



Toase-ehe Park Sanati Gohar Ofogh
Petrochemical Co.
**CONCEPTUAL, BASIC and DETAIL DESIGN
ENGINEERING OF STYRENE PARK OFFSITE**



Document Title: Chiller (Evaporator) Outline Drawing

Document No.: EI027-HSE-VD – ME– DWG– 008- R2

Rev. R2

Page 1 of 10

STYRENE PARK OFFSITE

Document Title:

Chiller (Evaporator) Outline Drawing

Rev.	Issued Date	DESCRIPTION	PREPARED	CHECKED	APPROVED
R2	16-09-2024	IFA	F.sh	M.O	A.M
R1	08-07-2024	IFA	F.sh	M.O	A.M
R0	15-05-2024	IFA	F.sh	M.O	A.M



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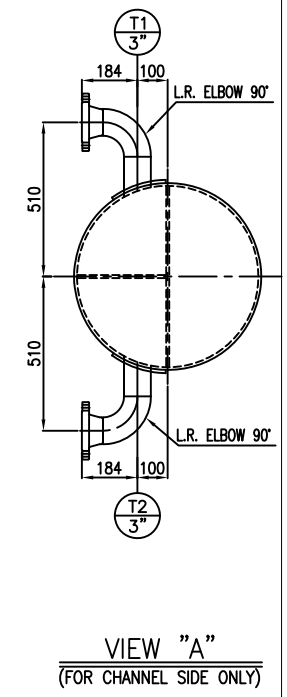
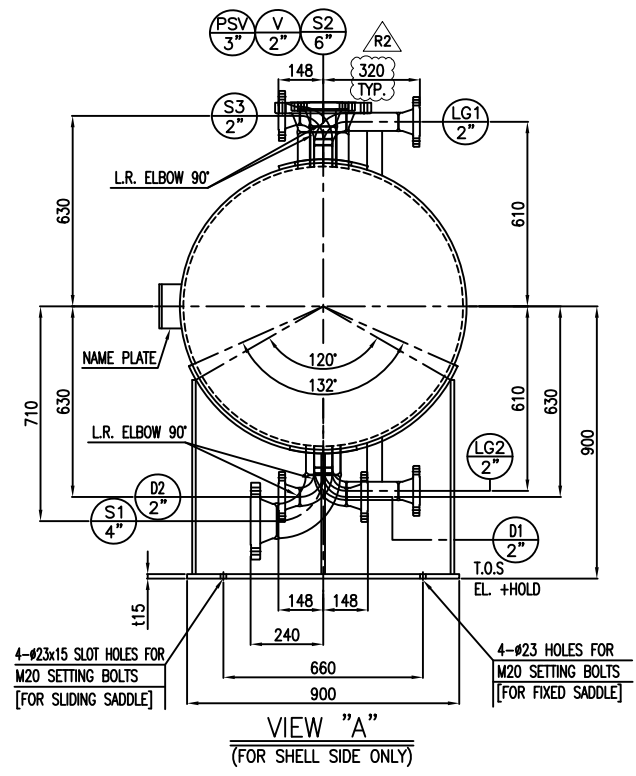
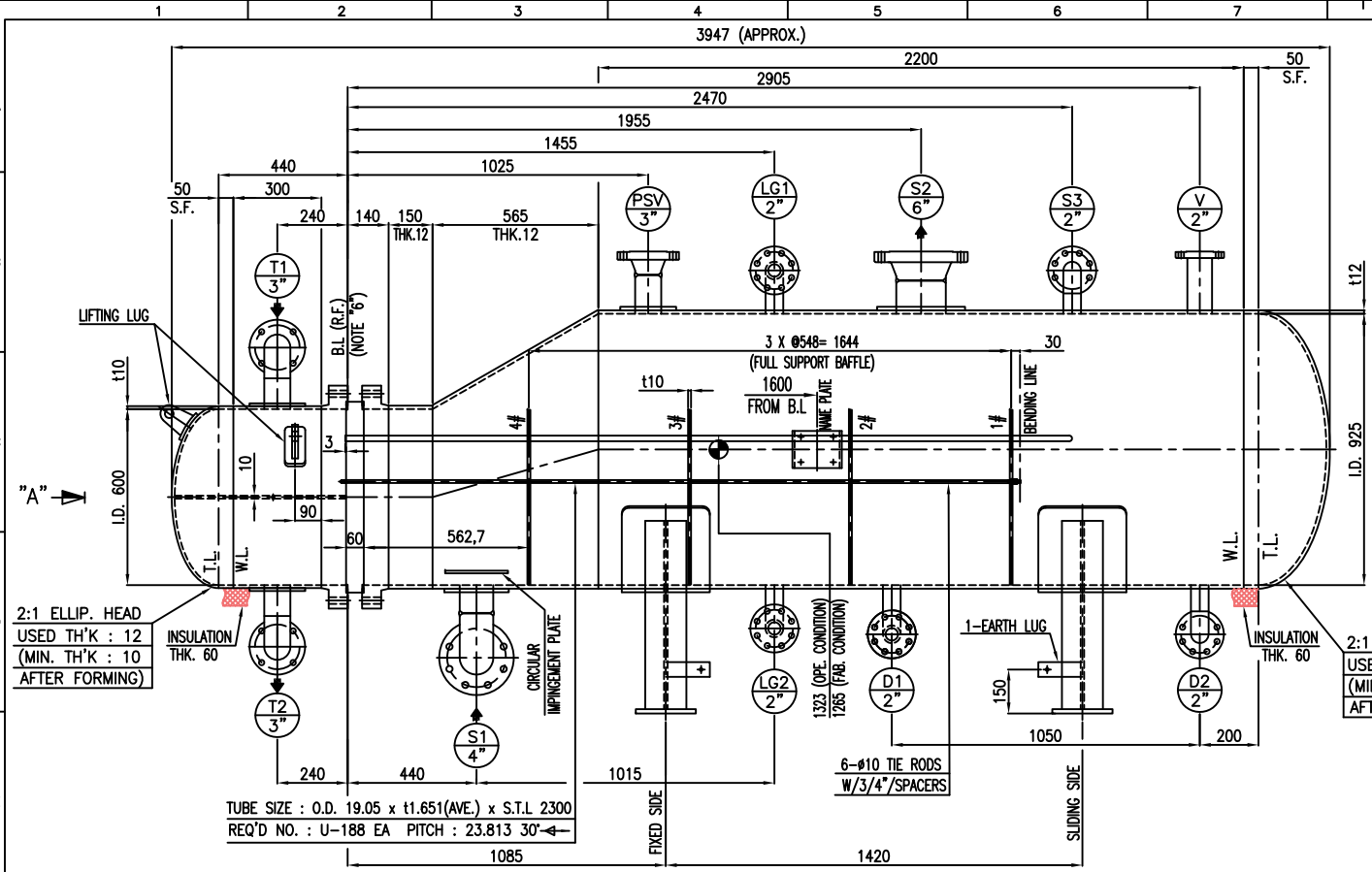
Document No.: EI027-HSE-VD – ME– DWG– 008- R2

Rev. R2

Page 2 of 10

REVISION RECORD SHEET

Page Page	Revisions							Page	Revisions						
	R0	R1	R2	R3	R4	R5	R6		R0	R1	R2	R3	R4	R5	R6
1	X							41							
2	X							42							
3	X							43							
4	X							44							
5	X							45							
6	X							46							
7	X							47							
8	X							48							
9	X							49							
10	X							50							
11								51							
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37								77							
38								78							
39								79							
40								80							



2:1 ELLIP. HEAD USED TH'K : 12 (MIN. TH'K : 10 AFTER FORMING)

