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VENTURI RADIANT COIL

Project title : Brahmaputra Petrochemical Complex Project
Location : Lepetaka, Dibrugarh, Assam, India
Owner : Brahmaputra Cracker and Polymer Ltd. (BCPL)
Owner Ref. : -
Customer : Engineers India Limited
Customer Ref. : BPCL-BPCP
UNIT : Ethylene Cracker Unit
Heater : 4 Gas / Naphtha Cracking Furnaces
Item : 113-FF-101 Thru 113-FF-104
LHT Ref. : 62559
Attached : Sheet 2 of 2

B
ISSUE
09-11-17

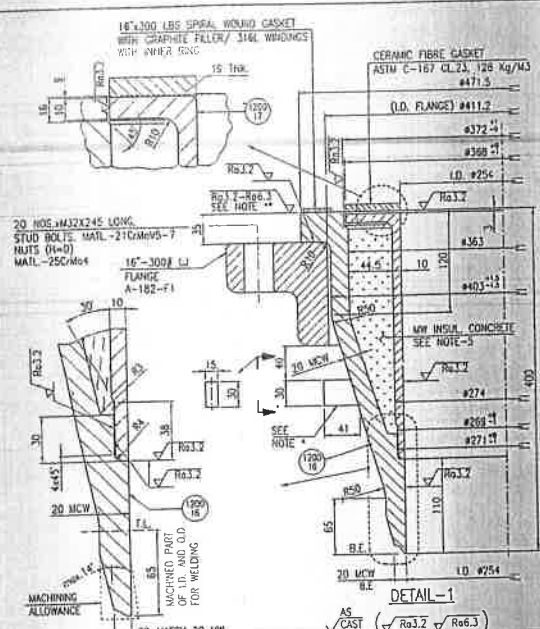


Lummus Technology Heat Transfer
Bloomfield, N.J.

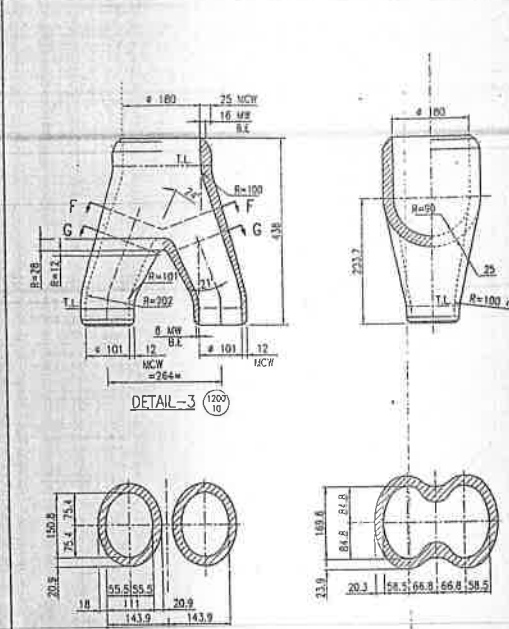
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2	09-25-09	FOR APPROVAL	OPS	MEP										

