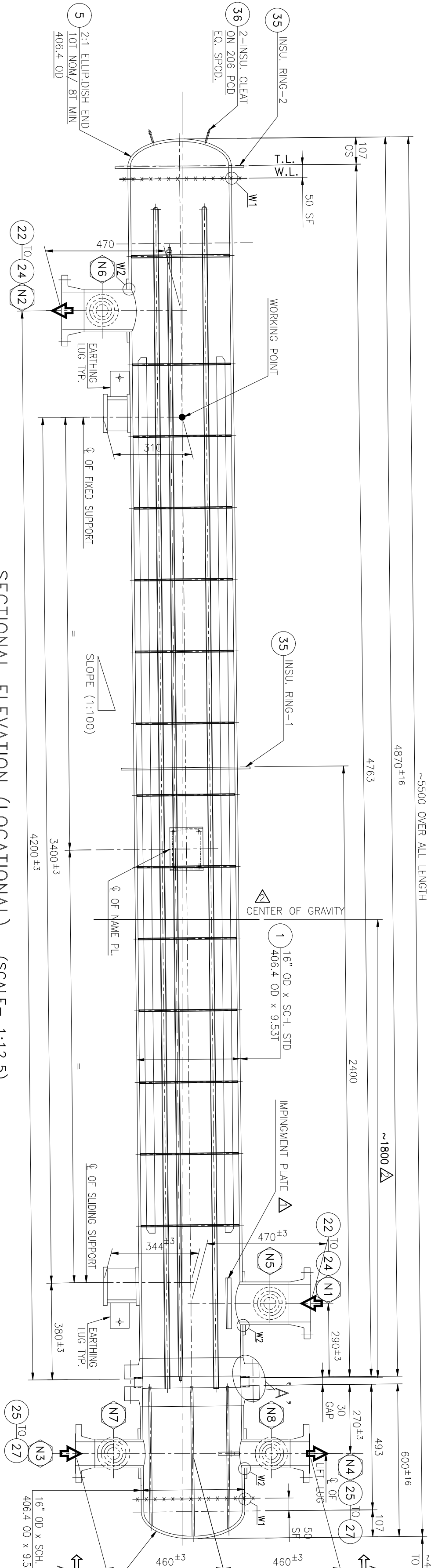
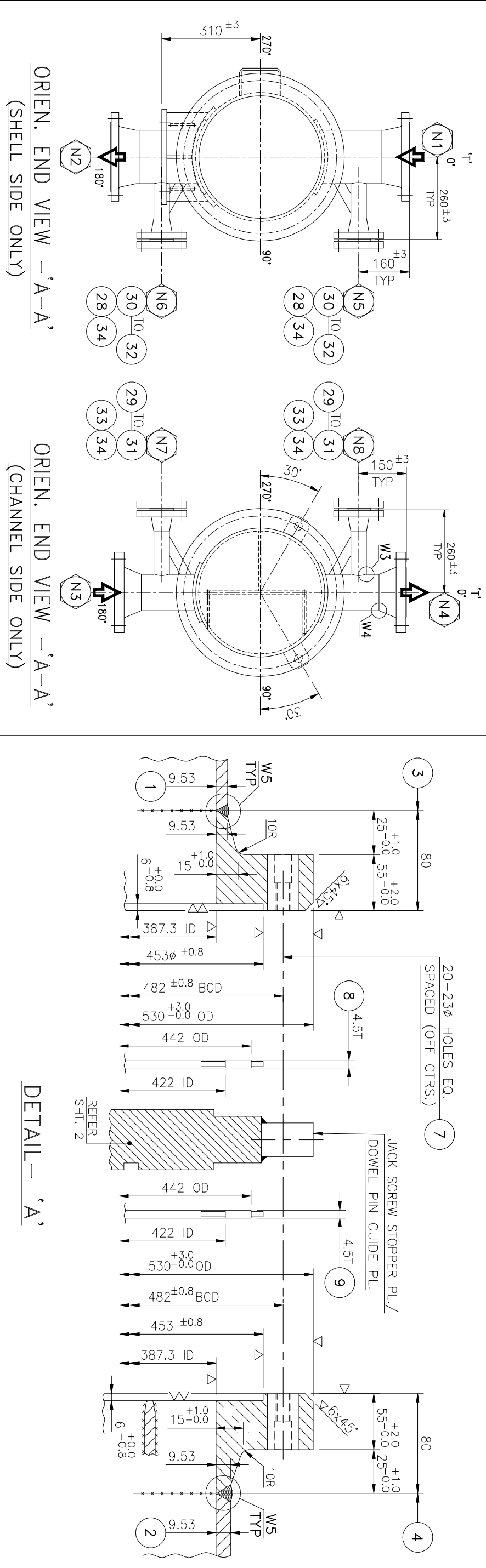
