

35	PLATE	6 THK	1250	1250		IS2062 GR A	47.10	73.60	2	147.20
34	PLATE	6 THK	1250	1550		IS2062 GR A	47.10	91.25	2	182.50
33	PLATE	6 THK	1114	1250		IS2062 GR A	47.10	65.60	2	131.20
32	PLATE	6 THK	1114	1550		IS2062 GR A	47.10	81.35	2	162.70
31	ISA	75X 6	6348			IS2062 GR A	6.80	43.16	4	172.64
30	HEX HD BOLT WITH NUT	M16	50			IS1367 CL4.6/4.0	15.00	0.15	20	3.00
29	PLATE	3 THK	106	582		SS 304	24.72	1.45	2	2.90
28	PLATE	3 THK	106	582		SS 304	24.72	1.45	2	2.90
27	ROD	DIA 16	275			IS2062 GR A	1.58	0.43	2	0.86
26	PLATE	6 THK	700	700		IS2062 GR A	47.10	23.07	1	23.07
25	GASKET	6 THK	50	2600		CF	0.65	0.65	1	0.65
24	ISA	50 X 6	600			IS2062 GR A	4.50	2.70	2	5.40
23	ISA	50 X 6	700			IS2062 GR A	4.50	3.15	2	6.30
22	PLATE	3 THK	50	600		SS 304	24.72	0.70	2	1.40
21	PLATE	3 THK	50	600		SS 304	24.72	0.70	2	1.40
20	PLATE	3 THK	30	580		SS 304	24.72	0.40	5	2.00
19	ISA	75X6(TOP)	1734			IS2062 GR A	6.80	11.80	2	23.60
18	PLATE	3.15 THK	150	1734		SS 304	24.72	6.12	2	12.24
17	PLATE	6 THK (BOTTOM)	185	1734		SS 310	47.10	15.10	2	30.20
16	ISMC	150	1734			IS2062 GR A	16.80	29.10	2	58.20
15	PLATE	3.15 THK	150	4870		SS 310	24.72	18.10	2	36.20
14	PLATE	3.15 THK	150	1734		SS 310	24.72	6.43	2	12.86
13	PLATE	3.15 THK	150	4563		SS 310	24.72	16.92	2	33.85
12	HEX HD BOLT WITH NUT	M16	50			IS1367 CL4.6/4.0	0.15	0.15	120	18.00
11	ISMC	150	2385			IS2062 GR A	16.80	40.06	8	320.48
10	PLATE	6 THK	1634	4775		IS2062 GR A	47.10	367.49	1	367.49
09	ISMC	150(CUT TO SUIT)	6348			IS2062 GR A	16.80	106.64	1	106.64
08	ISA	75X6(CUT TO SUIT)	4876			IS2062 GR A	6.80	33.15	2	66.30
07	ISMC	150	2432			IS2062 GR A	16.80	40.85	4	163.40
06	ISA	75X6(CUT TO SUIT)	6536			IS2062 GR A	6.80	44.44	4	177.76
05	ISA	75X6	2432			IS2062 GR A	6.80	16.53	8	132.24
04	ISMB	150X75	6900			IS2062 GR A	15.00	103.50	2	207.00
03	ISMB	200X100	6900			IS2062 GR A	25.40	175.26	4	701.04
02	PLATE	6 THK	4825	3210		IS2062 GR A	47.10	729.50	2	1459.00
01	PLATE	6 THK	4825	3176		IS2062 GR A	47.10	721.80	2	1443.60
VARIAN T NUMBER ITEM	DESCRIPTION	LENGTH	WIDTH	DRAWING NO.	MATERIAL CODE MATERIAL SPECN	UNIT WEIGHT	WT. PER NO.	QTY.	TOTAL WT.	
BILL OF MATERIAL						GRAND TOTAL:		6768.18		

57	ISMC	200X75	2432			CF	22.30	54.23	4	216.93
56	PLT	20 THK	250	200		IS2062 GR A	47.10	7.85	2	15.70
55	HEX HD BOLT WITH NUT	M27	90			A 106 GR B	0.78	0.70	24	16.80
54	PLT (SS)	20 THK	300	200		SS 304	157.00	9.42	4	37.68
53	HEX HD BOLT WITH NUT	M16	50			IS1367 CL4.6/4.0	0.00	0.14	24	3.36
52	PLATE	12 THK	37	200		SS 304	94.20	0.70	8	5.58
51	PLATE	12 THK	100	100		IS2062 GR A	94.20	0.94	2	1.88
50	PLATE	12 THK	47	200		IS2062 GR A	94.20	0.89	16	14.16
49	PLATE	12 THK	100	120		IS2062 GR A	94.20	1.13	4	4.52
48	HALF COUPLING WITH PLUG	1.5", 3000#				A 105	0.20	1.33	2	2.66
47	PIPE	O.D 48.3 x 5.08 THK	306			SS 304L	5.41	1.66	2	3.31
46	CF GASKET	6 THK (OD/ID)	254	103		CF	0.00	0.07	3	0.21
45	STUD WITH TWO HEX NUTS	(M20) 3/4"	120			A193 GR B7/A194 GR 7	0.41	0.41	120	49.20
44	RF WN BLIND FLANGE	4", 300#, R.F. (B: 102.26)				A 105		11.00	3	33.00
43	RF WN FLANGE	4", 300#, R.F. (B: 102.26)				A 105		12.00	3	36.00
42	PIPE	O.D 114.3 x 6.02 THK	295			SS 304L	16.07	4.74	3	14.22
41	PIPE	O.D 48.3 x 5.08 THK	163			SS 304L	5.41	0.88	6	5.28
40	CF GASKET	6 THK (CUT TO SUIT) OD/ID	156	38		CF	0.00	0.07	13	0.91
39	STUD WITH TWO HEX NUTS	(M20) 3/4"	120			A193 GR B7/A194 GR 7	0.41	0.41	52	21.32
38	RF WN FLANGE	1.5", 300#, R.F. (B: 38.14)				A 105	2.75	2.75	10	27.50
37	RF WN FLANGE	1.5", 300#, R.F. (B: 38.14)				A 105	3.18	3.18	10	31.80
36	PIPE	O.D 48.3 x 5.08 THK	263			SS 304L	5.41	1.42	7	9.94
VARIAN T NUMBER ITEM	DESCRIPTION	LENGTH	WIDTH	DRAWING NO.	MATERIAL CODE MATERIAL SPECN	UNIT WEIGHT	WT. PER NO.	QTY.	TOTAL WT.	
BILL OF MATERIAL						GRAND TOTAL:				

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.



BHARAT HEAVY ELECTRICALS LTD.,

HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012

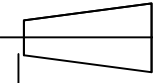
DRAWN
CHECKED
APPROVED
DATE

SMG NAIDU
S VIJAY
S VIJAY
12-10-2021

TITLE

BILL OF MATERIAL FOR RADIANT
WALL FLOOR AND ARCH

ALL DIMENSIONS ARE IN MILLIMETRES

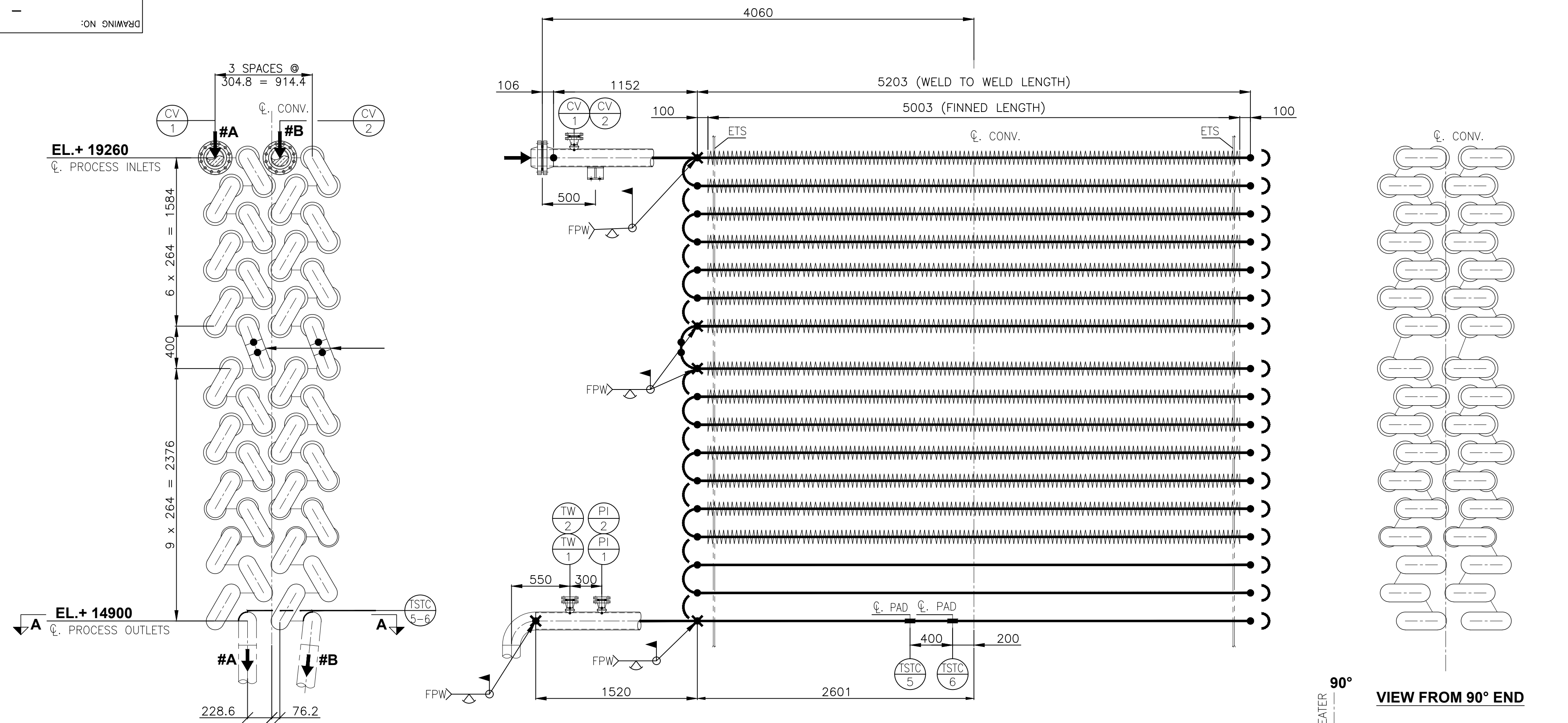


SCALE NTS

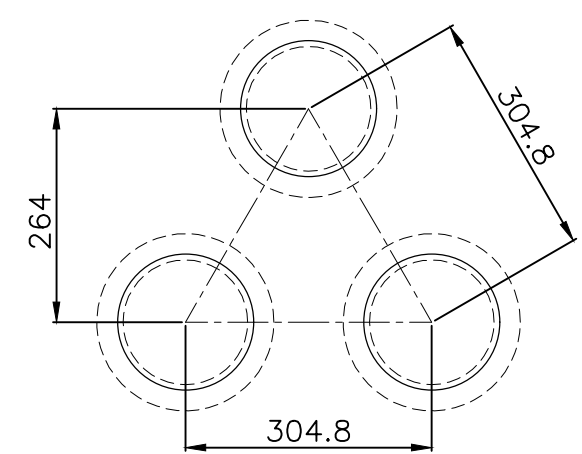
BHEL DRG NO. 3-48-810-U8001

REV.

