

NOTES

1. EST. WT. EMPTY: 18,000#

EST. FULL: 26,200#

BDL: 9,000#

CALCULATED SUPPORT LOADS TABLE

LOAD TYPE	FIXED SUPPORT	SLIDING SUPPORT
EMPTY WEIGHT	23,200 LB	20,385 LB
FULL WEIGHT	27,891 LB	24,122 LB
LONGITUDINAL WIND	105 LB	65 LB
TRANSVERSE WIND	437 LB	444 LB
LONGITUDINAL SEISMIC	19,771 LB	8,473 LB
TRANSVERSE SEISMIC	8,463 LB	8,463 LB
LONGITUDINAL WIND MOMENT	8,400 IN-LB	5,200 IN-LB
TRANSVERSE WIND MOMENT	34,960 IN-LB	35,520 IN-LB
LONGITUDINAL SEISMIC MOMENT	1,581,680 IN-LB	677,840 IN-LB
TRANSVERSE SEISMIC MOMENT	677,040 IN-LB	677,040 IN-LB

NON-PRESSURE PARTS

SUPPORTS / PADS	SA-516 GR. 70
BAFFLES / SUPPORTS	SA-240 304L
TIE RODS / SPACERS	304L S.ST'L
PASS PARTITIONS	SA-240 316L
GROUND LUGS	SA-240 304L
LIFT LUG A	SA-240 304L
LIFT LUG B	SA-36
SEAL STRIPS	SA-240 304L
SHIM PLATE	SA-36
NAMEPLATE BRACKET	SA-240 304
SEAL RODS	304L S.ST'L
LONG BAFFLE	SA-240 304L
LAMIFLEX STRIPS	304L S.ST'L

CERTIFIED BY SOUTHERN HEAT EXCHANGER CORPORATION

REQ'D

ASME

U

RT3

SOUTHERN

HEAT EXCHANGER

A DIVISION OF SHECO INDUSTRIES

SHELL: MAWP (INT) 150 PSIG @ 375 °F

MAWP (EXT) 15 PSIG @ 300 °F

MDMT 20 °F @ 150 PSIG

TUBE: MAWP (INT) 150 PSIG @ 375 °F

MAWP (EXT) 15 PSIG @ 300 °F

MDMT 20 °F @ 150 PSIG

SERIAL NUMBER 22-0251/252 YEAR 2023

SOUTHERN

HEAT EXCHANGER

SERIAL NUMBER 22-0251/252

P.O. NUMBER 4500027311 AIR PRODUCTS P.O.: 4505452541 EN207125

ITEM 19-X-050A/B SIZE/TYPE 40-168 AFS

NOTES SHELLSIDE: C.ST'L TUBESIDE: 316L S.ST'L

HEAT CAP.: 2,099,798 BYU/HR. WORLD ENERGY RENEWABLES

ANSI NOZZLE SCHEDULE

	SIZE	RATE	FACE	NOZZLE NECK	SERVICE
				TUBE SIDE	
• T1/3	6"	300#	RFWN	STD. WT.	BIOSOLIDS INLET
• T2/4	6"	300#	RFWN	STD. WT.	BIOSOLIDS OUTLET
				SHELL SIDE	
■ S1/3	6"	300#	RFWN	X-STG.	TOWER WATER INLET
■ S2/4	6"	300#	RFWN	X-STG.	TOWER WATER OUTLET
V1/D1	¾"	6000#	THD.	FULL CPLG. PLUGGED	VENT/DRAIN
V2/D2	¾"	6000#	THD.	FULL CPLG. PLUGGED	VENT/DRAIN

• EXTENDED WITH 6" STD. WT. L.R. ELBOW.

■ EXTENDED WITH 6" X-STG. L.R. ELBOW.

WELD PROCEDURES/WELD MAP PER DOCUMENT 22-0251/252WM

ASME CODE REQUIREMENTS

	SHELL SIDE	TUBE SIDE
DESIGN PRESSURE (INT/EXT) PSIG	150/15	150/15
DESIGN TEMPERATURE (MAX/MIN) °F	375/300/20	375/300/20
HYDRO. TEST PRESSURE (1 HOLD HOUR) PSIG	200	200
MAWP/LIMITING COMPONENT PSIG	150/BODY FLG.	150/BODY FLG.
CORROSION ALLOWANCE (C.ST'L ONLY)	⅛"	NONE
POSTWELD HEAT TREATMENT	NONE	NONE
RADIOGRAPHIC EXAMINATION	SPOT	SPOT
METAL TEMP. °F	—	—
NUMBER OF PASSES	2	8

ASME CODE STAMP / NAT'L BD. REG IS REQUIRED.

CUSTOMER INSPECTION IS REQUIRED

SPECIFICATIONS: 2021 ASME CODE SECT. VIII DIV. 1 (TEMA 10TH ED.)

SPECIAL SERVICE: NONE CODE CASE: NONE PARTIAL DATA REPORTS: NONE

TEMA (R) EXEMPT FROM IMPACT TESTING PER: UG-20(f), UCS-66, UHA-51

TUBES: SA-213 TP 316L (SMLS) WALL: AVG.

NO. 1032 O.D. ¾" BWG. 16 LENGTH: 14'-0"

TUBESHEETS: SA-240 316L

PART	SHELL SIDE	TUBE SIDE
VESSEL	SA-516 GR. 70	SA-240 316L
COVERS		SA-240 316L
FORMED HEADS	SA-516 GR. 70	
FITTINGS	SA-234 WPB	SA-403 WP 316L
BODY FLANGES	SA-105 (N)	SA-182 F 316L
NOZZLE FLANGES	SA-105	SA-182 F 316L
COUPLINGS/COUPLETS	SA-105	
NOZZLE PIPE	SA-106 GR. B	SA-312 316L
SPLIT BACKING RING		SA-182 F 316L
NOZZLE REINF. PADS	SA-516 GR. 70	SA-240 316L
EXT. STUDS/NUTS	SA-193-B7/SA-194-2H	SA-193-B7/SA-194-2H
INT. STUDS/NUTS	SA-193-B8 CL.1/SA-194-8	SA-193-B8 CL.1/SA-194-8
GASKETS	SEE SHEET 8 FOR DETAIL	SEE SHEET 8 FOR DETAIL
INSULATION (BY OTHERS)	NONE	NONE

REVISIONS

6

07/17/23

REVISED SUPPORT DETAIL.

5

06/30/23

REVISED SUPPORT LOAD TABLE.

4

05/17/23

REVISED ANCHOR BOLTS.

3

04/19/23

REVISED NAME PLATE, CAL. SUPPORT TABLE, SUPPORT DETAIL ON SHEET 3, & SPLIT RING BACKING I.D. ON SHEET 5.

CERTIFIED

ENG. J.D.D.

8/10/2023

CUSTOMER

EVOQUA/WORLD ENERGY PARAMOUNT (AIR PRODUCTS)

CUSTOMER P.O. NO.

4500027311(4505452541)

ITEM NO.

19-X-050A/B

SAP NO.

10016158

PLANT

PARAMOUNT, CA

PROJ. NO.

EN207125

TEMA SIZE AND TYPE

(2) 40-168 AFS 420 GPM WATER COOLER

SOUTHERN HEAT EXCHANGER CORP.

P.O. BOX 1850 TUSCALOOSA, AL. 35403

DATE 10/04/22

ORDER NO.

DWG. NO.

SB220251

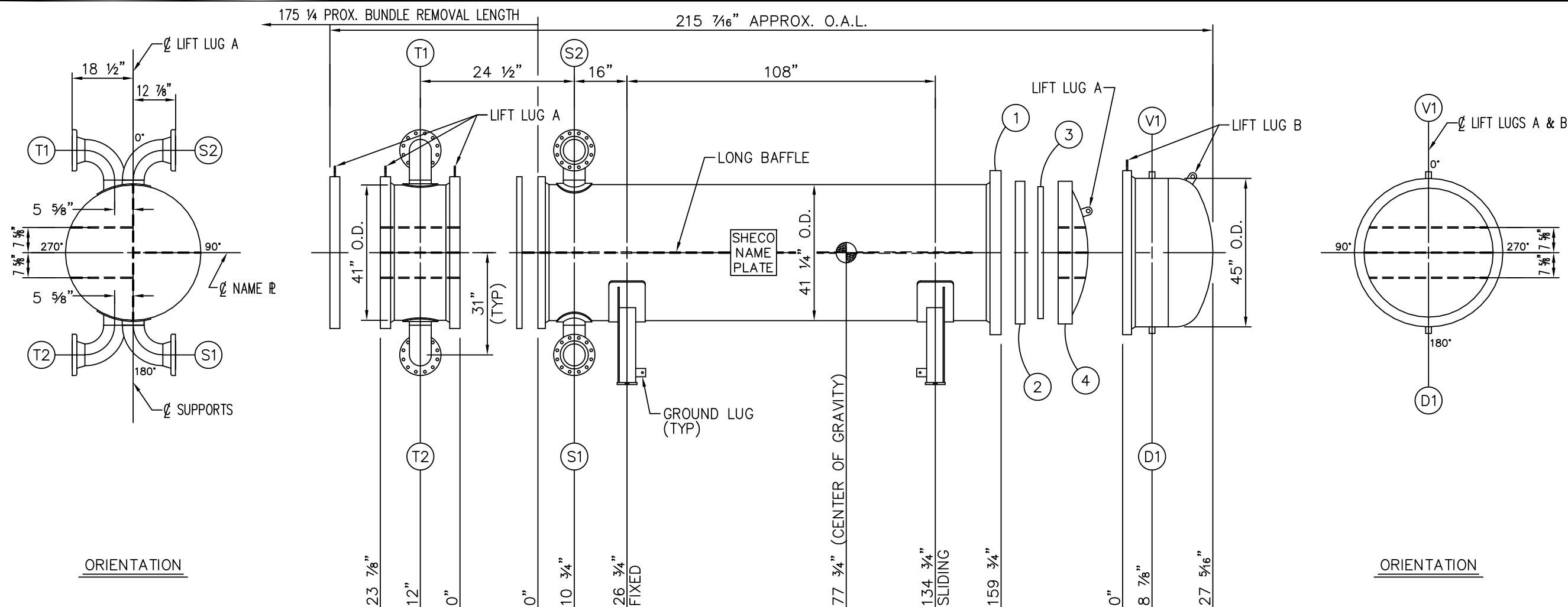
BY S.A.H.

