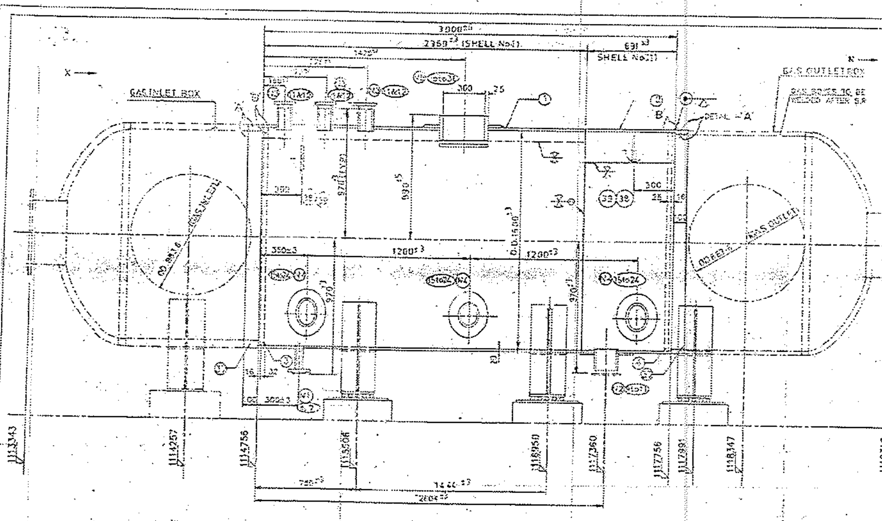
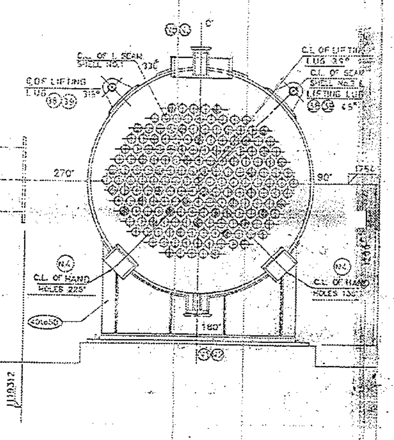
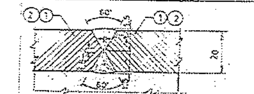


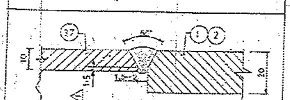
SECTIONAL ELEVATION



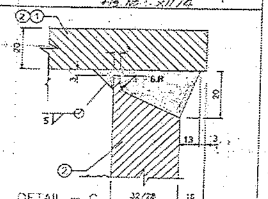
VIEW - X WITH OUT GAS BOXES



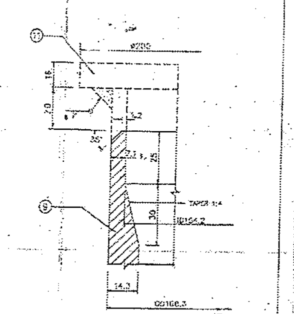
WELDING DETAIL OF L-SEAM AND C-SEAM SHELL



DETAIL - B

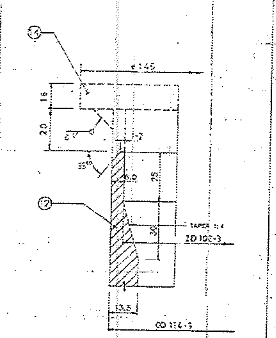


DETAIL - C



EDGE PREPARATION FOR (N2)

(Fig.no.-28(1X)(c))



EDGE PREPARATION FOR (N3)

(Fig.no.-28(1X)(e))

MATERIAL OF CONSTRUCTION

- SHELL, TUBE PLATE, R.F. PADS, FLANGES, WEAR PLATES etc. - CS TO SA 515-70, IS 2002-2, SA 516-60, SA 515-70
- STAND PIPES - CS TO SA106 GR.B
- TUBES - CS TO BS3059P 2 S2 Cat 2 Gr 360
- SADDLES - MS TO IS 226
- GAS BOXES - IS2002-2

FOR FURTHER DETAILS PLEASE REFER :

1) MOC & QTY	PART LIST
2) DESIGN DATA	STRENGTH CALCULATIONS S.D. No.2343
3) SADDLES	20732A2
4) GAS BOXES	20AOTS
5) PROCESS PARAMETERS / SPECIFICATIONS	ANNEXURE No.2
6) PROCESS CALCULATIONS	PC1343

VALVES AND MOUNTING SHALL BE FITTED AT SITE.
AT THE TIME OF REGN. BY M/s. R.C.F. LTD, BOMBAY.

