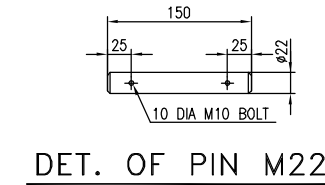
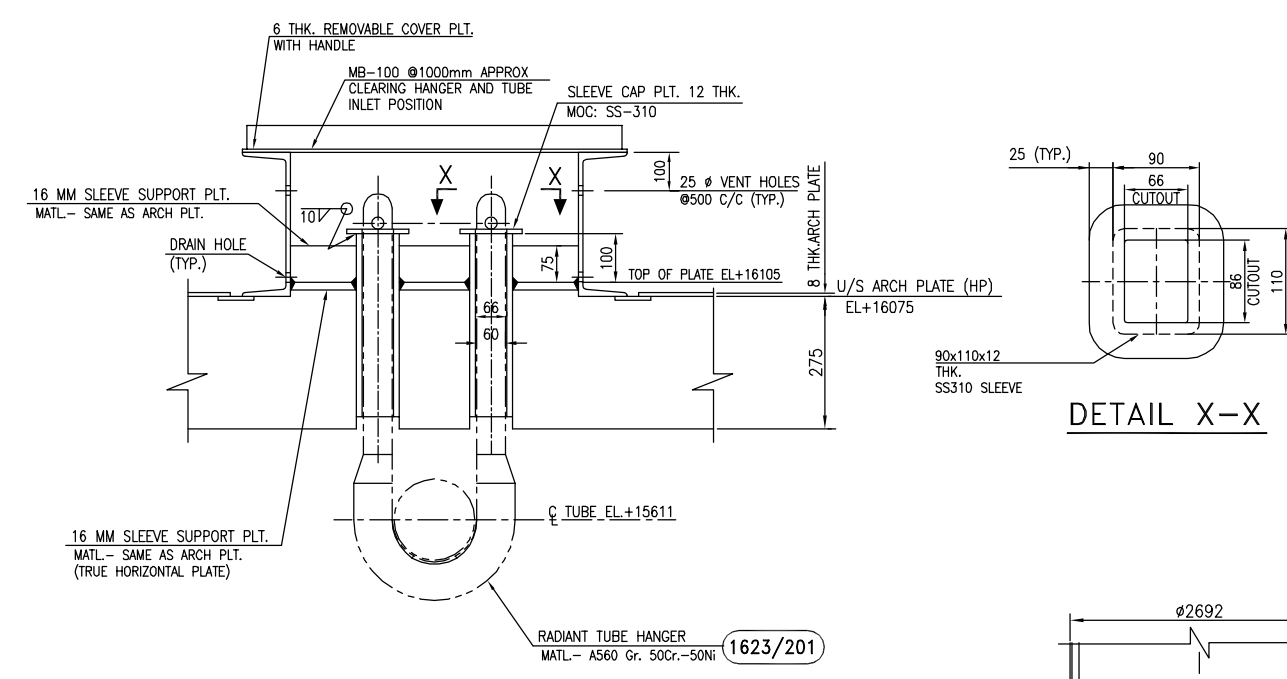
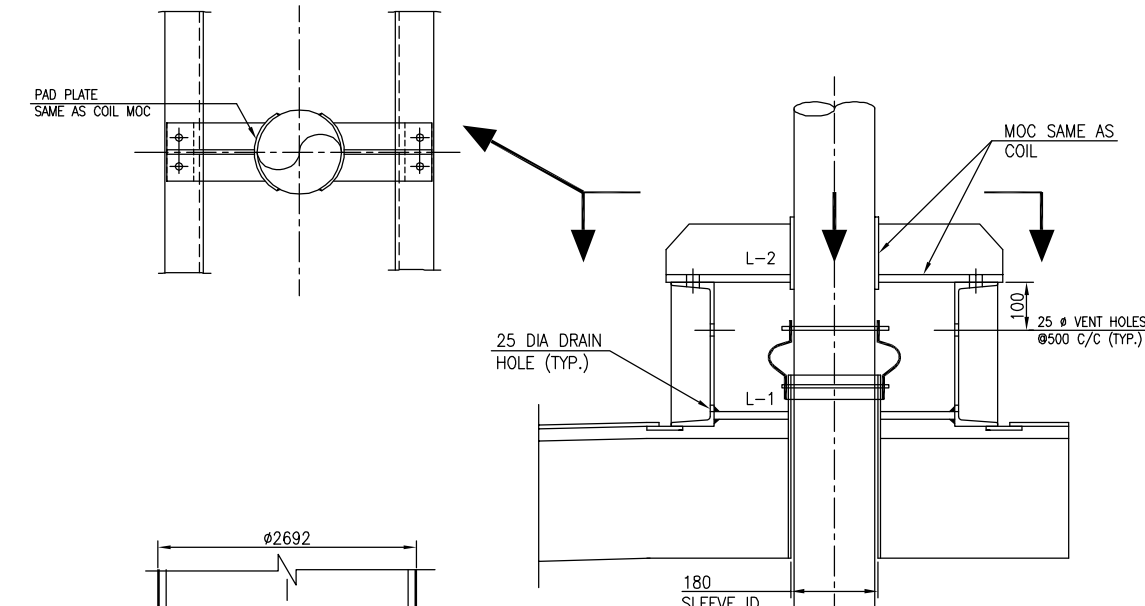


NOTE:-

1. RADIANt PASS #1 TO #7 INLETS ARE TO BE ANCHORED AS PER DETAIL-2.
2. RADIANt INLET #8 TO #14 FOLLOW DETAIL-2, TO BE MODIFIED (L-1 NO CHANGE, L-2 SLEEVE NO WELDING, GAP = 3mm) GUIDE BOLTING AS IT.
3. RADIANt CULLET PASS #1 TO #7 SLEEVE WITH GAP AS SHOWN IN TABLE-1 DWG. NO. B378-110-80-44-0102.
4. RADIANt CULLET PASS #8 TO #14 SLIDING SUPPORT WITH GAP AS PER TABLE-1, DETAIL-3 DWG. NO. B378-110-80-44-0102.
5. RADIANt CULLET LOCATION, DETAIL-2 TO BE MODIFIED (BY CONTRACTOR) AS SLIDING SUPPORT WITH PROVISION OF THROUGH AND THROUGH AXIAL AND LATERAL (WRT CULLET MANIFOLD) EXPANSION IN ARCH PIPE SLEEVE & 6 TH. REMOVAL COVER PASS #14-0102 IS AS PER CAD TABLE-1 IN DWG. NO. B378-110-80-44-0102 IS TO BE CONSIDERED.



COIL DESIGN CONDITIONS	
TOTAL HEATER ABSORBED DUTY, MMKcal/hr (DESIGN)	26.88
DESIGN PRESSURE (ELASTIC/PLASTIC) $\text{Kg}/\text{CM}^2\text{G}$	8.0/7.0 V.
DESIGN TUBE METAL TEMP. (°C) RAD/CONV. SHIELD/CONV. FINNED	704/574/540
DESIGN FLUID TEMP. (°C) RADIANT OUTLET MANIFOLD	610±28
CORROSION ALLOWANCE (MM) RADIANT (SS321)/CONVECTION (P11)	0/1.5
DESIGN CODE	API 550
HYDROTEST PRESSURE ($\text{Kg}/\text{CM}^2\text{G}$) RADIANT/CONVECTION	75
PAWMT	YES (NO FOR SS)
RADIOGRAPHY	100% OF 100% WELDS

REF. DWG. NO.	REFERENCE DRAWING TITLE
B378-101-16-43-00002	EQUIPMENT LAYOUT FOR PFD UNIT
B378-101-80-44-1100	FOUNDATION LOADING PLAN
B378-101-80-44-0102	GENERAL ARRANGEMENT PLAN-1
B378-101-80-44-0103	GENERAL ARRANGEMENT PLAN-2
B378-101-80-44-1104	GENERAL ARRANGEMENT PLAN-3
B378-101-80-44-1105	TUBE SUPPORT CASTINGS
B378-101-80-44-0106	APH SYSTEM DUCTING LAYOUT PLAN
B378-101-80-44-0107	APH SYSTEM DUCTING LAYOUT ELEVATION
B378-101-80-44-0108	MAIN MECH. STRUCTURE CONFIGURATION-ELEVATION
B378-101-80-44-0109	MAIN MECH. STRUCTURE CONFIGURATION-PLAN
B378-101-80-44-4604	GENERAL ROOF

NOTES :-

1. CYCLICAL NOTATIONS:-
- | | |
|---|---|
|  | ← SECTION PLANS OR DETAILS. |
|  | ← CROSS REFERENCE DIRG. NO. DETAIL APPEARS ON SAME DRAWING. |
|  | ← DENOTES PART NO. |
|  | ← DENOTES COLUMN GRID NO. |
|  | ← DENOTES AUXILIARY CONNECTIONS. |
|  | ← DENOTES STANDARD DRAWING. |
|  | ← DENOTES GRATING MAIN BAR. |
|  | ← SLIDING SUPPORT. |
|  | ← FIXED SUPPORT. |
|  | ← RESTING SUPPORT. |

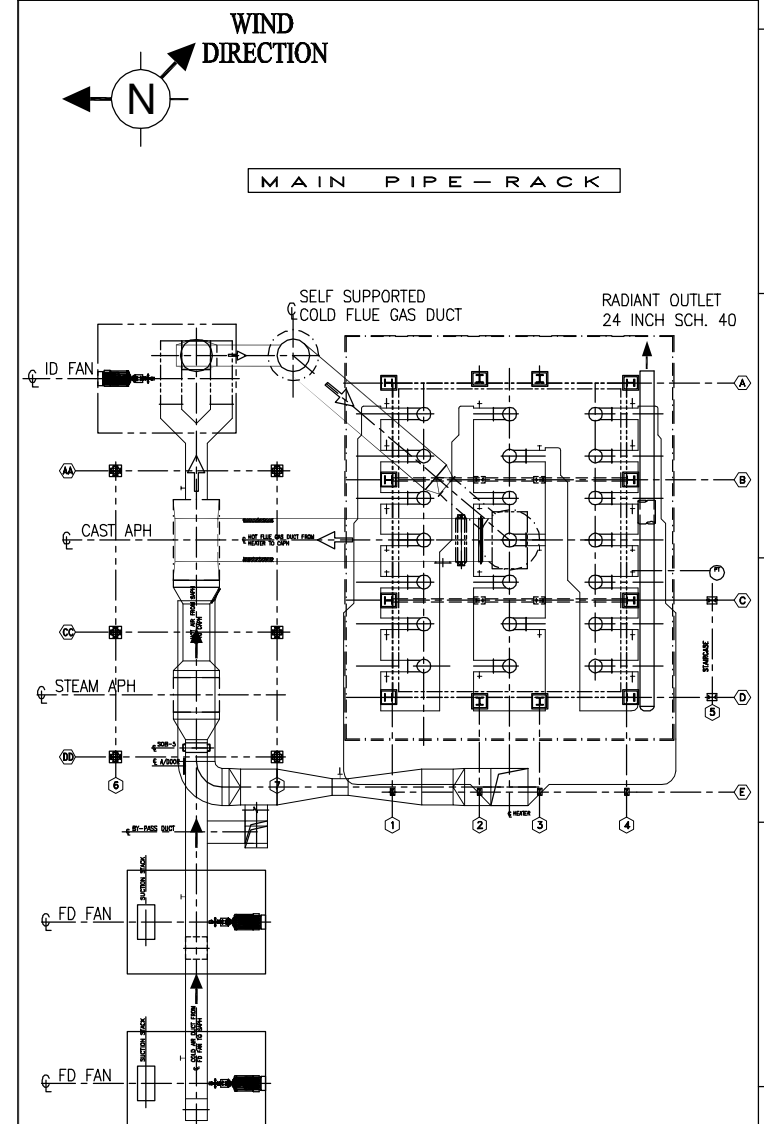
2. ALL DIMENSIONS ARE IN MM.
3. DO NOT SCALE DRAWING ASK IF IN ANY DOUBT.

SKIN THERMOCOUPLE DETAILS.	
TAG NO.	LOCATION
11227 - A TO N	CONVECTION BOTTOM MOST SHOCK TUBE
11206 - A TO N	5TH TUBE FROM RADIANT OUTLET
11207 - A TO N	3RD TUBE FROM RADIANT OUTLET
11208 - A TO N	AT RADIANT OUTLET

ALL INSTRUMENT TAG NOS SHALL BE PRE FIXED WITH
Eg. TE-1228 SHOULD BE READ AS TE-11228.

HOLDS: - (TO BE REMOVED BY HEATER CONTRACTOR)

- FLOOR CUTOUTS (BURNERS, PEEP HOLES, SKIN THERMOCOUPLE LOCATION, WASTE GAS NOZZLE LOCATION).



KEY PLAN

O	19.05.2022	ISSUED FOR ENGINEERING	MB	AV	RP	
C	27.01.2022	ISSUED FOR ENGINEERING	MB	AV	RP	
B	07.01.2022	ISSUED FOR BIDS/COMMENTS	MB	AV	RP	
A	10.09.2021	ISSUED FOR BIDS/COMMENTS	MB	PKA/AV	RP	
REV.	DATE	REVISIONS	BY	CHKD	APPD	PEMPC

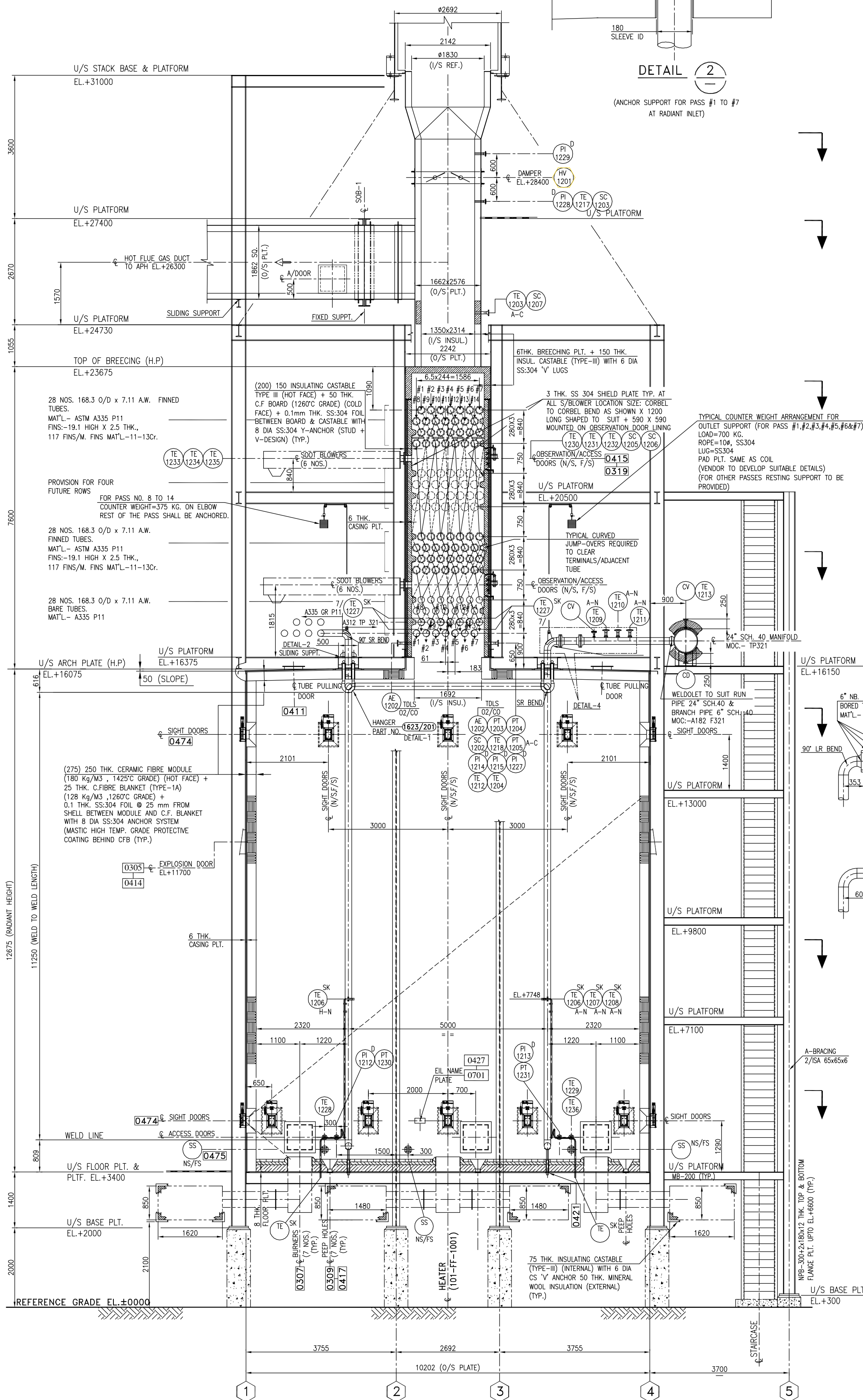


500 कैटीए पीडीएच पीपी परियोजना उत्तर महाराष्ट्र भारत	500 KTA PDH - PP PROJECT USAR, MAHARASHTRA, INDIA
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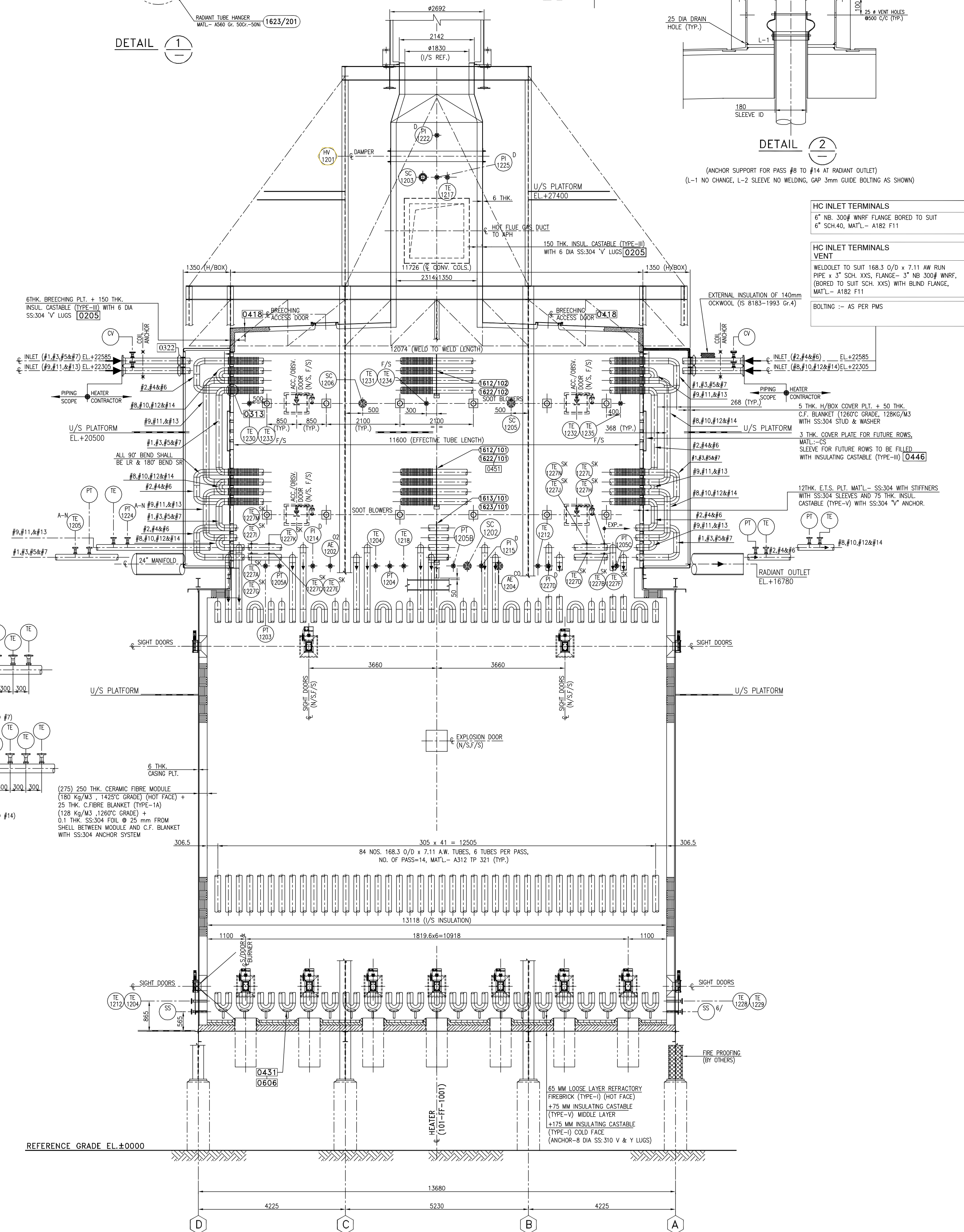
सामान्य व्यवस्था अनुभाग और अनुदैर्घ्य रिपक्टर चार्ज होटर	GENERAL ARRGT. CROSS SEC. & LONG. SEC. REACTOR CHARGE HEATER (101.55.1001)
--	--

<101-FF-1001>			HEATER (101-FF-1001)			
SCALE	JOB NO.	UNIT	DIVN.	DEPT.	DWG. NO.	REV.
1:55	B 3 7 8	1 0 1	8 0	4 4	0 1 0 1	0

3-1641-0500 REV.2 A0-1189 x 841



DIAGRAMMATIC CROSS SEC. ELEVATION OF HEATER
VIEW FROM CONVECTION TUBE REMOVAL END (VIEW FROM WEST END)
(FOR TRUE ORIENTATION SEE PLANS)