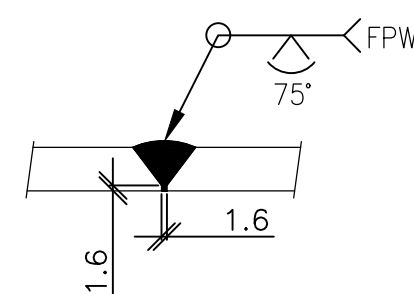
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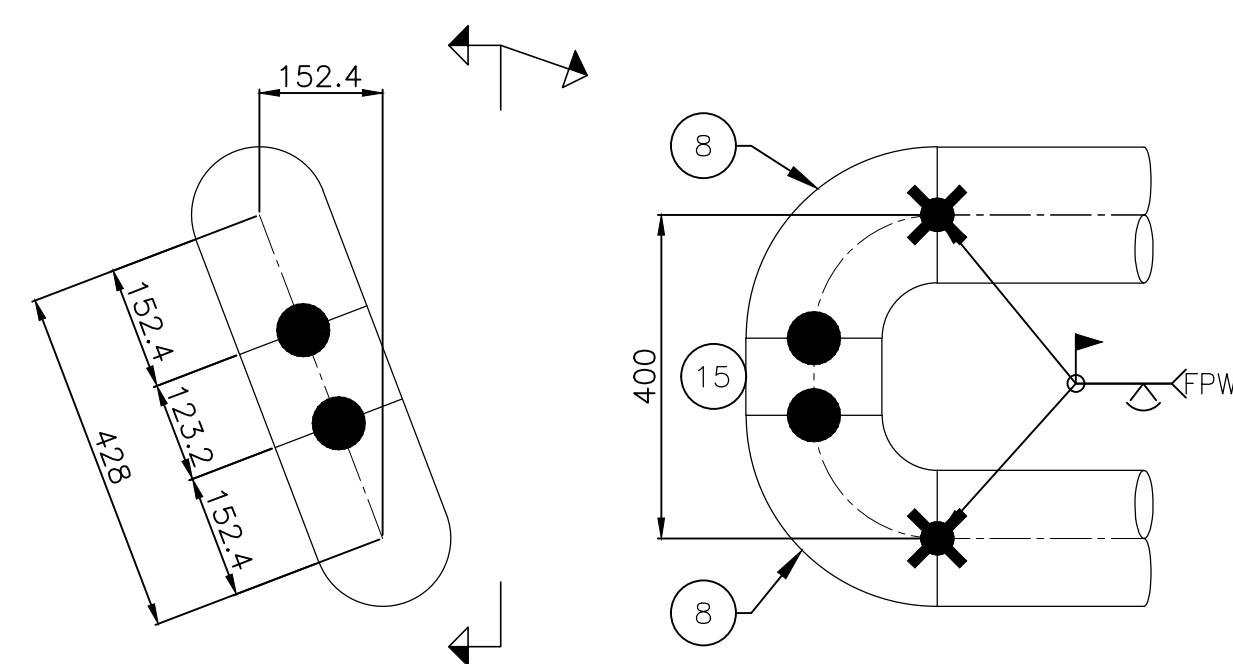
VIEW FROM 270° END



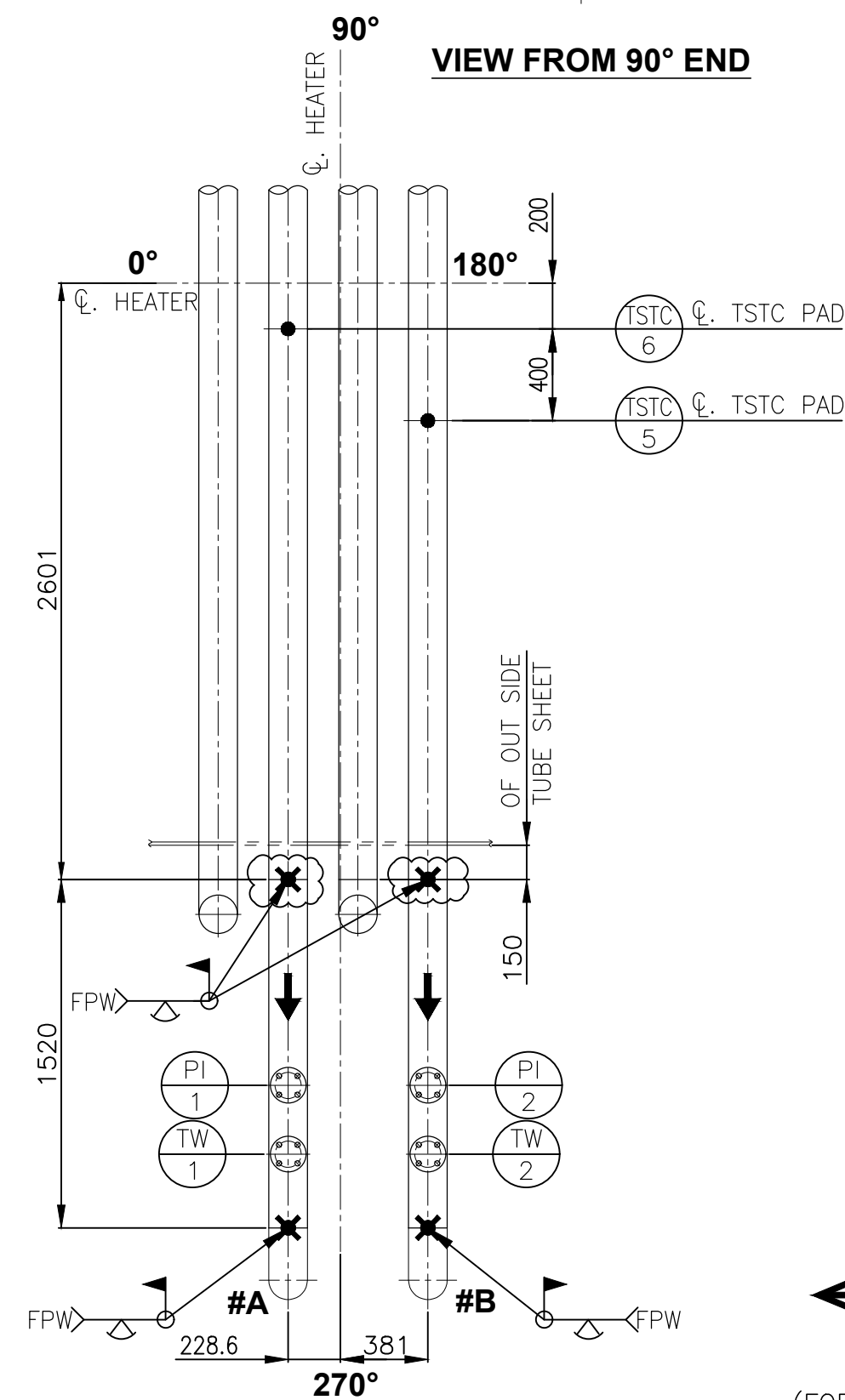
TYPICAL COIL ARRANGEMENT



TYPICAL BUTT WELD DETAIL

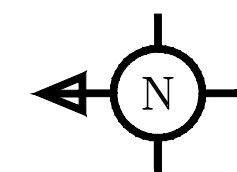


DETAILS OF MK. JO-1



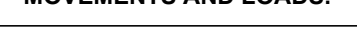
SECTION A-A

(CONVECTION OUTLET PLAN VIEW)

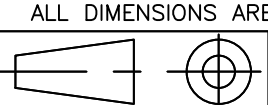


(FOR PLANS ONLY)

DESIGN CONDITIONS	
DESIGN CODE (TUBE)	API 530
DESIGN PRESSURE, ELASTIC/RUPTURE, (KG/CM ²)(G)	22.5
DESIGN FLUID TEMP. (°C)	350
DESIGN TUBE METAL TEMP. (°C)	445
SHOP HYDROTEST PRESSURE (KG/CM ²)	40.17
FIELD HYDROTEST PRESSURE (KG/CM ²)	40.17
CORROSION ALLOWANCE-COIL(MM)	3
RADIOGRAPHY: (ALL PRESSURE PART)	100%
POST WELD HEAT TREATMENT	NO
TOTAL FLUID VOLUME (M) ³	7.29

PROCESS CONNECTION					CONNECTION: MAX. ALLOWABLE FORCE (N), MOMENTS (N.m)							MAXIMUM ALLOWABLE MOVEMENTS (mm)			SIGN CONVENTION FOR TERMINAL MOVEMENTS AND LOADS.
ITEM	QTY.	DESIGNATION	MATERIAL	ELEVATION	F _x	F _y	F _z	M _x	M _y	M _z	X	Y	Z		
INLETS	2	6" NPS x SCH.40 300# WRTJ FLANGE	A105	EL.+19260	3336	6672	6672	2970	2238	2238	0	±13	±13		

0		SUBMITTED FOR APPROVAL			
REV NO.	ZONE	BRIEF RECORD OF REVISIONS	PPD.	CHD.	APPD.

DRAWING NO.		TITLE	
44AC-7500-221-M-B01-0001		GENERAL ARRANGEMENT DRAWINGS	
44AC-7500-221-M-B01-0002		DETAILS OF X-OVER	
NOTES :- - DO NOT SCALE THE DRAWING, ASK IF IN DOUBT. - ALL DIMENSIONS AND UNITS ARE IN THE MKS SYSTEM, U.N.O. - ELEVATIONS GIVEN ARE RELEVANT TO REF. GRADE EL+0000. - ALL ITEMS SHALL BE CHECKED BY FULL SCALE LAYOUT BEFORE FABRICATION. - NO UNDER CUT OF PIPE WALL IS PERMITTED DUE TO WELDING. - COMPLETED ASSEMBLIES TO BE SHOP HYDRO TESTED AFTER COMPLETION OF WELDING AND ALL STATED INSPECTION REQUIREMENTS. - COIL SHALL BE DRIED AFTER HYDROTEST. - ALL WELD PREPARATION SHALL CONFORM TO ANSI B16.25 AND PROJECT SPEC. - ALL FLANGE BOLT HOLES SHALL STRADDLE NATURAL CENTER LINES. - ALL COIL WELDS MUST BE FULL PENETRATION TYPE. - ALL PIPES AND FITTINGS SHALL BE SEAMLESS TYPE. - THE COIL FABRICATION SHALL CONFORM TO DOC. 44AC7500-00/M.02/0018/A4 (SPECIFICATION FOR FIRED HEATER), DOC.NO 44AD7500/V.02/5102/A4 (SPECIFICATION FOR COILS FOR FIRED HEATER) & DOC.NO 44AC7500/V.02/0135/A4 (GENERAL SPECIFICATION FOR WELDING). - FIELD WELDING ENDS OF ALL ELBOWS, WELDOLETS SHALL BE COVERED SUITABLY BY COIL FABRICATOR TO PROTECT ENDS DURING TRANSPORTATION AND HANDLING. - LEGEND:- - BBE : BEVELED ON BOTH ENDS ● : INDICATES SHOP WELD ✕ : INDICATES FIELD WELD - FPW : FULL PENETRATION WELD - EL. : ELEVATION ⌀ : CENTER LINE			
		CUSTOMER No. 7916	
PROJECT: EPCM SERVICES FOR PX-PTA EXPANSION PROJECT JOB NO. 44AC7500			
OWNER:  INDIAN OIL CORPORATION LIMITED-PANIPAT, HARYANA			
PMC:  WORLEY ENERGY CHEMICALS AND RESOURCES			
ITEM: HOT OIL HEATER FOR PTA UNIT (21-F1-1251)			
		BHARAT HEAVY ELECTRICALS LTD., HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012	
DRAWN		TITLE	
CHECKED		GENERAL ARRANGEMENT AND FAB. DEATILS OF CONVECTION COIL	
APPROVED			
DATE			
ALL DIMENSIONS ARE IN MILLIMETRES		C.DRG NO.44AC-7500-221-M-B02-0002-A1 REV.	
 SCALE 1:60		BHEL DRG NO.1-11-001-U8025 SHT-1 0	

A

B

C

D

E

F

G

H

A

B

C

D

E

F

G

H

DRAWING NO.

