Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Piping Centre , 80, G. N. Chetty Road, CHENNAI – 600 017
Phone : 91 (044) 28161245, Fax 044 28161 341 e-mail: prs@bhelmpc.co.in

REF: ENQ NO: 4101200040 DT: 25.04.2012

Sub: Procurement of BW Fittings – CS, AS & SS.

Ref: Enquiry No: PC: 4101200040 dt 25.04.2012

Please find the following tender documents for reference.

1. List of items
2. Tech. delivery condition TDG: 102 Rev 05.

This is a limited tender and only vendors who are already registered with BHEL and contacted through e-mail/courier may submit their offers. Unsolicited offers will not be considered for this enquiry.

New vendors may download vendor registration forms from BHEL web site www.bhel.com and relevant data for formal registration may please be sent to Manager, Supplier development cell, BHEL Piping centre, 80, G N Road, T. Nagar, Chennai – 600017.

After qualifying for registration, the new vendors may be considered for future requirements, in line with BHEL system and policy. Such vendors will not be considered for this enquiry.

25/4

Manager / Purchase
BHEL / Piping Centre
80, GN Road, T. Nagar
Chennai-600017
Ph: 044-28161243

ENQ NO:4101200040 DT:25.04.2012 LIST OF ALL ITEMS

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
1	921040410000	BW SR 90DEG ELL 406.4 X 9.53 SA234WPB		Seamless	D387.3	6		
2	921042670000	BW LR 90DEG ELL 323.9 X 40 SA234WPC		Seamless	P248.3	3		
3	921043610000	BW LR 90DEG ELL 219.1 X 8.18 SA234WPB		Seamless	D202.7	150		
4	921044290200	BWLR90DEGELL88.9X5.49(WITHMPI) SA234WPB		Seamless	D79	5000		
5	921044310200	BWLR90DEGELL168.3X7.11(WITHMPI) SA234WPB		Seamless	D155.6	1000		
6	921044540200	BWLR90DEGELL73X5.16(WITHMPI) SA234WPB		Seamless	D62.7	414		
7	921044550000	BW LR 90DEG ELL 73 X 9.53 SA234WPB		Seamless	D56.1	50		
8	921044590000	BW LR 90DEG ELL 168.3 X 10.97 SA234WPB		Seamless	D147.4	52		
9	921044610000	BW LR 90DEG ELL 273 X 9.27 SA234WPB		Seamless	D254.5	20		
10	921044620000	BW LR 90DEG ELL 323.9 X 9.53 SA234WPB		Seamless	D304.8	700		
11	921044650000	LR 90DEG ELL 273X9.27SA234WP22CL1		Seamless	D254.5	60		
12	921044660000	LR 90DEG ELL 323.9X9.53SA234WP22CL1		Seamless	D304.8	10		
13	921044670000	LR 90DEG ELL 355.6 X 9.53SA234WP22CL1		Seamless	D336.5	4		
14	921044750200	BWLR45DEGELL168.3X7.11(WITHMPI) SA234WPB		Seamless	D155.6	368		
15	921044770000	BW LR 45DEG ELL 273 X 9.27 SA234WPB		Seamless	D254.5	6		
16	921044780000	BW LR 45DEG ELL 323.9 X 9.53SA234WPB		Seamless	D 304.8	40		
17	921044970000	BW SR 90DEG ELL 273.1 X 9.27 SA234WPB		Seamless	D254.5	70		
18	921050850000	BW UEQT 273X6.35 219.1X6.35 SA234WPB		Seamless	D260.3/D206.4	20		
19	921054780000	BW EQT 88.9 X 5.49 SA234WPB		Seamless	D79	50		
20	921054790000	BW EQT 114.3 X 6.02SA234WPB		Seamless	D103.5	30		
21	921054920400	BW EQT 273X9.27SA234WP22CL1		Seamless	D254.5	10		
22	921055010000	BW EQT 60.3 X 12.5 - SA234WP22CL1		Seamless	D34.8	286		

NOTE: * is an indication that raw materials and other services for the corresponding items shall NOT be sourced from CHINA.

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
23	921055020000	BW EQT 60.3 X 5.54SA234WP22CL1		Seamless	D49	58		
24	921171060200	BW CON RED 88.9X5.49 73X5.16 SA234WPB		Seamless	D79/D62.7	50		
25	921171070000	BWCONRED88.9X15.24/73.0X14.02 SA234WPB		Seamless	P61.6/D47.7	12		
26	921171180000	BWCONRED323.9X12.7/168.3X10.97 SA234WPB	*	Seamless	D298.9/D147.4	12		
27	921171310200	BW CON RED 88.9X7.62/60.3X5.54 SA234WPB		Seamless	D73.7/D49	4		
28	921174480000	CONCRED273.1X9.27/219.1X12.7SA234WP22CL1		Seamless	D/254.5/194.1	12		
29	921174490000	CONCRED323.9X9.53/219.1X12.7SA234WP22CL1		Seamless	D/304.8/194.1	12		
30	921174510000	CONC RED 168.3X27.5/114.3X17.12 SA234WPC		Seamless	P/119.3/83.2	2		
31	921174530000	CONC RED 219.1X8.18/114.3X 6.02 SA234WPC		Seamless	D/202.7/103.5	10		
32	921174630000	BWCONRED813X10/711X10SA234WPB(WELDED)		**Welded**	D793/D691	1		
33	921174750000	CON.REDUCER 965 X37/864X34SA234WP22CL1		Seamless	P/892.3/800	3		
34	921174970000	REDUCER OD762X20/OD 558.8X23 SA234WPC (DRG No:4-80-320-69306 /00)		Seamless	AS PER DRG	2		
35	921175130000	RED OD 645X27.5/OD 559X28.58SA234WP22CL1 (DRG No:4-80-321-69526 /01)		Seamless	AS PER DRG	10		
36	921175150000	RED OD 457.2X45/OD 420X40 SA234WP22CL1 (DRG No:4-80-321-69528 /01)		Seamless	AS PER DRG	12		
37	921175620000	BWCONREDOD660X116/OD457X82SA234WPC		Seamless	P' D1=457.2/'P' D1=314	2		
38	921176120000	RED 219.1X12.7/168.3X10.97SA234WP22CL1	*	Seamless	D 194.1/ D 147.4	8		
39	921176220000	RED OD219.1x12.7/88.9x7.62SA234WPB	*	Seamless	D/194.1 / 73.7	14		
40	921176400000	RED457X23.83/355.6X15.09SA234WPC		Seamless	P/404.4/326.6	1		
41	921176490000	REDUCER273X12.7/ OD 168.3X7.11SA234WPC	*	Seamless	D/385.4/147.4	11		
42	921176840000	CON RED OD508X71/OD457X62 SA234WPC		Seamless	P/366/334.6	24		
43	921176850000	CON RED OD610X82/OD457X62 SA234WPC		Seamless	P/453.8/334.6	8		

NOTE: * is an indication that raw materials and other services for the corresponding items shall NOT be sourced from CHINA.

