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

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

   P.O. NO.: 4505600058

   ITEM NO.: 18-X-379

   SHIPPING WT.: 23,400 LBS.

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

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

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

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

14) HYDRO TEST CHARTS REQUIRED.

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

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

17) 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) ALL EXTERNAL ATTACHMENTS TO BE SEAL WELDED.
8) HYDROSTATIC TEST, USE CLEAN WATER WITH A CORROSION INHIBITOR ADDED.
   VOLUME OF WATER SHELLSIDE = 707 GALLONS (APPROXIMATELY)
   VOLUME OF WATER TUBESIDE = 470 GALLONS (APPROXIMATELY)
9) ALL LIFTING DEVICE ATTACHMENT WELDS SHALL BE EXAMINED BY THE PT METHOD.
10) INSTALL SHIPPING COVERS ON NOZZLES W/O BLD. FLANGES.
11) ALL SEAL WELDED EXTERNAL NON PRESSURE ATTACHMENTS REQUIRE A 1/4" NPT VENT HOLE.
12) AFTER THE HYDRO TEST, THE HEAT EXCHANGER SHALL BE COMPLETELY DRAINED AND THOROUGHLY DRIED.

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

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

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEBUTANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
1	8/17/22	ADDED DWG. PER CUST. B.W./DD

JOB NOTES

DWN. BY B.W.
DATE 8/17/22
CKD. BY DiCARLO

Fabsco
SHELL & TUBE, LLC

DWG. NO. S21-13258-15-1B
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) PRESSURE CONTAINING WELDS, INTERNAL ATTACHMENT WELDS, & SUPPORT WELDS SHALL BE CONTOURED TO PERMIT PROPER INTERPRETATION OF ANY REQ'D. UT EXAMINATION.
4) ALL WELDING CONSUMABLES SHALL BE OF LOW HYDROGEN TYPE. E60XX ELECTRODES SHALL NOT BE USED!
5) 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."
6) NOZ. TO CYL. WELDS, BRANCH NOZ. WELDS WHICH CAN'T BE X-RAYED SHALL BE UT.
7) ALL ARC STRIKES, START, STOPS SHALL BE CONFINED TO THE WELDING GROOVE OR SHALL BE REMOVED BY LIGHT GRINDING FOLLOWED BY MPT OR DPE.
8) HYDRO TEST WATER TEMP. AT ALL LOCATIONS SHALL BE AT LEAST 50°F. AT ALL TIMES DURING HYDROTEST.
9) THE USE OF HIGH NICKEL CONTENT C'STL. WELDING CONSUMABLES OR C-1/2Mo CONSUMABLES IS PROHIBITED.
10) ALL WELD SURFACES TO BE VISUALLY INSPECTED TO ENSURE THAT LAMINATIONS &/OR OTHER DEFECTS ARE NOT PRESENT.

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

11) PEENING IS NOT PERMITTED FOR PURPOSE OF CLEANING WELDS.
12) EXCH'S. TO BE STENCILED W/ THE FOLLOWING"
"HEIGHTH" : 6'-0"
"WIDTH" : 3'-10 1/2"
"LENGTH" : 21'-3"
"WEIGHT" : 23,400#
13) FINISHED EXCHANGER IS TO BE WEIGHTED. TO BE WITHIN +/- 2% OR BETTER ACCURACY. A CALIBRATED WEIGHT CERTIFICATE SHALL BE PROVIDED.
14) THE TEMPERATURE OF THE HYDRO TEST WATER & THE EXCHANGER SHALL BE EQUALIZED PRIOR TO HYDROTEST.
15) STAMPING TO BE DONE WITH "LOW STRESS" STAMPS.
16) LIFTING POINTS & CENTER OF GRAVITY SHALL BE MARKED ON EXCHANGER.
17) THE ENTIRE SURFACE OF FORGINGS INCLUDING WELD BEVEL SHALL BE EXAMINED BY MT AFTER FINISH MACHINING & PRIOR TO WELDING.
18) EXCHANGER SHALL BE IN A MANNER WHICH KEEPS NOZZLES FROM TOUCHING THE TRUCK BEDS AND/OR SURFACES AT OFF-LOADING AREA AT JOBSITE.
19) 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.
20) REQUIRED PREHEAT TEMPERATURE SHALL ALSO APPLY TO THERMAL CUTTING AND TACK WELDING.
21) PREHEAT ALL JOINT TO A MINIMUM OF 125° F. WHEN MOISTURE REMOVAL IS REQUIRED.

----------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 LONG & 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.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEBUTANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
1	8/18/22	ADDED DWG./FABSCO BW./DD

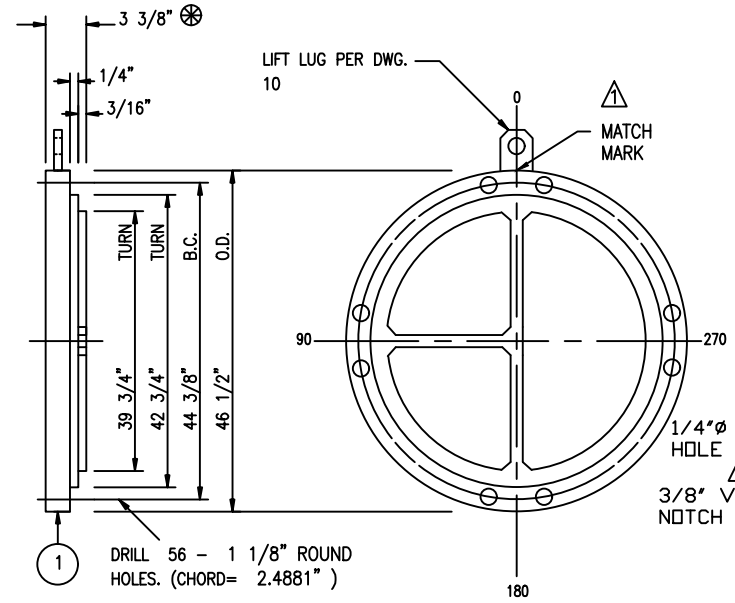
JOB NOTES (CONT.)

DWN. BY B.W.
DATE 8/18/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

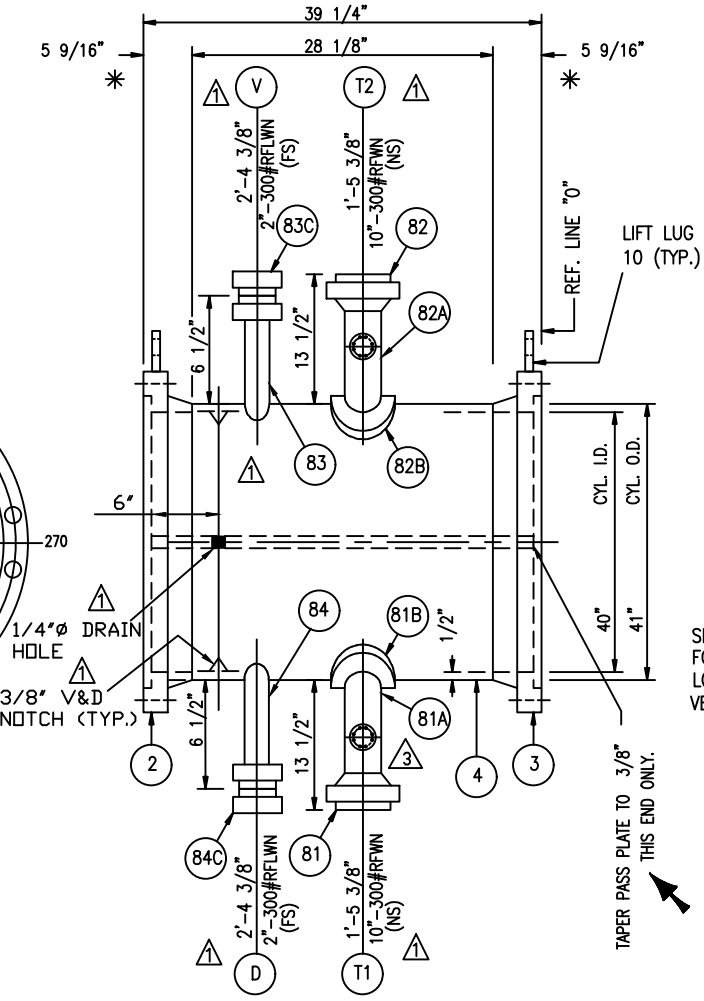
DWG. NO. S21-13258-15-1C
REV. 1

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 3/4" WIDE.
3) ALL COVER PASS PLATE GROOVE JUNCTIONS TO BE NOTCHED 3/8" AT 45 Deg.