PARTS LIST

S No	DESCRIPTION	MATERIAL	QTY	Wt (kgs)	REMARKS
				8274Kg	
50	[illegible] 1"BSW x 600 lg	MS to IS 226	8	25	201 SA 044
49	STOPPER Ø30x50 lg	MS to IS 226	4	2	201 SA 044
48	ANCHOR PLATE 1600x450x16	MS to IS 226	2	23	201 SA 044
47	ROLLERS Ø70x1400 lg	MS to IS 226	10	140	201 SA 044
46	FLAT 30x10-310 lg	MS to IS 226	4	1	201 SA 044
45	FLAT 30x10-1400 lg	MS to IS 226	12	40	201 SA 044
44	BASE PLATE 1400x250x16	MS to IS 226	2	90	201 SA 044
43	GUSSET-OUTER 485x117x16	MS to IS 226	8	35	201 SA 044
42	GUSSET-INNER 310x117x16	MS to IS 226	8	35	201 SA 044
41	RIB 1400x625x16	MS to IS 226	2	232	201 SA 044
40	WEAR PLATE 1775x250x15	IS 2002-2	2	114	201 SA 044
39	LUG 200x150x25	M-S to IS 226	4	32	
38	PAD FOR LUG (ELLIPTICAL) 215x165x20	SA 515-70	4	4	
37	SHELL OD 1600 x 10 thk 4893x100x10	IS 2002-2	2	82	
36	CAP PLATE 100x56x12	MS to IS 226	2	2	N5
35	STIFFNER (INNER) 65x40x16	MS to IS 226	4	2	N5
34	STIFFNER (OUTER) 95x40x16	MS to IS 226	4	3	N5
33	SIDE PLATE 340x95x16	MS to IS 226	4	17	N5
32	STUD + NN M33 x 335 lg	EN-8	2	4.5	N5
31	BOSS Ø65 / M33 x 50 lg	EN 8	2	2	N5
30	SQ ROD 6x6-1100 lg	M-S to IS 226	1	0.5	N5
29	GASKET SEE DRG x 3 thk	C.A.F	1	-	N5
28	HANDLE Ø12 x 300 lg	M-S to IS 226	2	0.5	N5
27	M.H COVER (ELLIPTICAL) 450 x 350 x 22 (25)	SA 515-70	1	25	N5
26	R.F. PAD (ELLIPTICAL) 100 WIDE x 20	SA 516-60	1	25	N5
25	M.H NOZZLE (in 2 pcs) 1200 x 170 x 25	SA 515-70	1	35	N5 SHEET 4 OF 4
24	CAP PLATE 115 x 56 x 10	-do-	6	3.0	N4
23	STIFFNER 65 x 40 x 15	-do-	12	3.0	N4
22	SIDE PLATE 165 x 65 x 16	M-S to IS 226	12	4.5	N4
21	STUD + NN 1"BSW x 260 lg	EN 8	6	4	N4
20	BOSS Ø65 / 1"BSW x 30 lg	EN 8	6	-	N4
19	SQ. ROD 6x6-350 lg	M-S to IS 226	6	-	N4
18	GASKET See drg x 3 thk	C.A.F	6	-	N4
17	H.H COVER (ELLIPTICAL) 160 x 210 x 18 (20)	SA 516-60	6	26	N4
16	H.H PAD (ELLIPTICAL) 65 WIDE x 20 thk	SA 516-60	6	39	N4
15	H.H NOZZLE ID 127 / 178 x 16 thk 150 lg	IS 2002-2	6	53	N4 SHEET 3 of 4
14	TEST COVER Ø145 x 16 thk	M-S to IS 226	3	7	N3
13					
12	PIPE 4"NB x 160 SCH OD 114.3 x 13.5 x 200 lg	SA 106 gr.B	3	20	N3
11	TEST COVER Ø200 x 16 thk	M-S to IS 226	1	4.0	N2
10	R.F. PAD Ø370 / Ø171 x 20 thk	SA 516-60	1	11	N2
9	PIPE 6"NB x 120 SCH OD 168.3 x 14.3 x 200 lg	SA 106 gr.B	1	11	N2
8	S.O.R.F. FLG 2"NB x 300# Ø165 / Ø63 x 26 (28)	SA 515-70	1	4.0	N1
7	PIPE 2"NB x 160 SCH OD 60.3 x 8.7 x 175 lg	SA 106 gr.B	1	2.0	N1
6	STAY TUBES OD 63.5 x 6.35 x 2980 lg	BS-3059-P.2 S2 Cat 2 Gr 360	47	1222	
5	PLAIN TUBES OD 63.5 x 4.47 x 2980 lg	BS-3059 P.2 S2 Cat 2 Gr 360	138	2861	
4	TUBE SHEET (REAR) Ø1554 x 28 thk	SA 515-70	1	293	
3	TUBE SHEET (FRONT) Ø1554 x 32 thk	IS 2002-2	1	335	
2	SHELL OD 1600 x 20 4963 x 631 x 20 thk	SA 515-70	1	500	Shell No.2
1	SHELL No.1 OD 1600 x 20 WT 4963 x 2369 x 20 thk	SA 515-70	1	1861	

NOZZLE AND FLANGE DATA

MARK	SERVICE	NOZZLE NB	NOZZLE SCH	NOZZLE THK	FLANGE TYPE	FLANGE FACE	FLANGE RATING	QTY
N1	BLOW DOWN Conn. (INT)	2"	160	8.7	S.O	R.F	300#	1
N2	STUB FOR D.C.	6"	120	14.3	-	-	-	1
N3	STUB FOR RISER	4"	160	13.5	-	-	-	3
N4	HAND HOLE	5"x7"	-	16.0	-	-	187K	6
N5	MAN HOLE	300x400	-	25.0	-	-	227K	1

DESIGN DATA

CODE	IBR 1950
EQPT	HEAT EXCHANGER No.II
WORKING PRESSURE Kg/cm^2g	16.50
DESIGN PRESSURE Kg/cm^2g	18.15
TEST (HYD) PRESSURE Kg/cm^2g	28.25
WORKING TEMP. °C	205
DESIGN TEMP °C	250
DESIGN TEMP (max) (Tube sheet)	[illegible]
CLASSIFICATION	CLASS - I
RADIOGRAPHY	100%
STRESS RELEIVING	YES
WELDING PROCESS	MANUAL METAL ARC
INSPECTION	D.O.B. A.P.
CERTIFICATION	FORM II & III
SURFACE AREA	107 m^2
INSULATION	BY R.C.F
BRICK & REFRACTORY LINING	BY R.C.F
PLAT FORMS LADDERS AND Foundations	BY R.C.F
WEIGHTS (in kgs) (WITH GAS BOXES)	
- EMPTY	10,320
- OPERATING	16,800
- TEST	14,450
CORROSION ALLOWANCE	
- SHELL	1.60
- TUBE PLATE	3.00
- TUBES	1.20
- OTHERS.	1.60