INSULATION THK. 60

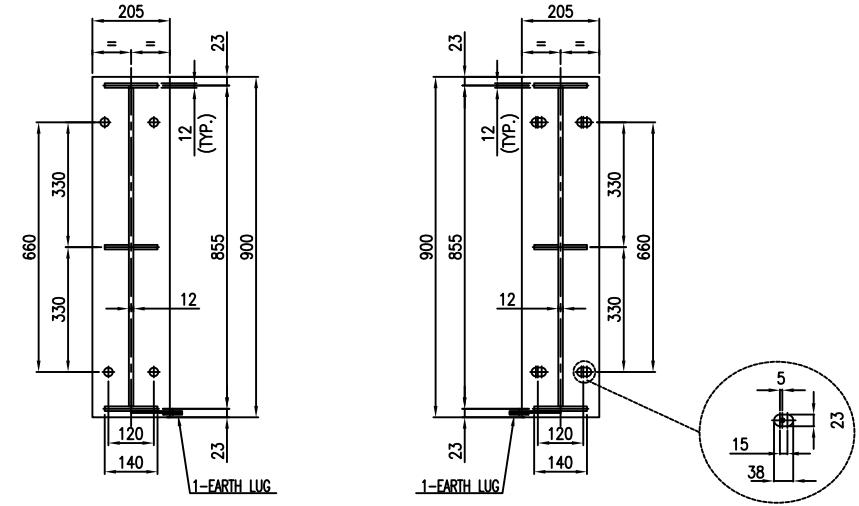
3 X Ø548= 1644 (FULL SUPPORT BAFFLE) 1600 FROM B.L.

1-EARTH LUG

6-#10 TIE RODS W/3/4" SPACERS

TUBE SIZE : O.D. 19.05 x t1.651(AVE.) x S.T.L. 2300

REQ'D NO. : U-188 EA PITCH : 23.813 30"



- NOTES
- UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MILLIMETERS.
 - UNLESS OTHERWISE NOTED OUTSIDE PROJECTION OF NOZZLES ARE MEASURED FROM C.L. OF EXCHANGER TO THE EXTREME FACE OF NOZZLE.
 - ALL WELDS CONTINUOUS EXCEPT NOTED.
 - BOLT HOLES FOR FLANGES SHALL BE STRADDLED TO EQUIPMENT MAIN AXIS.
 - ALL R.F. FLANGES SHALL HAVE SMOOTH FINISH FACING WITH RA= 3.2mm TO RA= 6.3mm.
 - BASE LINE (B.L.) INDICATES THE GASKET CONTACT SURFACE OF TUBE SHEET.
 - REINFORCING PADS FOR NOZZLES SHALL BE TAPPED WITH AT LEAST ONE (1) TELL TALE HOLE NPT 1/4" WITH VENT PIPE.
-
- DIMENSIONS REFER TO BAFFLES ARE MEASURED FROM C.L. OF EACH PLATE.
 - GASKET MATERIAL FOR ASME B16.20. SPIRAL WOUND (t4.5)
 - FILLER: GRAPHITE
 - INNER RING: 304 S.S.
 - HOOP: 304 S.S.
 - OUTER RING: 304 S.S.
 - GASKET MATERIAL: SPIRAL WOUND (t4.5)
 - FILLER: GRAPHITE
 - INNER RING: 304 S.S.
 - HOOP: 304 S.S.
 - SPARE PART (OPTIONAL)
- | | CONSTRUCTION & COMMISSIONING |
|-------------------|------------------------------|
| GASKETS | 100% |
| STUD BOLTS & NUTS | 5% (MIN. 2SETS) |
- ALL EXPOSED SURFACE SHALL BE PAINTED AS FOLLOWS: EXPOSED SURFACE FOR EXTERNAL PARTS: E1027-HSE-VD-QC-PRO-002
 - EXPOSED SURFACE OF INTERNAL: NOT PARTS REQUIRED
 - 1/1.4 FACTOR FOR LOAD COMBINATION HAS BEEN APPLIED
 - TUBES SHALL BE SEAMLESS
 - GASKET CONTACT SURFACE OF TUBE SHEET & GIRTH FLANGE: RA= 1.6µm (MAX)
 - FURTHER DETAILS TO BE ADDED FOR DISCLAIMER PURPOSES SUCH AS AFTER HYDROTEST TO BE CLEANED AND DRIED.

REFERENCE DRAWING	DWG NO.	REV.
-	-	-

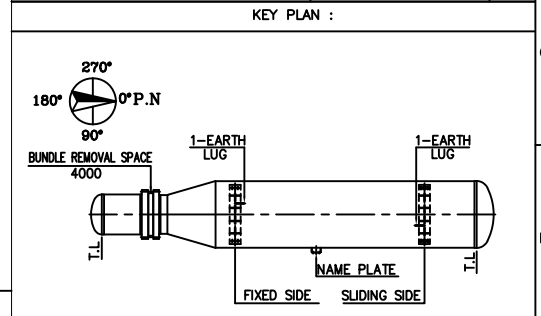


TABLE FOR FOUNDATION LOAD DATA

WIND		SEISMIC (NOTE 13)	
SHEAR (kgf)	MOMENT (kgf-m)	SHEAR (kgf)	MOMENT (kgf-m)
478	430	970	873

MATERIALS

SHELL		GENERAL	
BARREL	SA516-70N	SLIDING BAR/ROD	SA516 70/SA36
FLANGES	SA350-LF2 CL.1N	SEALING STRIP	SA516 70
NOZZLE FROM PIPE	SA333-6	DUMMY TUBE/SEAL ROD	-
NOZZLE FROM PLATE	SA516-70N	BLUNDED NOZZLE BOLT/NUT	SA320 L7/SA194-4
NOZZLE FLANGES	SA350-LF2 CL.1N	BLUNDED NOZZLE GASKET	SEE NOTE "9"
COUPLINGS & PLUGS	-	TEST RING	SA-266 2
NOZZLE REINF. PAD	SA516-70N	G A S K E T S	
EXCHANGERS SUPPORTS	SA283-C	SHELL/COVER	-
SUPPORT WEAR PLATE	SA516-70N	SHELL/TUBESHEET	SEE NOTE "10"
STIFFENING RINGS	SA516-70N	CHANNEL/TUBESHEET	SEE NOTE "10"
EXPANSION JOINT	-	CHANNEL/COVER	-
LINING	-	FLOATING HEAD	-
SHELL COVER		FLOATING HEAD	
BARREL	-	COVER	-
COVER	-	FLANGES	-
FLANGES	-	SPLIT RING	-
CHANNEL		B O L T S & N U T S	
BARREL	SA516-70N	SHELL/COVER	-
FLANGES	SA266-2N	SHELL/CHANNEL	SA320-L7/SA194-4
COVER	SA516-70N	CHANNEL/COVER	-
FLAT COVER	-	FLOATING HEAD	-
NOZZLE FROM PIPE	SA106-B	SETTING BOLTS/NUTS	SA193 B7 / SA194 2H
NOZZLE REINF.	SA516-70N	T U B E B U N D L E	
NOZZLE FLANGES	SA105N	TUBES	SA334-6
COUPLINGS & PLUGS	-	TUBESHEETS	SA350-LF2 CL1N
NOZZLE REINF. PAD	SA516-70N	BAFFLES/SUPPORTS/MP. PLATE	SA516-70
PARTITION PLATES	SA516-70N	TIE RODS & SPACERS	SA36/SA179

