----------API-660----------

1) STENCIL THE FOLLOWING ON THE EXCHANGER IN 3" HIGH (MIN.) WHITE BLOCK LETTERS::

   P.O. NO.: 4505600057

   ITEM NO.: 18-X-380

   SHIPPING WT.: 1,900 LBS.

   STENCIL "DO NOT WELD ON CHANNEL-PWHT" IN TWO (2) PLACES, 180° APART.

2) STUDS, NUTS AND THREADED SURFACES SHALL BE COATED WITH MARKAL E-Z- BREAK COMPOUND BEFORE ASSEMBLY.

3) HYDRO TEST PRESSURE SHALL BE HELD FOR A MINIMUM OF ONE HOUR.

4) PLUG SHELL INSIDE DIAMETER WITH A METAL TEMPLATE CONSISTING OF TWO DISCS (EACH HAVING A DIAMETER EQUAL TO THE DIAMETER OF THE BAFFLES) RIGIDLY MOUNTED PERPENDICULAR TO A SHAFT, AND SPACED 12" APART.

5) AT LEAST ONE SPOT RADIOGRAPH SHALL BE MADE OF EACH CIRCUMFERENTIAL AND LONGITUDINAL JOINT. SPOT RADIOGRAPHS SHALL INCLUDE EACH START, STOP AND BURN-THROUGH OF WELDS MADE BY THE AUTOMATIC SUBMERGED ARC PROCESS.

6) SPOT RADIOGRAPHS SHALL BE AT LEAST 10" LONG, OR SHALL BE FULL LENGTH WHERE WELDS ARE LESS THAN 10 INCHES LONG.

7) THE FLATNESS TOLERANCE (MAXIMUM DEVIATION FROM A PLANE) ON PERIPHERAL GASKET CONTACT SURFACES SHALL BE ± 1/32".

8) FLATNESS OF GASKET SURFACES SHALL BE MEASURED WITH A DIAL INDICATOR. PASS PLATE GROOVES CAN BE MEASURED WITH A STRAIGHT EDGE.

----------API-660 CONT.----------

9) WELD METAIL AND HAZ. HARDNESS EXAMINATION REQUIREMENTS ARE AS FOLLOWS (AFTER PWHT, IF REQUIRED):
   - -225 BHN, MAXIMUM.
   - -A 10mm BALL IS REQUIRED FOR TESTING.
   - -TEST ONE LONGITUDINAL AND ONE CIRCUMFERENTIAL WELD AND EACH CONNECTION TO COMPONENT WELD OF NOZZLES 2" NPT AND LARGER.
   - -IF MORE THAN ONE WELDING PROCEDURE IS USED TO PERFORM LONGITUDINAL OR CIRCUMFERENTIAL WELDS, HARDNESS READINGS SHALL BE MADE OF THE WELDS DEPOSITED BY EACH PROCEDURE.
   - -HARDNESS READINGS AND LOCATIONS SHALL BE RECORDED.
   - -TESTING TO BE DONE ON INSIDE SURFACE IF ACCESSIBLE.

10) FINAL VISUAL WELD INSPECTION SHALL BE PERFORMED AFTER POST WELD HEAT TREATMENT, IF REQUIRED.

11) COAT EXPOSED MACHINED SURFACES WITH AN EASILY REMOVABLE RUST PREVENTATIVE.

12) NOTIFY CUSTOMER TEN (10) DAYS PRIOR TO START OF FABRICATION, WITNESS OR HOLD POINTS.

13) MATCH MARKS SHALL BE PROVIDED TO ENSURE PROPER ALIGNMENT OF BOLTED JOINTS.

14) STAMP THE SERIAL No. ON O.D. OF TUBESHEETS, FLANGES AND CHANNEL COVERS.

15) HYDRO TEST CHARTS REQUIRED.

16) NOZZLE WELD PADS & SUPT. PADS SHALL BE AIR & W/15 PSI (MIN), 25 PSI (MAX) AIR PRESSURE.

----------API-660 CONT.----------

17) ALL FINISHED WELDS ON CHANNEL SHALL BE M.T. AFTER P.W.H.T.

18) SHELLSIDE HYDRO TEST SHALL BE PERFORMED WITH CHANNEL COVER REMOVED.

19) HEAT TREAT CHARTS REQUIRED.

20) TUBE WALL REDUCTION SHALL BE 8% MAXIMUM.

---------STANDARD SHOP PRACTICES---------

1) ALL BOLT HOLES SHALL STRADDLE NATURAL CENTERLINES.
2) GRIND INSIDE WELDS FLUSH WITH SHELL.
3) GRIND INSIDE WELDS SMOOTH WITH CHANNELS.
4) RADIUS ALL NOZZLES 1/8" INSIDE AT CYLINDER I.D.
5) SEAL WELD SUPPORT SADDLES WITH 1/4"(MIN) FILLET WELD.
6) EXCHANGER SHALL BE CLEANED INSIDE AND OUTSIDE OF WELD SPATTER, DIRT, WELD ROD AND OTHER DEBRIS.
7) FOR MDMT OF +30° F. (MINIMUM), HYDRO TEST WATER TEMPERATURE SHALL NOT TO BE LESS THAN 50°F.
8) ALL EXTERNAL ATTACHMENTS TO BE SEAL WELDED.
9) HYDROSTATIC TEST, USE CLEAN WATER WITH A CORROSION INHIBITOR ADDED.
   VOLUME OF WATER SHELLSIDE = 50 GALLONS (APPROXIMATELY)
   VOLUME OF WATER TUBESIDE = 16 GALLONS (APPROXIMATELY)
10) ALL LIFTING DEVICE ATTACHMENT WELDS SHALL BE EXAMINED BY THE PT METHOD.
11) INSTALL SHIPPING COVERS ON ALL NOZZLES.
12) ALL SEAL WELDED EXTERNAL NON PRESSURE ATTACHMENTS REQUIRE A 1/4" NPT VENT HOLE.
13) AFTER THE HYDRO TEST, THE HEAT EXCHANGER SHALL BE COMPLETELY DRAINED AND THOROUGHLY DRIED.

---------NDT REQUIREMENTS---------

1) SHELL: SPOT RADIOGRAPH.
2) CHANNELS: SPOT RADIOGRAPH.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.: 4505600057/ A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
1	8/19/22	ADDED DWG. PER CUST. B.W./DD

JOB NOTES

DWN. BY B.W.
DATE 8/19/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG. NO. S21-13258-16-1B
REV. 1

----------CUST. NOTES----------

1) ALL SHARP EDGES SHALL BE GROUND TO A .078" RAD. (MIN.)
2) THE INITIAL ROOT PASS OF DBL WELDED GROOVE JOINTS, INCLUDING ROOT TACK WELDS, SHALL BE CHIPPED, GROUND &/OR GOUGED TO SOUND METAL, AREA TO BE EITHER MPE OR DPE PRIOR TO WELDING FROM OTHER SIDE.
3) ON TUBESIDE, ALL CAT. A,B,C,D WELDS, THE WELDS & ADJACENT METAL TO BE HEATED TO 600°F., WRAPPED WITH INSULATION & ALLOWED TO COOL UNTIL PWHT CAN BE PERFORMED LATER.
4) PRESSURE CONTAINING WELDS, INTERNAL ATTACHMENT WELDS, & SUPPORT WELDS SHALL BE CONTOURED TO PERMIT PROPER INTERPRETATION OF ANY REQ'D. UT EXAMINATION.
5) ALL WELDING CONSUMABLES SHALL BE OF LOW HYDROGEN TYPE. E60XX ELECTRODES SHALL NOT BE USED!
6) TEMPORARY ATTACHMENTS TO BE REMOVED BY MECHANICALLY OR THERMALLY CUT WITHIN 1/8" OF SURFACE. AREA TO BE GROUND FLUSH W/ SURROUNDING AREAS FOLLOWED BY MPE OR DPE. DO NOT "KNOCK OFF."
7) NOZ. TO CYL. WELDS, BRANCH NOZ. WELDS WHICH CAN'T BE X-RAYED SHALL BE UT.
8) ALL ARC STRIKES, START, STOPS SHALL BE CONFINED TO THE WELDING GROOVE OR SHALL BE REMOVED BY LIGHT GRINDING FOLLOWED BY MPT OR DPE.
9) HYDRO TEST WATER TEMP. AT ALL LOCATIONS SHALL BE AT LEAST 50°F. AT ALL TIMES DURING HYDROTEST.
10) THE USE OF HIGH NICKEL CONTENT C'STL. WELDING CONSUMABLES OR C-1/2Mo CONSUMABLES IS PROHIBITED.
11) ALL WELD SURFACES TO BE VISUALLY INSPECTED TO ENSURE THAT LAMINATIONS &/OR OTHER DEFECTS ARE NOT PRESENT.
12) IF PWHT IS REQ'D. ALL PLATE EDGES SHALL BE MPT OR DPE BEFORE WELDING.