5203 (WELD TO WELD LENGTH)

CL. CONV.

FPW

5

4

3

FPW

1

CONVECTION COIL DEVELOPED VIEW FOR PASS #A & #B

EL. +14900

CL. CONV. OUTLET
TO RADIANT

25

21

DETAILS OF MK. -1
(FOR PASS #A)

DETAILS OF MK. -2
(FOR PASS #B)

EL. +13437

CL. RADIANT INLET

25

FPW

75°

TYPICAL BUTT WELD DETAIL

WELDING DETAIL FOR CV

WELDING DETAIL FOR TW PI

CONVECTION COIL DEVELOPED VIEW FOR PASS #A & #B

FPW

29

28

DETAIL -1

ITEM No.- 26

ITEM No.- 27

30	HEX BOLT M20	65			IS 1367 CL 4.8/4.0	0.11	0.1	8	0.9
29	PAD PLT (CUT FROM PIPE) 6" PIPE SCH 40	150	184		A106 Gr B	28.30	1.6	2	3.2
28	PLATE 14THK	150	75		SA 516 Gr 70	109.90	2.5	2	5.0
27	PLATE 14THK	150	150		SA 516 Gr 70	109.90	5.0	2	10.0
26	PLT 14 THK	114	68		SA 516 Gr 70	109.90	3.4	4	13.6
25	ELBOW, 6" SCH40, 90D LR	-			SA234 GR WPB	6.70	6.7	4	26.8
24	6" PIPE SCH 40 BBE	1013			SA106GRB	28.300	28.660	1	28.7
23	HEX STUD WITH NUT M20 FULL THRD	150			SA193 GRB7A194 GR 2H	0.500	0.500	24	12.0
22	GASKET 6", 300# RTJ OCT CROSS SECTION, R-45	-			SS316L	0.85	0.85	2	1.7
21	6" PIPE SCH 40 BBE	1005			SA106GRB	28.300	28.440	1	28.4
20	HEX STUD WITH NUT M20 FULL THRD	110			SA193 GRB7A194 GR 2H	0.387	0.387	16	6.2
19	GASKET 1.5", 300# RTJ OCT CROSS SECTION, R-20	-			SS316L	0.15	0.15	4	0.6
18	BLIND FLANGE, 1.5", 300#, RTJ	-			SA105	2.70	2.7	4	10.8
17	FLANGE, 1.5" SCH80, 300#, WNRTJ	-			SA105	3.20	3.2	4	12.8
16	Weldolet 6" SCH40 X 1.5" SCH 80	-			SA105	1.00	1.0	4	4.0
15	6" PIPE SCH 40 BBE	123			SA106GRB	28.30	3.5	2	7.0
14	HEX STUD WITH NUT M16 FULL THRD	110			SA193 GRB7A194 GR 2H	0.230	0.230	16	3.7
13	GASKET 2", 300# RTJ OCT CROSS SECTION, R-23	-			SS316L	0.33	0.33	2	0.7
12	BLIND FLANGE, 2", 300#, RTJ	-			SA105	3.70	3.7	2	7.4
11	FLANGE, 2" SCH80, 300#, WNRTJ	-			SA105	4.10	4.1	2	8.2
10	Weldolet 6" SCH40 X 2" SCH 80	-			SA105	1.00	1.0	2	2.0
09	FLANGE, 6" SCH40, 300#, WNRTJ	-			SA105	19.10	19.1	4	76.4
08	ELBOW, 6" SCH40, 90D SR	-			SA234 GR WPB	6.70	6.7	4	26.8
07	RETURN BEND, 6" SCH40, 180D LR	-			SA234 GR WPB	13.30	13.3	64	851.2
06	6" PIPE SCH 40 BBE	1152			SA106GRB	28.30	32.6	2	65.2
05	6" PIPE SCH 40 BBE	5203			SA106GRB	28.30	147.2	44	6478.8
04	SOLID FIN 1.5TKH, 25.4 HT X 197 FINS/M	5003			CS	37.40	187.1	44	8232.9
03	6" PIPE SCH 40 BBE	5203			SA106GRB	28.30	147.2	8	1178.0
02	SOLID FIN 1.5TKH, 19.1 HT X 197 FINS/M	5003			CS	27.40	137.1	8	1096.7
01	6" PIPE SCH 40 BBE	5203			SA106GRB	28.30	147.2	4	589.0
00	SOLID FIN 1.5TKH, 12.7 HT X 197 FINS/M	5003			CS	18.00	90.1	4	360.2
00	6" PIPE SCH 40 BBE	5203			SA106GRB	28.30	147.2	12	1766.9
00	6" PIPE SCH 40 BBE	1520			SA106GRB	28.30	43.0	2	86.0
BILL OF MATERIAL						GRAND TOTAL:			
						20982.6			

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Worley

Worley Energy Chemicals and Resources

PROJECT: EPCM SERVICES FOR PX-PTA EXPANSION PROJECT

JOB NO. 44AC7500

OWNER: Indian Oil Corporation Limited-PANIPAT, HARYANA

PMC: Worley

ITEM: HOT OIL HEATER FOR PTA UNIT (21-F1-1251)

BHARAT HEAVY ELECTRICALS LTD.,

HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012

DRAWN

CHECKED

APPROVED

DATE

TITLE

GENERAL ARRANGEMENT AND FAB. DEATILS OF CONVECTION COIL

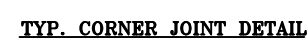
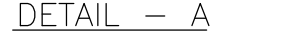
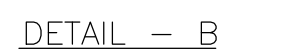
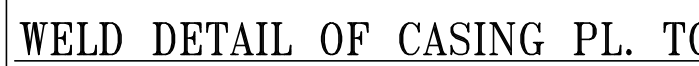
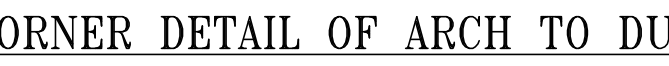
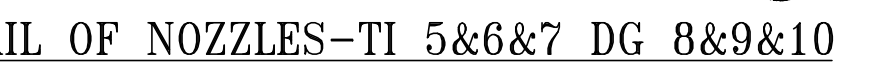
C.DRG NO.44AC-7500-221-M-B02-0002-A1

BHEL DRG NO.1-11-001-U8025 SHT-2

REV. 0

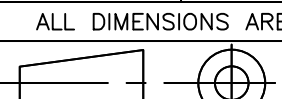
FORM NO. 0425/2

A1 SIZE

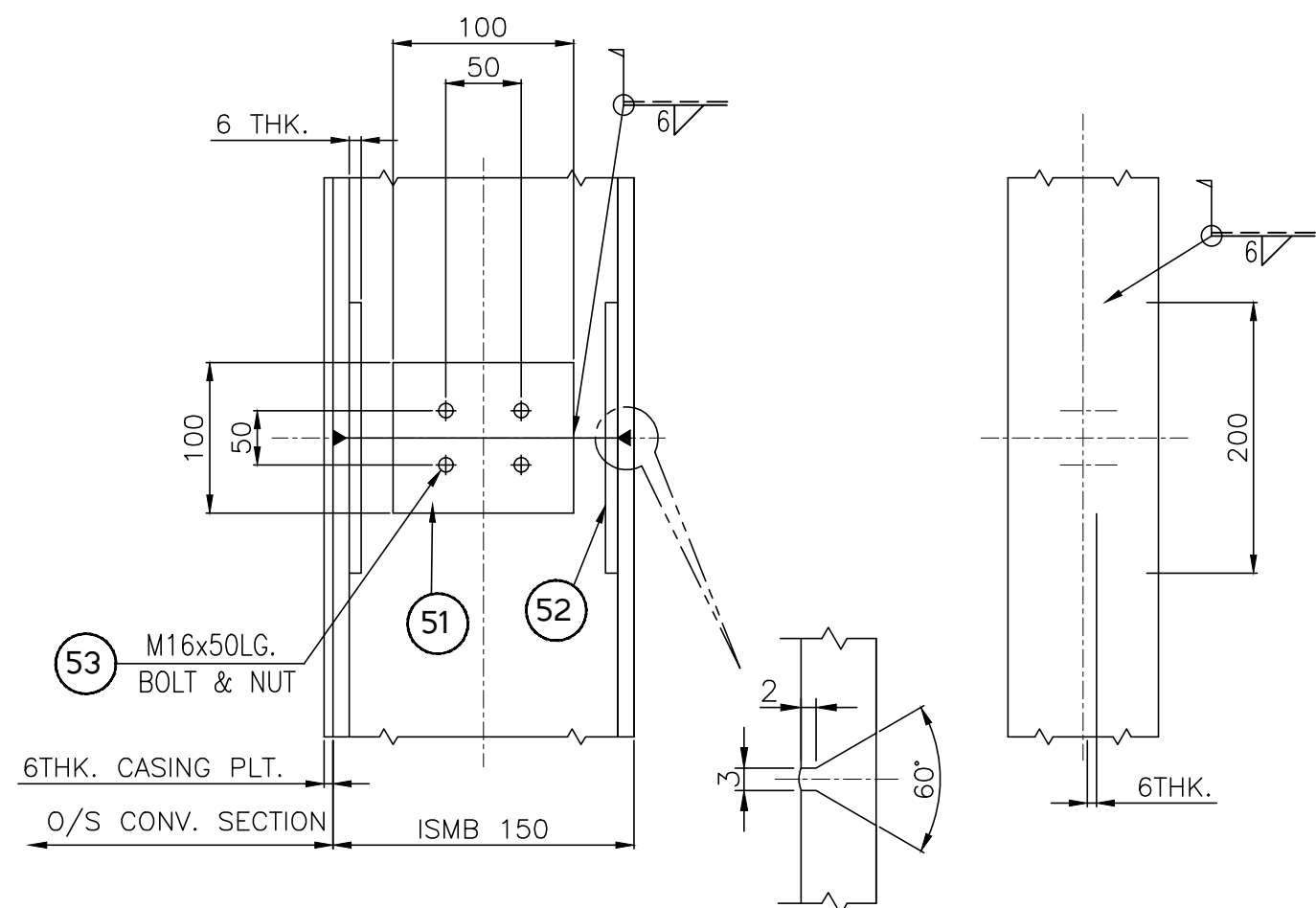


REV NO.	DATE	BRIEF RECORD OF REVISIONS	PPD.	CHD.	APPD.