SCALE: NONE BA62559DWG1204 1

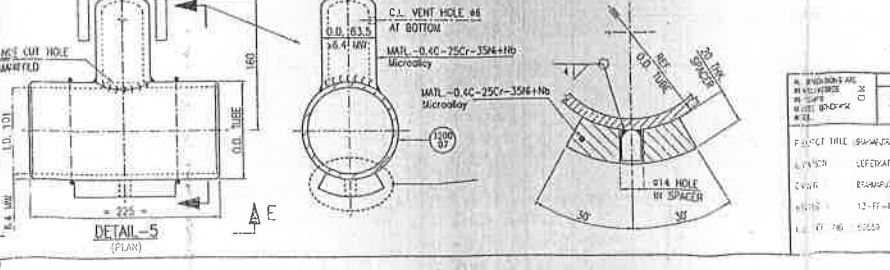
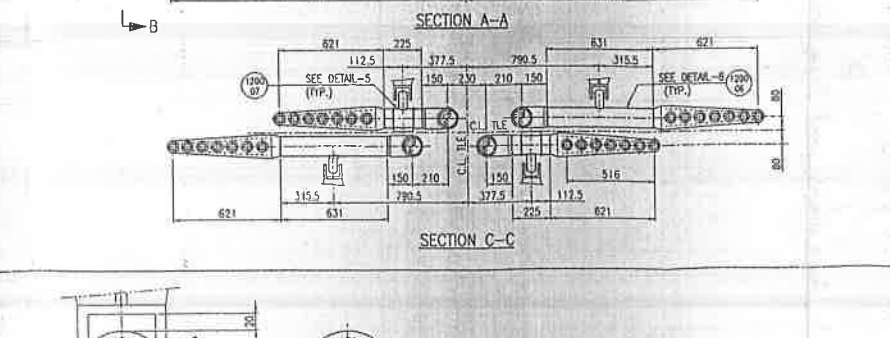
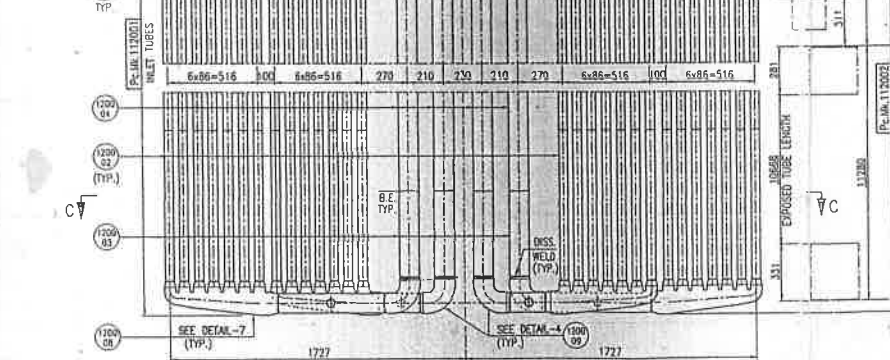
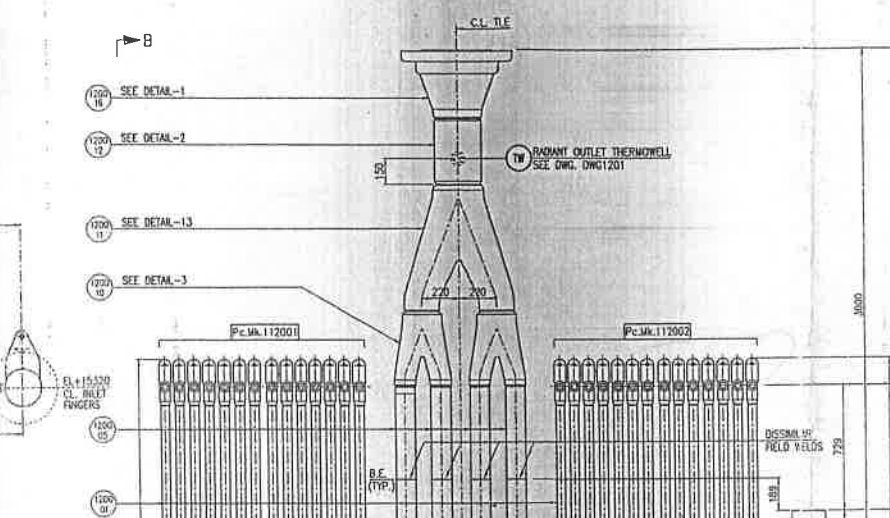
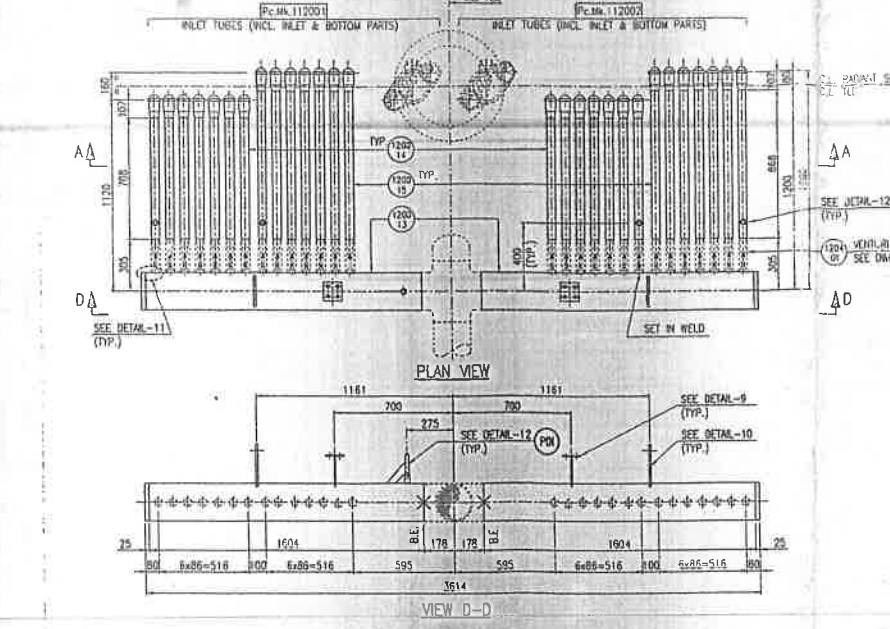
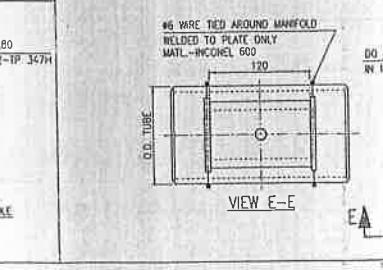
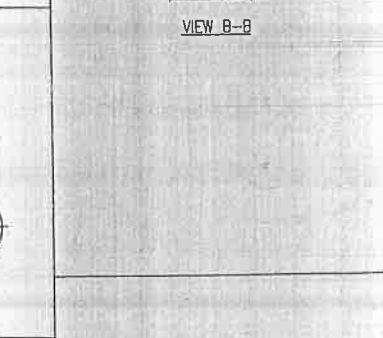
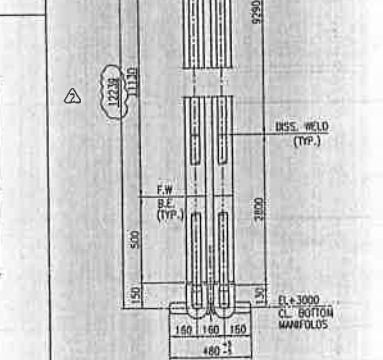
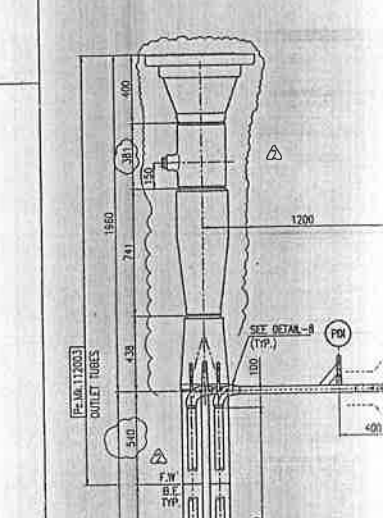
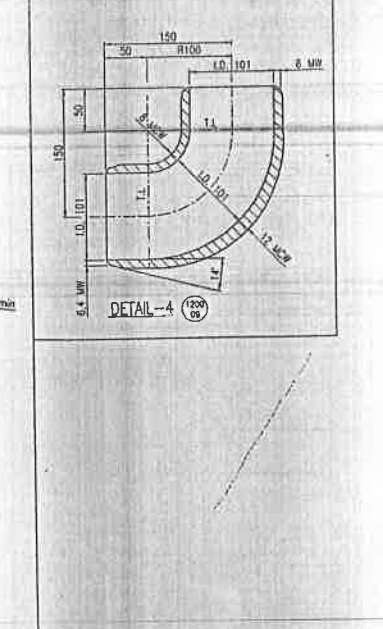
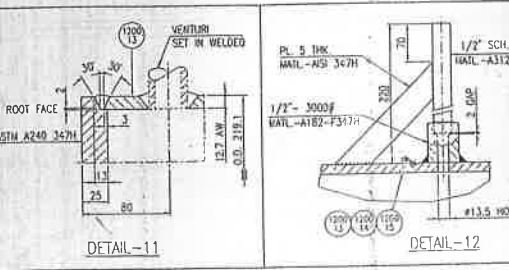
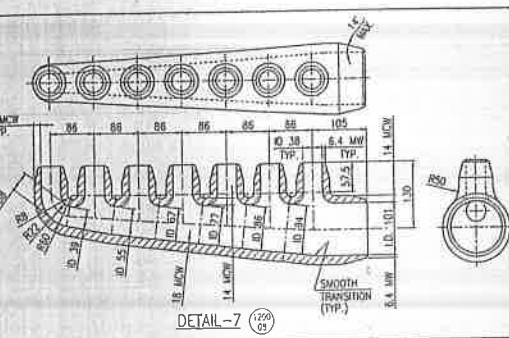
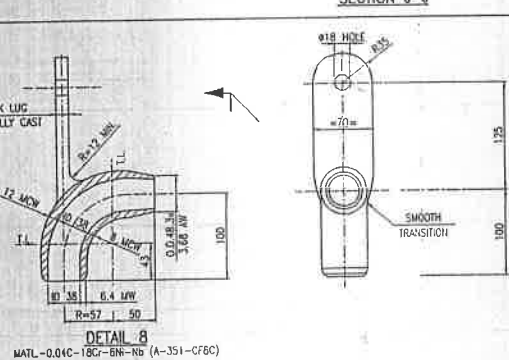
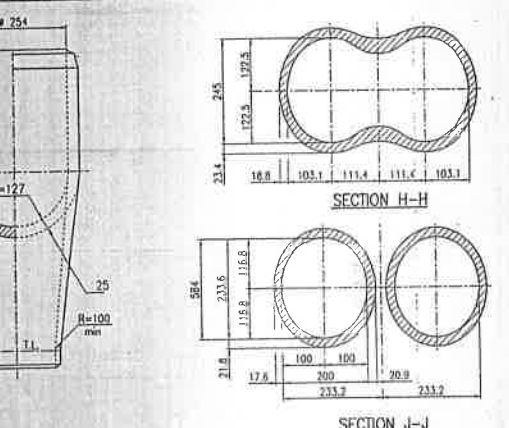
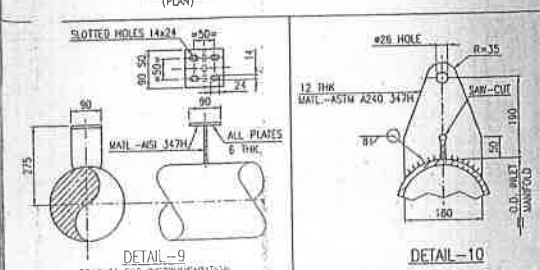
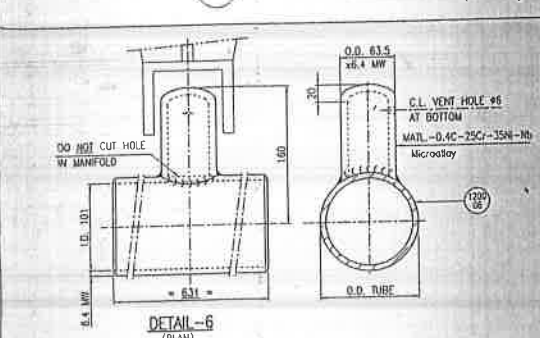
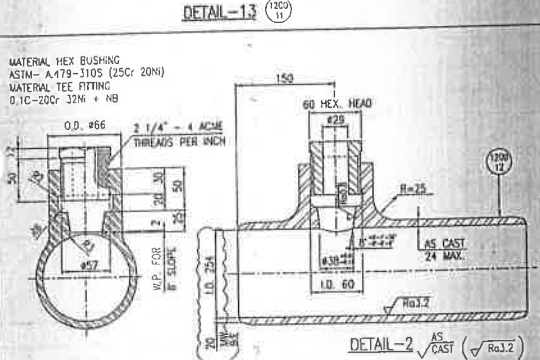
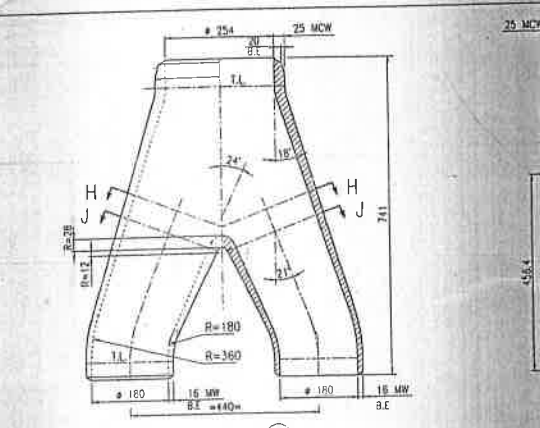
SHEET 1 OF 2