ENGINEERING NOTES

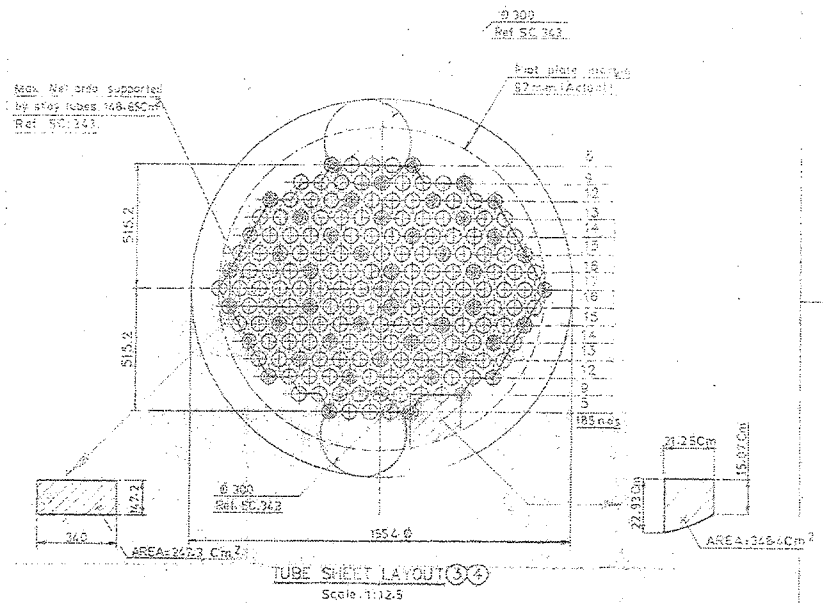
1) WELDING PROCESS - MANUAL METAL ARC TO IS 823
2) WELDING ELECTRODES - CARBON STEEL ELECTRODES ARE E 7018 / [illegible]
3) STRESS RELIEVING - COMPLETE BOILER WITH OUT GAS BOXES WILL BE STRESS RELIEVED AS PER REG No. 592
4) TUBE PLATE - SHALL PREFERABLY BE IN SINGLE PIECE. [illegible] IF ANY SHALL CLEAR TUBE HOLES [illegible] RADIOGRAPHED. TUBE PLATE SHALL BE SQUARE AND TRUE. ANY DEVIATION FROM TRUE PLANE SHALL NOT EXCEED 3mm. REMOVE ALL BURRS AND SHARP EDGES.
5) TUBE FIXING - THE TUBES SHALL BE EXPANDED AND SEAL WELDED TO THE FRONT & REAR TUBE SHEET.
6) MATERIAL - PLATES SHALL BE AS PER CHAPTER No. II REG. No. 9 TO 57. TUBES, PIPES SHALL BE AS PER CHAPTER No. III REG. No. [illegible] TO 47.
7) PAINTING - EXTERNAL SURFACES ARE TO BE CLEANED WITH SOLVENT AND HAND TOOLS TO BE FREE FROM OIL/GREASE/SOIL/SPATTER/RUST etc. BE FORE PAINTING WITH ONE COAT OF RED OXIDE PRIMER AND ONE COAT OF FINISHED PAINT OF [illegible] THICKNESS. PAINTING TO BE DONE AFTER FINAL TESTING AND INSPECTION.
8) INSULATION - EXTERNAL SURFACE OF THE [illegible] AND GAS BOXES ARE TO BE INSULATED [illegible] THE RESPECTIVELY WITH MINERAL WOOL AND TO BE CLADDED WITH 22 SWG AL. SHEET.
9) FLANGES - FLANGES WILL BE S.O.R.F. TO ANSI B16.5 CLASS 300 RATING AND WILL BE MADE FROM C.S PLATES IN SINGLE PIECE. FLANGE FACE TO BE MACHINED AFTER WELDING TO NOZZLE.
10) FLANGE FACES - FLANGE FACE SHALL HAVE CONC. GROOVES OF [illegible] DEPTH AND 90° VORTEX ANGLE.
11) BOLT HOLES - BOLT HOLES SHALL STRADDLE WITH CENTRE LINES OF NOZZLES.
12) REFRACTORY LINING - INNER SURFACE OF GAS INLET BOX / OUTLET BOX TO BE LINED [illegible] CASTABLE REFRACTORY LINING [illegible] SUITABLE FOR [illegible] AFTER TESTING PLEASE REFER DRG No. 20AOTS FOR DETAILS.

* AN EXTRA LENGTH OF 20mm PROVIDED FOR HYD TEST PURPOSE ON COMPLETE TESTING CUT-OFF THE EXTRA LENGTH AND PREPARE THE EDGES AS SHOWN

RASHTRIYA CHEMICALS & FERTILIZERS LTD.
CHEMBUR, MUMBAI-400 074.

DRN.	SAGAR CHOGALE	TROMBAY UNIT	
		PLANT : SAP (M)	
CHG.		TITLE:- GENERAL ARRANGEMENT OF HEAT EXCHANGER No.II (107 SQ.M)	
SUB.			
DATE	05.11.24		

CERTIFIED BY		APPROVED	SCALE	DRAWING NO	REV.	
SECTION HEAD			NTS	450-M-397 (1OF4)	00	A1



TUBE SHEET LAYOUT (3)(4)
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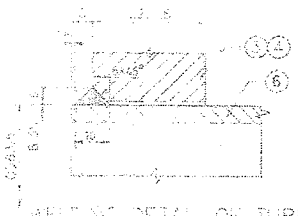
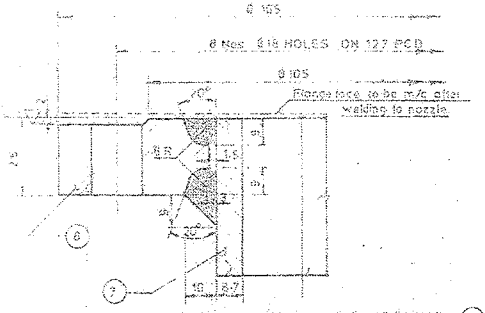
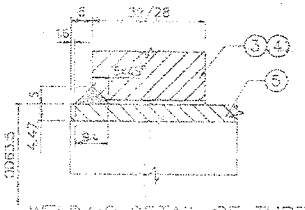


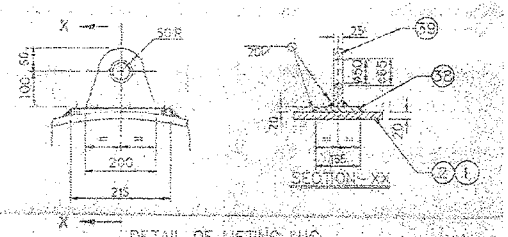
WELDING DETAIL OF TUBE SHEET TO STAY TUBES (Fig.no. XII/68)
TO BE EXPANDED ENTIRE LENGTH IN TUBE SHEET (32/28) AND SEAL WELDED AT BOTH ENDS.