DESIGN DATA

CODE	ASME SEC. VIII DV.1 (2021 ED.)	TYPE	H-BKU
TEMA CLASS	TEMA 10TH ED. (CLASS "R")	CODE STAMP	NO
LOCAL REGULATION	NO	WIND / SEISMIC CODE	UBC 97
FLUID	PROPANE STYRENE	WIND EXPOSURE / VELOCITY (km/h)	D / 125
DESIGN (INT.EXT.)	PRESS. barg 22/F.V. 6.8	Ca/Cv/Nv	0.4/0.56/1
	TEMP. (°C) 120/85	SEISMIC IMPORTANCE FACTOR/RESPONSE FACTOR	1.25 / 3
	STEAM OUT CONDITION -	INSULATION (TYPE/THK.)	COLD/60 COLD/60
OPER. (IN/OUT)	PRESS. barg 3.813 4.5	FIRE PROOFING (mm)	-
	TEMP. (°C) 1.24/1 15.2/5	PAINTING	SEE NOTE "12"
CORROSION ALLOWANCE (mm)	3	TUBE TO TUBESHEET JOINT	NEW EXPOSED WITH 2 GRINDS WITH SEAL WELD
JOINT EFFICIENCY (S/H)	1.0/1.0 1.0/1.0	NO. OF PASS	1(ONE) 4(FOUR)
RADIOGRAPHY (S/H)	FULL/FULL FULL/FULL	BUNDLE (KG)	840
HYDRO. TEST PRESS. (SHOP/FIELD)	barg 28.6/28.6 8.84/8.84	ERECTION (KG)	2,850
HYDRO. TEST TYPE	(U-200) NOTE (B) (U-200) NOTE (B)	EMPTY (KG)	2,850
PNEUM. TEST PRESS. barg	-	OPER. (KG)	4,250
M.D.M.T (°C)	-45 -29	FULL WATER (KG)	4,900
M.A.W.P (HOT & CORRODED) barg	22 6.8	SURFACE AREA/SHELL (M²)	61.76
M.A.P (NEW & COLD) barg	22 6.8	VOLUME (M³)	1.65 0.38
P.W.H.T	NO NO	FLUID DENSITY (kg/m³)	532.9 918.4
IMPACT TEST	NO NO	MEAN METAL TEMP. (°C)	- -
S.R OF HEAD AFTER COLD FORMING	YES YES		
		SHELL SIDE	TUBE SIDE

NOZZLE LIST

NOZZLE MARK	QTY / 1 SET	SIZE (INCH)	FLANGE RATING	SCH.	SERVICE	H/EX. C.L. PROJECTION	REINF. PAD TH'K	O.D.
S1	1	4"	ASME B16.5 300# WN.RF	120	SHELL SIDE INLET	SEE DWG.	12	220
S2	1	6"	ASME B16.5 300# WN.RF	80	SHELL SIDE OUTLET	675	12	300
T1	1	3"	ASME B16.5 150# WN.RF	80	CHANNEL SIDE INLET	SEE DWG.	10	190
T2	1	3"	ASME B16.5 150# WN.RF	80	CHANNEL SIDE OUTLET	SEE DWG.	10	190
D1	1	2"	ASME B16.5 300# LWN.RF	160	SHELL SIDE DRAIN	SEE DWG.	-	-
D2	1	2"	ASME B16.5 300# LWN.RF	160	OIL RECOVERY	SEE DWG.	-	-
LG1	1	2"	ASME B16.5 300# WN.RF	160	LEVEL GAUGE	SEE DWG.	-	-
LG2	1	2"	ASME B16.5 300# WN.RF	160	LEVEL GAUGE	SEE DWG.	-	-
PSV	1	3"	ASME B16.5 300# WN.RF	160	PRESSURE SAFETY VALVE	675	12	190
V	1	2"	ASME B16.5 300# LWN.RF	t16.6	VENT	675	-	-
S3	1	2"	ASME B16.5 300# WN.RF	160	SHELL SPARE/PURGE	SEE DWG.	-	-

LEGEND

B.L. = BASE LINE
 C.L. = CENTER LINE
 M.D.M.T. = MIN. DESIGN METAL TEMPERATURE
 N. = NORMALIZED
 O.T.L. = OUTER TUBE LINE
 C.O.G. = CENTER OF GRAVITY
 T.O.G. = TOP OF GROUTING
 W.P. = WORKING POINT

REV.	ISSUE DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
R2	09.14.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.
R1	06.27.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.
R0	04.21.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.