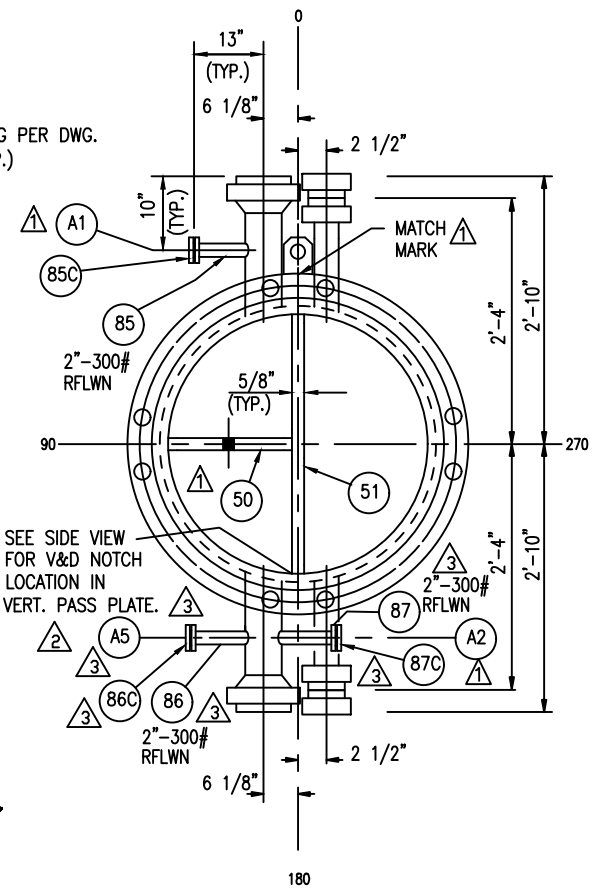


THK. INCLUDES 1/8" FUTURE MACHINING ALLOWANCE

CHANNEL-COVER DETAIL



CHANNEL SIDE VIEW



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.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
3	4/19/23	REV. "AS BUILT"/ FABSCO AS/DD
2	11/9/22	ADDED NOTE/CUST. DD/DG
1	8/16/22	REV. PER CUST. B.W./DD

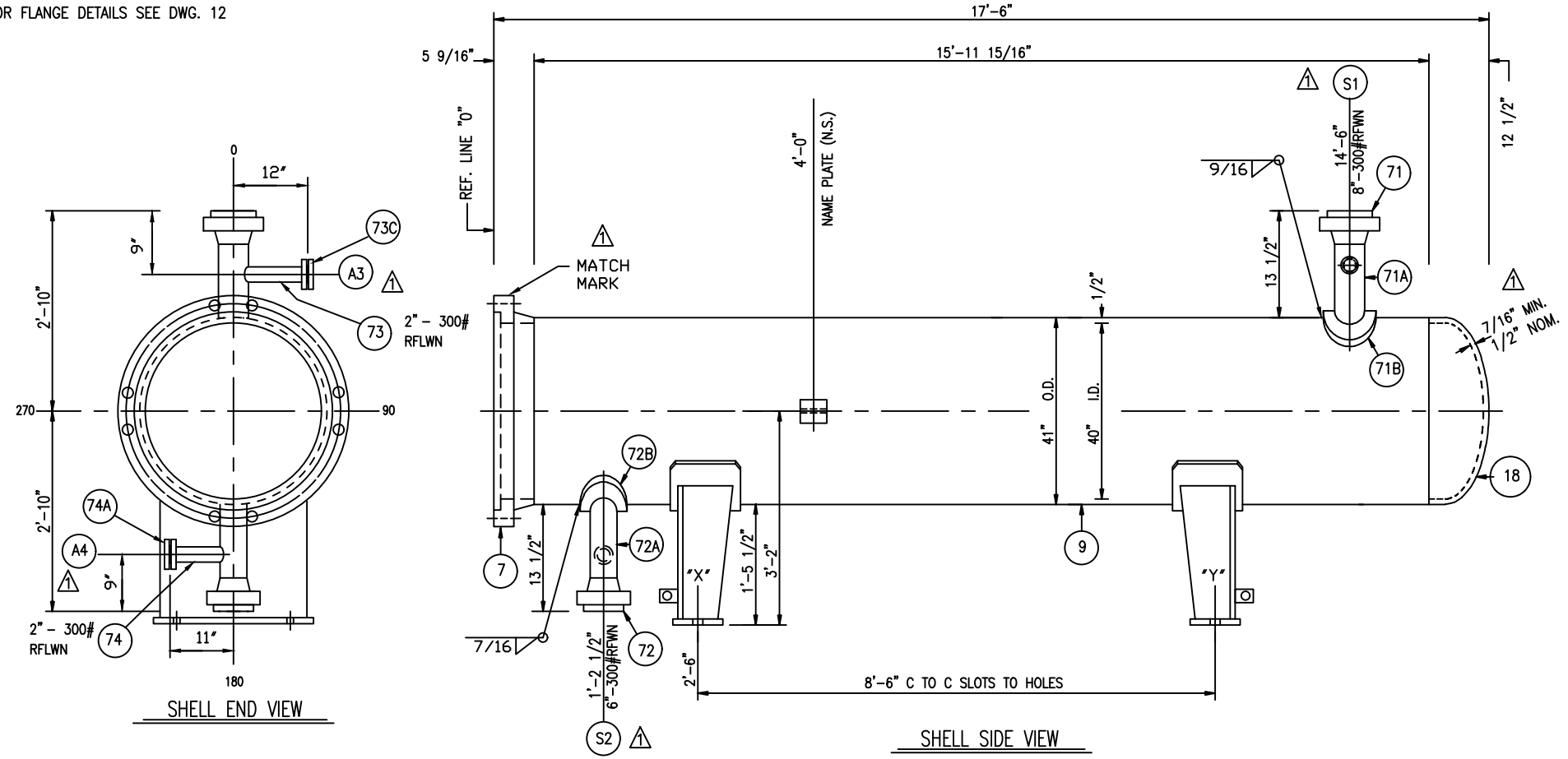
FRONT CHANNEL DETAILS

DWN. BY B.W.
DATE 6/14/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-15-2
REV. 3

FOR FLANGE DETAILS SEE DWG. 12



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
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ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

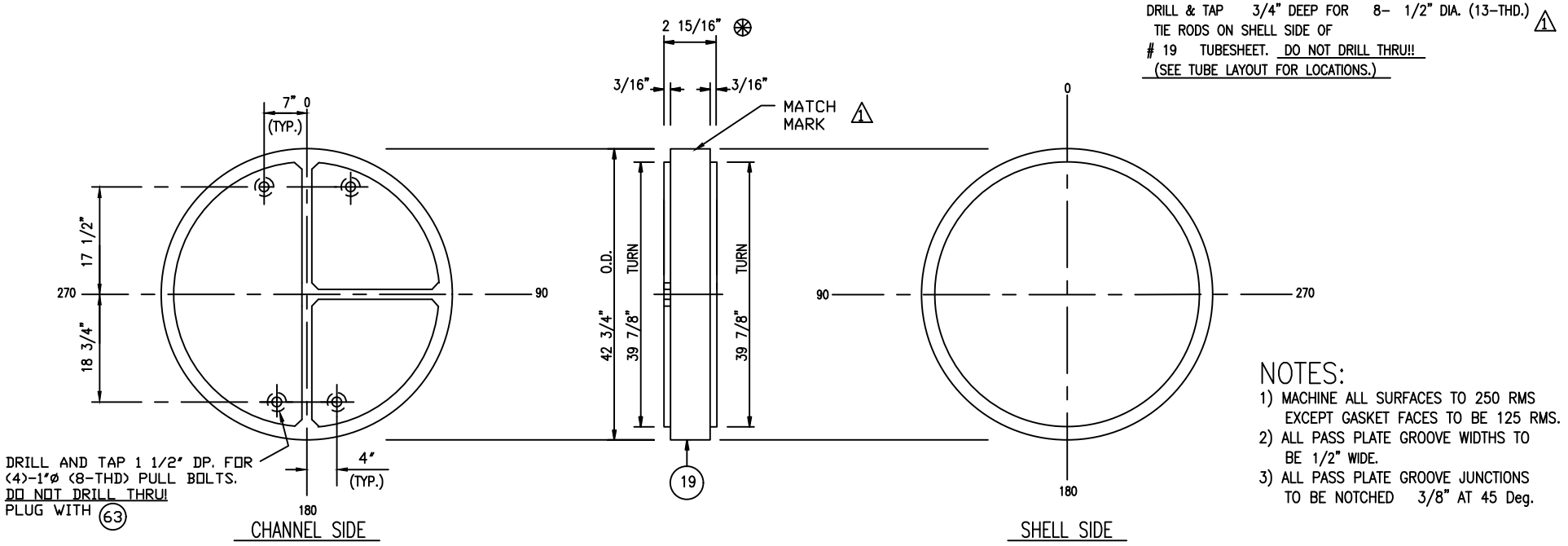
NO.	DATE	REVISIONS
1	8/16/22	REV. PER CUST. B.W./DD

SHELL DETAILS

DWN. BY B.W.
DATE 6/14/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-15-3
REV. 1

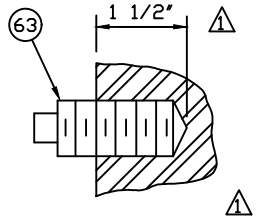


DRILL & TAP 3/4" DEEP FOR 8- 1/2" DIA. (13-THD.) 1
TIE RODS ON SHELL SIDE OF # 19 TUBESHEET. DO NOT DRILL THRU!!
(SEE TUBE LAYOUT FOR LOCATIONS.)