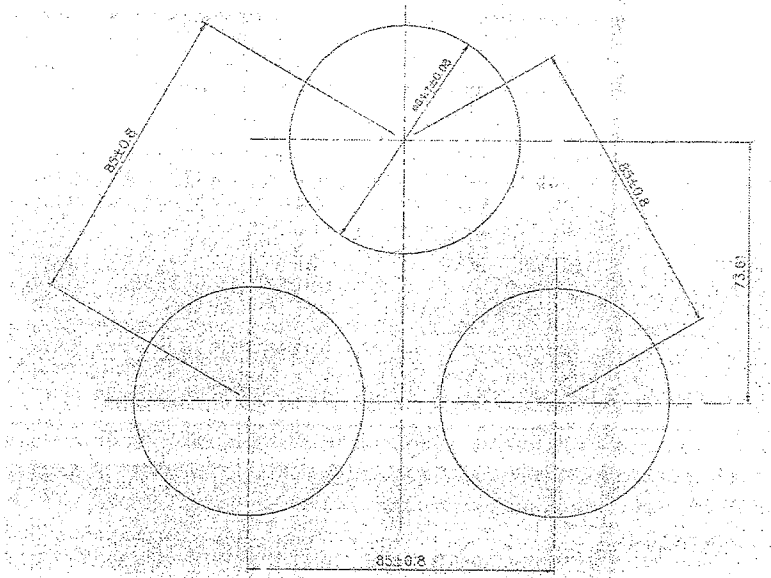
WELDING DETAIL OF NOZZLE TO FLANGE (N1) (FIG. No: XII/88)



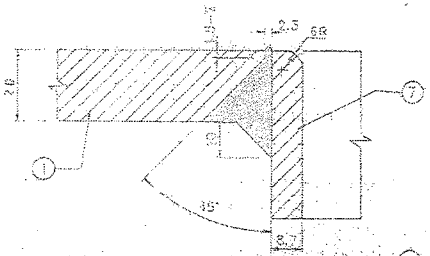
WELDING DETAIL OF TUBE SHEET TO PLAINTUBES (Fig.no. XII/68)
TO BE EXPANDED ENTIRE LENGTH IN TUBE SHEET (32/28) AND SEAL WELDED AT BOTH ENDS.



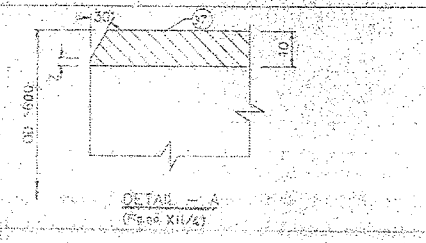
DETAIL OF LIFTING LUG



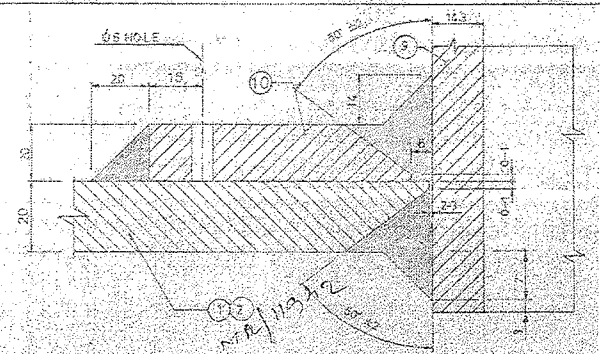
TUBE HOLE LAYOUT



WELDING DETAIL OF NOZZLE TO SHELL WITHOUT R.F. PAD (Fig. No. XII/84B)



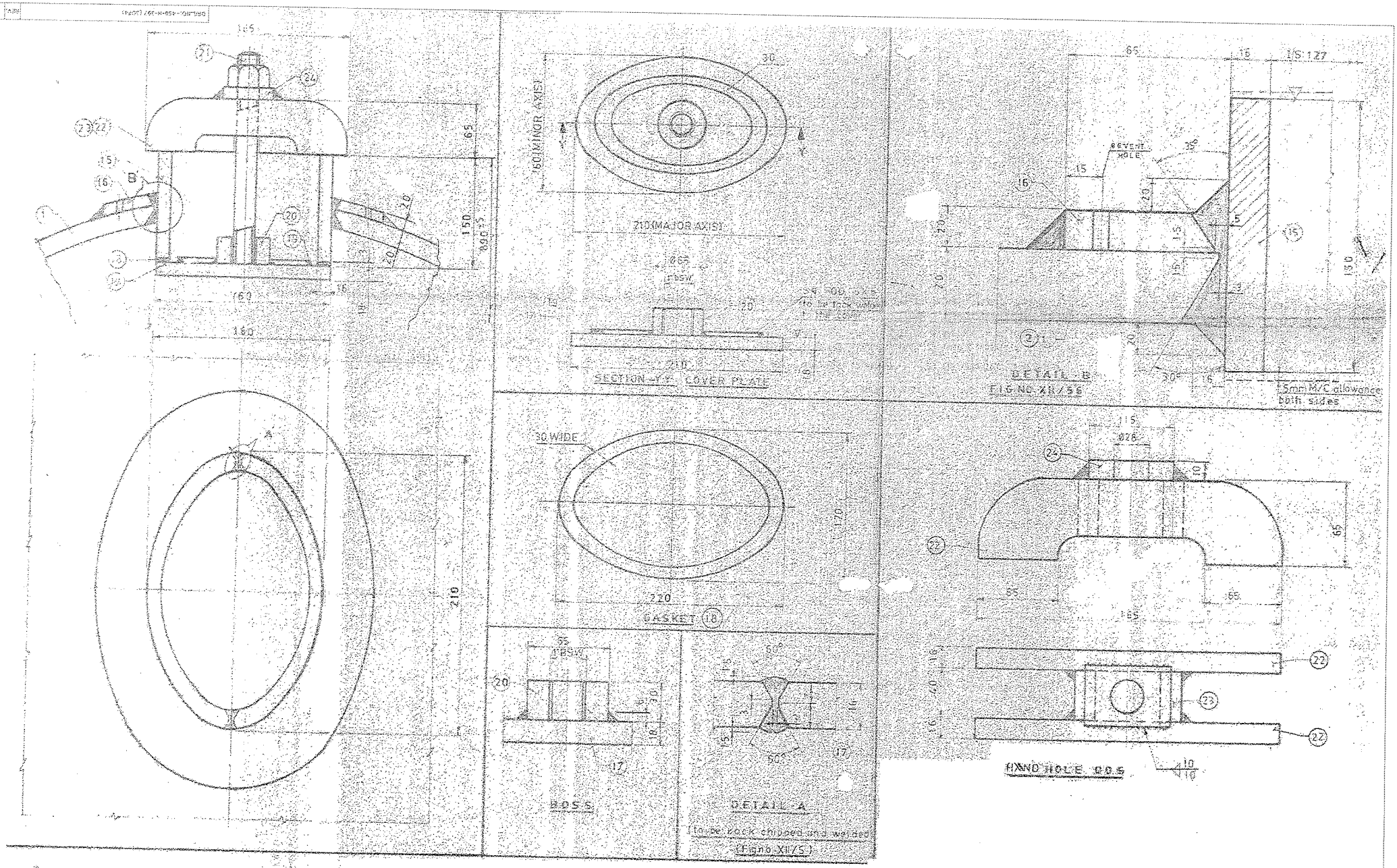
DETAIL — A
(Fig.no XII/47)