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
44	921177280000	RED 355.6X12.7/323.9X12.7 SA234WPC		Seamless	D/330.2/298.9	4		
45	925041310000	BW LR 90DEG ELL 558.8 X 32 SA234WP22CL1		Seamless	P499.6	13		
46	925041570000	BW LR 90DEG ELL 48.3 X 10.15 SA234WPC		Seamless	D30.3	400		
47	925041620000	BW LR 45DEG ELL 406.4 X 9.53 SA234WPB		Seamless	D387.3	60		
48	925042100000	BW LR 90DEG ELL88.9X7.62SA234WP22CL1		Seamless	D73.7	34		
49	925042240000	BW SR 90DEG ELL 219.1 X 6.35 SA234WPB		Seamless	D206.4	50		
50	925042250000	BW SR 90DEG ELL 273 X 6.35 SA234WPB		Seamless	D260.3	50		
51	925042320000	BW LR 45DEG ELL 114.3 X 13.49 SA234WPB		Seamless	D89.6	5		
52	925042640000	BW LR 45DEG ELL 88.9 X 5.49 SA234WPB		Seamless	D79	50		
53	925042860200	BW LR 90DEG ELL 219.1 X 6.35 SA234WPB		Seamless	D206.4	1500		
54	925042870200	BW LR 90DEG ELL 273 X 6.35 SA234WPB		Seamless	D260.3	800		
55	925042880200	BW LR 90DEG ELL 323.9 X 6.35 SA234WPB		Seamless	D311.2	600		
56	925042890200	BW LR 45DEG ELL 219.1 X 6.35 SA234WPB		Seamless	D206.4	30		
57	925043700400	BW LR 45DEG ELL 323.9X9.53SA234WPB		Seamless	D304.8	30		
58	925044080000	BW LR 90DEG ELL 711.2 X 9.53 SA234WPB		**Welded**	D/691.9	6		
59	925044600000	BW SR 90DEG ELL 355.6 X 9.53 SA234WPB		Seamless	D336.5	7		
60	925045050000	LR 90DEG ELL 73X5.16SA234WP22CL1		Seamless	D62.7	156		
61	925045370000	BW LR 90DEG ELL 609.6 X 9.53 SA234WPB		**Welded**	D 590.5	40		
62	925045440000	BW LR 90DEG ELL 355.6 X 9.53 SA234WPB		Seamless	D336.5	227		
63	925045450000	BW LR 90DEG ELL 60.3X12.5SA234WP22CL1		Seamless	D34.8	396		
64	925045460000	BW LR90DEG ELL114.3X6.02SA234WP22CL1		Seamless	D103.5	50		
65	925045480000	BW LR 90DEG ELL 60.3 X 5.54 SA234WPB		Seamless	D49	2000		

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
66	925045660000	BW LR90DEG ELL168.3X7.11SA234WP22CL1		Seamless	D155.6	16		
67	925045700200	BWLR90DEGELL114.3X6.02(WITHMPI) SA234WPB		Seamless	D 103.5	1000		
68	925045710200	BWLR45DEGELL114.3X6.02(WITHMPI) SA234WPB		Seamless	D 103.5	50		
69	925045720000	BW LR 45DEG ELL 508 X 9.53 SA234WPB		**Welded**	D 488.9	10		
70	925045800000	BW LR 90DEG ELL 508 X 28SA234WP22CL1		Seamless	P457.4	40		
71	925046710000	BW LR 90DEG ELL 114.3 X 13.49 SA234WPC		Seamless	D89.6	50		
72	925046780000	BW LR 90DEG ELL114.3X20SA234WP22CL1		Seamless	P78.2	8		
73	925046800000	BW LR90DEG ELL168.3X27.5SA234WP22CL1		Seamless	P119.3	7		
74	925046940000	BW LR 45DEG ELL 114.3 X 17.12 SA234WPC		Seamless	P83.2	12		
75	925048220000	BW 90 DEG LR ELBOW OD406.4x70 SA234WPC		Seamless	P/273.4	8		
76	925048240000	BW 30 DEG LR ELBOW OD457x62 SA234WPC		Seamless	P/334.6	10		
77	925048250000	BW 45 DEG LR ELBOW OD457x62 SA234WPC		Seamless	P/334.6	4		
78	925048260000	BW 60 DEG LR ELBOW OD457x62 SA234WPC		Seamless	P/334.6	6		
79	925048270000	BW 90 DEG LR ELBOW OD457x62 SA234WPC		Seamless	P/334.6	150		
80	925048280000	BW 45 DEG LR ELBOW OD457x82 SA234WPC		Seamless	P/301.4	8		
81	925048290000	BW 30 DEG LR ELBOW OD610x82 SA234WPC		Seamless	P/453.8	4		
82	925048310000	BW 90 DEG LR ELBOW OD610x82 SA234WPC		Seamless	P/453.8	24		
83	925049960000	BW LR 90 DEG ELL 609.6X14.27 SA234WPC		Seamless	P/582.3	11		
84	925052060000	BW EQT 73 X 5.16 SA234WPB		Seamless	D62.7	100		
85	925052090000	BW EQT 168.3 X 7.11 SA234WPB		Seamless	D155.6	29		
86	925052210000	BW UEQT 88.9X5.49 48.3X5.08 SA234WPB		Seamless	D79/D39.2	50		
87	925052320000	BW UEQT 114.3X6.02 88.9X5.49 SA234WPB		Seamless	D103.5/D79	42		

NOTE: * is an indication that raw materials and other services for the corresponding items shall NOT be sourced from CHINA.