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.

⊛ THK. INCLUDES 1/8" FUTURE MACHINING ALLOWANCE



SQUARE HEAD EYEBOLT PLUG DETAIL

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

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

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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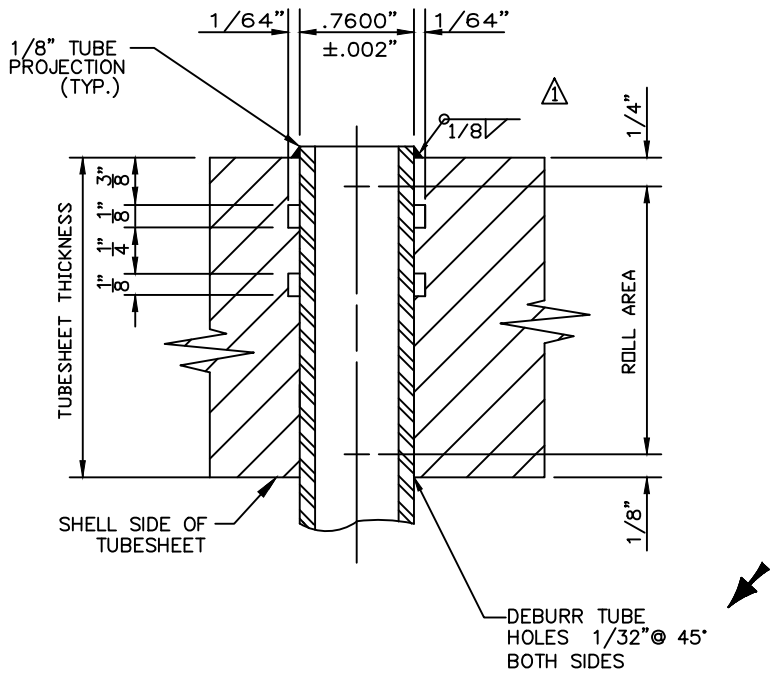
NO.	DATE	REVISIONS
2	11/9/22	NO REV./RESUBMIT FOR AP'L DD/DG
1	8/16/22	REV. PER CUST. B.W./DD

TUBESHEET DETAILS

DWN. BY B.W.
DATE 6/13/22
CKD. BY DiCARLO

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-15-4
REV. 2



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
SERVICE: ***DEBUTANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
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AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

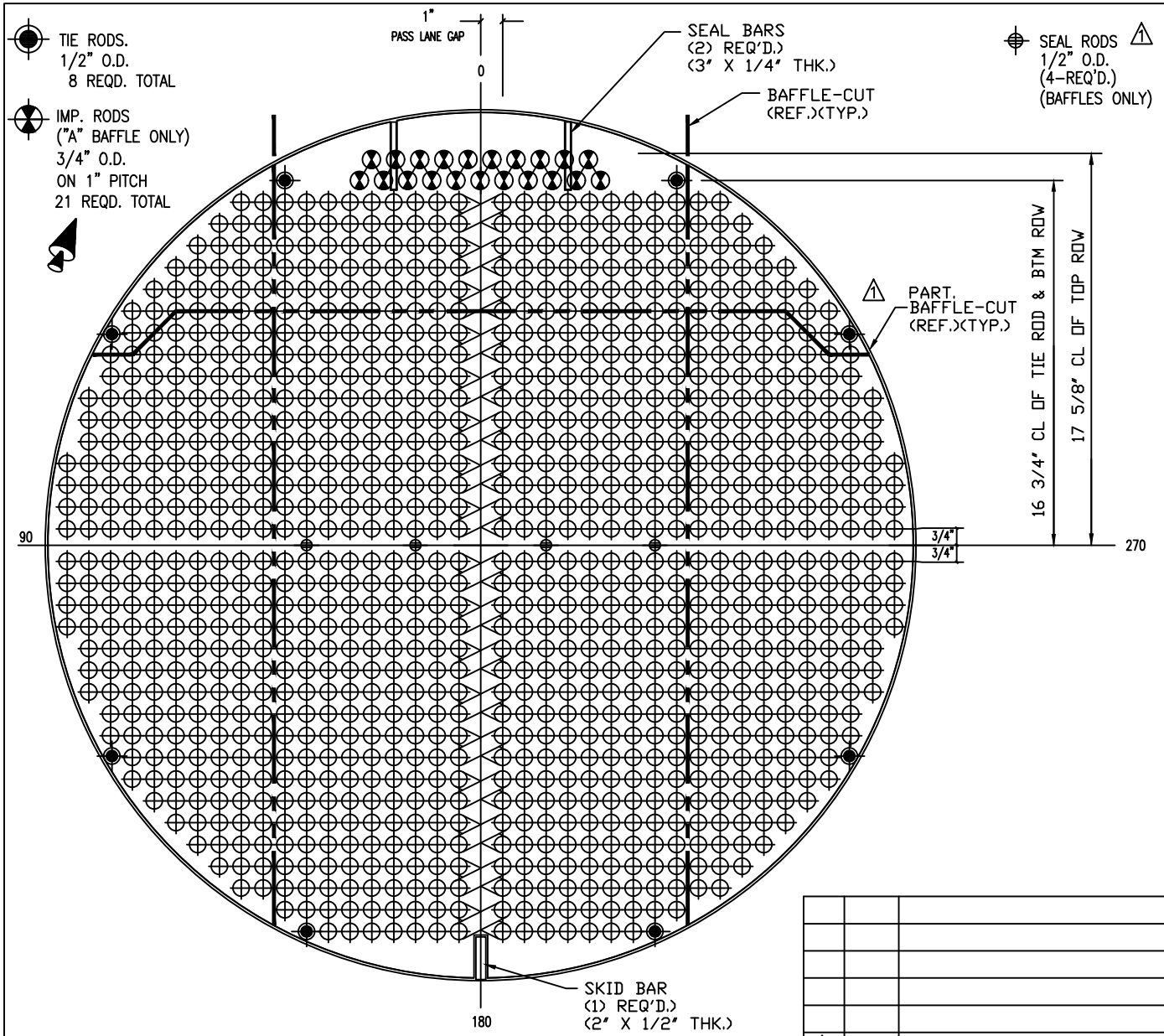
NO.	DATE	REVISIONS
1	8/16/22	REV. PER CUST. B.W./DD

TUBE SEAL WELD
& TUBE HOLE GROOVING DETAIL

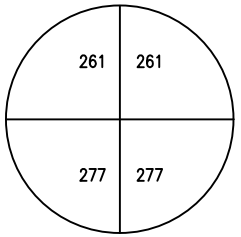
DWN. BY: B.W.
DATE: 6/13/22
CKD. BY: DiCARLO

Fabsco
SHELL & TUBE, LLC

DWG.NO.: S21-13258-15-4A
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 538 - 3/4" O.D. U-TUBES. TOTAL HOLES = 1076
2) TUBE PITCH = 1" SQUARE.
3) NUMBER OF PASSES = 4
4) SEE DRAWING 4A FOR TUBE GROOVING DETAILS.
5) BAFFLE O.D. = 39 3/4"
6) O.T.L. = 39 1/2"

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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NO.	DATE	REVISIONS
1	8/16/22	REV. PER CUST. B.W./DD

TUBE LAYOUT

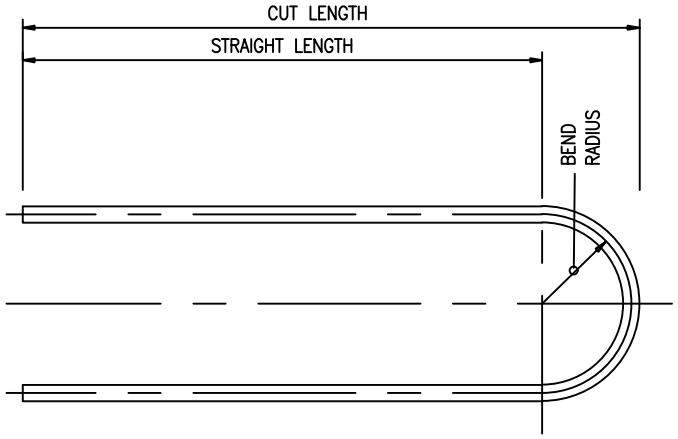
DWN. BY B.W.
DATE 6/13/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-15-5
REV. 1

