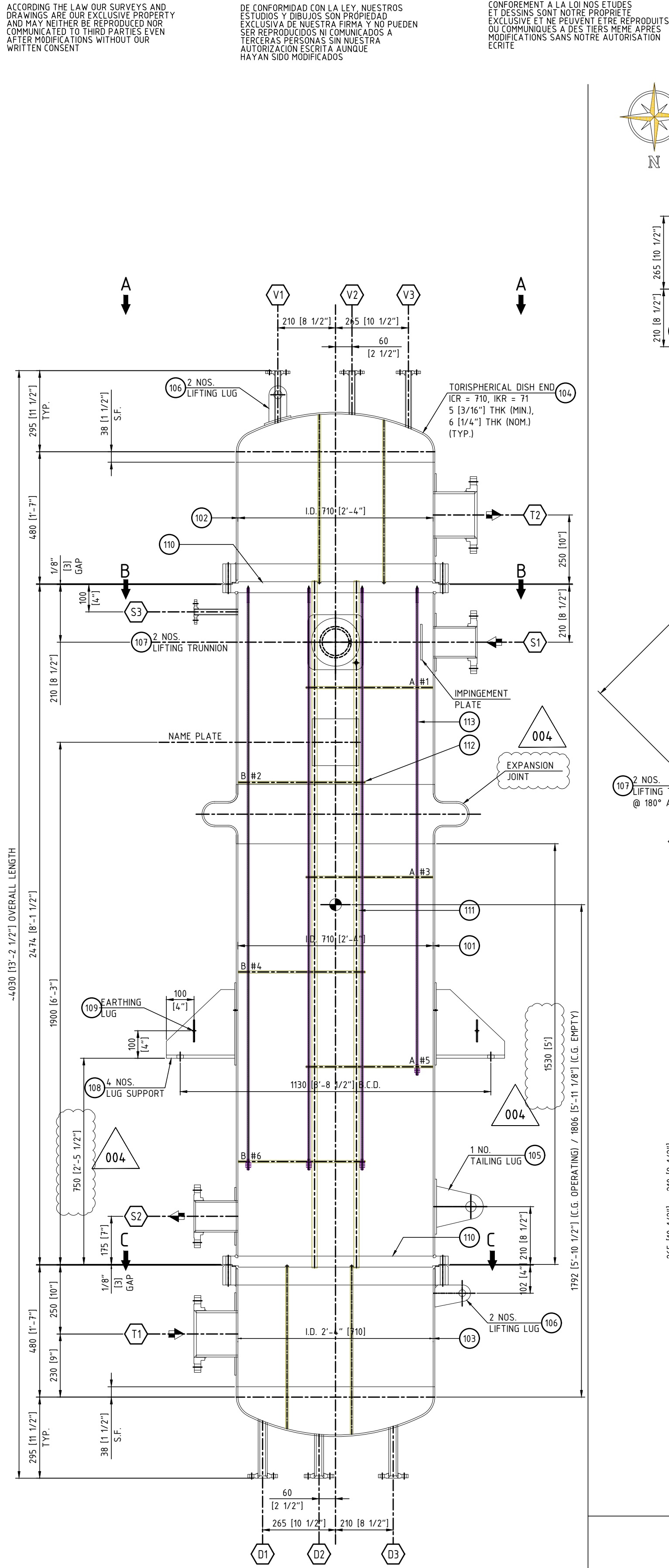
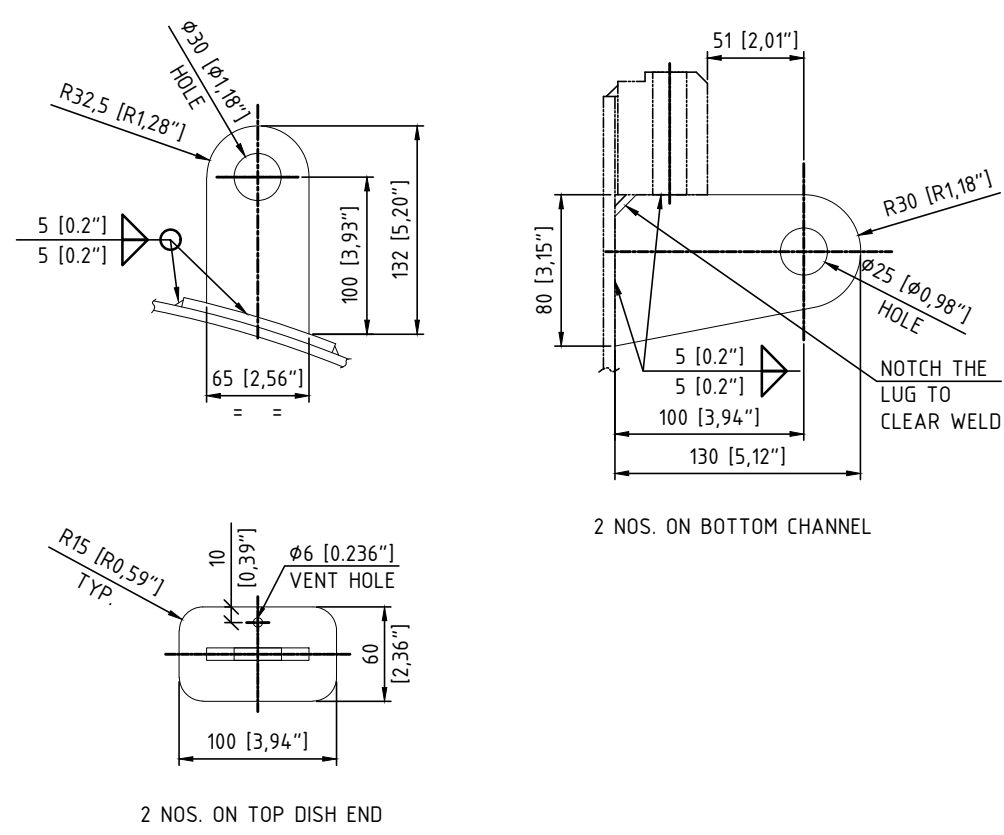
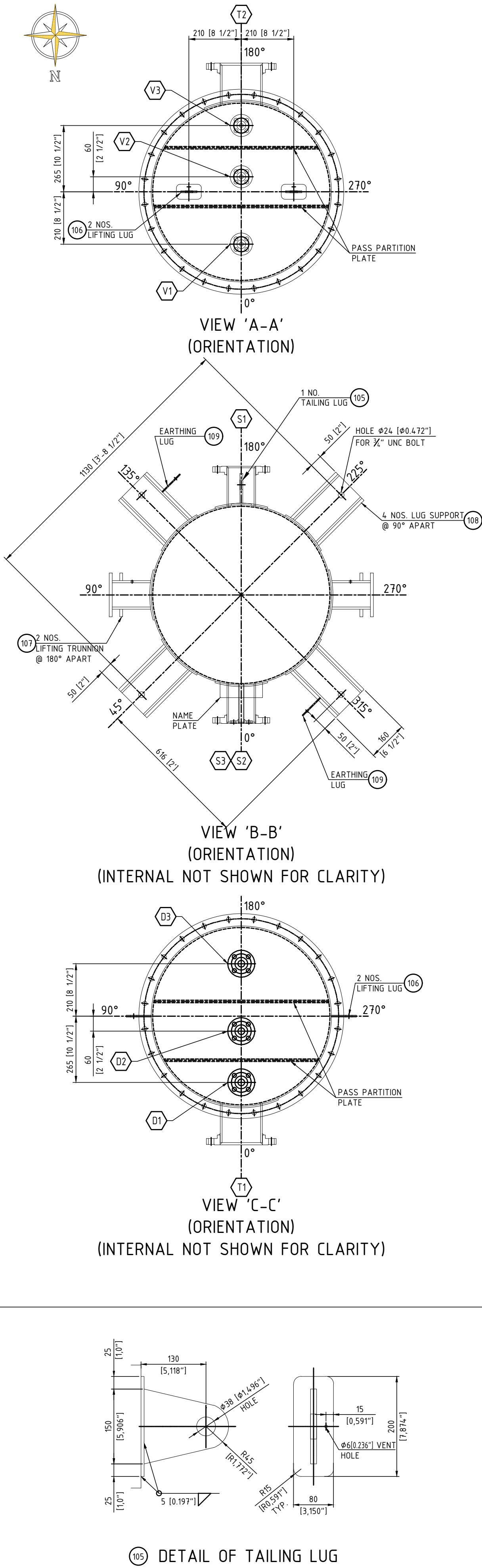
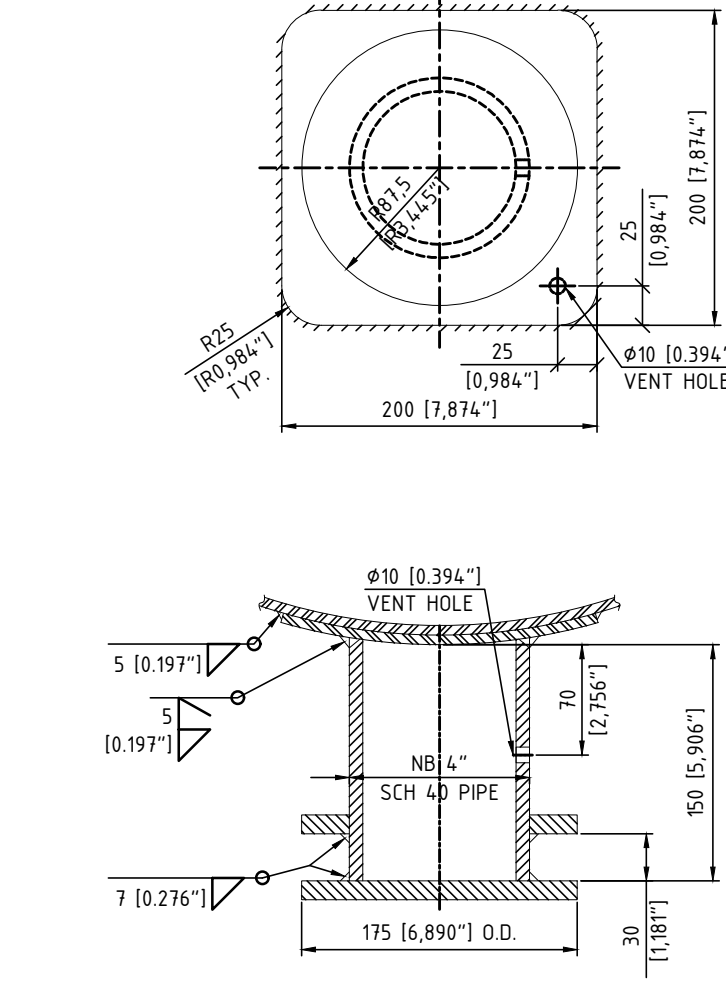