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
88	925052420000	BW UEQT 219.1X6.35 / 114.3X6.02 SA234WPB		Seamless	D206.4/D103.5	4		
89	925052600000	BW EQT 508 X 12.7 SA234WPB		Seamless	D482.8	1		
90	925052650000	BW UEQT 168.3X7.11 88.9X5.49 SA234WPB		Seamless	D155.6/D79	20		
91	925052660000	BW UEQT 114.3X6.02 60.3X5.54 SA234WPB		Seamless	D103.5/D49	2		
92	925052900000	BW UEQT 273X6.35 114.3X6.02 SA234WPB		Seamless	D260.3/D103.5	4		
93	925053050000	BW UEQT 88.9X5.49/ 60.3X5.54 SA234WPB		Seamless	D79/D49	54		
94	925055370000	BWUEQT88.9X7.62/ 60.3X 5.54SA234WP22CL1		Seamless	D 73.7 / D 48.6	10		
95	925057200000	BW EQUAL TEE OD610x82 SA234WPC		Seamless	P/453.8	4		
96	925057210000	BW UNEQUAL TEE OD610x82/219.1x32 SA234WP		Seamless	P/453.8/160.7	2		
97	925057220000	UNEQUAL TEE OD610x82/406.4x70 SA234WPC		Seamless	P/453.8/273.4	2		
98	925057230000	BW EQT 168.3 X 27.5 SA234WP22CL1		Seamless	P119.3	2		
99	925057240000	UNEQUAL TEE OD610x82/457x62 SA234WPC		Seamless	P/453.8/334.6	16		
100	925057250000	UNEQUAL TEE OD660x116/406.4x70 SA234WPC		Seamless	P/418.6/273.4	2		
101	925057380000	UEQT 508X25/457.2X22SA234WP22CL1		Seamless	P463/P417.2	8		
102	925057430000	BWUEQT558.8X28.58/457.2X25SA234WP22CL1		Seamless	P506.8/P412.4	2		
103	925057510000	BW UEQT 273X9.27/88.9X5.49 SA234WPC		Seamless	D 254.5 / D79	2		
104	925057640000	BW UEQT 610X22.2/457.2X22.2 SA234WP11CL1		Seamless	P570/P420.9	4		
105	925057760000	BWUNEQT OD558.8 x 32/508X 30SA234WP22CL1		Seamless	P499.6/P453.2	3		
106	925057790000	EQ TEE OD 508 X 64 SA234 WPC (DRG No:4-80-423-62608 /00)		Seamless	392/392	3		
107	925059290000	UNEQT 219.1X12.7/168.3X10.97SA234WP22CL1		Seamless	D 194.1/ D 147.4	3		
108	925059630000	BW EQUAL TEE OD355.6X15.09SA234WPC		Seamless	P/326.6	1		

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
109	925059940000	UNEQ TEE OD457x82/323.9x56SA 234 WPC		Seamless	P/301.4/214.2	6		
110	925059970000	BW UNEQTEE OD 559X16/273X9.53SA234WPB		Seamless	P/528.8/D/254.5	1		
111	925059980000	BWUNEQTEE OD559X16/219.1X6.35 SA 234 WPB		Seamless	P/528.8/D/206.4	1		
112	925173120000	BWCONRED219.1X8.18/168.3X7.11 SA234WPC		Seamless	D202.7/D155.6	2		
113	925173210000	C. RED114.3X 20 / 73 X 14.02SA234WP22CL1		Seamless	P78.2/D47.7	6		
114	925174110000	BWCONRED168.3X7.11/114.3X6.02 SA234WPB		Seamless	D155.6/D103.5	49		
115	925174300000	BWCON RED 273.1X6.35/219.1X6.35 SA234WPB		Seamless	D260.3/D206.4	5		
116	925174330000	BW CON RED 88.9X5.49/33.4X4.55 SA234WPB		Seamless	D79/D25.2	400		
117	925174640000	BWCONRED219.1X6.35/168.3X7.11 SA234WPB		Seamless	D206.4/D155.6	50		
118	925175440000	C.RED 88.9X15.24/73X14.02SA234WP22CL1		Seamless	P61.6/D47.7	8		
119	925175460000	BW CON RED 88.9X5.49/60.3X5.54 SA234WPB		Seamless	D79/D49	500		
120	925175760000	BWCONRED168.3X7.11/60.3X5.54 SA234WPB		Seamless	D155.6 / D 49	8		
121	925176480000	BW CON RED 273X9.27/219.1X8.18 SA234WPC		Seamless	D 254.5 / D202.7	7		
122	925176900000	BWCONRED323.9X9.53/168.3X7.11 SA234WPB		Seamless	D 304.8 / D 155.6	50		
123	925178790000	BW CON RED 508X12.7/323.9X9.53 SA234WPB		Seamless	D482.8/D304.8	2		
124	925178920000	BW CONRED73X5.16/60.3X5.54 SA234WP22CL1		Seamless	D62.7/D49	50		
125	925179030000	BWCON.RED 219.1X6.35/168.3X7.11SA234WPB		Seamless	D 206.4 / D 155.6	2		
126	925179300000	BW RED 114.3x17.12/88.9x11.13/SA234WPC		Seamless	P83.2/D69.2	1		
127	925179780000	C.RED. 60.3X11.07/33.4X6.35SA234WP22CL1		Seamless	D 37.7 / D 22	16		
128	925240170000	BW LR 90DEG ELL 88.9 X 15.24 SA234WPC		Seamless	D61.6	40		
129	925241190000	BW LR 90DEG ELL 88.9 X 5.49 SA234WPC		Seamless	D79	20		
130	925241580000	BW LR 90DEG ELL 355.6X62SA234WP22CL1		Seamless	P233	3		

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
131	925242430000	BW LR 90DEG ELL 219.1 X 12.7 SA234WPB		Seamless	D194.1	10		
132	925242690000	BW LR 90DEG ELL 508 X 10 SA234WPB		**Welded**	D 488	3		
133	925242710000	BW LR 90DEG ELL 48.3 X 5.08 SA234WPB		Seamless	D39.2	600		
134	925243000000	BW LR 45DEG ELL 355.6 X 9.53 SA234WPB		Seamless	D 336.5	100		
135	925243010000	BW LR 90DEG ELL 73.0 X 14.02 SA234WPC		Seamless	D47.7	10		
136	925243130000	BW LR 90DEG ELL 88.9 X 11.13 SA234WPC		Seamless	D69.2	20		
137	925243200000	BW LR 90DEG ELL 33.4 X 9.09 SA234WPC		Seamless	D17.2	410		
138	925243250000	BW SR 90DEG ELL 219.1 X 18.26 SA234WPC	*	Seamless	D 194.1	3		
139	925243420000	BW LR 90DEG ELL 355.6 X 12.7 SA234WPC		Seamless	D/ 331	20		
140	925243430000	BW LR 90DEG ELL 457.2 X 12.7 SA234WPC		Seamless	D432.1	32		
141	925244020000	BW LR90DEG ELL219.1X12.7SA234WP22CL1		Seamless	D194.1	38		
142	925244300000	BW LR90DEG ELL48.3X10.14SA234WP22CL1		Seamless	D30.3	36		
143	925244580000	BW LR90DEG ELL559X28.58SA234WP22CL1		Seamless	P506.8	9		
144	925244590000	LR 90DEG ELL 33.4X4.55SA234WP22CL1		Seamless	D25.2	186		
145	925244600000	BW LR 90DEG ELL 60.3X5.54SA234WP22CL1		Seamless	D49	250		
146	925244610000	BW LR 90DEG ELL 33.4X9.09SA234WP22CL1		Seamless	D17.2	75		
147	925244630000	BW LR 90DEG ELL 48.3X5.08SA234WP22CL1		Seamless	D39.2	150		
148	925245770000	LR 90 DEG ELBOW OD 610X9.53SA234 WPC		**Welded**	D/590.7	1		
149	925246300000	BWLR90DEGELBOW OD 508 X 25 SA234WP22CL1		Seamless	P460	14		
150	925246360000	BW LR90DEG ELL457.2X22.2SA234WP22CL1		Seamless	P417.2	8		
151	925246790000	BW LR45DEG ELL355.6X9.53SA234WP22CL1		Seamless	D336.5	6		
152	925247000000	BW LR 45DEG ELL 73 X 5.16 SA234WPB		Seamless	D62.7	198		

NOTE: * is an indication that raw materials and other services for the corresponding items shall NOT be sourced from CHINA.