ROW	NO.OF TUBES	BEND RADIUS	BEND DIAMETER	BEND LENGTH	STRAIGHT LENGTH	CUT LENGTH	DEVELOPED LENGTH
● A	17	1 1/8"	2 1/4"	0'-3 9/16"	15'-4"	15'-5 1/2"	30'-11 9/16"
● B	17	1 1/8	2 1/4"	0'-3 9/16"	15'-5"	15'-6 1/2"	31'-1 9/16"
C	34	2"	4"	0'-6 5/16"	15'-6"	15'-8 3/8"	31'-6 5/16"
D	34	3"	6"	0'-9 7/16"	15'-6"	15'-9 3/8"	31'-9 7/16"
E	34	4"	8"	1'-0 5/8"	15'-6"	15'-10 3/8"	32'-0 5/8"
F	34	5"	10"	1'-3 3/4"	15'-6"	15'-11 3/8"	32'-3 3/4"
G	34	6"	12"	1'-6 7/8"	15'-6"	16'-0 3/8"	32'-6 7/8"
H	34	7"	14"	1'-10"	15'-6"	16'-1 3/8"	32'-10"
J	33	8"	16"	2'-1 3/16"	15'-6"	16'-2 3/8"	33'-1 3/16"
K	33	9"	18"	2'-4 5/16"	15'-6"	16'-3 3/8"	33'-4 5/16"
L	32	10"	20"	2'-7 7/16"	15'-6"	16'-4 3/8"	33'-7 7/16"
M	32	11"	22"	2'-10 9/16"	15'-6"	16'-5 3/8"	33'-10 9/16"
N	30	12"	24"	3'-1 3/4"	15'-6"	16'-6 3/8"	34'-1 3/4"
O	28	13"	26"	3'-4 7/8"	15'-6"	16'-7 3/8"	34'-4 7/8"
P	26	14"	28"	3'-8"	15'-6"	16'-8 3/8"	34'-8"
Q	24	15"	30"	3'-11 1/8"	15'-6"	16'-9 3/8"	34'-11 1/8"
R	22	16"	32"	4'-2 5/16"	15'-6"	16'-10 3/8"	35'-2 5/16"
S	18	17"	34"	4'-5 7/16"	15'-6"	16'-11 3/8"	35'-5 7/16"
T	14	18"	36"	4'-8 9/16"	15'-6"	17'-0 3/8"	35'-8 9/16"
U	8	19"	38"	4'-11 3/4"	15'-6"	17'-1 3/8"	35'-11 3/4"

● DENOTES CROSS TUBES



TOTAL NO. REQUIRED: 538
SIZE: 3/4" O.D. X 0.083" THK. MIN. WALL
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.

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

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EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: *DEBUTANIZER OVERHEAD CONDENSER*
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

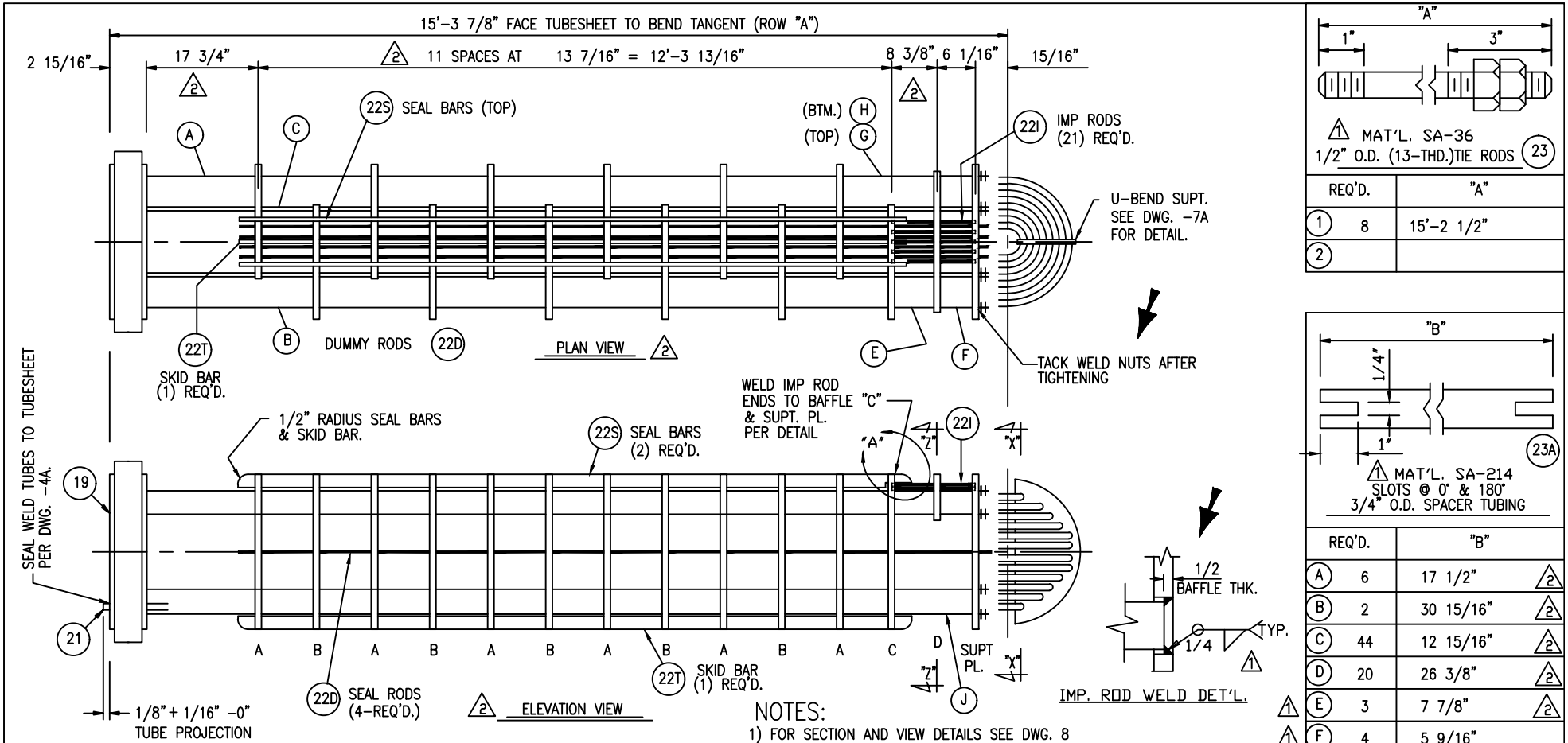
NO.	DATE	REVISIONS
△1	7/28/2022	REV./CUST. EMG

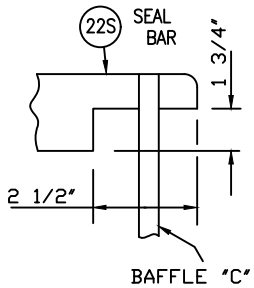
TUBE BENDING SCHEDULE

DWN. BY	EMG
DATE	5-25-22
CKD. BY	*DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO.	REV.
S21-13258-15-6	1





VIEW "A"
(TOP (2) SEAL BARS ONLY)

NOTES:
1) FOR SECTION AND VIEW DETAILS SEE DWG. 8
2) WELD SEAL BARS & SKID BARS TO INTERSECTING BAFFLES ON TWO OPPOSING SIDES. TO PROJECT 1" PAST BAFFLES. 1
RADIUS EACH END OF SEAL BARS & SKID BARS. 1/4"(MIN.) FILLET WELD.
SKID BARS TO PROJECT 1/32" PAST THE BAFFLE O.D.
3) SEAL RODS SHALL EXTEND 1" PAST FIRST AND LAST BAFFLE. WELD TO FIRST AND LAST BAFFLE. 1/4"(MIN.) FILLET WELD. 1

1 MAT'L. SA-36
1/2" O.D. (13-THD.)TIE RODS (23)

	REQ'D.	"A"
1	8	15'-2 1/2"
2		

1 MAT'L. SA-214
SLOTS @ 0° & 180°
3/4" O.D. SPACER TUBING

	REQ'D.	"B"	
A	6	17 1/2"	2
B	2	30 15/16"	2
C	44	12 15/16"	2
D	20	26 3/8"	2
E	3	7 7/8"	2
F	4	5 9/16"	
G	1	21 5/16"	2
H	1	27 3/8"	2
J	3	13 15/16"	2

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEBUTANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