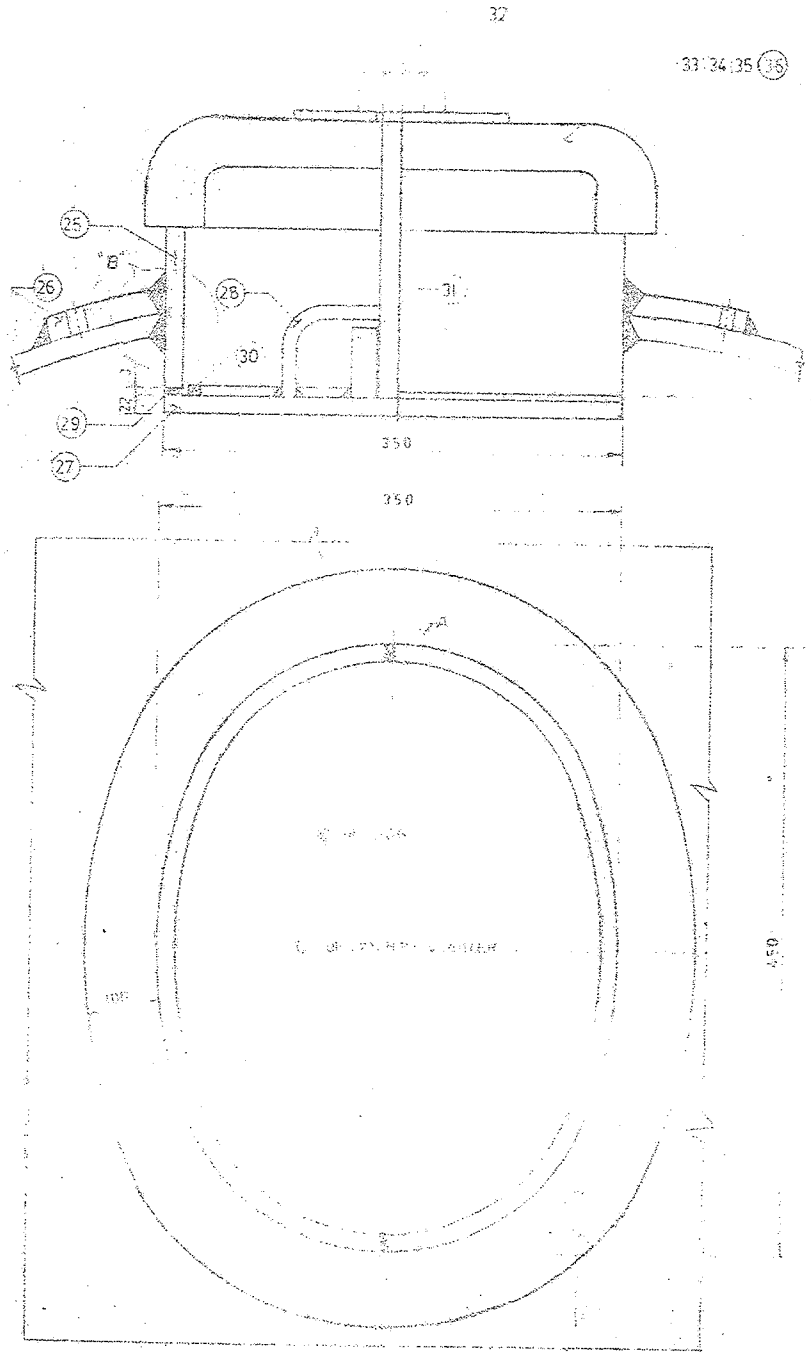
WELDING DETAIL OF NOZZLE (N2) TO SHELL WITH RF PAD (Fig.no. XII/88A)