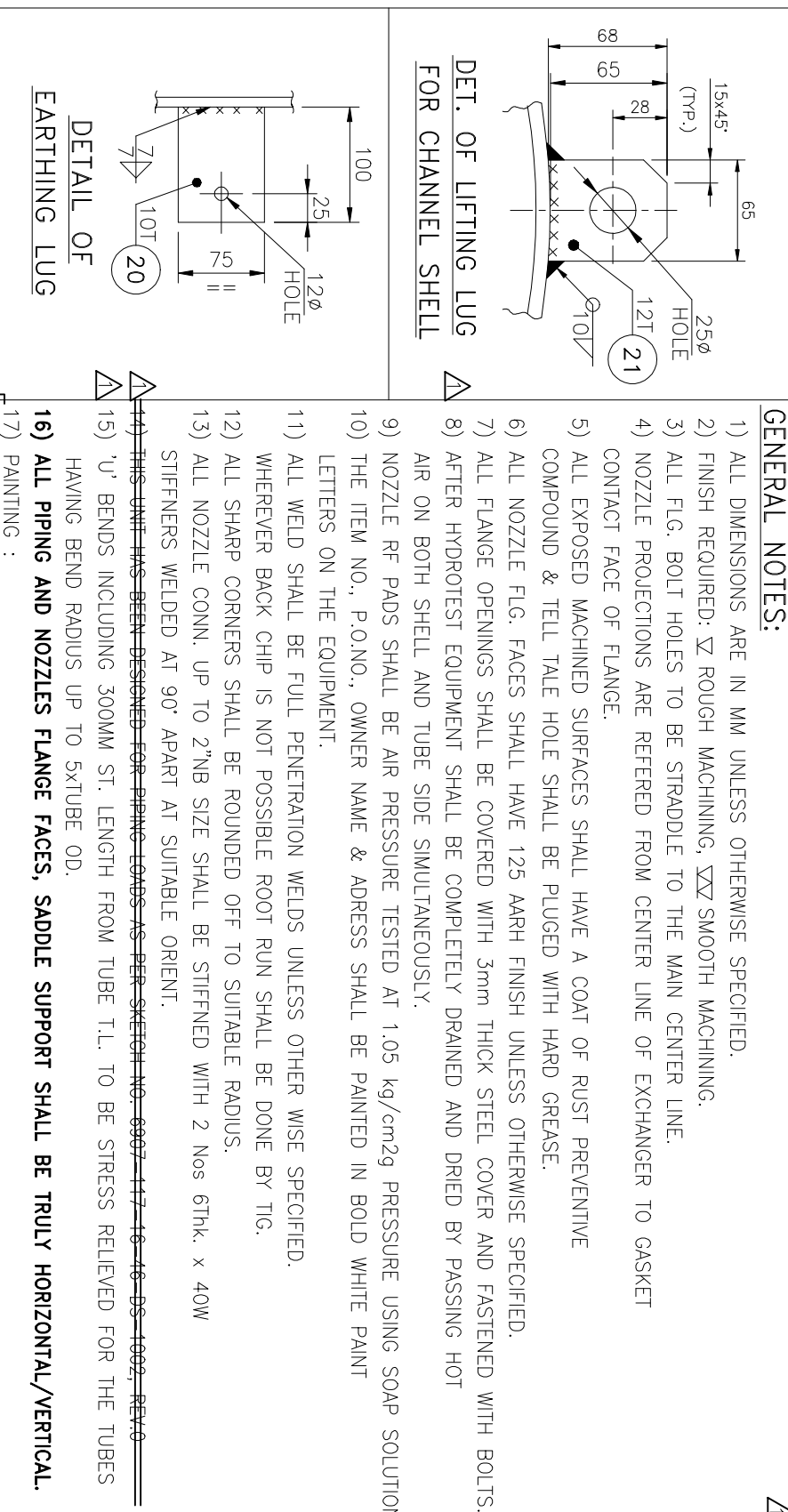




