE			CARD CODE	DRAWING No.	REV
PIPE WITH STUBS - SV&ERV IN MAIN STEAM LINE-I (600MW UNITS)			U 01	3-80-999-97763	00

REV 02	DATE	ALTD	REV 01	DATE	ALTD
ZONE		APPD	ZONE		APPD

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99776-666-08-C

DRAWING No



**NOTES :-**

12.5/

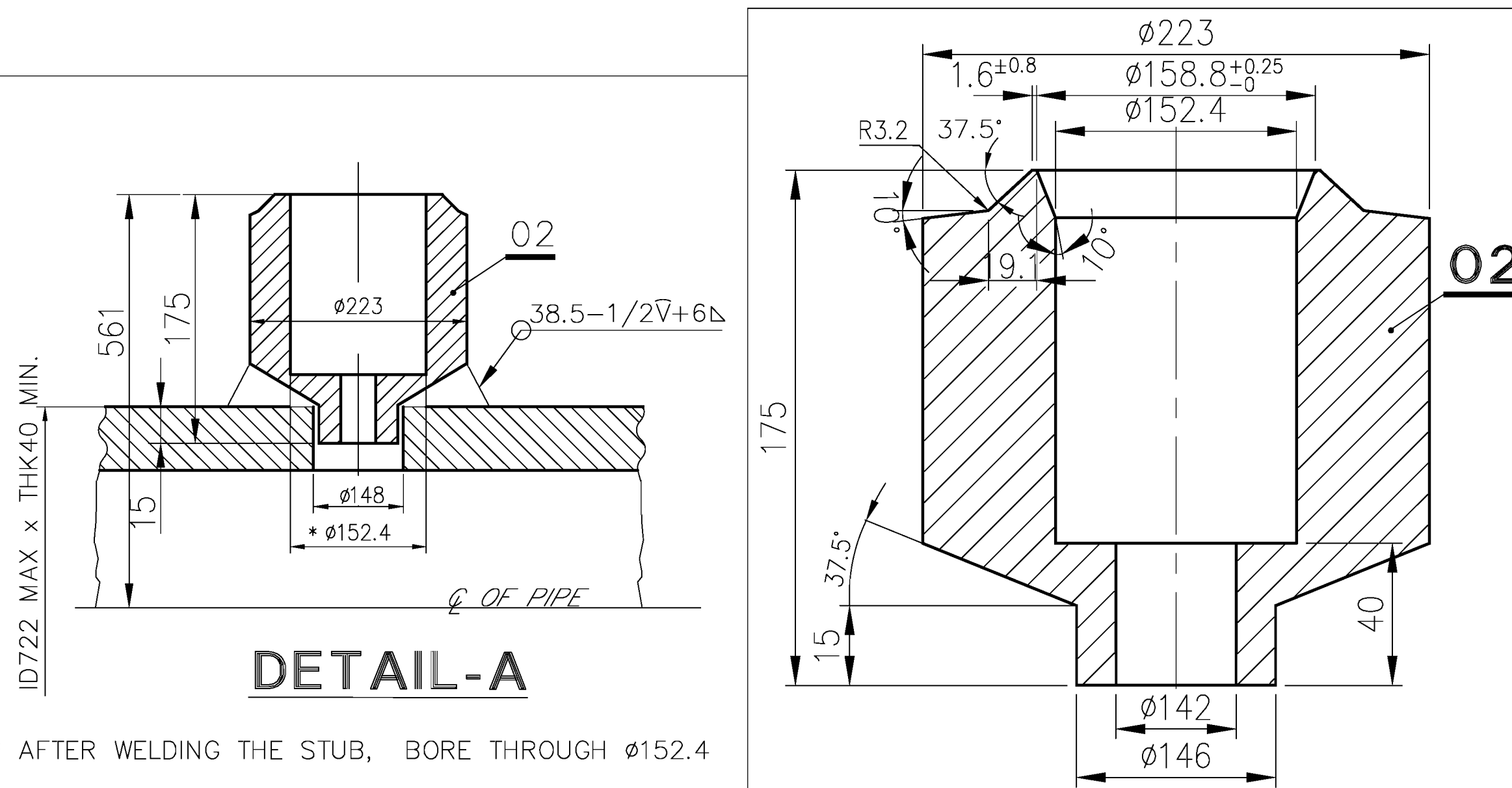
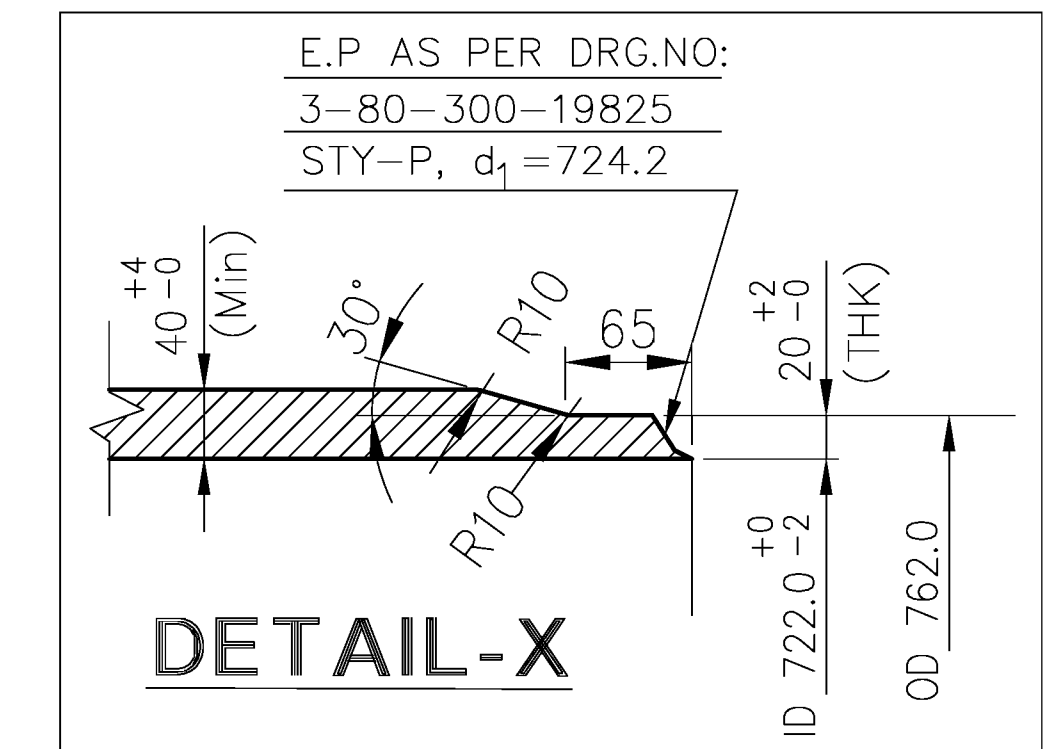
- DESIGN PRESSURE : 54 Kg/Sq.Cm (g)
- DESIGN TEMPERATURE : 360° C
- FOLLOW TDG : 109
- ELECTRODES TO BE USED ARE,