----------CUST. NOTES CONT.----------

13) ACCEPTANCE NDE SHALL BE PERFORMED AFTER ANY REQ'D. PWHT.
14) PEENING IS NOT PERMITTED FOR PURPOSE OF CLEANING WELDS.
15) EXCH'S. TO BE STENCILED W/ THE FOLLOWING"
    "HEIGHT" : 3'-4"
    "WIDTH" : 1'-6"
    "LENGTH" : 16'-7"
    "WEIGHT" : 1,900#
16) FINISHED EXCHANGER IS TO BE WEIGHTED. TO BE WITHIN +/- 2% OR BETTER ACCURACY. A CALIBRATED WEIGHT CERTIFICATE SHALL BE PROVIDED.
17) THE TEMPERATURE OF THE HYDRO TEST WATER & THE EXCHANGER SHALL BE EQUALIZED PRIOR TO HYDROTEST.
18) STAMPING TO BE DONE WITH "LOW STRESS" STAMPS.
19) LIFTING POINTS & CENTER OF GRAVITY SHALL BE MARKED ON EXCHANGER.
20) THE ENTIRE SURFACE OF FORGINGS INCLUDING WELD BEVEL SHALL BE EXAMINED BY MT AFTER FINISH MACHINING & PRIOR TO WELDING.
21) EXCHANGER SHALL BE IN A MANNER WHICH KEEPS NOZZLES FROM TOUCHING THE TRUCK BEDS AND/OR SURFACES AT OFF-LOADING AREA AT JOBSITE.
22) PRIOR TO WELDING, JOINTS SHALL BE VISUALLY INSPECTED FOR CLEANLINESS, CONDITION OF TACK WELDS IF PRESENT, PREHEAT IF SPECIFIED, AND FILLER METAL TO BE USED.
23) REQUIRED PREHEAT TEMPERATURE SHALL ALSO APPLY TO THERMAL CUTTING AND TACK WELDING.
24) PREHEAT ALL JOINT TO A MINIMUM OF 125° F. WHEN MOISTURE REMOVAL IS REQUIRED.
25) RADIOGRAPH OF WELDS IN PIPE EQ/OR SMALLER THAN 3" NPS, MAY BE DONE BY THE ELLIPTICAL PROJECTION TECHNIQUE. AT LEAST TWO SEPARATE EXPOSURES ARE REQ'D. AT 90° APART.

----------CUST. NOTES CONT.----------

22) FOR SET ON NOZZLES, THE BASE METAL ADJACENT TO AUX. NOZZLE OPENINGS ON MAIN NOZZLES SHALL BE THOROUGHLY U.T. & M.P.E. TO ENSURE THAT THERE ARE NO FLAWS. (ETC. LAMINATIONS)
23) WELDS FROM EACH WELD PROCEDURE, WELDER/WELDING OPERATOR SHALL BE SPOT RADIOGRAPHED IF ACCESSIBLE.
24) NON PRESSURE PARTS TO PRESSURE CONTAINING COMPONENT WELDS SHALL BE 100% M.P.E. OR D.P.E.
25) ALL CIRC SEAMS, NOZZLE ATTACHMENT WELDS SHALL BE FULL PENETRATION WELDED AS SHOWN ON DWG. -13.
26) FOR OFFSET NOZZLES, THE MIN. THROAT DIMENSIONS SHALL BE MAINTAINED.
27) ALL WELDING SHALL BE IN ACCORDANCE WITH ASME SECT. IX & PROJECT SPECIFICATIONS A8KM-PP-000-500550-A, A8KM-PP-000-500532-A, 4WEQ-1051, 3-11-10, 4-11-11.
28) ALL SHELL & HEAD JOINTS SHALL BE BACK WELDED JOINTS, WHERE POSSIBLE.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
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PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.: 4505600057/ A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
1	8/22/22	ADDED DWG./FABSCO B.W./DD

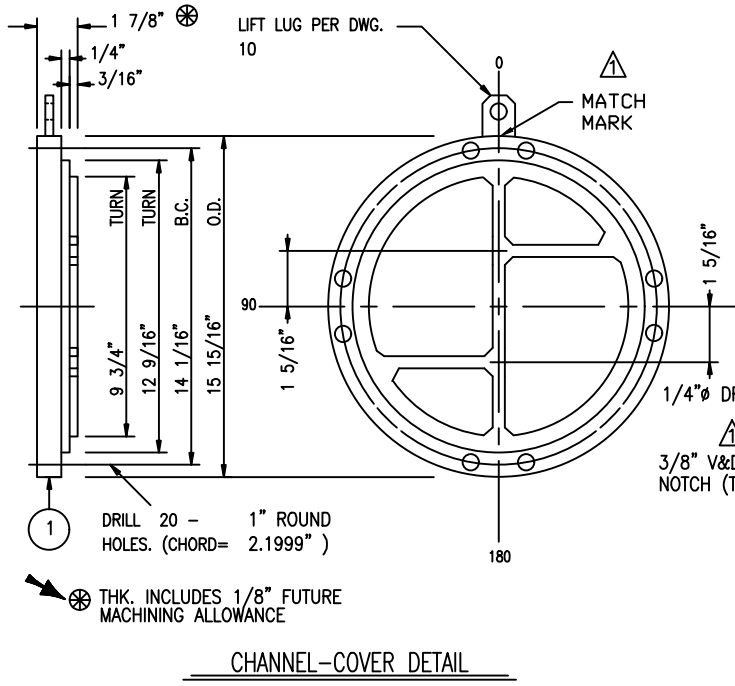
JOB NOTES (CONT.)

DWN. BY B.W.
DATE 8/22/22
CKD. BY *DiCarlo*

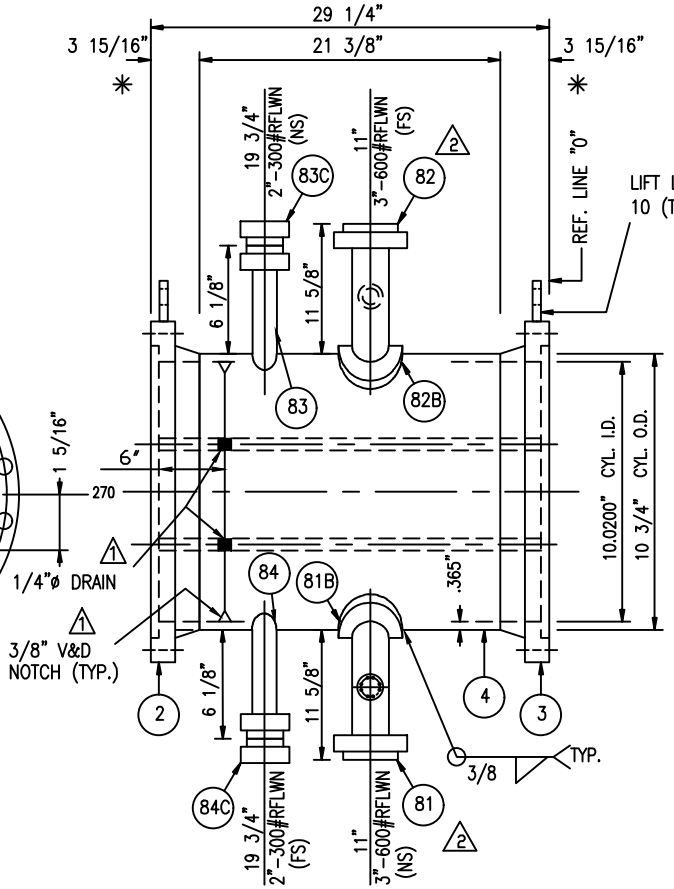
Fabsco SHELL & TUBE, LLC

DWG. NO. S21-13258-16-1C
REV. 1

COVER NOTES:
1) MACHINE ALL COVER SURFACES TO 250 RMS EXCEPT GASKET FACES TO BE 125 RMS.
2) ALL COVER PASS PLATE GROOVE WIDTHS TO BE 1/2" WIDE.
3) ALL COVER PASS PLATE GROOVE JUNCTIONS TO BE NOTCHED 3/8" AT 45 Deg.

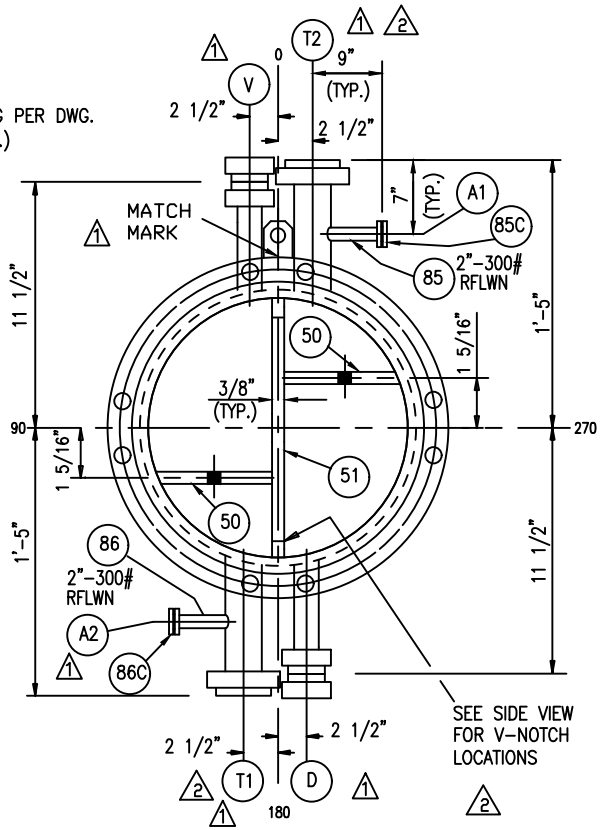


CHANNEL-COVER DETAIL



CHANNEL SIDE VIEW

* MACHINE GASKET FACING AFTER ALL WELDING.
FOR FLANGE DETAILS SEE DWG. 12



CHANNEL END VIEW

NOTES:

1) ALL WELDING TO BE IN ACCORDANCE W/ PROCEDURES ON DWG. -18.
2) ALL BOLT HOLES TO STRADDLE CENTER LINES.
3) FOR WELD AND BEVEL DETAILS SEE DWG. -13.
4) GRIND ALL INSIDE WELDS SMOOTH.
5) SPOT RADIOGRAPHY.
6) POST-WELD HEAT TREAT CHANNEL:
   A) HEAT FROM 800°F TO 1175°F +0° – 25° AT 400°F PER HOUR.
   B) HOLD AT 1175°F +0°-25° F FOR 1-HOUR (MIN).
   C) COOL FROM 1175°F +0° – 25° TO 800°F AT 500°F PER HOUR.
   D) FURTHER COOLING MAY BE IN STILL AIR.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
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AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
2	10/24/22	REV. PER CUST. COMMENTS DD/DG
1	8/18/22	REV. PER CUST. B.W./DD

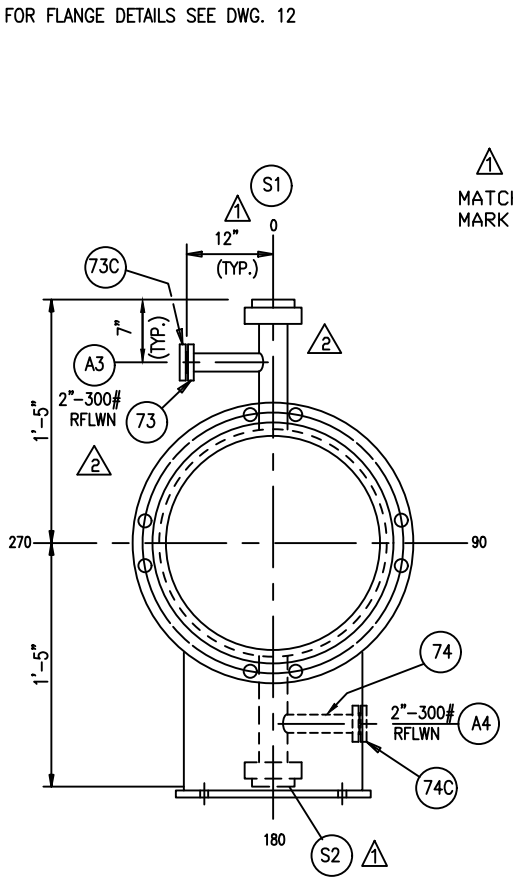
FRONT CHANNEL DETAILS

DWN. BY	B.W.
DATE	6/15/22
CKD. BY	*DiCarlo*

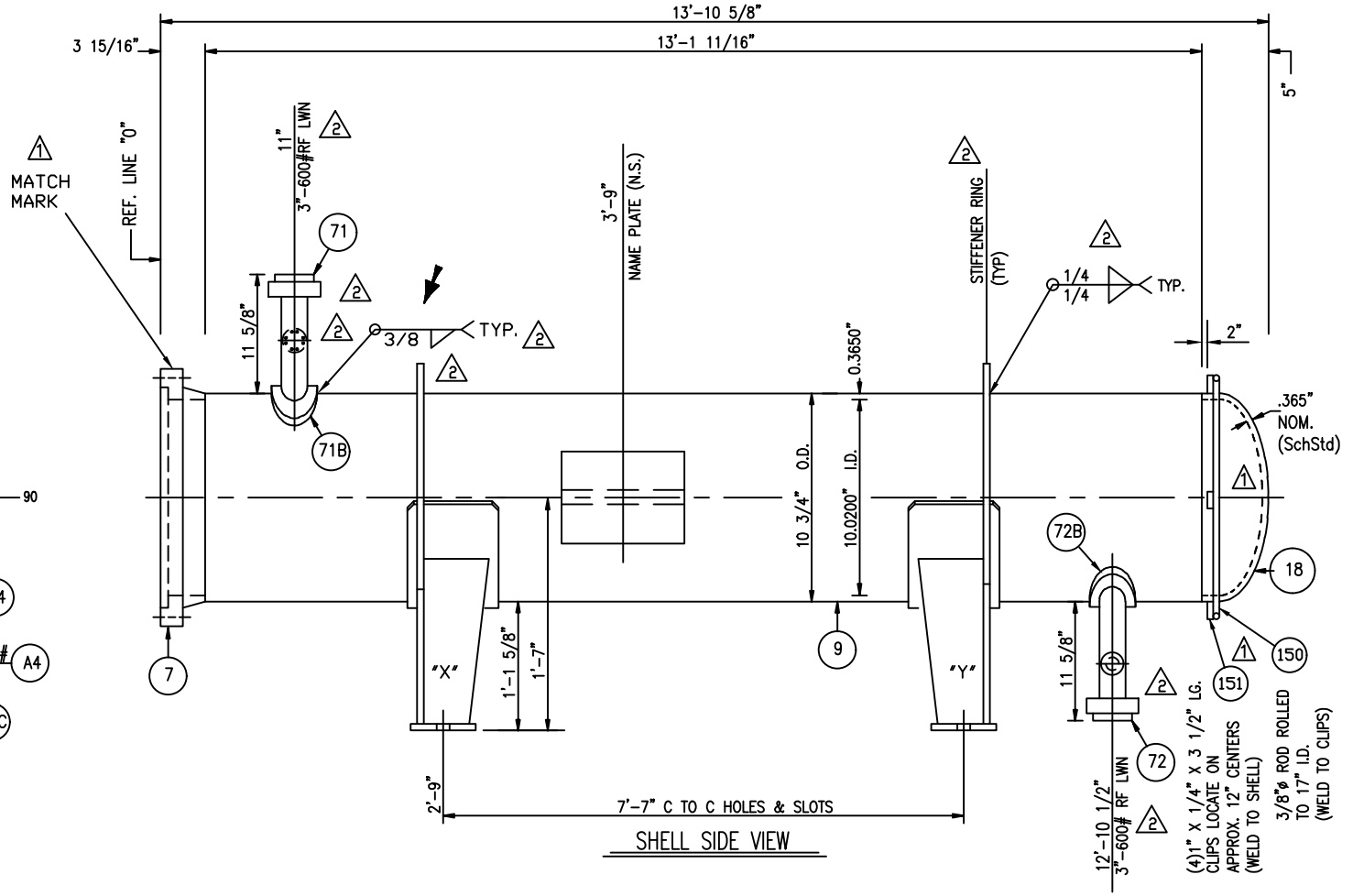
Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-16-2
REV. 2

FOR FLANGE DETAILS SEE DWG. 12



SHELL END VIEW



SHELL SIDE VIEW

NOTES:

1) ALL WELDING TO BE IN ACCORDANCE W/ PROCEDURES ON DWG. -18.
2) ALL BOLT HOLES TO STRADDLE CENTER LINES.
3) FOR WELD AND BEVEL DETAILS SEE DWG. -13.
4) FOR SUPPORT DETAILS SEE DWG. -9.
5) GRIND ALL INSIDE WELDS FLUSH.
6) SPOT RADIOGRAPHY.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.:4505600057 / A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

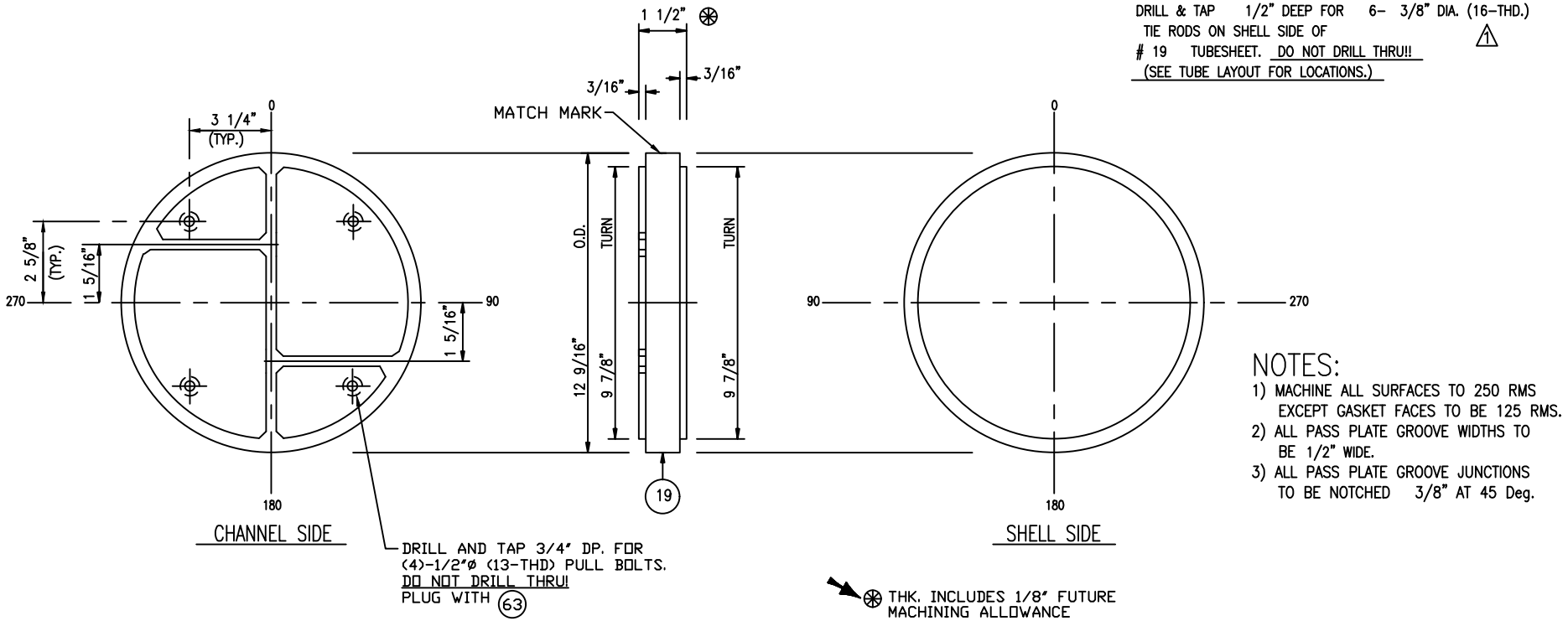
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2	10/24/22	REV. PER CUST. COMMENTS DD/DG
1	8/18/22	REV. PER CUST. B.W./DD