NOTES:
 1. J FLANGE SUPPORT BLOCKS TO BE WELDED AFTER INSTALLATION OF THE FLANGE.
 2. THE GASKET CONTACT SURFACE SHALL BE FORMED BY A CONTINUOUS SPIRAL GROOVE, GENERATED BY A 0.79 MM RADIUS ROUND ROSE TOOL AT A FEED RATE BETWEEN 0.35 MM AND 0.45 MM PER REVOLUTION. (R0.12/0.3 MM)



SECTION G-G
 SECTION F-F



REFERENCE DRAWINGS:

BE62559DWG1100
 B467555DWG1204
 B062555DWG1235

GENERAL NOTES:

- ONE (1) RADIANT COIL ASSEMBLY IS DRAWN AS SHOWN IN PLAN VIEW.
- SIX (6) RADIANT COIL ASSEMBLIES REQUIRED PER HEATER, FOUR (4) HEATERS REQUIRED.
- ALL COIL PARTS SHALL HAVE A PIECE MARK IDENTIFICATION NUMBER AS PER THIS DRAWING.
- WELD BEVEL PREPARATION AS PER MANUFACTURER'S STANDARD (SUBJECT TO LHT APPROVAL).
- LENGTH FOR ITEM NO. 120013 SHALL BE PROVIDED WITH 100 MM MAKE-UP LENGTH TO ALLOW SHOP HYDROTESTING. AFTER HYDROTESTING PIPE SHALL BE CUT TO THE PROPER LENGTH BEFORE SHIPMENT.
- FOR 12007 C, DENSITY: 1200 kg/m³ (107 C DRED), CONDUCTIVITY 0.27 W/LK AT 400° C AND 0.35 W/LK AT 800° C.
- ALL HEATER COIL PIECEMARKS SHALL BE IDENTIFIED (LABELLED) WITH AN UNIQUE NUMBER AS FOLLOWS:

ABBREVIATIONS:

7. - MW INDICATES: MINIMUM WALL THICKNESS AS CAST (WITHOUT MACHINING)
 - MW INDICATES: MINIMUM WALL THICKNESS AFTER MACHINING (FOR TUBES IT INCLUDES 0.8 MM OUTSIDE SURFACE ROUGHNESS)
 - MW INDICATES: AVERAGE WALL THICKNESS

- I.D. INDICATES: INSIDE DIAMETER
 - O.D. INDICATES: OUTSIDE DIAMETER
 - F.W. INDICATES: FIELD WELD
 - B.E. INDICATES: BEVELLED END
 - T.L. INDICATES: TANGENT LINE
 - P.C.M. INDICATES: PIECE MARK NUMBER