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
153	925247330000	BW LR 90DEG ELL 508 X 26.19 SA234WP22		Seamless	P460.6	2		
154	925247590000	LR90DEG ELBOW 323.9x35SA234WP22CL1		Seamless	P/ 258.9	210		
155	925247800000	LR 90DEG ELBOW OD 273.0X12.7SA234WPC	*	Seamless	D/248	109		
156	925247850000	SR 90DEG ELBOW OD 273X12.7SA234WPC	*	Seamless	D/248	3		
157	925248440000	BW LR 90DEG ELL 406.4 X 12.7 SA234WPB		Seamless	D381.3	100		
158	925248560000	BW LR 45DEG ELL 114.3X13.49 SA234WPC		Seamless	D89.6	12		
159	925248720000	BW LR 90DEG ELL88.9X20SA234WP22CL1		Seamless	P 53	16		
160	925248880000	BW LR 90DEG ELL 406.4X 55SA234WP22CL1		Seamless	P298.8	10		
161	925248970000	BW LR 45 DEG ELL 559X28.58 SA234WP22CL1		Seamless	P506.8	4		
162	925249020000	BW LR45DEGELL 323.9X40 SA234WPC		Seamless	P248.3	2		
163	925249110000	BW LR 45DEG ELL558.8x32SA234WP22CL1		Seamless	P499.6	4		
164	925249120000	BW LR 30DEG ELL558.8x32SA234WP22CL1		Seamless	499.6	4		
165	925249130000	BW LR 45DEG ELL 457.2 X 25 SA234WP22CL1		Seamless	P412.4	2		
166	925249140000	BW LR 90DEG ELL 508 X 30SA234WP22CL1		Seamless	P453.2	28		
167	925249170000	BW LR 90DEG ELL711.2X20SA234WPC		Seamless	P673.4	6		
168	925249260000	LR 90DEG ELL 168.3x14.27SA234WPC	*	Seamless	P-141.7	124		
169	925249360300	BW LR 90 DEG ELL 660 X 36 SA234WP22CL1		Seamless	P 595	19		
170	925249460000	BW LR 90 DEG ELL 406.4 X 54 SA234WPC		Seamless	P / 301	38		
171	925249720000	BW LR 45 ELBOW OD 610 X 14.27 SA234WPC		Seamless	P / 582.7	4		
172	925249780000	BW 90 DEG ELBOW OD 457 X 82 SA234WPC		Seamless	P' D1=314	42		
173	925249820000	BW 90 LR DEG ELBOW OD 660 X 116 SA234WPC	*	Seamless	P' D1=457.2	3		
174	925250070000	BW EQT 88.9 X 11.13 SA234WPC		Seamless	D69.2	4		

NOTE: * is an indication that raw materials and other services for the corresponding items shall NOT be sourced from CHINA.

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
175	925252100000	BW UEQT 73X5.16 60.3X5.54 SA234WPB		Seamless	D 62.7 / D 49	60		
176	925252620000	BW UEQT 323.9X9.53 168.3X7.11 SA234WPB		Seamless	D304.8 / D155.6	11		
177	925252640000	BW UEQT 48.3X5.08 33.4X4.55 SA234WPB		Seamless	D 39.2 / D25.2	50		
178	925252840000	BW UEQT 406.4 X 12.7/273 X 9.27 SA234WPB		Seamless	D 381.3 / D 254.5	5		
179	925253590000	BW UEQT 355.6X12.7 273X12.7 SA234WPC		Seamless	D 331/D 248	2		
180	925253720000	BWUEQT88.9X15.24 / 60.3 X 11.07SA234WPC		Seamless	P61.6/D38.2	6		
181	925253760000	BW EQT 609.6 X 14.27 SA234WPC		Seamless	P582	2		
182	925253770000	BW UEQT 609.6X14.27 273X9.27 SA234WPC		Seamless	P582/D254.5	4		
183	925253990000	BW EQT 711.2 X 20 SA234WPC		Seamless	P673.4	1		
184	925254030000	BW EQT 219.1 X 12.7SA234WP22CL1		Seamless	D194.1	1		
185	925255520000	BW UEQT 610 X 10 / 508 X 9.53 SA234WPB		**Welded**	D 590 / D 488.9	1		
186	925255760000	UEQT711.2X25/457.2X25 SA234WP22CL1		Seamless	P665.1/P412.4	2		
187	925255970000	BW UEQT OD 610X14.27/406.4X17.5-SA234WPC		Seamless	P 582.3 / P 374.6	1		
188	925256640000	UEQT 219.1X36/168.3X27.5SA234WP22CL1		Seamless	P152.2/P119.3	3		
189	925257050000	BW UEQT 508X9.53 323.9X9.53 SA234WPB		Seamless	D 488.9 /D 304.8	2		
190	925258340000	EQT 33.4 X 6.35SA234WP22CL1		Seamless	D22	8		
191	925258890000	BWUEQT508X25 / 406.4 X 22.2SA234WP22CL1		Seamless	P463/P366.6	3		
192	925259200000	UEQT355.6X9.53/168.3X7.11SA234WP22CL1		Seamless	D336.5/D155.6	3		
193	925270700000	BW CON RED 368X48 219.1X30 SA234WPC		Seamless	P281/P164.9	2		
194	925271570000	BW CON RED 48.3X5.08/33.4X4.55 SA234WPB		Seamless	D39.2/D25.2	100		
195	925273010000	BWCONRED114.3X17.12/73X14.02 SA234WPC		Seamless	P83.2/D47.7	5		
196	925273090000	BWCONRED168.3X10.97/88.9X7.62 SA234WPC	*	Seamless	D147.4/D73.7	18		

NOTE: * is an indication that raw materials and other services for the corresponding items shall NOT be sourced from CHINA.