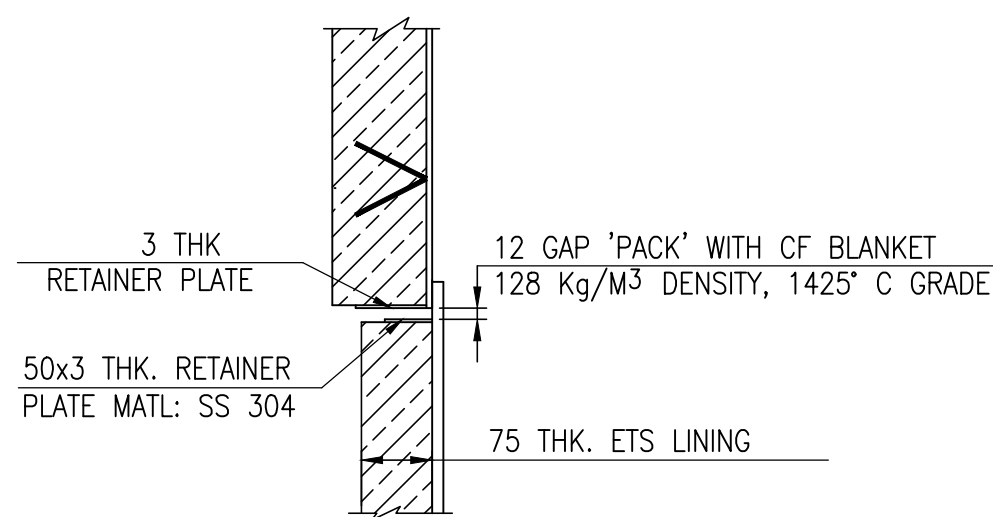
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PROJECT:		EPCM SERVICES FOR PX-PTA EXPANSION PROJECT	
JOB NO. 44AC7500			
OWNER:		INDIAN OIL CORPORATION LIMITED-PANIPAT, HARYANA	
			
PMC:		NEW ENERGY HOUSE, RAMKRISHNA MANDIR ROAD, KONDIVITA, ANDHERI (EAST), MUMBAI-400059,INDIA TEL: +91 22 26812000, FAX: +91 22 28208295	
			
ITEM:		HOT OIL HEATER FOR PTA UNIT (21-F1-1251)	
		BHARAT HEAVY ELECTRICALS LTD., HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012	
DRAWN	S SANKARA RAO	TITLE G.A AND FAB. DETAILS OF CONVECTION CASING WALL AND BREACHING	
CHECKED	S VIJAY		
APPROVED	L RAJA SEKHAR		
DATE	24-02-2021		
ALL DIMENSIONS ARE IN MILLIMETRES			
		C.DRG NO.44AC-7500-221-M-B02-0002-A1	REV
SCALE 1:55		BHEL DRG NO. 1-48-810-U8002	0
		SHT 2	

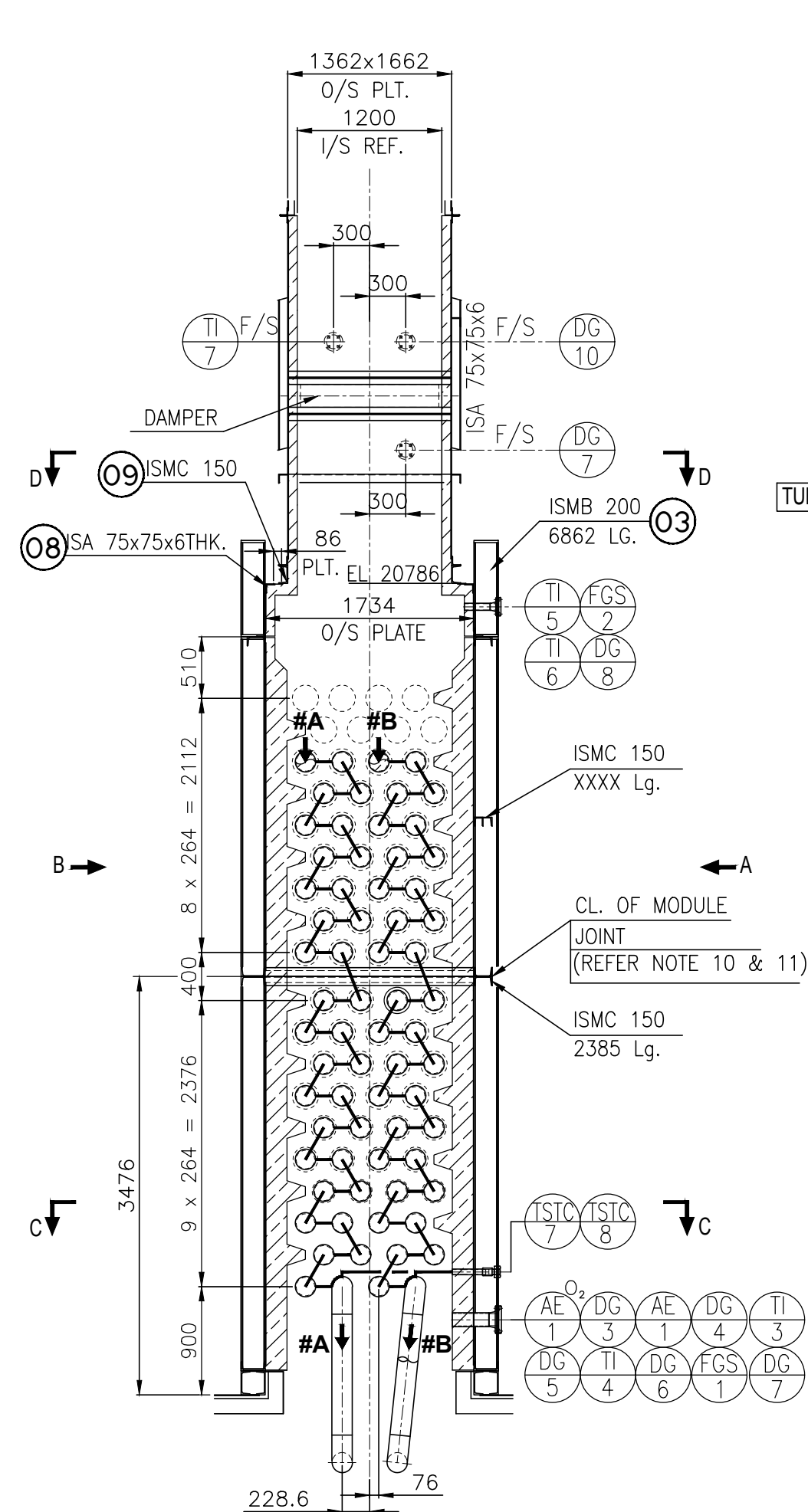
VIEW - A
(VIEW FROM 180° END)