SHELL DETAILS

DWN. BY B.W.
DATE 6/15/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-16-3
REV. 2

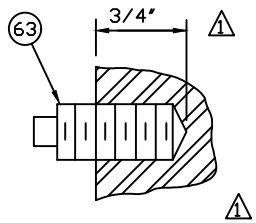


DRILL & TAP 1/2" DEEP FOR 6- 3/8" DIA. (16-THD.) TIE RODS ON SHELL SIDE OF # 19 TUBESHEET. DO NOT DRILL THRU!! (SEE TUBE LAYOUT FOR LOCATIONS.) ⚠1

NOTES:

1) MACHINE ALL SURFACES TO 250 RMS EXCEPT GASKET FACES TO BE 125 RMS.
2) ALL PASS PLATE GROOVE WIDTHS TO BE 1/2" WIDE.
3) ALL PASS PLATE GROOVE JUNCTIONS TO BE NOTCHED 3/8" AT 45 Deg.

SEE DWG. -4A FOR SEAL WELD & TUBE HOLE GROOVING DETAIL



SQUARE HEAD EYEBOLT PLUG DETAIL

⚠1 (65) EYEBOLT (TO SHIP LOOSE W/ EXCHANGER)

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.: 4505600057 / A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
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ENGINEER: EG
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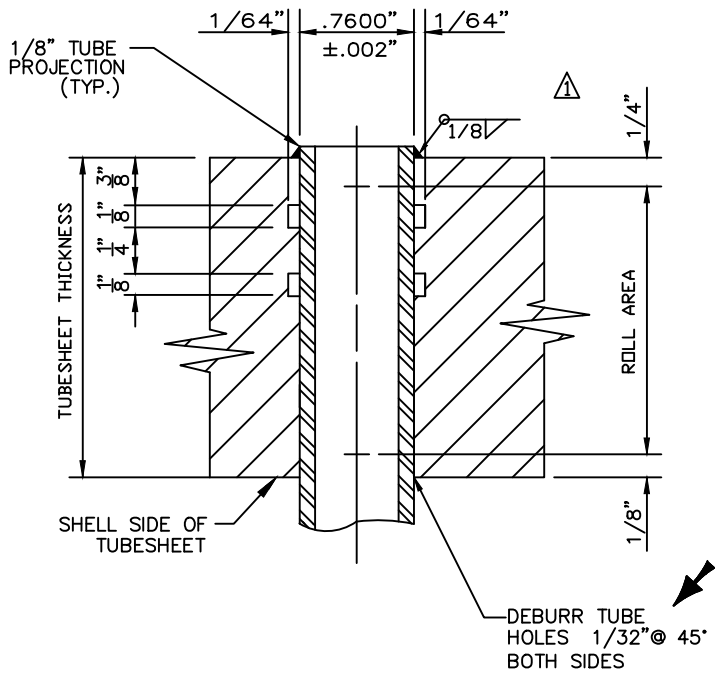
NO.	DATE	REVISIONS
⚠1	8/18/22	REV. PER CUST. B.W./DD

TUBESHEET DETAILS

DWN. BY B.W.
DATE 6/15/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-16-4
REV. 1



TUBE TO TUBESHEET SEAL WELD AND FABRICATION SEQUENCE

* *

1. DRILL, REAM AND RING GROOVE TUBE HOLES PER DETAIL ABOVE.
2. CLEAN AREAS TO BE WELDED AND ROLLED WITH DEGREASER.
3. INSTALL TUBES IN BUNDLE AND SET PROJECTIONS.
4. FUSION WELD USING GTAW PROCESS USING WPS: T-234.
5. LIQUID PENETRANT EXAMINE ALL WELDS AND THEN CLEAN THEM WITH DEGREASER. REPAIR ANY DEFECTIVE WELDS AND RECHECK.
6. TUBE-TO-T'SHT. WELDS SHALL BE AIR & SOAP TESTED PRIOR TO FINAL ROLLING W/ 15 PSI (MAX.) AIR PRESSURE.
7. ROLL TUBES INTO TUBESHEET PER DETAIL ABOVE.
8. REPEAT STEP 5.
9. TUBE WALL REDUCTION SHALL BE 8% (MAX.) 1

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
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AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

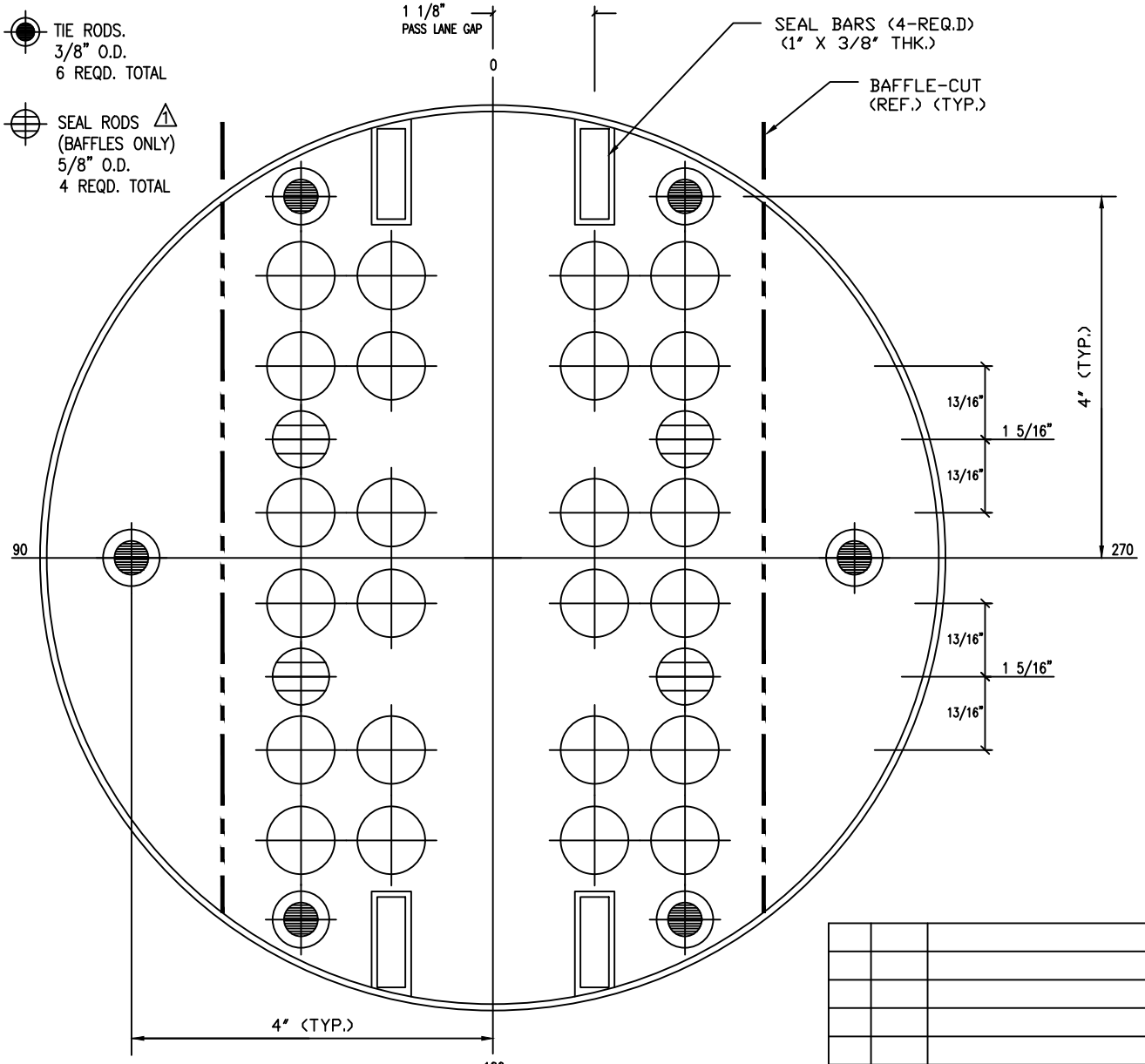
NO.	DATE	REVISIONS
1	8/18/22	REV. PER CUST. B.W./DD

TUBE SEAL WELD
& TUBE HOLE GROOVING DETAIL

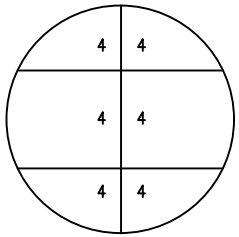
DWN. BY: B.W.
DATE: 6/16/22
CKD. BY: *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO.: S21-13258-16-4A
REV.: 1



VIEW LOOKING AT SHELL SIDE OF NO. 19 TUBESHEET



TUBE DISTRIBUTION

NOTES:

1) DRILL AND REAM TUBE HOLES IN
   TUBESHEETS TO 0.7600" +– 0.0020" DIA.
   FOR 12 – 3/4" O.D. U–TUBES.
   TOTAL HOLES = 24
2) TUBE PITCH = 1" SQUARE.
3) NUMBER OF PASSES = 6
4) SEE DRAWING 4A
   FOR TUBE GROOVING DETAILS.
5) BAFFLE O.D. = 9 7/8"
6) O.T.L. = 8 5/16"