MATERIAL SPECN. (A)	ELECTRODE DATA(A)	
MATERIAL SPECN. (A)	ROOT RUN	FURTHER RUN
SA106GRC	ER80SG	E7018A1
SA105		

VENDOR TO GIVE WPS,PQR FOR BHEL'S APPROVAL.

- FABRICATION, INSPECTION, TESTING AS PER IBR 1950
- PIPE SA106GrC(A) CAN ALSO BE USED IN PLACE OF SA105(A).
- FOR RADIOGRAPHIC TEST ACCESS HOLE AND SEAL WELDING REFER DRG No. 6108-0022. USE DETAIL 'Y' FOR DRILLING.
- THE FINISHED MATERIAL CODE : 925167020000
- THIS ITEM SHALL BE USED FOR SAFETY VALVE APPLICATION IN COLD REHEAT LINE FOR 600MW UNITS.

01



ID722 MAX x THK40 MIN.

**DETAIL-A**

\* AFTER WELDING THE STUB, BORE THROUGH  $\phi 152.4$

**STANDARD**

03	RG PLUG CS M27	6108-0022/08	94 331 008 0000	A	0,300
			SA 105		2
02	SAFETY VALVE STUB SA105 OD223 d1=158.8 L175	3-80-999-97766	92 516 679 0000	A	22,500
			SA 105		2
01	PIPE ID722xThK 40Min L=2480	3-80-999-97766	15 983 577 2500	A	1859,000
			SA 106 GRC		1
ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO. VAR NO.	MATERIAL CODE MATERIAL SPEC.	UNIT WT. QTY.