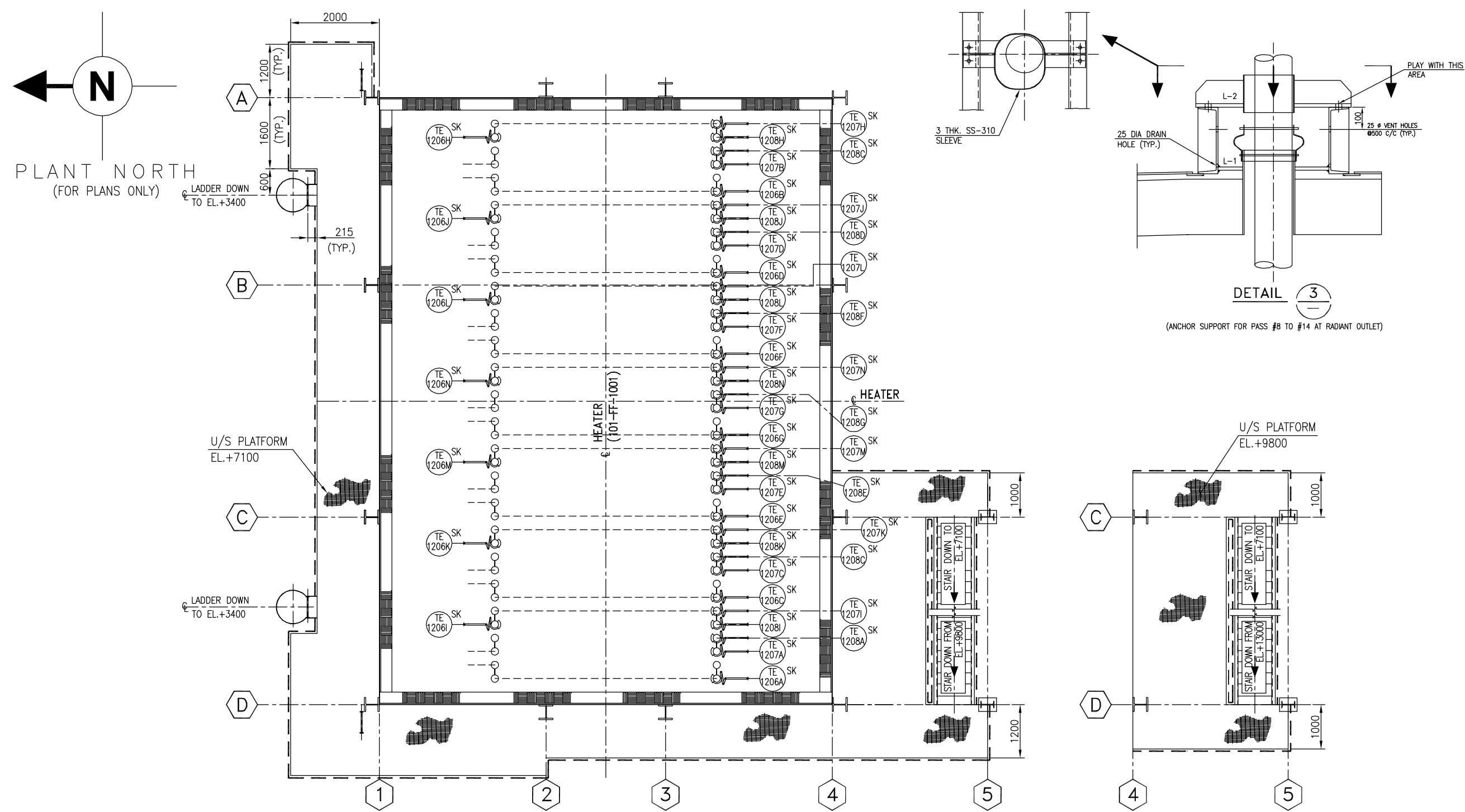


DIAGRAMMATIC LONGITUDINAL SECTIONAL ELEVATION OF HEATER
(VIEW FROM GRID-4)
(FOR TRUE ORIENTATION SEE PLANS)

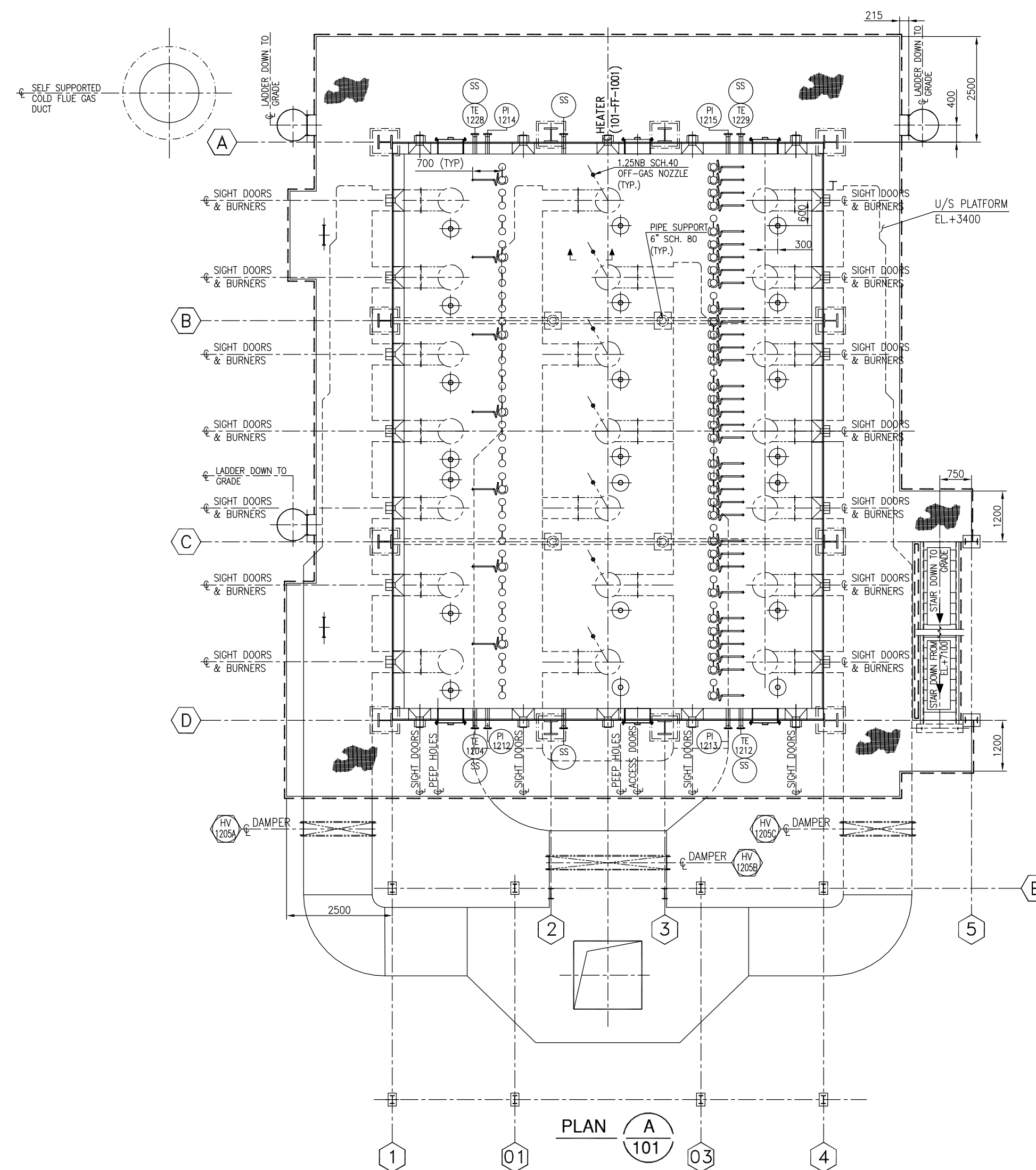
[illegible]

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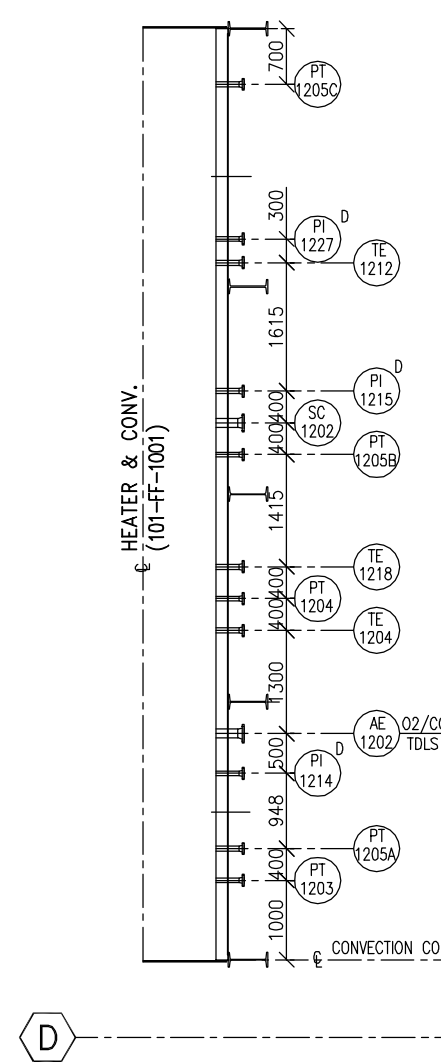
एक ड्राइंग, डिजाइन और विवरण इस फॉर्म पर दिए गए हैं। ये केवल उधार पर दिए जा रहे हैं ताकि उधारकर्ता को निहित रूप से यह स्पष्ट समझ हो कि वे इनका उपयोग केवल उधार प्राप्त करने के लिए ही कर सकते हैं और उधारकर्ता को उनके द्वारा उधारकर्ता के लिखित अनुमति के बिना इसे पुनः प्रतिलिपि बनाने, प्रदर्शित करना, प्रकाशित करना या अन्य किसी भी प्रकार का उपयोग करने की अनुमति नहीं दी जाती है।



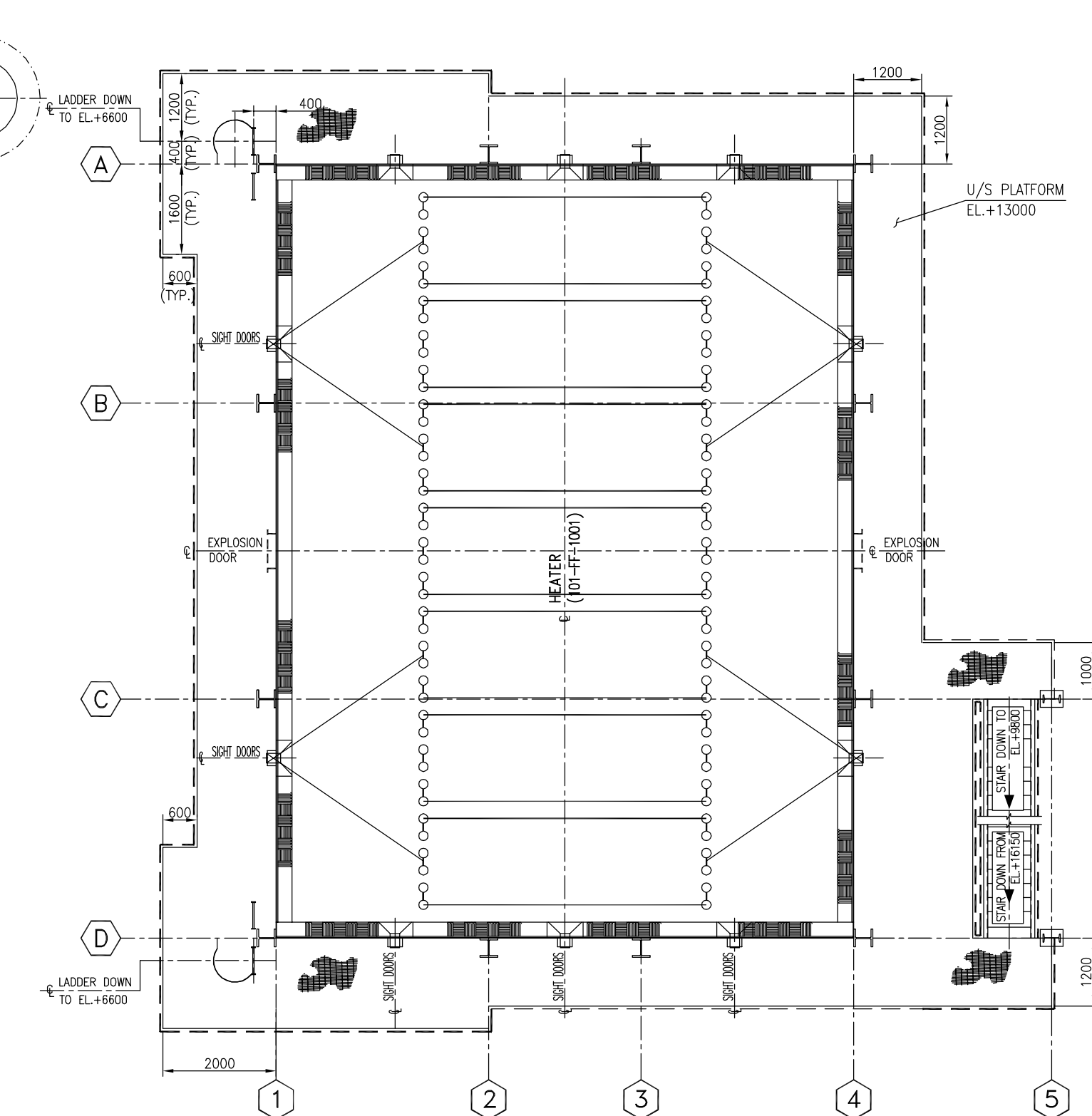
PLAN B
101



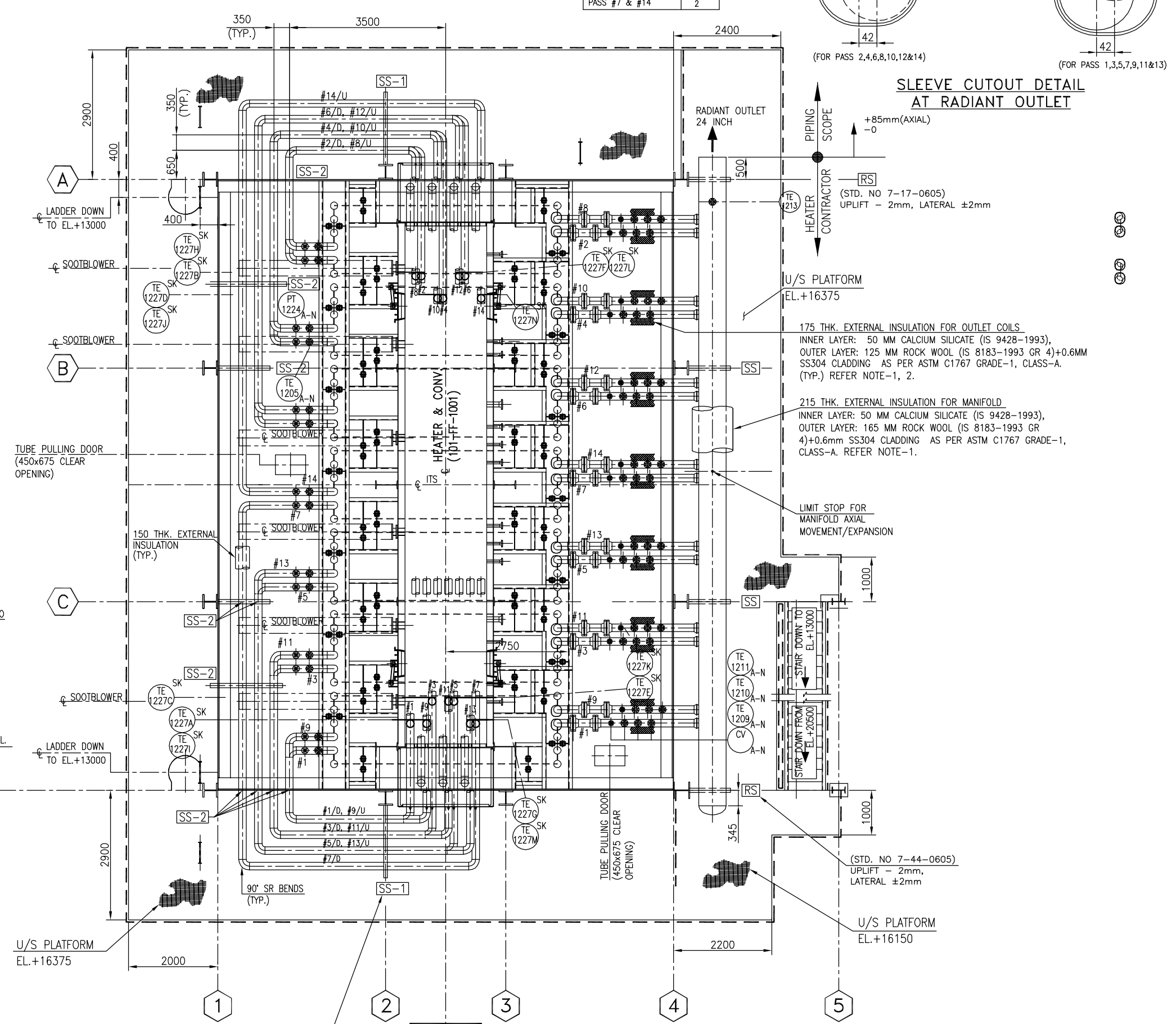
PLAN A
101



WASTE GAS FIRING ARRANGEMENT DETAIL

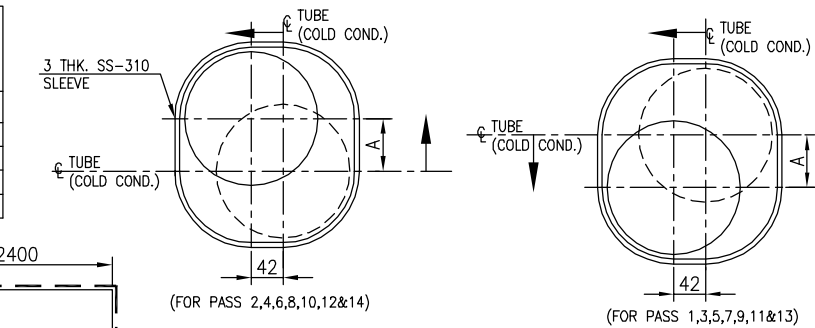


PLAN C
101



PLAN D
101

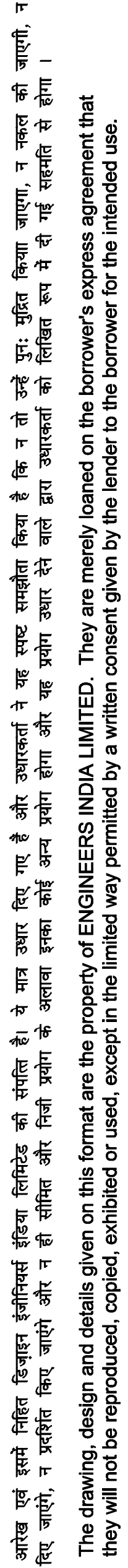
PASS NO	'A'
PASS #1, #2, #8 & #9	66
PASS #3, #4, #10 & #11	45
PASS #5, #6, #12 & #13	23
PASS #7 & #14	2



REF. DWG. NO.	REFERENCE DRAWING TITLE
B378-101-80-44-0101	GENERAL ARRANGEMENT CROSS SECTION & LONGITUDINAL SECTION
NOTES :-	
1.	OF BLANKET SHALL BE INHIBITED FOR CALORIFIC LEVEL LESS THAN 109PM. A 0.15MM THK SS FOIL WRAP OVER THE PIPING / MANHOLE TO AVOID DIRECT CONTACT OF THE INSULATION TO STAINLESS STEEL SUBSTRATE.
2.	THE CONTRACTOR SHALL PROVIDE A METHOD(S) FOR SUPPORTING THERMALBLANKET INSULATION TO PREVENT EXCESSIVE SAGGING, PARTICULARLY ON VERTICAL LINES.

O	19.05.2022	ISSUED FOR ENGINEERING	MB	AV	RP	
C	27.01.2022	ISSUED FOR ENGINEERING	MB	AV	RP	
B	07.01.2022	ISSUED FOR BIDS/COMMENTS	MB	AV	RP	
A	10.09.2021	ISSUED FOR BIDS/COMMENTS	MB	PK/AV	RP	
REV.	DATE	REVISIONS	BY	CHKD	APPD	P

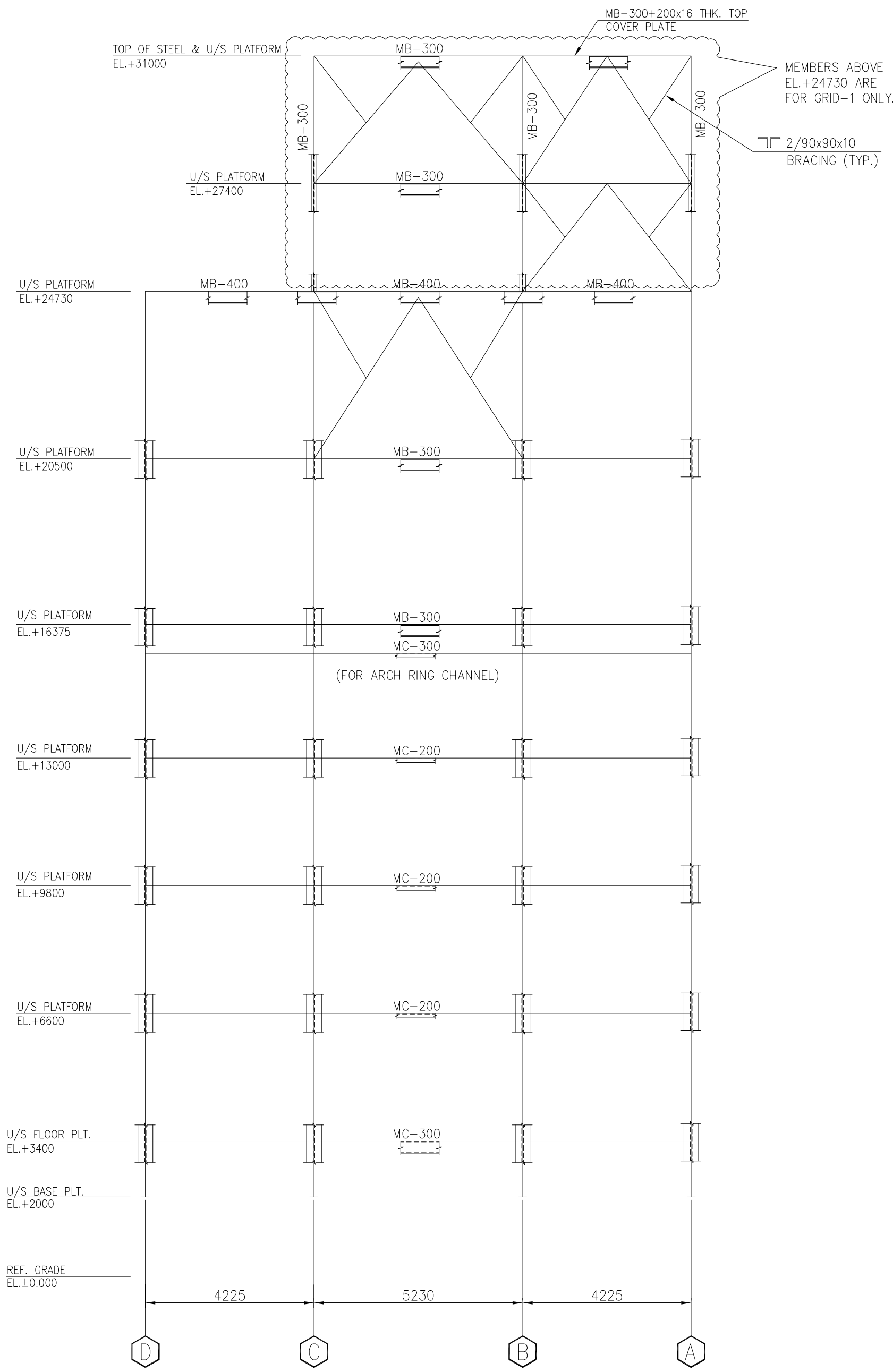
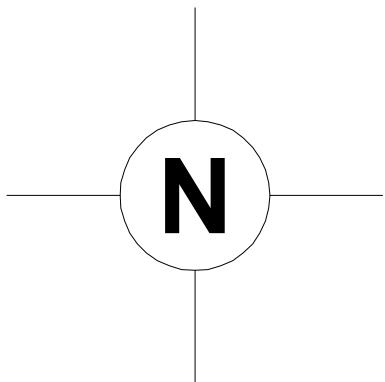
  ENGINEERS INDIA LIMITED (एंगीनियर्स इंडिया लिमिटेड) (A Govt. of India Undertaking)											
 GAIL (India) Limited गैल इंडिया लिमिटेड GAIL (INDIA) LIMITED USAR, MAHARASHTRA											
500		शैटलैण्ड पीट्रोब्रिड्ज वीथी परियोजना उस्कर महाराष्ट्र				500 KTA PDH – PP PROJE USAR, MAHARASHTRA INDIA					
		शैटलैण्ड पीट्रोब्रिड्ज वीथी परियोजना उस्कर महाराष्ट्र									
GENERAL ARGFT. PLAN-I REACTOR CHARGE FLEATER (101-FF-1001)											
SCALE		JOB NO		UNIT		DIVN		DEPT			
1:66.6		B 3 7 8		1 0 1		8 0 4		4 0			
15		15		15		15		15			
15		15		15		15		15			
15		15		15		15		15			
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15		15		15		15		15			
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15											