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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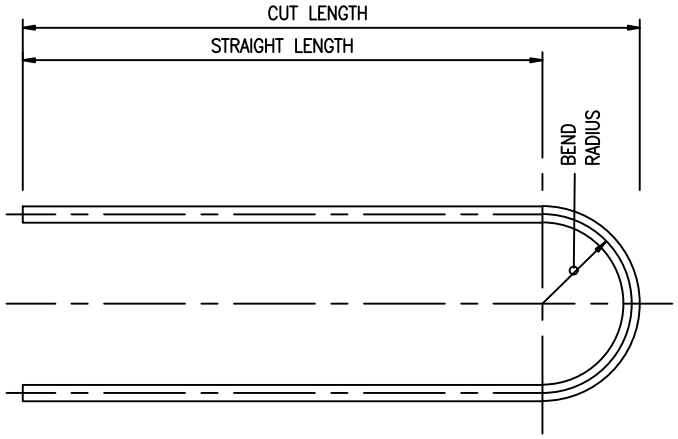
TUBE LAYOUT

DWN. BY B.W.
DATE 6/15/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21–13258–16–5
REV. 1

ROW	NO.OF TUBES	BEND RADIUS	BEND DIAMETER	BEND LENGTH	STRAIGHT LENGTH	CUT LENGTH	DEVELOPED LENGTH
A	6	1 1/8"	2 1/4"	0'-3 9/16"	13'-3"	13'-4 1/2"	26'-9 9/16"
B	6	2 1/8"	4 1/4"	0'-6 11/16"	13'-3"	13'-5 1/2"	27'-0 11/16"



TOTAL NO. REQUIRED: 12
SIZE: 3/4" (.083" MIN.)
MATERIAL: SA-179

MAXIMUM OUT-OF-ROUNDNESS OF TUBES AT U-BENDS NOT TO EXCEED 10%.

QUANTITIES SHOWN ARE FOR ONE SET OF U-TUBES,
1 -SET REQ'D. TOTAL.

STRESS RELIEF ANNEAL U-BENDS PLUS 1'-0" OF STRAIGHT LGTH. @ 1175° F. ± 25°F. BY ELECTRIC RESISTANCE METHOD.

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ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

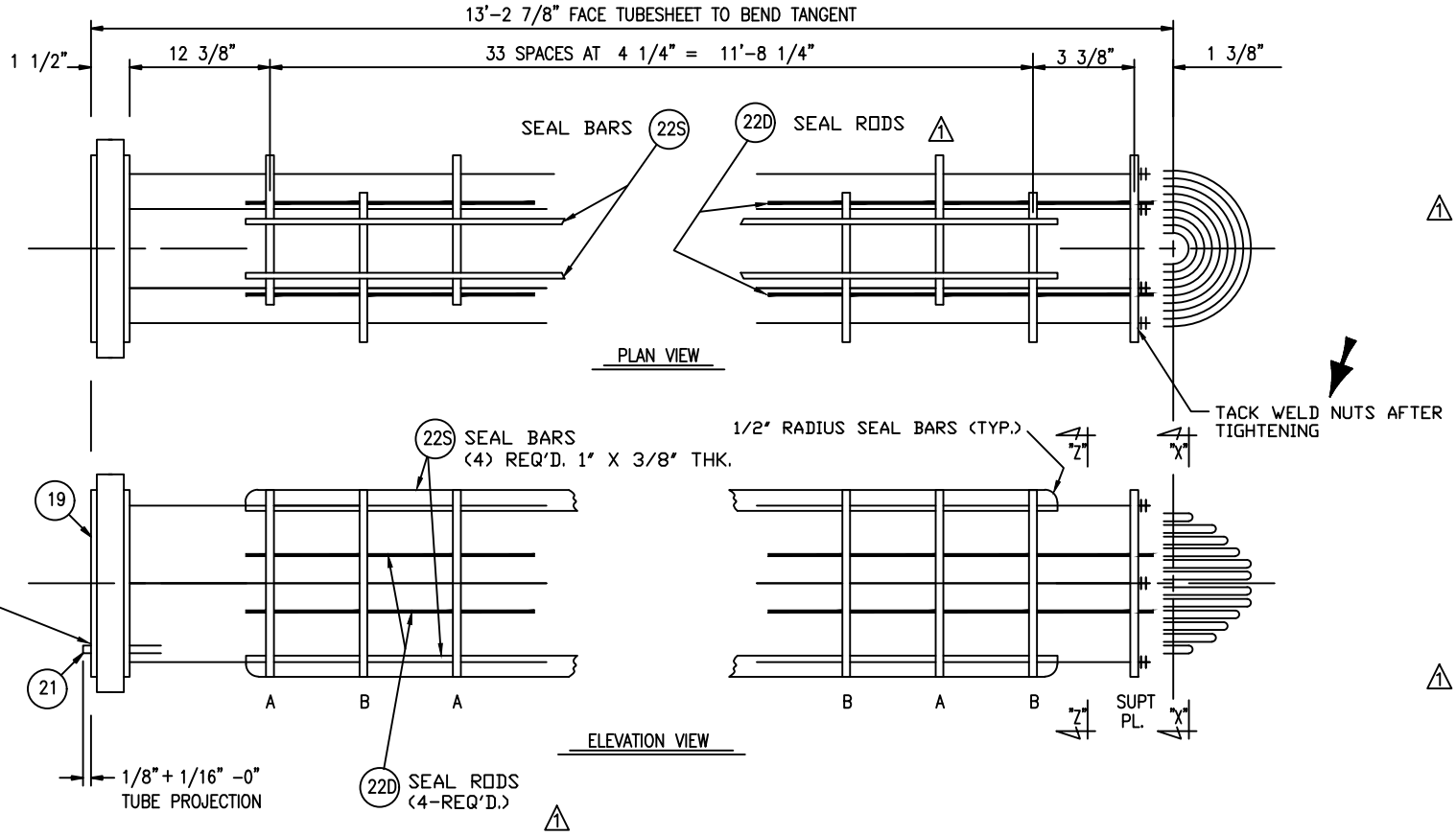
NO.	DATE	REVISIONS

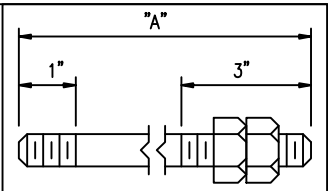
TUBE BENDING SCHEDULE

DWN. BY B.W.
DATE 6/15/22
CKD. BY *DiCarlo*

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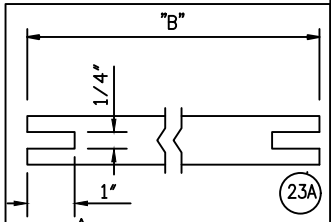
DWG.NO. S21-13258-16-6
REV. 0





1 MAT'L. SA-36
3/8" O.D. (16-THD.)TIE RODS (23)

	REQ'D.	"A"
1	6	13'-2 1/2"
2		
3		



1 MAT'L. SA-214
SLOTS @ 0° & 180°
5/8" O.D. SPACER TUBING

	REQ'D.	"B"
A	5	12 1/4"
B	1	16 1/2"
C	132	4"
D	32	8 1/4"
E	5	3 1/8"
F	1	7 3/8"
G		

NOTES:
1) FOR SECTION AND VIEW DETAILS SEE DWG. 8
2) WELD SEAL BARS TO INTERSECTING BAFFLES ON TWO OPPOSING SIDES. TO PROJECT 1" PAST BAFFLES.
1 RADIUS EACH END OF SEAL BAR. 1/4"(MIN.) FILLET WELD. 1
1 3) SEAL RODS TO PROJECT 1" PAST BAFFLES.
WELD TO FIRST & LAST BAFFLE. 1/4"(MIN.) FILLET WELD. 1

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.: 4505600057 / A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

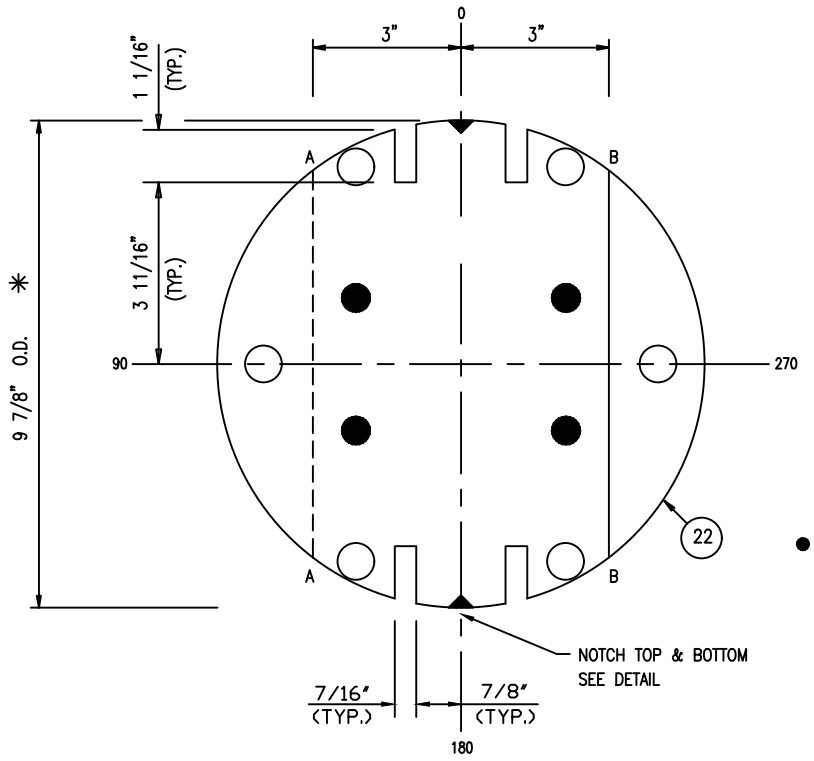
NO.	DATE	REVISIONS
1	8/18/22	REV. PER CUST. B.W./DD

BUNDLE DETAILS

DWN. BY B.W.
DATE 8/15/22
CKD. BY *DiCarlo*

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DWG.NO. S21-13258-16-7
REV. 1



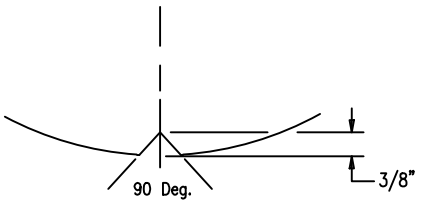
VIEW ZZ OF BAFFLES

1/4" THK.