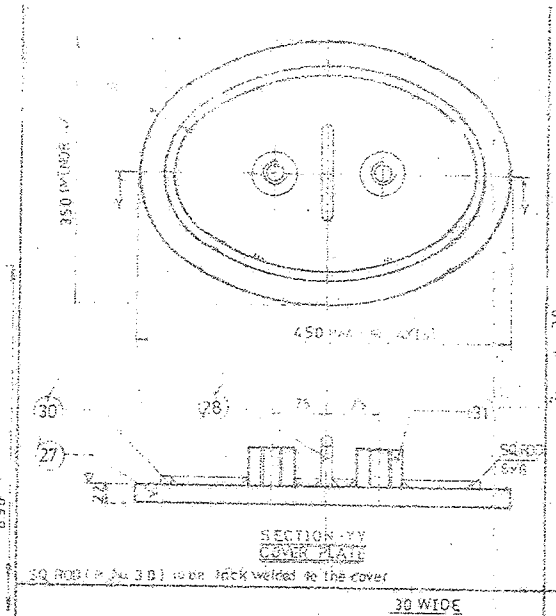
RFP/113/12

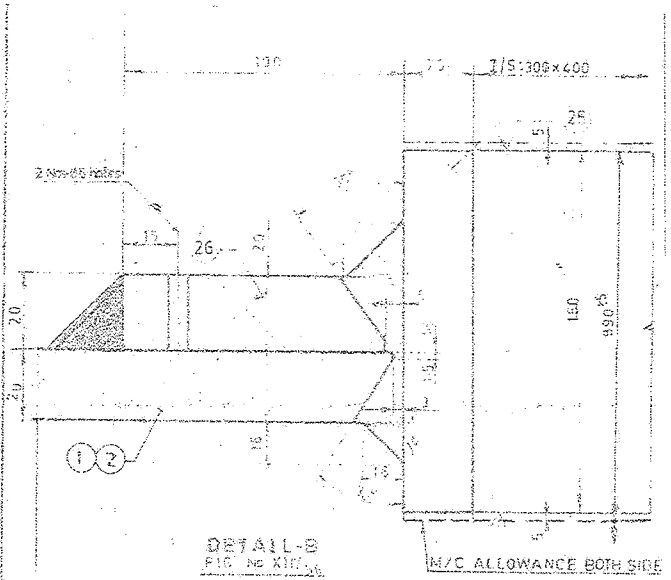
RASHTRIYA CHEMICALS & FERTILIZERS LTD. CHEMBUR, MUMBAI-400 074.			
DRN.	TROMBAY UNIT PLANT : SAP (M)		
CHD.	TITLE:- DETAILS OF HEAT EXCHANGER No.II (107 SQ.M)		
SUB.			
DATE 05.11.24			
CERTIFIED BY	APPROVED	SCALE	DRAWING NO / REV.
SECTION HEAD		NTS	450-M-397 (2OF4) / 00 / A1

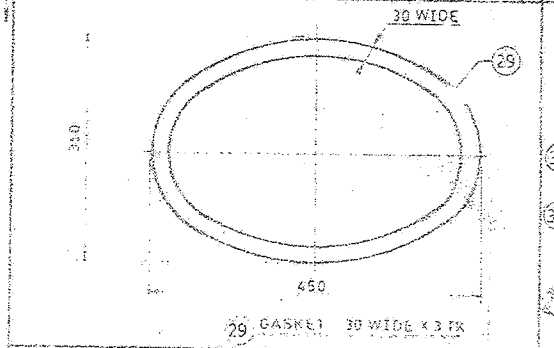


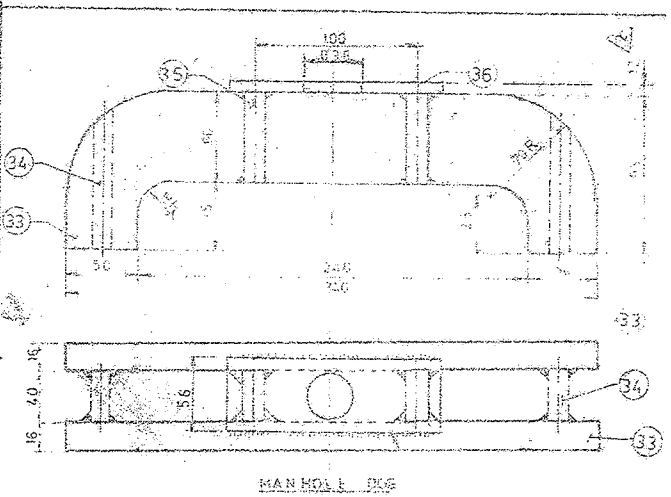
RASHTRIYA CHEMICALS & FERTILIZERS LTD. CHEMBUR, MUMBAI-400 074.			
DRN.		TROMBAY UNIT PLANT : SAP (M)	
CHD.		TITLE:- HAND HOLE 5"x7" FOR HEAT EXCHANGER No.II (107 SQ.M)	
SUB.			
DATE	05.11.24		
CERTIFIED BY	APPROVED	SCALE	DRAWING NO. / REV.
SECTION HEAD		NTS	450-M-397 (3OF4) / 00 / A1