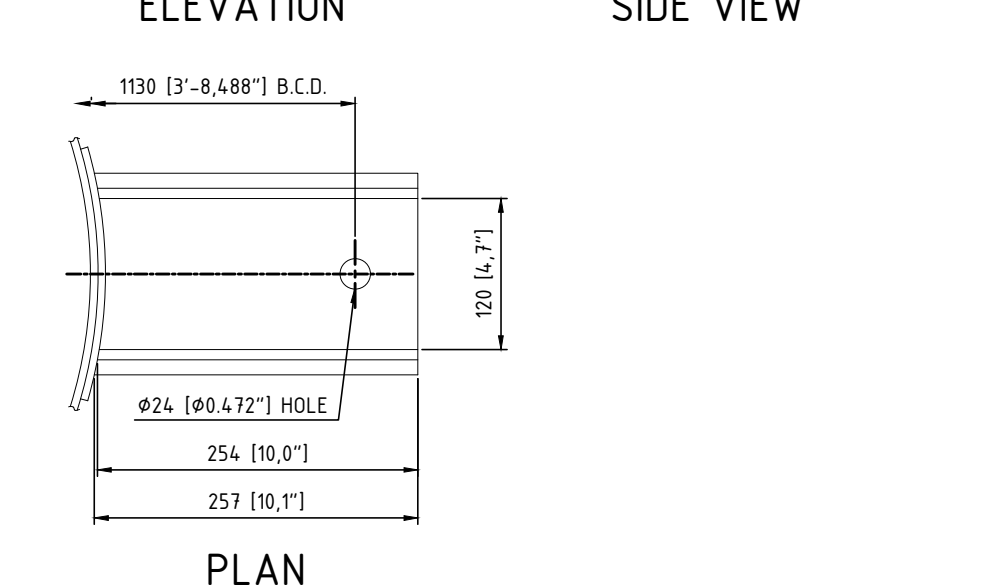
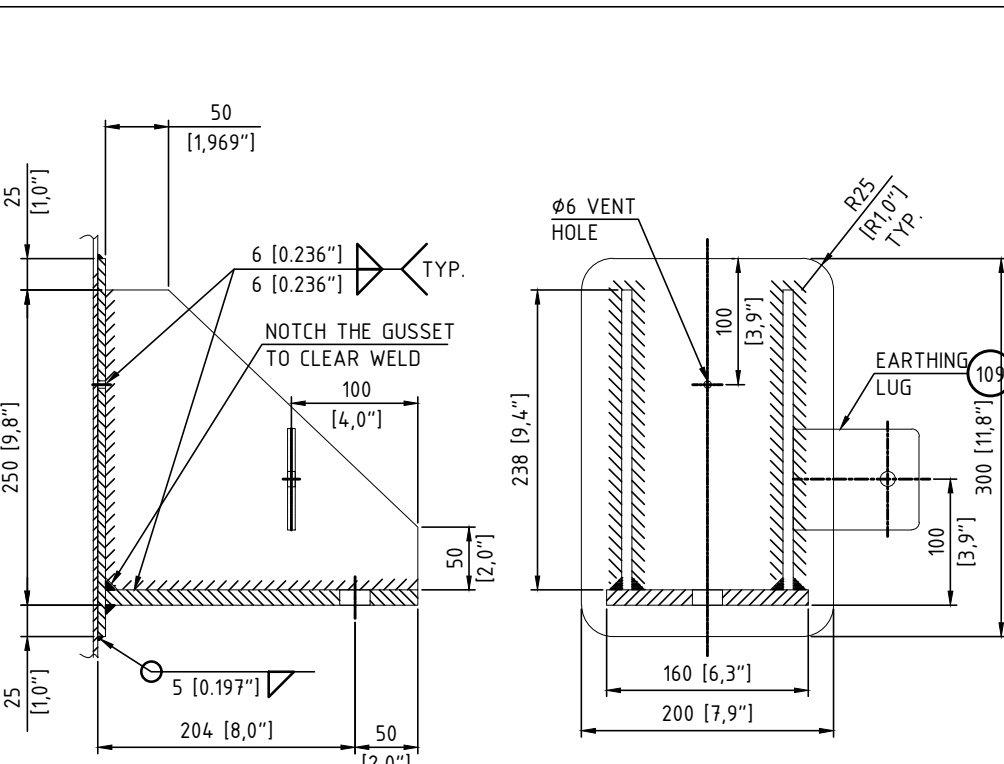
IF IN DOUBT, ASK - DO NOT SCALE !



DETAIL OF LIFTING LUG



DETAIL OF LIFTING TRUNNION



DETAIL OF LUG SUPPORT

MECHANICAL DESIGN CONDITION FOR FIXED TUBESHEET EXCHANGERS				
CASES	DESCRIPTION	MMT (SHELL) °C (°F)	MMT (TUBE) °C (°F)	Pshell, Bar(g) (psi(g))
NORMAL OPERATION	BASE ON THE PERFORMANCE ACCORD TO SPECIFIED CONDITIONS OF THIS TEMA-SHEET	173(344.3)	169(337.3)	8.0(116.03)
COLD START-UP	TUBESIDE OIL INLET @ 65°C AND SHELL WITH STEAM @ 10 Bar(g)	184(363.2)	179(354.2)	10(145.03)
INCIDENT-1:	STEAM VALVE FULLY OPENED, 12 Bar(g) @ SHELL DURING NORMAL OPERATION	191(397.4)	185(365.4)	12(174.04)
INCIDENT-2:	STEAM OPEN TO SHELLSIDE WITH EMPTY TUBES	175(354.9)	175(347)	8.0(116.03)
INCIDENT-3:	SHELL SIDE NO STEAM @ ATM, WHILE CIRCULATING OIL THROUGH TUBES	58(306.9)	63(146.8)	0(0)

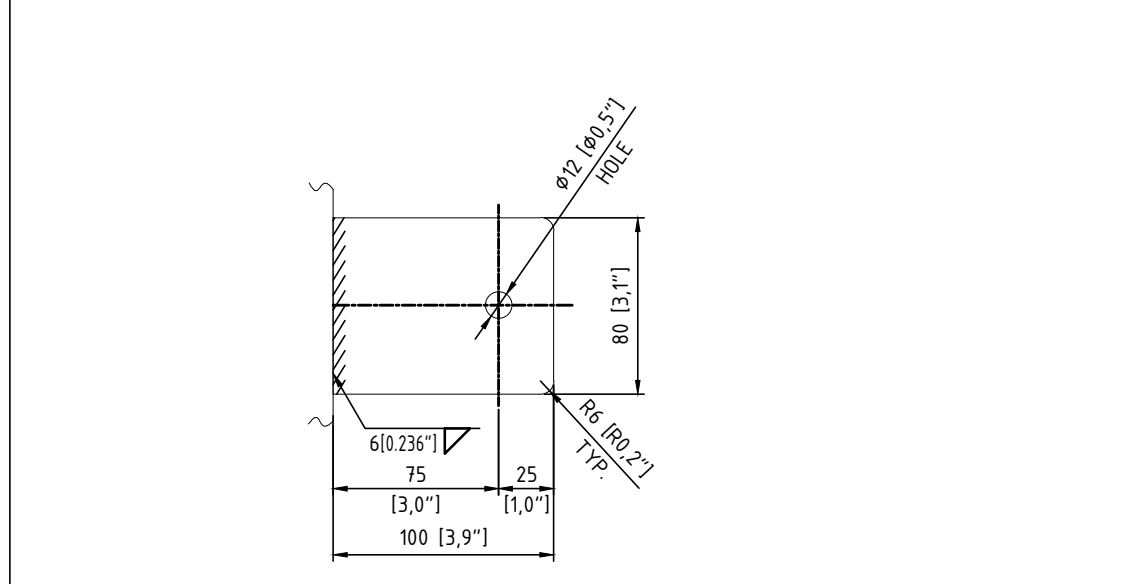
APPLICABLE STANDARDS FOR WIND & EARTHQUAKE				
WIND DESIGN :-	Wind Speed = 101 mph			
EARTHQUAKE DESIGN :-	S _{DS} = 1.077g, S _{D1} = 0.664g (ASCE 7-16)			

APPLICABLE STANDARDS		
DESCRIPTION	EDITION	TITLE
METALLIC GASKET FOR PIPE FLANGES (LATEST)	2017	ASME B16.20
STAINLESS STEEL PIPE	2018	ASME B36.19M
WELDED & SEAMLESS WROUGHT STEEL PIPE (LATEST)	2018	ASME B36.10M
FORGED FITTINGS (LATEST)	2016	ASME B16.11
BUTTWELDED FITTINGS (LATEST)	2018	ASME B16.9
NOZZLE FLANGES UP TO NPS 24 / DN 600	2013	ASME B16.5
STAINLESS STEEL TUBES	2019	ASME 213