BHARAT HEAVY ELECTRICALS LTD.,  
PIPING CENTRE,  
CHENNAI 600 017

DRN	NAME MURALI	SIGN	DATE 09.02.10	NO OF ITEMS
CHD	VENKAT		09.02.10	
APPD	K.V.RAMANI		09.02.10	

DEPT.	GRADE OF UN TOL. DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	1904.000		
TITLE <b>PIPE ID722X40 WITH STUBS (SA106GrC)</b>			CARD CODE U 01	DRAWING No. <b>3-80-999-97766</b>	REV <b>01</b>

REV 02 DATE ALTD APPD

REV 01 DATE 20.01.11 ALTD APPD JITEN VENKAT

NOTE 09 ADDED. TITLE REVISED.

ALL REVISIONS INDICATED AS 01

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3-80-310-28601

DRAWING No

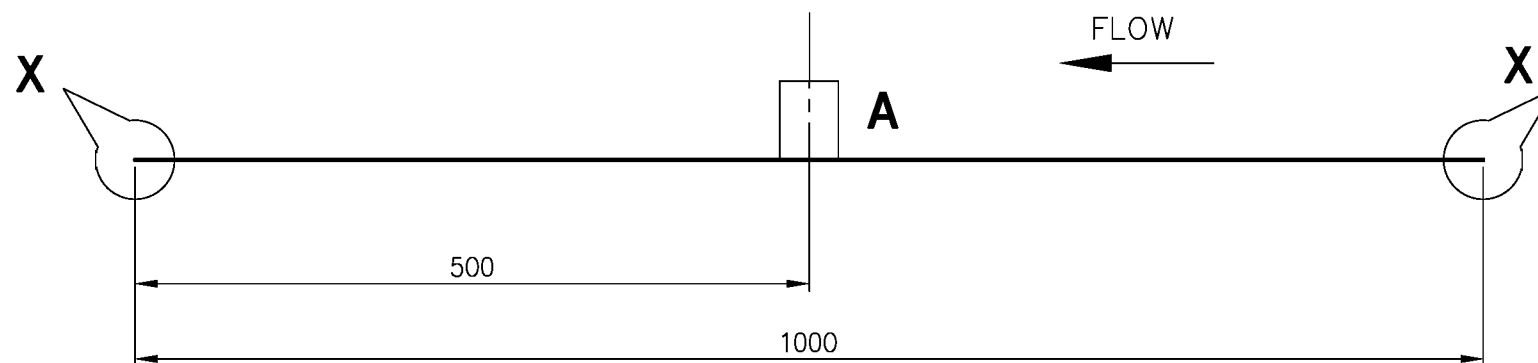
**NOTES :-**

- DESIGN PRESSURE : 68 Kg/Sq.Cm (g)
- DESIGN TEMPERATURE : 596° C
- FOLLOW : TDG:109
- ELECTRODES TO BE USED ARE,

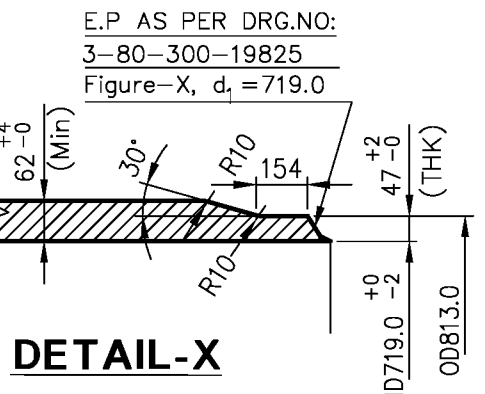
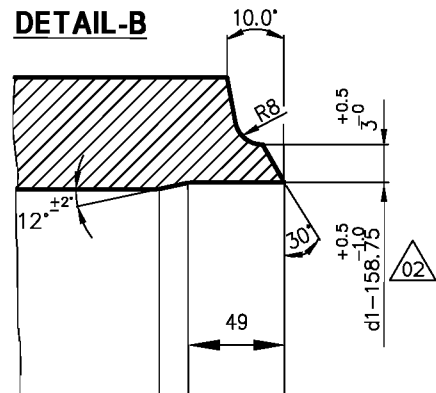
12.5