SECTIONAL ELEVATION (LOCATIONAL) (SCALE- 1:12.5)



DETAIL- 'A'

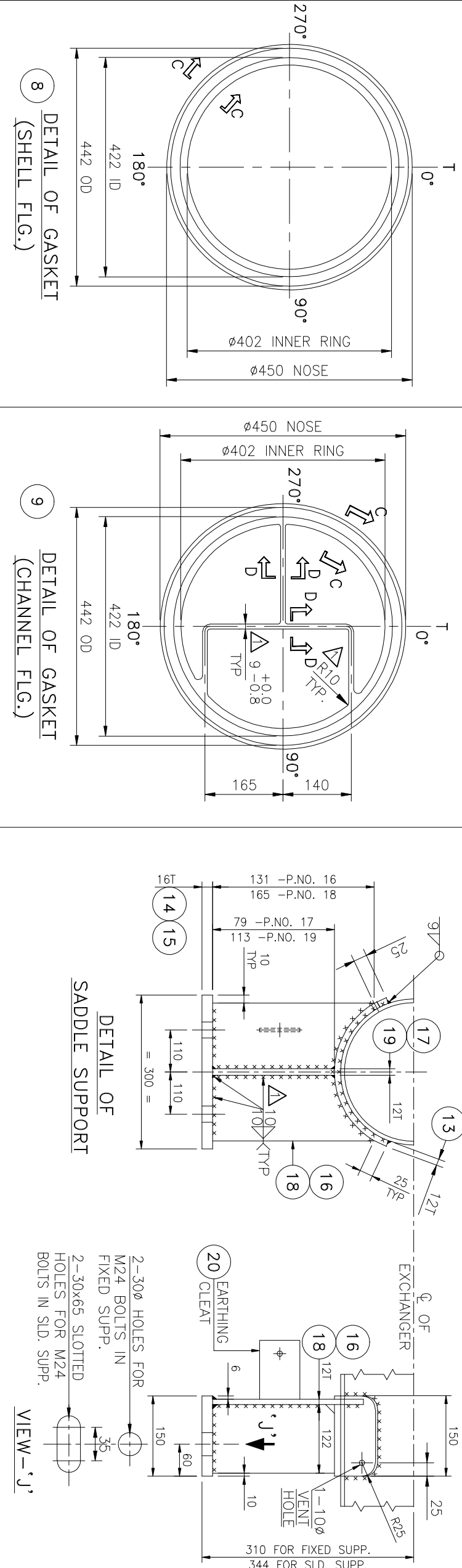


- GENERAL NOTES:**
- 1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
 - 2) FINISH REQUIRED: ∇ ROUGH MACHINING, $\times$ SMOOTH MACHINING.
 - 3) ALL FLG. BOLT THDS. TO BE STRAIGHT TO THE MAIN CENTER LINE.
 - 4) NOZZLE PROJECTIONS ARE REFERRED FROM CENTER LINE OF EXCHANGER TO GASKET CONTACT FACE OF FLANGE.
 - 5) ALL EXPOSED MACHINED SURFACES SHALL HAVE A COAT OF RUST PREVENTIVE COMPOUND & TELL TAIL HOLE SHALL BE FILLED WITH HARD GREASE.
 - 6) ALL NOZZLE FLG. FACES SHALL HAVE 125 AMPH FINISH UNLESS OTHERWISE SPECIFIED.
 - 7) ALL FLANGE OPENINGS SHALL BE COVERED WITH 3mm THICK STEEL COVER AND FASTENED WITH BOLTS.
 - 8) ALL HYDROTEST EQUIPMENT SHALL BE COMPLETELY DRYING AND DRYED BY PASSING HOT AIR ON BOTH SHELL AND TUBE SIDE SIMULTANEOUSLY.
 - 9) NOZZLE END FLANGES SHALL BE AIR PRESSURE TESTED AT 1.05 kg/cm² PRESSURE USING SOAP SOLUTION.
 - 10) THE ITEM NO., PO. NO., OWNER NAME & ADDRESS SHALL BE PAINTED IN BOLD WHITE PAINT LETTERS ON THE EQUIPMENT.
 - 11) ALL WELD SHALL BE FULL PENETRATION WELDS UNLESS OTHER WELD IS SPECIFIED.
 - 12) WHEREVER BACK CHIP IS NOT POSSIBLE, ROOT RUN SHALL BE DONE BY TIG.
 - 13) ALL SHARP CORNERS SHALL BE ROUNDED OFF TO SUITABLE RADIUS.
 - 14) ALL NOZZLE CORN. UP TO 2NB SIZE SHALL BE STIFFENED WITH 2 Nos 6mm x 40W STIFFENERS WELDED AT 90° APART AT SUITABLE ORIENT.
 - 15) ALL WELDS SHALL BE DONE WITH THE SHIELD TO BE WITHIN 25mm TO 50mm FROM THE WELD LINE.
 - 16) UP. BENDS INCLUDING 300MM ST. LENGTH FROM TUBE T.L. TO BE STRESS RELIEVED FOR THE TUBES HAVING BEND RADIOUS UP TO 5X TUBE OD.
 - 17) ALL PIPING AND NOZZLES FLANGE FACES, SADDLE SUPPORT SHALL BE TRULY HORIZONTAL/VERTICAL.
 - 18) PAINTING:

1 DESIGN CODE		ASME SEC. VIII DIV.1, ED. 2007 & TEMA CL. R. 2007 ED.	
SIZE: 36"3 x 4500 mm (37)			
SURFACE AREA/ SHELL: 29.8 m ²			
TYPE OF EXCHANGER: BEU (HORIZONTAL)		SHELL SIDE	
2 OPERATING FLUID		HE & N2	
3 DESIGN PRESSURE		10.20/TP	
4 DESIGN TEMPERATURE		150.0 °C	
5 WORKING PRESSURE		3.90 kg/cm ² g	
6 WORKING TEMPERATURE		113.0 / 38.0 °C	
7 HYD. TEST PRESSURE		13.3 kg/cm ² g	
8 CORROSION ALLOWANCE		3.0 MM	
9 JOINT EFFICIENCY		0.85	
10 RADIOGRAPHY		SPOT	
11 HEAT TREATMENT		SR. OF DISH END AFTER FORMING	
12 NUMBER OF PASSES		4	
13 MDMT		1	
14 HEAD DUTY		0.1250 x 1.10	
15 INSPECTION BY		ELC	
16 INSULATION THK. (BY OTHERS)		NIL	
17 EMPTY WEIGHT		25 (PP)	
18 WEIGHT FULL OF WATER		~ 1400 kgs	
19 WEIGHT OF TUBE BUNDLE		~ 1900 kgs	
20 SHELL PER UNIT		~ 600 kgs	
21 No. OF UNIT		ONE	
22 ITEM NO		117-EE-482	
23 SERVICE		KA-480 FIRST STAGE COOLER	

AERO ENGINEERS REF. DRAWINGS		
SR. No	DRG. No.	SHEET No. DESCRIPTION
1	AEH-10140	1 OF 2 ASSEMBLY AND PART DETAIL
2	AEH-10140	2 OF 2 ASSY. Y. AND DETAIL OF TUBE BUNDLE AND TEST FLANGE

