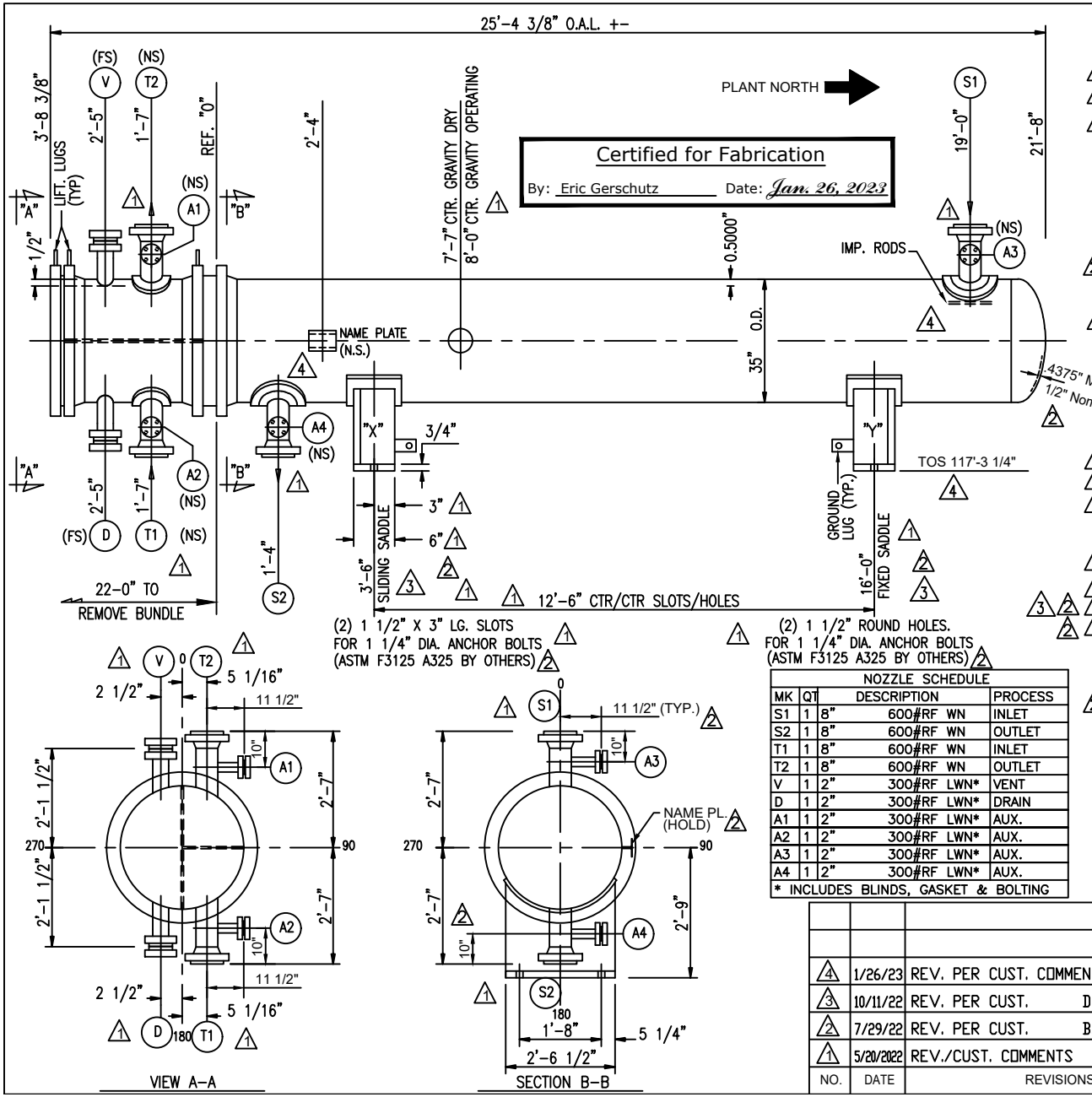


NOZZLE SCHEDULE			
MK	QT	DESCRIPTION	PROCESS
S1	1	8" 600#RF WN	INLET
S2	1	8" 600#RF WN	OUTLET
T1	1	8" 600#RF WN	INLET
T2	1	8" 600#RF WN	OUTLET
V	1	2" 300#RF LWN*	VENT
D	1	2" 300#RF LWN*	DRAIN
A1	1	2" 300#RF LWN*	AUX.
A2	1	2" 300#RF LWN*	AUX.
A3	1	2" 300#RF LWN*	AUX.
A4	1	2" 300#RF LWN*	AUX.

* INCLUDES BLINDS, GASKET & BOLTING

DESIGN DATA	SHELL	TUBE
DESIGN PRESSURE P.S.I.G.	360	280
M.A.W.P. P.S.I.G.	364	307
M.A.P. P.S.I.G.	404	316
LIMITED BY	2:1 ELLIP. HEAD	CHANNEL COVER
VACUUM PRESSURE P.S.I.G.	15 @ 300° F.	N/A
TEST PRESSURE P.S.I.G.	SHOP-525/FIELD-473	SHOP-410/FIELD-399
DESIGN TEMP. Deg.F.	400	150
MDMT Deg. F.	-45	32
CORROSION ALLOWANCE	1/8"	1/8"
NUMBER OF PASSES	1	4
RADIOGRAPHY	SPOT/UW-11(a)(5)(b)	SPOT/UW-11(a)(5)(b)
HEAT TREAT REQUIRED	NO	NO

ESTIMATED WEIGHTS, LBS.