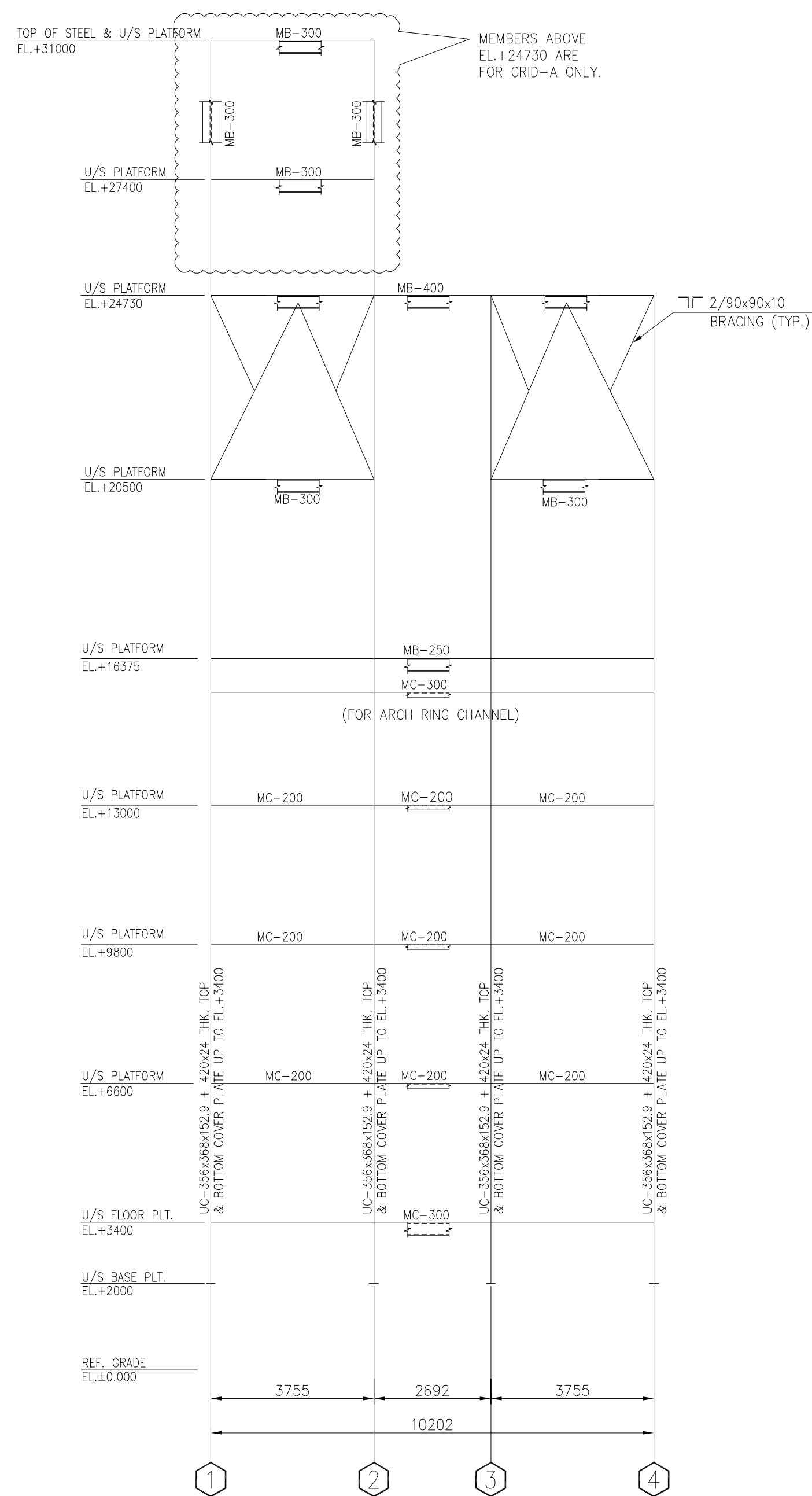
CONTROL AND CLIMPED FIELD
 WITH 50mm MINERAL WOOL WITH
 GI WIRE MESH & ALUMINUM
 CLADDING.

अनुमति के बिना इस दस्तावेज़ को प्रतिलिपि बनाना या किसी भी रूप में प्रसारित करना गैर कानूनी है।
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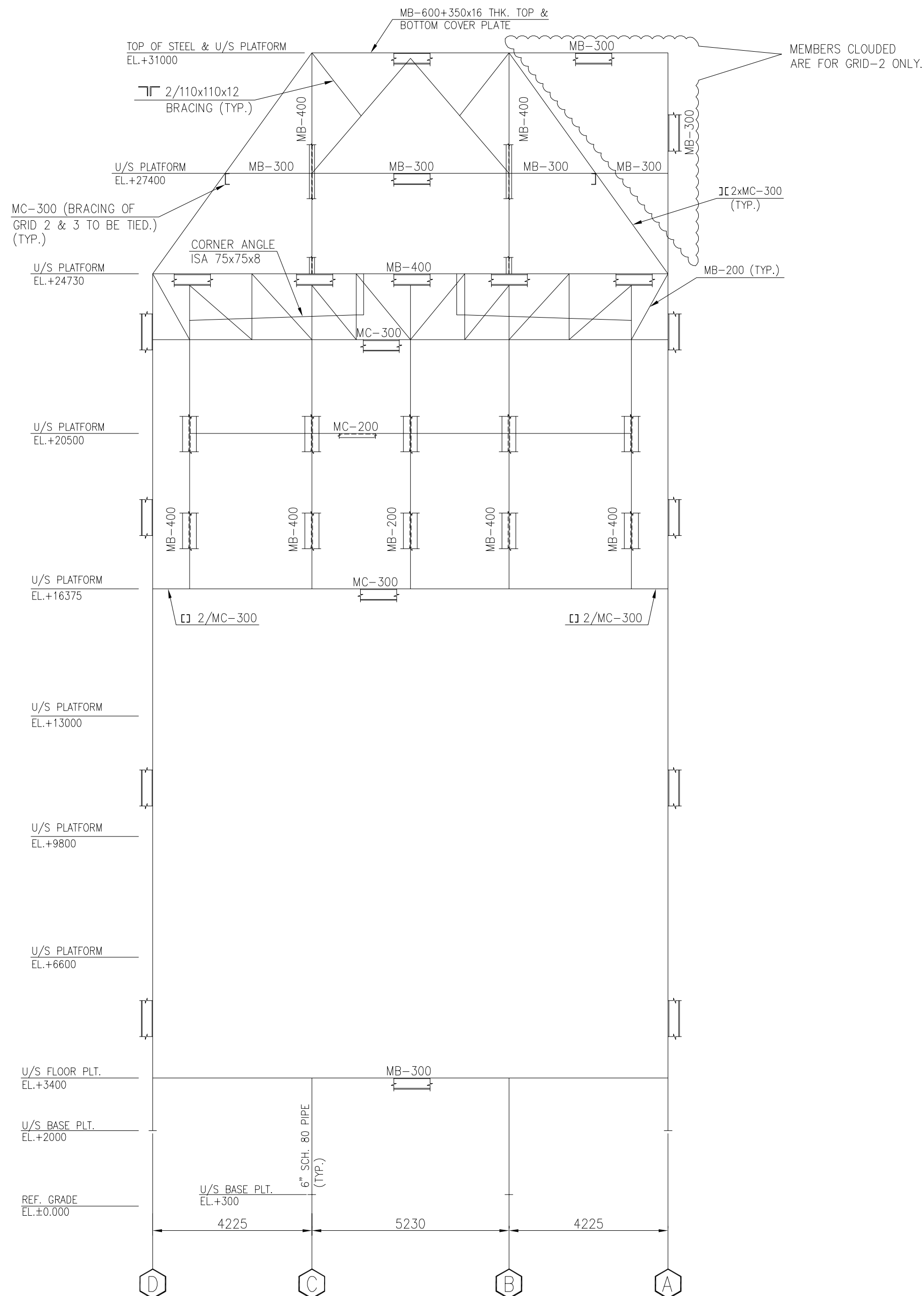
8378-101-80-44-0108



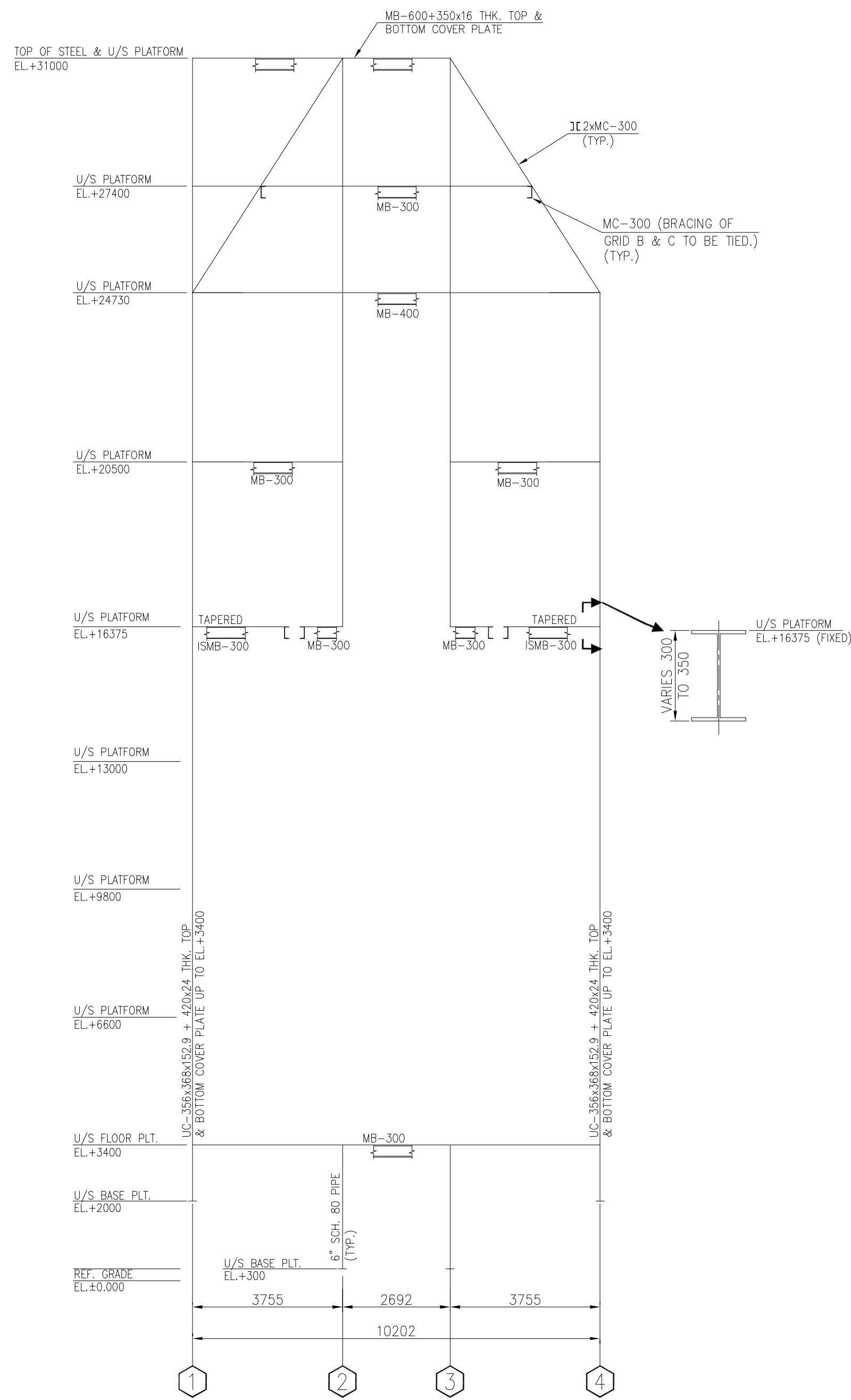
MAIN MEMBER STEEL FRAME WORK
VIEW ON GRID-1 & 4



MAIN MEMBER STEEL FRAME WORK VIEW
ON GRID-A & D



MAIN MEMBER STEEL FRAME WORK
VIEW ON GRID-2 & 3



MAIN MEMBER STEEL FRAME WORK VIEW
ON GRID-B & C

REF. DWG. NO. REFERENCE DRAWING TITLE

8378-101-80-44-0101 GENERAL ARRANGEMENT CROSS SECTION
8378-101-80-44-0109 STRUCTURAL CONFIGURATION - PLANS

NOTES :-

1. ALL DIMENSIONS ARE IN MM.
2. DRAWING TO BE READ IN CONJUNCTION WITH THE HEATER GA DRAWINGS.
3. ADDITIONAL MEMBERS WHEREVER REQUIRED FOR PLATFORM SUPPORTS, PIPING SUPPORT, DUCT SUPPORT, REDUCING PANEL SIZES ETC. SHALL BE ENGINEERED & PROVIDED BY CONTRACTOR.
4. ALL CONNECTIONS AND DETAILS NOT SPECIFICALLY DETAILED SHALL BE SIMILAR TO TYPICAL DETAILS USED FOR SIMILAR CONNECTIONS AND SHALL BE DEVELOPED BY FABRICATOR AND GOT APPROVED FROM EIL.
5. PLAN HORIZONTAL BRACING TO BE LOWERED TO CLEAR DRAINING SUPPORT MEMBERS MATCH C.C. OF BRACING TO CENTRE LINE OF CONNECTING BEAMS WHEREVER FEASIBLE.
6. WHEREVER IN THE BRACING ARRANGEMENT DOUBLE BACK TO BACK ANGLE HAVE BEEN PROVIDED, THE SPACING BETWEEN THE TWO ANGLES SHALL BE AS A MINIMUM EQUAL TO THE THICKNESS OF ANGLE WITH LONG SIDE OF THE ANGLE TO BE TAKEN AS BACK TO BACK.
7. MEMBER ORIENTATION SHALL BE AS PER THE GENERAL ARRANGEMENT DRAWING / STANDARD ORIENTATION FOR THESE TYPE OF HEATER. HEATER VENDOR TO DISCUSS IN CASE OF ANY DOUBT.
8. SECONDARY MEMBERS FOR PLATFORM, DUCT SUPPORTS ETC SHALL BE DESIGNED & WORKED OUT BY CONTRACTOR.
9. ALL JOINTS AND STIFFENERS SHALL BE DESIGNED AND DETAILED BY THE CONTRACTOR.

REV.	DATE	REVISIONS	BY	CHKD	APPRO	PERMR
0	19.05.2022	ISSUED FOR ENGINEERING	MB	AV	RP	
1	27.01.2022	ISSUED FOR ENGINEERING	MB	AV	RP	
2	07.01.2022	ISSUED FOR BOS/COMMENTS	MB	AV	RP	
3	10.09.2021	ISSUED FOR BOS/COMMENTS	MB	PK/AV	RP	

ENGINEERS INDIA LIMITED
(A Joint Vt India Undertaking)
गैल इंडिया लिमिटेड
GAIL (INDIA) LIMITED
USAR, MAHARASHTRA

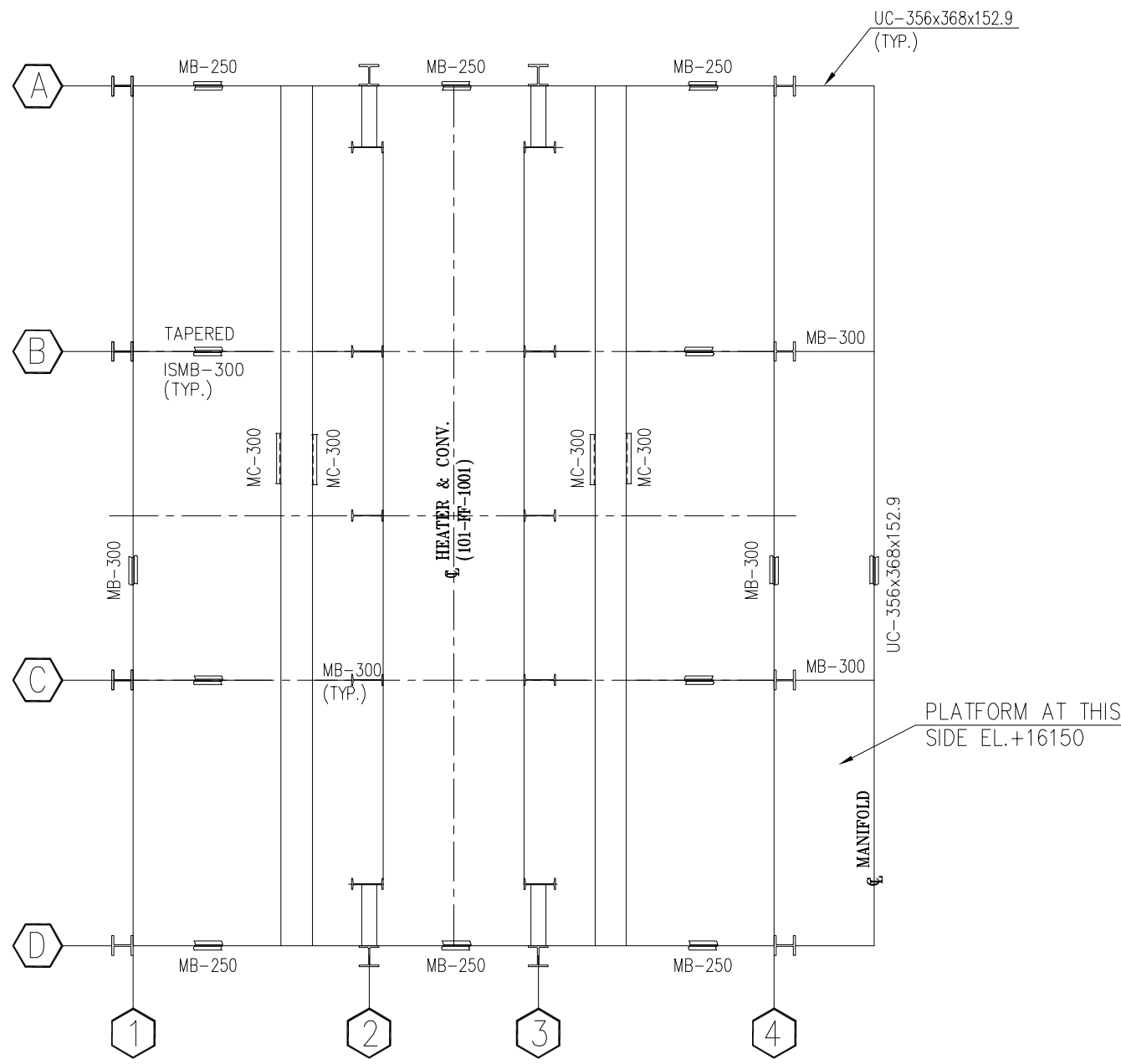
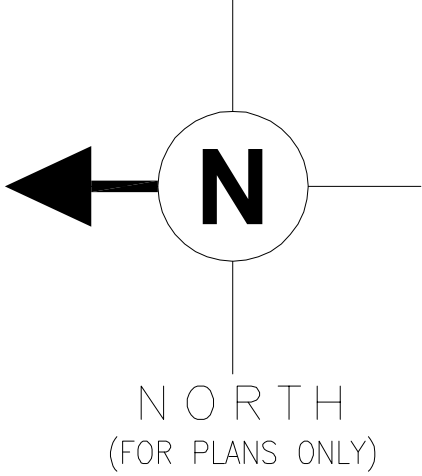
500 केलीफ वीडीएच पीपी प्रियोजना
उत्तर महाराष्ट्र
500 KTA PDH - PP PROJECT
USAR, MAHARASHTRA
INDIA

संरचनात्मक विचार - उन्नयन
REACTOR CHARGE HEATER
(101-FF-1001)
STRUCTURAL
CONFIGURATION - ELEVATIONS
REACTOR CHARGE HEATER
(101-FF-1001)