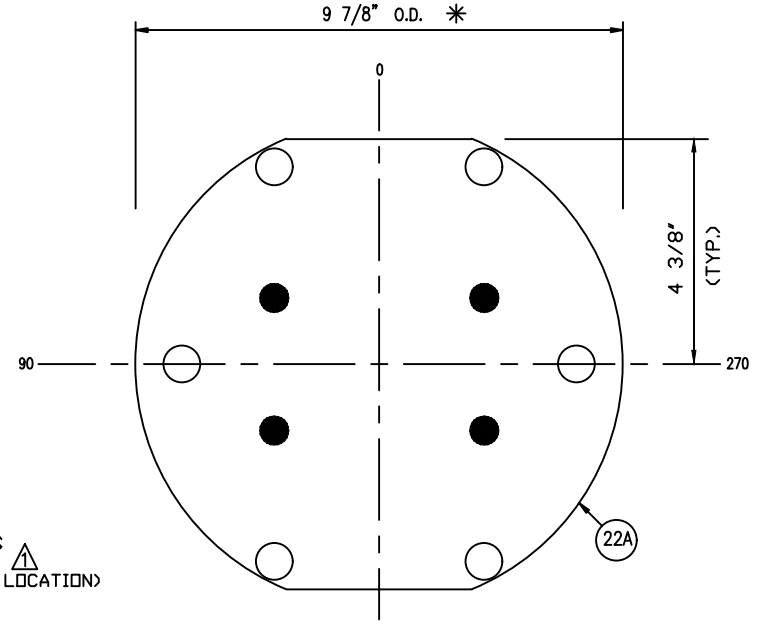
17 -REQD. CUT AA

17 -REQD. CUT BB

● DRILL (4) 11/16"ø HOLES FOR 5/8" ø SEAL RODS ⚠1 (SEE TUBE LAYOUT FOR LOCATION)



NOTCH DETAIL



VIEW XX OF SUPT.PL.

1/4" THK.

1-REQ'D.

NOTES:

1) DRILL TUBE HOLES IN BAFFLES 25/32" DIA. & DEBURR.
2) DRILL TIE ROD HOLES 7/16" DIA.
   SEE TUBE LAYOUT FOR LOCATION.
3) RADIUS ALL CORNERS ON BAFFLE CUTS.
* 4) CHECK SHELL I.D. BEFORE MACHINING BAFFLE O.D.
5) MACHINE O.D. OF BAFFLES TO 250 RMS.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.: 4505600057 / A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
⚠1	8/18/22	REV. PER CUST. B.W./DD

BAFFLE DETAILS

DWN. BY B.W.

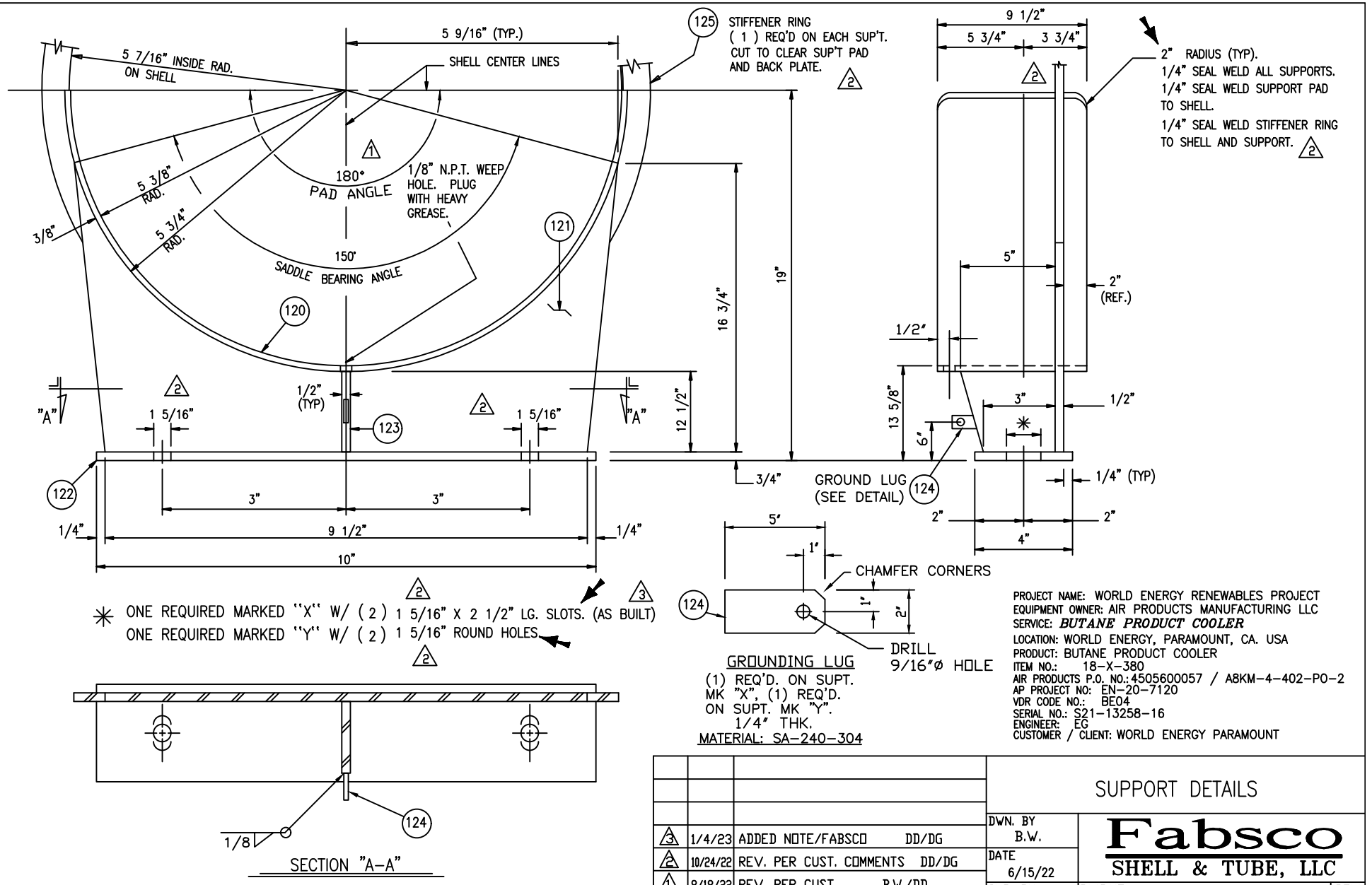
DATE 6/15/22

CKD. BY DiCARLO

Fabsco SHELL & TUBE, LLC

DWG.NO. S21-13258-16-8

REV. 1



GROUNDING LUG
(1) REQ'D. ON SUPT. MK "X", (1) REQ'D. ON SUPT. MK "Y".
1/4" THK.
MATERIAL: SA-240-304

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: *BUTANE PRODUCT COOLER*
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.:4505600057 / A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

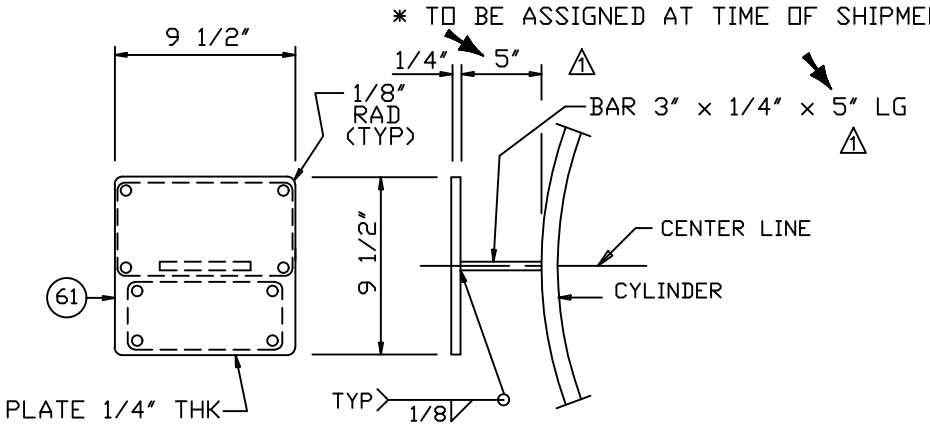
NO.	DATE	REVISIONS
3	1/4/23	ADDED NOTE/FABSCO DD/DG
2	10/24/22	REV. PER CUST. COMMENTS DD/DG
1	8/18/22	REV. PER CUST. B.W./DD