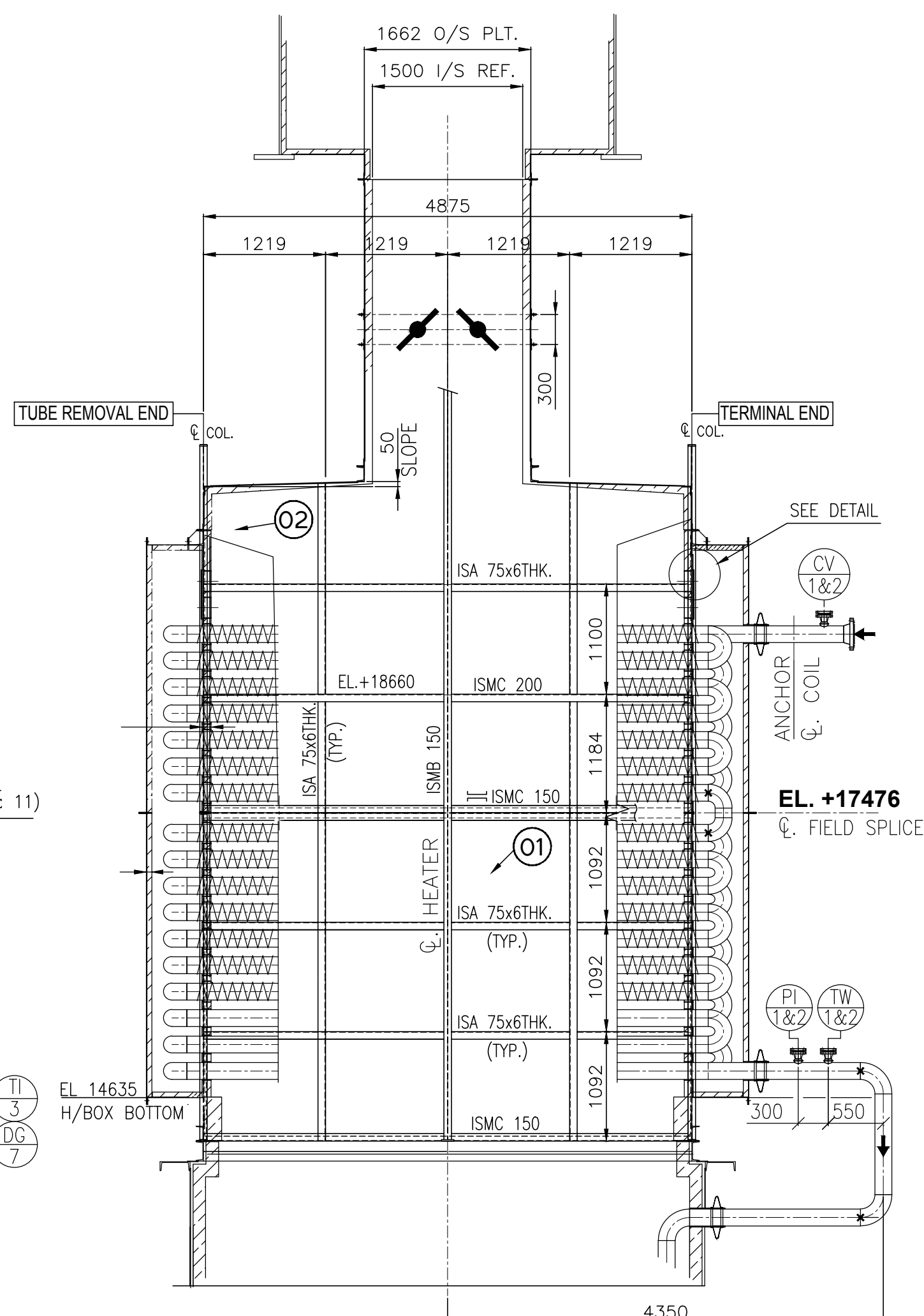
TYP. DETAIL OF SPLICE JOINT FOR BEAMS



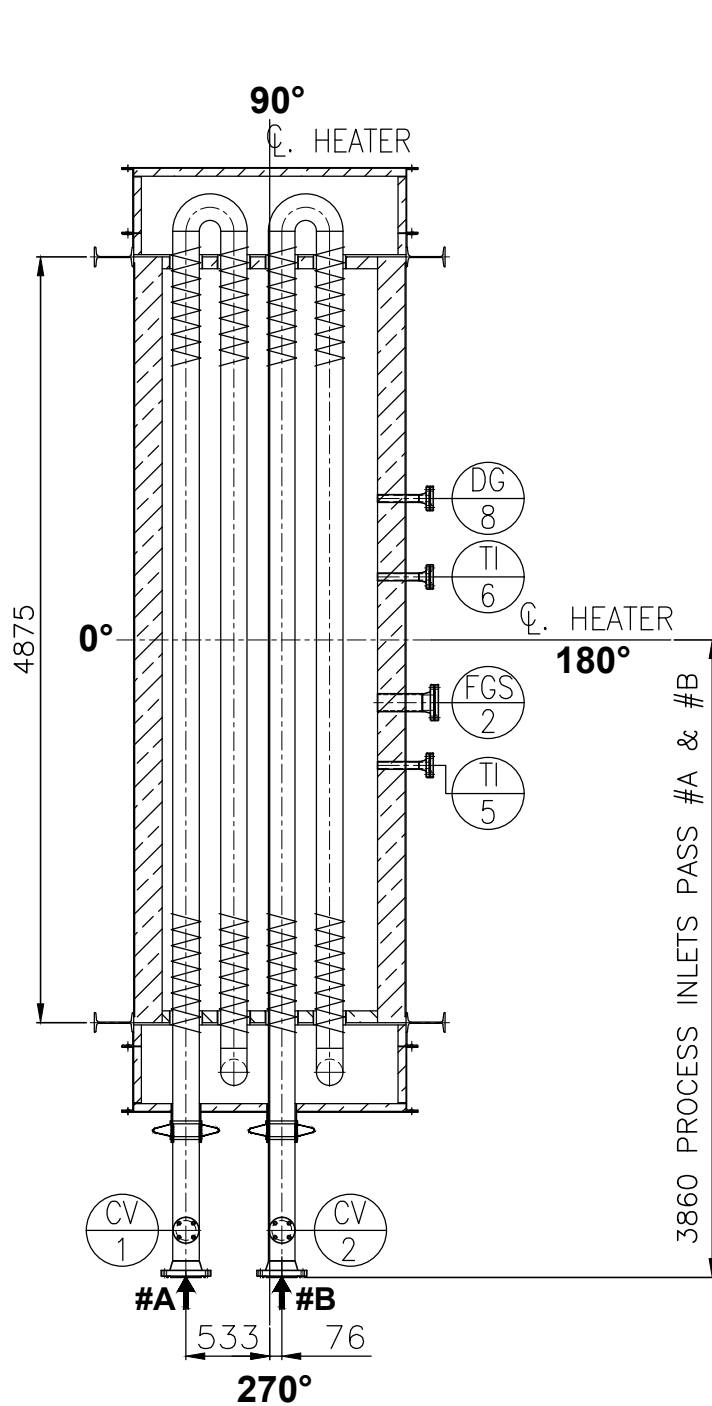
ETS BREECHING BOUNDARY DETAIL



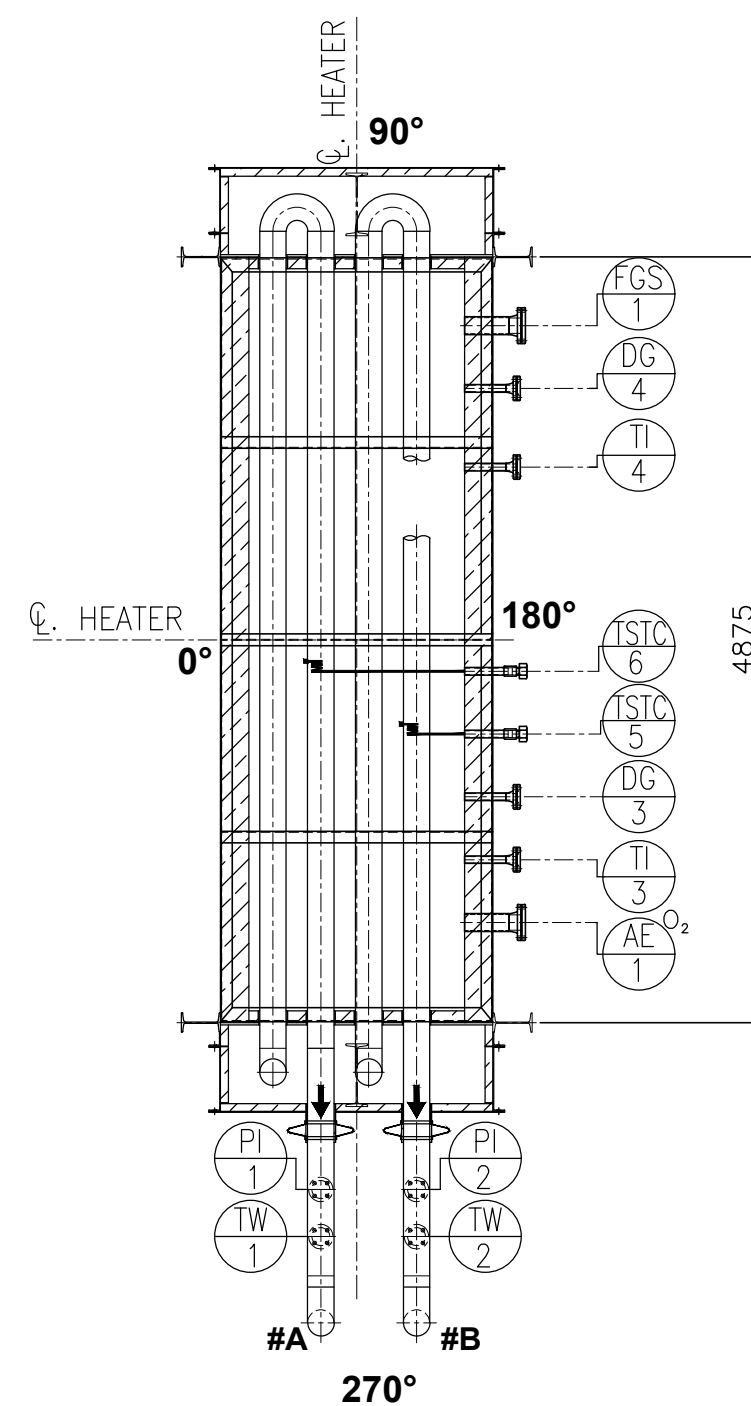
VIEW LOOKING FROM TUBE REMOVABLE END



VIEW - B



PLAN AT SECTION-D D



PLAN AT SECTION-C C

REV NO.	DATE	BRIEF RECORD OF REVISIONS	PPD.	CHD.	APPD.

GENERAL NOTES:-

1. ALL DIMENSIONS & ELEVATIONS ARE IN MM UNLESS OTHERWISE NOTED.
2. ELEVATIONS GIVEN ARE RELEVANT TO REFERENCE GRADE EL.+0000.
3. ALL MATERIALS SHALL BE CARBON STEEL IS-2062 Gr. "B" EXCEPT WHERE NOTED OTHERWISE.
4. ALL FLANGE HOLES SHALL STRADDLE VERTICAL & HORIZONTAL CENTER LINES.
5. ALL EXPANSION GAPS INCLUDING AROUND BURNERS TO BE "PACKED" WITH CERAMIC FIBRE BLANKET OF DENSITY 128 KG/M3 1260°C GRADE.
6. ALL CONNECTIONS SHALL BE WELDED TO DEVELOP FULL STRENGTH OF THE MEMBERS CONNECTED EXCEPT CONNECTIONS THAT ARE SPECIFICALLY GIVEN AS BOLTED.
7. DETAILS NOT ILLUSTRATED MAY BE SUITABLY DEVELOPED BY CONTRACTOR.
8. ALL STRUCTURAL MEMBERS SHALL BE COPED TO SUIT THE CONNECTING MEMBERS PROFILE.
9. ALL GAPS IN INSULATION MARKED "PACK" TO BE PACKED WITH CERAMIC FIBRE.
10. ALL EXTERNAL SURFACES SHALL BE BLAST CLEANED TO SA 2½.
11. PAINTING:-
 - COATING SYSTEM: CS-3, MINIMUM DFT IS 125 MICRONS.
 - EXTERNAL:
 - a) PRIMER COAT: 1x75 MICRONS DFT INORGANIC ZINC SILICATE PRIMER.
 - b) FINISH COAT: 1X50 MICRONS DFT HIGH TEMPERATURE SILICON ACRYLIC.
 - c) FINISH COLOR CODE: ALUMINIUM RAL 9006.
 - INTERNAL:
 - a) 2x(90-100 MICRONS EACH) EPIPLUS-56 OF SHALIMAR PAINTS OR EQ. SHALL BE APPLIED ON SHELL PLATE IN CONTACT WITH CERAMIC FIBER.
12. ALL WELDING ON HEATER CASING/DUCTING TO BE FULL WELDING 6 MM FILLET OUTSIDE & INTERMITTENT 50-100 ON INSIDE. WELD ON STIFFENER TO BE CONTINUOUS ON TOP SIDE & DISCONTINUOUS ON BOTTOM SIDE U.O.N.
13. ALL SKEW AND DIRECT WELDING SHALL BE DONE BY PREPARING THE CONNECTING MEMBER ENDS TO SUITABLE PROFILE (CUT TO SHAPE) AND THEN WELDED.
14. SEATING CLEATS AS REQUIRED SHALL BE PROVIDED BY FABRICATOR.
15. ALL ELEVATIONS REFERRED TO ARE TOP OF STEEL/UNDER SIDE OF GRATING.
16. SUITABLE EXTRA BRACING SHALL BE PROVIDED (AS REQUIRED) TO PREVENT DISTORTION/DAMAGE TO STRUCTURE DURING HANDLING, TRANSPORTATION AND ERECTION.
17. ALL LAPS ON PLATES TO BE 25 MM UNLESS OTHERWISE NOTED.
18. BOLT HOLES FOR MATCHING PARTS/MATCHING FLANGES SHALL BE MATCH MARKED AND HOLES DRILLED.
19. PROVIDE DRAIN HOLES IN HORIZONTAL PLATES WHEREVER REQUIRED.
20. READ THIS DRAWING IN CONJUNCTION WITH DRG. No. 1-48-000-U6008
21. REFER DRG. NO. 1-35-110-U0368 FOR STRUCTURAL ELEMENTS OF CONVECTION
21. REFER DRG. NO. 3-48-810-U8001 FOR BILL OF MATERIAL
22. HEADER BOX BOTTOM PLATE MAY BE SUITABLY INSERTED OVER THE CHANNEL AS SHOWN IN THE DRAWING
23. ALL RETAINER PLATE GAPS SHALL BE PACKED WITH CF BLANKET WITH GLUE ON ONE SIDE BEFORE ERECTION