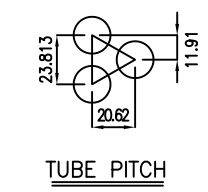
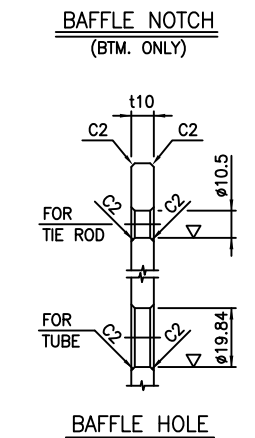
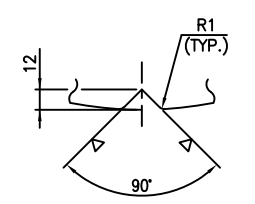
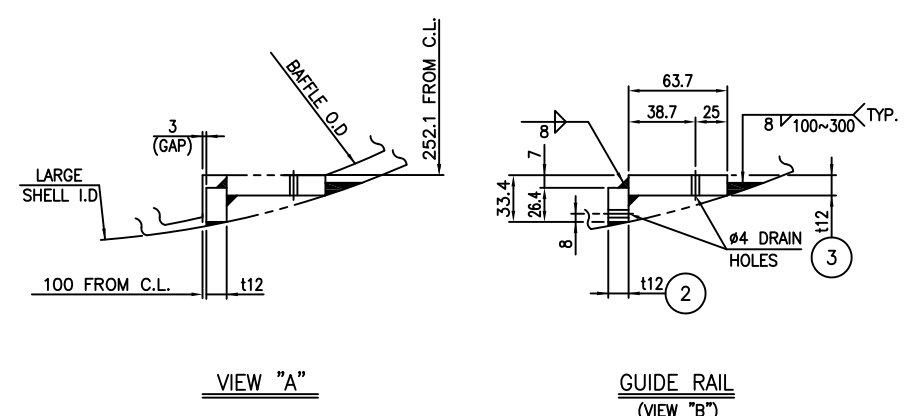
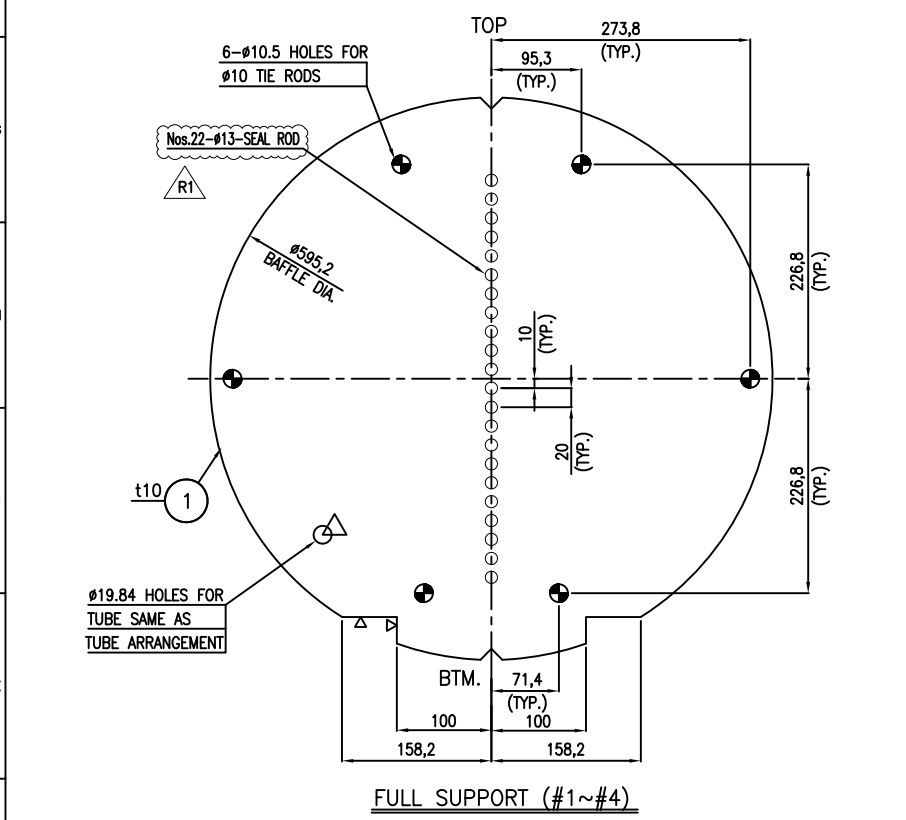
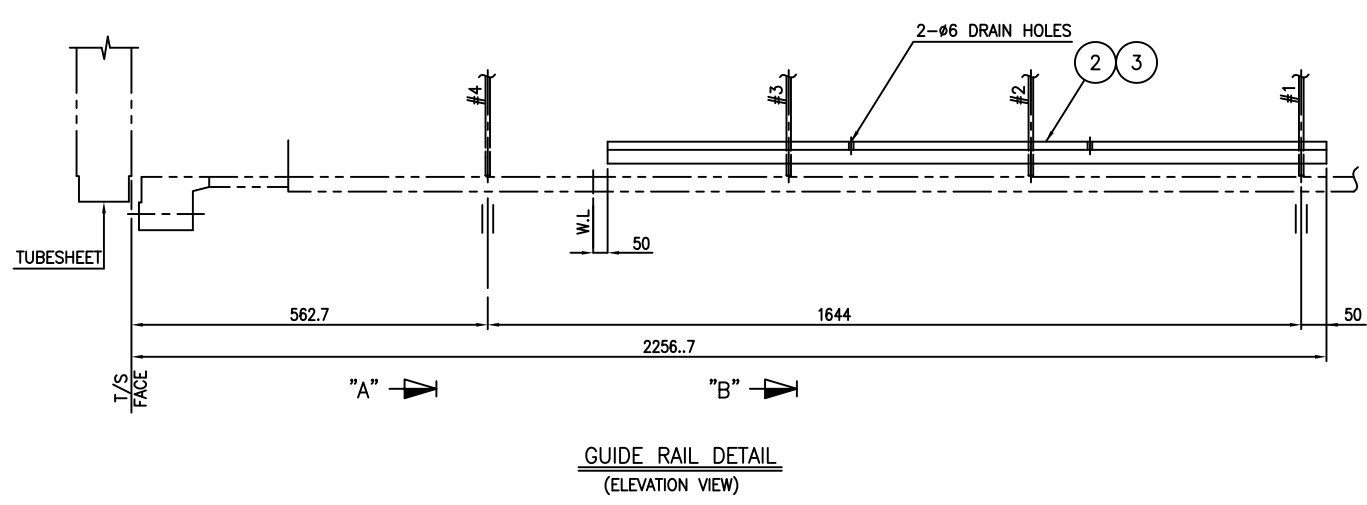
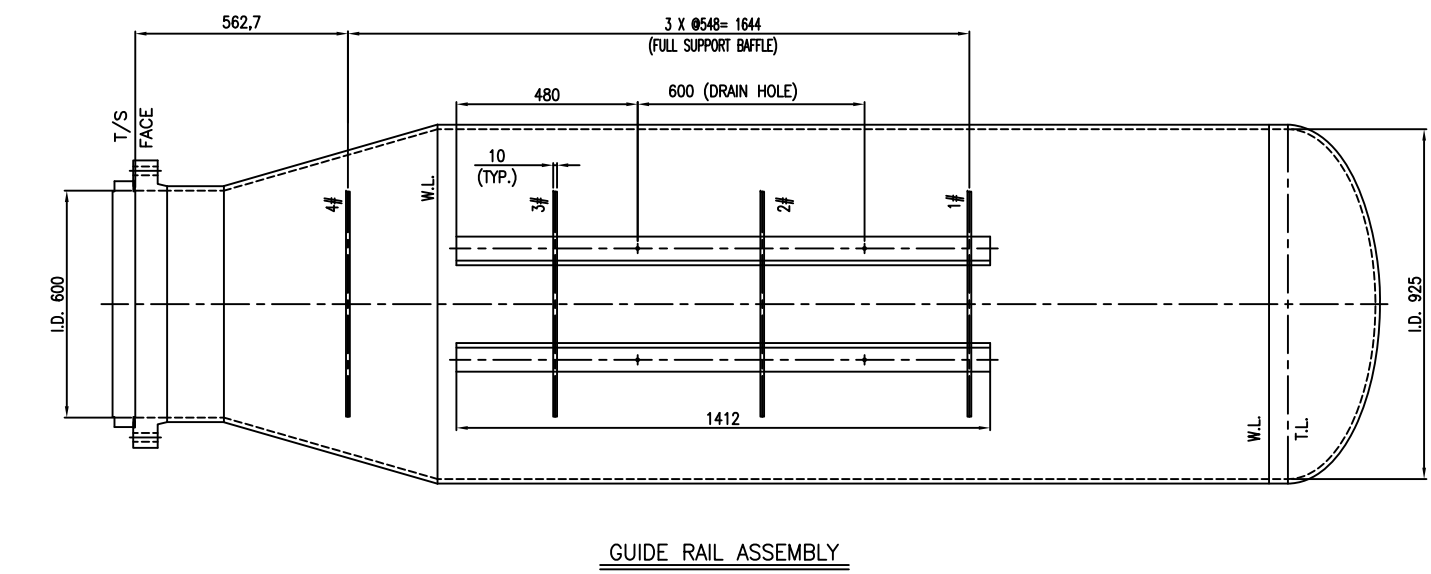
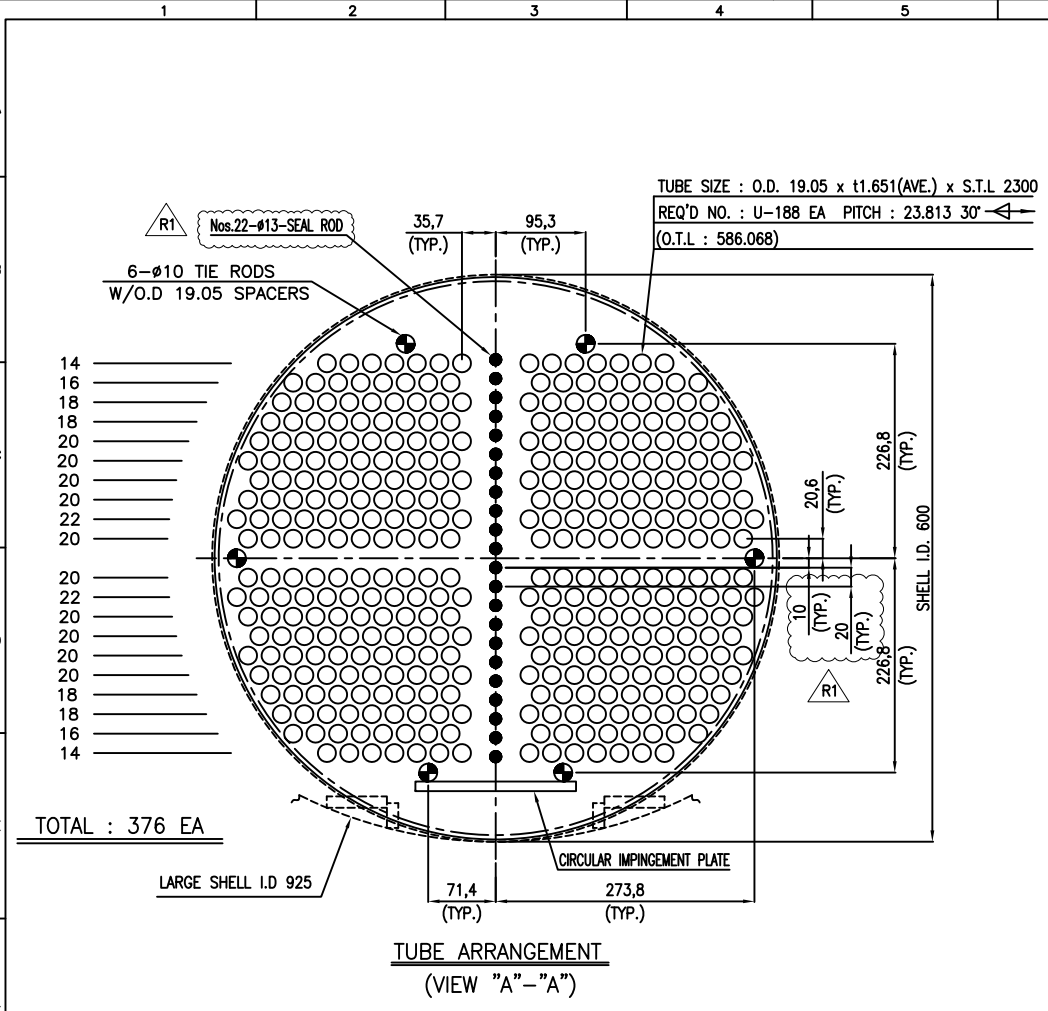
CLIENT