- EL+ INDICATES: ELEVATION
 - C.L. INDICATES: CENTER LINE
 - PL. INDICATES: PLATE
 - U.S. INDICATES: UNDERSIDE
 - T.O. INDICATES: TOP OF
 - TYP. INDICATES: TYPICAL

DESIGN CONDITIONS COIL:

DESCRIPTION	DESIGN PRESSURE Kg/cm ² (g)	DESIGN TEMPERATURE °C	MATERIAL	TEST PRESSURE Kg/cm ² (g) SHIP FIELD HYDROST. AIR
INLET FINGERS ITEM 120014/15 O.D. 48.3 x 3.68 MW	5.3	770 (3)	A312-TP347H	70 1.5
INLET MANFOLD ITEM 120013 O.D. 219.1 x 12.7 MW	5.3	770 (3)	A312-TP347H	70 1.5
INLET TUBES ITEM 120001 I.D. 38 x 6.4 MW	2.0 3.5	1115 (2) 1065 (1)(2)	0.4C-25Cr-35Ni-Nb Microalloy	70 1.5
INLET TUBES ITEM 120002 I.D. 38 x 6.4 MW	2.0 3.5	1115 (2) 1065 (1)(2)	0.4C-35Cr-15Ni-Nb Microalloy	70 1.5
BOTTOM PARTS ITEM 120006/07/08 & 09 I.D. 101 x 8.4 MW	2.0 3.5	1115 (2) 1065 (1)(2)	0.4C-25Cr-35Ni-Nb Microalloy	70 1.5
OUTLET TUBES ITEM 120003/04 I.D. 101 x 8.4 MW	1.7 3.5	1125 (2) 1065 (1)(2)	0.4C-35Cr-45Ni-Nb Microalloy	70 1.5
OUTLET TUBES ITEM 120005 I.D. 101 x 8.4 MW	3.56 5.56	900 (2) 950 (1)(2)	0.1C-20Cr-32Ni-Nb	70 1.5
WYE PIECE ITEM 120010 I.D. 101 x 10.16 MW	3.56 5.56	900 (2) 950 (1)(2)	0.1C-20Cr-32Ni-Nb	70 1.5
WYE PIECE AND TEE PIECE, RESP. ITEM 120011 & 12 I.D. 180 x 10.254 & I.D. 254	3.56 5.56	900 (2) 950 (1)(2)	0.1C-20Cr-32Ni-Nb	70 1.5
OUTLET COKE ITEM 120016 & 17	3.56 5.56	900 (2) 950 (1)(2)	0.1C-20Cr-32Ni-Nb	70 1.5

(1) SHORT TERM DESIGN CONDITIONS (1000 HOURS).
 (2) DESIGN CODE: LUMMUS STD.
 (3) DESIGN CODE: ASME B31.3

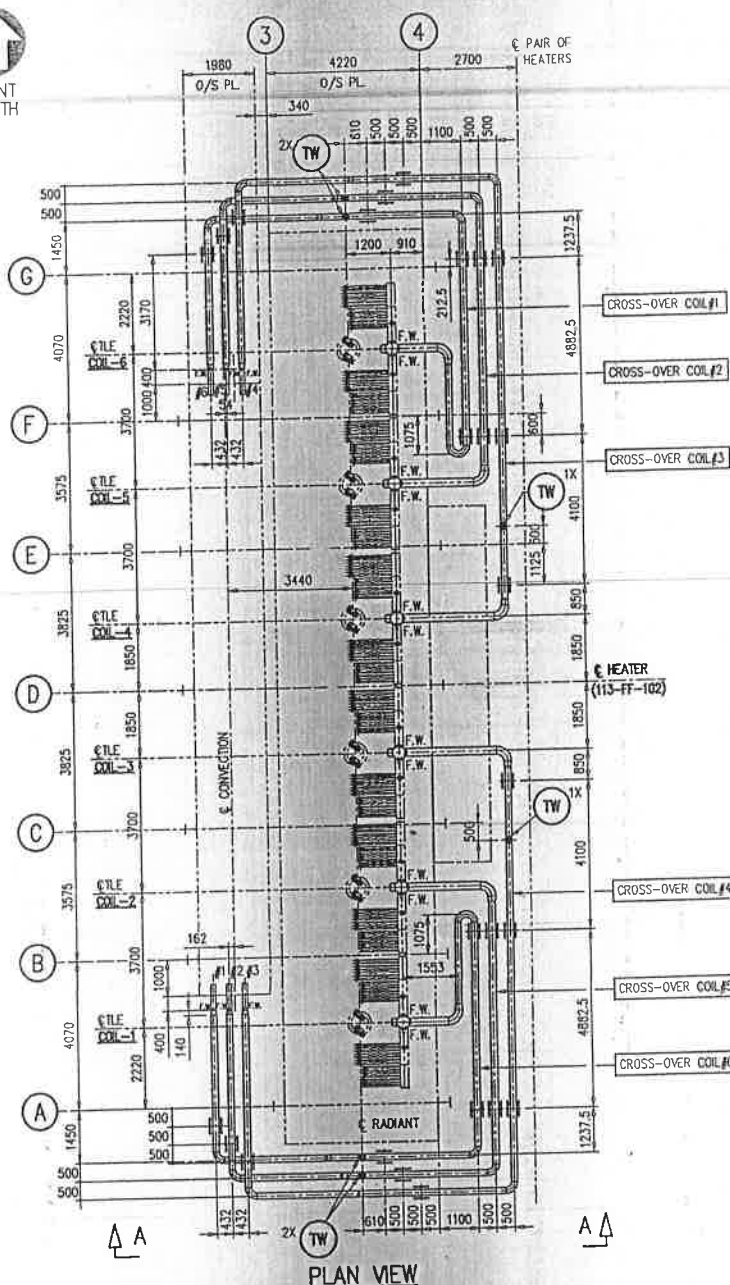
PIPERACK KEY-PLAN

PLANT NORTH

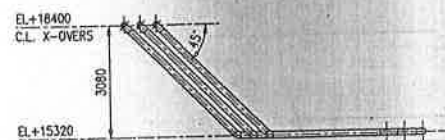
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RADIANT COIL

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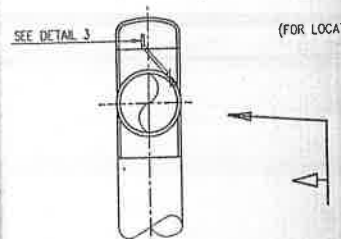