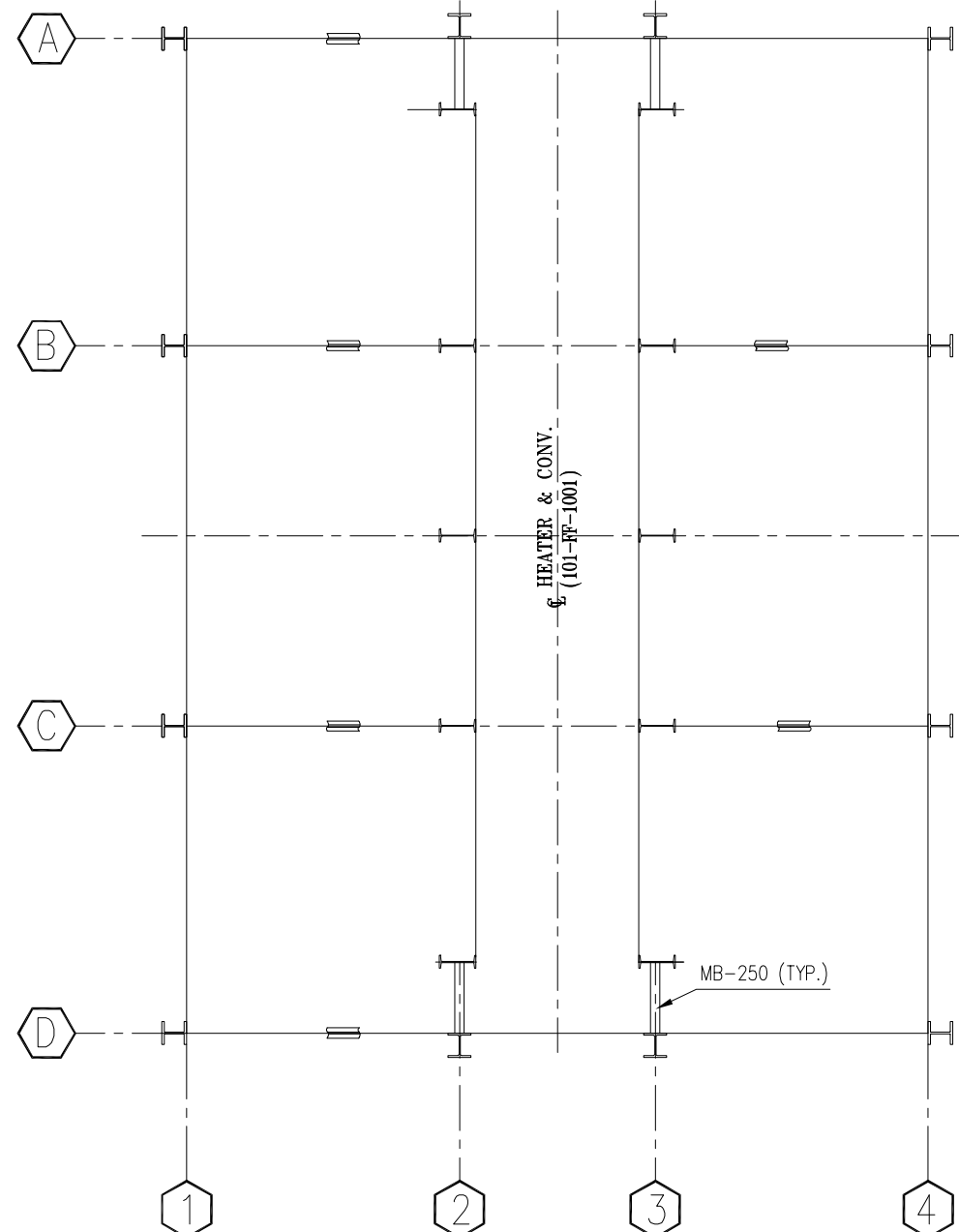
SCALE JOB NO. UNIT DIVN DEPT DWG. NO. REV.
1:100 B 3 7 8 1 0 1 8 0 4 4 0 1 0 8 0

प्रमाणित किया गया है कि यह दस्तावेज़ ग्राहक के द्वारा प्रदान की गई जानकारी के आधार पर तैयार किया गया है। ग्राहक को इस दस्तावेज़ के उपयोग के लिए आवश्यक सभी जानकारी प्रदान की गई है। ग्राहक को इस दस्तावेज़ के उपयोग के लिए आवश्यक सभी जानकारी प्रदान की गई है।

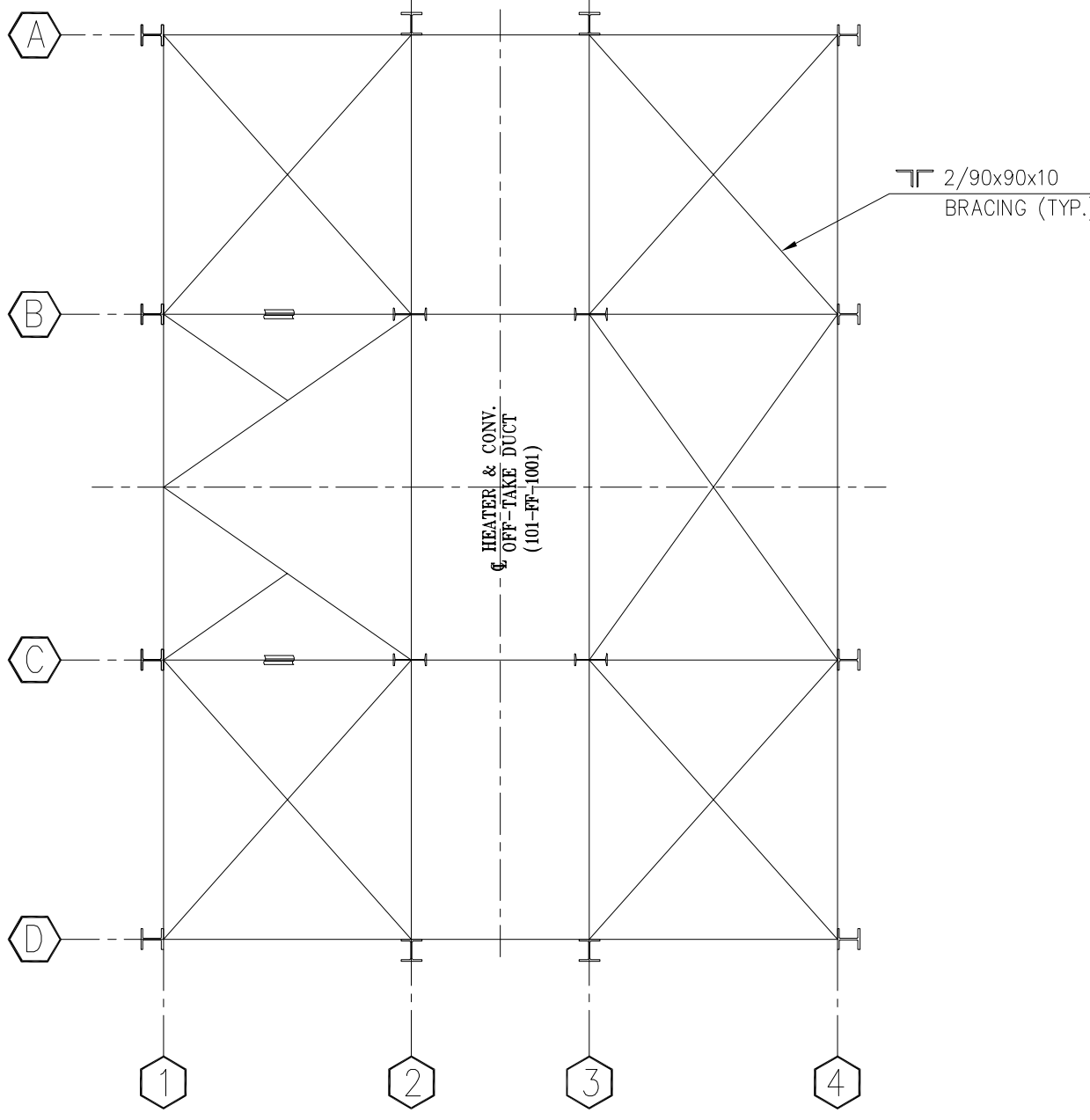
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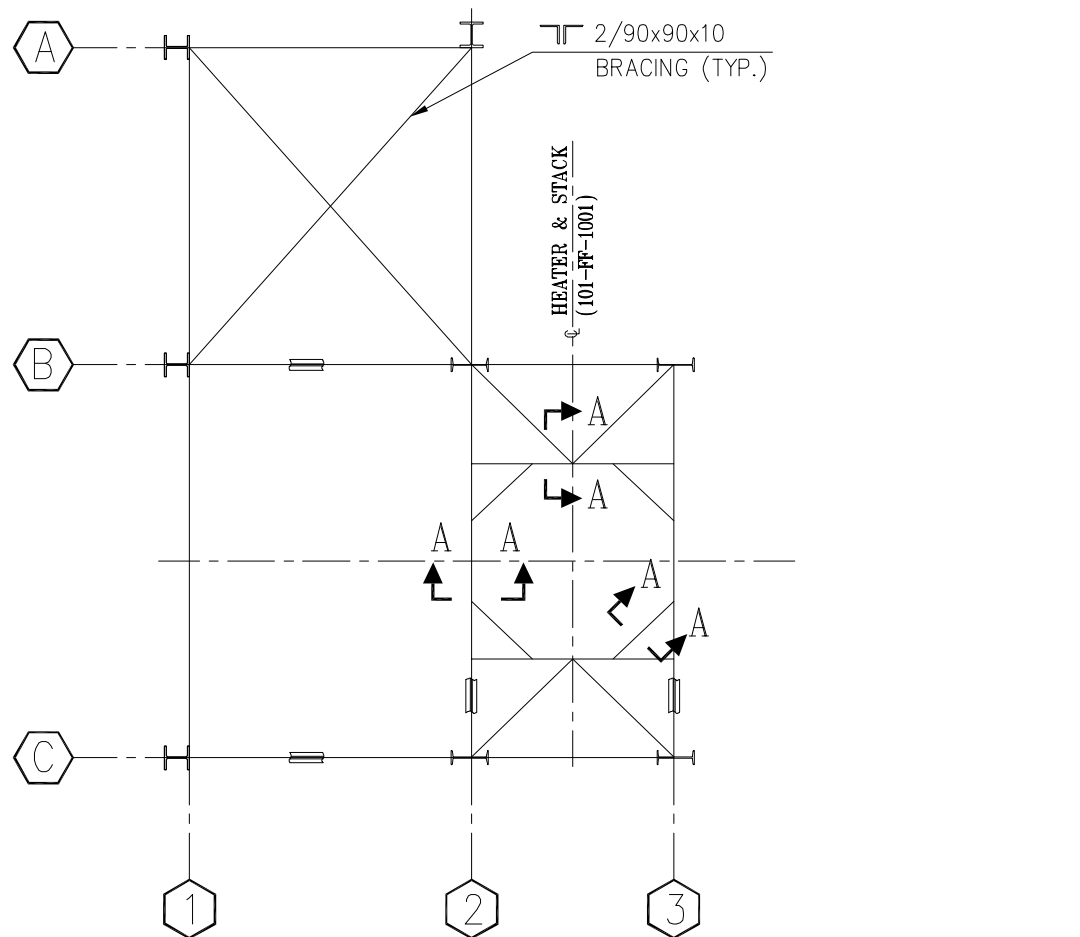
PLAN AT EL+16375



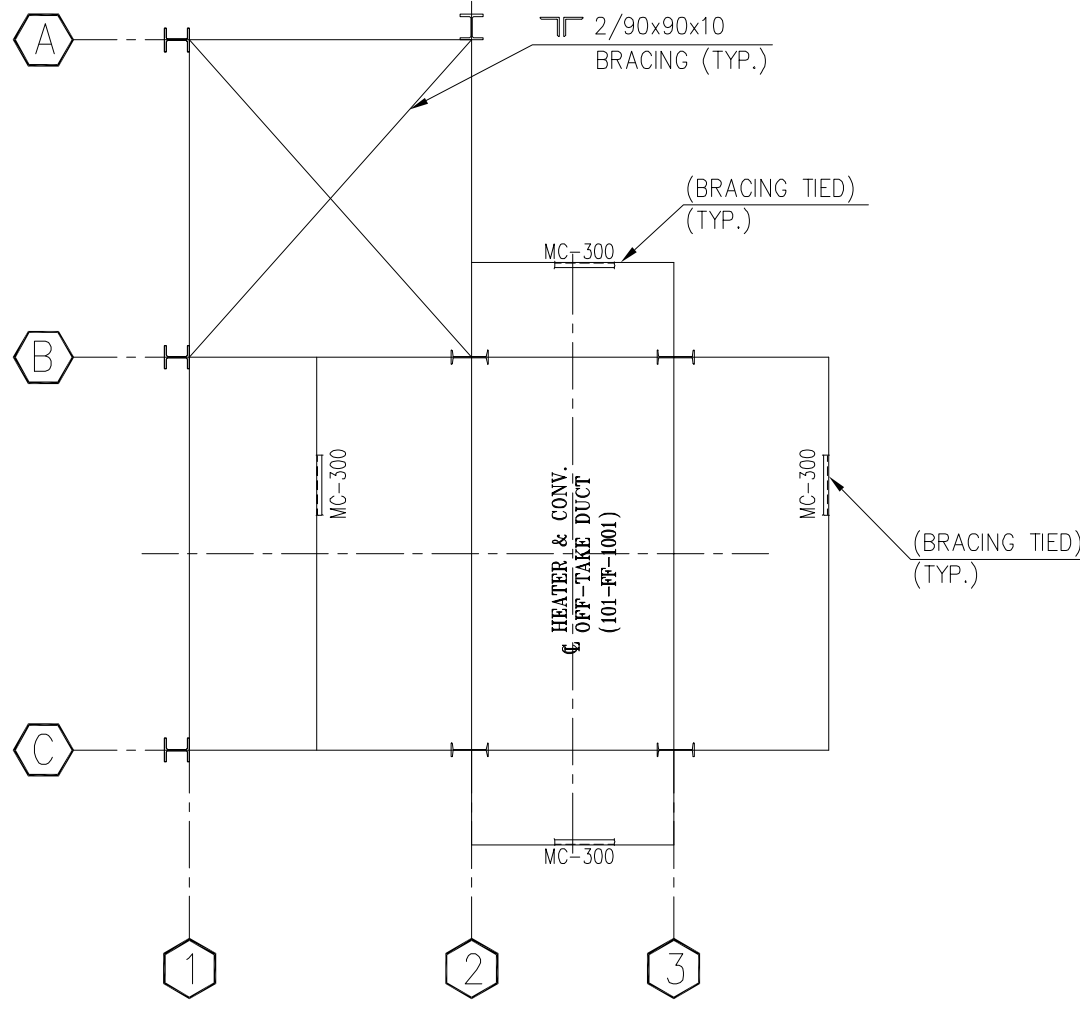
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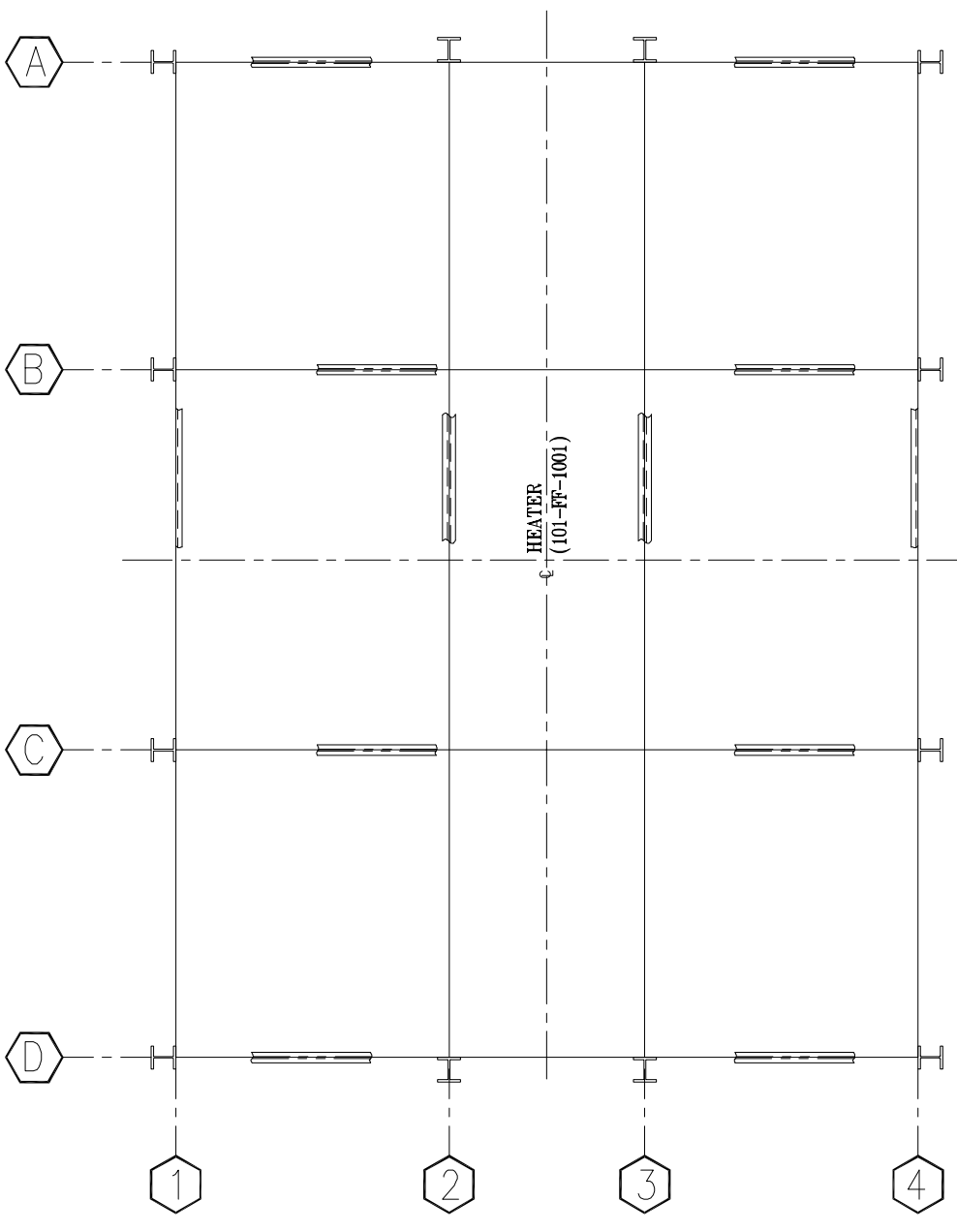
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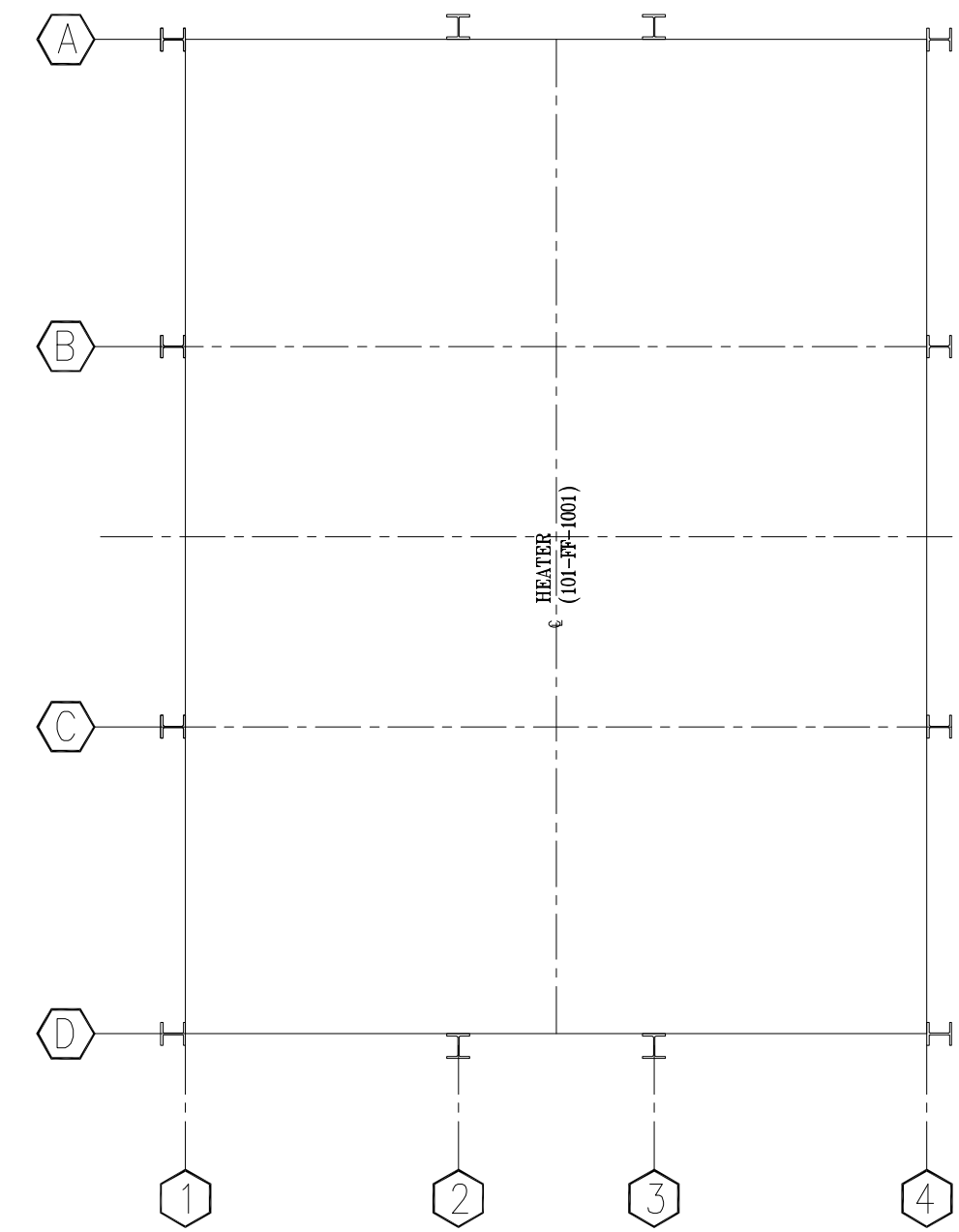
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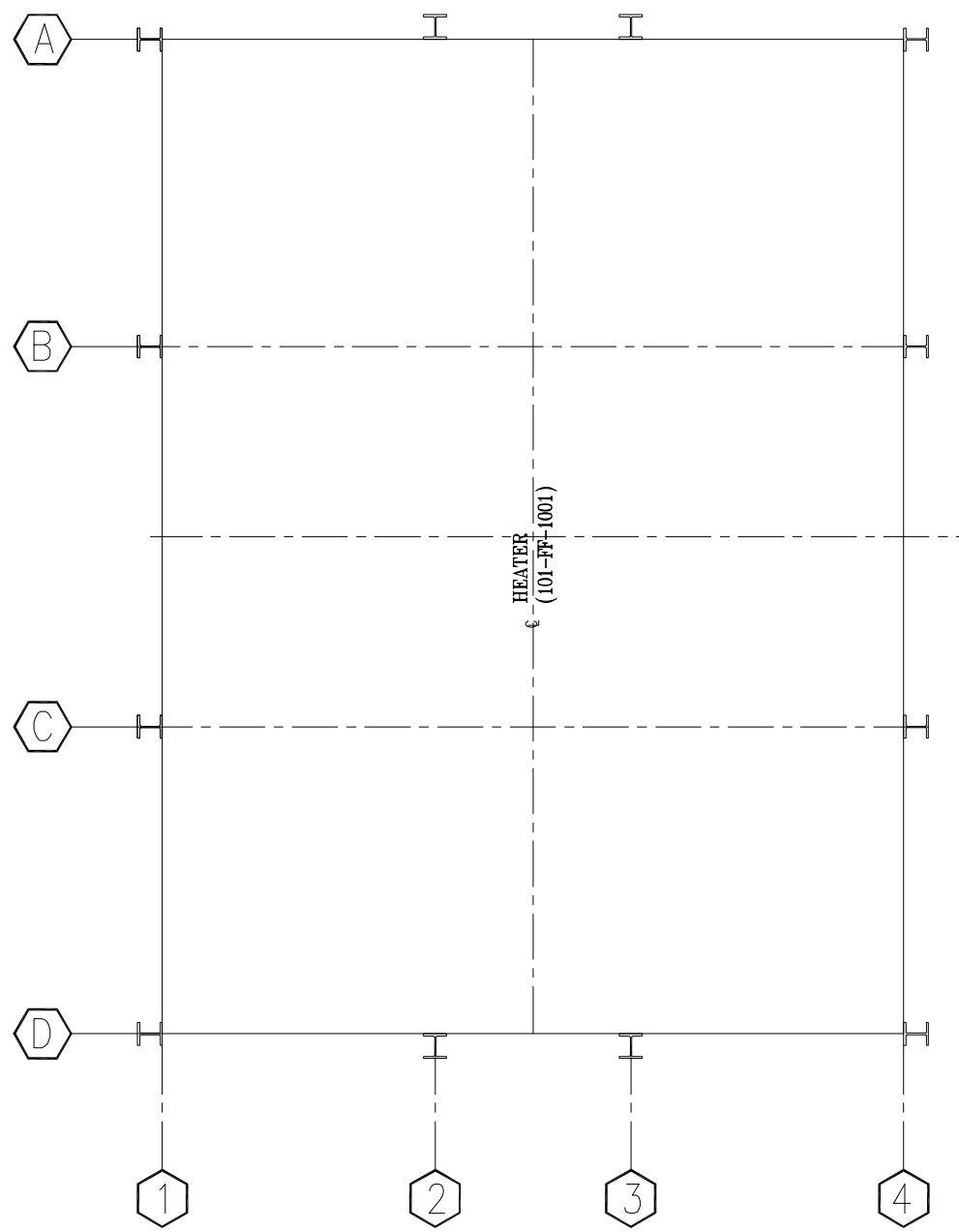
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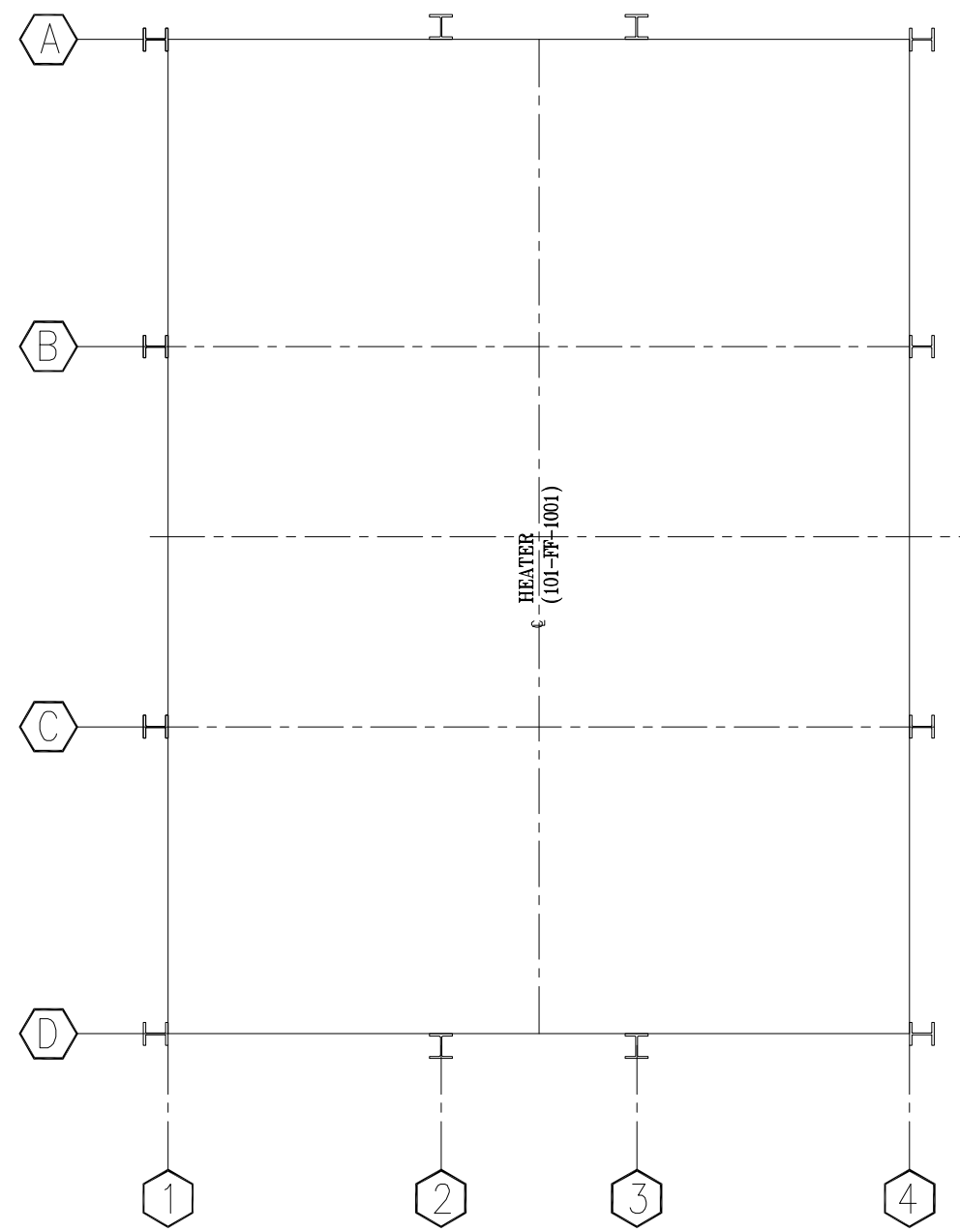
PLAN AT EL+3400