DRY: 20550 BUNDLE: 11750 WET/HYDRO: 28900 SHELL: 5250 CHAN.CVR.: 450 CHAN.: 3100

SPECIFICATIONS

ASME Code Section VIII, Division 1, 2021 Ed. (Stamp: Yes)
TEMA Class R 10th Ed.; & Natl. Bd. Reg. is Req'd. API-660 9th Ed.
Design Reviewed For Compliance With The Requirements of UG-120(d).
Impact Test Exempt per UCS-66(a),(c),(g), Fig. UCS-66 Gen. Note (c) & UCS-67.

MATERIAL

CHANNEL:	SA-516-70N	BAFFLES:	SA-516-70
SHELL:	SA-516-70N	TUBES:	SA-334-6 (SMLS)
TUBESHEETS:	SA-350LF2CL1		

REFER TO BILL OF MATERIAL FOR REMAINING MAT'L.

(372) U's 3/4" O.D.X 0.083" (min.) X 20'-0" LG.
TUBE PITCH 1" □ 90° SURFACE 2873 (EFF) SQ.FT.

GENERAL NOTES

ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.
NO INSULATION REQUIRED.
STRESS RELIEVE U-BENDS PLUS 1'-0" OF STRAIGHT LENGTH
SEAL WELD & EXPAND TUBES TO TUBESHEET
FIRE PROOFING ON SUPPORTS: N/A
SHELLSIDE; TOXIC & FLAMMABLE SERVICE ; TUBESIDE:---

GASKETS: .1750" THK. 304 SPIRAL WOUND GPHT FILLED W/ 304 S.S. INNER & OUTER COMP. RINGS
2 SETS OF SPARE GASKETS REQUIRED.
10% SPARE BOLTING FOR BODY FLG'S.
PAINT: SEE SHT. -1A

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: HCO9
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

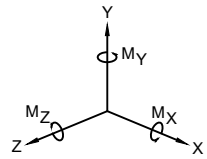
NO.	DATE	REVISIONS
4	1/26/23	REV. PER CUST. COMMENTS DD/DG
3	10/11/22	REV. PER CUST. DD/DG
2	7/29/22	REV. PER CUST. B.W./DD
1	5/20/2022	REV./CUST. COMMENTS EMG

ASSEMBLY AND SPECIFICATIONS FOR
ONE 34-240 A E U

DWN. BY EMG
DATE 12-14-21
CKD. BY GS

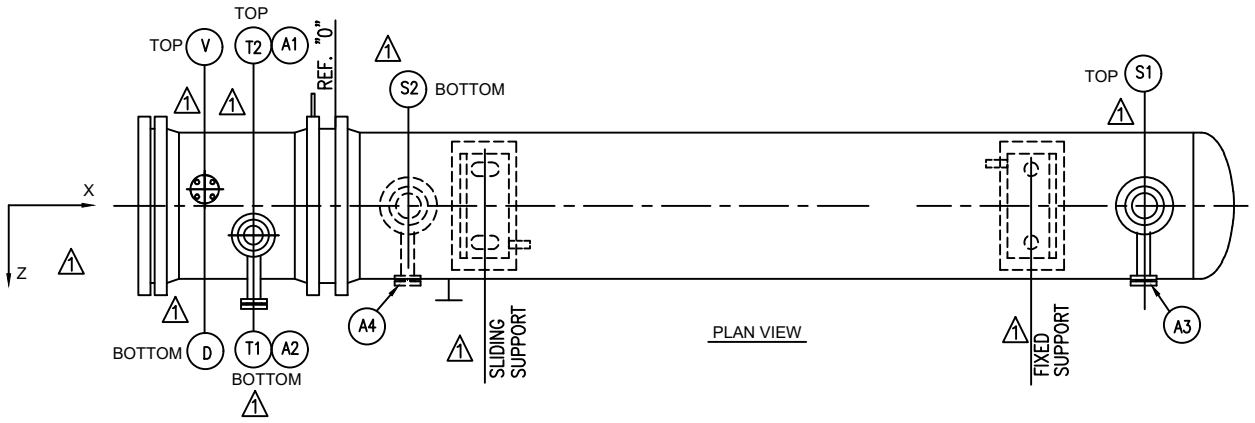
Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-12-1
REV. 4



NOZZLE LOADS

MK.	$M_{X\ LBF-FT}$	$M_{Y\ LBF-FT}$	$M_{Z\ LBF-FT}$	$F_{X\ LBF}$	$F_{Y\ LBF}$	$F_{Z\ LBF}$	LOAD BASES
S1	9020	14600	11460	4560	3640	4560	8"-300#; 2 x API-660
S2	9020	14600	11460	4560	3640	4560	8"-300#; 2 x API-660
T1	9020	14600	11460	4560	3640	4560	8"-300#; 2 x API-660
T2	9020	14600	11460	4560	3640	4560	8"-300#; 2 x API-660