CUSTOMER No. 7916

PROJECT: EPCM SERVICES FOR PX-PTA EXPANSION PROJECT
JOB NO. 44AC7500



INDIAN OIL CORPORATION LIMITED-PANIPAT, HARYANA



NEW ENERGY HOUSE, RAMKRISHNA MANDIR ROAD,
KONDIVITA, ANDHERI (EAST), MUMBAI-400059,INDIA
TEL: +91 22 26812000, FAX: +91 22 28208295

ITEM:

HOT OIL HEATER FOR PTA UNIT
(21-F1-1251)



BHARAT HEAVY ELECTRICALS LTD.,
HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012

DRAWN	S SANKARA RAO
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TITLE

CHECKED	S VIJAY
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C.A. AND FAR DETAILS OF CONVECTION

APPROVED	1. RAJA SEKHA
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AND FAB. DETAILS OF CONVECTION

DATE	31.03.2021
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CASING WALL AND BREACHING

DATE 24-02-2021

ALL DIMENSIONS ARE IN MILLIMETRES

[illegible]

ALL DIMENSIONS ARE IN MILLIMETRES

C.DRG NO.44AC-7500-221-M-B02-0002-A1 REV. 2

SCALE 1:55

BHEL DRG NO. 1-48-810-U8002	SHT 1	0
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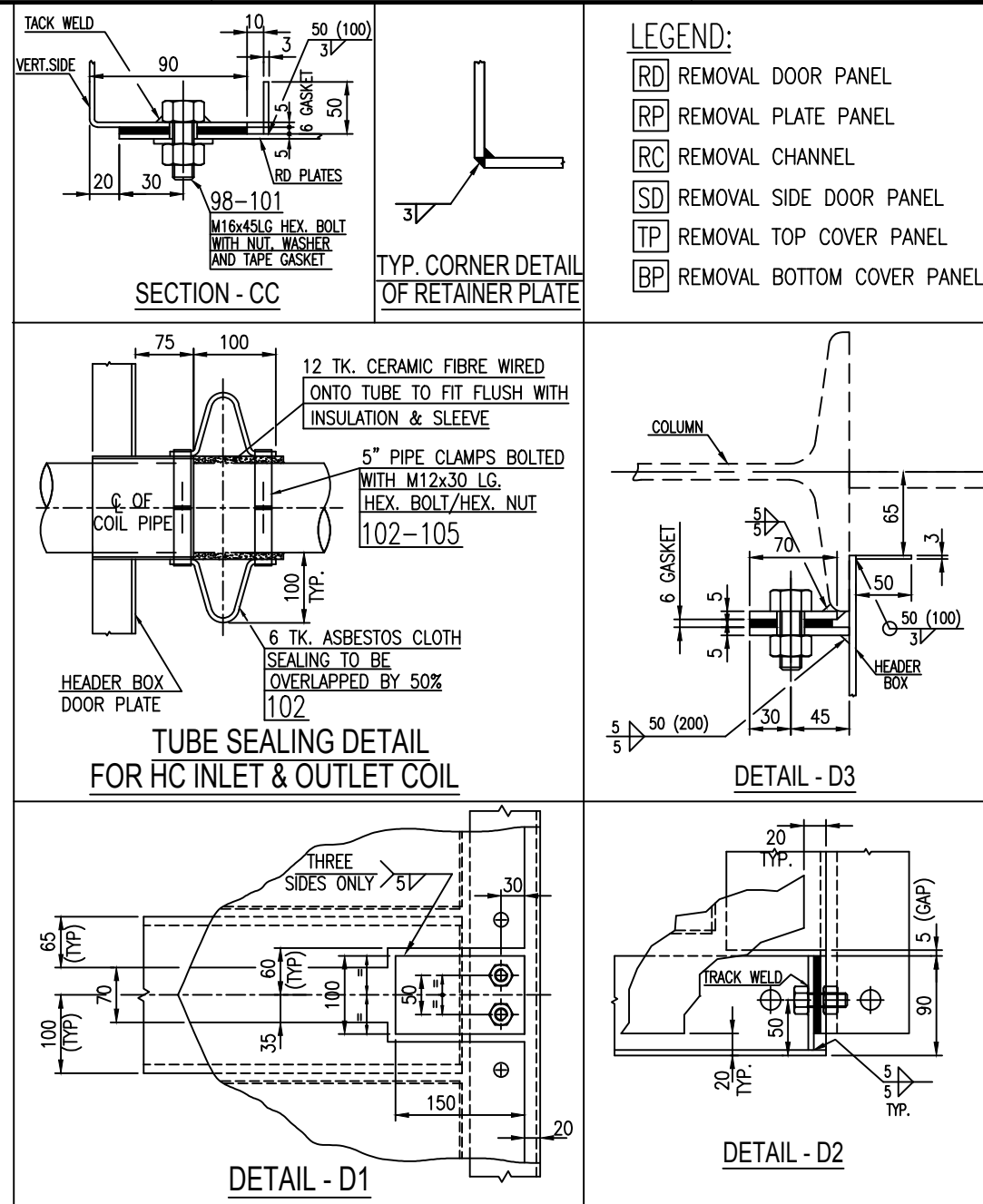
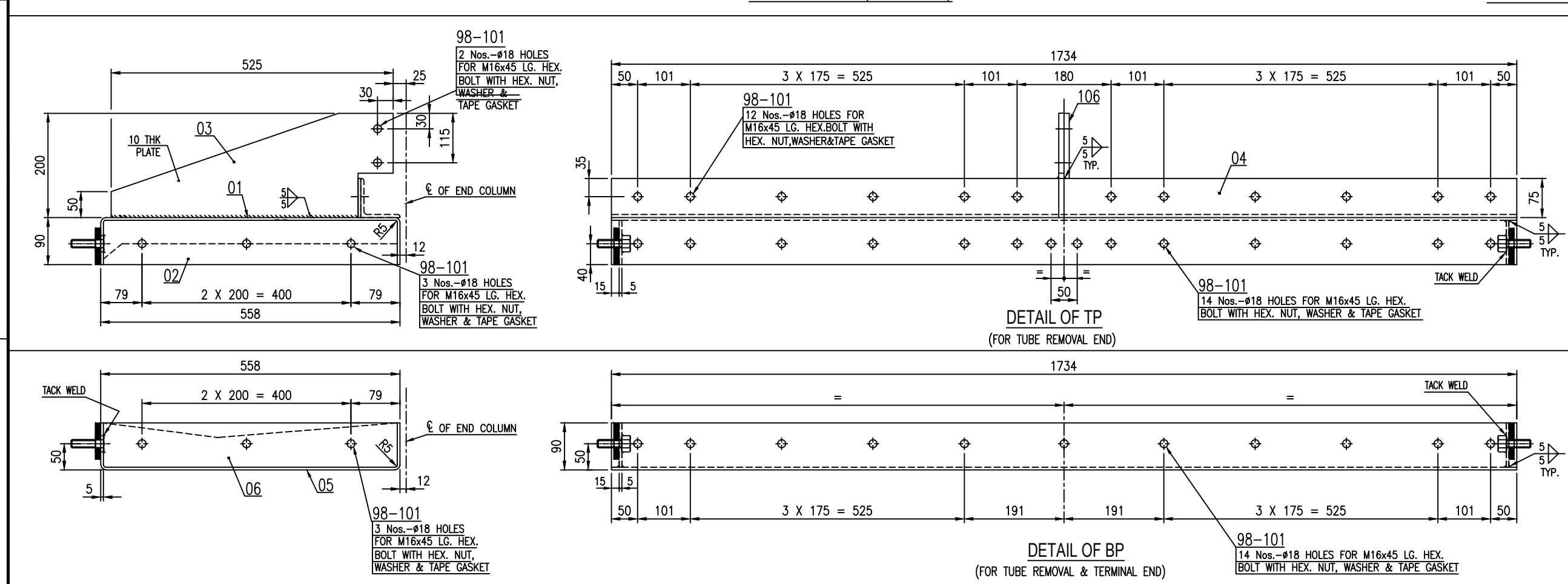
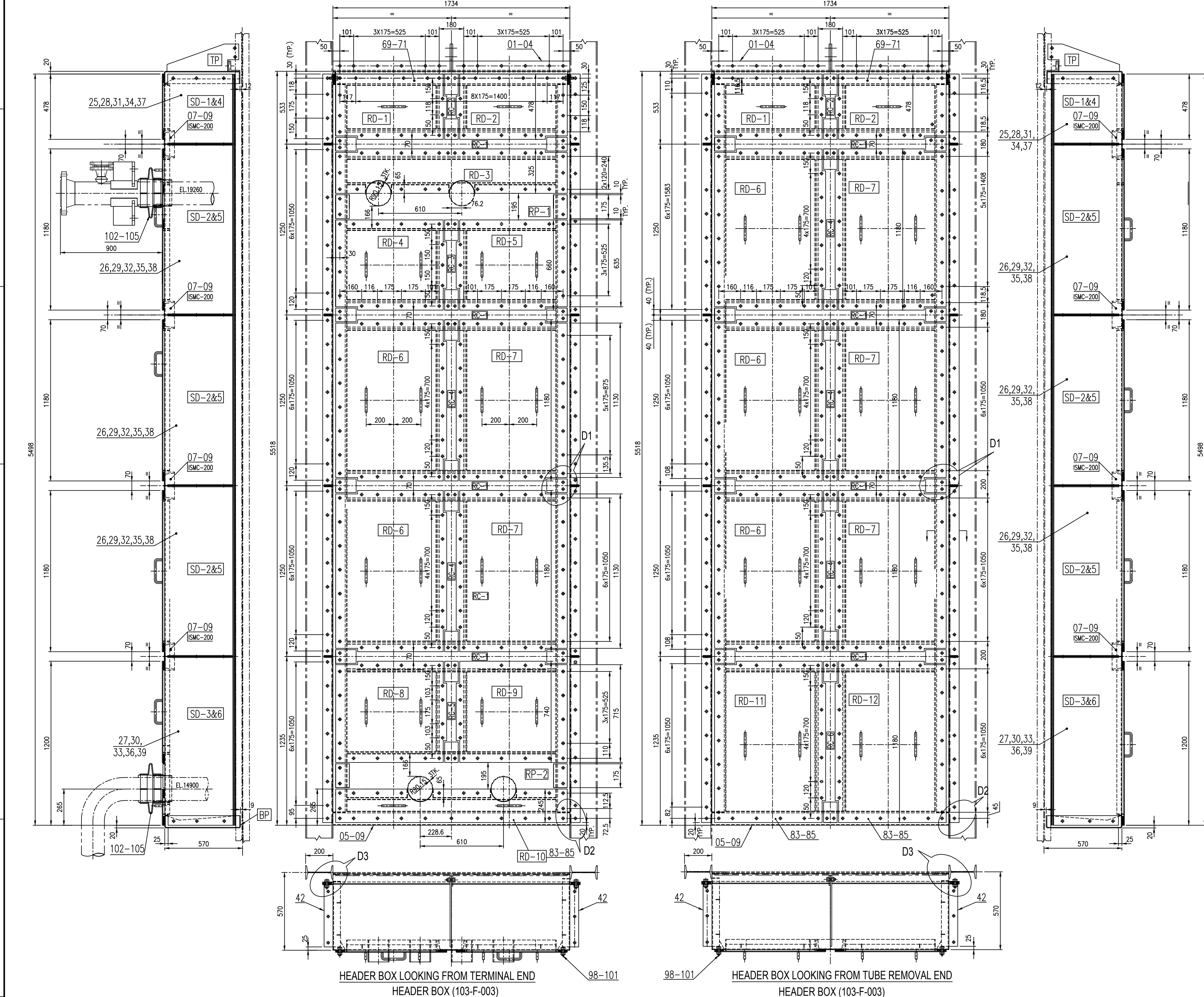
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FORM NO. 0424/2