LOADING DATA		
SEISMIC MOMENT	N-m	12420
SEISMIC SHEAR	N	13100
WIND MOMENT	N-m	700
WIND SHEAR	N	1910

GENERAL NOTES :-

- ALL DIMENSIONS ARE IN (mm), UNLESS SPECIFIED OTHERWISE.
- ALL BOLT HOLES SHALL STRADDLE RADIAL CENTER LINES.
- PROJECTION OF NOZZLES ON SHELL SHALL BE FROM EQUIPMENT C.L. UNLESS SPECIFIED.
- ALL FULL PENETRATION WELDS (FPW) TO BE CHIPPED BACK TO SOUND METAL ON THE SECOND SIDE & REWELDED, OR FULL PENETRATION WELDS MAY BE ACHIEVED FROM ONE SIDE ONLY USING PROPER QUALIFIED WELDING PROCEDURE (WITH GTAW ROOT PASS)
- ALL WELDING SURFACES TO BE THOROUGHLY CLEANED OF SCALE, RUST, OIL OR FOREIGN BODIES, BEFORE WELDING.
- ALL SHARP CORNERS SHALL BE ROUNDED OFF TO A MINIMUM 3mm (1/8 in) RADIUS.
- ALL REINFORCING PADS SHALL HAVE TWO NUMBER 6 mm, NPT (1/4 in) VENT HOLE, PLACED IN THE LOWEST AREA OF PAD. AFTER COMPLETION OF WELDING, THE PAD SHALL BE SUBJECTED TO DRY AIR AND SOAPY WATER TEST AT 0.1 MPa(g). THESE TEST HOLE SHALL BE FILLED WITH RUST PREVENTATIVE GREASE COMPATIBLE WITH THE BASE MATERIAL PRIOR TO SHIPMENT. DO NOT PLUG THE TEST HOLE.
- PIPES TO BE USED IN NOZZLE CONSTRUCTION SHALL BE SEAMLESS ONLY, IF FABRICATED (ABOVE NPS 10) THE LONG SEAM SHALL BE 100% RADIOGRAPHED.
- PRESSURE RELIEF DEVICES SHALL BE PROVIDED BY THE USER & SHALL BE THEIR RESPONSIBILITY.
- EQUIPMENT TOLERANCES SHALL BE STRINGENT OF CODE(TEMA) AND SPECIFICATION. TOLERANCES ON FILLET LEG LENGTH SHALL BE 3; UNLESS SPECIFIED OTHERWISE TOLERANCE ON ROOT HEIGHT FOR WELD PREPARATION SHALL BE 3.
- ALL INTERNAL WELD OF SHELL SIDE SHALL BE GROUND FLUSH TO FACILITATE BUNDLE INSERTION. ALL EXTERNAL WELDS SHALL BE KEPT IN AS-WELDED CONDITION.
- WATER USED FOR HYDROTEST SHALL HAVE CHLORIDE CONTENT LESS THAN 25 ppm.
- WELDING TO BE DONE AS PER APPROVED WELDING PROCEDURE AND WELD TEST PLAN.
- PT SHALL BE CARRIED OUT AFTER CHIP BACK IN CASE OF ACCESSIBLE WELD & AFTER ROOT PASS IN CASE OF INACCESSIBLE WELD FOR CATEGORY A, B, C & D JOINT. PT SHALL ALSO BE CARRIED OUT ON ALL ATTACHMENT WELD WITH MAIN SHELL.
- MACHINED SURFACES, FLANGE FACES, THREADED SURFACES, AND OTHER FINISHED OR DELICATE PARTS SHALL BE WELL-GREASED AND PROTECTED AGAINST RUSTING AND DAMAGE DURING SHIPMENT.
- IN ADDITION TO THE NDE REQUIREMENT PER CODE & SPECIFICATION, ATTACHMENT WELD FOR LIFTING LUG, TAILING LUG SHALL BE PT/MT EXAMINED.
- ALL NOZZLE FLANGES UP TO AND INCLUDING 24" NB SHALL BE AS PER ASME B16.5.
- ALL PRESSURE RETAINING NUTS SHALL BE OF HEAVY SERIES ONLY.
- GASKET SEATING SURFACE OF GIRTH FLANGE & NOZZLE FLANGE SHALL HAVE SERRATED FINISH OF 32-63 µm.
- ANY OFFSET WITHIN THE ALLOWABLE TOLERANCE PROVIDED IN CODE SHALL BE TAPERED AT A THREE TO ONE TAPER.
- PAINTING:
SHELL SIDE INTERNAL : SURFACE PROTECTION AS PER TNO001
SHELL SIDE EXTERNAL : SURFACE PROTECTION AS PER TNO001
TUBE SIDE INTERNAL : NONE
TUBE SIDE EXTERNAL : NONE
TUBE-TUBESHEET JOINT : NONE



DETAIL OF EARTHING LUG

DESIGN PARAMETERS				
CONSTRUCTION CODE / REGULATIONS: ASME SECTION VIII DIV.1, 2019 EDITION + TEMA 10 TH EDITION (2019)				
ASME CERTIFICATION MARK : YES WITH 'U' DESIGNATOR				
NATIONAL BOARD REGISTRATION: YES				
TEMA CLASS: C, TEMA TYPE: 8EM (VI), SIZE 710 x 2500 mm				
DESCRIPTION	UNIT	SHELL SIDE	TUBE SIDE	
FLUID NAME	-	STEAM	PRODUCT 1 + BE	
CAPACITY	m ³ (ft ³)	0.5111 (18.049)	0.7272 (25.680)	
SPECIFIC GRAVITY	-	0.0046 / 0.8842	0.8846 / 0.8713	
DESIGN PRESSURE (INT. / EXT.)	Bar(g) (psi(g))	12.0 / F.V. (174.04 / F.V.)	8.0 / F.V. (116.03 / F.V.)	
MAWP (INTERNAL) / MAWP (EXTERNAL)	Bar(g) (psi(g))	12.0 / F.V. (174.04 / F.V.)	8.0 / F.V. (116.03 / F.V.)	
HYDROSTATIC TEST PRESSURE (AT TOP) (POSITION) (VERTICAL)	Bar(g) (psi(g))	16.735 (242.72) (UG99)(b)	11.154 (1618) (UG99)(b)	
MAX. DESIGN TEMPERATURE (INT. / EXT.)	°C (°F)	220 / 220 (428 / 428)	220 / 220 (428 / 428)	
MIN. DESIGN METAL TEMPERATURE	°C (°F)	-10 (14) AT 12 Bar g	-10 (14) AT 8 Bar g	
TEST TEMPERATURE (MIN. / MAX.)	°C (°F)	0 / 48 (32 / 120)	0 / 48 (32 / 120)	
CORROSION ALLOWANCE (INT. / EXT.)	mm(in)	0 / 0	0 / 0	
RADIOGRAPHY / JOINT EFFICIENCY	-	NONE / 0.7	NONE / 0.7 (SEAMLESS HEAD)	
FWHT	-	EXEMPTED AS PER UHA-44	EXEMPTED AS PER UHA-44	
PWHT	-	EXEMPTED AS PER UHA-32	EXEMPTED AS PER UHA-32	
IMPACT TEST	-	EXEMPTED AS PER UHA-51	EXEMPTED AS PER UHA-51	
NO. OF PASSES	-	ONE	FIVE	
PAINTING	-	NA	NOTE-21	
INSULATION THICKNESS / TYPE	mm(in) / -	100 (4.0) / MINERAL WOOL	100 (4.0) / MINERAL WOOL	
FRIGIDPROOFING (BY FLUENT)	-	NONE	NONE	
APPLICABLE UG-22 LOADING DATA	-	(a), (b), (c), (d), (f), (h), (i)	(a), (b), (c), (d), (f), (h), (i)	
HEAT TRANSFER AREA PER SHELL	m ² (ft ²)	94.9 (GROSS), 916 (EFF.) (10215 (GROSS), 985.9 (EFF.))		
EMPTY WEIGHT (W)	kg (lb)	-2330 (5137)		
TEST WEIGHT (W)	kg (lb)	-3610 (7959)		
OPERATING WEIGHT (W)	kg (lb)	-3460 (7628)		
MANUFACTURER SERIAL NUMBER	-	-		
INSPECTION BY	-	ASME INSPECTOR		

OPERATING PARAMETERS			
DESCRIPTION	UNIT	SHELL SIDE	TUBE SIDE
OPERATING PRESSURE	Bar(g) (psi(g))	8.0 / 7.992 (116.03 / 115.91)	5.9 / 5.67 (85.57 / 82.23)
OPERATING TEMPERATURE (IN / OUT)	°C (°F)	175.5 / 170.5 (347.9 / 338.9)	65.0 / 85.0 (149.0 / 185.0)

SERVICE RESTRICTIONS			
DESCRIPTION	SHELL SIDE	TUBE SIDE	
CYCLIC / LETHAL / HYDROGEN SERVICE	NO / NO / NO	NO / NO / NO	
SOUR SERVICE / NACE REQUIREMENTS	NO / NO	NO / NO	
EXPLOSIVE / FLAMMABLE SERVICE	NO / NO	NO / NO	

NOZZLE PARAMETERS											
MARK	PIPE SIZE		FLANGE			R.F. PAD		PROJECTION	SERVICE		
	NOMINA L DIA	SCH / THK	CLASS	TYPE	FACE	FINISH Ra µm	O.D. (mm) [in]	THK. (mm) [in]			
S1	NB 4"	SCH 40S	CL 150	SO	RF	3.2-6.3	210 (8 1/4")	6.35 (1/4")	55 (1'-8")	STEAM INLET	
S2	NB 4"	SCH 40S	CL 150	SO	RF	3.2-6.3	210 (8 1/4")	6.35 (1/4")	55 (1'-8")	CONDENSATE OUTLET	
T1	NB 6"	SCH 40S	CL 150	SO	RF	3.2-6.3	300 (11 13/16")	6.35 (1/4")	55 (1'-8")	PRODUCT 1 + BE INLET	
T2	NB 6"	SCH 40S	CL 150	SO	RF	3.2-6.3	300 (11 13/16")	6.35 (1/4")	55 (1'-8")	PRODUCT 1 + BE OUTLET	
V1 TO V3	NB 1/2"	SCH 40S	CL 150	SO	RF	3.2-6.3	-	-	SEE DRG.	TUBE SIDE VENT	
D1 TO D3	NB 1"	SCH 40S	CL 150	SO	RF	3.2-6.3	-	-	SEE DRG.	TUBE SIDE DRAIN	
S3	NB 1/2"	SCH 40S	CL 150	SO	RF	3.2-6.3	-	-	55 (1'-8")	SHELL SIDE VENT	