22-0251/252

SHEET 1 OF 11

REV. 6

CERTIFIED

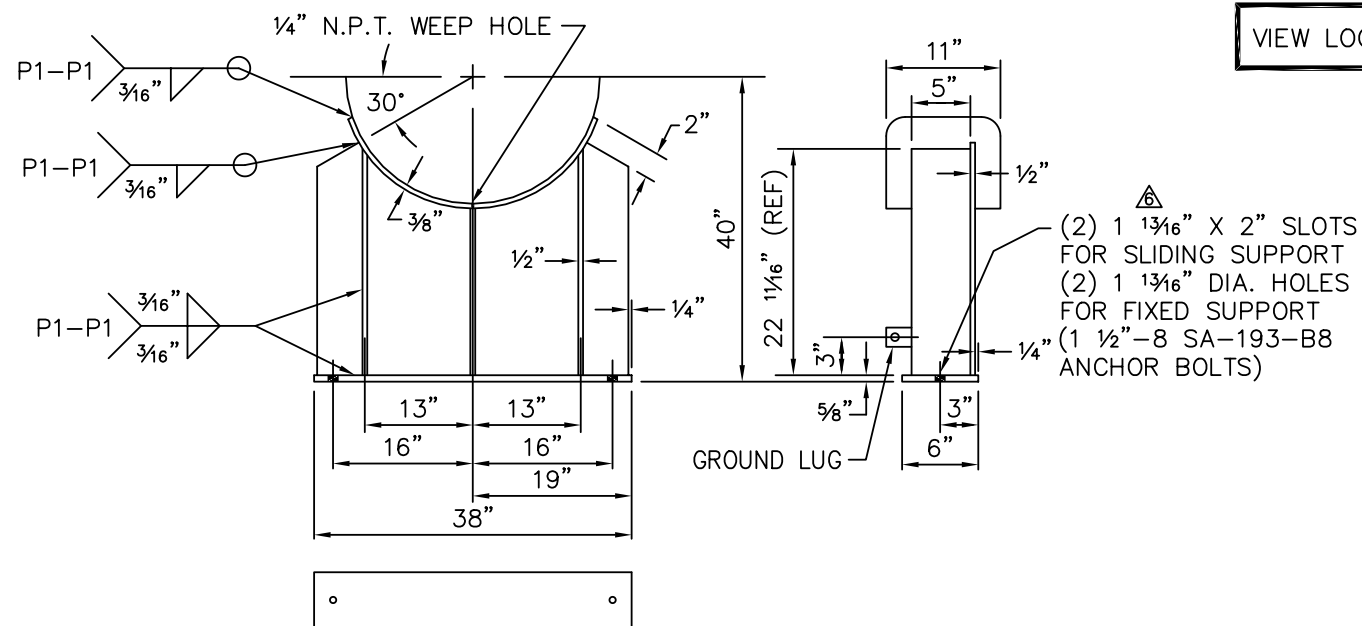


ORIENTATION

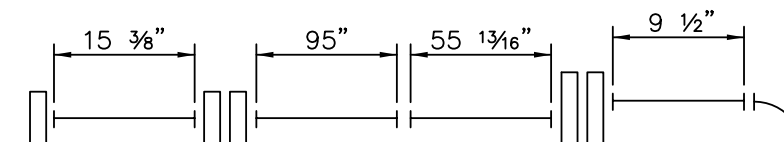
ELEVATION

VIEW LOOKING SOUTH

ORIENTATION



SUPPORT DETAIL

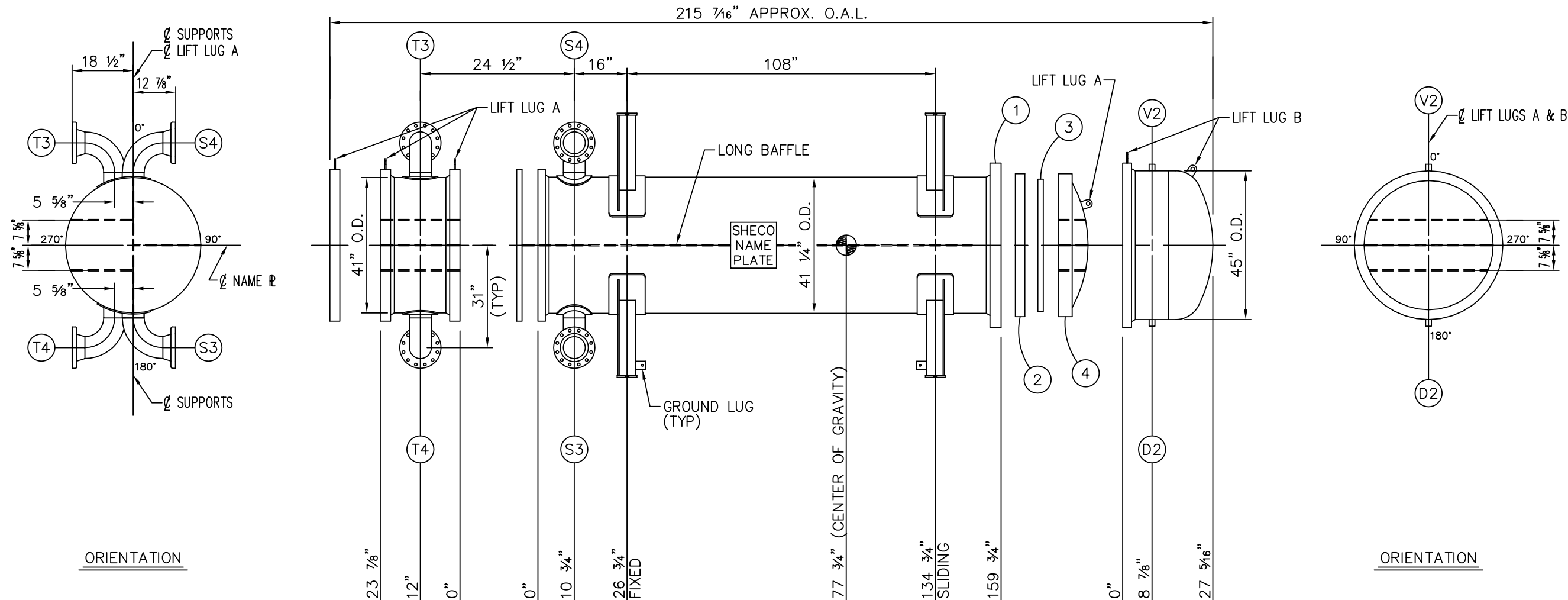


THEORETICAL COURSE LENGTH

- ① SHELL FLANGE
- ② SPLIT BACKING RING
- ③ FLOATING TUBESHEET
- ④ FLOATING HEAD

- C.ST'L
- 316/316L S.ST'L
- 304/304L S.ST'L
(FOR CUT VIEWS ONLY)

CERTIFIED	ENG. J.D.D.	8/10/2023	
CUSTOMER	EVOQUA/WORLD ENERGY PARAMOUNT (AIR PRODUCTS)		
CUSTOMER P.O. NO.	4500027311(4505452541)		
ITEM NO.	19-X-050A	SAP NO.	10016158
PLANT	PARAMOUNT, CA	PROJ. NO.	EN207125
TEMA SIZE AND TYPE (1) 40-168 AFS 420 GPM WATER COOLER			
SOUTHERN HEAT EXCHANGER CORP. P.O. BOX 1850 TUSCALOOSA, AL. 35403			
DATE 10/04/22	ORDER NO.	DWG. NO.	SB220251
BY S.A.H.	22-0251	SHEET 2 OF 11	REV. 6