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
197	925273180000	BWCONRED114.3X17.12/88.9X15.24 SA234WPC		Seamless	P83.2/P61.6	6		
198	925273260000	BWCONRED88.9X15.24/60.3X11.07 SA234WPC		Seamless	P61.6/D37.7	16		
199	925273850000	BWCONRED457.2X14.27/406.4X14.27 SA234WPC		Seamless	P432.2/P377.2	4		
200	925273910000	BW CON RED 711X20 457.2X12.7 SA234WPC		Seamless	P673.4/D432.1	6		
201	925274190400	BWCONRED355.6X9.53/273X9.27 SA234WP22CL1		Seamless	D 336.5 / D 254.5	6		
202	925274540000	C.RE.168.3X27.5/114.3X17.12SA234WP22CL1		Seamless	P119.3/P83.2	3		
203	925274680000	C.RED 323.9X30/168.3X27.5SA234WP22CL1		Seamless	P269.5/P119.3	1		
204	925274860000	BWCONRED73X14.02/33.4X9.09 SA234WP22cl1		Seamless	D47.7/D17.2	4		
205	925274930000	C.RED ID260X51/168.3X28SA234WP22CL1		Seamless	P260/P118.6	1		
206	925275690000	BW CON RED 323.9X36 273X30 SA234WPC		Seamless	P256.8/P218.7	8		
207	925276630000	C.RED 406.4 X 25 / 273 X 25SA234WP22CL1		Seamless	P356.2/P229.1	4		
208	925277030000	BW CON RED 711.2X9.53/610X9.53 SA234WPB		**Welded**	D/691.9/D 590.9	2		
209	925277480000	C.RED 457.2X28.5/273X28.5SA234WP22CL1		Seamless	P405.7/P222	2		
210	925278140000	BW CON RED 73X5.16 60.3X5.54 SA234WPB		Seamless	D62.7/D49	80		
211	925278810000	BW CON RED 88.9X5.49/48.3X5.08 SA234WPB		Seamless	D79 / D39.2	160		
212	925279160000	BW CON RED 60.3X5.54/33.4X4.55 SA234WPB		Seamless	D 49 / D 25.2	50		
213	925279180000	C.RED 168.3X7.11/114.3X6.02SA234WP22CL1		Seamless	D155.6/D103.5	8		
214	925279320000	C.RED 88.9X7.62/60.3X5.54SA234WP22CL1		Seamless	D 73.7 / D 49	6		
215	955179900000	CONRED355.6X9.53/168.3X7.11SA234WP22CL1		Seamless	D336.5/D155.6	3		
216	925246120000	BW LR 90DEG ELL 60.3 X 3.91 SA403WP304H		Seamless	D 53.2	150		
217	925246130000	BW LR 90DEG ELL 48.3 X 3.68 SA403WP304H		Seamless	D 41.6	20		
218	925246140000	BW LR 90DEG ELL 33.4 X 3.38 SA403WP304H		Seamless	D27.2	382		

Sl no	Material Code	Description	Ind	Type of construction	EP style and D1 value	Qty nos	Curr	Unit Rate
219	925246920000	BW LR 90DEG ELL 88.9 X 5.49 SA403WP316		Seamless	D79	4		
220	925257170000	BW EQT 60.3 X 3.91 SA403WP304H		Seamless	D 53.2	11		
221	925257180000	BW EQT 33.4 X 3.38 SA403WP304H		Seamless	D27.2	70		
222	925278860000	BWCONRED48.3X5.08/33.4X4.55 SA403WP304H		Seamless	D39.2/D25.2	3		
	Grand Total					22365		

1.0 CODES:-

The fittings shall meet Indian Boiler Regulations (IBR) and the following requirements in addition to the standards specified in the Purchase Order (PO).

2.0 RAW MATERIALS:-

a) All pipes used for fittings shall meet the respective specification. The test certificate shall be furnished.
b) All mother pipes used for fittings shall be subjected to a hydraulic test as per SA 530 or UT as per ASTM E 213 at the mill
c) All plates used for fittings shall be UT tested as per S1 of SA578 and acceptance norms shall be as per Level B of SA578
d) The raw material forging shall be ultrasonically tested as per SA 388 and the acceptance norm shall be as per 3.3.4 of ASME Sec VIII Div 2.
e) Steel for SA182 F11,F12 &F22 if indigenously procured, to be from following manufacturers approved under IBR for creep resistant steels: i) Alloy Steel Plant Durgapur, ii)Tata Iron & Steel company, Jamshedpur & iii) Mahindra Ugine Steel Company , Mumbai.
f) Carbon content of SA 234 WPB, WPC, SA 105 fittings shall be restricted to 0.25% max

3.0 PROCESS:-

a) Process of manufacture shall conform to applicable standards.
b) All fittings shall be of seamless unless otherwise specified in the purchase order.
c) In case of welded fittings, WPS, PQR & welder qualification shall be approved by BHEL - PC, prior to start of welding.
d) All fittings shall have smooth surfaces, workman like finish and free from loose scales and defects like laps, seams, folds, cracks, pitting etc.. Repair by welding is NOT permitted.
e) Dimensions shall be as per ASME B16.9 or B16.28, Butt Weld edges shall be as given in Purchase Order. The ends of reducers shall have a straight portion of Minimum 13mm.
f) Unless otherwise specified in the P.O SA 234 WP 11/12/22 fittings shall be supplied as per class1, SA 182 F11/12 shall be supplied as class 2; SA 182 F22 shall be of class 3 only.

4.0 HEAT TREATMENT:-

4.1 All fittings shall be heat treated as below.

SA 234 WP B	- As per specification
SA 105,SA234 WP C	- Normalised
SA234 WP11/ WP12/ WP22	- Normalised & Tempered
SA182 F11/ F12/ F22	- Normalised & Tempered
Stainless Steel :-	
SA 182 F304/ 316/ 321/ 347	- Solution annealed
SA 403 WP304/ 316/ 321/ 347	- Solution annealed
SA 815 (Duplex Stainless Steel)	- Solution annealed

4.2 Fittings confirming to SA 234 WP91 and SA182 F91shall be normalised at 1040 to1070deg C (for wall thickness larger than 75 mm, accelerated cooling may be done to obtain a fully martensitic structure) and tempered at 760 ± 10 deg C. Soaking time:1Hr. minimum. Still air cooling.

Approved by	
G.Venkataramani, Engg & Qlty	K.Vedaprasad, QC
G.Panneer Selvam, QA	K. Ganeshan, OPC & MPL

5.0 TESTING: -

(a) MPI / LPI:- All ferrous fittings shall be tested by MPI as per ASTM E-709 and SS fittings shall be LPI tested as per ASTM E 165.

(b) Tensile Test:- One fitting of each specification, heat, heat treatment lot and size shall be subjected to Tension Test as per applicable standard.

(c) Ultrasonic Test:- All fittings of wall thickness above 6mm or NB 200mm and above shall be Ultrasonically Tested as per SA 388; acceptance norms shall be 3.3.4 of ASME section VIII Div.2.

(d) Hardness Test:- For WP91 / F91 & SA 815 (Duplex Stainless Steel) fittings Hardness test shall be carried out on 100% of the fittings. For other fittings hardness shall be checked on 10% of the fittings.