PLAN VIEW

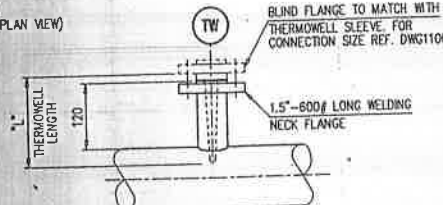


SECTION A-A

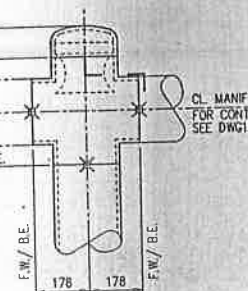
(FOR LOCATION OF TW CONN. REFER PLAN VIEW)



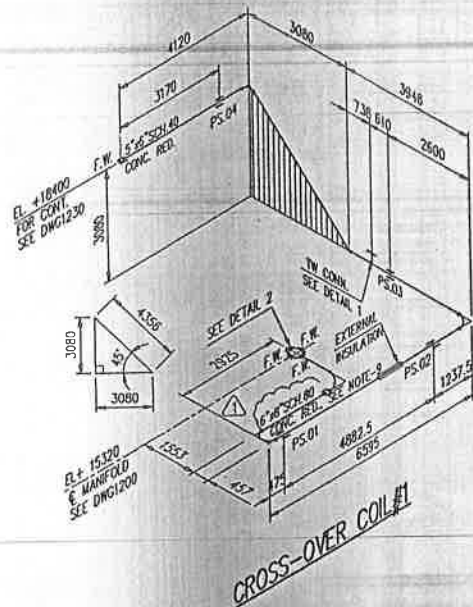
DETAIL 2



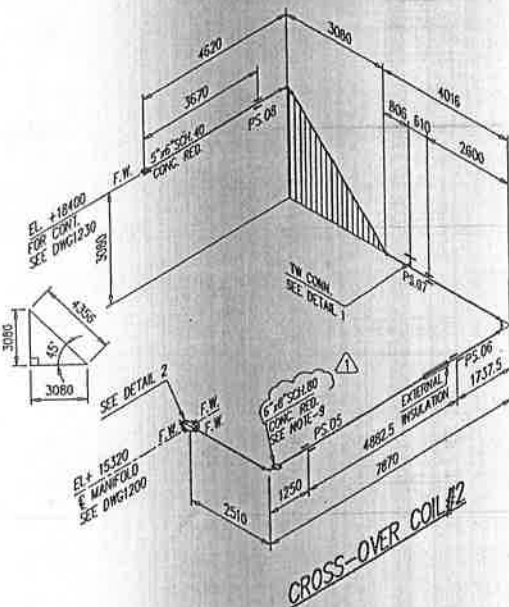
DETAIL-1
(TYPICAL TW DETAIL)