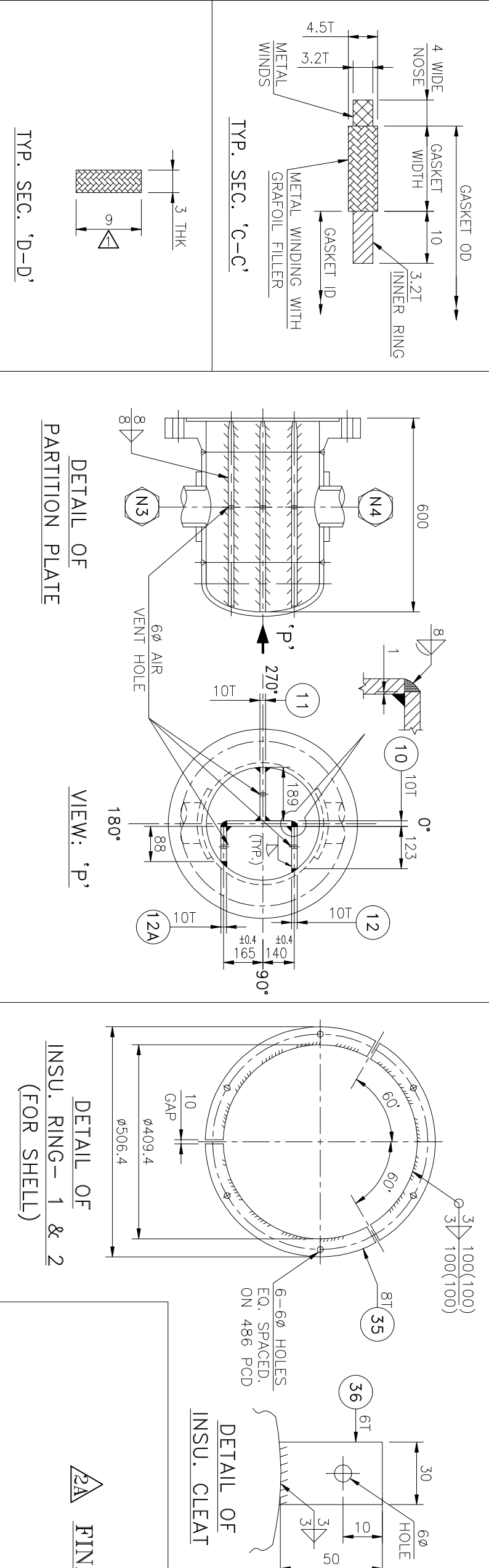
**** 2T NON ASBESTOS BS7531 GR.X RING GASKET (DIMENSIONS AS PER ASME B 16.21)
 **** 4.5T SS316 SPWD GASKET WITH GRAFL FILLER AND 3.2T CS OUTER RING. (DIMENSIONS AS PER ASME B 16.20)
 ** 4.5T SS316 SPWD GASKET WITH GRAFL FILLER AND 3.2T SS316 INNER CENTERING RING.



APPLICABLE STANDARDS & SPECIFICATIONS			
S/N	STD. NO.	DESCRIPTION	REMARKS
1	7-15-0001	PAINT DETAILS	3
2	7-15-0002	TYPE OF NAIL, NAGETS	3
3	7-15-0004	SUPPORT FOR ROOFING DOWNS	3
4	7-15-0007	ROOFING SHAPES TO NAIL	3
5	7-15-0008	EYE BOLT DETAILS	3
6	7-15-0010	WALL SKEIN TRAIL & ARRANGMENT	3
7	7-15-0011	FIXING DETAIL OF DOWEL PINS	3
8	7-15-0013	LIFTING LUG DETAIL	3
9	7-15-0017	EASTHING LUG	3
10	7-15-0019	NAVE PLATE (E&T EXCHANGER)	3
11	7-15-0019	FRANCISSES FOR SHILL AND ROOF	3
12	6-15-0001	STEELING SPECIFICATION FOR DEAN	4
13	6-15-0003	STEELING SPEC. FOR WELDED	3
14	6-15-0006	STEELING SPEC. FOR WELDED	3
15	6-15-0006	STEELING SPECIFICATION FOR	3