SUPPORT DETAILS

DWN. BY B.W.
DATE 6/15/22
CKD. BY *DiCarlo*

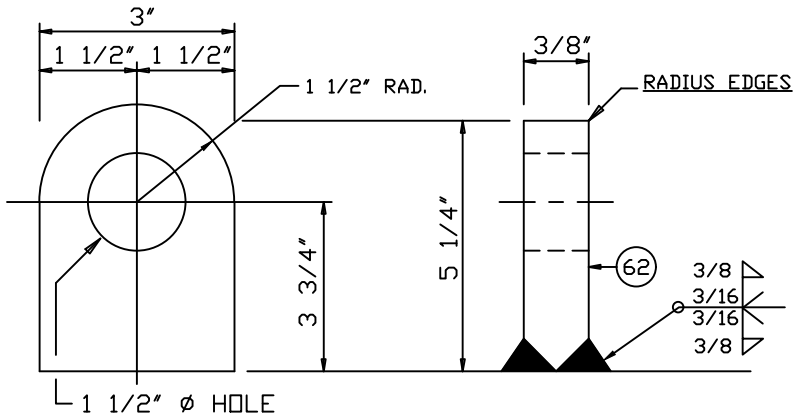
Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-16-9
REV. 3



NAME PLATE BRACKET DETAIL

(ONE) REQUIRED



LIFTING LUG DETAIL

3-REQUIRED

MATERIAL: 18-8 STN. STL.(16 GA)

60

NAT'L BD. *

CERTIFIED BY

FABSCO SHELL & TUBE, LLC

SAPULPA, OKLAHOMA

U

RT-3
HT-T

	MAWP		**MAWT**	
SHELL	430	**PSI AT**	300	**° F.**
	MAEWP		**MAWT**	
SHELL	15	**PSI AT**	300	**°F.**
	MDMT		**MAWP**	
SHELL	10	**°F. AT**	430	**PSI**
	MAWP		**MAWT**	
TUBES	430	**PSI AT**	150	**° F.**
	MAEWP		**MAWT**	
TUBES	N/A	**PSI AT**	N/A	**°F.**
	MDMT		**MAWP**	
TUBES	32	**°F. AT**	430	**PSI**

SERIAL NUMBER	**YEAR BUILT**	**ITEM/TAG NUMBER**
S21-13258-16	2023	18-X-380

1 P.O. NO.: 4505600057 WT.: 1900 LBS. TEST DATE:

BUTANE PRODUCT COOLER

INFORMATION NAME PLATE

HYDRO TEST PRESS PSIG.,TUBESIDE: SHOP-747/FIELD-559

HYDRO TEST PRESS PSIG.,SHELLSIDE: SHOP-747/FIELD-559

1 DESIGN PRESS.: SHELLSIDE=240 PSIG; TUBESIDE=185 PSIG

SECT. VIII, DIV 1, 2021 ED; API-660; TEMA "R"

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.:4505600057 / A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: HC09
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
1	8/18/22	REV. PER CUST. B.W./DD

LIFT LUG DETAIL w/ NAME PLATE & BRACKET

DWN. BY B.W.

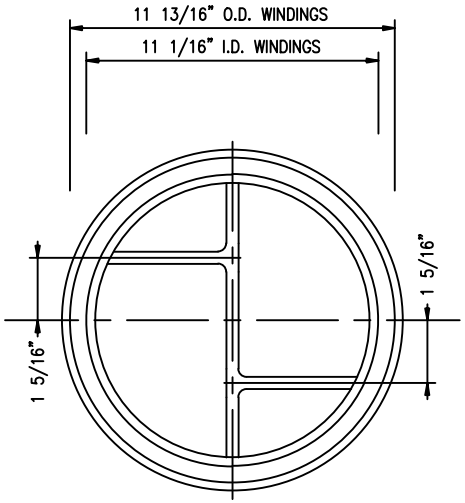
DATE 6/15/22

CKD. BY *DiCarlo*

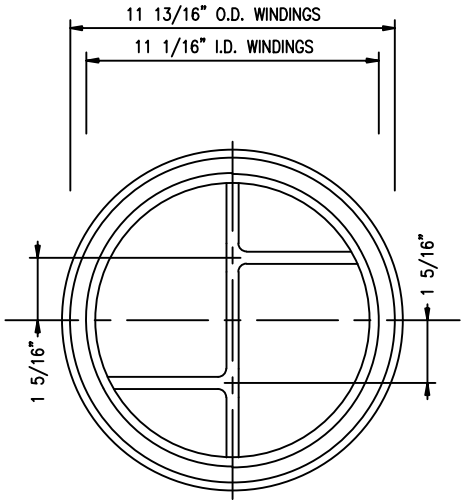
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DWG. NO. S21-13258-16-10

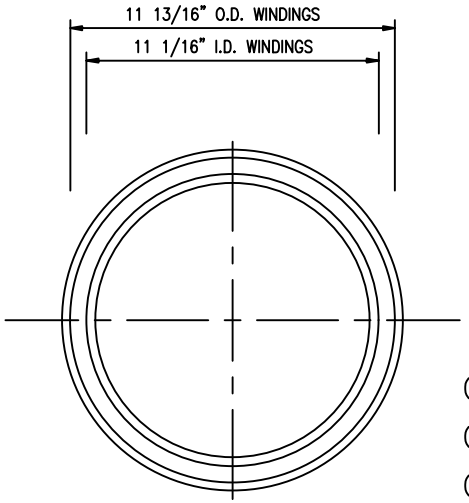
REV. 1



(1)–REQUIRED.
CHANNEL COVER GASKET.
0.175" THK. 304 S.S. SPIRAL WOUND
W/ GRAPHITE FILLER & INNER / OUTER COMP. RINGS (A)
RIB TO BE 3/16" THK. X 7/16" WIDE 304 S.S. DBL. JKT'D
W/ GRAPHITE FILLER AND 1/64" THK. GRAPHITE
FACE ON BOTH SIDES
TEST PRESSURE:
SHOP: 747/FIELD: 559



(1)–REQUIRED.
CHANNEL GASKET.
0.175" THK. 304 S.S. SPIRAL WOUND
W/ GRAPHITE FILLER & INNER / OUTER COMP. RINGS (B)
RIB TO BE 3/16" THK. X 7/16" WIDE 304 S.S. DBL. JKT'D
W/ GRAPHITE FILLER AND 1/64" THK. GRAPHITE
FACE ON BOTH SIDES
TEST PRESSURE:
SHOP: 747/FIELD: 559



(1)–REQUIRED.
SHELL GASKET.
0.175" THK. 304 S.S. SPIRAL WOUND
W/ GRAPHITE FILLER & INNER / OUTER COMP. RINGS (C)
TEST PRESSURE:
SHOP: 747/FIELD: 559

===== COMPRESSION RINGS =====

(A) 12.5625 O.D. X .1250 THICK: MATERIAL=SA-240-304
10.3125 I.D. X .1250 THICK: MATERIAL=SA-240-304
(B) 12.5625 O.D. X .1250 THICK: MATERIAL=SA-240-304
10.3125 I.D. X .1250 THICK: MATERIAL=SA-240-304
(C) 12.5625 O.D. X .1250 THICK: MATERIAL=SA-240-304
10.3125 I.D. X .1250 THICK: MATERIAL=SA-240-304

NOTES:

1) QUANTITIES SHOWN FOR ONE SET
(3)–SET REQUIRED TOTAL.
ONE SET OF GASKETS TO BE USED IN EXCH. AND
(2) SETS TO BE BOXED, MARKED WITH
P.O. & ITEM NO. & SHIPPED WITH EXCHANGER.

2) ALL RADII TO BE 1/4"

CHANNEL COVER TO CHANNEL FLANGE BOLTING INFO
STUD DIAMETER: 7/8" O.D.
NUMBER STUDS: (20)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 360.2-405.9 FT. LBS

CHAN. FLG./T'SHT./SHELL FLG. BOLTING INFO
STUD DIAMETER: 7/8" O.D.
NUMBER STUDS: (20)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 360.2-405.9 FT. LBS

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.:4505600057 / A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