A1:841x594



ITEM NO.	DESCRIPTION	MATL. SPEC.	QTY.	UNIT WT(Kg.)	REF. DRG./ STD. NO.
106	PLATE - 10THK X 60 X 115	IS:2062 Gr.A	2	0.54	
105	HEX. NUT M12	IS 1367 CL.4.0	16	0.02	
104	HEX. BOLT M12 X 30LG	IS 1367 CL.4.6	16	0.05	
103	PIPE CLAMP 3 THK. X 50 X 360	IS 1079	16	0.42	
102	SEALING CLOTH 6 X 400 X 700	ASBESTOS	8	-	
101	TAPE GASKET - 6THK X 65 X ~60 RM	ASBESTOS	1	-	
100	WASHER TO SUIT - M16	IS 2016	331	-	
99	HEXNUT - M16	IS 1367 CL.4.0	685	0.03	
98	HEX. HO. BOLT - M16 X 45LG	IS 1367 CL.4.6	685	0.09	
97	HANDLE #16 X DEVLG. 262	IS:2062 Gr.A	38	0.41	
96	RET. PLATE - 3THK X 50 X 626LG	IS 1079	4	0.73	
95	RET. PLATE - 3THK X 50 X 278.5 LG.	IS 1079	4	0.32	
94	TOP DOOR PLATE - 5THK X 434.5 X 1180.5 LG	IS:2062 Gr.A	2	20.13	
93	HALF SLEEVE - 3TK X 140 X 245.5 DEV LG.	IS:2062 Gr.A	1	0.80	
92	RET. PLATE - 3THK X 50 X 1019.5 LG.	IS 1079	2	1.20	
91	RET. PLATE - 3THK X 50 X 164 LG.	IS 1079	2	0.19	
90	TOP DOOR PLATE - 5THK X 340 X 1180.5 LG.	IS:2062 Gr.A	1	15.75	
89	HALF SLEEVE - 3TK X 140 X 245.5 DEV LG.	IS:2062 Gr.A	2	0.80	
88	RET. PLATE - 3THK X 50 X 1019.5 LG.	IS 1079	2	1.20	
87	RET. PLATE - 3THK X 50 X 164 LG.	IS 1079	2	0.19	
86	TOP DOOR PLATE - 5THK X 340 X 1180.5 LG.	IS:2062 Gr.A	1	15.75	
85	RET. PLATE - 3THK X 50 X 2425 LG.	IS 1079	2	2.85	
84	RET. PLATE - 3THK X 50 X 34 LG.	IS 1079	2	0.04	
83	BOTTOM DOOR PLATE - 5TK X 190 X 1644 LG.	IS:2062 Gr.A	1	12.26	
82	HALF SLEEVE - 3TK X 140 X 245.5 DEV LG.	IS:2062 Gr.A	2	0.80	
81	RET. PLATE - 3THK X 50 X 1019.5 LG.	IS 1079	2	1.20	
80	RET. PLATE - 3THK X 50 X 413 LG.	IS 1079	2	0.48	
79	BOTTOM DOOR PLATE - 5TK X 584 X 1180.5 LG	IS:2062 Gr.A	1	27.05	
78	HALF SLEEVE - 3TK X 140 X 245.5 DEV LG.	IS:2062 Gr.A	2	0.80	
77	RET. PLATE - 3THK X 50 X 1019.5 LG	IS 1079	2	1.20	
76	RET. PLATE - 3THK X 50 X 413 LG	IS 1079	2	0.48	
75	BOTTOM DOOR PLATE - 5TK X 584 X 1180.5LG	IS:2062 Gr.A	1	27.05	
74	RET. PLATE - 3THK X 50 X 1019.5 LG	IS 1079	4	1.20	
73	RET. PLATE - 3THK X 50 X 698 LG	IS 1079	4	0.32	
72	MIDDLE SIDE PLATE - 5THK X 854.25 X 1180.5 LG	IS:2062 Gr.A	2	39.50	
71	RET. PLATE - 3THK X 50 X 1019.5 LG	IS 1079	4	1.20	
70	RET. PLATE - 3THK X 50 X 719.25 LG	IS 1079	4	0.84	
69	TOP PLATE - 5THK X 869.25 X 1180.5 LG	IS:2062 Gr.A	2	40.07	

ITEM NO.	DESCRIPTION	MATL. SPEC.	QTY.	UNIT WT(Kg.)	REF. DRG./ STD. NO.
68	HALF SLEEVE - 3TK X 140 X 375.5 DEV LG.	IS:2062 Gr.A	1	1.23	
67A	RET. PLATE - 3THK X 50 X 2265 LG	IS 1079	1	2.66	
67	RET. PLATE - 3THK X 50 X 230 LG	IS 1079	1	0.27	
66	RET. PLATE - 3THK X 50 X 354 LG	IS 1079	1	0.41	
65	RET. PLATE - 3THK X 50 X 354 LG	IS 1079	1	0.41	
64	RET. PLATE - 3THK X 50 X 354 LG	IS 1079	1	0.41	
63	RET. PLATE - 3THK X 50 X 357 LG	IS 1079	1	0.42	
62	RET. PLATE - 3THK X 50 X 219 LG	IS 1079	2	0.25	
61	SLEEVE DOOR PLATE - 5TK X 225 X 2271 LG	IS:2062 Gr.A	1	20.01	
60	HALF SLEEVE - 3TK X 140 X 375.5 LG	IS:2062 Gr.A	4	1.23	
59A	RET. PLATE - 3THK X 50 X 2265 LG	IS 1079	1	2.66	
59	RET. PLATE - 3THK X 50 X 103 LG	IS 1079	4	0.12	
58	RET. PLATE - 3THK X 50 X 354 LG	IS 1079	1	0.41	
57	RET. PLATE - 3THK X 50 X 608 LG	IS 1079	1	0.71	
56	RET. PLATE - 3THK X 50 X 354 LG	IS 1079	1	0.41	
55	RET. PLATE - 3THK X 50 X 230 LG	IS 1079	1	0.27	
54	RET. PLATE - 3THK X 50 X 219 LG	IS 1079	2	0.25	
53	SLEEVE DOOR PLATE - 5THK X 225 X 2271 LG	IS:2062 Gr.A	1	20.05	
52	RET. PLATE - 3THK X 65 X 829 LG	IS 1079	4	1.26	
51	HOR PLATE - 5THK X 65 X 429 LG	IS:2062 Gr.A	12	1.09	
50	VER PLATE - 5THK X 65 X 904 LG	IS:2062 Gr.A	4	2.30	
49	BOTTOM SIDE PLATE - 5TK X 585 X 904 LG	IS:2062 Gr.A	1	20.75	
48	TOP SIDE PLATE - 5THK X 585 X 904 LG	IS:2062 Gr.A	1	20.75	
47	BOTTOM SIDE PLATE - 5THK X 585 X 904 LG	IS:2062 Gr.A	1	20.75	
46	TOP SIDE PLATE - 5THK X 585 X 904 LG	IS:2062 Gr.A	1	20.75	
37	RET. PLATE - 3THK X 50 X 924 LG	IS 1079	8	1.0	
36	RET. PLATE - 3THK X 50 X 829 LG	IS 1079	4	0.98	
35	RET. PLATE - 3THK X 50 X 485 LG	IS 1079	16	0.57	
34	HOR PLATE - 5TK X 65 X 429 LG	IS:2062 Gr.A	12	1.09	
33	VER PLATE - 5TK X 65 X 924 LG	IS:2062 Gr.A	2	2.35	
32	VER PLATE - 5TK X 65 X 924 LG	IS:2062 Gr.A	4	2.35	
31	VER PLATE - 5TK X 65 X 904 LG	IS:2062 Gr.A	1	2.30	
30	BOTTOM SIDE PLATE - 5TK X 585 X 904 LG	IS:2062 Gr.A	1	20.75	
29	MIDDLE SIDE PLATE - 5TK X 585 X 924 LG	IS:2062 Gr.A	4	21.21	
28	TOP SIDE PLATE - 5THK X 585 X 904 LG	IS:2062 Gr.A	1	20.75	
27	BOTTOM SIDE PLATE - 5TK X 626 X 1053 LG	IS:2062 Gr.A	1	25.87	
26	MIDDLE SIDE PLATE - 5TK X 626 X 1073 LG	IS:2062 Gr.A	4	26.36	
25	TOP SIDE PLATE - 5THK X 626 X 1053 LG	IS:2062 Gr.A	2	25.87	
24	GUSSET PLATE - 5THK X 100 X 150	IS:2062 Gr.A	2	0.58	
23	RET. PLATE - 3THK X 69 X 183	IS 1079	2	0.29	
22	CHANNEL ISMC200 - 863 LG	IS:2062 Gr.A	1	19.07	
21	GUSSET PLATE - 5THK X 100 X 150	IS:2062 Gr.A	2	0.29	
20	RET. PLATE - 3THK X 69 X 183	IS 1079	2	0.29	
19	CHANNEL ISMC200 - 329 LG	IS:2062 Gr.A	1	7.38	
18	GUSSET PLATE - 5THK X 100 X 150	IS:2062 Gr.A	1	0.58	
17	RET. PLATE - 3THK X 69 X 183	IS 1079	2	0.29	
16	CHANNEL ISMC200 - 382 LG	IS:2062 Gr.A	1	8.57	
15	GUSSET PLATE - 5THK X 100 X 150	IS:2062 Gr.A	8	0.58	
14	RET. PLATE - 3THK X 69 X 183LG	IS 1079	8	0.29	
13	CHANNEL ISMC200 X 853 LG	IS:2062 Gr.A	4	18.85	
12	GUSSET PLATE - 5THK X 100 X 150	IS:2062 Gr.A	2	0.58	
11	RET. PLATE - 3THK X 69 X 183 LG	IS 1079	2	0.29	
10	CHANNEL ISMC200 X 863 LG	IS:2062 Gr.A	1	19.07	
09	GUSSET PLATE - 5THK X 100 X 150 LG	IS:2062 Gr.A	24	0.58	
08	RET. PLATE - 3THK X 69 X 183 LG	IS 1079	12	0.29	
07	CHANNEL ISMC200 X 1534 LG	IS:2062 Gr.A	6	33.90	
06	SIDE PLATE - 5THK X 85 X 578	IS:2062 Gr.A	4	1.79	
05	BOTTOM COVER PLATE - 5THK X 752 X 1734		2	48.45	
04	TOP PLATE - 5THK X 75 X 1734 LG		2	5.10	
03	GUSSET - 10THK X 200 X 525 LG		2	8.08	
02	SIDE PLATE - 5THK X 85 X 548 LG		4	1.79	
01	TOP COVER PLATE - 5THK X 752 X 1734	IS:2062 Gr.A	2	48.45	