CONSULTING ENGINEER

PROJECT: **STYRENE PARK OFFSITE**

DRAWING TITLE: **GENERAL ARRANGEMENT DRAWING FOR CHILLER (EVAPORATOR)**

DRAWING NO.	REV.	SIZE	SCALE	SHEET
E1027-HSE-VD-ME-DWG-008	R2	A3	NTC	1 of 8



NOTES

1. UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MILLIMETERS.

* FOR ONE SET

3	GUIDE RAIL	SAS16-70M	2	t12 x 63.7 x 1412
2	GUIDE RAIL	SAS16-70M	2	t12 x 28.4 x 1412
1	FULL SUPPORT	SAS16-70	4	t10 x #595.2

PART NO.	PART NAME	MATERIAL	REGULAR SPARE		REMARK
			QUANTITY	SPECIFICATION	

BILL OF MATERIAL

REV.	ISSUE DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
R1	07.13.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.
R0	06.27.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.

CLIENT



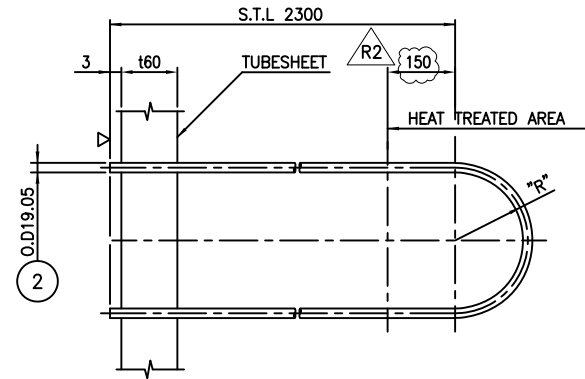
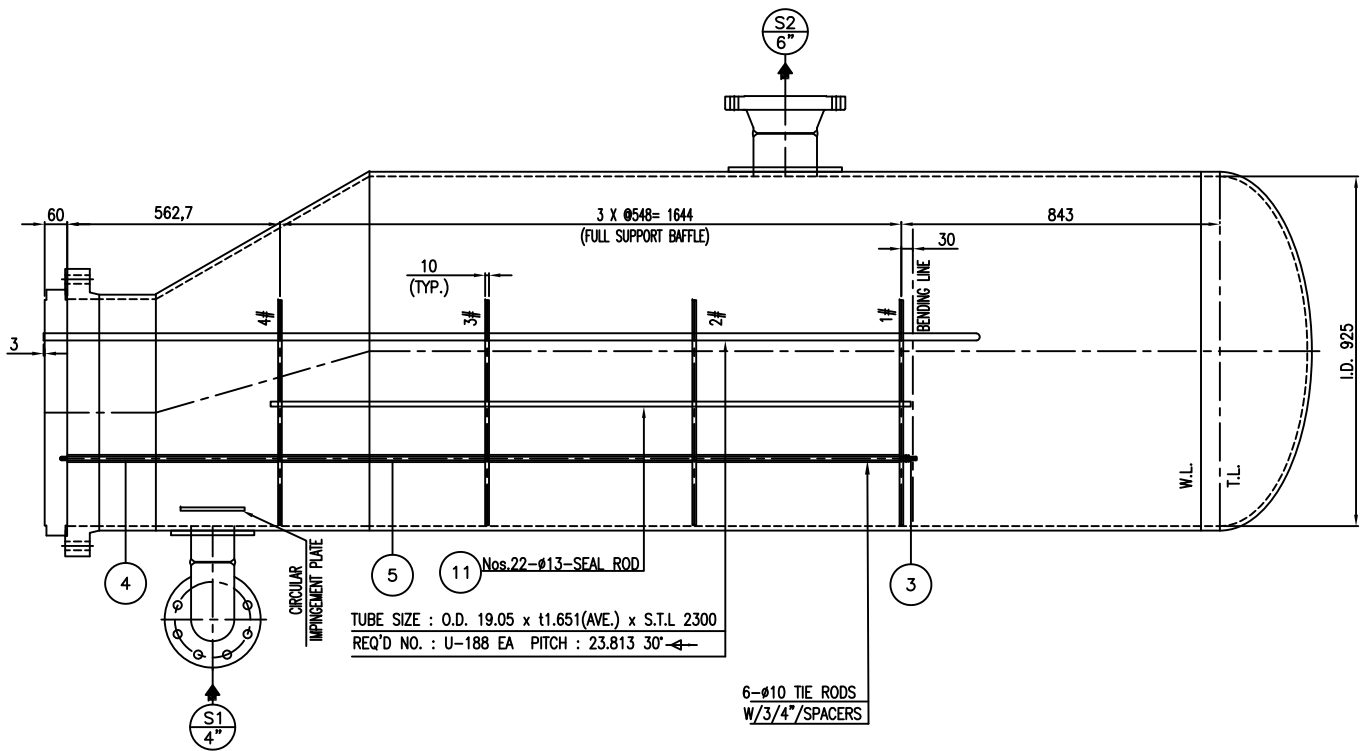
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 صنعتی گوهر المی

CONSULTING ENGINEER

PROJECT: **STYRENE PARK OFFSITE**

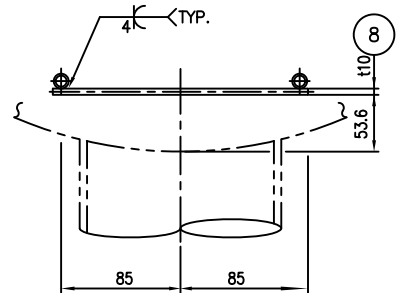
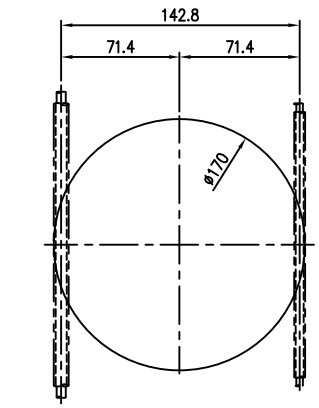
DRAWING TITLE: **BUNDLE DETAIL DRAWING FOR CHILLER (EVAPORATOR) (1/2)**

DRAWING NO.	REV.	SIZE	SCALE	SHEET
EIO27-HSE-VD-ME-DWG-008	R1	A3	NTC	3 of 8

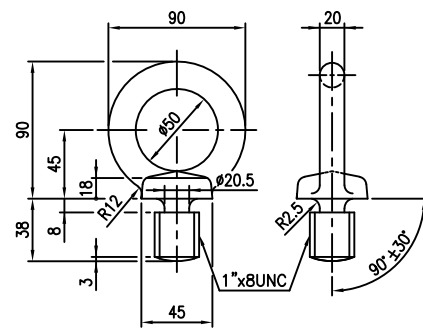


U-TUBE

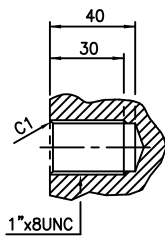
NO.	"R"	"L"	Q'TY
1	35.72	4712.2	10
2	47.63	4749.6	10
3	59.53	4787.0	10
4	71.44	4824.4	10
5	83.35	4861.8	10
6	95.25	4899.3	10
7	107.16	4936.7	10
8	119.07	4974.1	10
9	130.98	5011.5	10
10	142.88	5048.9	10
11	154.79	5086.3	10
12	166.70	5123.7	10
13	178.60	5161.1	10
14	190.51	5198.5	10
15	202.42	5235.9	8
16	214.33	5273.3	10
17	226.23	5310.7	8
18	238.14	5348.1	8
19	250.05	5385.5	6
20	261.95	5422.9	6
21	273.86	5460.4	2