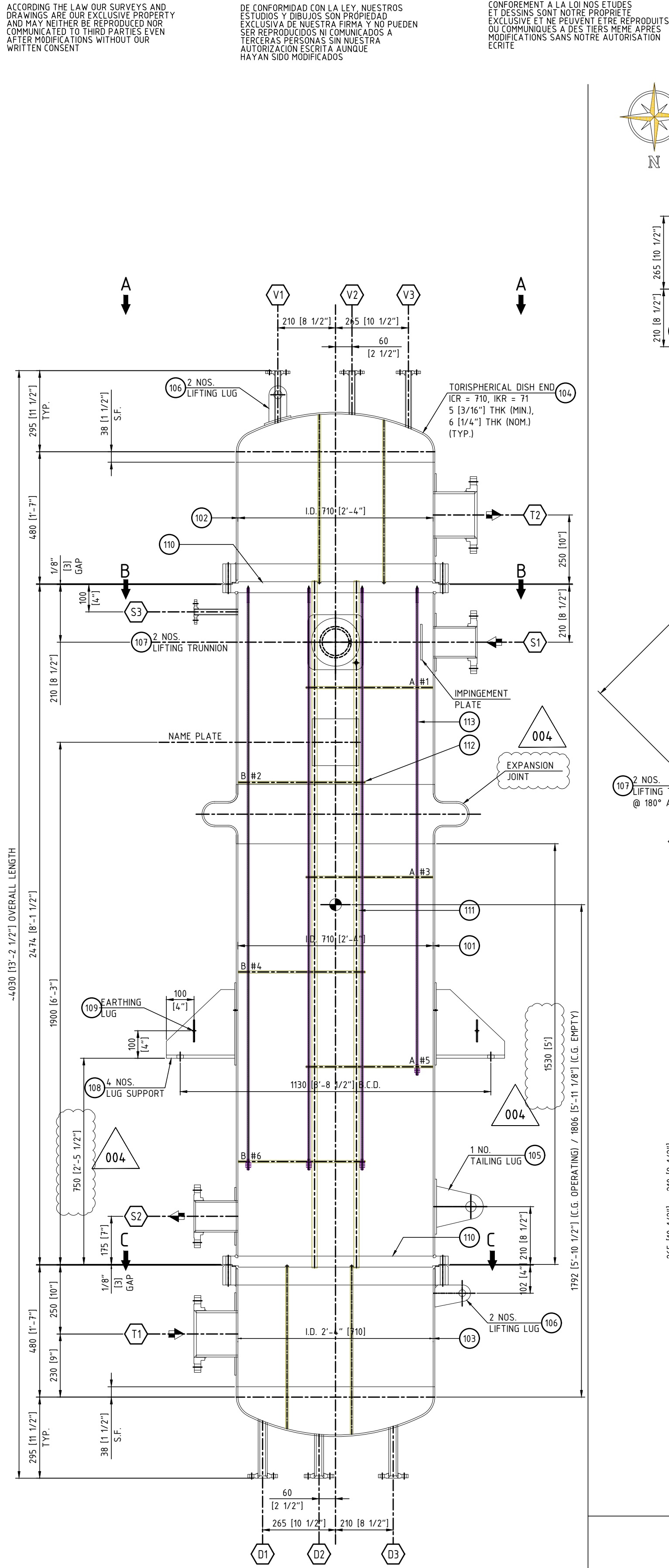
PIPING NOZZLE LOADS TABLE									
MARK	RADIAL FORCE (F _R) (N (lbs))	CIRC. FORCE (F _C) (N (lbs))	LONG. FORCE (F _L) (N (lbs))	CIRC. MOMENT(M _C) (N-m (ft-lbs))	LONG. MOMENT(M _L) (N-m (ft-lbs))	TOPSIONAL MOMENT(M _T) (N-m (ft-lbs))			
S1	2840 (638)	2130 (479)	2840 (638)	680 (152)	1020 (175)	1280 (94.4)			
S2	2840 (638)	2130 (479)	2840 (638)	680 (152)	1020 (175)	1280 (94.4)			
T1	3820 (859)	2860 (643)	3820 (859)	1160 (185)	1740 (1283)	2180 (1608)			
T2	3820 (859)	2860 (643)	3820 (859)	1160 (185)	1740 (1283)	2180 (1608)			
V1 TO V3	-	-	-	-	-	-			
D1 TO D3	-	-	-	-	-	-			
S3	-	-	-	-	-	-			

TOP AND BOTTOM HEAD GASKET TYPE/MATERIAL : GARLOCK 3510 (m = 2 & y = 17.2 MPa (2494.649 psil) , DIMENSION OF TOP AND BOTTOM HEAD GASKET: 751 O.D. x 725 I.D. x 3 THK.

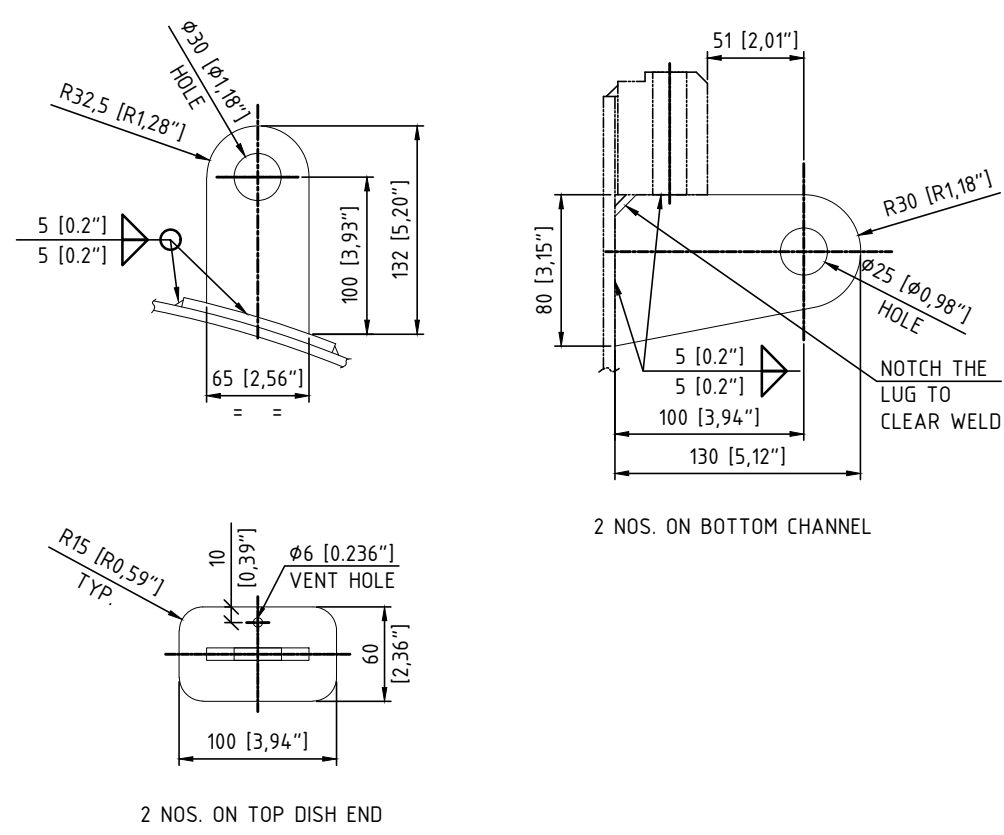
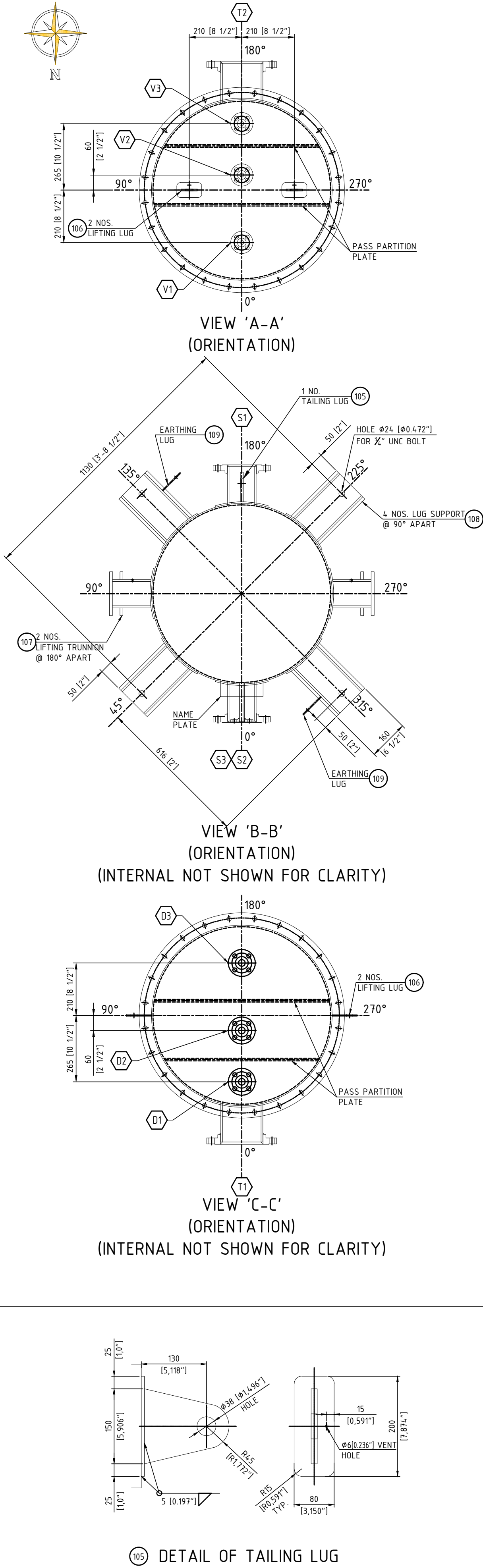
NOZZLE MATERIAL OF CONSTRUCTION		
POS. NO	NOZZLE NECKS	NOZZLE FLANGES
S1	SA-312 GR TP304	SA-182 GR F304
S2	SA-312 GR TP304	SA-182 GR F304
T1	SA-312 GR TP304	SA-182 GR F304
T2	SA-312 GR TP304	SA-182 GR F304
V1 TO V3	SA-312 GR TP304	SA-182 GR F304
D1 TO D3	SA-312 GR TP304	SA-182 GR F304
S3	SA-312 GR TP304	SA-182 GR F304

113	TIE ROD	7	-	SS 304	
112	BAFFLE PLATE	6	-	SA-240 TYPE 304	
111	TUBES	634	-	SA-213 GR TP 304L (SEAMLESS)	
110	TUBE SHEET	2	-	SA-240 TYPE 304	
109	EARTHING LUG	2	-	SS 304	
108	LUG SUPPORT	4	-	SA-240 TYPE 304 / SA-285 GR C	
107	LIFTING TRUNNION	2	-	SA-240 TYPE 304 / SA-285 GR C / SA-106 GR B	
106	LIFTING LUG	4	-	SA-240 TYPE 304 / SA-285 GR C /	
105	TAILING LUG	1	-	SA-240 TYPE 304 / SA-285 GR C /	
104	CHANNEL DISH	2	-		
103	BOTTOM CHANNEL SHELL	1	-	SA-240 TYPE 304	
102	TOP CHANNEL SHELL	1	-		
101	MAIN SHELL	1	-		