MATERIAL SPECN. (A)	ELECTRODE DATA(A)	
MATERIAL SPECN. (A)	ROOT RUN	FURTHER RUN
SA335P91/SA182F91	ER90SB9	E9015B9
SA335P91/SA182F91		

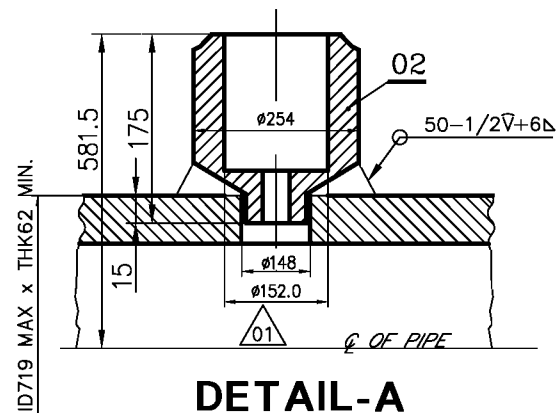
- VENDOR TO GIVE WPS,PQR FOR BHEL'S APPROVAL.
- FABRICATION, INSPECTION, TESTING AS PER IBR 1950
  - PIPE SA335P91(A) CAN ALSO BE USED IN PLACE OF SA182F91(A).
  - HARD PUNCH FLOW DIRECTION.
  - THE FINISHED MATERIAL CODE : 92 516 744 0000
  - \* EP SHALL BE INFORM LATER



**DETAIL-B**

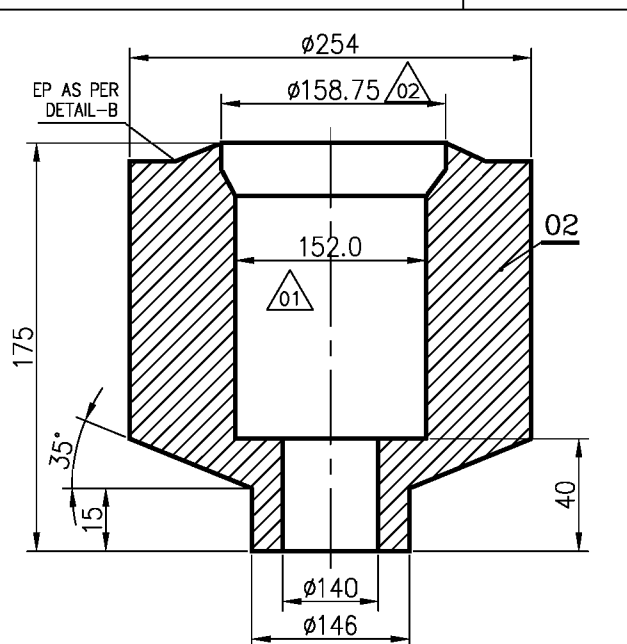


**DETAIL-X**



**DETAIL-A**

\* AFTER WELDING THE STUB, BORE THROUGH  $\phi 152.4$



ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO.	MATERIAL CODE	UNIT WT.
VAR NO.			VAR NO.	MATERIAL SPEC.	QTY.
02	FORGED STUB L=175 OD260/ID140	3-80-310-28601		XX XXX XXX XXXX SA 182 F91	47,000 1
01	FORGING ID719xThk 62Min L=1000	3-80-310-28601		XX XXX XXX XXXX SA 182 F91	1194,159 1

	BHARAT HEAVY ELECTRICALS LTD.,				DRN	SIGN	DATE	NO OF ITEMS
	PIPING CENTRE,							
	CHENNAI 600 017							
CHD	KONDAPA						12.07.11	
APPD	K.V.RAMANI						12.07.11	