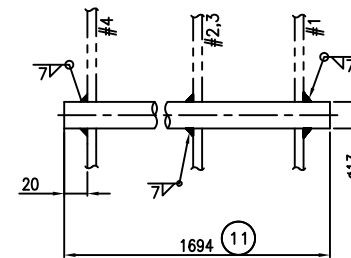
IMPINGEMENT PLATE



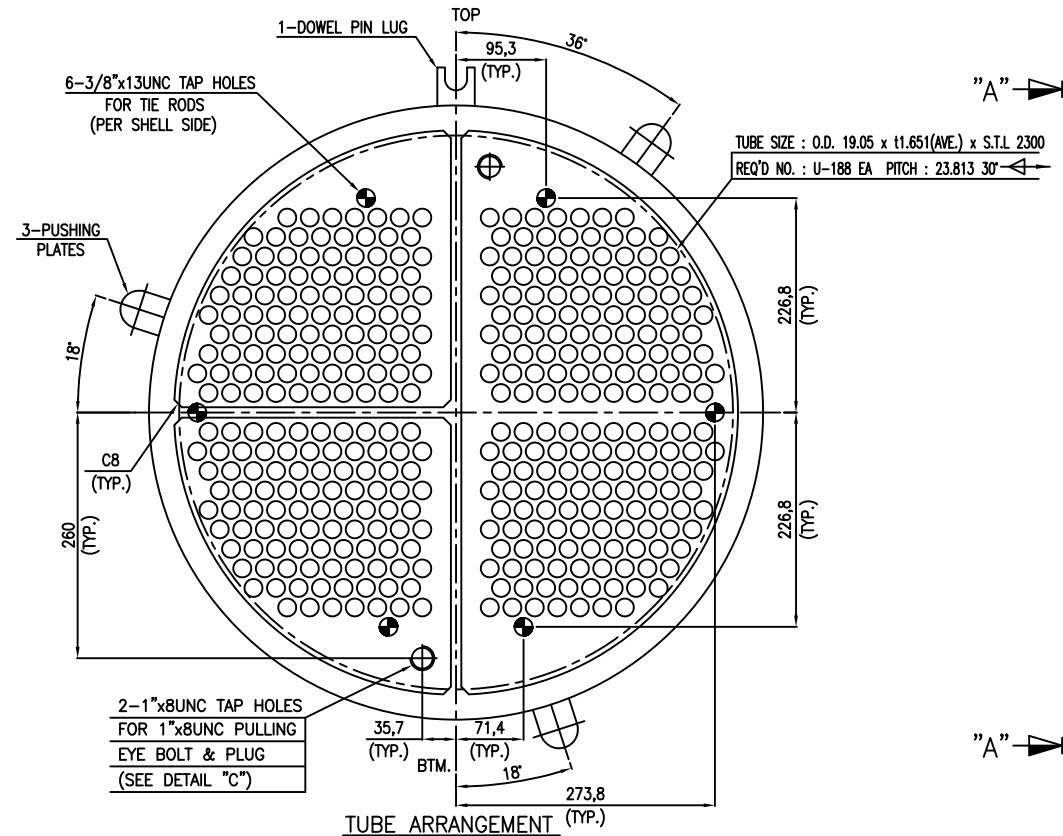
6 EYE BOLT



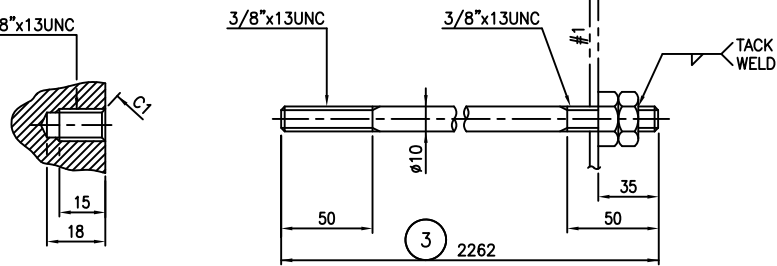
DETAIL "C"



SEALING ROD

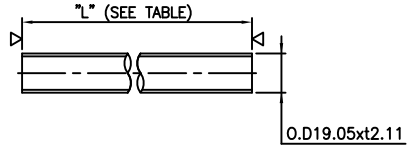


TUBE ARRANGEMENT (VIEW "A"- "A")



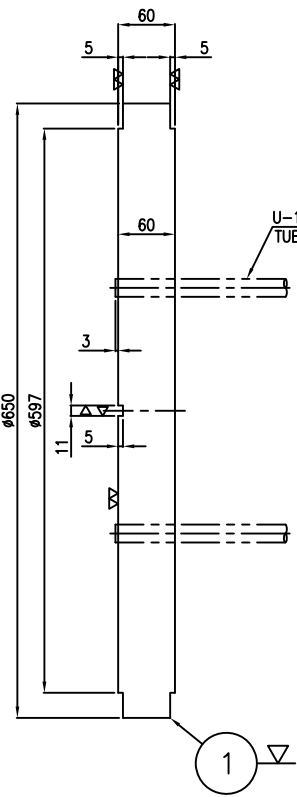
DETAIL "B"

TIE ROD & 2 NUTS

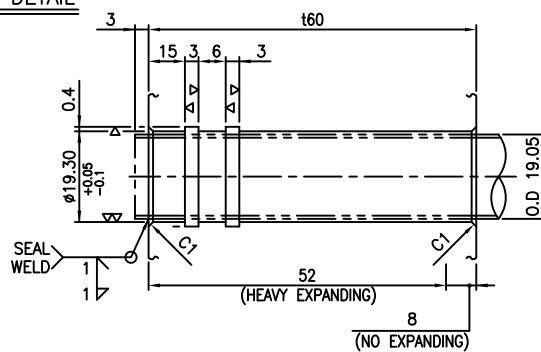


PART NO.	QTY	"L"
4	6	558
5	18	538

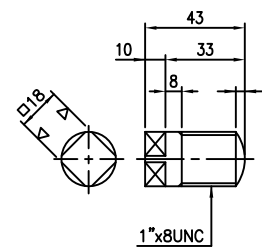
SPACER



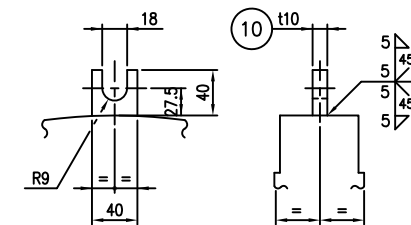
TUBESHEET DETAIL



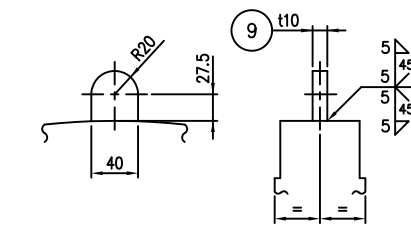
TUBE TO TUBESHEET JOINT



7 PLUG



DOWEL PIN LUG



PUSHING PLATE

NOTES

1. UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MILLIMETERS.

*** FOR ONE SET**

NO	DESCRIPTION	MATERIAL	QTY	SPECIFICATION	REMARK
11	SEAL ROD	SA-36	22	R.B. #13, L=1694	
10	DOWEL PIN LUG	SA516-70N	1	t10 x 40 x 40	
9	PUSHING PLATE	SA283-C	3	t10 x 34 x 47.5	
8	IMPINGEMENT PLATE	SA516-70N	1	t10 x Ø170	
7	PLUG	304 S.S	2	1"x8UNC	
6	EYE BOLT	SA36	2	1"x8UNC	
5	SPACER	SA334-6	18	Ø19.05 x t1.651 x L538	
4	SPACER	SA334-6	6	Ø19.05 x t1.651 x L558	
3	TIE ROD & 2NUTS	SA36/SA194-2H	6SETS	3/8"x13UNC (R180) x L282	
2	TUBE	SA334-6	U-188	Ø19.05 x t1.651(AVE.) x L2300	
1	TUBESHEET	SA350-LF2 CL.1N	1	t60x Ø650	

BILL OF MATERIAL

REV.	ISSUE DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
R2	09.14.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.
R1	07.13.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.
R0	06.27.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.