- 17) SURFACES SHALL BE BLOWING TO NEAR WHITE FINISH AS PER SSPC-SP-10 (S2,1/2) AND ASSISTANCE
- 18) A COAT OF INORGANIC ZINC SLAKE PRIMER EN-68-75 MINIMUM DFT.
- 19) ALL REQUIREMENTS OF THE PE SHALL BE COMPLIED WITH, UNLESS OTHERWISE AGREED BETWEEN THE EIL AND AERO ENGINEERS, WITHOUT ANY COST AND DELIVERY IMPLICATIONS.
- 20) SPARE QUANTITY SHOWN IN BOX IS FOR MAINTENANCE SPARES AS UNDER
- 21) GASKET : 400K FOR GROM FLANGES, INTER CONNECTING NOZZLES & BLIND FLANGES.
- 22) FASTENER : 20% (MIL. 4 NOS.) FOR ORIFL FLANGES, INTER CONNECTING NOZZLES & BLIND FLANGES.
- 23) FOR DETAILED PLEASE REFER ANNEXURE I
- 24) SLIDING END OF EXCHANGER SHALL BE PAINTED AS "CAUTION SLIDING END" IN BLACK ON PRIMER COATING IN THE SHOP.
- 25) EQUIPMENT WITH NO. PURCHASE ORDER NO. CUSTOMER NAME AND ADDRESS SHALL BE PAINTED WITH ITEM NO. IN BOLD LETTERS ON THE EQUIPMENT BEFORE THE DISCHARGE.
- 26) SPARE PARTS SHALL BE DISPATCHED SEPARATELY IN A BOX AND MARKED WITH PO NO. ITEM NO. & PURCHASER'S NAME AND ADDRESS.
- 27) CLEAN PIPES SHALL BE USED FOR HYDROTEST. MINIMUM WATER TEMPERATURE (FOR HYDROTEST) SHALL BE 20 °C. TEST PRESSURE SHALL BE MAINTAIN FOR AT LEAST ONE HOUR.
- 28) A) DESCRIBE THE BATTLE POINTS ON BOTH SIDES.
- 29) B) DRAWING MUST MARK FOR ASSEMBLY AND SHALL PUNCHED AT "O" OF ALL BATTLE POINTS, TUBE SHEETS AND ON ALL WELDING PARTS.
- 30) ALL PRESSURE BEARING PLATES & PLATES WELD TO PRESSURE PARTS SHALL BE IN NONWELD CONDITION.

26	INSU. CL&T	2	SA 516 CR 60	6T × 30W × 50 LG
35	INSUL&PR. RING - SHELL	2	SA 516 CR 60	8T × 50x4.0 00 × 406.4 ID
34	STD W/2 1/2 HDN-10N-20N-28	16/16	SA 150 CR 20	1/2" UNC × 75 LG
33	GASKET -N7N8	2/8	SA 150 CR 20	1-1/2NBS × ASME 150# B16.21
32	GASKET -N7N8	2/8	***	1-1/2NBS × ASME 150# B16.21
31	BLD.FLG.-N5N6N7N8	4	SA 105	1-1/2NBS × ASME 150# BLRF
29	FLANGE -N5N6N7N8	4	SA 105	1-1/2NBS SCH. 160 × ASME 150# WNF
28	PIPE - N7N8	2	SA 106 CR 6	1-1/2NBS SCH. 160 × 160 LG
27	FLANGE - N5N6	2	SA 106 CR 6	1-1/2NBS SCH. 160 × 150 LG
26	PIPE - N3N4	2	SA 105 CR 6	4NBS × SCH.120 × ASME 150# WNF
25	RPD -N3N4	2	SA 516 CR 60	10T × 126 ID × 195 OD
24	FLANGE - N1N2	2	SA 105	6NBS × SCH.80 × ASME 150# WNF
23	PIPE - N1N2	2	SA 106 CR 6	6NBS × SCH.80 × 210 LG
22	RPD -N1N2	2	SA 516 CR 60	10T × 180 ID × 250 OD
21	FLANGE FOR LIFT LOGS	2	SA 516 CR 60	12 THK × 65W × 65 LG
20	FLANGING LOG	2	IS 2062 CR 6	10 THK × 75W × 100 LG