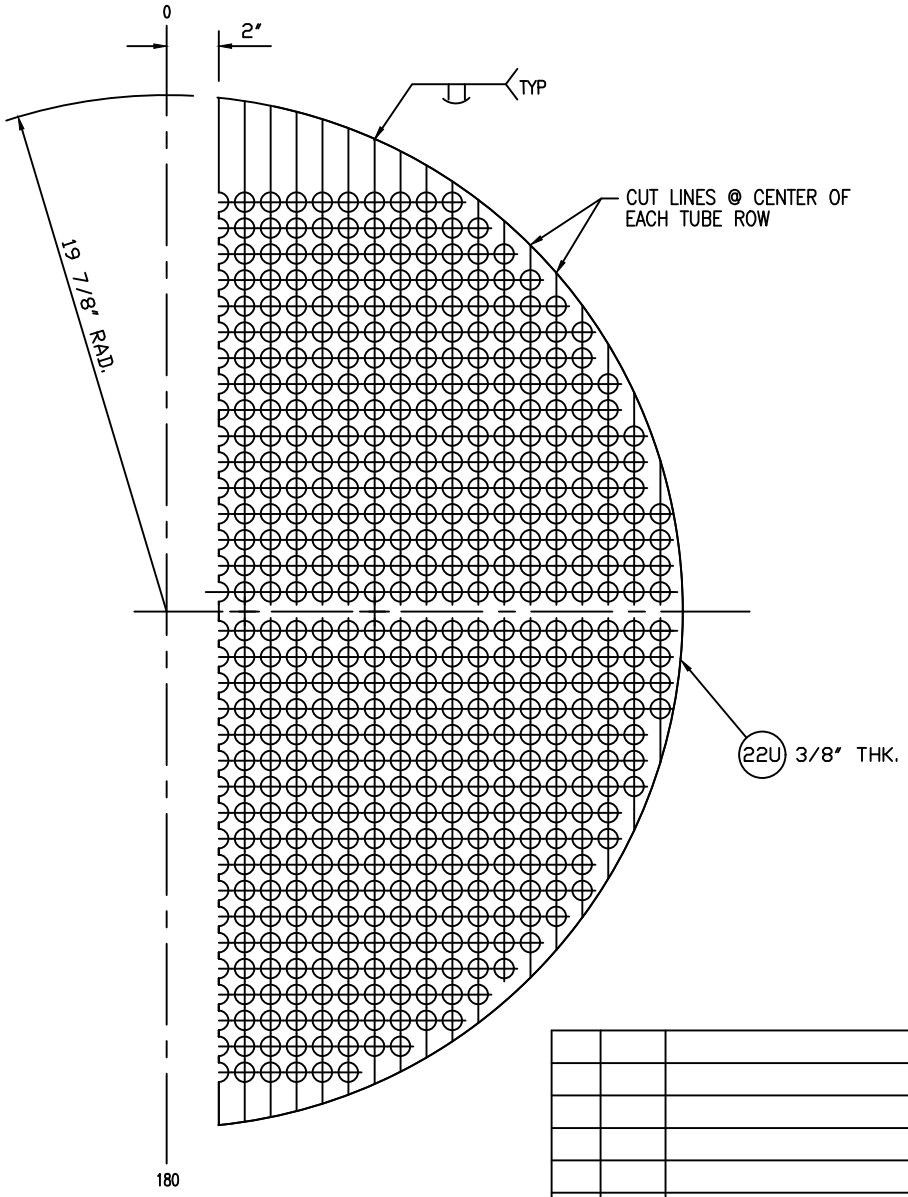
NO.	DATE	REVISIONS
2	11/9/22	REDESIGNED BUNDLE/CUST. DD/DG
1	8/16/22	REV. .PER CUST. B.W./DD

BUNDLE DETAILS

DWN. BY B.W.
DATE 6/13/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-15-7
REV. 2



NOTES:

1) DRILL TUBE HOLES 25/32" DIA. & DEBURR
2) TUBE PITCH = 1" 90° SQUARE.
3) CUT PART #22A ON CENTERLINE OF EACH ROW SHOWN.
4) STARTING AFTER INSERTING ROW "C", INSERT STRIPS BETWEEN EACH ROW AT BENDS AS SHOWN.
5) WELD PIECES TOGETHER AS SHOWN.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
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LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

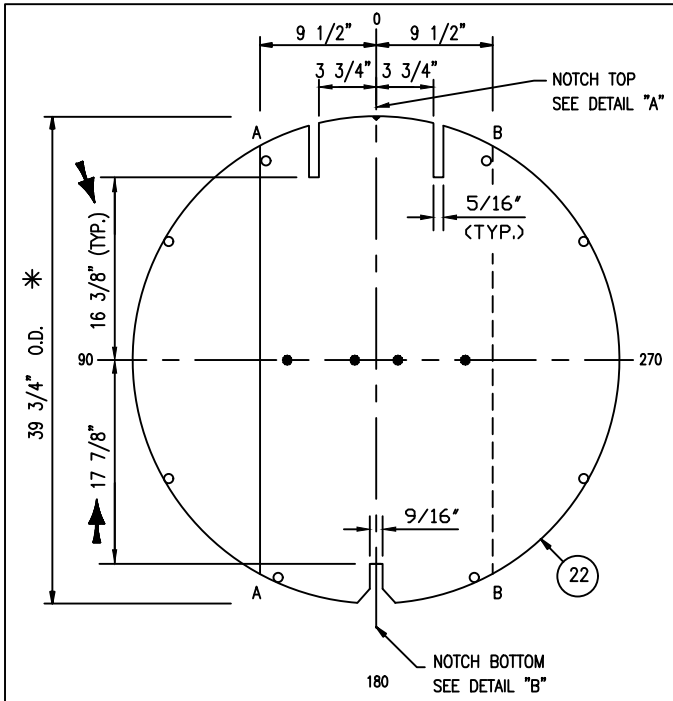
NO.	DATE	REVISIONS

U-BEND SUPPORT

DWN. BY B.W.
DATE 6/13/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-15-7A
REV. 0

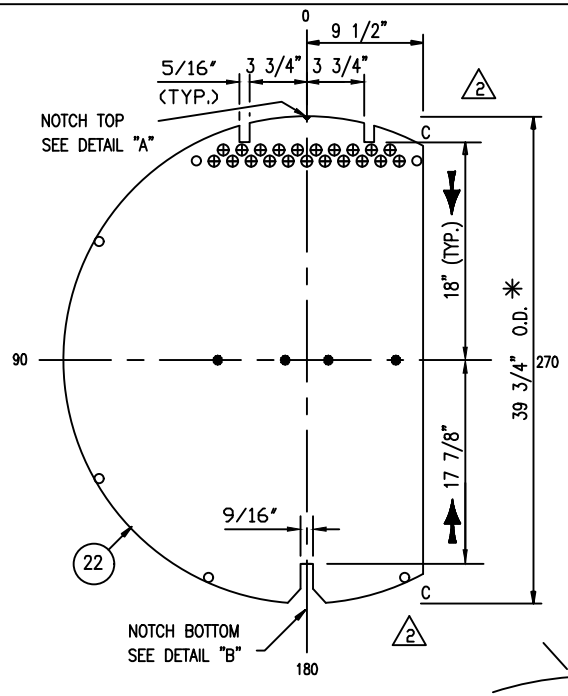


VIEW ZZ OF BAFFLES

1/2" THK.

6 -REQD. CUT AA

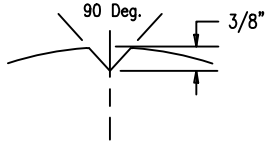
2 5 -REQD. CUT BB



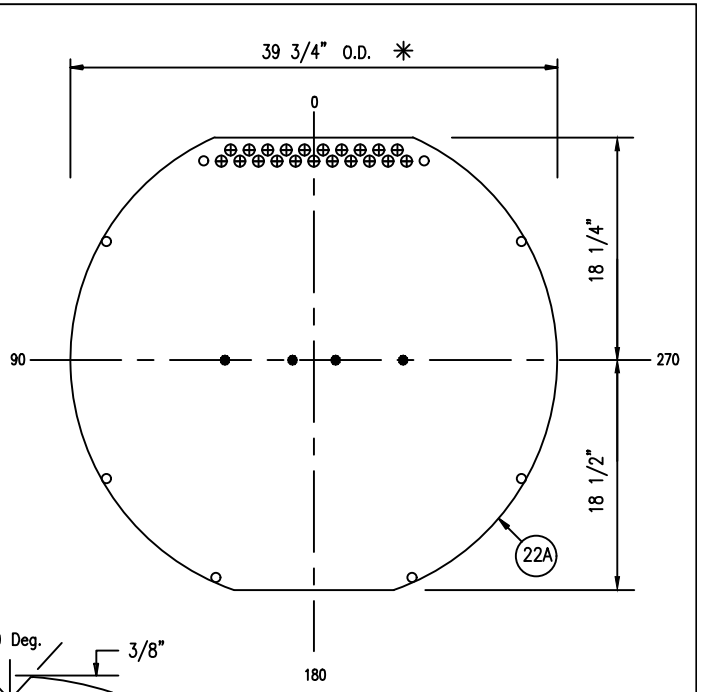
VIEW ZZ OF BAFFLES

1/2" THK.