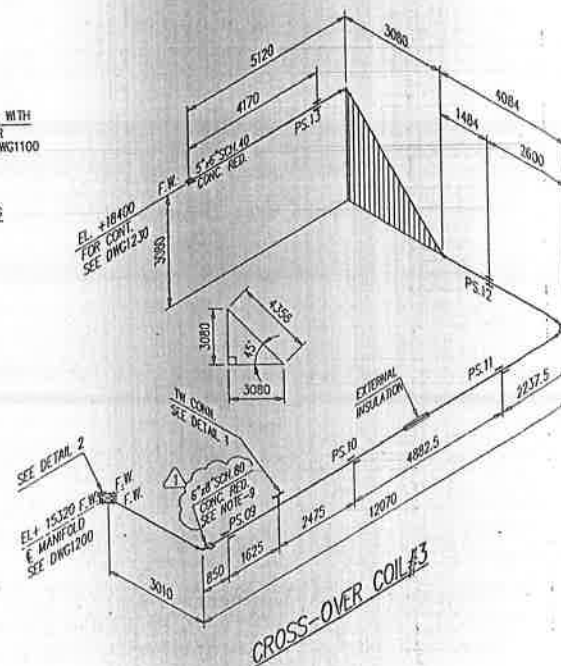
DETAIL 3



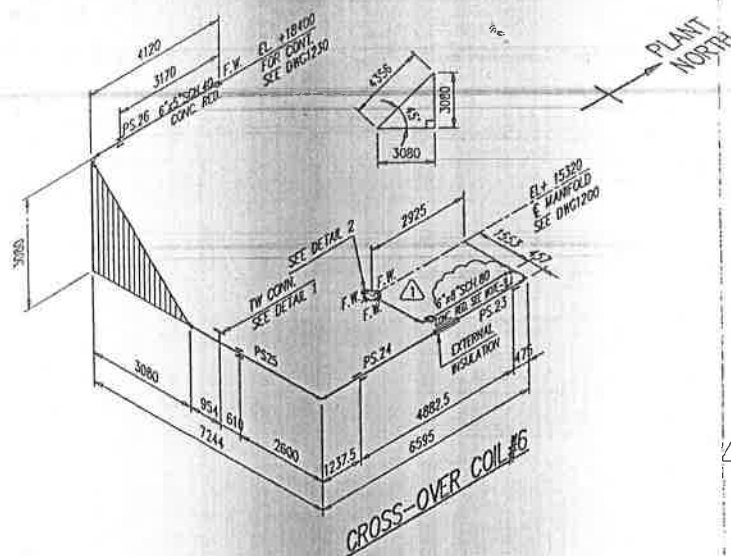
CROSS-OVER COIL #1



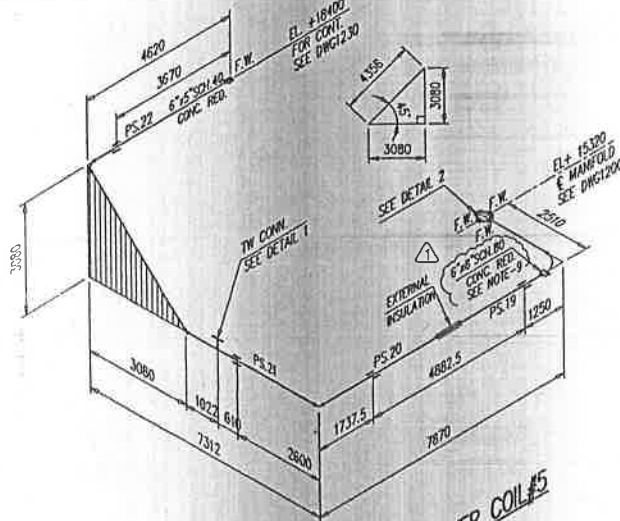
CROSS-OVER COIL #2



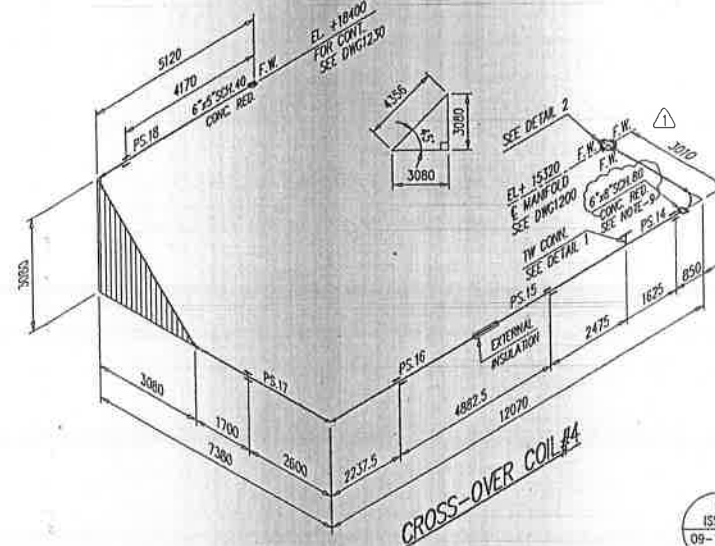
CROSS-OVER COIL #3



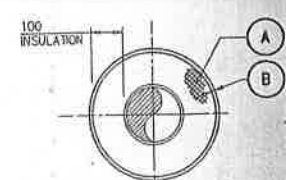
CROSS-OVER COIL #6



CROSS-OVER COIL #5



CROSS-OVER COIL #4



DETAIL 4
(SEE NOTES 6 & 7)

DESIGN CONDITIONS

DESCRIPTION	MATERIAL	SIZE	DESIGN TEMP.	DESIGN PRESS.	CORROSION ALLOWANCE	TEST PRESSURE
			°C	kg/cm ² (g)	MM	SHOP HYDRO-TEST FIELD AIR-TEST
CROSS-OVERS	A-312-TP-347H	ØD. 168.3 x 7.11 AW THK ØD. 219.1 x 12.7 AW THK	770	5.3	1.0	70 1.5

GENERAL NOTES:

- ALL PIPE ENDS FOR FIELD WELDS SHALL HAVE 100 OVERLENGTH TO ALLOW CONNECTION OF HYDROTEST EQUIPMENT AT WORKSHOP. AFTER HYDROTESTING 50 mm TO BE CUT BEFORE SHIPMENT. THE REMAINING 50 mm TO BE USED AS MAKE-UP LENGTH FOR FIELD ADJUSTMENT, TO BE MARKED UP WITH A BRIGHT COLOUR.
- F.H. (X) INDICATES FIELD WELD ELEVATION (LEVEL).
- CROSS-OVERS SHOWN FOR ONE HEATER 113-FF-102. FOUR (4) HEATERS ARE REQUIRED. CROSS-OVERS FOR HEATERS 113-FF-102 & 104 ARE AS DRAWN. CROSS-OVERS FOR HEATERS 113-FF-101 & 103 ARE OPPOSITE HAND.
- ALL INDIVIDUAL PIECEMARKS TO BE MARKED WITH PIECE MARK NUMBER. PIECEMARK NUMBER FOR OPPOSITE HAND ARRANGEMENTS SHALL BE PREFIXED WITH A "W".
- P.S. INDICATES CROSS-OVER PIPE SUPPORT AS SHOWN ON DWG1570.
- LOAD THE CROSS-OVER SYSTEM IS INCLUDING A THERMAL INSULATION THICKNESS OF (A)=100 mm WITH A DENSITY OF 128 KG/M³ AND (B)=0.7 mm STAINLESS STEEL SHEETING.
- CROSS-OVERS TO BE SEPARATELY INSULATED TO ALLOW FREE INDIVIDUAL MOVEMENT.
- ALL RETURN BENDS AND ELBOWS L.R. R=1.5D.
- REDUCER END THICKNESS TO BE TAPERED TO MATCH WITH 6" SCH. 40 PIPE.

NOTES FOR INSULATION VENDOR

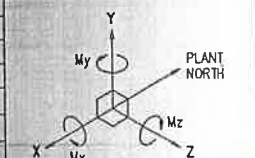
- CROSS-OVER INSULATION MATERIALS TO BE PROTECTED AGAINST RAINWATER BEFORE DURING AND AFTER INSTALLATION.
- THE PROTECTIVE SHEETING FOR THERMAL INSULATION SHALL BE ABSOLUTELY RAINWATER TIGHT. SEAMS SHALL NOT BE OPENED BY THE THERMAL EXPANSION OF THE X-OVER.
- SUFFICIENT EXPANSION JOINTS SHALL BE PROVIDED. THE LONGITUDINAL SEAMS SHALL BE LEANWARDS AND THE BOTTOM SIDE, WITH OVERLAP DOWNWARDS.
- ALL SEAMS SHALL BE SEALED WITH SEALING TAPE OR MASTIC (CHLORIDE & SULPHUR FREE).
- WHERE LUGS PROTRUDE SHEETING, THE OPENING SHALL BE ABSOLUTELY SEALED.
- INSULATION MATERIAL SHALL BE ABSOLUTELY CHLORIDE & SULPHUR FREE.

CALCULATED MOVEMENTS AT PIPE SUPPORT LOCATIONS (mm)

PS.01	Dx	Dy	Dz	PIPE LOAD (N/m)	PS.14	Dx	Dy	Dz	PIPE LOAD (N/m)
PS.01	+5	-65	-70	2118	PS.14	-20	-65	-75	2063
PS.02	-65	-75	-85	1719	PS.15	+40	-60	-75	1921
PS.03	-85	-65	-55	2436	PS.16	+100	-55	-75	1998
PS.04	-90	-2	-10	2446	PS.17	+125	-50	-40	2666
PS.05	-20	-70	-75	2302	PS.18	+100	+2	+15	2527
PS.06	-85	-70	-80	1757	PS.19	+20	-70	-75	2302
PS.07	-105	-60	-45	2560	PS.20	+85	-70	-80	1757
PS.08	-100	-1	+5	2484	PS.21	+105	-60	+45	2560
PS.09	+20	-65	-75	2063	PS.22	+100	-1	+5	2484
PS.10	-40	-60	-75	1921	PS.23	-5	-65	-70	2118
PS.11	-100	-55	-75	1998	PS.24	+65	-75	-85	1719
PS.12	-125	-50	-40	2666	PS.25	+85	-65	-55	2436
PS.13	-100	+2	+15	2527	PS.26	+90	-2	-10	2446

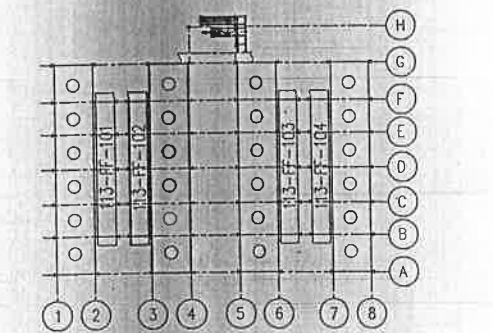
* MAXIMUM VERTICAL MOVEMENT BASED ON MAXIMUM ALLOWED CREEP DURING OPERATION = APPROX. -230 mm.