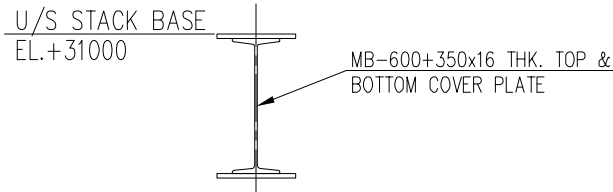
PLAN AT EL+6600



PLAN AT EL+9800



PLAN AT EL+13000



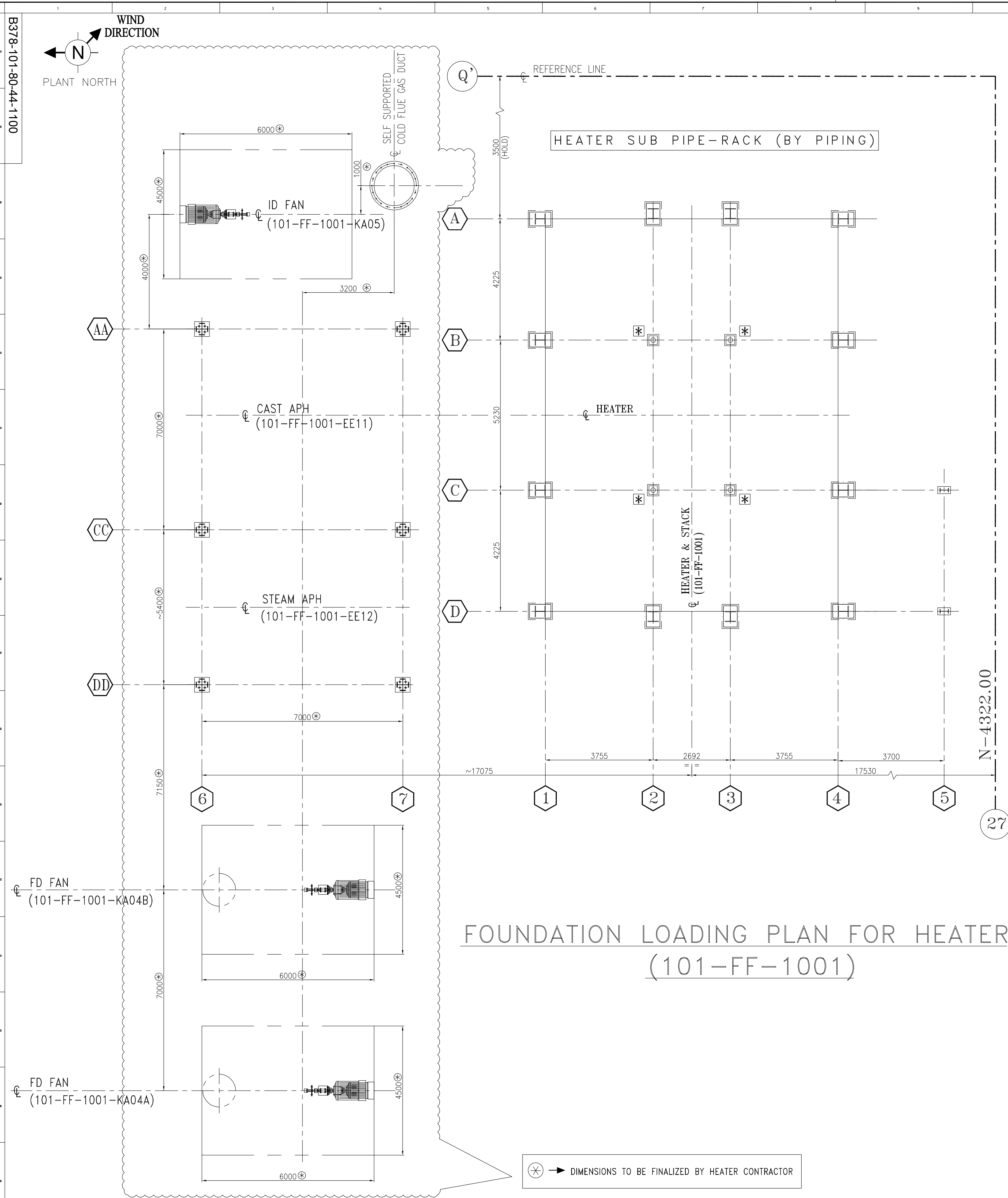
SECTION A-A

REF. DWG. NO.	REFERENCE DRAWING TITLE
B378-101-80-44-0101	GENERAL ARRANGEMENT PLANS-I
B378-101-80-44-0102	GENERAL ARRANGEMENT PLANS-II
B378-101-80-44-0103	STRUCTURAL CONFIGURATION - ELEVATIONS

- NOTES :-
- ALL PLATFORM TIEING MEMBER FROM COLUMN TO BE MIN. ISMB-200 U.O.N. OTHER TIEING MEMBER FROM HEATER TO PLATFORM TO BE ISMC-150 AS A MIN. U.O.N.

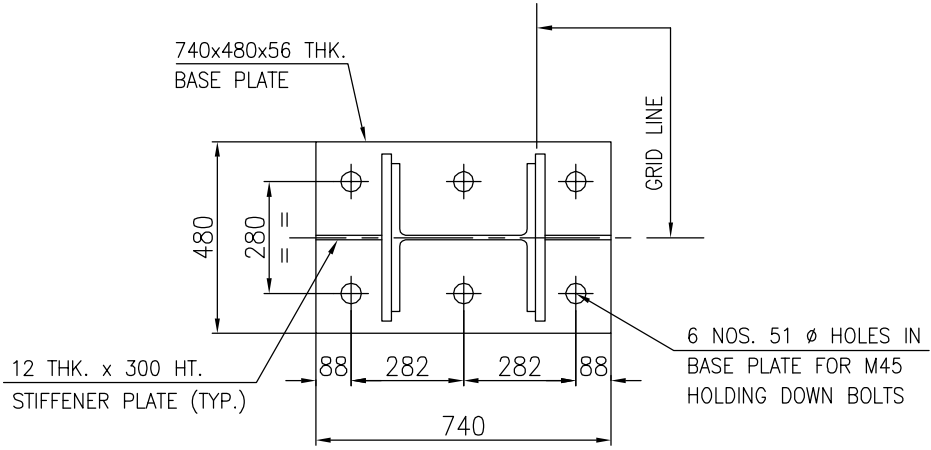
B	19.05.2022	ISSUED FOR ENGINEERING	MB	AV	RP	
C	27.01.2022	ISSUED FOR ENGINEERING	MB	AV	RP	
B	07.01.2022	ISSUED FOR BIS/COMMENTS	MB	AV	RP	
A	10.08.2021	ISSUED FOR BIS/COMMENTS	MB	PK/AV	RP	
REV.	DATE	REVISIONS	BY	CHKD	APPD	PERMD
 GAIL (India) Limited गैल इंडिया लिमिटेड ENGINEERS INDIA LIMITED (एन्जिनीयर्स इंडिया लिमिटेड) (Sole. of India Understanding) गैल इंडिया लिमिटेड GAIL (INDIA) LIMITED USAR, MAHARASHTRA						
500 केलोएच पीओडब्ल्यू की क्षमतावाला उसर महाराष्ट्र 500 KTA PDH - PP PROJECT USAR, MAHARASHTRA INDIA संरचनात्मक रीस्पॉन्स - योजना REACTOR CHARGE HEATER (101-FF-1001) STRUCTURAL CONFIGURATION - PLANS REACTOR CHARGE HEATER (101-FF-1001)						
SCALE	JOB NO.	UNIT	DIVN.	DEPT.	DWG. NO.	REV.
1:66.6	B 3 7 8 1 0 1	UNIT	8 0	4 4	0 1 0 9 0	0
15			15			

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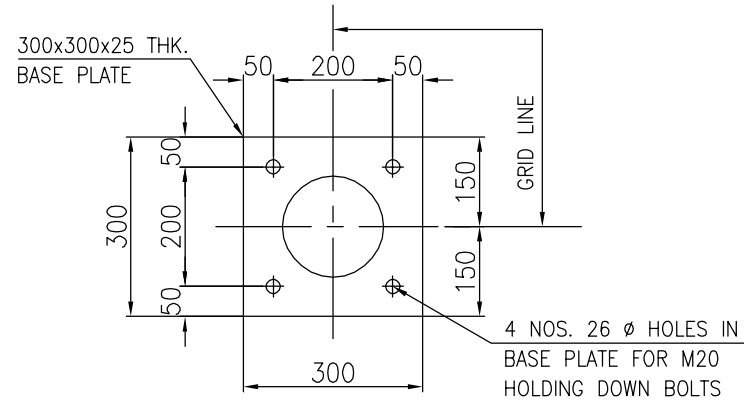


FOUNDATION LOADING FOR REACTOR CHARGE HEATER (101-FF-1001)																			
(LOADS IN METRIC TONNES, AT EL.+2000)																			
COL. NO	GRAVITY LOAD (INCLUDING LIVE LOAD)	WIND LOAD						EARTHQUAKE LOAD						PIPING LOAD					
		W		E		S		W		E		S			W	E	N	S	
		MAX.	MIN.	V	H	V	H	V	H	V	H	V	H	V	H	V	H	V	H
1-A	100	35	±13	±44	±17	±69	±17	±47	±10	±44	±10	±2	±5						
1-B	100	35	±13	±12	±2	±40	±17	±10	±3	±22	±10	±4	±1						
1-C	100	35	±13	±12	±2	±40	±17	±10	±3	±22	±15	±4	±1						
1-D	100	35	±13	±44	±17	±69	±17	±47	±10	±44	±29	±4	±5						
2-A	95	35	±4	±28	±13	±17	±6	±25	±8	±10	±5	±2	±5						
2-D	95	35	±4	±28	±13	±17	±6	±25	±8	±10	±15	±2	±5						
3-A	95	35	±4	±28	±13	±17	±6	±25	±8	±10	±5	±2	±5						
3-D	95	35	±4	±28	±13	±17	±6	±25	±8	±10	±10	±2	±5						
4-A	93	35	±13	±44	±17	±69	±17	±47	±10	±44	±21	±4	±5						
4-B	93	35	±13	±12	±8	±40	±17	±10	±3	±22	±5	±4	±1						
4-C	93	35	±13	±12	±8	±40	±17	±10	±3	±22	±1	±4	±1						
4-D	93	35	±13	±44	±17	±69	±17	±47	±10	±44	±1	±4	±5						
(LOADS IN METRIC TONNES, AT EL.+300) (FOR STAIRCASE COLUMN)																			
5-C	20	7	±3	±5	±4	±10	±3	±6	±3	±6	±2	±1	±1						
5-D	20	7	±3	±5	±4	±10	±3	±6	±3	±6	±2	±1	±1						

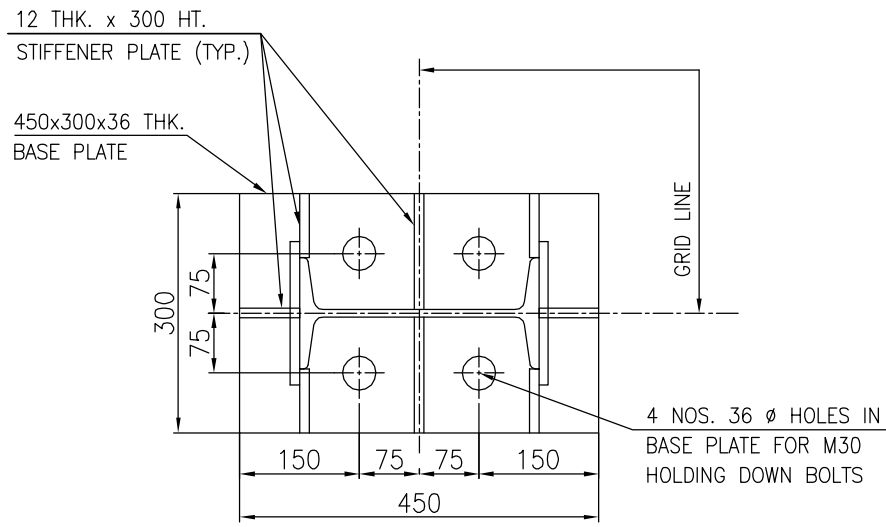
THE COLUMN MARKED * TO BE DESIGNED FOR GRAVITY LOAD = 15 TONS,
UPLIFT = 4 TONS & HORIZONTAL SHEAR = 3 TON