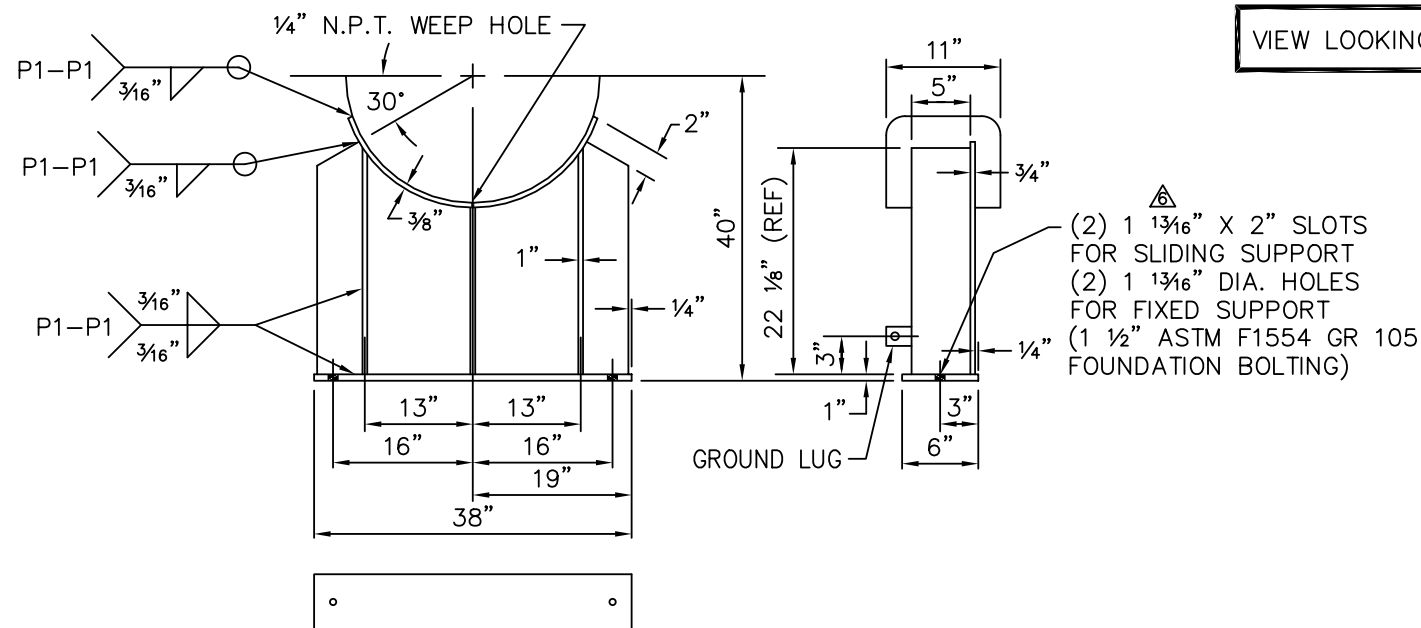


ORIENTATION

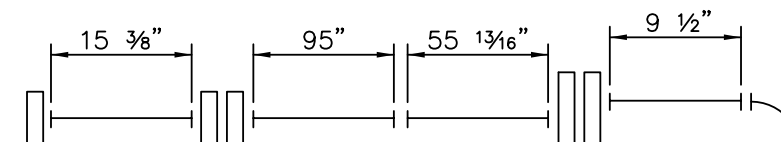
ELEVATION

VIEW LOOKING SOUTH

ORIENTATION



TOP/BTM. SUPPORT DETAIL

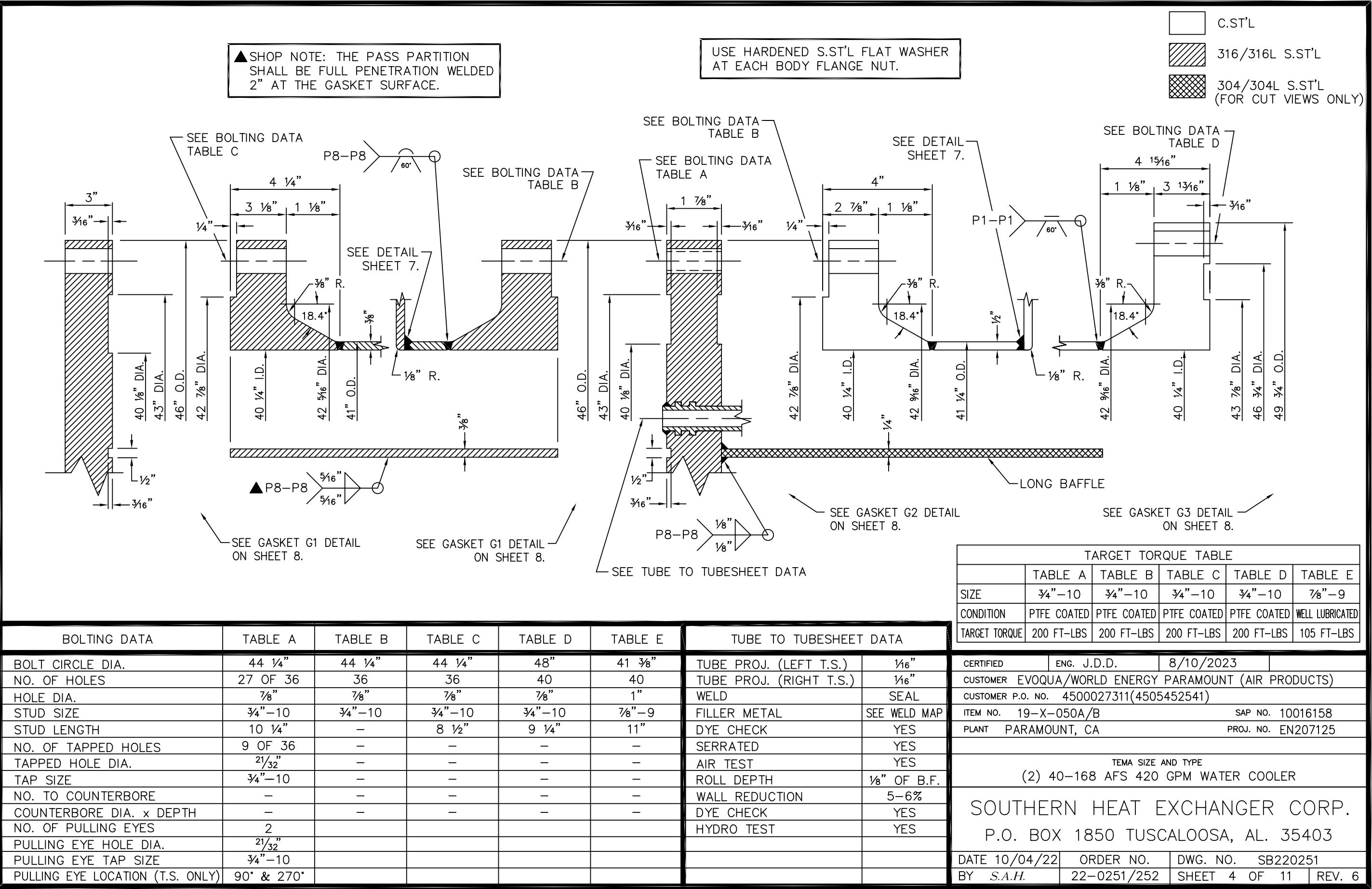


THEORETICAL COURSE LENGTH

- ① SHELL FLANGE
- ② SPLIT BACKING RING
- ③ FLOATING TUBESHEET
- ④ FLOATING HEAD

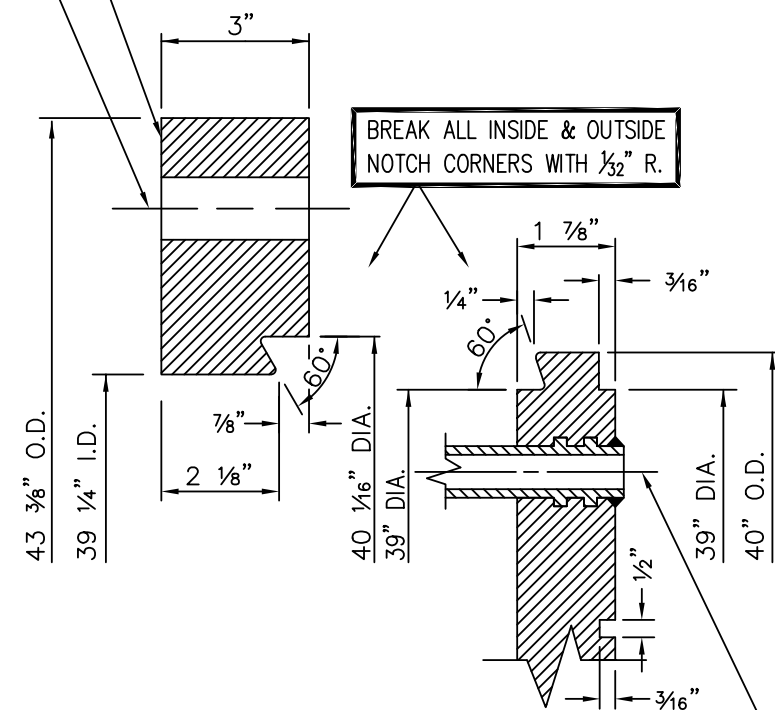
- C.ST'L
- 316/316L S.ST'L
- 304/304L S.ST'L (FOR CUT VIEWS ONLY)