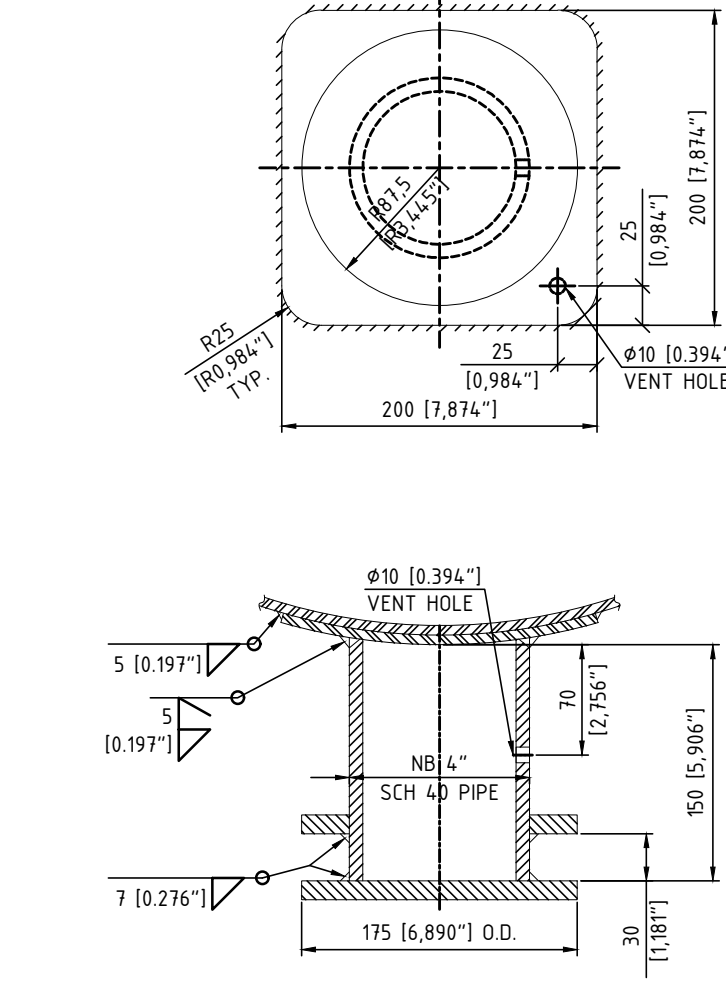
BILL OF MATERIAL (FOR ONE EQUIPMENT)				
004	09.09.2021	HOLD REMOVED FOR SUPPORT LUG ELEVATION HEIGHT AND ADDED EXPANSION BELLOW (MARKED 004)		PKV
003	20.07.2021	DRAWING UPDATED AS PER PROCESS COMMENTS (MARKED 003)		PKV
002	05.07.2021	UPDATED ORIENTATION AND HOLD REMOVED FOR ORIENTATION AND DRAWING UPDATED AS PER COMMENTS (MARKED 002)		PKV
001	04.05.2021	DRAWING UPDATED IMPERIAL UNITS TO METRIC AS PER PROCESS COMMENTS (MARKED 001)		PKV
REV	DATE (dd-mm-yyyy)	DESCRIPTION OF MODIFICATION	NBR OF MOD	BY
DESMET BALLESTRA				
ITEM/SECTION NUMBER	621C.1 (19-X-754)	PROJECT	WOPPAR	
ITEM/SECTION DESCRIPTION	OIL / STEAM HEAT EXCHANGER	DOCUMENT	VESSEL (ASSY)	
Sh=94.9 D=710 Ltub=2500			DOCUMENT NUMBER	REVISION
GENERAL ARRANGEMENT			100176792	004



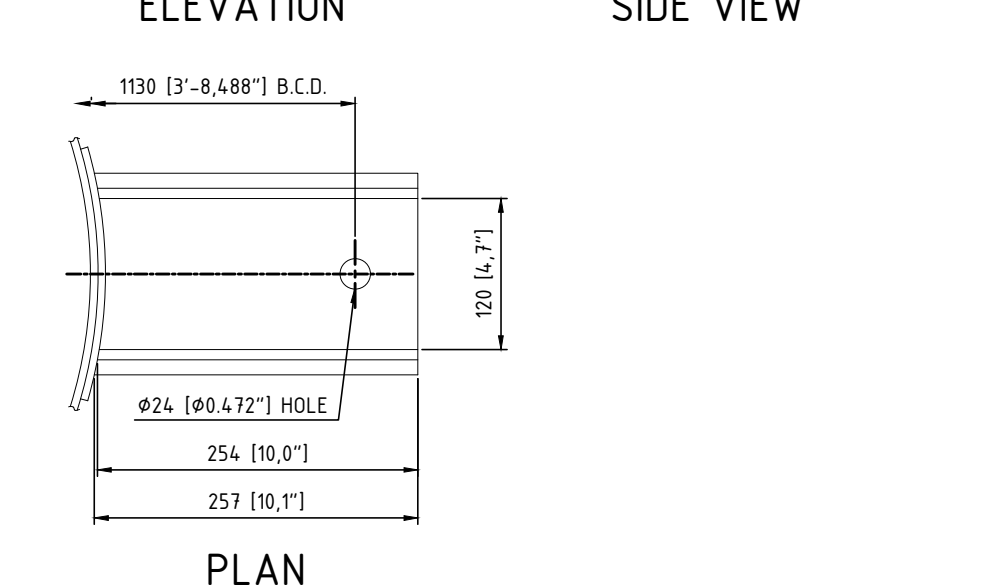
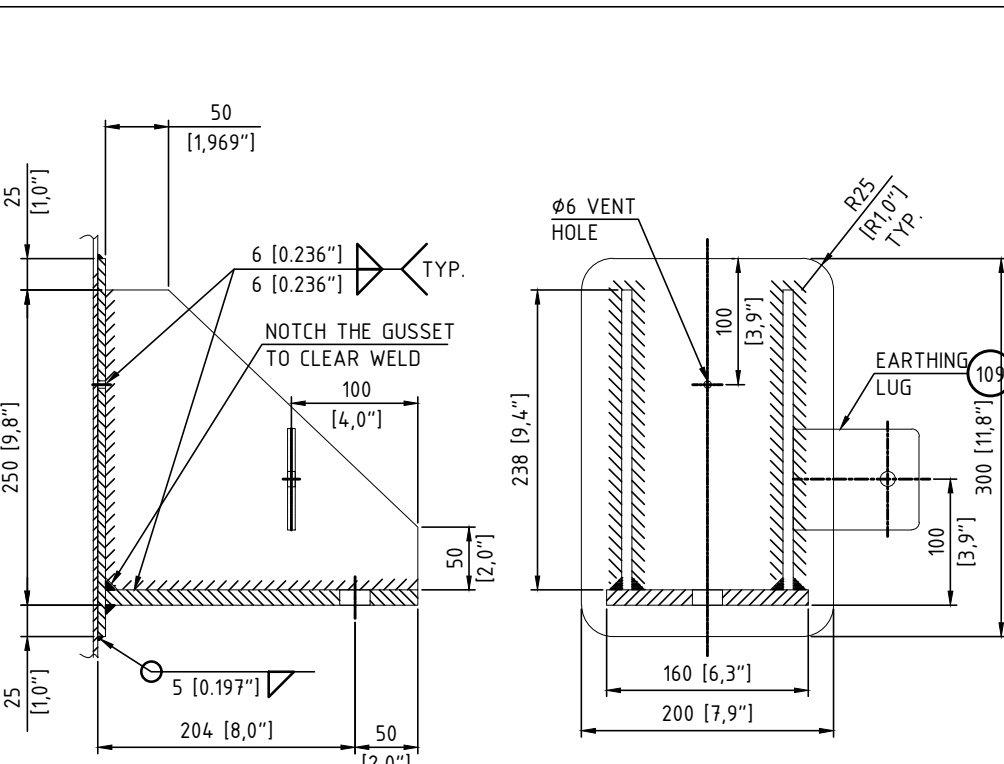
IF IN DOUBT, ASK - DO NOT SCALE !



DETAIL OF LIFTING LUG



DETAIL OF LIFTING TRUNNION



DETAIL OF LUG SUPPORT

MECHANICAL DESIGN CONDITION FOR FIXED TUBESHEET EXCHANGERS				
CASES	DESCRIPTION	MMT (SHELL) °C (°F)	MMT (TUBE) °C (°F)	Pshell, Bar(g) (psi(g))
NORMAL OPERATION	BASE ON THE PERFORMANCE ACCORD TO SPECIFIED CONDITIONS OF THIS TEMA-SHEET	173(344.3)	169(337.3)	8.0(116.03)
COLD START-UP	TUBESIDE OIL INLET @ 65°C AND SHELL WITH STEAM @ 10 Bar(g)	184(363.2)	179(354.2)	10(145.03)
INCIDENT-1:	STEAM VALVE FULLY OPENED, 12 Bar(g) @ SHELL DURING NORMAL OPERATION	191(397.4)	185(365.4)	12(174.04)
INCIDENT-2:	STEAM OPEN TO SHELLSIDE WITH EMPTY TUBES	175(354.9)	175(347)	8.0(116.03)
INCIDENT-3:	SHELL SIDE NO STEAM @ ATM, WHILE CIRCULATING OIL THROUGH TUBES	58(336.9)	63(146.8)	0(0)