(e) Radiography Test (for Welded fittings):- All the welds shall be 100% RT tested and acceptance norms shall be UW 51 of ASME Sec VIII DIV-1.

(f) The following **supplementary tests** shall be carried out for specifications namely SA105, SA 182 F11 / F12 / F22 / F91, SA 234 WPC / WP11 / WP12 / WP22 / WP91 (No supplementary test applicable for SA 234 WPB)
a) Product analysis – one / heat / size.
b) Tension test – one / heat / heat treatment lot / size.

(g) Metallography:- Metallography shall be carried out on one per heat, per size, per heat treatment lot of WP91 / F91 fittings. Acceptance norms - The Material shall be free from any micro fissures. Microstructure shall show tempered martensite and also to be examined for any grain growth. Photomicrograph with 500x (Min) magnification along with Metallography report to be provided. The actual magnification shall be indicated.

6.0 POSITIVE MATERIAL IDENTIFICATION (PMI) FOR ALLOY STEEL FITTINGS.

Each alloy steel fitting shall be checked for the correctness of the material during manufacturing and final inspection using X-ray fluorescence principle or spark emission spectrography.

7.0 PAINTING, COLOUR CODING, MARKING, PACKING & END PROTECTION

7.1 **PAINTING:** All fittings (except stainless steel and galvanised) shall be **painted** on the external surface as given below

a) Surface preparation: Blast cleaning
b) **Indigenous Vendor:** 50 microns of Red oxide zinc phosphate confirming to IS 12744 followed by 70 microns of Synthetic enamel paint confirming to IS2934.
c) **Foreign Vendor:** 100 microns of Sea worthy Epoxy paint.
d) Shade : (i) Smoke grey – shade no 692 of IS5 for all carbon steel fittings.
(ii) Sea green – shade no 217 of IS5 for all Alloy steel fittings.

The internal surface shall be protected with rust preventive coating or rust inhibitor. Stainless steel and Galvanised fittings need not be painted.

7.2 **COLOUR CODING:** All fittings shall be colour coded circumferentially at ends as given below

SA 234 WPB / WPBW	=	Red
WPC / SA105	=	Blue
WP11 / SA182 F11	=	Green & White
WP12 / SA182 F12	=	Black & Red
WP22 / SA182 F22	=	Blue & Red
WP91 / SA182 F91	=	Brown & Red
SA182 / SA 403 F / WP 304	=	Blue & Yellow
316	=	Black & Green
321	=	Blue & Brown
347	=	Yellow & Black
SA 815 (Duplex Stainless Steel)	=	Red, White & Green

7.3 **MARKING** (In English only):

7.3.1 The fittings dispatched to **BHEL Stores** shall be hard punched / etched with Material code, Heat number, material specification, maker`s emblem, Inspectors seal and Statutory authorities seal (as applicable).
In addition, the above details along with size shall be paint stencilled on the fittings.
If the thickness of the fitting is less than 6 mm, punching is not permitted and the above details shall be paint stencilled only. Fittings of size up to 2" (50mm) shall be tied together and the above details shall be punched / etched in a separate tag and tied to it.

7.3.2 The fittings dispatched directly to project site as **DTS** shall be hard punched and paint stencilled with DU code (14 digit work order du detail) as given by purchase in addition to marking done as per Para 7.3.1.

7.4 **PACKING AND END PROTECTION:** Machined ends of the fittings shall be well protected using end caps and fittings shall be suitably packed in box / crate to avoid transit & other damages.

8.0 INSPECTION & CERTIFICATION (In English only): -

All fittings are to be Inspected at the manufacturer's works by the Inspection agencies / authorities as per IBR and as indicated in the P.O. Inspection certificate in IBR Form III C shall be submitted along with the Work Test Certificate countersigned by the above authorities and shall include the following.

1. Test Certificate Number & date.
2. BHEL P.O Number & Amendment Number
3. BHEL P.O. Serial Number
4. BHEL TDC Number
5. Size-wise Quantity
6. Specification, Grade & Year of code.
7. Heat/Melt Number
8. Starting material details.

9. Steel making process
10. Ladle Analysis of Raw Material and product analysis of fitting.
*11. Positive Material Identification (PMI) report for Alloy steel fittings.
*12. Supplementary Test (Product analysis, Tension test.) results.
*13. Heat Treatment Chart.
*14. NDE report. (VISUAL.MPI, LPI, UT)
*15. Tensile Test Report
*16. Hardness Test Report
17. Metallography Report along with photomicrograph with 500x (min) magnification.
*18. Dimensional conformance.
*19. RT test report / Results (for welded fittings)
*20. Guarantee of HTP shall be given as follows:- "Fittings are capable of withstanding without failure, leakage or impairment of their serviceability a hydrostatic test pressure equal to that prescribed for the specified matching pipe of equivalent material".

*Details furnished in the Tests certificate in lieu of chart/report is acceptable.

9.0 RECORDS OF REVISION:-

Rev 01 : **a)** Fully revised for better clarity.

b) Para 2.0 (e) added.

Rev 02 : **a)** Para 2.0 (c): UT acceptance norms revised from level A to B.

Rev 03 : **a)** Fully revised for better clarity.

b) Para 4.2, 6.0, 8.0 (11) added.

c) Para 2 (d), 4.1, 5 (d) are revised.

Rev 04 : **a)** Para 5.0 (g), 7.0 and 8.0 (17) are revised.

Rev 05 : **a)** New material specification SA 815 Duplex Stainless Steel included.

b) Para 4.1, 4.2, 5.0 (d), 7.1 & 7.2 are revised.

c) 5.0 (a), (b), (c), (e), (f), (g), 7.3.1 & 7.3.2 are modified for better clarity.

*****

Approved by

G.Venkataramani, Engg & Qlty — K. Vedaprasad, QC

G.Panneer Selvam, QA — K. Ganeshan, OPC & MPL

FIRST ANGLE PROJECTION(ALL DIMENSIONS IN MILLIMETRES)

DRAWING No. 3-80-300-19825

NOTES: –

01. APPLICABLE FOR P91 MATERIAL
02. FOR OD MISMATCHING REF. FIGURE–Xa.
03. α = 6° FOR WALL THICKNESS ≤ 30 mm
04. α = 10° FOR WALL THICKNESS > 30 mm

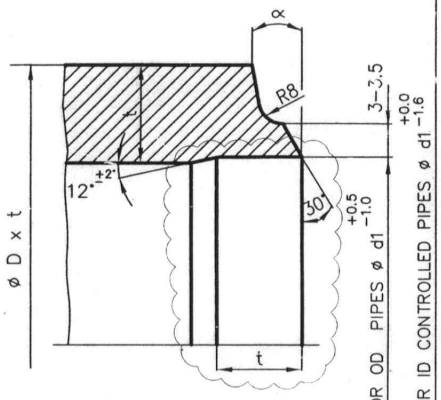


FIGURE – X

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. α = 6° FOR WALL THICKNESS ≤ 30 mm
03. α = 10° FOR WALL THICKNESS > 30 mm