** SEE NOTE 6



REFERENCE DRAWINGS

- BEE2559DWG1100 GENERAL ARRANGEMENT
- BEE2559DWG1200 RADIANT COIL
- BEE2559DWG1230 CONNECTION COIL
- BEE2559DWG1570 COUNTERWEIGHT SYSTEM WITH BM
- BAL2559DWG1580 COUNTERWEIGHT DETAILS



KEY-PLAN

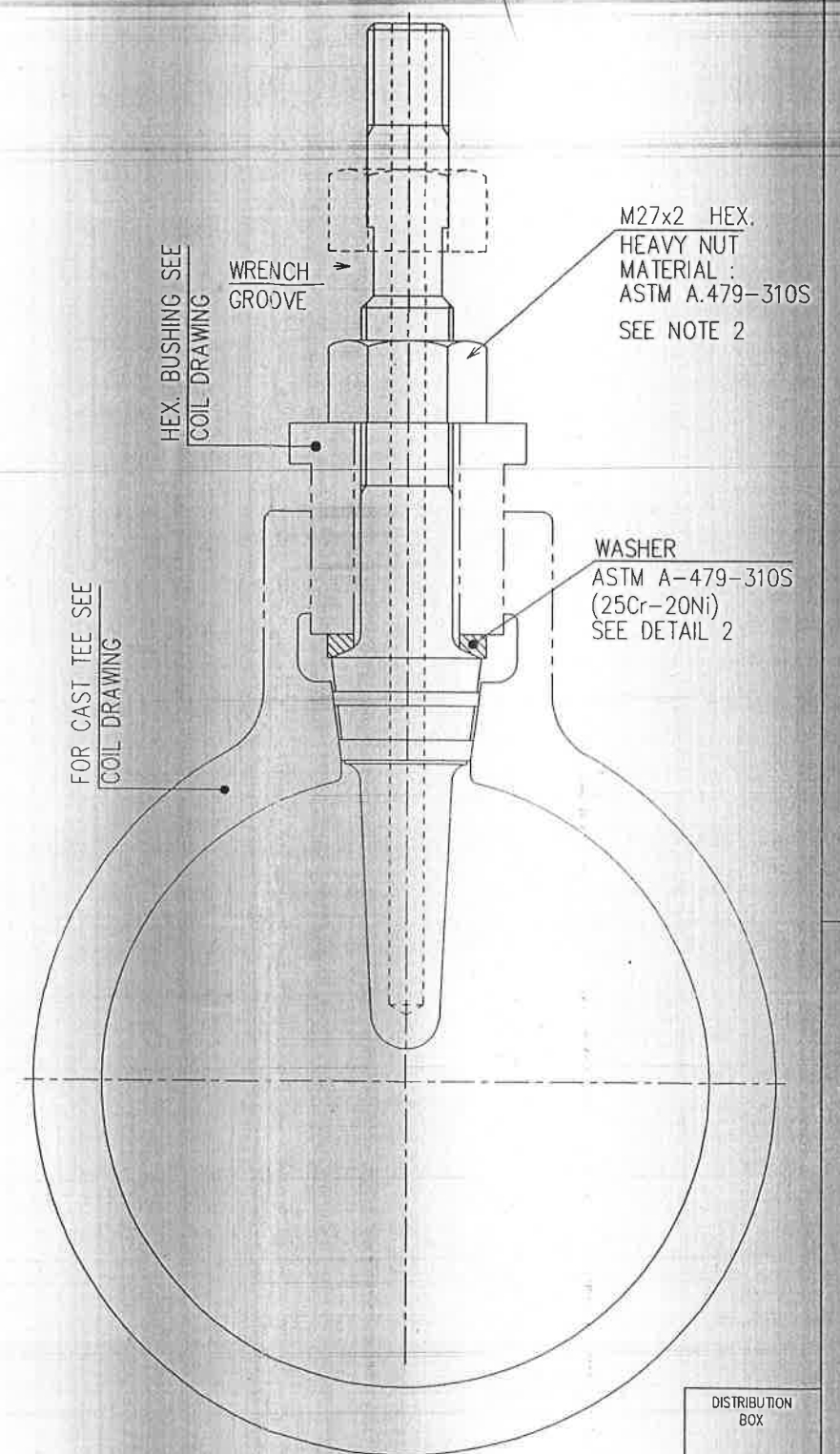
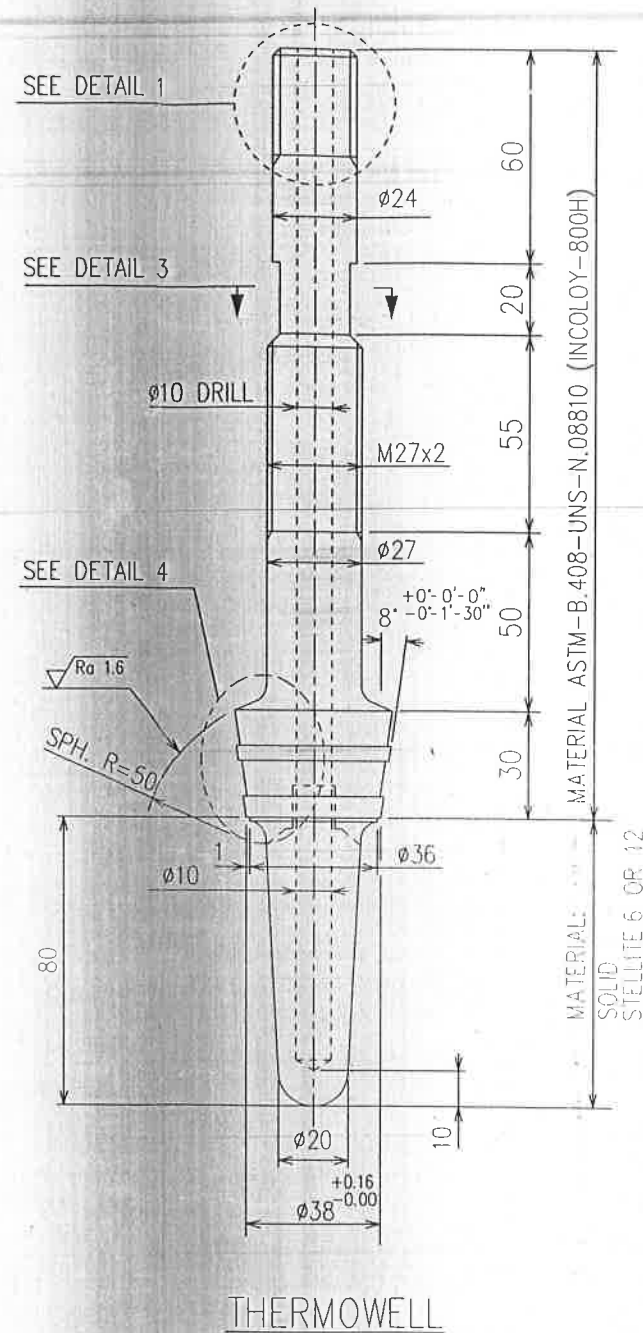
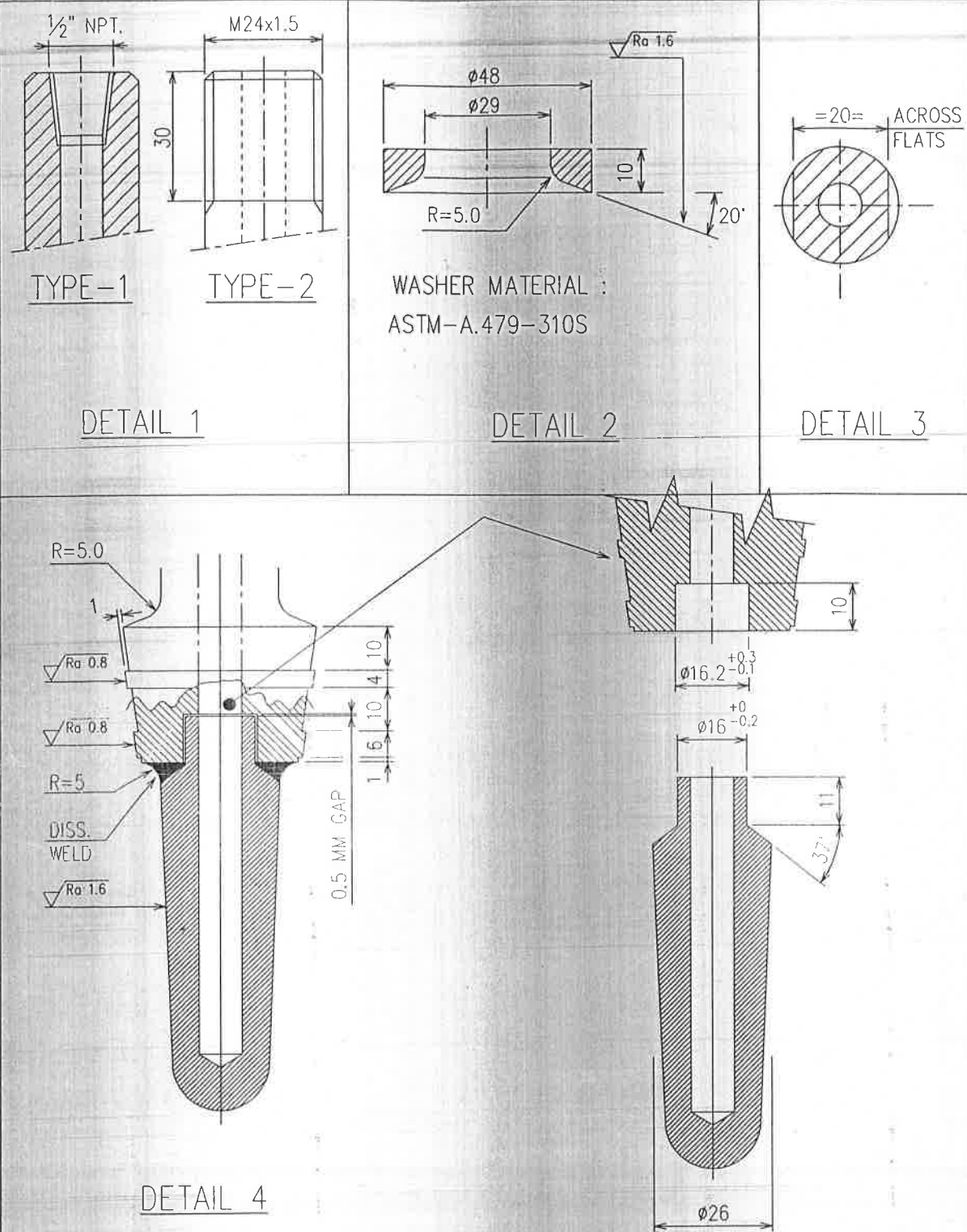
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2	09-09-25	FOR APPROVAL	MK	MEP	AT	KHT
3	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
4	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
5	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
6	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
7	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
8	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
9	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
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16	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
17	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
18	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
19	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT
20	09-09-25	FOR APPROVAL	DR	MEP	AT	KHT