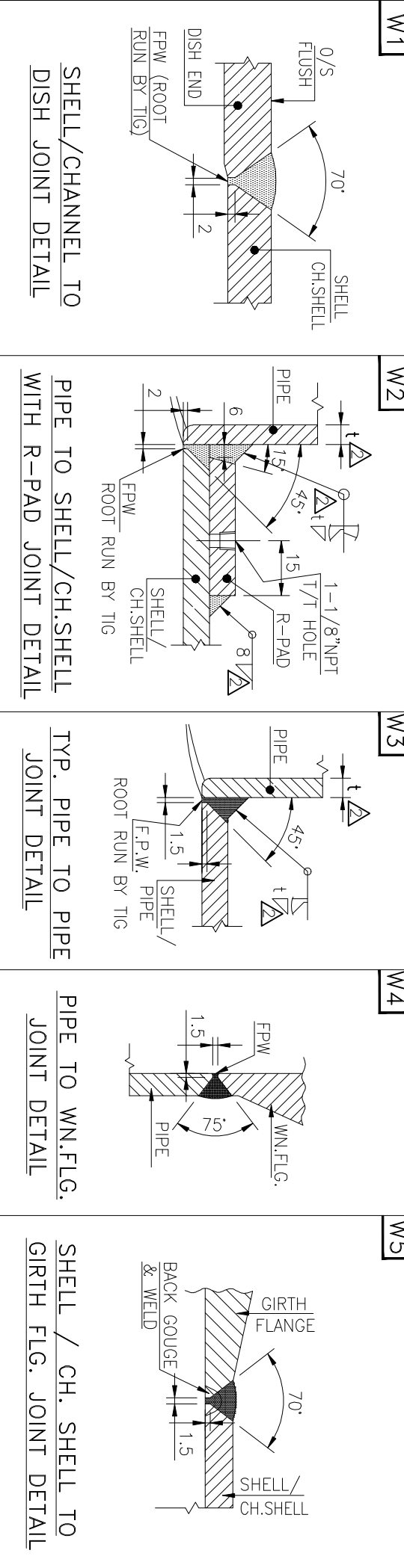


FINAL 'AS BUILT' DRAWING.

16	6-81-0001	STANDARD SIZES FOR P&AT	1
17	6-81-0009	NO. 1000 & 1001 P&AT	1
18	6-81-11-46-45-482	SLING PLATE FOR ITEM NO. 117-EE-482	0
19	6-81-117-05-45-442	TUBE LAYOUT	1
20	6-81-117-05-45-442	PIPE LAYOUT	1
21	6-81-117-05-45-442	PIPE LAYOUT	1
22	6-81-117-05-45-442	PIPE LAYOUT	1
23	6-81-117-05-45-442	PIPE LAYOUT	1
24	7-15-0009	METHOD OF ASSEMBLING NUT TO THE ROOST	3

28. ALL CARBON CONTENT IN PLATES SHALL NOT EXCEED 0.23%.
29. ALL TUBES SHALL BE COLD DRAWN, SEAMLESS, SINGLE PEECE & IN ANNEALED CONDITION.
30. SLING MARK IDENTIFICATION SHALL BE PROVIDED ON HEAT EXCHANGERS WITH RESPECT TO C.O. OF EQUIPMENT
31. FOR EXTERNAL STUDS, FOR WORKING TEMPERATURE UP TO 200°C, USE GRAPHITE GREASE AND FOR ABOVE 200°C USE MOLYBDENUM DISULPHIDE GREASE.
32. ALL TUBE HOLES SHALL HAVE CLOSE FIT AS PER TEMA.
33. ALL OVER V FINISH REQUIRED FOR MACHINING SURFACES.
34. EQUIPMENT SHALL BE PROVIDED WITH PRESSURE GAUGE AND 1/2" NON RETURN VALVE ON SLEEVE SIDE AND TUBE SIDE AND DISCHARGED AFTER THE PUMPING AND FILLING AT 0.25MPa/36psim.
35. FOR HEAT EXCHANGER TOLERANCES REFERE EL STD 7-15-0019 REV.3 OR TEMA, IF NOT SPECIFIED IN EL STD, STRAINING OF BOTH SHALL CONFORM.
36. ALL BOLT HOLES TO BE STRAIGHT 1/5° CENTERLINE.
37. SPOT RADIATION MEANS 5 % OF TOTAL WELDED LENGTH INCLUDING ALL "T" JOINTS AND AT LEAST ONE SPOT ON EACH LONGITUDINAL & CIRCUMFERENTIAL SEAM RADIOGRAPHED.
38. PORTABLE WAVE SHALL BE USED FOR HYDROTESTS SHALL NOT CONTAIN CHLORIDE MORE THAN 25 PPM.
39. FINAL HYDROTEST OF EQUIPMENT SHALL BE DONE WITH SERVICE GAS/SLT.
40. ALL WELD NECK FLANGES 1/2" TO BE BORED TO SLIT NOZZLE NECK 1/2".