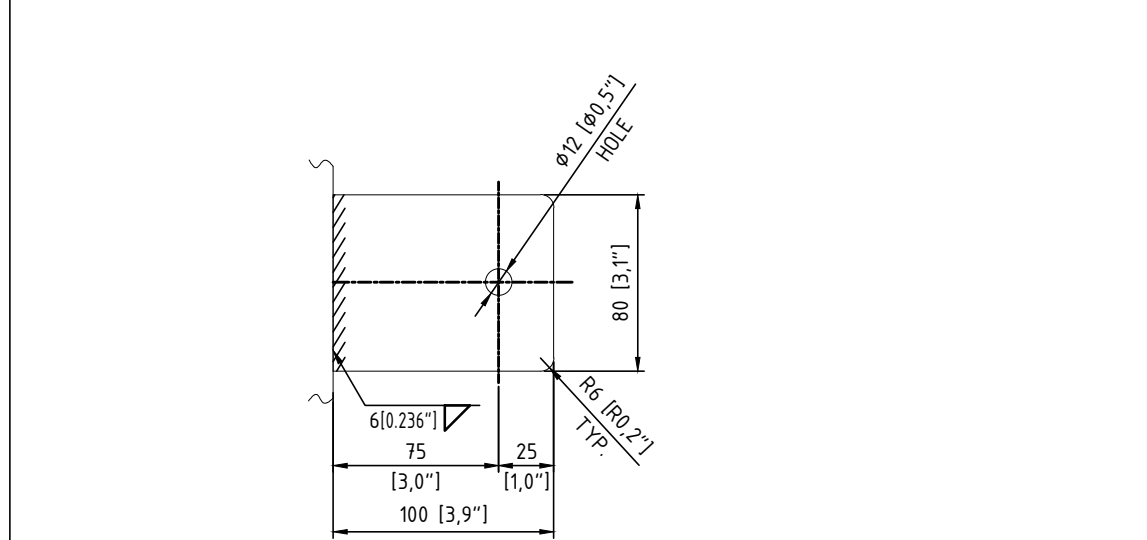
APPLICABLE STANDARDS FOR WIND & EARTHQUAKE				
WIND DESIGN :-	Wind Speed = 101 mph			
EARTHQUAKE DESIGN :-	S _{DS} = 1.077g, S _{D1} = 0.664g (ASCE 7-16)			

APPLICABLE STANDARDS		
DESCRIPTION	EDITION	TITLE
METALLIC GASKET FOR PIPE FLANGES (LATEST)	2017	ASME B16.20
STAINLESS STEEL PIPE	2018	ASME B36.19M
WELDED & SEAMLESS WROUGHT STEEL PIPE (LATEST)	2018	ASME B36.10M
FORGED FITTINGS (LATEST)	2016	ASME B16.11
BUTTWELDED FITTINGS (LATEST)	2018	ASME B16.9
NOZZLE FLANGES UP TO NPS 24 / DN 600	2013	ASME B16.5
STAINLESS STEEL TUBES	2019	ASME 213

LOADING DATA		
SEISMIC MOMENT	N-m	12420
SEISMIC SHEAR	N	13100
WIND MOMENT	N-m	700
WIND SHEAR	N	1910

GENERAL NOTES :-

- ALL DIMENSIONS ARE IN (mm), UNLESS SPECIFIED OTHERWISE.
- ALL BOLT HOLES SHALL STRADDLE RADIAL CENTER LINES.
- PROJECTION OF NOZZLES ON SHELL SHALL BE FROM EQUIPMENT C.L. UNLESS SPECIFIED.
- ALL FULL PENETRATION WELDS (FPW) TO BE CHIPPED BACK TO SOUND METAL ON THE SECOND SIDE & REWELDED, OR FULL PENETRATION WELDS MAY BE ACHIEVED FROM ONE SIDE ONLY USING PROPER QUALIFIED WELDING PROCEDURE (WITH GTAW ROOT PASS)
- ALL WELDING SURFACES TO BE THOROUGHLY CLEANED OF SCALE, RUST, OIL OR FOREIGN BODIES, BEFORE WELDING.
- ALL SHARP CORNERS SHALL BE ROUNDED OFF TO A MINIMUM 3mm (1/8 in) RADIUS.
- ALL REINFORCING PADS SHALL HAVE TWO NUMBER 6 mm, NPT (1/4 in) VENT HOLE, PLACED IN THE LOWEST AREA OF PAD. AFTER COMPLETION OF WELDING, THE PAD SHALL BE SUBJECTED TO DRY AIR AND SOAPY WATER TEST AT 0.1 MPa(g). THESE TEST HOLE SHALL BE FILLED WITH RUST PREVENTATIVE GREASE COMPATIBLE WITH THE BASE MATERIAL PRIOR TO SHIPMENT. DO NOT PLUG THE TEST HOLE.
- PIPES TO BE USED IN NOZZLE CONSTRUCTION SHALL BE SEAMLESS ONLY, IF FABRICATED (ABOVE NPS 10) THE LONG SEAM SHALL BE 100% RADIOGRAPHED.
- PRESSURE RELIEF DEVICES SHALL BE PROVIDED BY THE USER & SHALL BE THEIR RESPONSIBILITY.
- EQUIPMENT TOLERANCES SHALL BE STRINGENT OF CODE(TEMA) AND SPECIFICATION. TOLERANCES ON FILLET LEG LENGTH SHALL BE 3; UNLESS SPECIFIED OTHERWISE TOLERANCE ON ROOT HEIGHT FOR WELD PREPARATION SHALL BE 3.
- ALL INTERNAL WELD OF SHELL SIDE SHALL BE GROUND FLUSH TO FACILITATE BUNDLE INSERTION. ALL EXTERNAL WELDS SHALL BE KEPT IN AS-WELDED CONDITION.
- WATER USED FOR HYDROTEST SHALL HAVE CHLORIDE CONTENT LESS THAN 25 ppm.
- WELDING TO BE DONE AS PER APPROVED WELDING PROCEDURE AND WELD TEST PLAN.
- PT SHALL BE CARRIED OUT AFTER CHIP BACK IN CASE OF ACCESSIBLE WELD & AFTER ROOT PASS IN CASE OF INACCESSIBLE WELD FOR CATEGORY A, B, C & D JOINT. PT SHALL ALSO BE CARRIED OUT ON ALL ATTACHMENT WELD WITH MAIN SHELL.
- MACHINED SURFACES, FLANGE FACES, THREADED SURFACES, AND OTHER FINISHED OR DELICATE PARTS SHALL BE WELL-GREASED AND PROTECTED AGAINST RUSTING AND DAMAGE DURING SHIPMENT.
- ALL PRESSURE RETAINING NUTS SHALL BE OF HEAVY SERIES ONLY.
- GASKET SEATING SURFACE OF GIRTH FLANGE & NOZZLE FLANGE SHALL HAVE SERRATED FINISH OF 32-63 µm.
- ANY OFFSET WITHIN THE ALLOWABLE TOLERANCE PROVIDED IN CODE SHALL BE TAPERED AT A THREE TO ONE TAPER.
- PAINTING:
SHELL SIDE INTERNAL : SURFACE PROTECTION AS PER TNO001
SHELL SIDE EXTERNAL : SURFACE PROTECTION AS PER TNO001
TUBE SIDE INTERNAL : NONE
TUBE SIDE EXTERNAL : NONE
TUBE-TUBESHEET JOINT : NONE



DETAIL OF EARTHING LUG

DESIGN PARAMETERS				
CONSTRUCTION CODE / REGULATIONS: ASME SECTION VIII DIV.1, 2019 EDITION + TEMA 10 TH EDITION (2019)				
ASME CERTIFICATION MARK : YES WITH 'U' DESIGNATOR				
NATIONAL BOARD REGISTRATION: YES				
TEMA CLASS: C, TEMA TYPE: 8EM (VI), SIZE 710 x 2500 mm				
DESCRIPTION	UNIT	SHELL SIDE	TUBE SIDE	
FLUID NAME	-	STEAM	PRODUCT 1 + BE	
CAPACITY	m ³ (ft ³)	0.5111 (18.049)	0.7272 (25.680)	
SPECIFIC GRAVITY	-	0.0046 / 0.0842	0.8846 / 0.8713	
DESIGN PRESSURE (INT. / EXT.)	Bar(g) (psi(g))	12.0 / F.V. (174.04 / F.V.)	8.0 / F.V. (116.03 / F.V.)	
MAWP (INTERNAL) / MAWP (EXTERNAL)	Bar(g) (psi(g))	12.0 / F.V. (174.04 / F.V.)	8.0 / F.V. (116.03 / F.V.)	
HYDROSTATIC TEST PRESSURE (AT TOP) [POSITION] (VERTICAL)	Bar(g) (psi(g))	16.735 (242.72) (UG99)(b)	11.154 (1618) (UG99)(b)	
MAX. DESIGN TEMPERATURE (INT. / EXT.)	°C (°F)	220 / 220 (428 / 428)	220 / 220 (428 / 428)	
MIN. DESIGN METAL TEMPERATURE	°C (°F)	-10 (14) AT 12 Bar g	-10 (14) AT 8 Bar g	
TEST TEMPERATURE (MIN. / MAX.)	°C (°F)	0 / 48 (32 / 120)	0 / 48 (32 / 120)	
CORROSION ALLOWANCE (INT. / EXT.)	mm(in)	0 / 0	0 / 0	
RADIOGRAPHY / JOINT EFFICIENCY	-	NONE / 0.7	NONE / 0.7 (SEAMLESS HEAD)	
FWHT	-	EXEMPTED AS PER UHA-44	EXEMPTED AS PER UHA-44	
PWHT	-	EXEMPTED AS PER UHA-32	EXEMPTED AS PER UHA-32	
IMPACT TEST	-	EXEMPTED AS PER UHA-51	EXEMPTED AS PER UHA-51	
NO. OF PASSES	-	ONE	FIVE	
PAINTING	-	NA	NOTE-21	
INSULATION THICKNESS / TYPE	mm(in) / -	100 (4.0) / MINERAL WOOL	100 (4.0) / MINERAL WOOL	
FRIGIDPROOFING (BY FLUENT)	-	NONE	NONE	
APPLICABLE UG-22 LOADING DATA	-	(a), (b), (c), (d), (f), (h), (i)	(a), (b), (c), (d), (f), (h), (i)	
HEAT TRANSFER AREA PER SHELL	m ² (ft ²)	94.9 (GROSS), 916 (EFF.) (10215 (GROSS), 985.9 (EFF.))		
EMPTY WEIGHT (W)	kg (lb)	-2330 (5137)		
TEST WEIGHT (W)	kg (lb)	-3610 (7959)		
OPERATING WEIGHT (W)	kg (lb)	-3460 (7628)		
MANUFACTURER SERIAL NUMBER	-	-		
INSPECTION BY	-	ASME INSPECTOR		

OPERATING PARAMETERS			
DESCRIPTION	UNIT	SHELL SIDE	TUBE SIDE
OPERATING PRESSURE	Bar(g) (psi(g))	8.0 / 7.992 (116.03 / 115.91)	5.9 / 5.67 (85.57 / 82.23)
OPERATING TEMPERATURE (IN / OUT)	°C (°F)	175.5 / 170.5 (347.9 / 338.9)	65.0 / 85.0 (149.0 / 185.0)