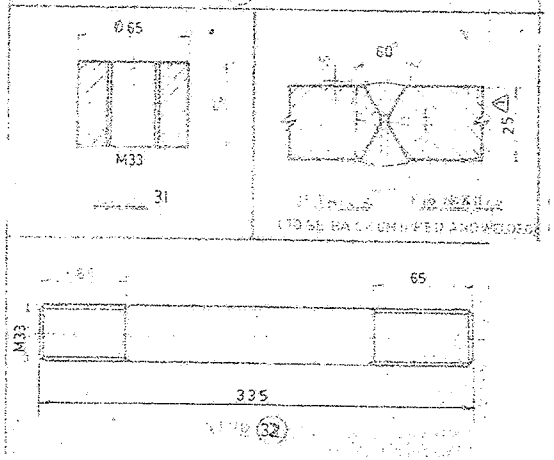






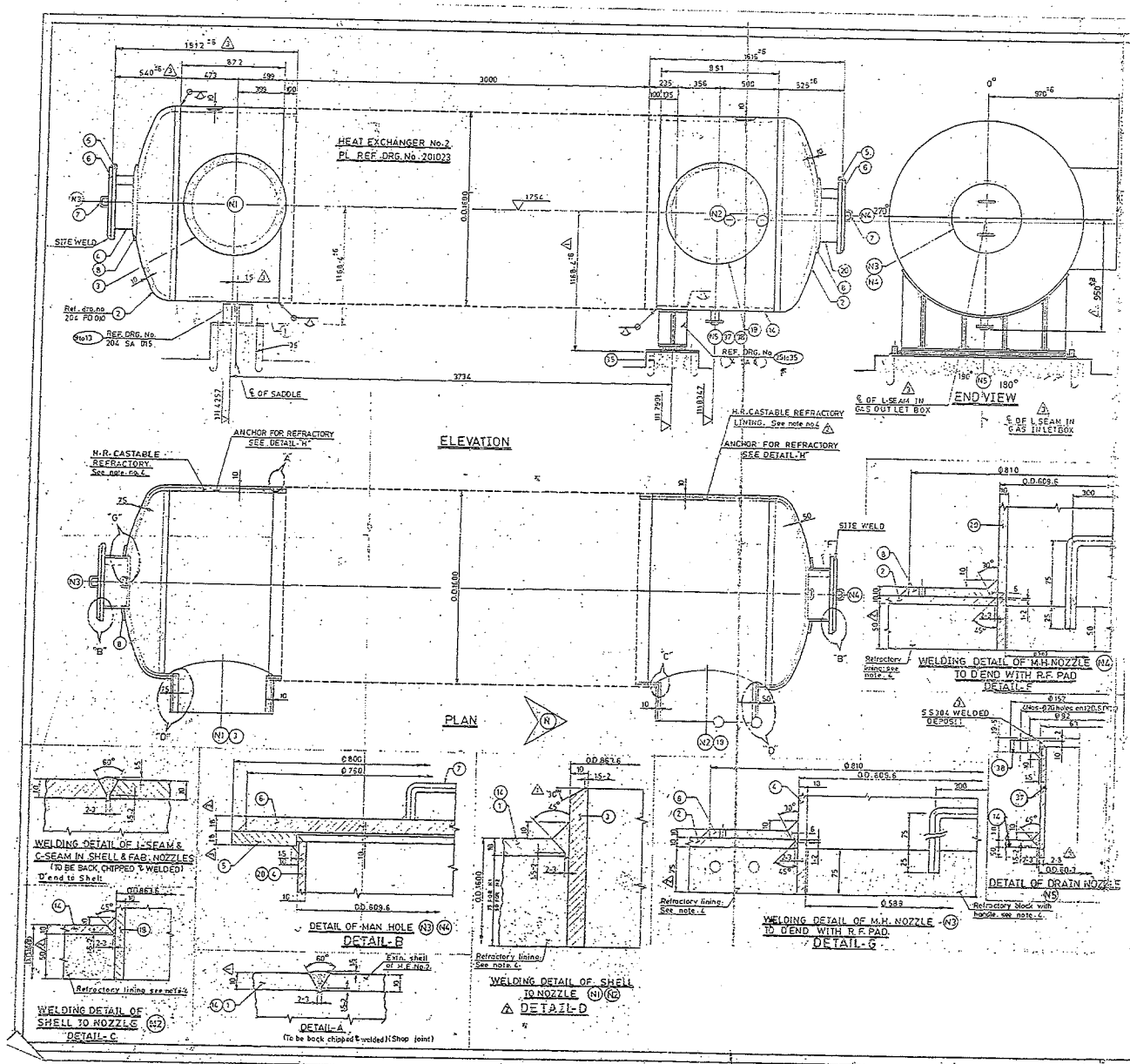


MAN HOLE DTG



	RASHTRIYA CHEMICALS & FERTILIZERS LTD. CHEMBUR, MUMBAI-400 074.			
DRN.	TROMBAY UNIT PLANT : SAP (M)			
CHD.	TITLE:- MAN HOLE 16"x12" FOR HEAT EXCHANGER No.II (107 SQ.M)			
SUB.				
DATE 05.11.24				
CERTIFIED BY	APPROVED	SCALE	DRAWING NO	REV.
SECTION HEAD		NTS	450-M-397 (4OF4)	00

A1



WELDING DETAIL OF M.H.NOZZLE TO D'END WITH R.F. PAD
DETAIL-F

WELDING DETAIL OF M.H. NOZZLE TO D'END WITH R.F. PAD.
DETAIL-G

WELDING DETAIL OF SHELL TO NOZZLE (N1) (N2)
⚠ DETAIL-D

WELDING DETAIL OF SHELL TO NOZZLE (N12)
DETAIL-C

WELDING DETAIL OF L-SEAM & C-SEAM IN SHELL & FAB. NOZZLES
(TO BE BACK CHIPPED & WELDED)
D'end to Shell

DETAIL OF MAN HOLE (N3) (N4)
DETAIL-B

DETAIL-A
(To be back chipped & welded) (Shop joint)

DETAIL OF DRAIN NOZZLE (N5)