ITEM NO.	DESCRIPTION	QTY.	MAT. SPEC.	SIZE	REMARKS
18	SUPPORT PLATE (SLIDING)	1	IS 2002 GR-B	12 THK x 165MM x 220 LG.	
17	HB. PLATE (FIXED)	1	IS 2002 GR-B	12 THK x 75MM x 122 LG.	
16	SUPPORT PLATE (FIXED)	1	IS 2002 GR-B	12 THK x 131MM x 280 LG.	
15	BASE PLATE (FIXED)	1	IS 2002 GR-B	16 THK x 150MM x 300 LG.	
14	BASE PLATE (SLIDING)	1	IS 2002 GR-B	16 THK x 150MM x 300 LG.	
13	PAO PLATE (FOR SUPP.)	2	SA 516 CR-60	12 THK x 180 W x 355 DEVL. LG.	
12A	PARTITION PLATE	1	SA 516 CR-60	101 THK x 85MM x 538 LG.	
12	PARTITION PLATE	1	SA 516 CR-60	101 THK x 123W x 552 LG.	
11	PARTITION PLATE	1	SA 516 CR-60	101 THK x 189W x 585 LG.	
10	PARTITION PLATE	1	SA 516 CR-60	101 THK x 295W x 585 LG.	
9	CASKET - CH-SHELL	1+4		4.5 THK (AS PER DET.)	
8	CASKET - SHELL	1+4		4.5 THK (AS PER DET.)	
7	STUD WITH 2 HEX NUT	20+4	SA 193 CR-B7 / SA 184 CR-B7	M20 x 200 LG.	
6	DISHED END - CH-SHELL	1	SA 516 CR-60	101 x 610 BLANK DIA.	
5	DISHED END - SHELL	1	SA 516 CR-60	50 THK x 610 BLANK DIA.	
4	DRIFT FLANGE - CH-SHELL	1	SA 266 CL-4	55 THK x AS PER DRG.	
3	DRIFT FLANGE - SHELL	1	SA 266 CL-4	55 THK x AS PER DRG.	
2	CHANNEL SHELL	1	SA 106 CR-B	16"00 x 50"ASD x .363 LG.	
1	NAIL SHELL	1	SA 106 CR-B	16"00 x 50"ASD x .463 LG.	



REV. NO.	DATE	DESCRIPTION	REV.	APPD.
12.12.11		SHOWN "AS BUILT" DRAWING AS MFD.	KMP	CRG
28.06.11		REVISED AS PER CLIENT COMMENTS AS MK'D.	KMP	SJP
27.05.11		REVISED AS PER CLIENT COMMENTS AS MK'D.	KMP	SJP
			REV.	APPD.
			BY	BY

NOZZLE CONNECTIONS										
MARK NO.	REQ. NOS	SOFT PIPE	THK	RATING	FACING	PIPE TYPE	FACE	SERVICE	WXT R-PAD	REMARK
N738	2	1.5	160	7.14	150	RF	WN	15.48H MP CONNECTION	--	with B.F.
N536	2	1.5	160	7.14	150	RF	WN	15.48H MP CONNECTION	--	with B.F.
N4	1	4	120	11.13	150	RF	WN	15.48H CHANNEL OUTLET	40 x 10	--
N3	1	4	120	11.13	150	RF	WN	15.48H CHANNEL INLET	40 x 10	✓
N2	1	6	80	10.97	150	RF	WN	15.48H SHELL OUTLET	40 x 10	--
N1	1	6	80	10.97	150	RF	WN	15.48H SHELL INLET	40 x 10	--

BILL OF MATERIAL	
 AERO ENGINEERS 3419, CIDC PH V, VADVA AHMEDABAD. 382445 TEL:-25841295, 25840720 FAX NO:-0091-79-25841041	
TITLE: ASSEMBLY & PARTS DETAIL FOR KA-480 FIRST STAGE COOLER	
P/NO. NO. 6907-117-EE-PR-6036/04/4, REV.0 PRODUCT: BRCP. LEBENKAW. ASSAM. ITEM NO. 117-EE-482 PURCHASER: BRAMPANAPUR COOLER & POLYMER LIMITED. DUN: LODE/HDEP P/NO. NO. 6907-117-EE-PO-6036/02/04/4 DT: 02/07/2011	DRN BY T.S.P. 1303.11 CHD BY S.J.P. 1303.11 APPR BY U.P.S. 1303.11 JOB NO.: AEH-10140 DRG. NO.: AEH-10140 QTY.: 1 NO. REV. 1 OF 2 1 2 3 4 5 6 7 8 9 10 11 12