CERTIFIED	ENG. J.D.D.	8/10/2023	
CUSTOMER EVOQUA/WORLD ENERGY PARAMOUNT (AIR PRODUCTS)			
CUSTOMER P.O. NO. 4500027311(4505452541)			
ITEM NO. 19-X-050B		SAP NO. 10016158	
PLANT PARAMOUNT, CA		PROJ. NO. EN207125	
TEMA SIZE AND TYPE			
(1) 40-168 AFS 420 GPM WATER COOLER			
SOUTHERN HEAT EXCHANGER CORP.			
P.O. BOX 1850 TUSCALOOSA, AL. 35403			
DATE 10/04/22		ORDER NO.	DWG. NO. SB220251
BY S.A.H.		22-0252	SHEET 3 OF 11
			REV. 6





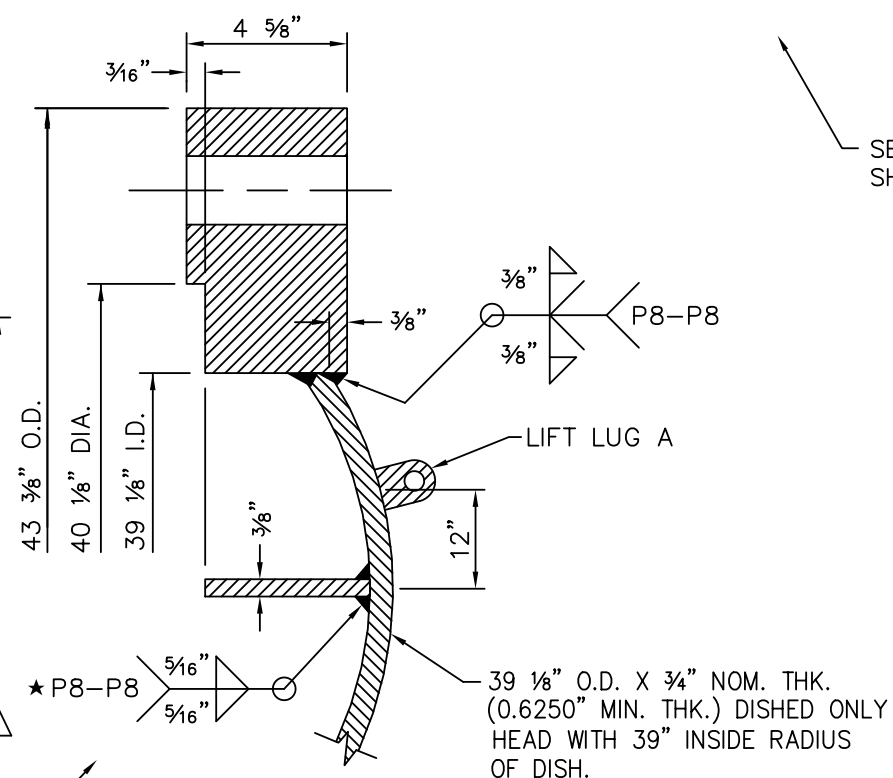
✓ SPLIT BACKING RING



SEE TUBE TO TUBESHEET DATA SHEET 4 -

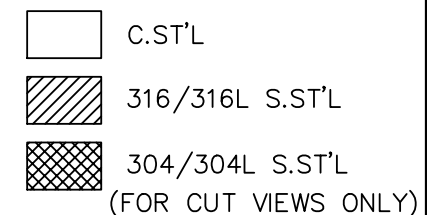
SEE GASKET G4 DETAIL
SHEET 8

FLOATING TUBESHEET & HEAD

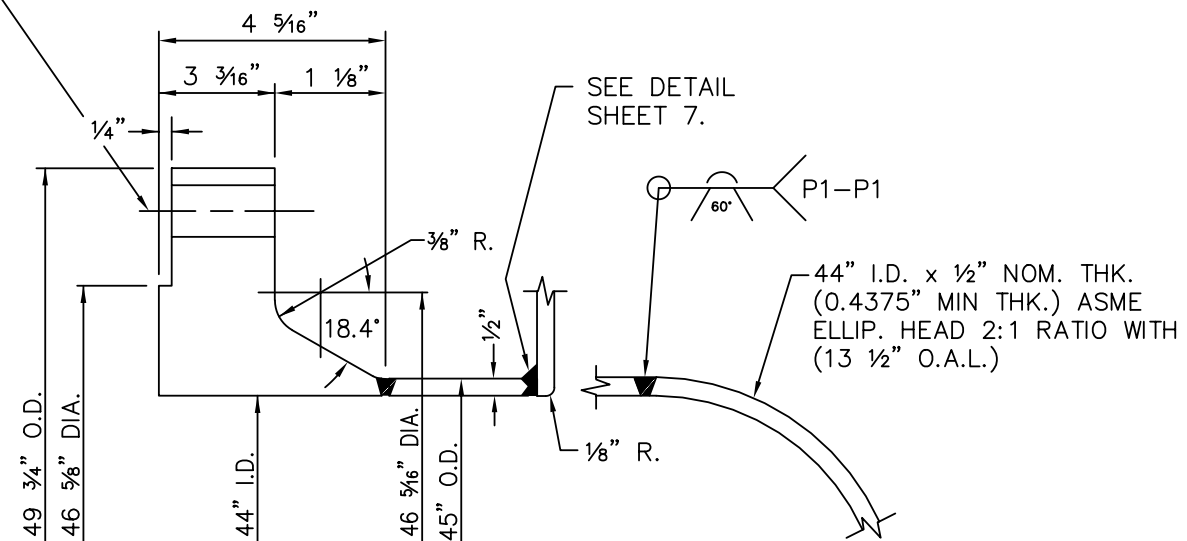


- 39 1/8" O.D. X 3/4" NOM. THK.
(0.6250" MIN. THK.) DISHED ONLY
HEAD WITH 39" INSIDE RADIUS
OF DISH.

★ SHOP NOTE: THE PASS PARTITION SHALL BE FULL PENETRATION WELDED 2" AT THE GASKET SURFACE.



- SEE BOLTING DATA TABLE D
SHEET 3.

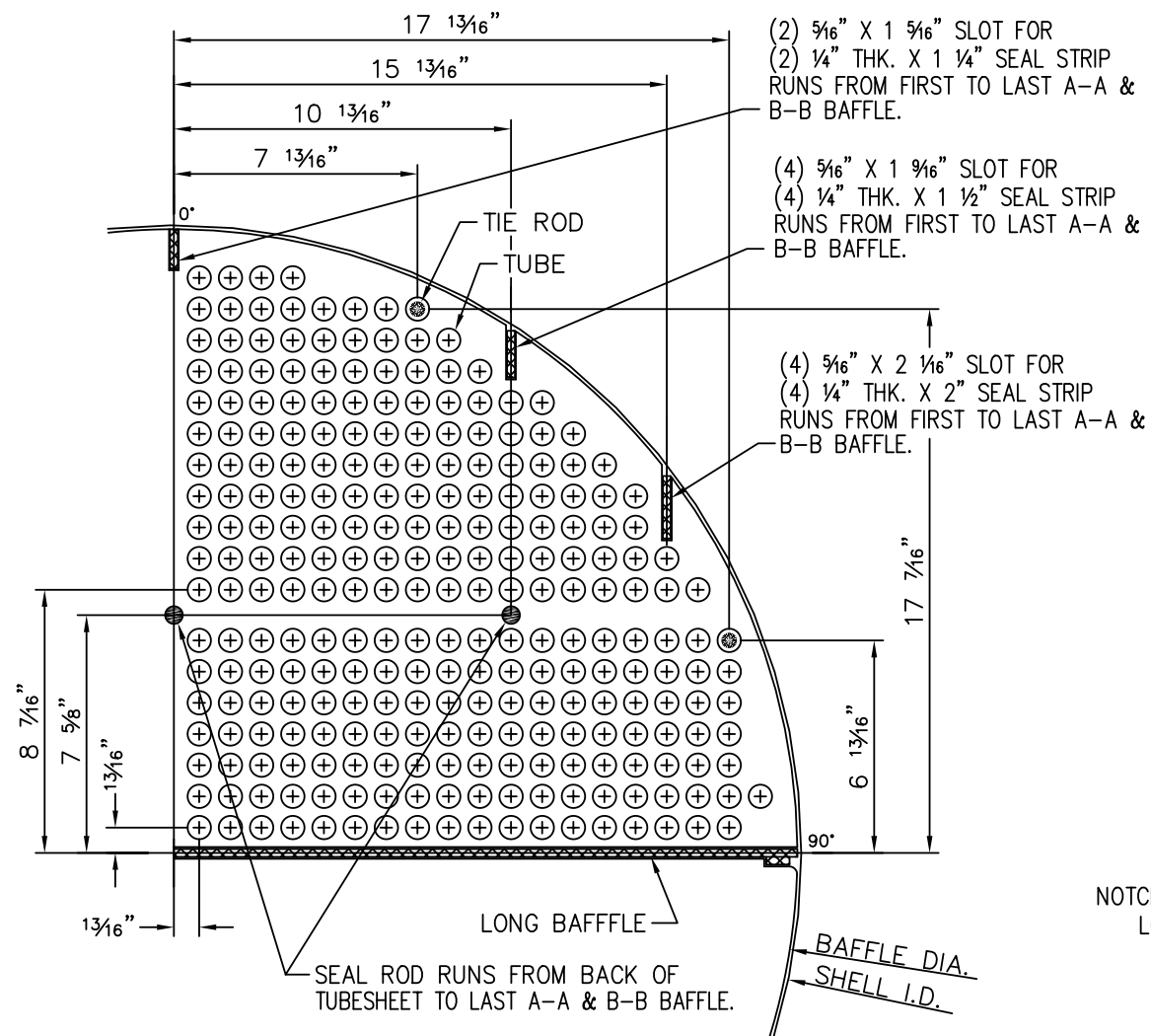


44" I.D. x 1/2" NOM. THK.
(0.4375" MIN THK.) ASME
ELLIP. HEAD 2:1 RATIO WITH
(13 1/2" O.A.L.)