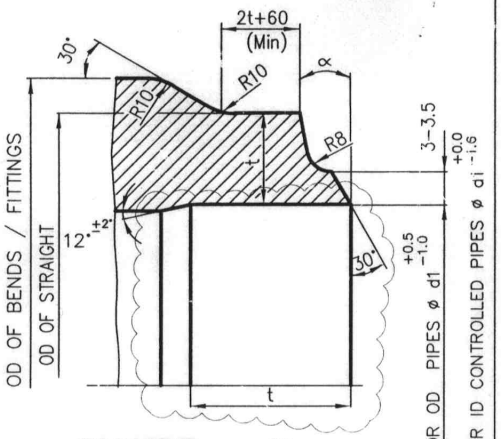
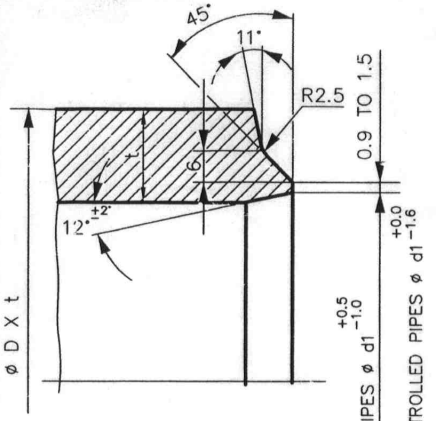


FIGURE – Xa



NOTES: –

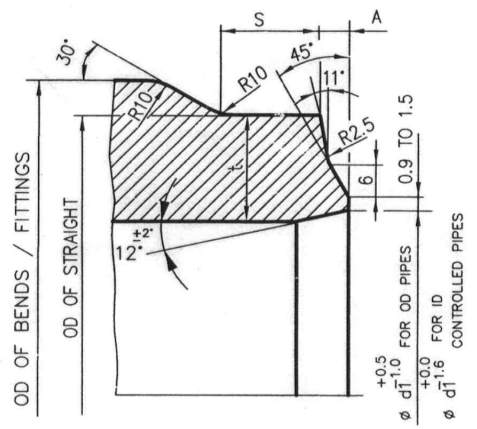
01. USE WHEN t ≥ 14.2 mm.
02. FOR OD MISMATCHING REF. FIGURE–Pa

STYLE – P

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

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)

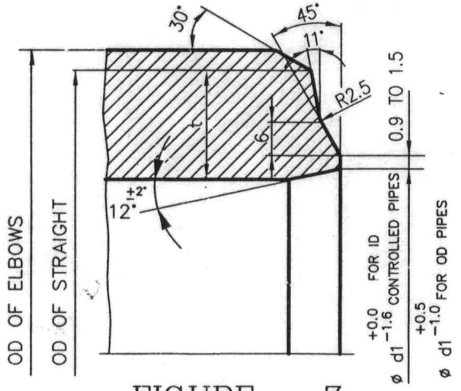
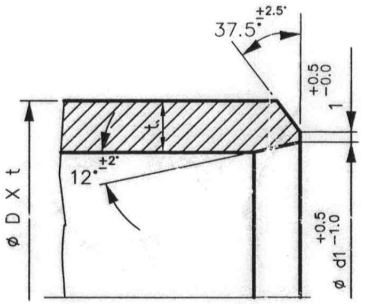


FIGURE – Z



STYLE – D

NOTES: –

01. USE WHEN t < 14.2 mm.

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.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: STANDARD (61)

BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, CHENNAI

	NAME	SIGN	DATE
DRN	K.B.RAGUNATH	B.Ragu	11.10.01
CHD	M.C.SEKARAN		11.10.01
APPD	A.VELAYUTHAM		11.10.01

REV	DATE	ALTERED / APPROVED
01	11-05-04	R. Senthil /

ZONE: PROJECT NAME REMOVED AND 'STANDARD' INCORPORATED IN TITLE BLOCK.