PROJECT TITLE : BRAHMAPUTRA PETROCHEMICAL COMPLEX PROJECT
LOCATION : LEPEKATA, DIBRUGARH, ASSAM
OWNER : BRAHMAPUTRA CRACKER & POLYMER LTD.
HEATER : 113-FF-101 THRU 113-FF-104
LHT REF. NO. : 62559

Lummus Technology Heat Transfer
Bloomfield, N.J.

CROSS-OVERS

1:100 BD62559DWG1235 1

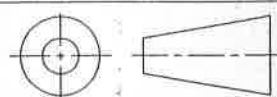


NOTES:

- FABRICATOR MUST ENSURE PROPER FIT OF ALL ITEMS.
- JACK NUT SHALL NOT BE TIGHTENED DURING HEATER OPERATION BUT SHALL BE IN UNSCREWED POSITION TO PREVENT SEIZING OF NUT AND THERMOWELL THREAD

ALL DIMENSIONS ARE
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0 09-11-20 ISSUED FOR BDEP

REV. DATE DESCRIPTION

KSG OPS AT KHT PJHB

DRAWN BY CHECK BY ENG. LEAD ENG. THERM. MECH. PROJ. MANG.



Lummus Technology Heat Transfer
Bloomfield, N.J.

RADIANT OUTLET THERMOWELL
FOR CRACKING HEATERS

SCALE: 1:2 BB62559DWG1201 0

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