CLIENT



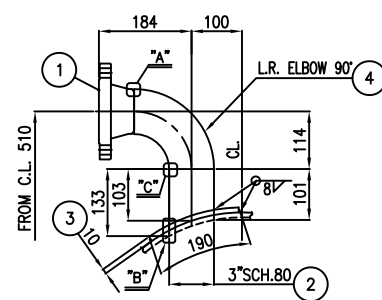
پتروشیمی توسعه پارک
صنعتی گوهر المی

CONSULTING ENGINEER

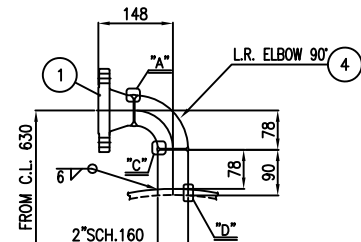
PROJECT: **STYRENE PARK OFFSITE**

DRAWING TITLE: **BUNDLE DETAIL DRAWING FOR CHILLER (EVAPORATOR) (2/2)**

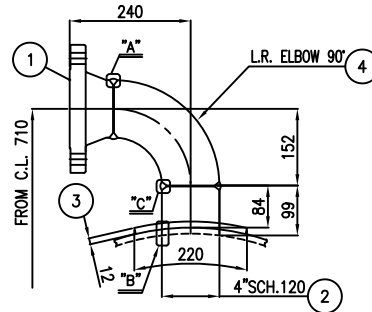
DRAWING NO.	REV.	SIZE	SCALE	SHEET
EIO27-HSE-VD-ME-DWG-008	R2	A3	NTC	4 of 8



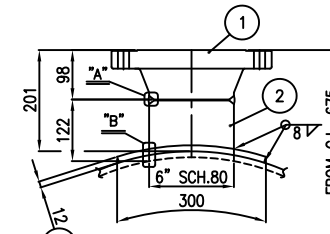
DETAIL OF $\begin{matrix} T1 \\ 3" \\ T2 \\ 3" \end{matrix}$



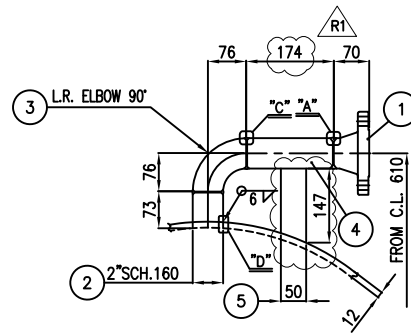
DETAIL OF $\begin{matrix} D1 \\ 2" \\ D2 \\ 2" \\ S3 \\ 2" \end{matrix}$



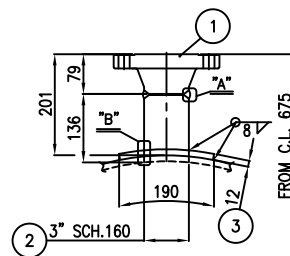
DETAIL OF $\begin{matrix} S1 \\ 4" \end{matrix}$



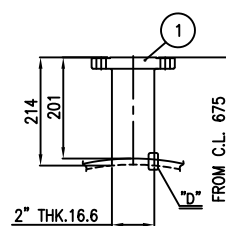
DETAIL OF $\begin{matrix} S2 \\ 6" \end{matrix}$



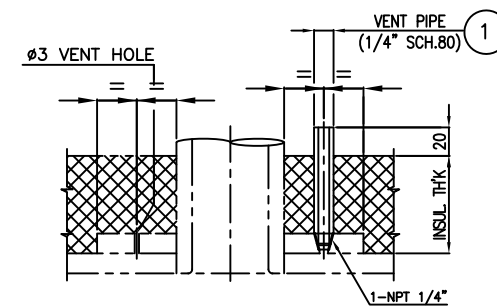
DETAIL OF $\begin{matrix} LG1 \\ 2" \\ LG2 \\ 2" \end{matrix}$



DETAIL OF $\begin{matrix} PSV \\ 3" \end{matrix}$



DETAIL OF $\begin{matrix} V \\ 2" \end{matrix}$



HOLES ON REINF. PAD
(SEE NOTE "2,3")

- NOTES**
- UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MILLIMETERS.
 - FOR THE TEST VENT HOLES #3 WILL BE OBTURED BY WELDING.
 - AFTER TEST 1/4" HOLE SHALL BE FILLED WITH THREADED TUBE EXTENDING BEYOND INSULATION.

BILL OF MATERIAL FOR ONE SET

NOZZLE PART NO.	PART NAME	MATERIAL	REGULAR QUANTITY	SPARE QUANTITY	SPECIFICATION/REMARK
2	HALF COUPLING	SA105	5		1/4" ASME 3000#
1	VENT PIPE	SA106-B	5		1/4" SCH.80, L80
5	GUSSET	SA516-70	2		15 x 50 x 147
4	NOZZLE NECK	SA333-6	2		2" SCH.160 x L174
3	ELBOW	SA420-WPL6	2		2" SCH.160, LR 90
2	NOZZLE NECK	SA333-6	2		2" SCH.160 x L73
1	FLANGE (SCH.160)	SA350-LF2 CL.1N	2		2" ASME 300# WNLRF
3	ELBOW	SA420-WPL6	3		2" SCH.160, LR 90
2	NOZZLE NECK	SA333-6	3		2" SCH.160 x L80
1	FLANGE (SCH.160)	SA350-LF2 CL.1N	3		2" ASME 300# WNLRF
1	FLANGE (THK.16.6)	SA350-LF2 CL.1N	1		4" ASME 300# WNLRF
3	REINF. PAD	SA516-70M	1		112 x #220
2	NOZZLE NECK	SA333-6	1		4" SCH.120 x L131
1	FLANGE (SCH.120)	SA350-LF2 CL.1N	1		4" ASME 300# WNLRF
3	REINF. PAD	SA516-70M	1		112 x #190
2	NOZZLE NECK	SA333-6	1		3" SCH.120 x L136
1	FLANGE (SCH.160)	SA350-LF2 CL.1N	1		3" ASME 300# WNLRF
3	REINF. PAD	SA516-70M	1		112 x #300
2	NOZZLE NECK	SA333-6	1		6" SCH.80 x L122
1	FLANGE (SCH.80)	SA350-LF2 CL.1N	1		6" ASME 300# WNLRF
4	ELBOW	SA234 WPB	2		3" SCH.80, LR 90
3	REINF. PAD	SA516-70M	2		110 x #190
2	NOZZLE NECK	SA106-B	2		3" SCH.80 x L133
1	FLANGE (SCH.80)	SA105H	2		3" ASME 150# WNLRF
4	ELBOW	SA420-WPL6	1		4" SCH.120, LR 90
3	REINF. PAD	SA516-70M	1		112 x #225
2	NOZZLE NECK	SA333-6	1		4" SCH.120 x L99
1	FLANGE (SCH.120)	SA350-LF2 CL.1N	1		4" ASME 300# WNLRF

BILL OF MATERIAL

REV.	ISSUE DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
R1	09.14.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.
R0	06.27.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.