BASE PLATE DETAIL
COLUMNS NO. 1-A, 1-B, 1-C, 1-D,
2-A, 2-D, 3-A, 3-D,
4-A, 4-B, 4-C & 4-D
U/S BASE PLATE EL.+2000



BASE PLATE DETAIL
COLUMNS NO. 2-B, 2-C, 3-B & 3-C
U/S BASE PLATE EL.+300

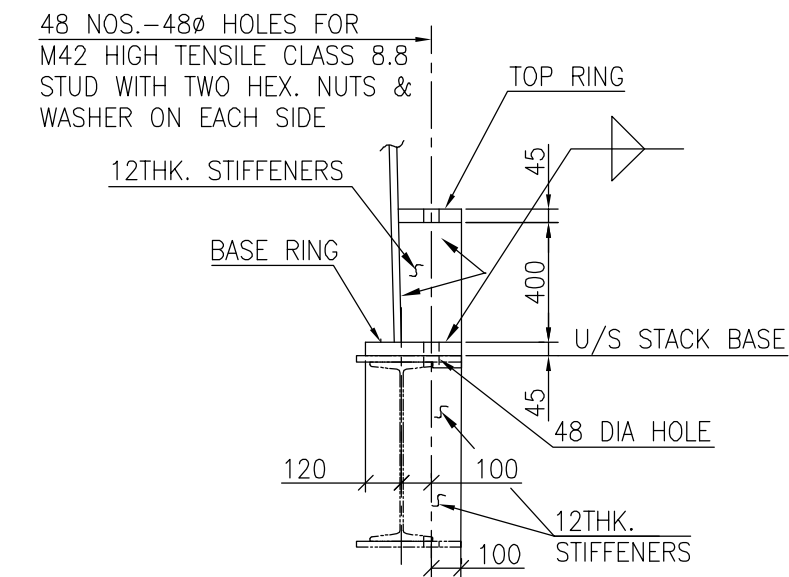
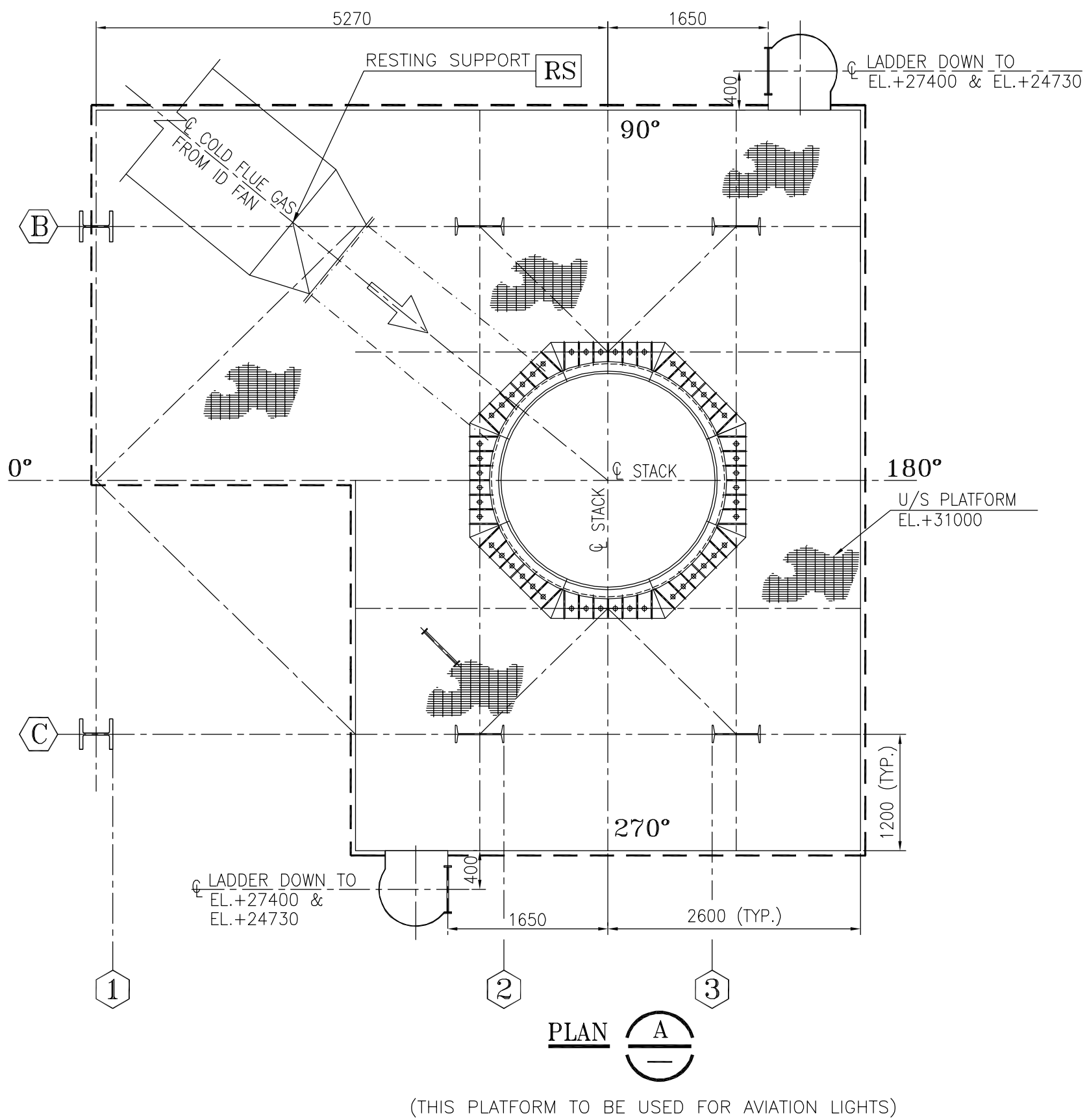
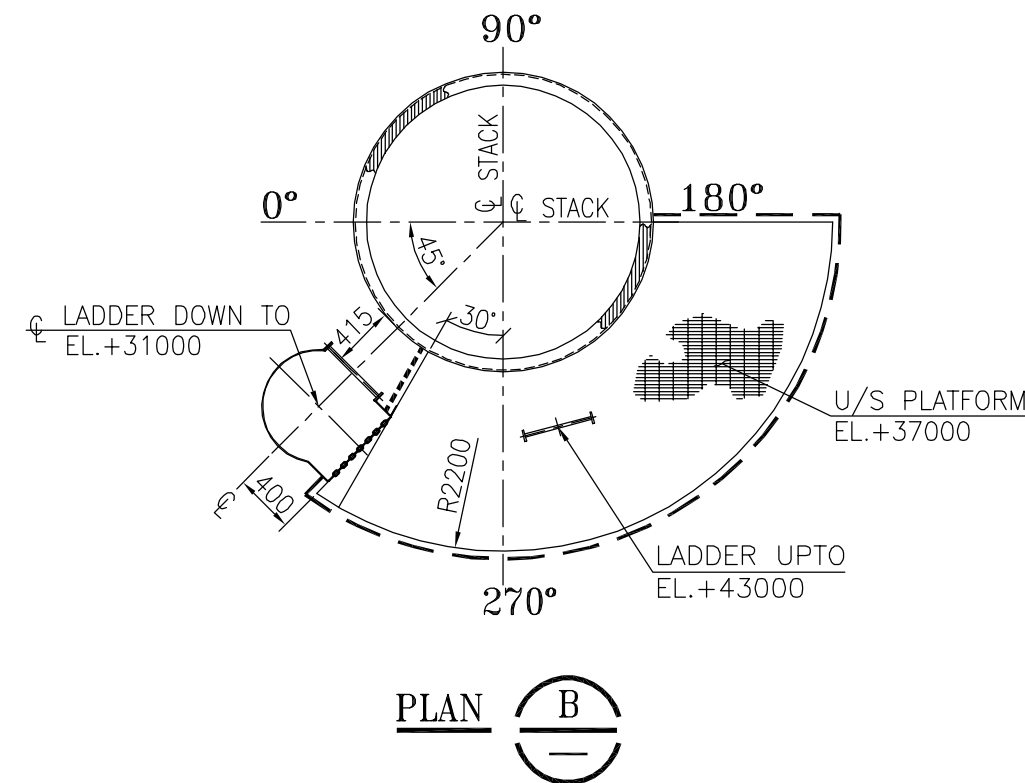
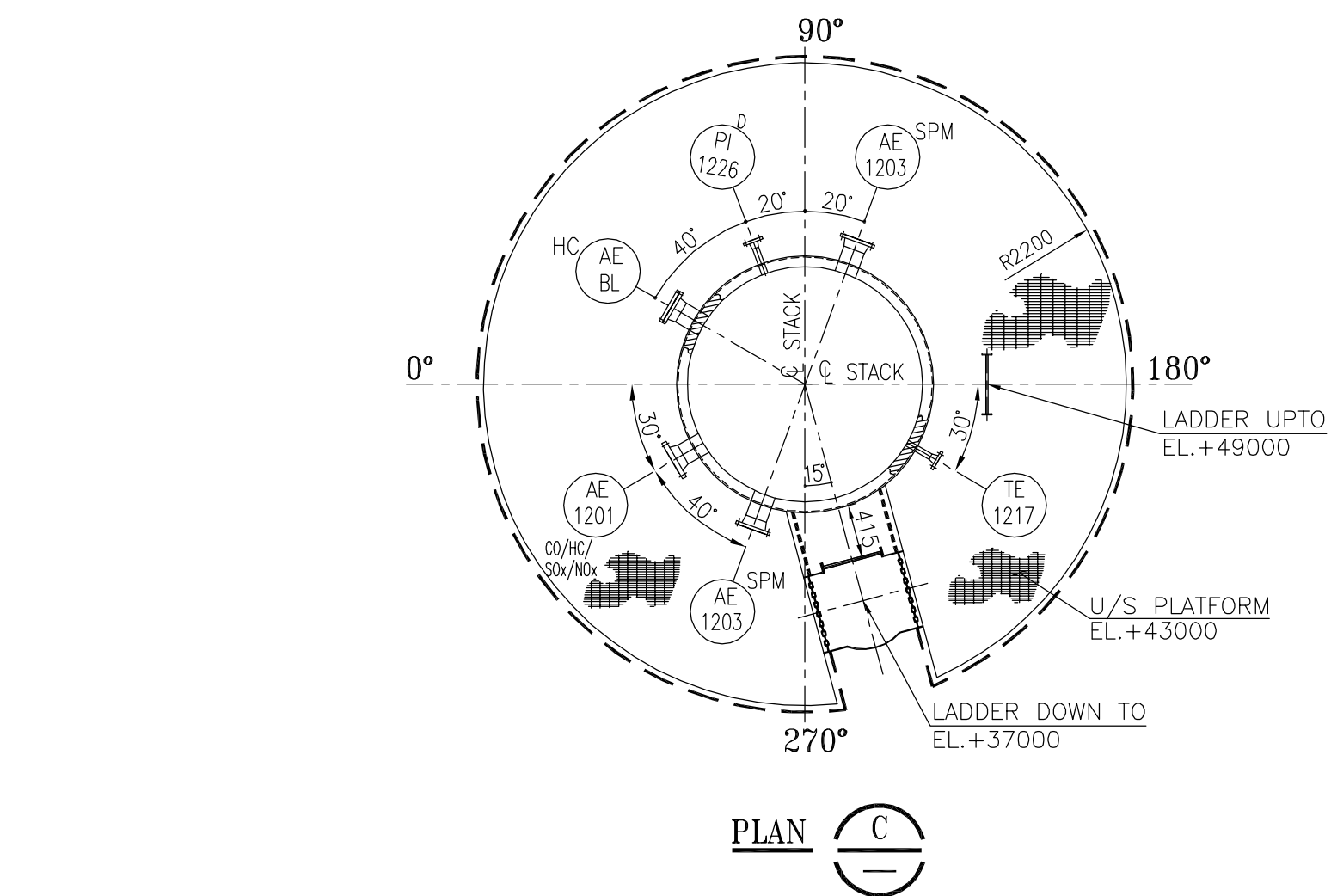
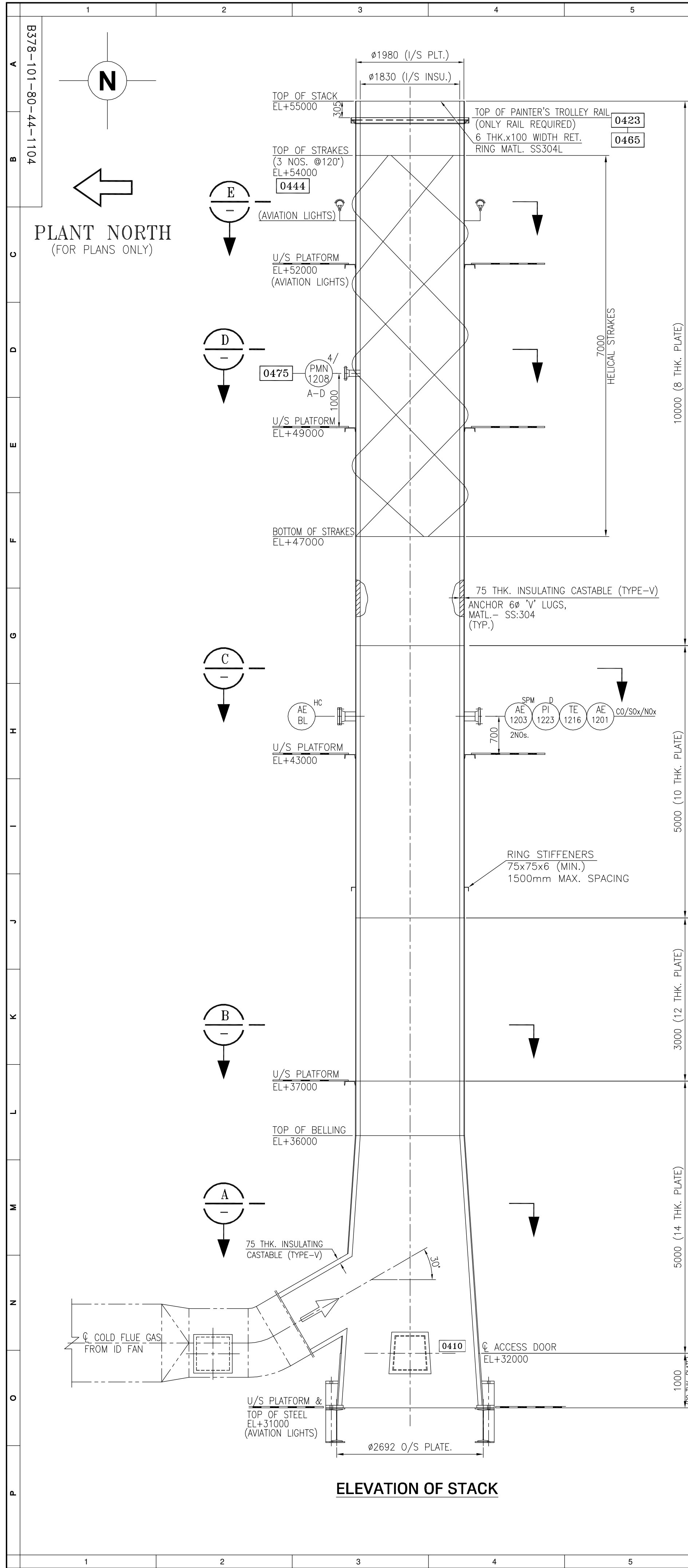


BASE PLATE DETAIL
COLUMNS NO. 5-C & 5-D
U/S BASE PLATE EL.+300

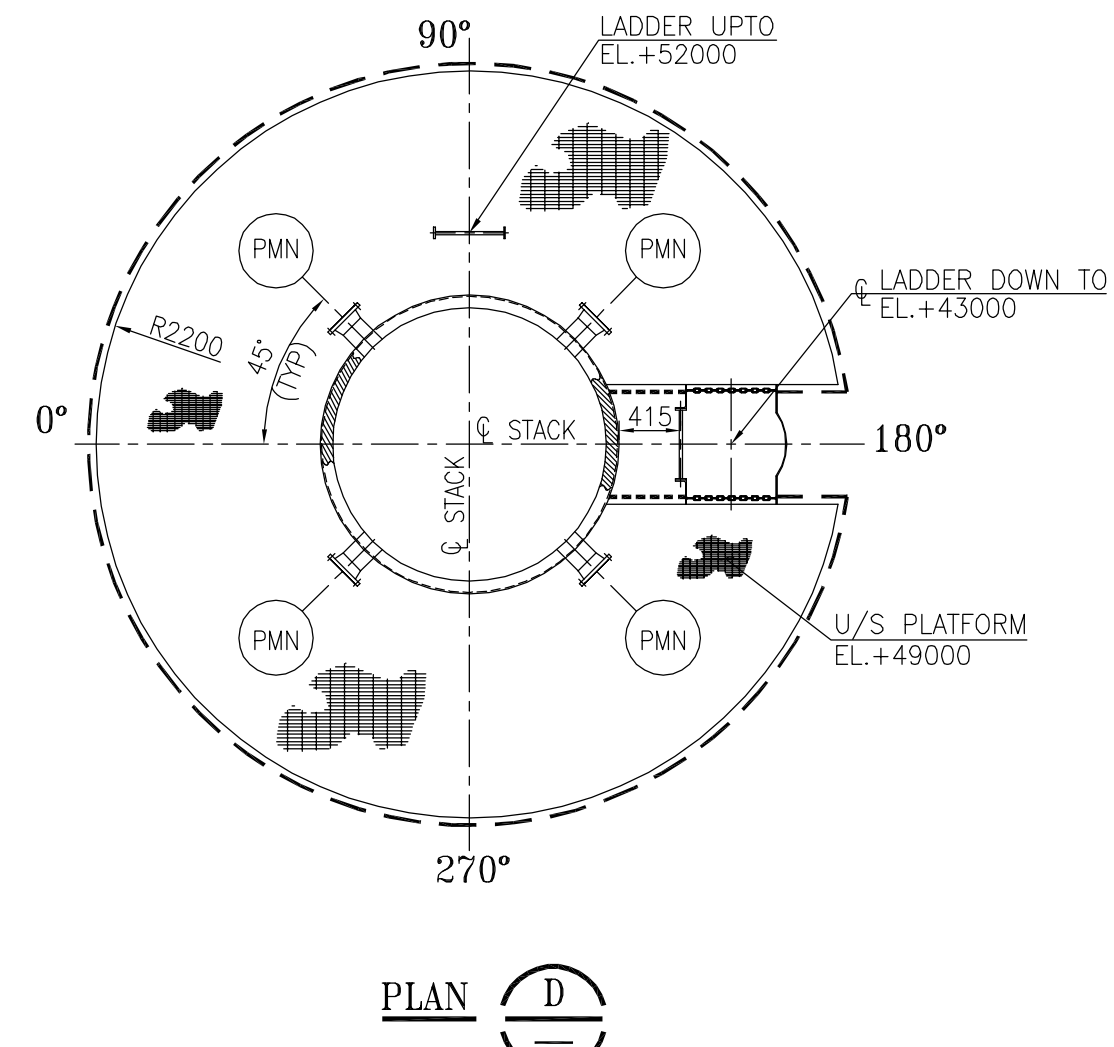
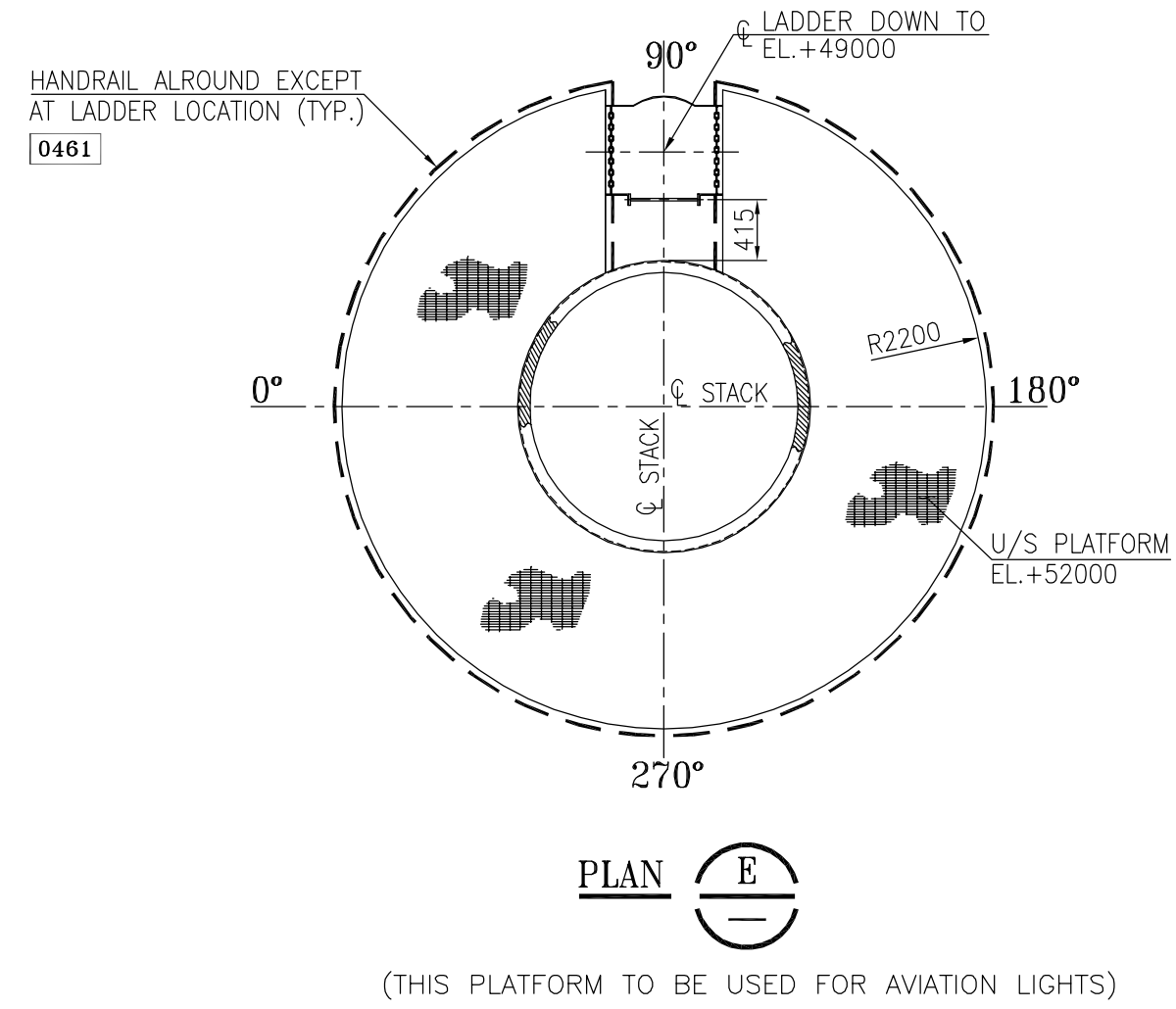
[illegible]

प्रस्तुत आंशक एवं इसमें निहित दिवायन इंडीपेंडेंट सीडिंग लिमिटेड की संमति है। ये प्राप्त ऊपर दिए गए हैं और उपासकों ने यह स्पष्ट समझौता किया है कि न तो उन्हें या तो, मुद्रित किया जाएगा, न मकल की जाएगी, न प्रतिलिपि बनाई जाएगी, न प्रतिलिपि बनाई जाएगी और न ही साक्षित्री और निवेदन प्रमाण को अलावा इसका कोई अन्य प्रमाण होगा और यह प्रमाण ऊपर दिये वाले हस्ताक्षरकों की लिखित स्वीकृति से होगा।

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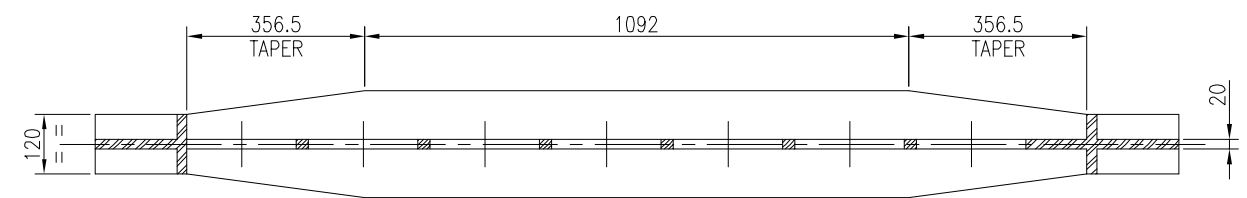
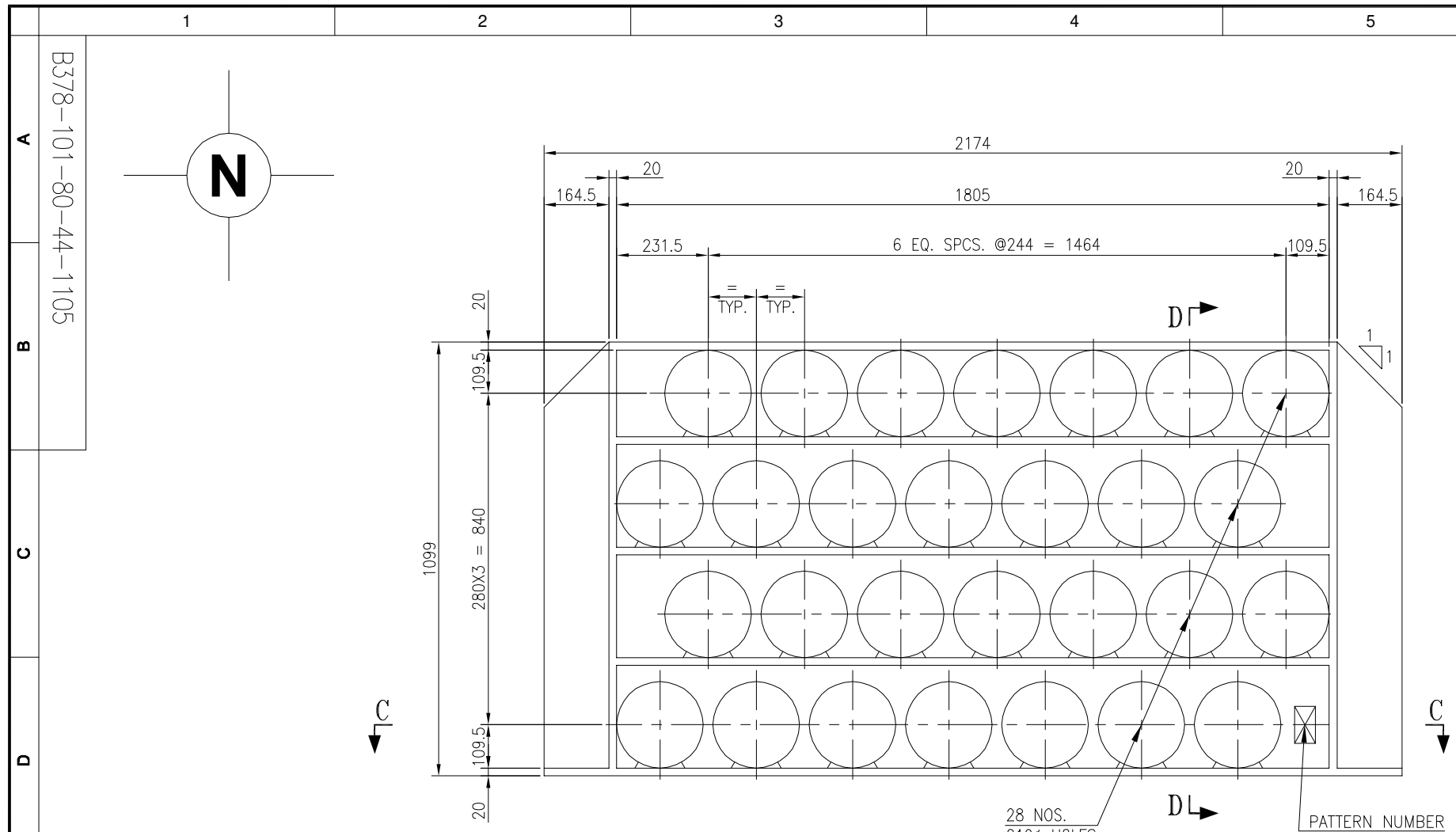