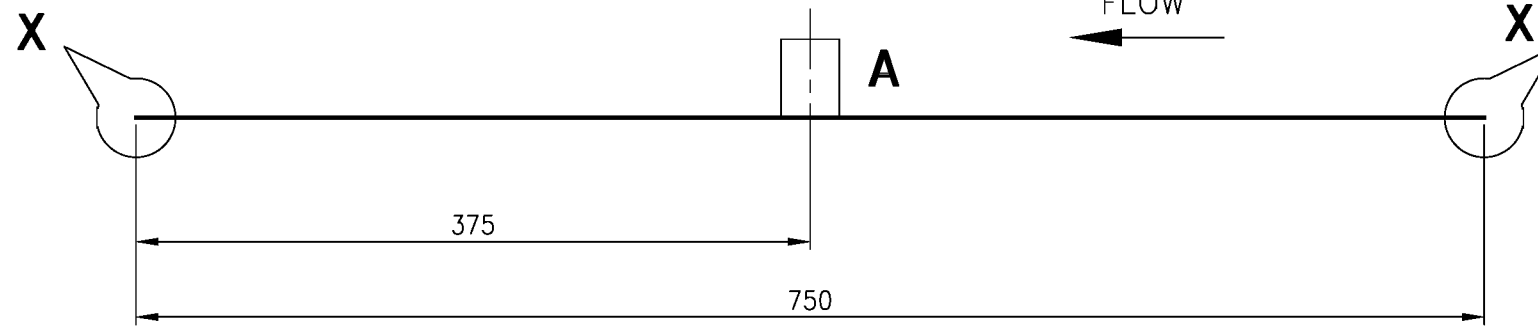
DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO.	ITEM No.
CODE	C/M/F	N.T.S.	~1242		
TITLE			CARD CODE	DRAWING No.	REV
<b>PIPE WITH SAFETY VALVE IN HOT REHEAT LINE ID719X62 SA182F91</b>			U 01	<b>3-80-310-28601</b>	<b>03</b>

REV 03	DATE 05.09.12	ALTD MANOJ	APPD S.PANDA	REV 02	DATE 29.02.12	ALTD KONDAPA	APPD KVRAMANI	REV 01	DATE 18.08.11	ALTD KONDAPA	APPD KVRAMANI
ZONE	DESIGN PRESSURE ALTERED ALL REVISIONS MARKED AS $\triangle 03$			ZONE	WELD END DIA INDICATED ALL REVISIONS MARKED AS $\triangle 02$			ZONE	ID REVISED TITLE BLOCK REVISED ALL REVISIONS MARKED AS $\triangle 01$		

CAUTION THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

00982-073-08-3

DRAWING No



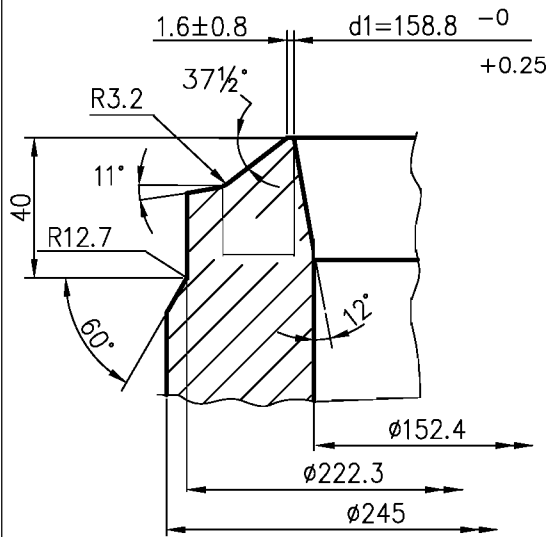
**NOTES :-**

- DESIGN PRESSURE : 74 Kg/Sq.Cm (g)
- DESIGN TEMPERATURE : 387° C
- FOLLOW TDG : 109
- ELECTRODES TO BE USED ARE,

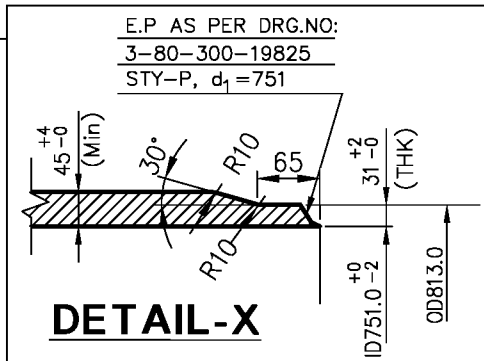
MATERIAL SPECN. (A)	ELECTRODE DATA(A)	
MATERIAL SPECN. (A)	ROOT RUN	FURTHER RUN
SA106GRC/SA105	ER80SG	E7018A1
SA106GRC/SA105		