CLIENT

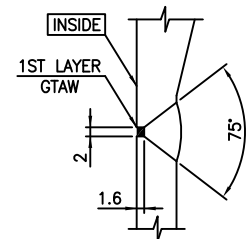


CONSULTING ENGINEER

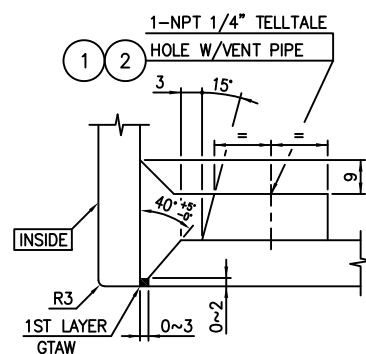
PROJECT: **STYRENE PARK OFFSITE**

DRAWING TITLE: **NOZZLE DETAIL DRAWING FOR CHILLER (EVAPORATOR)**

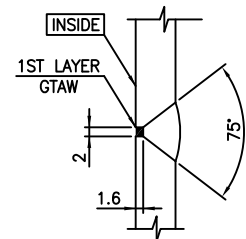
DRAWING NO.	REV.	SCALE	SHEET
EIO27-HSE-VD-ME-DWG-008	R1	A3	6 of 8



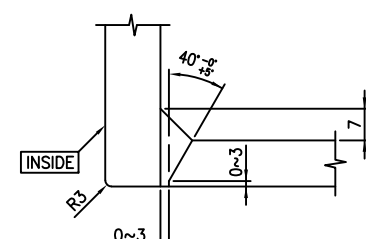
DETAIL "A"



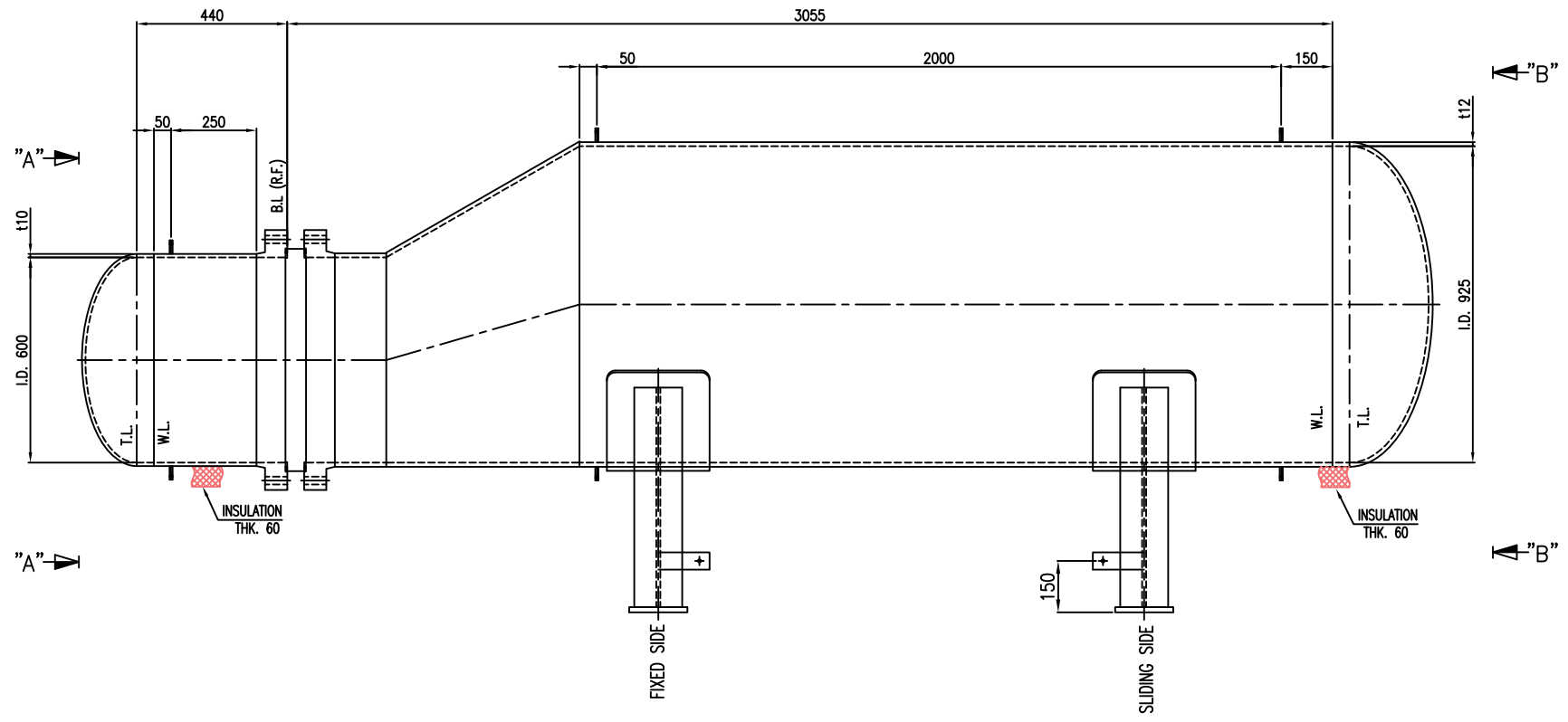
DETAIL "B"



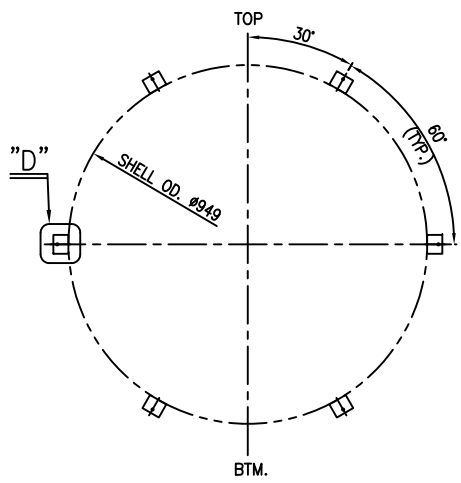
DETAIL "C"



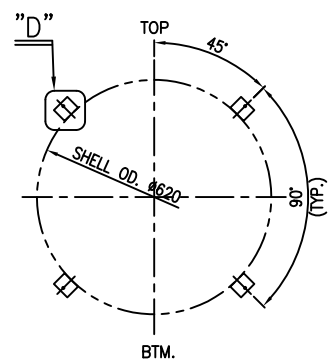
DETAIL "D"



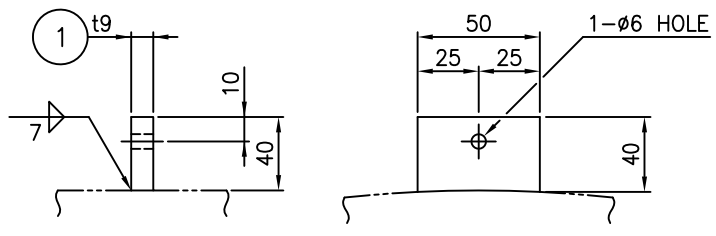
ELEVATION VIEW



VIEW "B"- "B"



VIEW "A"- "A"



DETAIL "D"

NOTES
1. UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MILLIMETERS.

* FOR ONE SET

PART NO.	PART NAME	MATERIAL	REGULAR QUANTITY	SPARE QUANTITY	SPECIFICATION	REMARK
1	INSUL. SUPT CLIP	SAS16-70N	16		19 x 40 x 50	

BILL OF MATERIAL

REV.	ISSUE DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
R0	06.27.2024	ISSUED FOR APPROVAL (IFA)	D.SH.	M.O.	A.M.

CLIENT



پتروشیمی توسعه پارک
صنعتی گودر المی

CONSULTING ENGINEER

PROJECT: **STYRENE PARK OFFSITE**

DRAWING TITLE: **INSULATION CLIP DRAWING FOR CHILLER (EVAPORATOR)**

DRAWING NO.	REV.	SIZE	SCALE	SHEET
EI027-HSE-VD-ME-DWG-008	R0	A3	NTC	7 of 8