CUSTOMER NO. 7916

PROJECT: EPCM SERVICES FOR PX-PTA EXPANSION PROJECT

JOB NO. 44AC7500

OWNER: INDIAN OIL CORPORATION LIMITED-PANIPAT, HARYANA

PMC: NEW ENERGY HOUSE, RAMKRISHNA MANDIR ROAD, KONDIVITA, ANDHERI (EAST), MUMBAI-400059,INDIA
TEL: +91 22 26812000, FAX: +91 22 28208295

ITEM: HOT OIL HEATER FOR PTA UNIT (21-F1-1251)

BHARAT HEAVY ELECTRICALS LTD.,
HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012

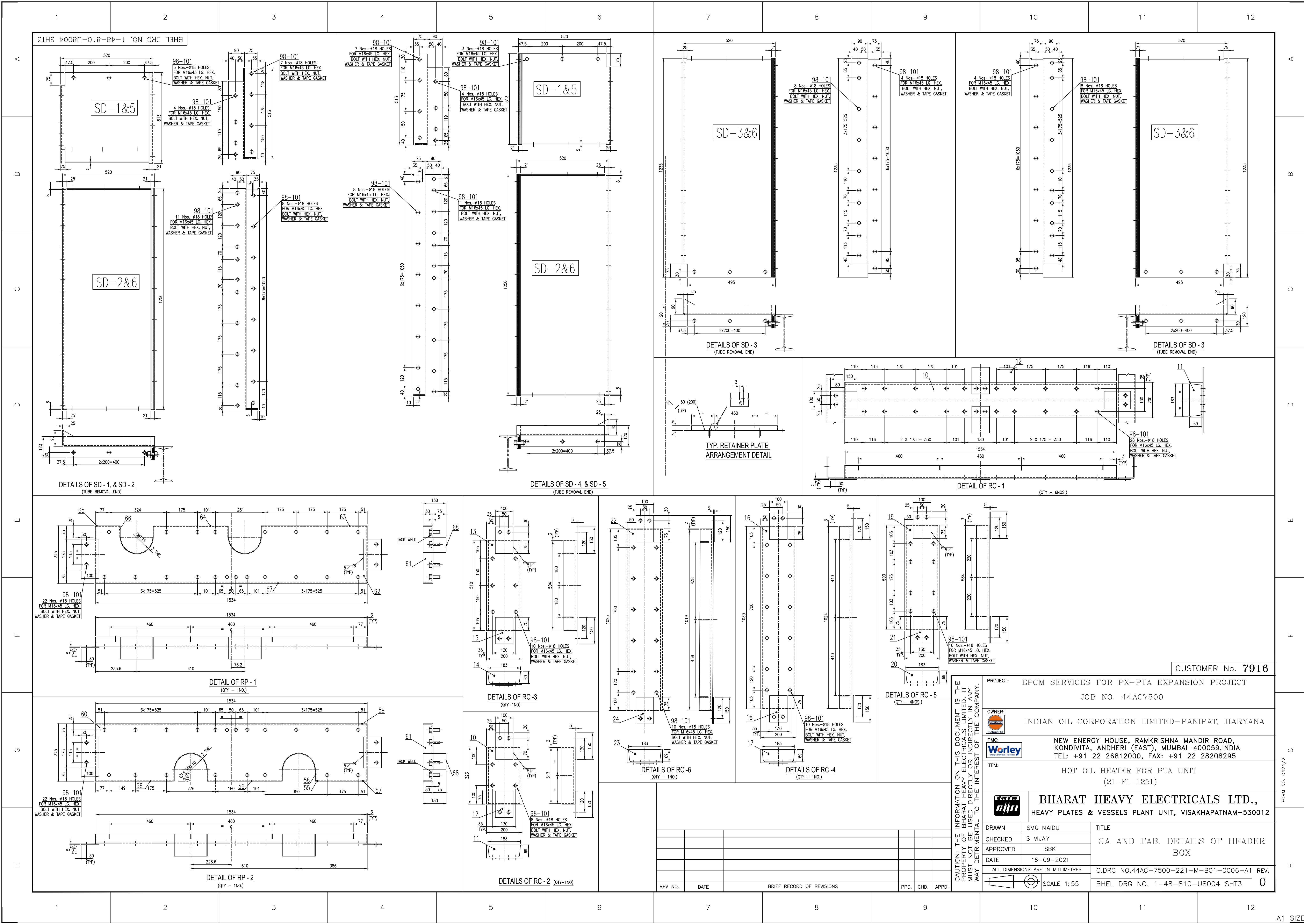
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CHECKED: S VIJAY
APPROVED: SBK
DATE: 16-09-2021

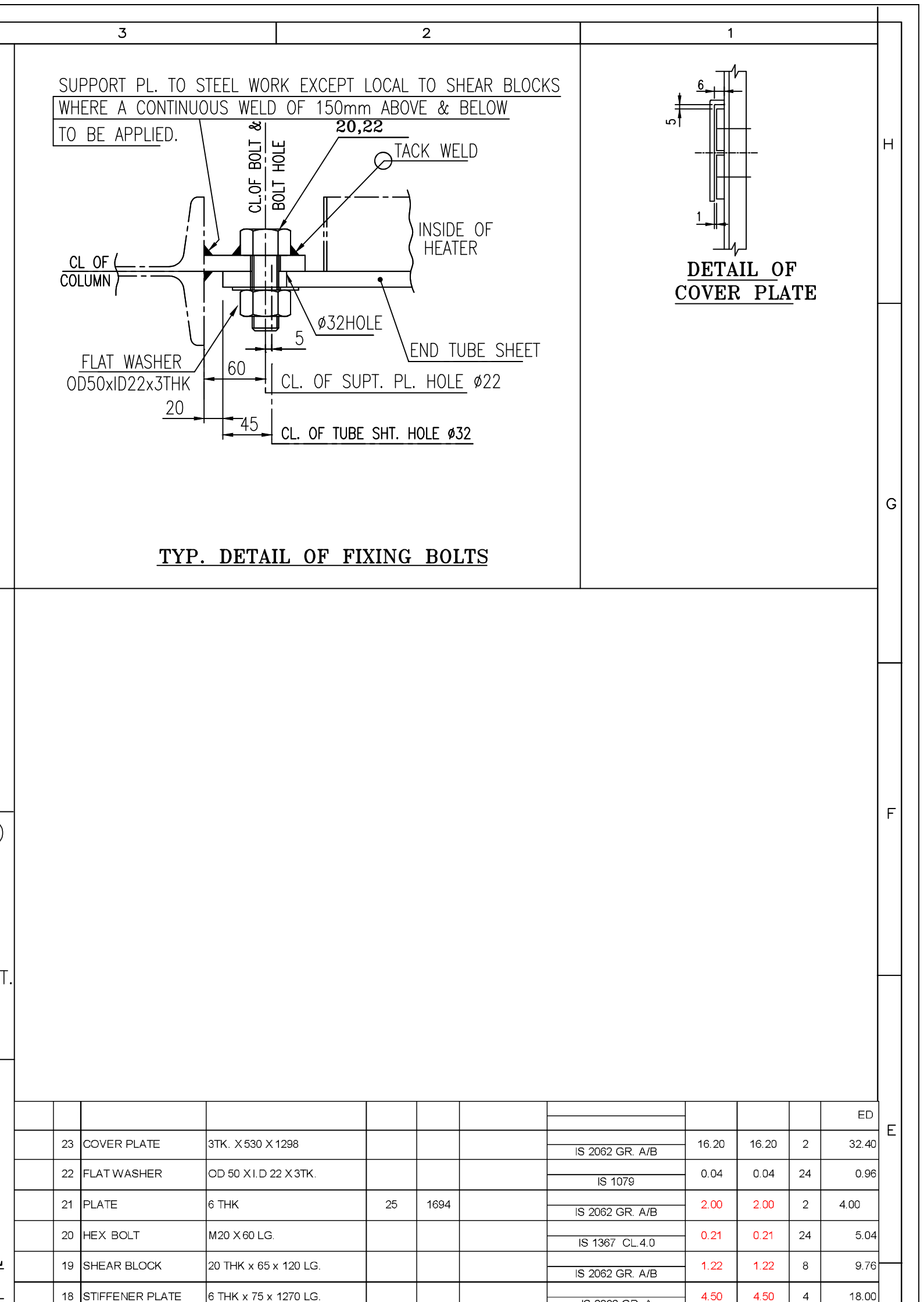
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SCALE 1:55

TITLE: GA AND FAB. DETAILS OF HEADER BOX
C.DRG NO.44AC-7500-221-M-B01-0006-A1
BHEL DRG NO. 1-48-810-U8004 SHT1

REV. 0

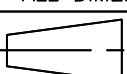
REV NO.	DATE	BRIEF RECORD OF REVISIONS	PPD.	CHD.





COVER PLATE DETAIL OF TUBE SLEEVE (ITEM NO.10) DETAIL OF TUBE SLEEVE (ITEM NO.09)	COVER PLATE DETAIL OF TUBE SLEEVE (ITEM NO.10) DETAIL OF TUBE SLEEVE (ITEM NO.09)	COVER PLATE DETAIL OF TUBE SLEEVE (ITEM NO.10) DETAIL OF TUBE SLEEVE (ITEM NO.09)
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PROJECT: EPCM SERVICES FOR PX-PTA EXPANSION PROJECT		CUSTOMER No. 7916	
JOB NO. 44AC7500			
OWNER: 		INDIAN OIL CORPORATION LIMITED-PANIPAT, HARYANA	
PMC: 		NEW ENERGY HOUSE, RAMKRISHNA MANDIR ROAD, KONDIVITA, ANDHERI (EAST), MUMBAI-400059,INDIA TEL: +91 22 26812000, FAX: +91 22 28208295	
ITEM:		HOT OIL HEATER FOR PTA UNIT (21-F1-1251)	
		BHARAT HEAVY ELECTRICALS LTD., HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012	
DRAWN	S SANKARA RAO	TITLE G.A AND FAB. DETAILS OF CONVECTION END TUBE SHEET	
CHECKED	S VIJAY		
APPROVED	L RAJA SEKHAR		
DATE	24-02-2021		
ALL DIMENSIONS ARE IN MILLIMETRES		C.DRG NO.44AC-7500-221-M-B02-0003-A1	REV.
	 SCALE 1:55	BHEL DRG NO. 1-48-810-U8003	0

FORM NO. 0424/2