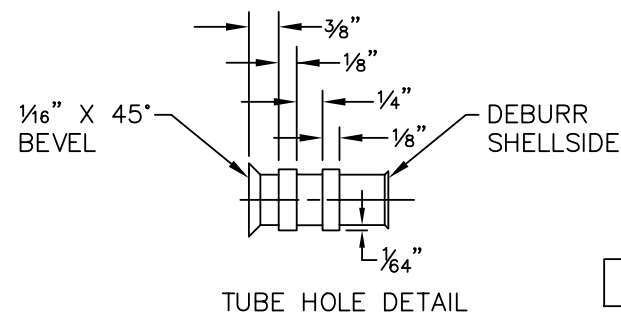
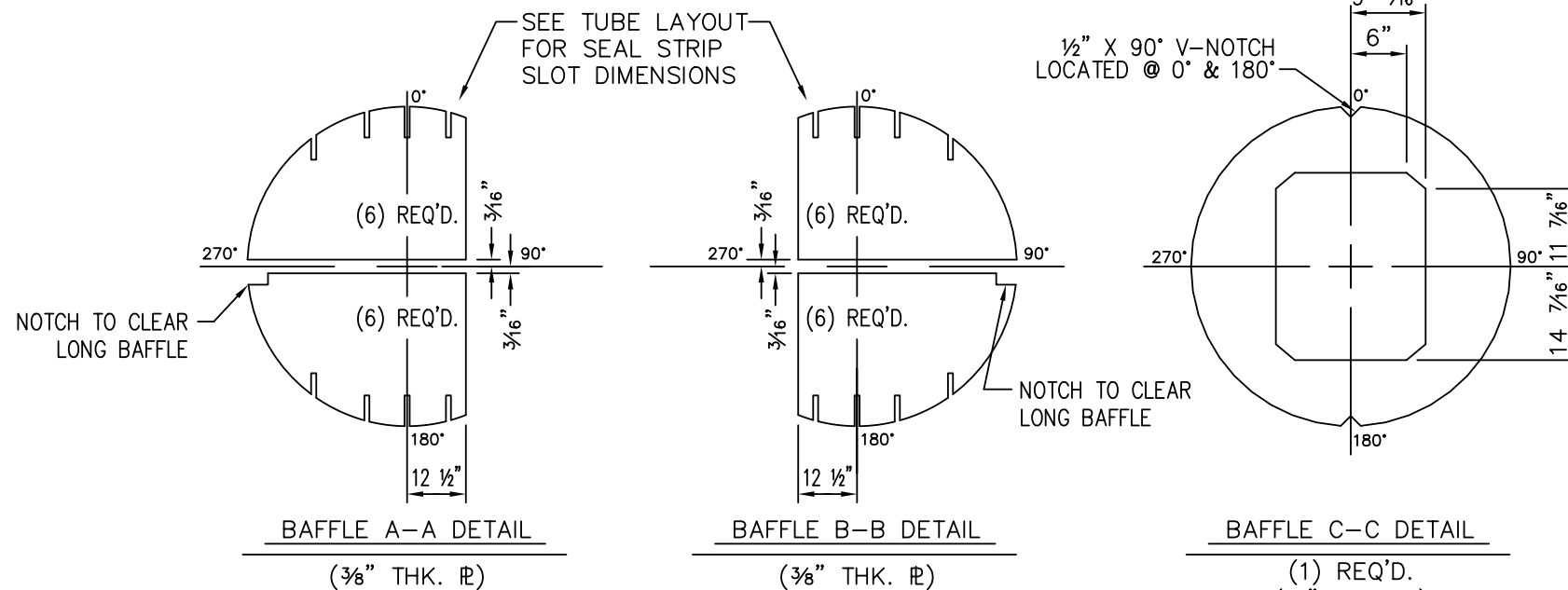
— SEE GASKET G3 DETAIL
SHEET 8.

FLOATING HEAD COVER

CERTIFIED	ENG. J.D.D.	8/10/2023
CUSTOMER EVOQUA/WORLD ENERGY PARAMOUNT (AIR PRODUCTS)		
CUSTOMER P.O. NO. 4500027311(4505452541)		
ITEM NO. 19-X-050A/B	SAP NO. 10016158	
PLANT PARAMOUNT, CA	PROJ. NO. EN207125	
TEMA SIZE AND TYPE (2) 40-168 AFS 420 GPM WATER COOLER		
SOUTHERN HEAT EXCHANGER CORP. P.O. BOX 1850 TUSCALOOSA, AL. 35403		
DATE 10/04/22	ORDER NO.	DWG. NO. SB220251
BY S.A.H.	22-0251/252	SHEET 5 OF 11
		REV. 6

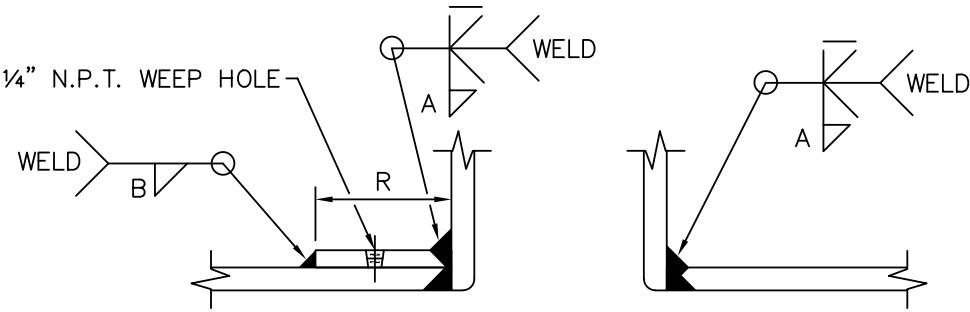


TUBE O.D.	3/4"
NO OF TUBE HOLES	1032
SIZE OF TUBE HOLE IN TUBESHEET	0.758"
SIZE OF TUBE HOLE IN BAFFLE	25/32"
PITCH	1" 90°
TIE ROD O.D.	1/2"
NO. OF TIE RODS	8
TIE ROD HOLE SIZE IN TUBESHEET	9/16" x 1/2" DP. (SEAL WELD)
TIE ROD HOLE SIZE IN BAFFLE	9/16"
SPACER O.D.	3/4"
SEAL ROD O.D.	1/2"
NO. OF SEAL RODS	6
SEAL ROD HOLE SIZE IN BAFFLES	9/16"
O.T.L.	38.5492"
BAFFLE DIA.	40.0000"
BAFFLE CUT ALTERNATES	(SEE BAFFLE DETAILS)



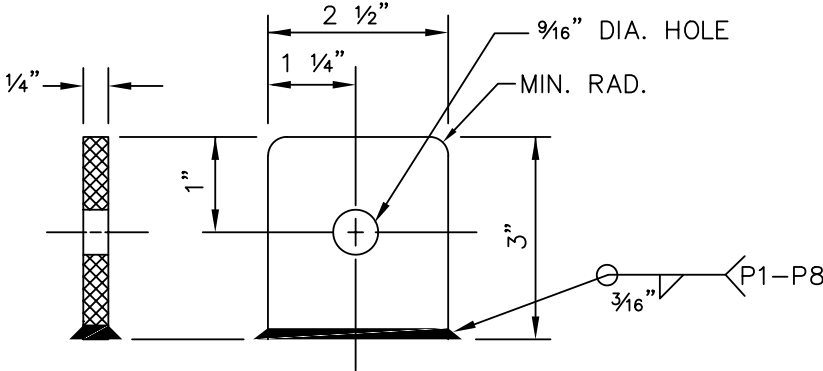
	C.ST'L
	316/316L S.ST'L
	304/304L S.ST'L (FOR CUT VIEWS ONLY)

CERTIFIED	ENG. J.D.D.	8/10/2023	
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TEMA SIZE AND TYPE (2) 40-168 AFS 420 GPM WATER COOLER			
SOUTHERN HEAT EXCHANGER CORP. P.O. BOX 1850 TUSCALOOSA, AL. 35403			
DATE 10/04/22	ORDER NO.	DWG. NO.	SB220251
BY S.A.H.	22-0251/252	SHEET 6 OF 11	REV. 6