SERVICE RESTRICTIONS			
DESCRIPTION	SHELL SIDE	TUBE SIDE	
CYCLIC / LETHAL / HYDROGEN SERVICE	NO / NO / NO	NO / NO / NO	NO / NO / NO
SOUR SERVICE / NACE REQUIREMENTS	NO / NO	NO / NO	NO / NO
EXPLOSIVE / FLAMMABLE SERVICE	NO / NO	NO / NO	NO / NO

NOZZLE PARAMETERS										
MARK	PIPE SIZE		FLANGE			R.F. PAD		PROJECTION	SERVICE	
	NOMINA L DIA	SCH / THK	CLASS	TYPE	FACE	FINISH Ra µm	O.D. (mm) [in]	THK. (mm) [in]		
S1	NB 4"	SCH 40S	CL 150	SO	RF	3.2-6.3	210 (8 1/4")	6.35 (1/4")	55 (1'-8")	STEAM INLET
S2	NB 4"	SCH 40S	CL 150	SO	RF	3.2-6.3	210 (8 1/4")	6.35 (1/4")	55 (1'-8")	CONDENSATE OUTLET
T1	NB 6"	SCH 40S	CL 150	SO	RF	3.2-6.3	300 (11 13/16")	6.35 (1/4")	55 (1'-8")	PRODUCT 1 + BE INLET
T2	NB 6"	SCH 40S	CL 150	SO	RF	3.2-6.3	300 (11 13/16")	6.35 (1/4")	55 (1'-8")	PRODUCT 1 + BE OUTLET
V1 TO V3	NB 1/2"	SCH 40S	CL 150	SO	RF	3.2-6.3	-	-	SEE DRG.	TUBE SIDE VENT
D1 TO D3	NB 1"	SCH 40S	CL 150	SO	RF	3.2-6.3	-	-	SEE DRG.	TUBE SIDE DRAIN
S3	NB 1/2"	SCH 40S	CL 150	SO	RF	3.2-6.3	-	-	55 (1'-8")	SHELL SIDE VENT

PIPING NOZZLE LOADS TABLE							
MARK	RADIAL FORCE (F _R) (N (lbs))	CIRC. FORCE (F _C) (N (lbs))	LONG. FORCE (F _L) (N (lbs))	CIRC. MOMENT(M _C) (N-m (ft-lbs))	LONG. MOMENT(M _L) (N-m (ft-lbs))	TOPSIONAL MOMENT(M _T) (N-m (ft-lbs))	
S1	2840 (638)	2130 (479)	2840 (638)	680 (152)	1020 (175)	1280 (94.4)	
S2	2840 (638)	2130 (479)	2840 (638)	680 (152)	1020 (175)	1280 (94.4)	
T1	3820 (859)	2860 (643)	3820 (859)	1160 (185)	1740 (1283)	2180 (1608)	
T2	3820 (859)	2860 (643)	3820 (859)	1160 (185)	1740 (1283)	2180 (1608)	
V1 TO V3	-	-	-	-	-	-	
D1 TO D3	-	-	-	-	-	-	
S3	-	-	-	-	-	-	

TOP AND BOTTOM HEAD GASKET TYPE/MATERIAL : GARLOCK 3510 (m = 2 & y = 17.2 MPa (2494.649 psil) , DIMENSION OF TOP AND BOTTOM HEAD GASKET: 751 O.D. x 725 I.D. x 3 THK.

NOZZLE MATERIAL OF CONSTRUCTION		
POS. NO	NOZZLE NECKS	NOZZLE FLANGES
S1	SA-312 GR TP304	SA-182 GR F304
S2	SA-312 GR TP304	SA-182 GR F304
T1	SA-312 GR TP304	SA-182 GR F304
T2	SA-312 GR TP304	SA-182 GR F304
V1 TO V3	SA-312 GR TP304	SA-182 GR F304
D1 TO D3	SA-312 GR TP304	SA-182 GR F304
S3	SA-312 GR TP304	SA-182 GR F304

113	TIE ROD	7	-	SS 304	
112	BAFFLE PLATE	6	-	SA-240 TYPE 304	
111	TUBES	634	-	SA-219 GR TP 304L (SEAMLESS)	
110	TUBE SHEET	2	-	SA-240 TYPE 304	
109	EARTHING LUG	2	-	SS 304	
108	LUG SUPPORT	4	-	SA-240 TYPE 304 / SA-285 GR C	
107	LIFTING TRUNNION	2	-	SA-240 TYPE 304 / SA-285 GR C / SA-106 GR B	
106	LIFTING LUG	4	-	SA-240 TYPE 304 / SA-285 GR C /	
105	TAILING LUG	1	-	SA-240 TYPE 304 / SA-285 GR C /	
104	CHANNEL DISH	2	-		
103	BOTTOM CHANNEL SHELL	1	-	SA-240 TYPE 304	
102	TOP CHANNEL SHELL	1	-		
101	MAIN SHELL	1	-		

BILL OF MATERIAL (FOR ONE EQUIPMENT)				
004	09.09.2021	HOLD REMOVED FOR SUPPORT LUG ELEVATION HEIGHT AND ADDED EXPANSION BELLOW (MARKED 004)		PKV
003	20.07.2021	DRAWING UPDATED AS PER PROCESS COMMENTS (MARKED 003)		PKV
002	05.07.2021	UPDATED ORIENTATION AND HOLD REMOVED FOR ORIENTATION AND DRAWING UPDATED AS PER COMMENTS (MARKED 002)		PKV
001	04.05.2021	DRAWING UPDATED IMPERIAL UNITS TO METRIC AS PER PROCESS COMMENTS (MARKED 001)		PKV
REV	DATE (dd-mm-yyyy)	DESCRIPTION OF MODIFICATION	NBR OF MOD	BY
DESMET BALLESTRA				
ITEM/SECTION NUMBER	621C.1 (19-X-754)	PROJECT	WOPPAR	
ITEM/SECTION DESCRIPTION	OIL / STEAM HEAT EXCHANGER	DOCUMENT	VESSEL (ASSY)	
Sh=94.9 D=710 Ltub=2500			DOCUMENT NUMBER	REVISION
GENERAL ARRANGEMENT			100176792	004

IF IN DOUBT, ASK DO NOT SCALE !

CAD DRWG. DO NOT MODIFY

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
As Required by the Provisions of the ASME Boiler and Pressure Vessel Code Rules, Section VIII, Division 1

1. Manufactured and certified by Wuxi Zhicheng Biochemical Engineering Equipment Co., Ltd. No.8 Baoyuan Road Machinery Equipment Industrial Park, B Zone Yangjian Town, Xishan District, Wuxi City, Jiangsu Province 214108 People's Republic of China.
(Name and address of Manufacturer)

2. Manufactured for Not known
(Name and address of Purchaser)

3. Location of installation Not known
(Name and address)

4. Type Vertical Heat exchanger WZA21-27
(Horizontal, vertical, or sphere) (Oil/steam heat exchanger 621C.1)(19-X-754) (Manufacturer's serial number)
NA WXZC21A20-00 Rev.1 154 2021
(CRN) (Drawing number) (National Board number) (Year built)

5. ASME Code, Section VIII, Div. 1 2019 Edition NA NA
(Edition and Addenda, if applicable (date)) (Code Case number) [Special service per UG-120(d)]

Items 6-11 incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multichamber vessels.

6. Shell: (a) Number of course(s) 3 (b) Overall length 2414mm

Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter	Length	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	See attached form U-4 page 1 of 2													

Body Flanges on Shells													
No.	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Location	Bolting				
									Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material	
NA													

7. Heads: (a) NA (b) NA
(Material spec. number, grade or type) (H.T. — time and temp.) (Material spec. number, grade or type) (H.T. — time and temp.)

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	NA													

Body Flanges on Heads													
	Location	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Bolting				
									Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material	
(a)	NA												

8. Type of jacket NA Jacket closure NA
(Describe as ogee and weld, bar, etc.)

If bar, give dimensions; if bolted, describe or sketch NA

9. MAWP 1.2MPa 0.1MPa at max. temp. 220°C 220°C Min. design metal temp. -10°C at 1.2MPa
(Internal) (External) (Internal) (External)

10. Impact test No, Per UHA-51(d)(e)(h) at test temperature of NA
[Indicate yes or no and the component(s) impact tested]

11. Hydro., pneu., or comb. test pressure Hydro. Test at 1.69MPa (Horizontal) Proof test NA

Items 12 and 13 to be completed for tube sections.

12. Tubesheet SA-240 340 820mm/820mm 40mm/40mm 0mm/0mm Welded/Welded
(Top & Bottom) (O.D.) (Nominal) (Corr. allow.) [Attachment (welded or bolted)]
[Stationary (material spec. no.)] [Diameter (subject to press.)] (Nominal thickness)
NA NA NA NA NA
[Floating (material spec. no.)] (Diameter) (Nominal thickness) (Corr. allow.) (Attachment)

13. Tubes SA-213 TP304L 19.05mm 1.65mm 634 pcs Straight (L=2500mm)
(Material spec. no., grade or type) (O.D.) (Nominal thickness) (Number) [Type (straight or U)]

Chen Hengxing
2021.12.22

Jiangyong Wang
December 22, 2021

FORM U-1

Page 2 of 3

Manufactured by Wuxi Zhicheng Biochemical Engineering Equipment Co., Ltd.
Manufacturer's Serial No. WZA21-27 CRN NA National Board No. 154

Items 14-18 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

14. Shell: (a) Number of course(s) 1/1 (Top/Bottom) (b) Overall length 427mm/427mm (Top/Bottom)

Course(s)			Material	Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter	Length	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	I.D. 710mm	427mm	SA-240 304	6mm	0mm	1	Spot	0.85	1/Man. App.2 Fig. 2-4(8)	Spot/NA	0.85/ NA	NA	NA
2	I.D. 710mm	427mm	SA-240 304	6mm	0mm	1	Spot	0.85	1/Man. App.2 Fig. 2-4(8)	Spot/NA	0.85/ NA	NA	NA

Body Flanges on Shells												
No.	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Location	Bolting			
									Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material
1	FM	725 mm	820 mm	Nominal 72mm	NA	SA-182 F304	Welded	Top	24& M16X160mm	SA-193 B8	O.D.43.5/I.D. 17.5/T3.5 (mm)	SA-240 304
2	FM	725 mm	820 mm	Nominal 72mm	NA	SA-182 F304	Welded	Top	24& M16X160mm	SA-193 B8	O.D.43.5/I.D. 17.5/T3.5 (mm)	SA-240 304

15. Heads: (a) Top: SA-240 304 Cold forming, NOT PWHT (b) Bottom: SA-240 304 Cold forming, NOT PWHT
(Material spec. number, grade or type) (H.T. — time and temp.) (Material spec. number, grade or type) (H.T. — time and temp.)