2 1 -REQD. CUT CC



NOTCH DETAIL "A"



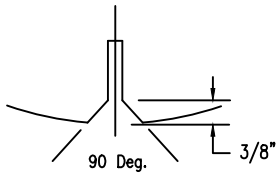
VIEW XX OF SUPT.PL.

1/2" THK.

1-REQ'D.

⊕ DENOTES (21) 13/16" HOLES FOR 3/4" O.D. IMP. RODS.
"DRILL BAFFLE "C" & SUPT. PL. ONLY"
(SEE TUBE LAYOUT FOR LOCATION)

● DRILL (4) 9/16"ø HOLES FOR 1/2" ø SEAL RODS 1
(SEE TUBE LAYOUT FOR LOCATION)



NOTCH DETAIL "B"

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEBUTANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NOTES:

1) DRILL TUBE HOLES IN BAFFLES 25/32" DIA. & DEBURR.
2) DRILL TIE ROD HOLES 9/16" 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.

NO.	DATE	REVISIONS
2	11/9/22	REV. PER CUST. COMMENTS DD/DG
1	8/16/22	REV. PER CUST. B.W./DD

BAFFLE DETAILS

DWN. BY B.W.

DATE 8/13/22

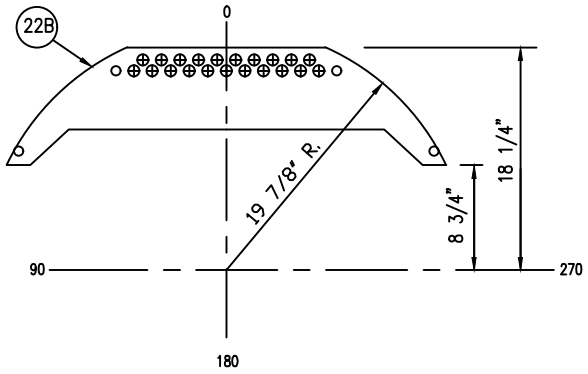
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-15-8

REV. 2

SEE TUBE LAYOUT -5
FOR BAFFLE CUT-OUT.



VIEW XX OF PART. BAFFLE
1/2" THK.
1-REQ'D. MARKED "D"

⊕DENOTES (21) 13/16" HOLES
FOR 3/4" O.D. IMP. RODS.
(SEE TUBE LAYOUT FOR LOCATION)

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEBUTANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NOTES:

1) DRILL TUBE HOLES IN BAFFLES 25/32" DIA. & DEBURR.
2) DRILL TIE ROD HOLES 9/16" 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.

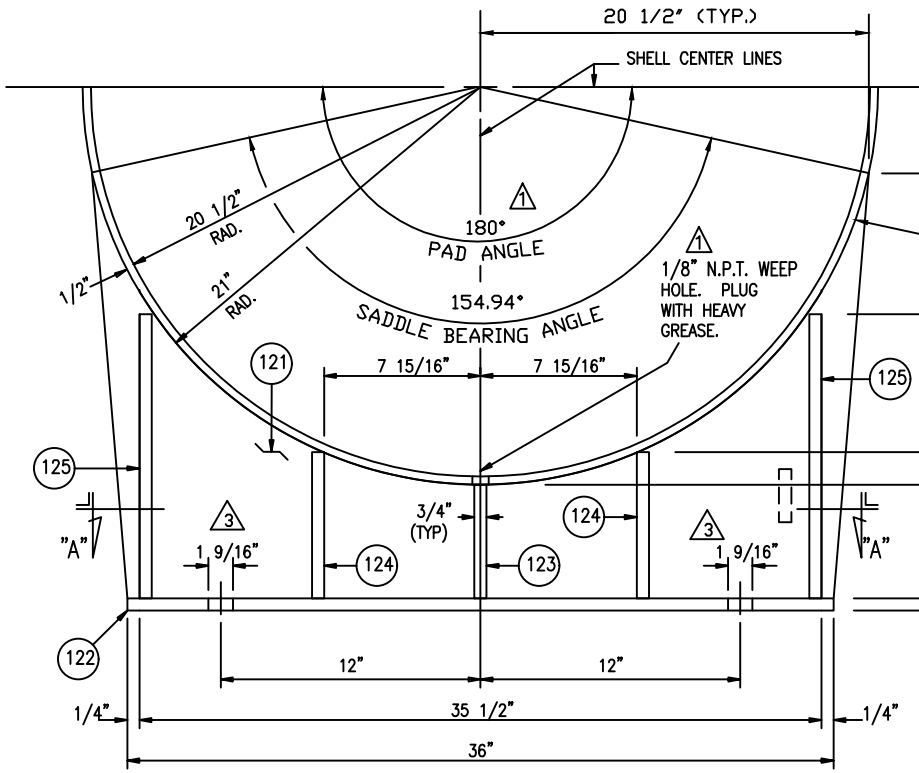
NO.	DATE	REVISIONS
1	8/16/22	ADDED DWG. PER CUST. B.W./DD

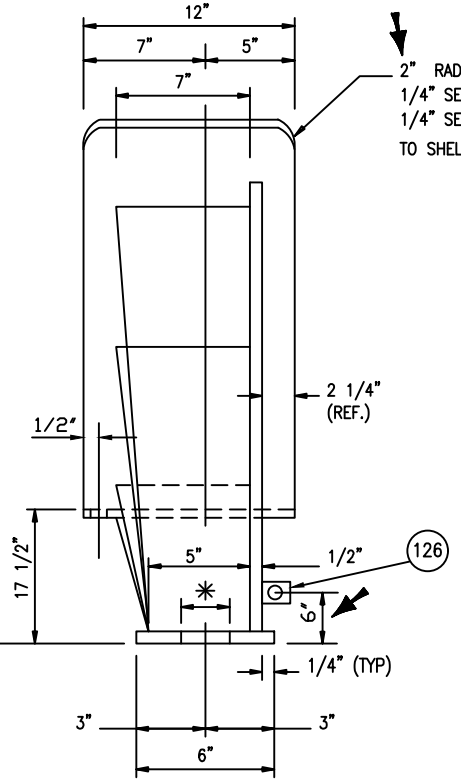
BAFFLE DETAILS CONT.

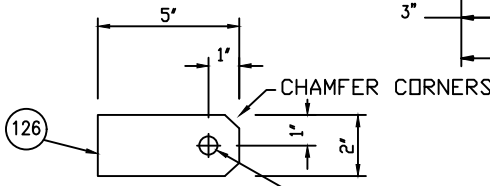
DWN. BY	B.W.
DATE	8/16/22
CKD. BY	*DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-15-8A
REV. 1

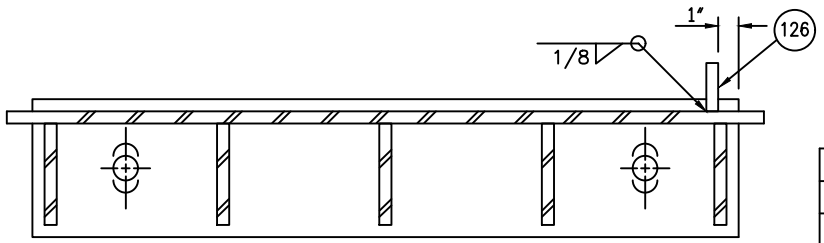






✳ ONE REQUIRED MARKED "X" W/ (2) 1 9/16" X 3" LG. SLOTS
ONE REQUIRED MARKED "Y" W/ (2) 1 9/16" ROUND HOLES

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



SECTION "A-A"

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: *DEBUTANIZER OVERHEAD CONDENSER*
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
3	12/29/22	REV. PER CUST. COMMENTS DD/DG
2	11/9/22	REV. PER CUST. COMMENTS DD/DG
1	8/16/22	REV. PER CUST. B.W./DD