DETAIL OF ANCHORING REFRACTORY LINING
DETAIL-H

PARTS LIST

S.No	DESCRIPTION	MATERIAL	QTY	Wt. (Kgs)	REMARKS
38	SORF. FLANGE 2"NB x 150# Ø152 / Ø63 x 19.5 (20)	IS2002-2	1	2·5	(N5)
37	NOZZLE 2"NB x 10 Sch OD 60.3 x 2·8 x 195lg	AISI 304	1	0·6	(N5)
36					
35	FOUNDATION BOLTS 1"BSW x 600lg	MS to IS 226	8	13	204 SA 014
34	STOPPER Ø30 x 50lg	MS to IS 226	2	2	204 SA 014
33	ANCHOR PLATE 1600x 450 x 16 Thk	MS to IS 226	1	58	204 SA 014
32	ROLLER Ø 330 x 1430	MS to IS 226	5	72	204 SA 014
31	FLAT 30 x 10 Thk - 3101g	MS to IS 226	2	2	204 SA 014
30	FLAT 30 x 10 Thk - 1400 lg	MS to IS 226	6	7	204 SA 014
29	BASE PLATE 1400 x 250 x 16 Thk	MS to IS 226	1	28	204 SA 014
28	RIB-OUTER 443 x 120 x 10 Thk	MS to IS 226	4	2	204 SA 014
27	RIB-INNER 275 x 120 x 10 Thk	MS to IS 226	4	12	204 SA 014
26	GUSSET 1200 x 650 x 10 Thk	MS to IS 226	1	75	204 SA 014
25	WEAR PLATE 1779 x 225 x 10 Thk	IS 2002-2	1	36	204 SA 014
24					
23					
22					
21					
20	M.H-NOZZLE OD 609.6 x 10 Thk 1883 x 241 x 10	IS 2002-2	1	16	(N4)
19	GAS NOZZLE OD 863.6 x 10 2682 x 369 x 10 Thk	IS 2002-2	1	62	(N2)
18					
17					
16					
15					
14	SHELL OD 1800 x 10 4995 x 891 x 10 Thk	IS 2002-2	1	355	
13	BASE PLATE 1400 x 250 x 16 Thk	MS to IS 226	1	28	204 SA 015
12	RIB-OUTER 485 x 120 x 10	MS to IS 226	4	20	204 SA 015
11	RIB-INNER 320 x 120 x 10	MS to IS 226	4	13	204 SA 015
10	GUSSET 1400 x 685 x 10	MS to IS 226	1	63	204 SA 015
9	WEAR PLATE 1585 x 250 x 10	IS 2002-2	1	36	204 EA 015
8	R.F.PAD Ø 810 / Ø 622 x 10	IS 2002-2	2	34	(N3) (N4)
7	HANDLE Ø 12 x 300 lg	MS to IS 226	4	—	(N3) (N4)
6	BLIND FLANGE Ø 780 x 18	IS 2002-2	2	145	(N3) (N4)
5	FLANGE (RING) Ø 660 / Ø 613 x 18	IS 2002-2	2	67	(N3) (N4)
4	M.H.NOZZLE OD 509.6 x 10 Thk 1883 x 267 x 10 Thk	IS 2002 2	1	21	(N3)
3	GAS NOZZLE OD 863.6 x 10 Thk 2682 x 400 x 10 WT	IS 2002-2	1	61	(N1)
2	DISHED END OD 1800 x 10 BLANK DIA 1975 x 10 Thk	IS 2002-2	2	448	204 PD 010
1	SHELL OD 1600 x 10 4995 x 872 x 10 Thk	IS 2002-2	1	310	

NOZZLE AND FLANGE DATA

MARK	SERVICE	NOZZLE DATA SIZE	NOZZLE DATA THK	FLANGE DATA TYPE	FLANGE DATA RATING	FLANGE DATA STD	Remarks
N1	GAS INLET	34"NB	10	BE	—	—	—
N2	GAS OUTLET	34"NB	10	BE	—	—	—
N3	MAN HOLE	24"NB	10	SORF	—	18Thk	—
N4	MAN HOLE	24"NB	10	SORF	—	18Thk	—
N5	DRAIN	1"NB	10Sch	SORF	150#	B16.5	—

DESIGN DATA ⚠

WORKING PRESSURE	Kg/cm²g	0·21
DESIGN PRESSURE	Kg/cm²g	0·44
TEST(AIR) PRESSURE	Kg/cm²g	0·60
WORKING TEMP.	IN/OUT °C	500/455
METAL TEMP.(Max) DESIGN TEMP.	°C	300
CODE OF CONSTRUCTION		GOOD ENGG PRACTICE
RADIOGRAPHY		NIL
STRESS RELIEVING		NIL
CORROSION ALLOWANCE		1·6

ENGINEERING NOTES

1) WELDING: ALL THE WELD JOINTS WILL BE DONE BY MANUAL METAL ARC WELDING . USING ELECTRODES TO A.W.S.-E6013. ALL THE BUTT-JOINTS TO BE BACK CHIPPED & WELDED.

2) FLANGES: FLANGES SHALL BE S.O.R.F. GASKET SEATING SHALL HAVE CONC. GROOVES OF 0.8 PITCH AND 0.4 DEPTH, 90° VORTEX ANGLE. FLANGE FACE TO BE MACHINED AFTER WELDING TO NOZZLE.

3) BOLT HOLES: BOLT HOLES SHALL STRADDLE WITH THE CENTRE LINES.

⚠ 4) REFRACTORY LINING: INNER SURFACE OF THE GAS INLET/OUTLET BOX TO BE REFRCTORY LINED WITH 25/50% Respectively with Castable Refractory having K = 0·24 Kcal/h-m-°c SUITABLE FOR TEMP. UPTO 800 °C BY CLIENT, AT SITE.

5) TESTING: THE GAS BOXES ARE TO BE TESTED AT SITE BY THE CLIENT, AFTER CONNECTING TO DUCTING.

6) PAINTING: EXTERNAL SURFACES SHALL BE CLEANED AND PAINTED ONE COAT OF RED OXIDE PRIMER AT SHOP PRIOR TO DESPATCH.

7) INSULATION: EXTERNAL SURFACE TO BE INSULATED WITH 100 Thk. MINERAL WOOL AND CLADDED WITH 24 SWG AL. SHEET, BY CLIENT, AT SITE.

MATERIAL OF CONSTRUCTION

GAS SIDE PARTS : C.S. TO I.S. 2002-2/EQ
SUPPORTS / SADDLES: M.S. TO I.S 226.

NOTE : THIS DRG. HAS BEEN SCANNED FROM TSI's DRG.NO: 204015 (REV-3)

	RASHTRIYA CHEMICALS AND FERTILIZERS LTD.	
SCAN	K.R.KONY.	TROMBAY UNIT
CHD.	—	PLANT : SAP-MECH
SUB.		GENERAL ARRANGEMENT & DETAILS
REC.		OF GAS BOXES FOR H.E. No : 2 (WAST HEAT BOILER No : 2)
ENGINEER		SCALE : NTS
DESIGNATION	SIGNATURE	DATE : 21/10/2010
CERTIFIED BY ABOVE		APPROVED.
		AS ORG. NO. 450-M-340 REV. 0