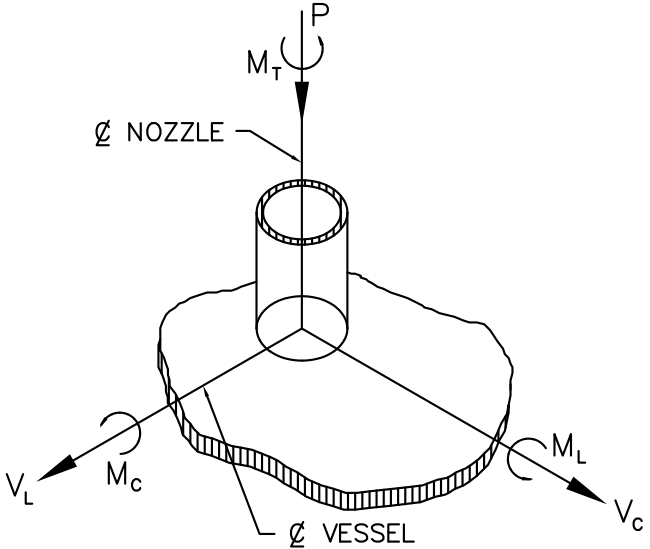


NOZ.	SIZE	PAD THK.	R	PAD SIZE	WELD	A	B
T1-4	6"	3/8"	2" MIN.	11 1/4" DIA.	P8-P8	5/16"	5/16"
S1-4	6"	3/8"	2" MIN.	11 1/4" DIA.	P1-P1	5/16"	5/16"
V1/D1	3/4"	PAD NOT REQ'D			P1-P1	3/16"	-
V2/D2	3/4"	PAD NOT REQ'D			P1-P1	3/16"	-

NOZZLE WELD DETAIL
(HATCH NOT SHOWN ON THIS DETAIL)

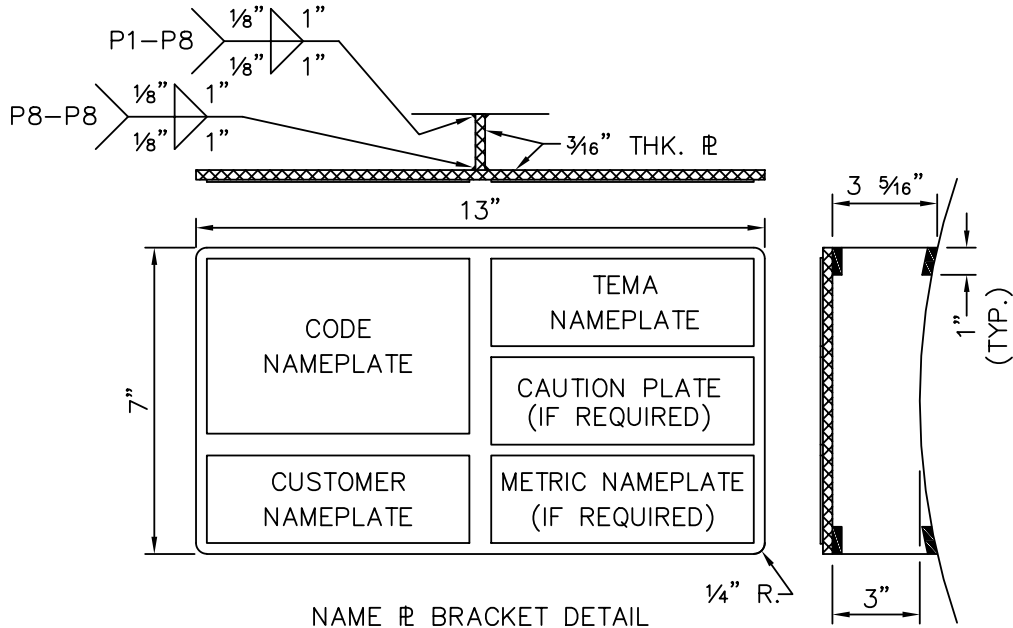


GROUND LUG DETAIL
(2) REQ'D.
(DO NOT PAINT)



ALLOWABLE EXTERNAL LOADS ON NOZZLES
(TWO TIMES API 660 LOADS FOR 150# FLANGES)

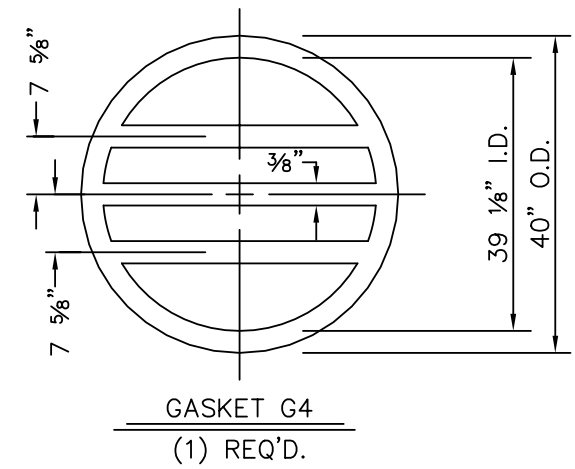
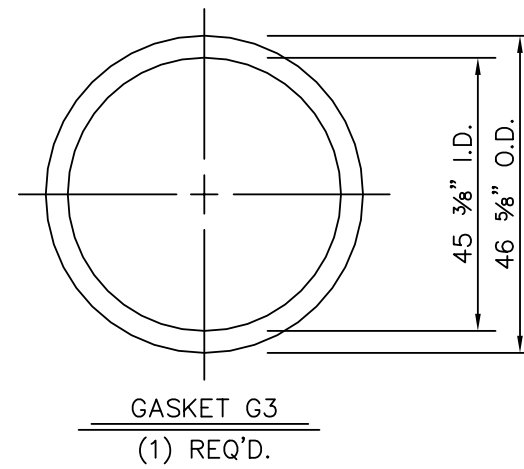
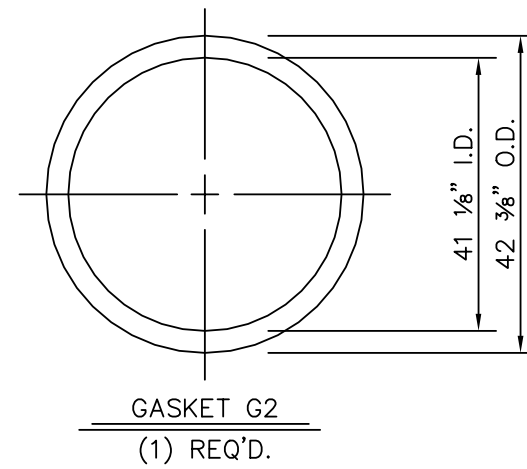
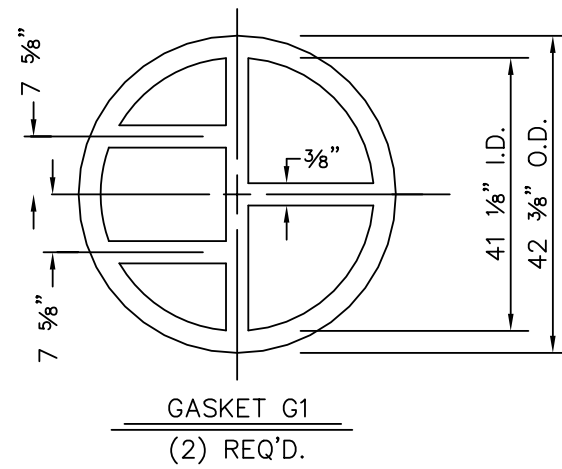
Noz.	P (lbs.)	V _L (lbs.)	V _C (lbs.)	M _L (ft.-lbs.)	M _C (ft.-lbs.)	M _T (ft.-lbs.)
T1/2	1600	2000	2000	3880	3060	4920
T3/4	1600	2000	2000	3880	3060	4920
S1/2	1600	2000	2000	3880	3060	4920
S3/4	1600	2000	2000	3880	3060	4920



NAME PLATE BRACKET DETAIL

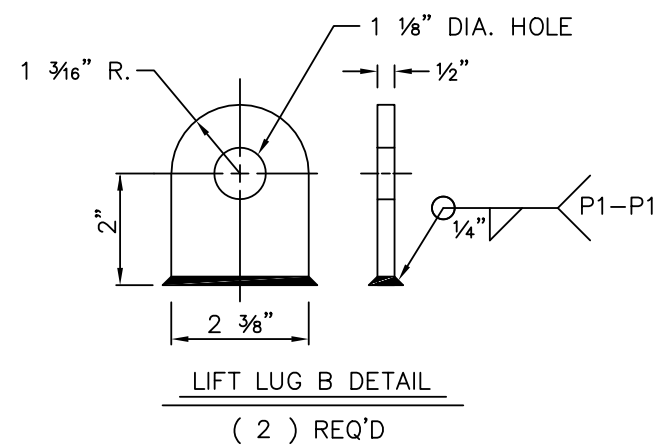
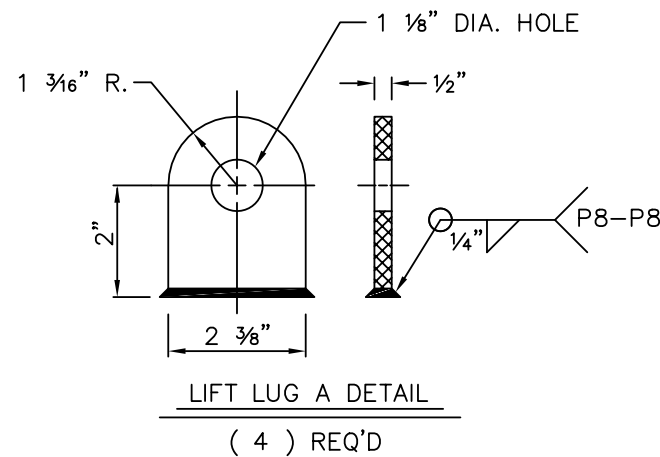
- C.ST'L
- 316/316L S.ST'L
- 304/304L S.ST'L (FOR CUT VIEWS ONLY)