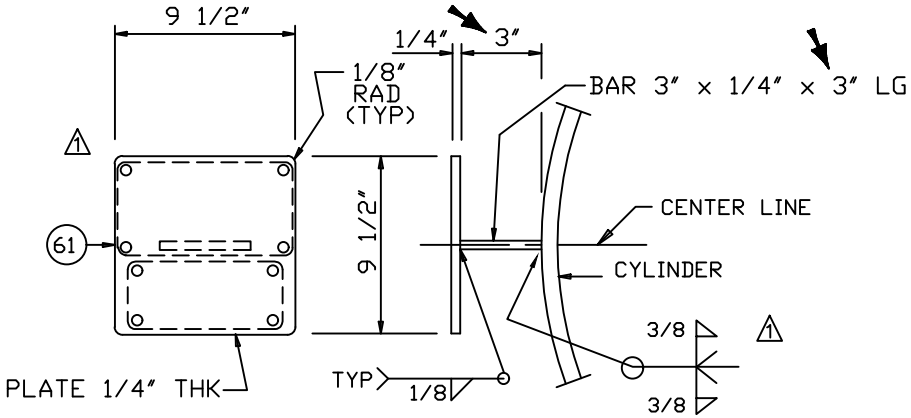
SUPPORT DETAILS

DWN. BY B.W.
DATE 6/13/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

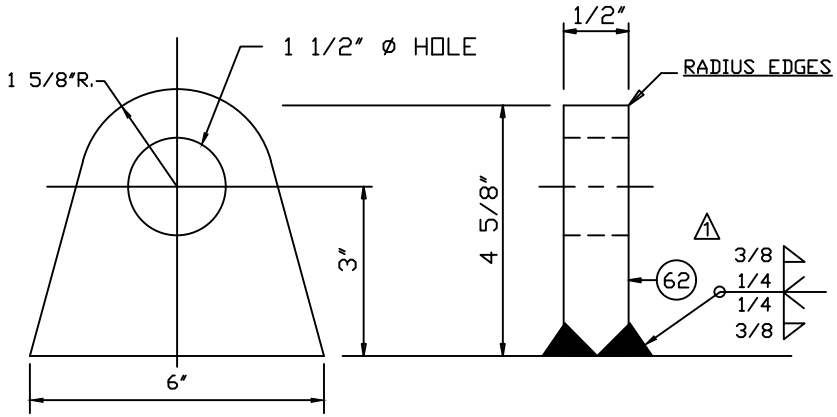
DWG.NO. S21-13258-15-9
REV. 3

* TO BE ASSIGNED AT TIME OF SHIPMENT



NAME PLATE BRACKET DETAIL

(ONE) REQUIRED



LIFTING LUG DETAIL

△2 3 - REQUIRED

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

60

NAT'L BD. *

CERTIFIED BY

FABSCO SHELL & TUBE, LLC

SAPULPA, OKLAHOMA

U

RT-3

	MAWP		MAWT		
SHELL	173	PSI AT	330	° F.	△2
	MAEWP		**MAWT**		
SHELL	15	PSI AT	300	°F.	
	MDMT		**MAWP**		
SHELL	10	°F. AT	173	PSI	△2
	MAWP		**MAWT**		
TUBES	158	PSI AT	150	° F.	△2
	MAEWP		**MAWT**		
TUBES	N/A	PSI AT	N/A	°F.	
	MDMT		**MAWP**		
TUBES	32	°F. AT	158	PSI	△2

SERIAL NUMBER	YEAR BUILT	ITEM/TAG NUMBER
S21-13258-15	2023	18-X-379

△1 P.O. NO.: 4505600058 WT.: 23400 LBS. TEST DATE:

△1 DEBUTANIZER OVERHEAD CONDENSER

INFORMATION NAME PLATE

△2 HYDRO TEST PRESS PSIG..TUBESIDE: SHOP-228/FIELD-206

△2 HYDRO TEST PRESS PSIG..SHELLSIDE: SHOP-245/FIELD-225

△1 DESIGN PRESS.: SHELLSIDE=170 PSIG; TUBESIDE=135 PSGI

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

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEBUTANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: HC09
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
△2	11/9/22	REV. PER CUST. COMMENTS DD/DG
△1	8/16/22	REV. PER CUST. B.W./DD

LIFT LUG DETAIL w/ NAME PLATE & BRACKET

DWN. BY B.W.

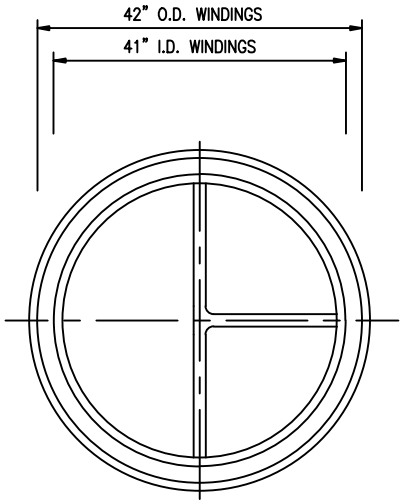
DATE 6/13/22

CKD. BY *DiCarlo*

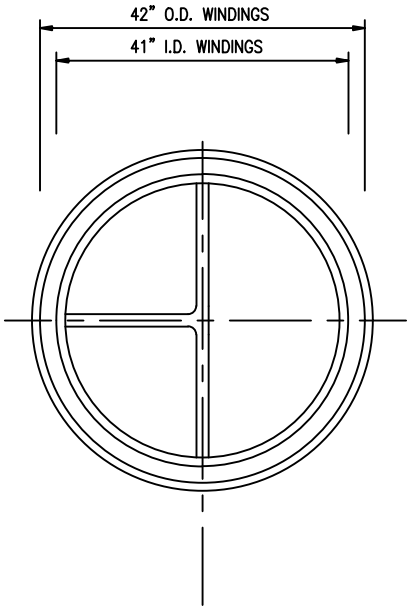
Fabsco SHELL & TUBE, LLC

DWG. NO. S21-13258-15-10

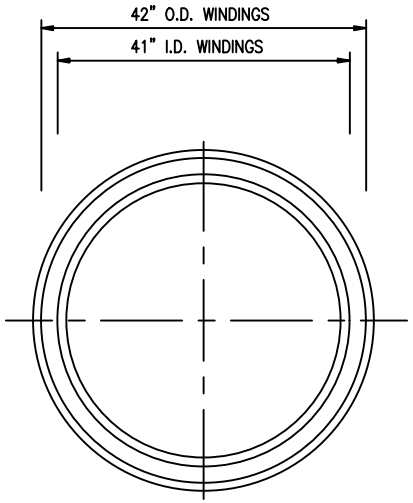
REV. 2



(1)–REQUIRED.
CHANNEL COVER GASKET.
0.175" THK. 304 S.S. SPIRAL WOUND
W/ GRAPHITE FILLER & INNER / OUTER COMP. RINGS (A)
⚠1 RIB TO BE 3/16" THK. X 3/8" WIDE 304 S.S. DBL. JACKETED
W/ GRAPHITE FILLER AND 1/64" THK. GRAPHITE
FACE ON BOTH SIDES
TEST PRESSURE:
SHOP: 244/FIELD: 210



(1)–REQUIRED.
CHANNEL GASKET.
0.175" THK. 304 S.S. SPIRAL WOUND
W/ GRAPHITE FILLER & INNER / OUTER COMP. RINGS (B)
⚠1 RIB TO BE 3/16" THK. X 7/16" WIDE 304 S.S. DBL. JACKETED
W/ GRAPHITE FILLER AND 1/64" THK. GRAPHITE
FACE ON BOTH SIDES
TEST PRESSURE:
SHOP: 244/FIELD: 210



(1)–REQUIRED.
SHELL GASKET.
0.175" THK. 304 S.S. SPIRAL WOUND
W/ GRAPHITE FILLER & INNER / OUTER COMP. RINGS (C)
TEST PRESSURE:
SHOP: 305/FIELD: 230

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

(A) 42.7500 O.D. X .1250 THICK: MATERIAL=SA-240-304
40.2500 I.D. X .1250 THICK: MATERIAL=SA-240-304
(B) 42.7500 O.D. X .1250 THICK: MATERIAL=SA-240-304
40.2500 I.D. X .1250 THICK: MATERIAL=SA-240-304
(C) 42.7500 O.D. X .1250 THICK: MATERIAL=SA-240-304
40.2500 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: 1" O.D.
NUMBER STUDS: (56)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 601.1-637-9 FT. LBS

CHAN. FLG./T'SHT./SHELL FLG. BOLTING INFO
STUD DIAMETER: 1" O.D.
NUMBER STUDS: (56)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 601.1-637.9 FT. LBS.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEBUTANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