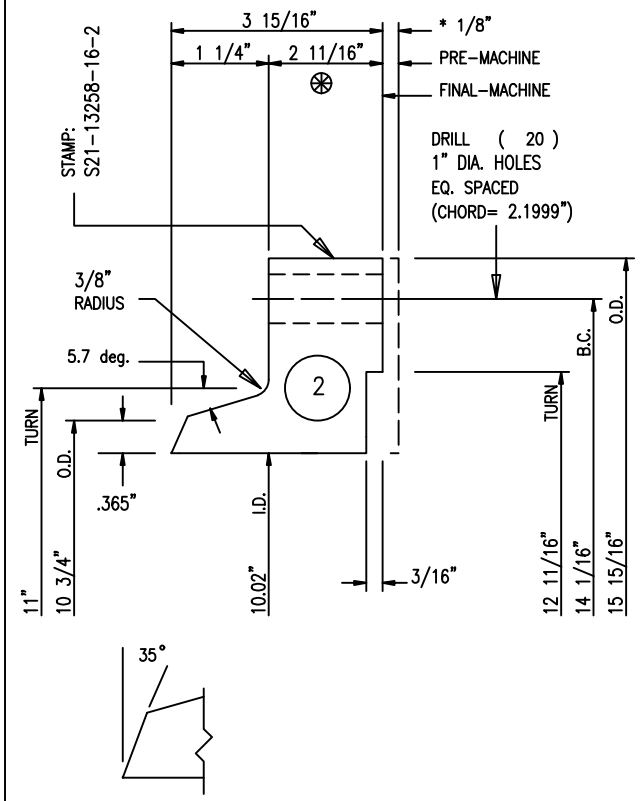
NO.	DATE	REVISIONS

GASKET DETAILS

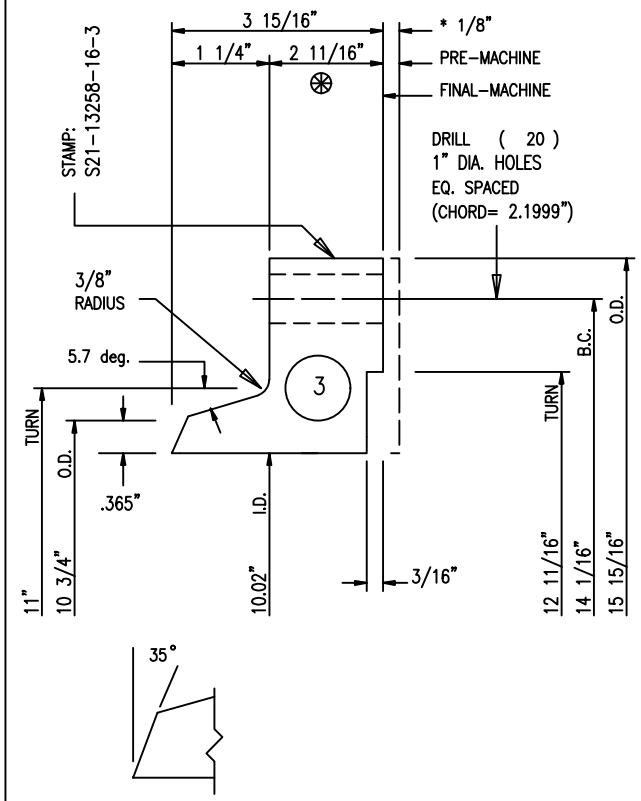
DWN. BY	B.W.
DATE	6/15/22
CKD. BY	*DiCarlo*

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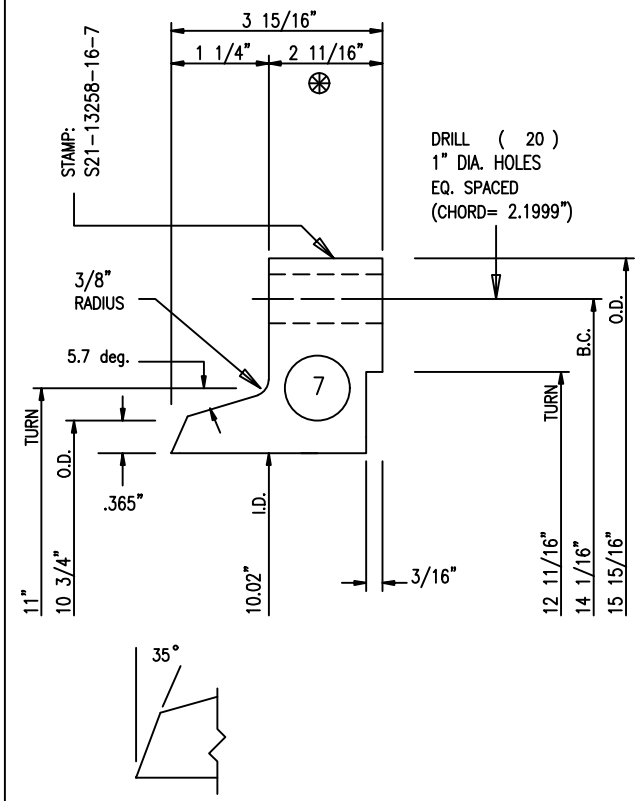
DWG.NO.	REV.
S21-13258-16-11	0



2 GIRTH FLANGE (ONE)REQ'D.



3 GIRTH FLANGE (ONE)REQ'D.



7 GIRTH FLANGE (ONE)REQ'D.

NOTES:

1) MACHINE ALL SURFACES TO 250 RMS EXCEPT GASKET SURFACES MACHINE TO 125 RMS.
2) ALL BOLT HOLES TO STRADDLE NATURAL CL.
3) * FINAL MACHINE FACING AFTER FINAL WELDING.

⊛ THK. INCLUDES 1/8" FUTURE MACHINING ALLOWANCE

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.: 4505600057 / A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

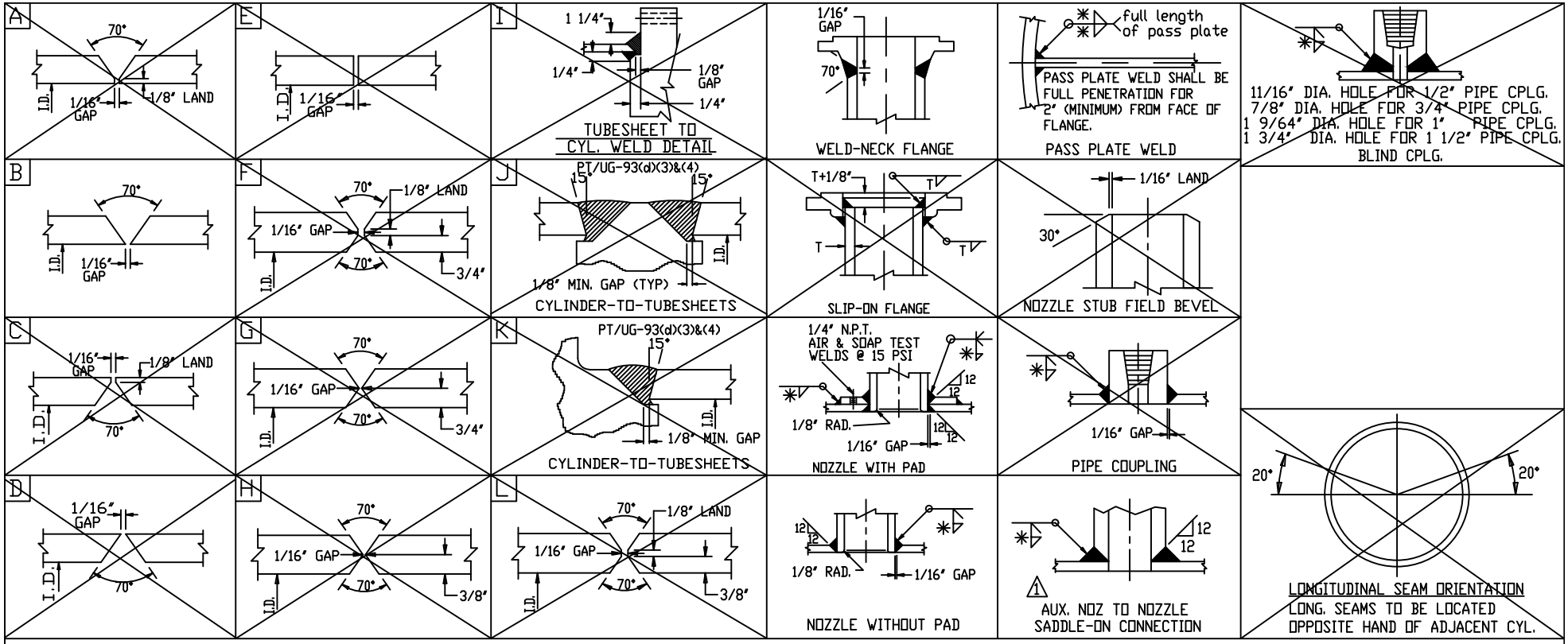
NO.	DATE	REVISIONS

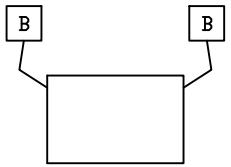
GIRTH FLANGES

DWN. BY	B.W.
DATE	6/15/22
CKD. BY	*DiCarlo*

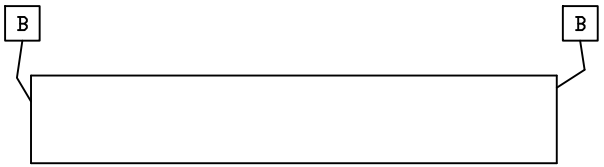
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DWG.NO.	REV.
S21-13258-16-12	0





CHANNEL BEVELS



SHELL BEVELS



HEAD BEVELS

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***BUTANE PRODUCT COOLER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: BUTANE PRODUCT COOLER
ITEM NO.: 18-X-380
AIR PRODUCTS P.O. NO.: 4505600057 / A8KM-4-402-PO-2
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-16
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

GENERAL NOTES:

1) ALL WELDING SHALL BE IN ACCORDANCE WITH ASME CODE (SECTION IX). 2

* 2) ALL FILLET WELDS SHALL BE 3/8", UNLESS NOTED OTHERWISE ON DETAIL DRAWINGS

3) LIFTING LUGS SHALL HAVE A 3/8" CONTINUOUS FILLET WELD, UNLESS NOTED OTHERWISE.

4) NOZZLE PADS SHALL BE UT OR RT 100% IF SPLIT IS WITHIN 45° OF VESSEL LONGITUDINAL AXIS.

NO.	DATE	REVISIONS
2	10/24/22	REV. PER CUST. COMMENTS DD/DG
1	8/19/22	REV. PER CUST. B.W./DD

WELD & BEVEL DETAILS

DWN. BY: B.W.
DATE: 6/15/22
CKD. BY: *DiCarlo*

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SHELL & TUBE, LLC

DWG.NO. S21-13258-16-13
REV. 2