STACK CHAIR DETAIL

[illegible]

प्रस्तुत आदेश एवं समस्त निहित विधानन ईंजिनियर्स इंडिया लिमिटेड को संर्पत्त है। ये सम आदेश दिए गए हैं और आयातकर्ता ने यह स्पष्ट समझौता किया है कि न तो उन्हें नए, मुद्रित किया जाएगा, न मकान की बाजारों, न खरार दिए जाएंगे, न प्रदर्शित किए जाएंगे और न ही सीमित के अलावा इस्का कोई अन्य प्रयोग होगा और यह प्रयोग खरार देने वाले हटा आयातकर्ता को निहित रूप में दो गई सदति से होगा।

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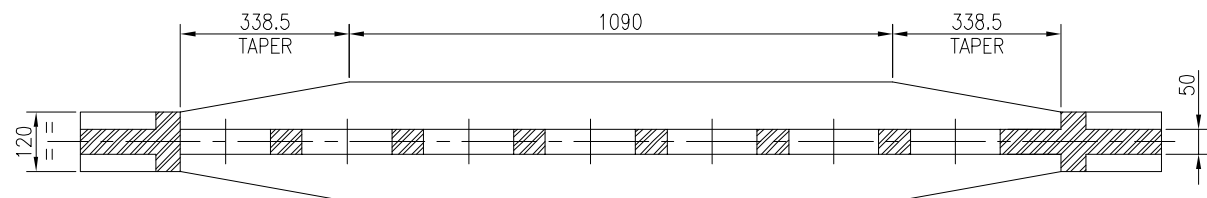
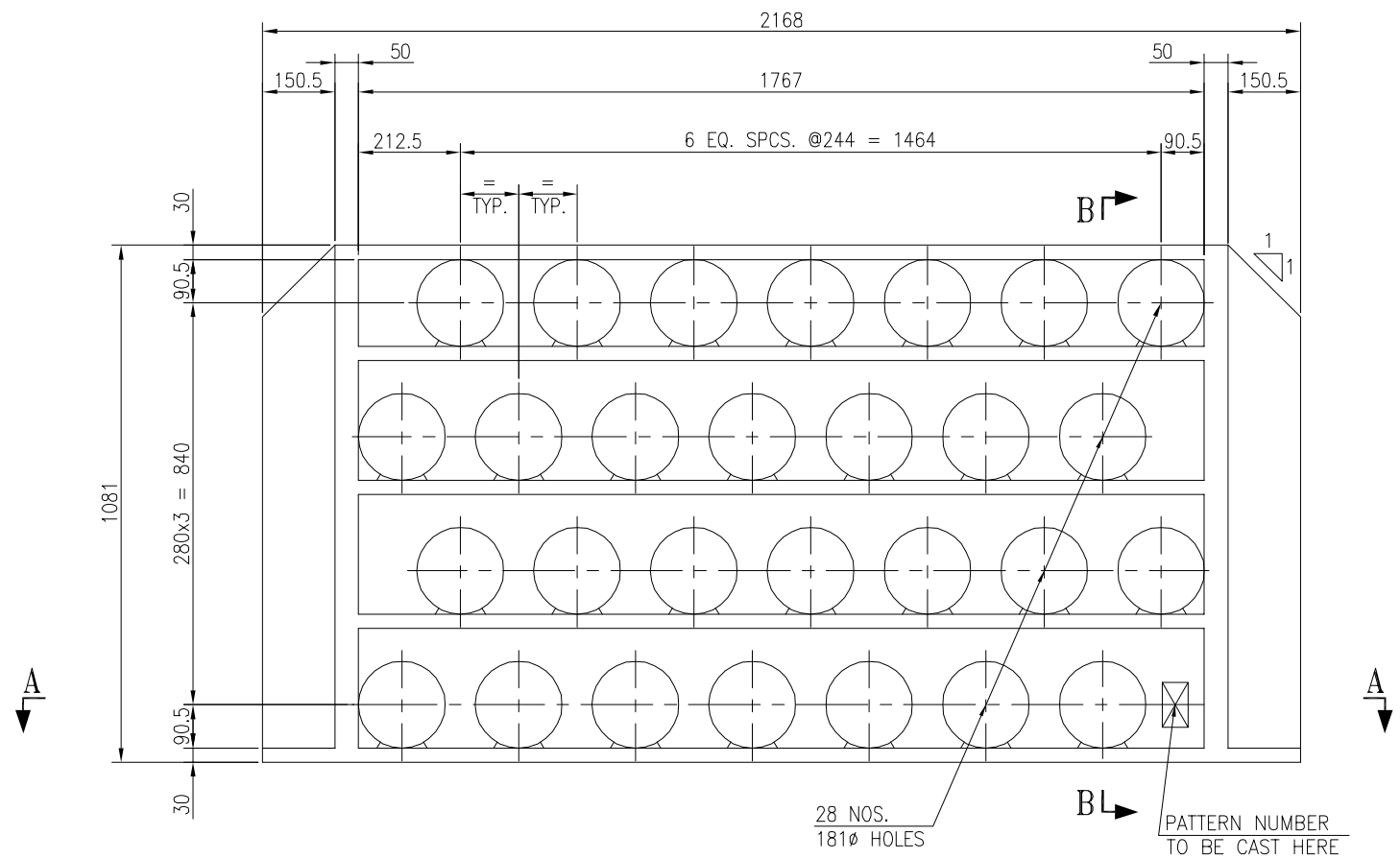
(REFERENCE EXPANSION DURING HEATER OPERATION=32mm)

SECTION C-C

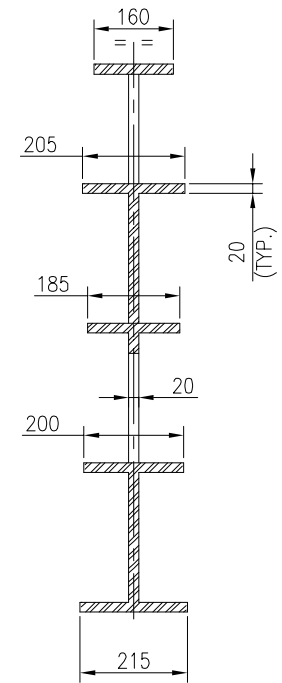
DETAIL OF INTERMEDIATE TUBE SHEET

PATTERN NO. B378/1612/101

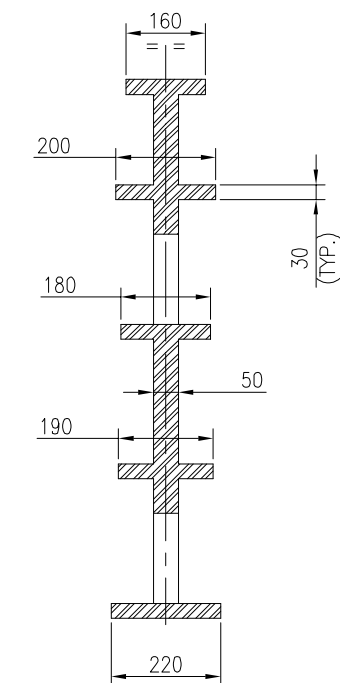
1612/101



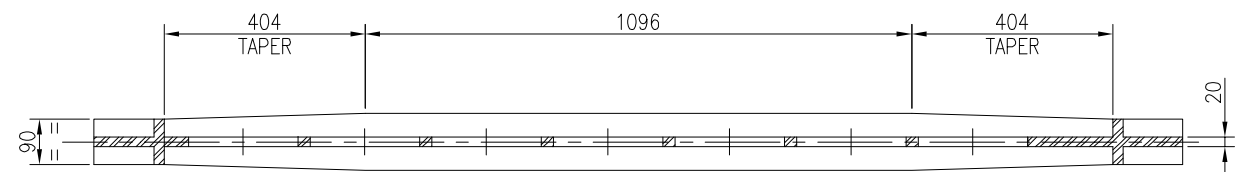
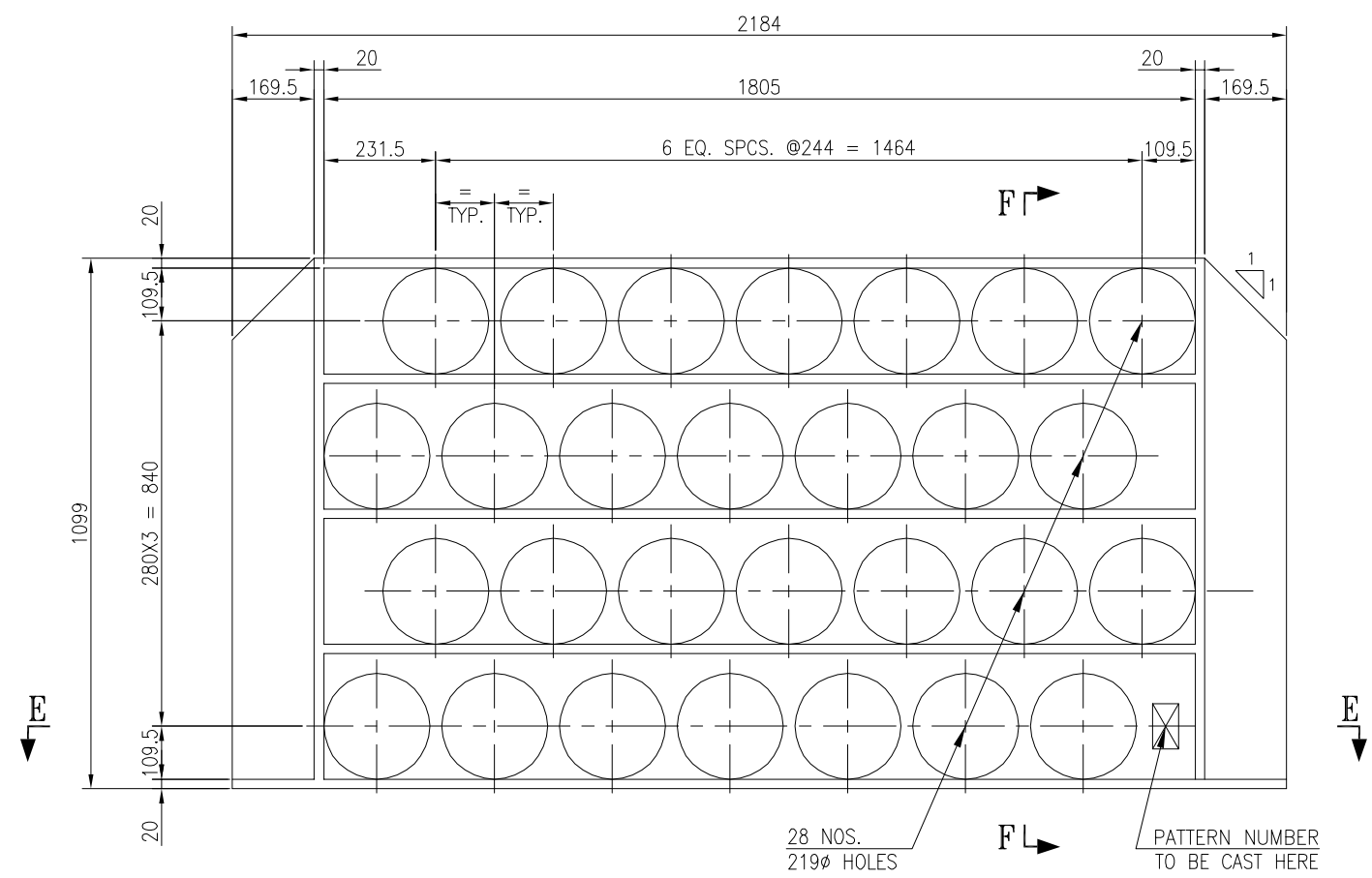
(REFERENCE EXPANSION DURING HEATER OPERATION=40mm)
SECTION A-A
DETAIL OF INTERMEDIATE TUBE SHEET
PATTERN NO. B378/1613/101 1613/101



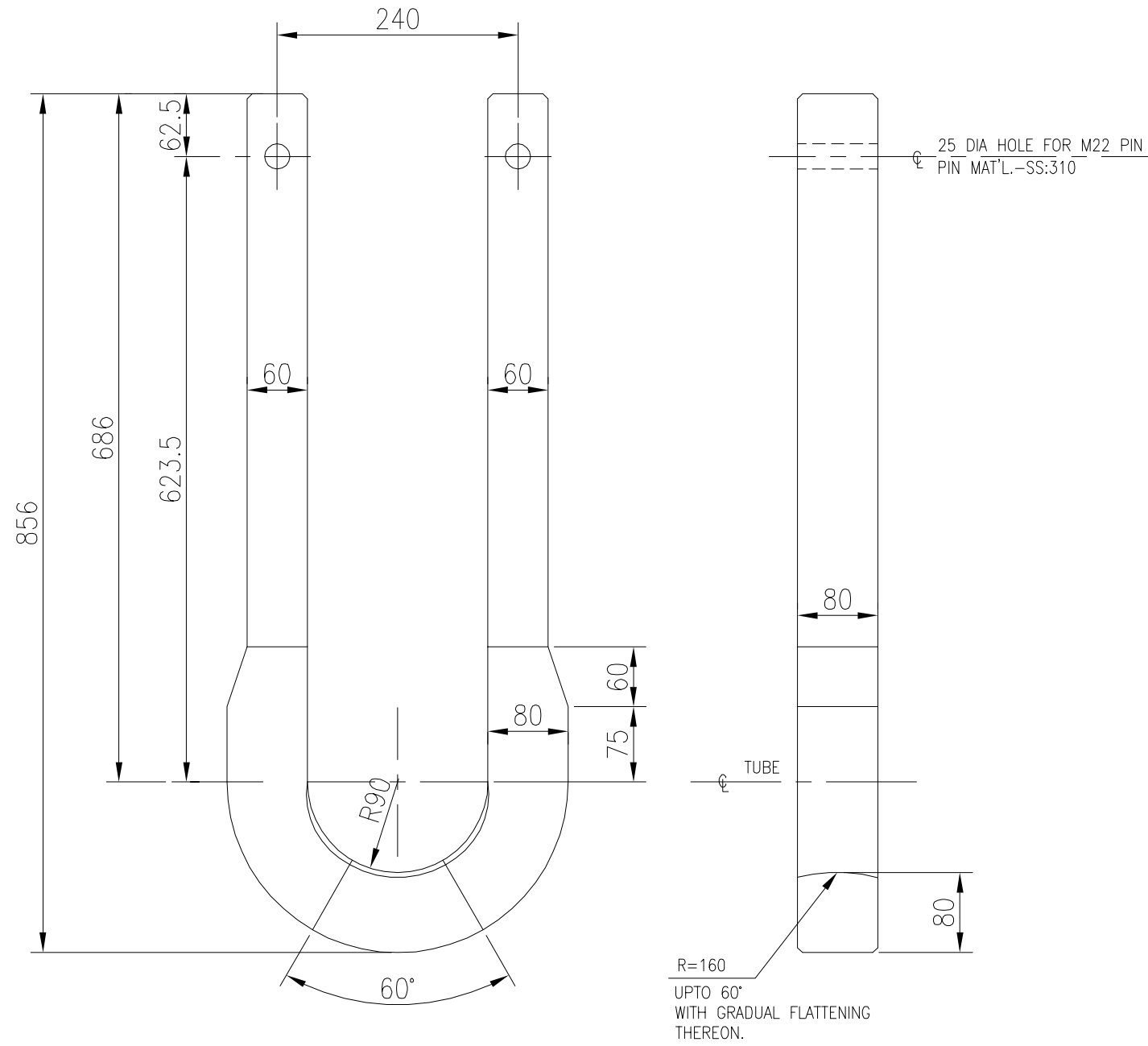
SECTION D-D



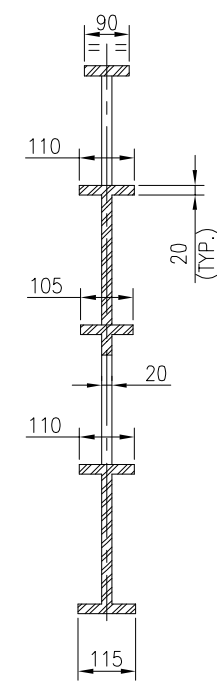
SECTION B-B



(REFERENCE EXPANSION DURING HEATER OPERATION=24mm)
SECTION E-E
DETAIL OF INTERMEDIATE TUBE SHEET
PATTERN NO. B378/1612/102 (1612/102)



DET. OF RAD. TUBE HANGER
MATL.- A351 Gr. HK 40
PART NO. (B378/1623/201)



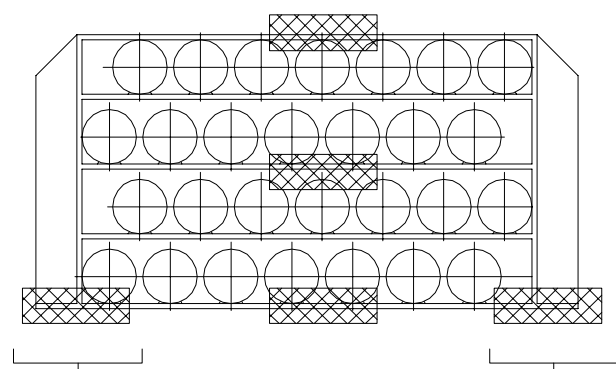
SECTION F-F

- NOTES :-**

- ## 1. TYPICAL NOTATION

(1613/101) ← DENOTES PART NO.

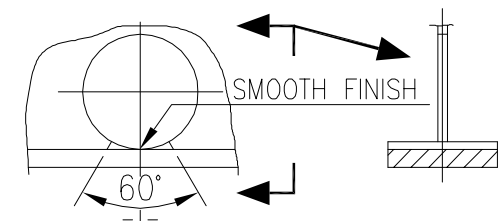
2. ALL DIMENSIONS ARE IN mm U.O.N.
3. ALL BEARING SURFACES TO BE FREE FROM BURRS AND SHARP EDGES.
4. MANUFACTURE, TESTING AND SUPPLY ARE TO BE AS PER EIL STD. SPEC. FOR TUBE SUPPORT CASTING 6-17-0007 U.O.N. IN DRAWING.
5. AREAS OF RADIOGRAPHY ON PRODUCTION CASTINGS ARE INDICATED BY HATCHING  AS SHOWN BELOW



NO DRAFT ON SEATING SURFACE

INSPECTION OF CASTINGS SHALL CONFORM TO ASTM E 446 SEVERITY LEVEL 3 SHALL APPLY IN ALL CATEGORIES EXCEPT CRITICAL & FLANGE AREAS. CRITICAL AREAS (SUPPORT AREAS / BOTTOM FLANGE AREAS) SHALL CONFORM TO SEVERITY LEVEL 2.

6. 6 mm RADIUS ON EDGES AND CORNERS U.O.N EXCEPT AT HOLES.
7. HOLES TO BE IN LINE AND PARALLEL AND AT 90° TO THE WEB.
8. DO NOT SCALE THE DRG. SEEK CLARIFICATION IF IN DOUBT.
9. SEEK CLARIFICATION IF ANY,BEFORE TAKING UP ACTUAL PRODUCTION OF CASTING.
10. ALL MATING PARTS SHALL BE CHECKED FOR CORRECT FIT AT SHOP PRIOR TO DESPATCH OF ALL ITEMS.
11. WEIGHT OF ALL CASTINGS SHALL BE WORKED OUT BY THE BIDDER & TO BE FURNISHED IN THE OFFER AS WELL AS IN THEIR RESPECTIVE FABRICATION DRAWINGS.
12. BEARING SLEES TO BE 30° EACH SIDE OF VERTICAL C OF THE HOLE FOR FULL WIDTH OF UNDERLYING FLANGE.



NO DRAFT ON SEATING SURFACE

13. ALL FLANGE WIDTHS SHALL BE SYMMETRICAL ABOUT $\frac{C}{2}$ OF ITS.
14. QUANTITIES SHOWN ARE INSTALLED QUANTITIES ONLY. HOWEVER, CONTRACTOR TO CHECK THE TOTAL NO. REQUIRED AS PER GAD. FOR SPARES REFER TENDER DOCUMENT
15. IF DRAFT TAPE IS PROVIDED ON FLANGES, THE MIN. FLANGE THICKNESS SHALL BE MAINTAINED AS INDICATED. THE TOP SURFACE SHALL BE KEPT HORIZONTAL & THE BOTTOM SURFACE SHALL NOT PROJECT IN TO THE HOLE.
16. THE GAP BETWEEN OUTER EDGES OF THE ITS & INNER FACE OF CASING SHALL BE ENSURED TO ACCOUNT FOR THERMAL EXPANSION. THIS SHALL SUITABLY BE COVERED IN RELATED QAP/ITP.