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	Top	6.5mm	0mm	R 710 mm	R 71 mm	NA	NA	NA	NA	No	Yes	S	Full	0.85
(b)	Bottom	6.5mm	0mm	R 710 mm	R 71 mm	NA	NA	NA	NA	No	Yes	S	Full	0.85

Body Flanges on Heads												
	Location	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Bolting			
									Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material
(a)	NA											

16. MAWP 0.8MPa 0.1 at max. temp. 220°C 220°C Min. design metal temp. -10°C at 0.8MPa
(Internal) (External) (Internal) (External)

17. Impact test No, Per UHA-51(d)(e)(h) at test temperature of NA
(Indicate yes or no and the component(s) impact tested)

18. Hydro., pneu., or comb. test pressure Hydro. Test at 1.11MPa (Horizontal) Proof test NA

19. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Type	Material		Nozzle Thickness		Reinforcement Material	Attachment Details		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
See attached form U-4 page 2 of 2											

20. Supports: Skirt NA Lugs 4 Legs NA Others 7 Lifting lugs Attached Remarks 7
(Yes or no) (Number) (Number) (Describe) (Where and how)

21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report
(list the name of part, item number, Manufacturer's name, and identifying number):

NA

22. Remarks

- 1, Impact test exempted per UHA-51(d)(e)(h).
- 2, PWHT are exempted by UHA-32.
- 3, The safety valve is to be installed at pipe system at site by user.
- 4, For each design and operating condition, see attached Form U-5.
- 5, UG-46(a)" when inspection openings are omitted in fixed tube sheet heat exchangers.
- 6, The channel flange gaskets: O.D. 751/I.D. 725X3mm, GARLOCK 3510, 2 pcs.
- 7, 4 Lifting lugs welded to the Top head and bottom channel shell, the others welded to the shell.

Changheng
2021.12.22

Jinyang Wang
December 26, 2021

FORM U-1

Page 3 of 3

Manufactured by Wuxi Zhicheng Biochemical Engineering Equipment Co., Ltd.
Manufacturer's Serial No. WZA21-27 CRN NA National Board No. 154

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1.

U Certificate of Authorization Number 36,922 Expires Sept. 21, 2022

Date 2021. 12. 22 Name Wuxi Zhicheng Biochemical Engineering Equipment Co., Ltd. Signed Chen zhengming
(Manufacturer) (Representative)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and employed by LRQA Verification Limited of UK

have inspected the pressure vessel described in this Manufacturer's Data Report on December 22, 2021, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. By signing this certificate neither the Inspector nor his/her employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his/her employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date December 22, 2021 Signed Jiangang Wang Commissions AI Commission No.: 14743
(Authorized Inspector) (National Board Authorized Inspector Commission number)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the statements in this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1.

U Certificate of Authorization Number _____ Expires _____

Date _____ Name _____ Signed _____
(Assembler) (Representative)

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and employed by _____

of _____ have compared the statements in this Manufacturer's Data Report with the described pressure vessel and state that parts referred to as data items _____, not included in the certificate of shop inspection, have been inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel in accordance with the ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of _____. By signing this certificate neither the Inspector nor his/her employer makes any warranty, expressed or implied concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his/her employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date _____ Signed _____ Commissions _____
(Authorized Inspector) (National Board Authorized Inspector Commission number)

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
As Required by the Provisions of the ASME Boiler and Pressure Vessel Code Rules, Section VIII, Division 1

1. Manufactured and certified by Wuxi Zhicheng Biochemical Engineering Equipment Co.,Ltd. No.8 Baoyuan Road Machinery Equipment Industrial Park,B Zone YangjianTown,Xishan District, Wuxi City, Jiangsu Province 214108 People's Republic of China.
(Name and address of Manufacturer)

2. Manufactured for Not known
(Name and address of Purchaser)

3. Location of installation Not known
(Name and address)

4. Type Vertical Heat exchanger WZA21-27
(Horizontal, vertical, or sphere) (Oil/steam heat exchanger 621C.1)(19-X-754) (Manufacturer's serial number)
NA WXZC21A20-00 Rev.1 154 2021
(CRN) (Drawing number) (National Board number) (Year built)

Data Report

Item

Number

Remarks

Item 6

Shell:

Course(s)			Material	Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B, & C)			Heat Treatment	
No.	Diameter	Length	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	I.D.710mm	1500mm	SA-240 304	6mm	0mm	1	Spot	0.85	1/ Fig.UW-13.2(j)	Spot/NA	0.85/ NA	None	NA
2	O.D.972mm/ O.D.722mm	216mm	SA-240 304	6mm	0mm	1	Full	1	1/ 1	Spot/ Spot	0.85/ 0.85	None	NA
3	I.D.710mm	698mm	SA-240 304	6mm	0mm	1	Spot	0.85	1/ Fig.UW-13.2(j)	Spot/NA	0.85/ NA	None	NA

Certificate of Authorization: Type U No. 36,922 Expires Sept. 21, 2022Date 2021. 12. 22 Name Wuxi Zhicheng Biochemical Engineering Equipment Co., Ltd. Signed chenzhengming
(Manufacturer) (Representative)Date December 22, 2024 Signed Jiangang Wang Commissions AI Commission No.: 14743
(Authorized Inspector) (National Board Authorized Inspector Commission number)

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
As Required by the Provisions of the ASME Boiler and Pressure Vessel Code Rules, Section VIII, Division 1

1. Manufactured and certified by Wuxi Zhicheng Biochemical Engineering Equipment Co., Ltd. No.8 Baoyuan Road Machinery Equipment Industrial Park, B Zone Yangjian Town, Xishan District, Wuxi City, Jiangsu Province 214108 People's Republic of China.
 (Name and address of Manufacturer)

2. Manufactured for Not known
 (Name and address of Purchaser)

3. Location of installation Not known
 (Name and address)

4. Type Vertical Heat exchanger WZA21-27
 (Horizontal, vertical, or sphere) (Oil/steam heat exchanger 621C.1)(19-X-754) (Manufacturer's serial number)

NA WXZC21A20-00 Rev.1 154 2021
 (CRN) (Drawing number) (National Board number) (Year built)

Data Report

Item Number	Remarks
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Item 19 Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc)	No.	Diameter or Size (mm)	Type	Material		Nozzle Thickness		Reinforce ment Material	Attachment Details		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
S1 Steam inlet	1	O.D. 114.3mm	ASME B16.5- 2013 Cl.150 flg. SO RF	SA-312 TP304	SA-182 F304	6.02mm	0mm	SA-240 304	Fig.UW- 16.1(e)	Fig. UW- 21(1)	NA
S2 Condensate outlet	1	O.D. 114.3mm	ASME B16.5- 2013 Cl.150 flg. SO RF	SA-312 TP304	SA-182 F304	6.02mm	0mm	SA-240 304	Fig.UW- 16.1(e)	Fig. UW- 21(1)	NA
S3 Shell side vent	1	O.D. 21.3mm	ASME B16.5- 2013 Cl.150 flg. SO RF	SA-312 TP304	SA-182 F304	2.77mm	0mm	Integral	Fig.UW- 16.1(c)	Fig. UW- 21(1)	NA
T1 Product 1+BE inlet	1	O.D. 168.3mm	ASME B16.5- 2013 Cl.150 flg. SO RF	SA-312 TP304	SA-182 F304	7.11mm	0mm	SA-240 304	Fig.UW- 16.1(e)	Fig. UW- 21(1)	NA
T2 Product 1+BE outlet	1	O.D. 168.3mm	ASME B16.5- 2013 Cl.150 flg. SO RF	SA-312 TP304	SA-182 F304	7.11mm	0mm	SA-240 304	Fig.UW- 16.1(e)	Fig. UW- 21(1)	NA
V1/V2/V3 Tube side vent	3	O.D. 21.3mm	ASME B16.5- 2013 Cl.150 flg. SO RF	SA-312 TP304	SA-182 F304	2.77mm	0mm	Integral	Fig.UW- 16.1(c)	Fig. UW- 21(1)	NA
D1/D2/D3 Tube side drain	3	O.D. 33.4mm	ASME B16.5- 2013 Cl.150 flg. SO RF	SA-312 TP304	SA-182 F304	3.38mm	0mm	Integral	Fig.UW- 16.1(c)	Fig. UW- 21(1)	NA

Certificate of Authorization: Type U No. 36,922 Expires Sept. 21, 2022

Date 2021. 12. 22 Name Wuxi Zhicheng Biochemical Engineering Equipment Co., Ltd. Signed Chenchen
 (Manufacturer) (Representative)

Date December 22, 2021 Signed Jiangang Wang Commissions AI Commission No.: 14743
 (Authorized Inspector) (National Board Authorized Inspector Commission number)

FORM U-5 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
SHELL-AND-TUBE HEAT EXCHANGERS

As Required by the Provisions of the ASME Boiler and Pressure Vessel Code Rules, Section VIII, Division 1

1. Manufactured and certified by Wuxi Zhicheng Biochemical Engineering Equipment Co.,Ltd. No.8 Baoyuan Road Machinery Equipment Industrial Park,B Zone YangjianTown,Xishan District, Wuxi City, Jiangsu Province 214108 People's Republic of China.
(Name and address of Manufacturer)

2. Manufactured for _____ Not known
(Name and address of Purchaser)

3. Location of installation _____ Not known

4.Type	Vertical (Horizontal, vertical, or sphere)	WZA21-27 (Manufacturer's serial number)	NA (CRN)
	WXZC21A20-00 Rev.1 (Drawing number)	154 (National Board number)	2021 (Year built)

[illegible]

Data Report

Item Number

Remarks

22

Remarks 4

Certificate of Authorization: Type	U	No.	36,922	Expires	Sept. 21, 2022
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Date 2021. 12. 22 Name Wuxi Zhicheng Biochemical Engineering Equipment Co., Ltd. Signed Chenchenming
(Manufacturer) (Representative)

Date December 22, 2021 Signed Jiangang Wang Commissions AI Commission No.: 14743
(Authorized Inspector) (National Board Authorized Inspector Commission number)