DEPT.	GRADE OF UN TOL. DIM	SCALE	WEIGHT (Kg).	NAME OF ORIGINAL ORGANISATION	ITEM No.
CODE	C/M/F				

TITLE: EDGE PREPARATION DETAILS

CARD CODE	DRAWING No.	REV
U 01	3-80-300-19825	01

NO OF ITEMS

SIZE A3

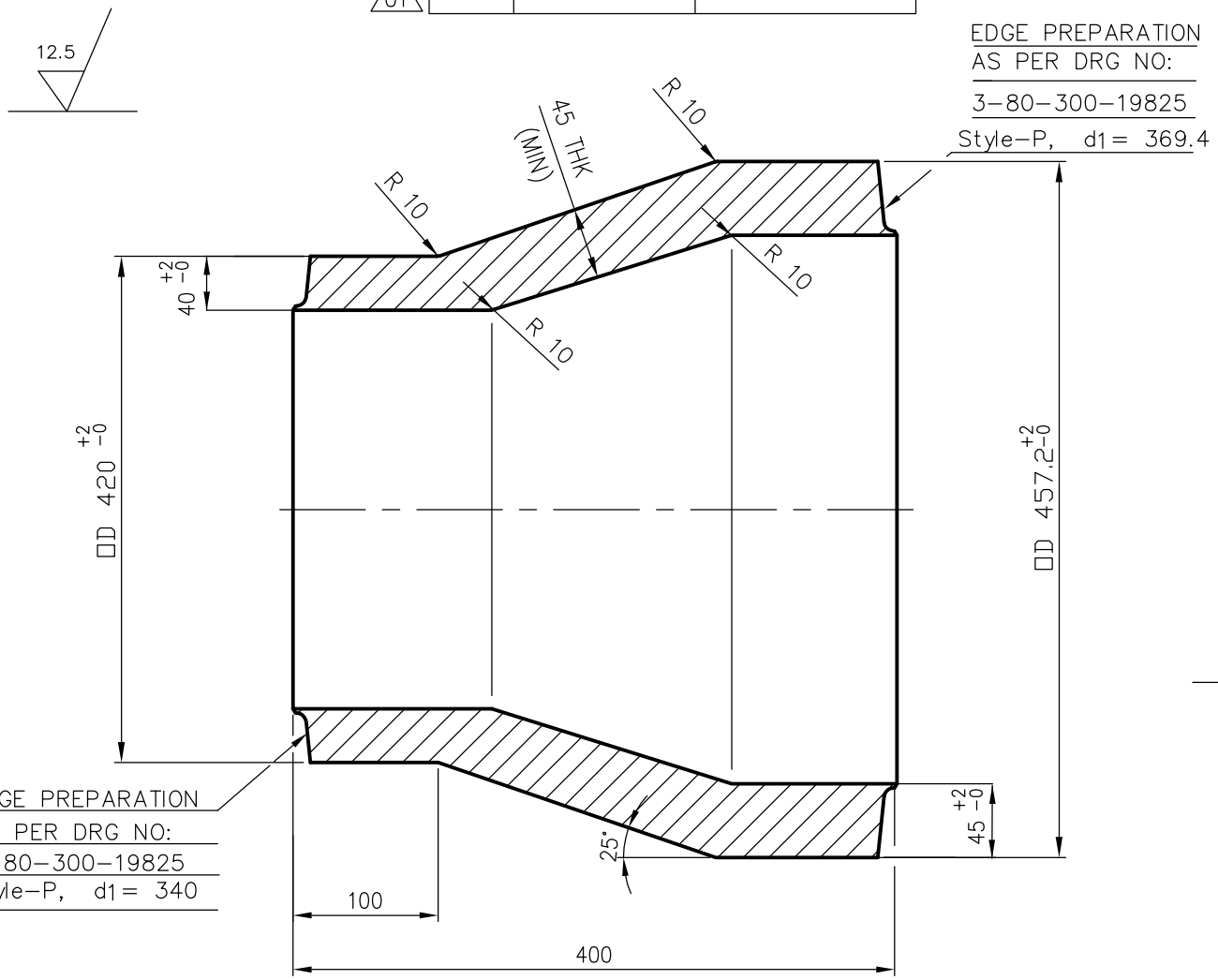
EP1

REV	DATE	ALTERED: POONGKODI.V
01	06.01.12	APPROVED: C.V.NATHAN
DESIGN PARAMETER #2 ADDED.		
REVISION MARKED AS 01		

ALL DIMENSIONS ARE IN MILLIMETRES

DESIGN PARAMETER :-

Sl.No	PRESSURE Kg/Cm ^{2}(g)	TEMPERATURE °C
1.	54	500
01 2.	73.5	490



	REDUCER OD457.2X45/OD420X40		92 117 515 0000	A		178 000
			SA234WP22CL1			
VAR NO.	DESCRIPTION	STD	MATL. CODE	A/C	UNIT	UNIT.WT.(Kg)
			MATL. SPECN.		DI	QTY.

BHARAT HEAVY ELECTRICALS LIMITED
PIPING CENTRE
CHENNAI 600 017

	NAME	SIGN	DATE	NO.OF VAR
DRN	SUDHAKAR		07.10.09	
CHD	SUDHAKAR		07.10.09	
APPD	PARAM		07.10.09	

DEPT CODE	GRADE OF UNTOL.DIM C / M / F	SCALE	WEIGHT (KG).	BHEL PO REF.NO:	ITEM NO.	NO. OF ITEMS
		N.T.S	178.000			

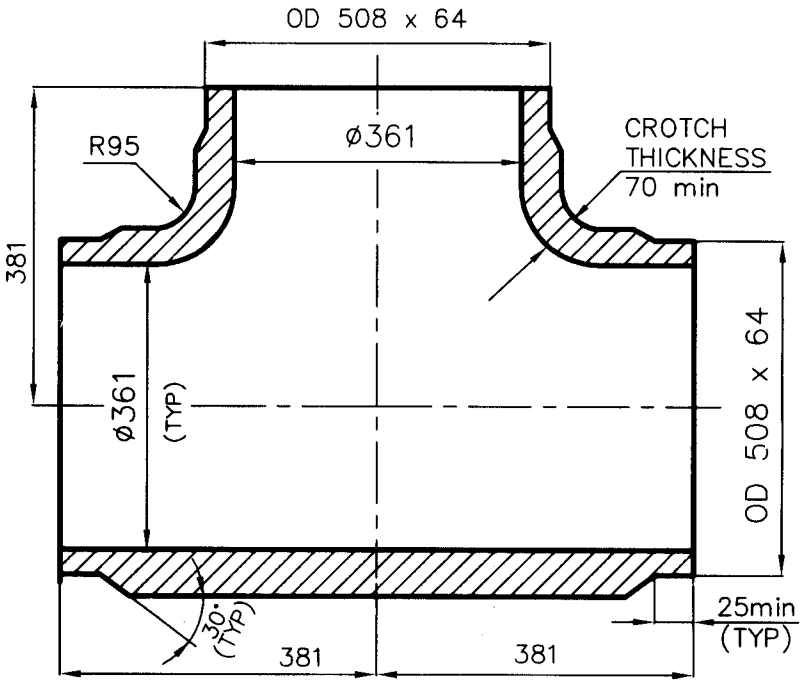
TITLE	CARD CODE	DRAWING NO.	REV
REDUCER (OD457.2x45/OD420x40)	U 01	**4-80-321-69528**	**01**

Size A4

REV	DATE	ALTERED
		APPROVED

ALL DIMENSIONS ARE IN MILLIMETRES

RAW MATL SPECN: SA106Gr.C(A)
FITTING SPECN : SA234WPC(A)
FITTING SPECN : SA234WPC(A)
FITTING MATERIAL CODE :92 505 779 0000



NOTES:

1) ALL DIMENSIONS ARE FINISHED DIMENSIONS.
2) FOR TOLERANCES REFER STD. DRG. NO. 4-80-301-26192.
3) MANUFACTURING, INSPECTION AND TESTING SHALL BE AS PER IBR,ASME B16.9 & SA234.
4) MINIMUM THICKNESS FOR MAIN & BRANCH SHALL NOT BE LESS 56 mm
5) BORE TO ø361 AFTER FORMING, ON RUN AND BRANCH ENDS.
6) EDGE PREPARATION SHALL BE AS PER DRG. No.3-80-300-19825 STY. P d1=392.00
7) HIGHER THICKNESS RAW MATERIAL PIPE CAN ALSO BE USED IN VIEW OF NOTE 5.
8) TEE SHALL BE MACHINED ON THEIR OUTSIDE DIAMETER BOTH RUN OF BRANCH ENDS FOR A MINIMUM LENGTH OF 25mm AS SHOWN IN THE DRG

PIPE OD 812.8 x 75 NOM L=1200	15 983 567 1200	A	1635.000	
	SA 106 GRC			
RAW MATL SIZE	MATL. CODE	A	UNIT WT	
	MATL. SPECN.	C	QTY	

STANDARD

BHARAT HEAVY ELECTRICALS LTD.
PIPING CENTRE
MADRAS 600 017

	NAME	SIGN	DATE
DRN	K.R.BALA	K.R.B.L	21.07.06
CHD	T.N.ELANGOVAN		21.07.06
APPD	T.N.ELANGOVAN		21.07.06

DEPT / CODE	GRADE OF UNTOL.DIM C / M / F	SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.
			1635.000	

TITLE	CARD CODE	DRAWING NO.	REV
EQUAL TEE OD 508 x 64	U 01	4-80-423-62608	00

Size A4

TEE342