CERTIFIED	ENG. J.D.D.	8/10/2023	
CUSTOMER EVOQUA/WORLD ENERGY PARAMOUNT (AIR PRODUCTS)			
CUSTOMER P.O. NO. 4500027311(4505452541)			
ITEM NO. 19-X-050A/B		SAP NO. 10016158	
PLANT PARAMOUNT, CA		PROJ. NO. EN207125	
TEMA SIZE AND TYPE (2) 40-168 AFS 420 GPM WATER COOLER			
SOUTHERN HEAT EXCHANGER CORP. P.O. BOX 1850 TUSCALOOSA, AL. 35403			
DATE 10/04/22	ORDER NO.	DWG. NO. SB220251	
BY S.A.H.	22-0251/252	SHEET 7 OF 11	REV. 6



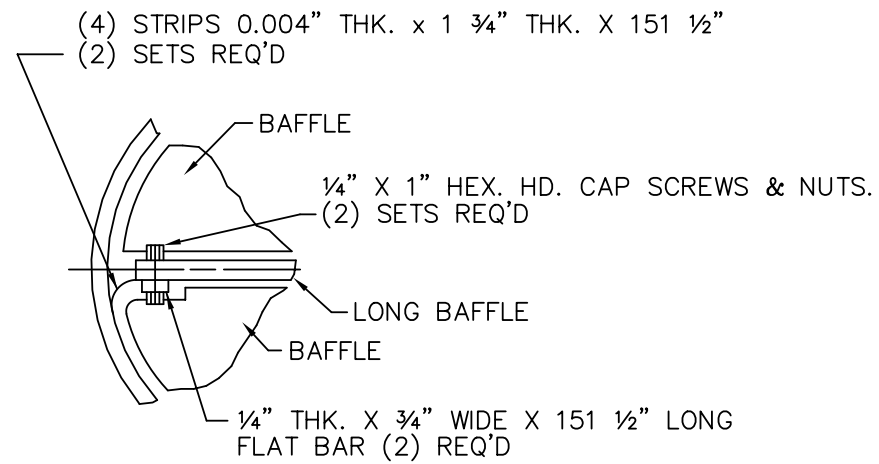
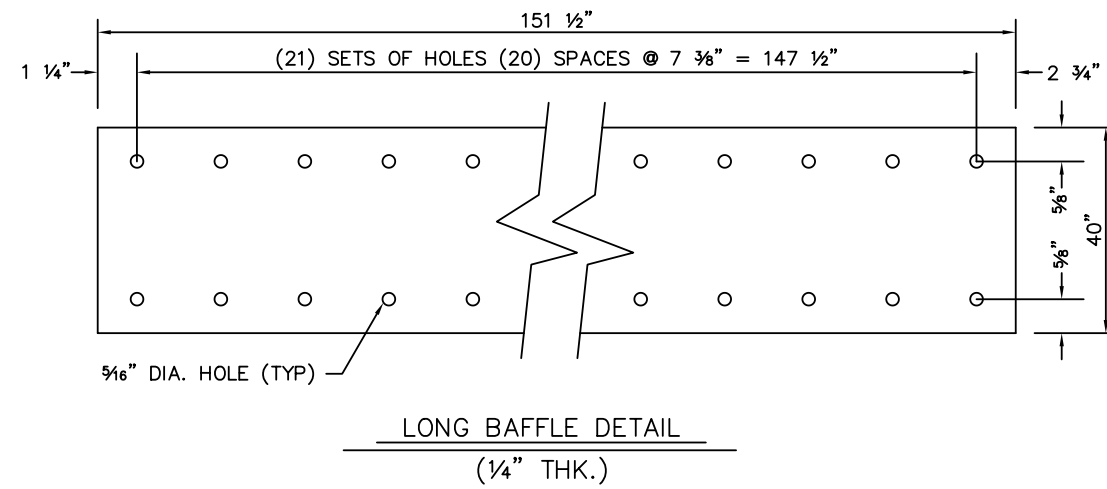
GASKET DETAIL

1/8" THK. 316L S.ST'L KAMMPROFILE GASKET WITH GRAPHITE FACE



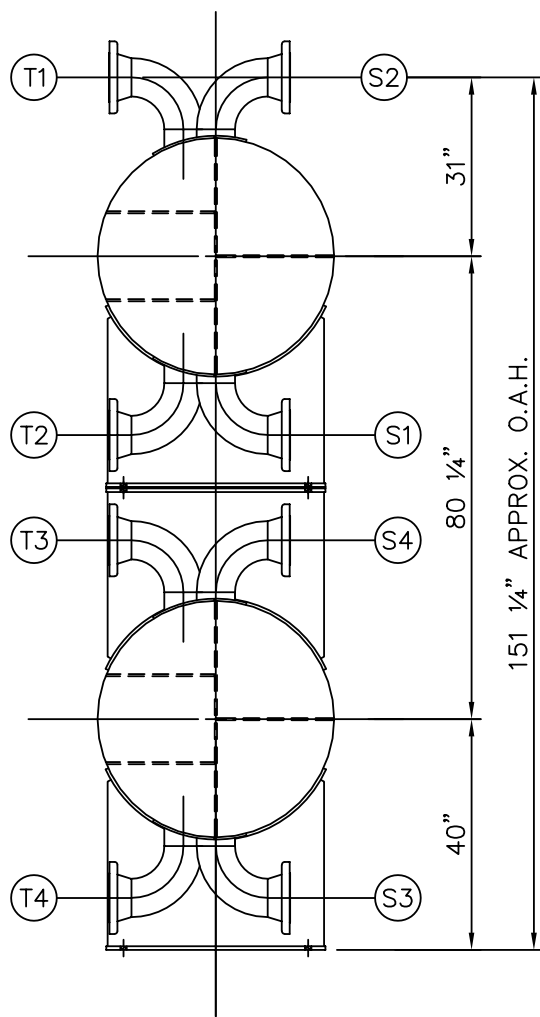
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BY S.A.H.	22-0251/252	SHEET 8 OF 11	REV. 6

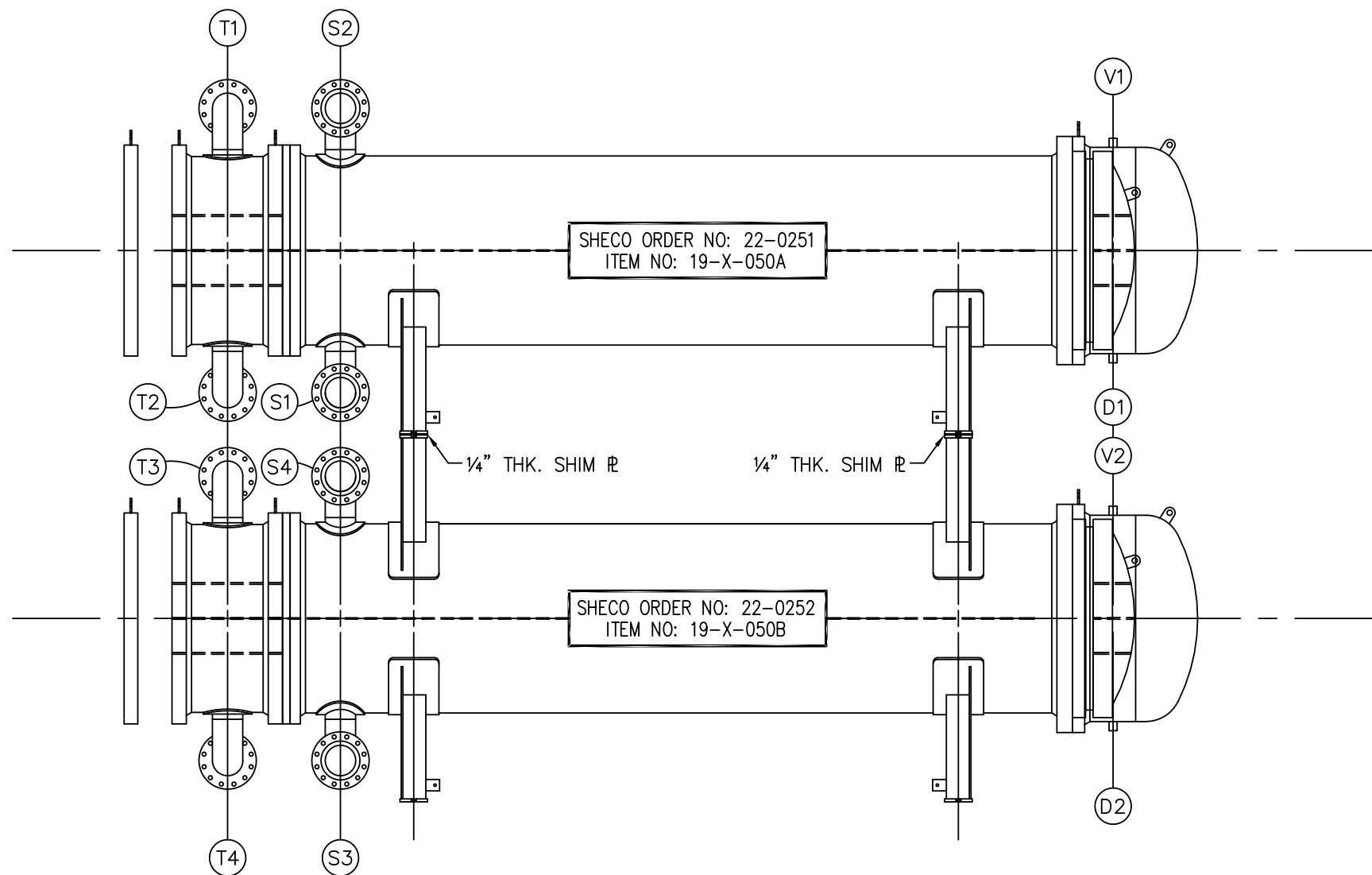


	C.ST'L
	316/316L S.ST'L
	304/304L S.ST'L (FOR CUT VIEWS ONLY)