BILL OF MATERIAL FOR CAST TUBE SUPPORTS
(INSTALLED QUANTITIES EXCLUDING SPARES)

PART NO.	MATERIAL	EIL STD. NO.	QUANTITY	REMARKS
CONVECTION INTERMEDIATE TUBE SHEETS				
1613/101	A 351 Gr HK 40	AS PER DETAIL	1	BOTTOM TUBE SHEET
1612/101	A 297 Gr HF	—DO—	1	2nd TUBE SHEET FROM BOTTOM
1612/102	A 297 Gr HF	—DO—	2	3rd & 4th TUBE SHEET FROM BOTTOM
CONVECTION ITS SUPPORT BRACKETS				
1623/101	A 351 Gr HK 40	7-17-0164	2	BOTTOM TUBE SHEET
1622/101	A 297 Gr HF	7-17-0163	2	2nd TUBE SHEET FROM BOTTOM
1622/102	A 297 Gr HF	7-17-0101	4	3rd & 4th TUBE SHEET FROM BOTTOM

RADIANT ROOF TUBE HANGER

1623/201	A 351 Gr HK 40	AS PER DETAIL	42	RADIANT ROOF TUBE HANGER
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0	19.05.2022	ISSUED FOR ENGINEERING	MB	PK/AV	RP	
C	27.01.2022	ISSUED FOR ENGINEERING	MB	PK/AV	RP	
B	07.01.2022	ISSUED FOR TENDER	MB	PK/AV	RP	
A	10.09.2021	ISSUED FOR BIDS/COMMENTS	MB	PK/AV	RP	

REV.	DATE	REVISIONS	BY	CHKD	APPD	PEM/P
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**इंजीनियर्स
इंडिया लिमिटेड**
(भारत सरकार का उपक्रम)

 **ENGINEERS
INDIA LIMITED**
(A Govt. of India Undertaking)


 गेल इंडिया लिमिटेड
 GAIL (India) Limited
 USAR, MAHARASHTRA

500 कॅटीर पीडीएच पीपी परियोजना उत्तर महाराष्ट्र	500 KTA PDH - PP PROJECT USAR, MAHARASHTRA INDIA
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ट्यूबशीट सपोर्ट कास्टिंग 101-FF-1001	TUBE SUPPORT CASTINGS 101-FF-1001
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SCALE	JOB NO.				UNIT			DIVN.		DEPT.		DWG. NO.				REV.
1:10	B	3	7	8	1	0	1	8	0	4	4	1	1	0	5	0

	MANUFACTURER'S NAME & ADDRESS		SITE ACTIVITIES QUALITY PLAN				PROJECT: GAIL, USAR			
	BHEL-VISAKHAPATNAM or Approved Sub-Contractor		ITEM: Reaction Charge Heater QP NO: CQP 2532 Rev 00 TAG No: 101-FF-1001 Date: 02.12.2022 PAGE 1 of 8				PACKAGE: Reaction Charge Heater SO NO: 7933 Customer PO : GAIL/ND/C&P/PDH-PP/HEATER/ W400/2022/FOA/458 Dt. 19-05-2022			

SL No	COMPONENT & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								M	C	N	
1	2	3	4	5	6	7	8	D			

1.0	INCOMING MATERIALS VERIFICATION (Material, Equipment, Pre-Fabricated and Bought Out Items)										
1.1	Radiant coils, Convection coils Crossover lines etc.,	Mechanical Chemical NDT as applicable	Records verification	100%	BHEL Drawing	Mfg TC/ Material Data Report	V	P	QC	R	Refer Note-3
1.2	Bought Out Items / Direct dispatches	Mechanical Chemical NDT as applicable	Records verification	100%	BHEL Drawing	Mfg TC/ Material Data Report	V	P	QC	R	Refer Note-3
1.3	Refractory & Insulation items etc.,	Mechanical Chemical NDT as applicable	Records verification	100%	BHEL Drawing	Mfg TC As applicable	V	P	QC	R	Refer Note-3
1.4	Items like Piping, non-pressure parts like Structural and Stack, Other Miscellaneous Materials / Items as per respective material specification / BHEL Drawing(s).					-	V	P	QC	R	Refer Note-3
1.5	Consumable Items like Paints, Welding electrodes etc. as per respective material specification and BHEL Drawing(s) as applicable.					-	-	P	QC	-	(Check on sample basis)

Prepared by  P. Gopi Kishore / Manager/QA	Reviewed & Approved By  A.K. Mandal/ AGM (Q&BE)	Approved By Customer Signature & Stamp
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		MANUFACTURER'S NAME & ADDRESS BHEL-VISAKHAPATNAM or Approved Sub-Contractor		SITE ACTIVITIES QUALITY PLAN			PROJECT: GAIL, USAR PACKAGE: Reaction Charge Heater SO NO: 7933 Customer PO : GAIL/ND/C&P/PDH-PP/HEATER/ W400/2022/FOA/458 Dt. 19-05-2022					
				ITEM: Reaction Charge Heater QP NO: CQP 2532 Rev 00 TAG No: 101-FF-1001 Date: 02.12.2022 PAGE 2 of 8								
SL No	COMPONENT & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
								D	M	C	N	
1	2	3	4	5	6	7	8					

2.0	PRE-FABRICATION ACTIVITIES											
2.1	Calibration of Test / Measuring Instruments	Validity	Records verification	100%	Drawings / Specification	Reports / Records	V	P	QC	V		
2.2	Welding Equipment , accessories and tools & tackles	Functionality / Validity	Records verification	100%	Drawings / Specification	Reports / Records	-	P	QC	R		
2.3	Welding Qualification	Procedure Qualification	WPS Review	100%	ASME Sec IX as applicable	WPS PQR	-	P	QC	V		
2.4	Welder Qualification	Personnel Qualification	WQR Review	100%	AWS/IBR/IS (#)	WQR	-	P	QC	V	# As applicable	
2.5	Approved drawings, NDE & Welding procedures, Painting specification	Availability before start of work	Review	100%	Drawings / Specification	Records	-	P	QC	V	(as applicable)	
2.6	Material traceability	Identity	Verification	100%	Drawings / Specification	Records	-	P	QC	V		
2.7	PMI (only for SS and Alloy Steels)	Properties	Verification	100%	Drawings / Specification	Records	-	P	QC	V	(as applicable)	

Prepared by  P. Gopi Kishore / Manager/QA	Reviewed & Approved By  A.K. Mandal/ AGM (Q&BE)	Approved By Customer Signature & Stamp
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	MANUFACTURER'S NAME & ADDRESS	SITE ACTIVITIES QUALITY PLAN		PROJECT: GAIL, USAR PACKAGE: Reaction Charge Heater SO NO: 7933 Customer PO : GAIL/ND/C&P/PDH-PP/HEATER/ W400/2022/FOA/458 Dt. 19-05-2022	
	BHEL-VISAKHAPATNAM or Approved Sub-Contractor	ITEM: Reaction Charge Heater TAG No: 101-FF-1001	QP NO: CQP 2532 Rev 00 Date: 02.12.2022 PAGE 3 of 8		

SL No	COMPONENT & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								M	C	N	
1	2	3	4	5	6	7	8	D			

3.0	FABRICATION INPROCESS INSPECTION and NDE (Refer Execution Philosophy enclosed)										
3.1	Edge preparation of welds	Soundness	Visual & LPI	100%	BHEL Drawing	Report	v	P	QC & NDT	-	
3.2	Fit up inspection	Weld angle, mis-match, root gap etc.	Visual & Dimension	100%	BHEL Drawing	Report	v	P	QC	R	
3.3	Pre heat as per WPS	Temperature	Verification	100%	Drawing / WPS / Specification	Report	v	P	QC	R	
3.4	PT of Root and final welds of all butt and fillet joints	Soundness	PT	100%	Customer Specification	PT Report		P	NDT	*	*Random check
3.5	PWHT as per WPS	Time & Temperature	Verification	100%	Drawing / WPS / Specification	Report/ Chart	v	P	QC	V	
3.6	Hardness check (if applicable) as per WPS after PWHT	Hardness	Verification	100%	Drawing / WPS / Specification	Report	-	P	QC	V	
3.7	Weld Visual before RT	Soundness	Visual	100%	As per drawing	Report		P	QC	-	

Prepared by  P. Gopi Kishore / Manager/QA	Reviewed & Approved By  A.K. Mandal/ AGM (Q&BE)	Approved By Customer Signature & Stamp
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	MANUFACTURER'S NAME & ADDRESS	SITE ACTIVITIES QUALITY PLAN		PROJECT: GAIL, USAR PACKAGE: Reaction Charge Heater SO NO: 7933 Customer PO : GAIL/ND/C&P/PDH-PP/HEATER/ W400/2022/FOA/458 Dt. 19-05-2022	
	BHEL-VISAKHAPATNAM or Approved Sub-Contractor	ITEM: Reaction Charge Heater TAG No: 101-FF-1001	QP NO: CQP 2532 Rev 00 Date: 02.12.2022 PAGE 4 of 8		

SL No	COMPONENT & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								M	C	N	
1	2	3	4	5	6	7	8	D			

3.8	RT of Butt welds in Radiant & Convection coils, Cross-over lines etc.,	Soundness	RT	100%	Customer Specification	RT Report	V	P	NDT	V	V-Random check
3.9	Surface preparation & Painting	Visual, DFT etc.,	Verification	100%	Customer Specification & BHEL Drawing / Painting Specification	Painting report	V	P	QC	W	
4.0	ERECTION										
4.1	Lifting Arrangement	Adequacy	Verification	100%	Customer Specification & BHEL Drawing / Specifications	-	V	P	QC	R	
4.2	Inspection of foundation for cleanliness	Free from foreign materials	Verification	100%	Customer Specification & BHEL Drawing / Specifications	Report	-	P	QC	R	
4.3	Alignment & Levels / Correctness of Location & orientation of branches / bracing, lugs, ladders etc	Dimensions	Verification	100%	Customer Specification & BHEL Drawing	Report	V	P	QC	W	

Prepared by  P. Gopi Kishore / Manager/QA	Reviewed & Approved By  A.K. Mandal/ AGM (Q&BE)	Approved By Customer Signature & Stamp
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	MANUFACTURER'S NAME & ADDRESS		SITE ACTIVITIES QUALITY PLAN				PROJECT: GAIL, USAR			
	BHEL-VISAKHAPATNAM or Approved Sub-Contractor		ITEM: Reaction Charge Heater QP NO: CQP 2532 Rev 00 TAG No: 101-FF-1001 Date: 02.12.2022 PAGE 5 of 8				PACKAGE: Reaction Charge Heater SO NO: 7933 Customer PO : GAIL/ND/C&P/PDH-PP/HEATER/ W400/2022/FOA/458 Dt. 19-05-2022			

SL No	COMPONENT & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								M	C	N	
1	2	3	4	5	6	7	8	D			

4.4	Fit up and Dimensional Check	Alignment, mismatch etc.	Visual & Dimension	100%	BHEL Drawing	Report	√	P	QC	RW	
4.5	Provision of instrument tappings, vents, drains, Lapping of RTJ flange face gasket etc as applicable	Correctness	Visual	100%	As per drawing	Report	-	P	QC	V	
4.6	Weld Visual	Soundness	Visual	100%	As per drawing	Report	-	P	QC	R	
4.7	Correctness of type of support, anchor, guides etc., Gaskets and fasteners, Valves and steam traps as applicable.	Correctness	Visual	100%	As per drawing	Report	√	P	QC	R	
4.8	Bolt tensioning / Torqueing / Manual tightening as applicable	Correctness	Visual	100%	As per drawing	Report	-	P	QC	R	

Prepared by  P. Gopi Kishore / Manager/QA	Reviewed & Approved By  A.K. Mandal/ AGM (Q&BE)		Approved By Customer Signature & Stamp
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	MANUFACTURER'S NAME & ADDRESS		SITE ACTIVITIES QUALITY PLAN				PROJECT: GAIL, USAR			
	BHEL-VISAKHAPATNAM or Approved Sub-Contractor		ITEM: Reaction Charge Heater TAG No: 101-FF-1001		QP NO: CQP 2532 Rev 00 Date: 02.12.2022 PAGE 6 of 8		PACKAGE: Reaction Charge Heater SO NO: 7933 Customer PO : GAIL/ND/C&P/PDH-PP/HEATER/ W400/2022/FOA/458 Dt. 19-05-2022			

SL No	COMPONENT & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								M	C	N	
1	2	3	4	5	6	7	8	D			

5.0	REFRACTORY & INSULATION WORK										
5.1	Clearance prior to start of Refractory work	Mechanical Completeness	Visual, Measurement	100%	BHEL Drawing, EIL Specification & approved Drawings as applicable	Inspection Report	√	P	QC	W	
5.2	Refractory application & Dry out	Completeness	Visual, Measurement	100%	Approved Refractory Procedure, Execution Philosophy, EIL Specification as applicable	Inspection Report	√	P	QC	W	
5.3	Clearance prior to start of Insulation work	Mechanical Completeness	Visual, Measurement	100%	BHEL Drawing, EIL Specification & approved Drawings as applicable	Inspection Report	√	P	QC	W	
5.4	Insulation application	Completeness	Visual, Measurement	100%	Approved Insulation Procedure, Execution Philosophy, EIL Specification as applicable	Inspection Report	√	P	QC	W	

Prepared by  P. Gopi Kishore / Manager/QA	Reviewed & Approved By  A.K. Mandal/ AGM (Q&BE)	Approved By Customer Signature & Stamp
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	MANUFACTURER'S NAME & ADDRESS		SITE ACTIVITIES QUALITY PLAN				PROJECT: GAIL, USAR PACKAGE: Reaction Charge Heater SO NO: 7933 Customer PO : GAIL/ND/C&P/PDH-PP/HEATER/ W400/2022/FOA/458 Dt. 19-05-2022			
	BHEL-VISAKHAPATNAM or Approved Sub-Contractor		ITEM: Reaction Charge Heater QP NO: CQP 2532 Rev 00 TAG No: 101-FF-1001 Date: 02.12.2022 PAGE 7 of 8							

SL No	COMPONENT & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
								M	C	N	
1	2	3	4	5	6	7	8	D			

6.0	FINAL INSPECTION & TESTING										
6.1	Visual & Dimensional check	Visual & Dimensions	Visual Measurement	100%	BHEL Drawing	Inspection Report	√	P	QC	W	
6.2	Flushing and cleaning	Free from debris / foreign objects	Verification	100%	Customer Specification & BHEL Drawing	Report	√	P	QC	W	
6.3	Hydro test, Draining and Drying	Soundness	Visual & Leak check	100%	Customer Specification & BHEL Drawing	Hydro test report	√	P	QC	W	Refer Note 1
6.4	Surface preparation & Painting	Visual, DFT	Verification	100%	Customer Specification & BHEL Drawing / Painting Specification	Painting report	√	P	QC	W	
6.5	Spares (as applicable)	Availability	Verification	100%	Customer Specification & BHEL Drawing	Reports	√	P	QC	W	IRN to be issued by TPI.
6.6	Document Folder	Documents	Verification	100%	Customer Specification & BHEL Drawing	Records		P	QC	V	

NOTES:

- 1) Hydro test of only Radiant coils & convection coils will be done after completion of site welds. After hydro test in coils, dry / hot air shall be used for cleaning.
- 2) Quality Plan for Supplied Items (CQP 2531) is submitted separately.
- 3) Dispatch Instruction (DI); Inspection Release Notes to be produced for IMIR Clearance excluding consumables i.e Paints, Welding electrodes etc.

Prepared by  P. Gopi Kishore / Manager/QA	Reviewed & Approved By  A.K. Mandal/ AGM (Q&BE)		Approved By Customer Signature & Stamp
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		MANUFACTURER'S NAME & ADDRESS BHEL-VISAKHAPATNAM or Approved Sub-Contractor		SITE ACTIVITIES QUALITY PLAN ITEM: Reaction Charge Heater QP NO: CQP 2532 Rev 00 TAG No: 101-FF-1001 Date: 02.12.2022 PAGE 8 of 8			PROJECT: GAIL, USAR PACKAGE: Reaction Charge Heater SO NO: 7933 Customer PO : GAIL/ND/C&P/PDH-PP/HEATER/ W400/2022/FOA/458 Dt. 19-05-2022					
SL No	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
									M	C	N	
1	2	3	4	5	6	7	8	D				

LEGEND:

P: Perform	TDC: Technical Delivery Condition	PQR: Procedure Qualification Record	QC: Quality Control
R: Review	TC: Test Certificate	WQR: Welder Qualification Record	NDT: Non-Destructive Testing
W: Witness	AWS: American Welding Society	RT: Radiographic testing;	M: BHEL/Approved sub-contractor
RW: Random Witness	WPS: Welding Procedure Specification	LPI: Liquid Penetrant Inspection	C: BHEL /Authorized Field Quality Control Engineer
V: Verification	For clauses marked with (TICK) in "D", Certificates shall be included in Documentation.	PMI: Positive Material Identification	N: TPIA Representing Customer (appointed by BHEL as per present contract)

Prepared by  P. Gopi Kishore / Manager/QA	Reviewed & Approved By  A.K. Mandal/ AGM (Q&BE)		Approved By Customer Signature & Stamp
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Painting Schedule for Heater Package

Project : Reactor Charge Heater for M/s GAIL-USAR
Doc.No.: 7933-PAINT-SCH-001 (SHT-1 of 2) / Rev-B
EIL Job No.: B378

S.No.	DESCRIPTION	SURFACE PREPARATION & PROFILE	Temp. applicable Deg C	Coating type/system	PRIMER COAT		FINISH COAT		TOTAL DFT $\mu\text{m}/\text{min}$	Color code
					PAINT	NO OF COATS / DFT	PAINT	NO OF COATS / DFT		
1	Heater Casing plate, Columns and structural stiffeners in contact with heater casing & Stack shell with stiffeners, H-Box plate, Duct stiffeners & Supports Steel MOC:IS 2062	SSPC-SP-10	≤ 250	Spray	F-9 @ 65-75 μ DFT/Coat	1 coat of F-9	F-12 @ 20 μ DFT/Coat	2 coats of F-12	105-115	Heat resistant aluminum 9006
2	Stair tower & APH support structure and platform support beams, & misc. structures Steel MOC:IS 2062	SSPC-SP-10	≤ 80	Spray	F-9 @ 65-75 μ DFT/Coat + P-6 @ 40 μ DFT/coat (Tie/ Mist Coat)	1 coat of F-9 + 1 coat of P-6	F-6B @ 100 μ DFT/Coat + F-2 @ 40 μ DFT/Coat	2 coats of F-6B + 1 coat of F-2	345-355	Steel grey 7011
3	Radiant Shell Inside (*) Steel MOC:IS 2062	SSPC-SP-7 or SP-3	175	Spray	F-15 @ 75-100 μ DFT/Coat	1 coat of F-15	F-15 @ 75 μ DFT/Coat	2 coats of F-15	225	Heat resistant aluminum 9006
4	Stair stringers and Chequered plates Steel MOC:IS 2062	SSPC-SP-10	≤ 80	Spray	F-9 @ 65-75 μ DFT/Coat + P-6 @ 40 μ DFT/coat (Tie/ Mist Coat)	1 coat of F-9 + 1 coat of P-6	F-6B @ 100 μ DFT/Coat + F-2 @ 40 μ DFT/Coat	2 coats of F-6B + 1 coat of F-2	345-355	Black 9005
5	Hand railing, Ladder vertical post (Except hand rail post which is covered above) Steel MOC:IS 2062, Pipes: IS 1239	SSPC-SP-10	≤ 80	Hot dip galvanizing + spray paint	Hot Dip Galvanizing to 80-85 microns as per ISO 14713-2/ ISO 1461 + 1 coat of P-6 @ 40 μ DFT/coat		F-2 @ 40 μ DFT/Coat	1 coat	80 (excluding galvanizing)	Signal red 3001
6	Ladder rungs, Ladder cage, Handrail posts Steel MOC:IS 2062, Pipes: IS 1239	SSPC-SP-10	≤ 80	Hot dip galvanizing + spray paint	Hot Dip Galvanizing to 80-85 microns as per ISO 14713-2/ ISO 1461 + 1 coat of P-6 @ 40 μ DFT/coat		F-2 @ 40 μ DFT/Coat	1 coat	80 (excluding galvanizing)	Black 9005
7	Gratings Steel MOC:IS 2062	SSPC-SP-10	≤ 80	Hot dip galvanizing + spray paint	Hot Dip Galvanizing to 80-85 microns as per ISO 14713-2/ ISO 1461 + 1 coat of P-6 @ 40 μ DFT/coat		F-2 @ 40 μ DFT/Coat	1 coat	80 (excluding galvanizing)	Black 9005
8	Cold Air Duct Inside Surface Steel MOC:IS 2062	SSPC-SP-10	<80	Spray	F-9 @ 65-75 μ DFT/Coat	1 coat of F-9	F-6A @ 100 μ DFT/Coat + F-2 @ 50 μ DFT/Coat	1 coat of F-6A + 1 coat of F-2	225	Steel grey 7011
9	Cold Air Duct outside Surface Steel MOC:IS 2062	SSPC-SP-10	<80	Spray	F-9 @ 65-75 μ DFT/Coat + P-6 @ 40 μ DFT/coat (Tie/ Mist Coat)	1 coat of F-9 + 1 coat of P-6	F-6A @ 100 μ DFT/Coat + F-2 @ 40 μ DFT/Coat	2 coats of F-6B + 1 coat of F-2	345-355	Steel grey 7011

F-6B

Painting Schedule for Heater Package



BHARAT HEAVY ELECTRICALS LTD .
Heavy Plates & Vessels Plant
Visakhapatnam - 530 012

Project : Reactor Charge Heater for M/s GAIL-USAR

Doc.No.: 7933-PAINT-SCH-001 (SHT-2 of 2) / Rev -B

EIL Job No.: B378

S.No.	DESCRIPTION	SURFACE PREPARATION & PROFILE	Temp. applicable Deg C	Coating type/system	PRIMER COAT		FINISH COAT		TOTAL DFT $\mu\text{m}/\text{min}$	Color code
					PAINT	NO OF COATS / DFT	PAINT	NO OF COATS / DFT		
10	Hot Air / Bypass Duct Inside & Outside Surface, FLUE GAS DUCT outside Surface Steel MOC:IS 2062	SSPC-SP-10	400	Spray	F-12 @ 20 μ DFT/Coat	2 coats of F-12	F-12 @ 20 μ DFT/Coat	2 coats of F-12	80	Steel grey 7011
11	FLUE GAS DUCT Inside Surface (*) Steel MOC:IS 2062	SSPC-SP-10	175	Spray	F-15 @ 75-100 μ DFT/Coat	1 coat of F-15	F-15 @ 75 μ DFT/Coat	2 coats of F-15	225	Steel grey 7011

Notes:

- 1) No overcoating to be done on F-9 as it will lead to mud cracking
- 2) All primers and finish coats should be ambient temperature curing and air drying unless otherwise specified.
- 3) For Stack inside shell, 3mm Coating of potassium silicate mortar (as per IS 4832 part-1) before application of castable lining (supply & application by Refractory vendor)
- 4) (*) -Radiant Shell Inside Surface & Flue Gas Duct Inside Surface – Paint is in scope of Insulation & Refractory Vendor scope.
- 5) Radiant:
 - a) Sidewalls & Arch : CF Module(Type-IA) & CF Blanket
 - b) Floor: Castable & Brick lining.
- 6) Convection:
 - a) Sidewalls: Insulating Castable(Type-III) & CF Board
 - b) Breaching: Insulating Castable(Type-III)
- 7) Stack:
 - Insulating castable(Type-V).
- 8) Ducting:
 - a) HFG – Inside Cashable Lining(Type-III).
 - b) CFG – Internal lining(50mm AL dense Castable), External Mineral wool Insulation.
 - c) Hot Air Ducts & BP2 – Internal Castable lining & External Mineral Wool Insulation.
 - d) BP1 –External Mineral Wool Insulation.



Rev-B -MOC added, Refractory & Insulation details covered in Note 5 to 8