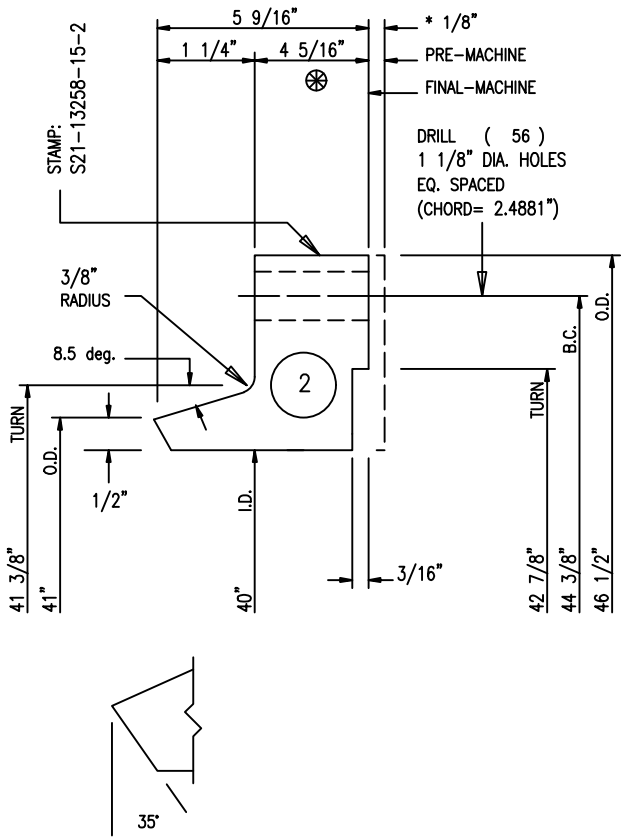
NO.	DATE	REVISIONS
⚠1	8/16/22	REV. PER CUST. B.W./DD

GASKET DETAILS

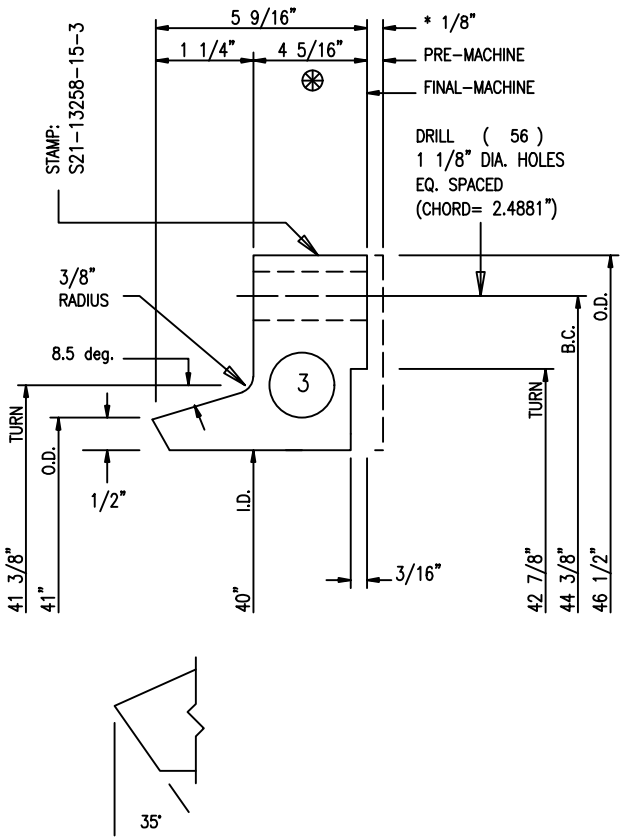
DWN. BY B.W.
DATE 6/13/22
CKD. BY DICARLO

Fabsco
SHELL & TUBE, LLC

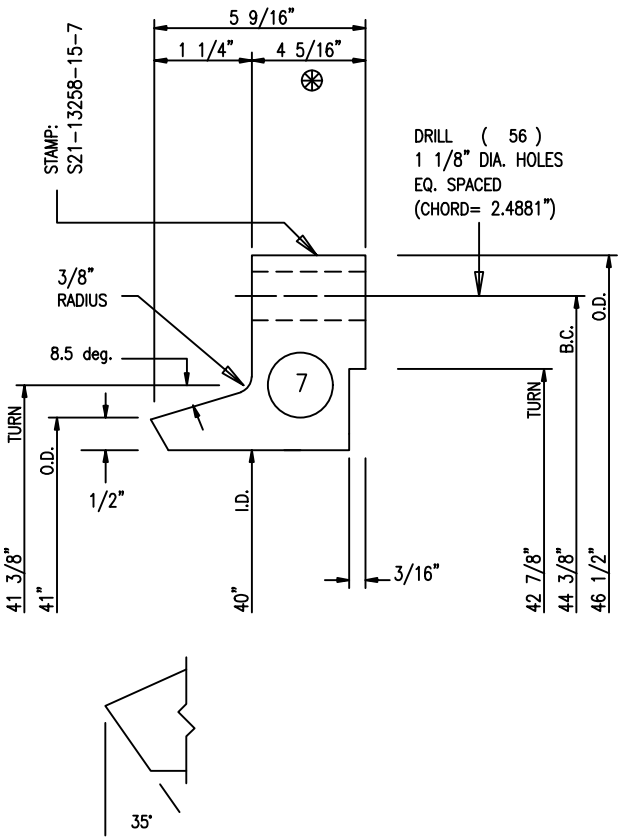
DWG.NO. S21-13258-15-11
REV. 1



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
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LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

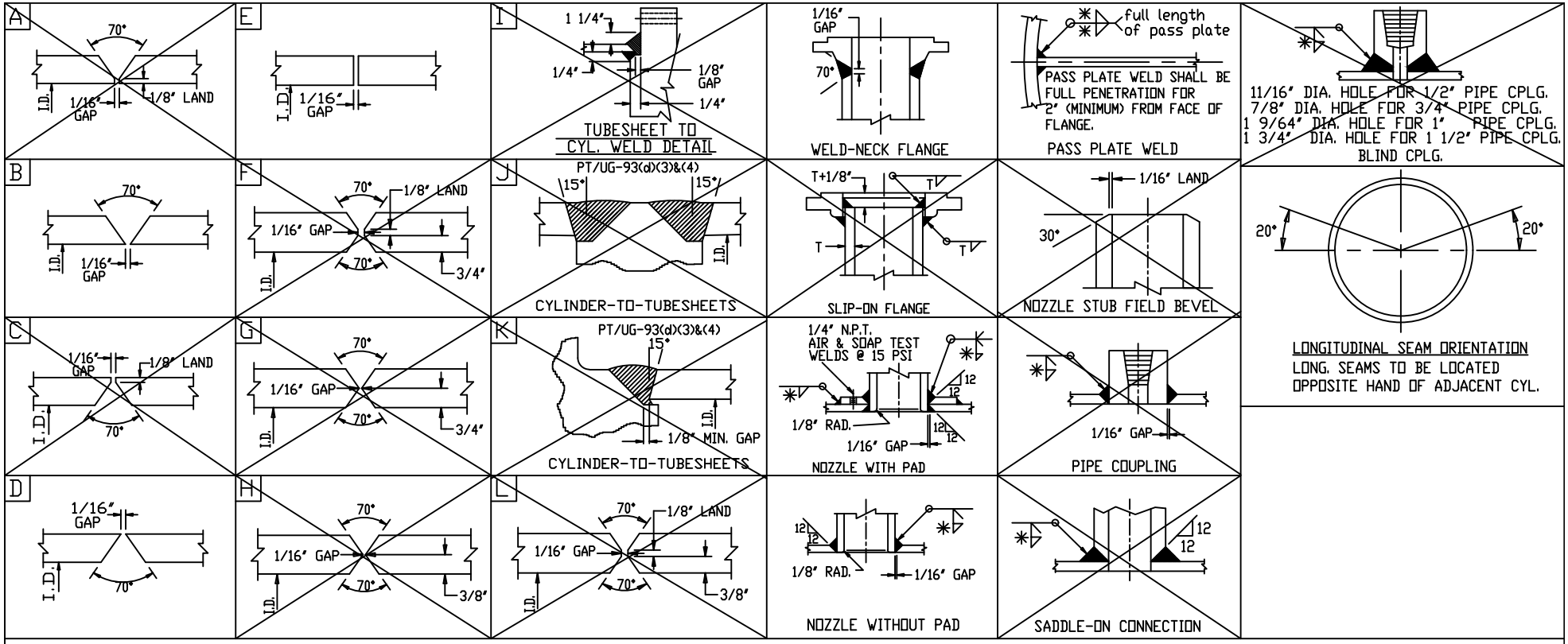
NO.	DATE	REVISIONS

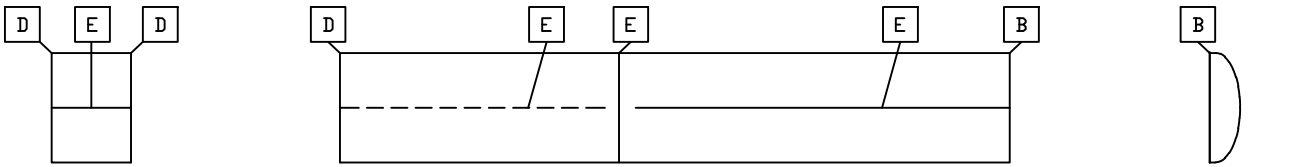
GIRTH FLANGES

DWN. BY B.W.
DATE 6/13/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-15-12
REV. 0





PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEBUTANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEBUTANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-379
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7020
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-15
ENGINEER: SD
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

GENERAL NOTES

1) ALL WELDING SHALL BE IN ACCORDANCE WITH ASME CODE (SECTION IX).
* 2) ALL FILLET WELDS SHALL BE 3/8", UNLESS NOTED OTHERWISE.
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

WELD & BEVEL DETAILS

DWN. BY	B.W.
DATE	6/13/22
CKD. BY	*DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG. NO.	REV.
S21-13258-15-13	0