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DATE 10/04/22	ORDER NO.	DWG. NO.	SB220251
BY S.A.H.	22-0251/252	SHEET 9 OF 11	REV. 6



ORIENTATION



ELEVATION

STACKING DETAIL

-  C.ST'L
-  316/316L S.ST'L
-  304/304L S.ST'L
(FOR CUT VIEWS ONLY)

CERTIFIED	ENG. J.D.D.	8/10/2023	
CUSTOMER EVOQUA/WORLD ENERGY PARAMOUNT (AIR PRODUCTS)			
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SOUTHERN HEAT EXCHANGER CORP.			
P.O. BOX 1850 TUSCALOOSA, AL. 35403			
DATE 10/04/22	ORDER NO.	DWG. NO.	SB220251
BY S.A.H.	22-0251/252	SHEET 10 OF 11	REV. 6

-	GENERAL	SHOP	QC	5	FCAW may be used with the following restrictions: Dual Shield Process, the use of low hydrogen diffusible electrodes (H4 or H8) is mandatory Filler metal wire diameter less than or equal to 0.045inch.			2	Paint: C.ST'L Only: Sandblast O.S. per SSPC-SP-10. S.ST'L Only: Solvent Clean O.S. per SSPC-SP-1. C.ST'L Only: Apply (1) prime coat of Carbozinc 11 2.5 to 4.0 mils D.F.T. Apply (1) intermediate coat of Thermaline 4900 1.5 to 2.0 mils D.F.T. Apply (1) finish coat of Thermaline 4900 (Color: Light Gray, RAL 7035) 1.5 to 2.0 mils D.F.T. Total D.F.T. is 5.5 to 8.0 mils.		
1	All bolt holes straddle normal centerlines.			6	Welding specifications per 4WEQ-1051 and A8KM-PP-000-500550-A.			-	SHIPPING	SHOP	QC
2	Provide customer with MTR's for all materials including ANSI flanges and hydrotest certificate.			7	Surfaces to be welded shall be cleaned 1 1/2 inch on either side of the weld on the OD and ID. Surfaces shall be free from paint, oil, dirt, scale, oxides, and other foreign material detrimental to the weld.			1	The unit shall be gravity drained following hydrotest.		
-	MATERIALS	SHOP	QC	8	Weld joint preparation shall be made by machining, grinding, or thermal cutting. When thermal cutting is performed, the joint surfaces shall be mechanically cleaned to sound metal prior to welding.			2	Following hydrotest, the interior shall be drained, dried, and cleaned of slag, spatter, and foreign material.		
1	Materials may be globally sourced.			9	SAW multipass welding in carbon steel, alloy steel, and corrosion-resistant steels shall use an essentially neutral flux.			3	Package and label all spare parts and gaskets with the customer's purchase order number and equipment number.		
2	All 304/304L and 316/316L material shall be dual certified.			10	Welds deposited by the SAW process shall not derive any principal element from the flux. Solid wires for automatic welding processes shall contain the principal elements required for the deposited weld metal.			4	Paint customer purchase order number and equipment number on the shell in 3" high letters with highly visible paint.		
3	Elliptical heads shall either be cold formed with heat treatment as required per UCS-79 for exceeding 5% elongation, or it shall be hot formed.			11	Carbon and low alloy steel electrodes/bare wire that have a nonspecific chemistry as indicated by a "G" classification shall not be used.			5	Following hydrotest, drain and hot air dry both sides.		
4	Tubesheet plate shall be 100% UT examined to detect possible laminations prior to welding to the shell.			12	GMAW - Short Circuit (GMAW-S) Transfer process is limited as follows: Carbon steel only, The root pass is removed by back gouging and the back gouged area welded with another process, Vertical welding is performed in the uphill progression, GMAW-S is not allowed for branch connections, nozzle-to-shell welds, attachments and socket welds.			6	Provide a nitrogen charge of 5 psig on both sides. Provide a gauge and drain valve on both sides. All covers shall be painted orange and clearly marked with a removable tag indicating that the vessel is under pressure.		
5	All external body flange bolting shall be teflon coated.			-	NDE	SHOP	QC	7	Determine the center of gravity by successive lifts. Paint "C.G." on shell in 3" high block letters at C.G. point.		
-	MACHINING	SHOP	QC	1	At least one spot radiograph shall be made of each butt weld (excluding nozzles 10" NPS and smaller) and shall include all starts and stops of welds made by the sub-arc process.						
1	125-250 microinch RMS main gasket surfaces.			2	Spot radiographs must be minimum of 10" long or the full length of the weld if it is shorter than 10".						
2	The flatness tolerance of peripheral gasket surfaces shall be 1/32" as measured by a straight edge. Flatness readings shall be conducted after all welding, tube rolling, machining, and any PWHT is complete.			3	One longitudinal weld, one circumferential weld and each nozzle to shell weld (if greater than 2" NPS) shall be Brinell hardness tested. If more than one set of WPS is used to fabricate longitudinal or circumferential seams, a Brinell hardness test shall be performed for each set of WPS. The test shall include the weld metal and the heat affected zone and shall be performed after any required PWHT. The maximum Brinell hardness limit shall be 225 HBW for carbon steel and 240 HBW for stainless steels.						
-	FABRICATION	SHOP	QC	4	Hydro test water shall not have more than 50 ppm chlorides.						
1	After all welding and any heat treatment, a metal template consisting of two rigid disks mounted 18" apart shall pass through the shell without binding. The disk diameter shall equal the baffle OD, and the thickness shall be the baffle thickness or 1/4", whichever is less.			5	Reinforcement pads shall be pneumatically tested at 25 psig.						
2	Marking inks, crayons, or paints that contain chlorine, carbon, or harmful metals or metal salts such as zinc, lead, or copper which may cause corrosive attack when the part is heated, shall not be used. Wax crayon or vegetable dye markers are acceptable.			6	PMI is required for all 300 S.ST'L and higher alloy materials. PMI to be performed per World Energy Paramount spec. A8KM-PP-000-500512-A.						
3	S.ST'L metal shall not be contaminated with C.ST'L tools, brushes, or grinding discs during welding or cleaning.			7	Areas where temporary attachments have been removed shall be PT or MT examined.						
4	All body flanges and tubesheets shall be match marked to prevent misassembly.			8	Materials that have been verified by PMI shall be marked and recorded.						
5	Coat all studs with antiseize compound. Do not get the antiseize compound on the gasket surfaces.			9	All arc strikes, starts, and stops shall be confined to the welding groove or shall be removed by light grinding followed by either PT or MT examination.						
6	Coat all exposed gasket surfaces with rust veto heavy.			-	COATING	SHOP	QC				
-	WELDING	SHOP	QC	1	Paint or other coatings shall not be applied until after hydrotest.						
1	SMAW, GTAW, SAW, FCAW, and GMAW with Spray or Short Circuit Transfer, are acceptable when used in accordance with this specification and the applicable Codes. Using a combination of these processes within a weld joint is also acceptable. GMAW Globular Transfer is prohibited.										
2	Full penetration open root groove welds which will not be backgouged in P-4 material and higher shall have the root pass welded with the GTAW process and shall have the interior beneath the welding zone purged with an inert gas. The inert gas shall be held for the first two layers of weld metal.										
3	Open-root welds made from one side with low hydrogen SMAW electrodes or FCAW require backgouging and rewelding/back welding of the back gouged area.										
4	Single sided butt welds with FCAW root pass and removable ceramic backer. Weld metal to be back gouged form the opposite side and rewelded as required to achieve full penetration.										

CERTIFIED	ENG. J.D.D.	8/10/2023	
CUSTOMER	EVOQUA/WORLD ENERGY PARAMOUNT (AIR PRODUCTS)		
CUSTOMER P.O. NO.	4500027311(4505452541)		
ITEM NO.	19-X-050A/B	SAP NO.	10016158
PLANT	PARAMOUNT, CA	PROJ. NO.	EN207125
TEMA SIZE AND TYPE			
(2) 40-168 AFS 420 GPM WATER COOLER			
SOUTHERN HEAT EXCHANGER CORP.			
P.O. BOX 1850 TUSCALOOSA, AL. 35403			
DATE 10/04/22	ORDER NO.	DWG. NO.	SB220251
BY S.A.H.	22-0251/252	SHEET 11 OF 11	REV. 6