- VENDOR TO GIVE WPS,PQR FOR BHEL'S APPROVAL.
- FABRICATION, INSPECTION, TESTING AS PER IBR 1950
  - PIPE SA106GrC(A) CAN ALSO BE USED IN PLACE OF SA105(A).
  - THE FINISHED MATERIAL CODE : 92 516 745 0000

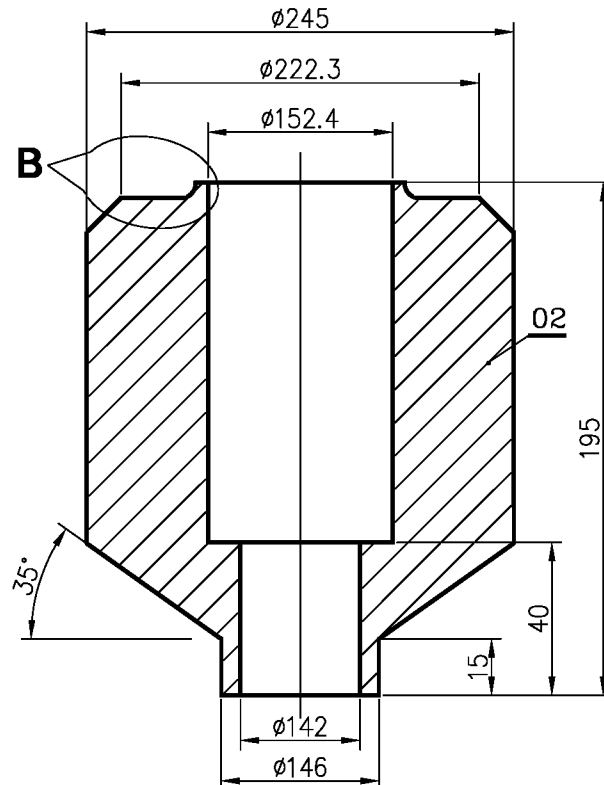
12.5/



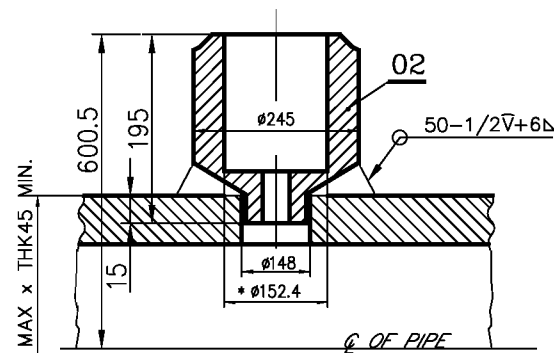
**DETAIL-B**



**DETAIL-X**



**DETAIL-A**



**DETAIL-A**

\* AFTER WELDING THE STUB, BORE THROUGH  $\phi 152.4$

ITEM NO.	DESCRIPTION	DRAWING NO.	ITEM NO.	MATERIAL CODE	UNIT WT.
VAR NO.			VAR NO.	MATERIAL SPEC.	QTY.
02	FORGED STUB OD250/ID140 L=175	3-80-320-28600		XX XXX XXX XXXX SA 105	36,530 1
01	FORGING ID751xThK 45Min L=750	3-80-320-28600		XX XXX XXX XXXX SA 105	662,531 1

	BHARAT HEAVY ELECTRICALS LTD.,		DRN	NAME	SIGN	DATE	NO OF
	PIPING CENTRE,		CHD	KONDAPA NAIDU		12.07.11	ITEMS
	CHENNAI 600 017		APPD	K.V.RAMANI		12.07.11	

DEPT.	GRADE OF UN TOL DIM	SCALE	WEIGHT (Kg).	BHEL PO REF.NO:	ITEM No.
CODE	C/M/F	N.T.S.	~700		

TITLE	CARD CODE	DRAWING No.	REV
<b>PIPE WITH SAFETY VALVE STUB CRH- ID751X45 SA105</b>	U 01	<b>3-80-320-28600</b>	<b>01</b>

REV 02	DATE	ALTD B SINGH	REV 01	DATE	ALTD S PANDA
ZONE		APPD	ZONE		DESIGN PRESSURE ALTERED

REVISIONS MARKED AS