DESIGN DATA	SHELL	TUBE
OPERATING PRESSURE PSIG	240.0	50.0
OPERATING TEMP. °F.	IN: 125 OUT: 110.7	IN: 80 OUT: 104
HYDROTEST TEMP. °F.	40°F. (MIN.)	40°F. (MIN.)
JOINT EFF.	1	1
FLUID NAME	PROPANE	COOLING WATER
FLUID DENSITY lb/ft^3	OUT: 28.95	OUT: 61.952
LETHAL SERVICE	NO	NO
DESIGN DUTY Btu/hr	8724000	
WIND CODE	ASCE 7-16 WIND SPEED: 101 MPH IMP. FACTOR: 1	
SEISMIC CODE	ASCE 7-16 IMP. FACTOR: 1.5 Fa: 1 Fv: 1.721	
	Ss: 1.616 S_1: 0.579 Site Class: D Sd_1: 0.996	

PAINT: (PAINT SYSTEM #1)
SOLVENT CLEAN PER SSPC-SP1
SANDBLAST PER SSPC-SP10 (1.5-2.5 MILS ANCHOR PROFILE)
PRIMER: ONE COAT SHERWIN WILLIAMS ZINC CLAD II (2.5-4.0 MILS DFT)
INTERM: ONE COAT SHERWIN WILLIAMS MACROPOXY 646 (4.0-6.0 MILS DFT)
(COLOR: MILLWHITE)
FINISH COAT: ONE COAT SHERWIN WILLIAMS ACROLON 218HS
(2.0-3.0 MILS DFT)
(COLOR: LIGHT GRAY RAL #7035)

APPLICABLE SPECIFICATIONS :

3-11-10, 4-11-11, 4WEQ-1051, 4WGN-10001,
4WPI-670210, A8KM-PP-000-40002-A,
A8KM-PP-000-50720-A, A8KM-PP-000-200001-A,
A8KM-PP-000-500005-A, A8KM-PP-000-500510-A,
A8KM-PP-000-500512-A, A8KM-PP-000-500520-A,
A8KM-PP-000-500550-A, FORM 8232,
SPEC-ENG-DOC001, SPEC-ENG-DOC002,
SPEC-ENG-MQ042, SPEC-ENG-MQ057,
SPEC-MED-DOC001

FOUNDATION LOADS

SADDLE MARK	SUP'T "X"	SUP'T "Y"
TRANSVERSE SHEAR LOAD	7827 LBS.	7827 LBS.
LONGITUDINAL SHEAR LOAD	15653 LBS.	15653 LBS.
VERTICAL LOAD	45862 LBS.	38132 LBS.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: HC09
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

2 CHANNEL COVER TO CHANNEL FLANGE BOLTING INFO
STUD DIAMETER: 1 1/8" O.D.
NUMBER STUDS: (48)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 760.3-778.4 FT. LBS

2 CHAN. FLG./T'SHT./SHELL FLG. BOLTING INFO
STUD DIAMETER: 1 1/8" O.D.
NUMBER STUDS: (48)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 628.9-778.4 FT. LBS.

NO.	DATE	REVISIONS
4	1/26/23	REV.PER CUST. COMMENTS DD/DG
3	11/8/22	REV. PER CUST. DD/DG
2	10/11/22	REV. PER CUST. DD/DG
1	7/29/22	REV. PER CUST. B.W./DD

SUPPLEMENTAL INFORMATION
ONE 34 - 240 A E U

DWN. BY: EMG
DATE: 5/20/2022
CKD. BY: *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-12-1A
REV. 4

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

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

   P.O. NO.: 4505600058

   ITEM NO.: 18-X-375

   SHIPPING WT.: 20,550 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 FIVE (5) DAYS (MIN.) 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% MAX.

----------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 40°F.
8) ALL EXTERNAL ATTACHMENTS TO BE SEAL WELDED.
9) HYDROSTATIC TEST, USE CLEAN WATER WITH A CORROSION INHIBITOR ADDED.
   VOLUME OF WATER SHELLSIDE = 646 GALLONS (APPROXIMATELY)
   VOLUME OF WATER TUBESIDE = 353 GALLONS (APPROXIMATELY)
10) ALL LIFTING DEVICE ATTACHMENT WELDS SHALL BE EXAMINED BY THE PT METHOD.
11) INSTALL SHIPPING COVERS ON NOZZLES WITHOUT BLINDS.
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 PER UW-11(a)(5)(b) RADIOGRAPHY.
2) CHANNEL: SPOT PER UW-11(a)(5)(b) RADIOGRAPHY.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
1	8/2/22	ADDED DWG. PER FABSCO B.W./DD

JOB NOTES

DWN. BY B.W.
DATE 8/1/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG. NO. S21-13258-12-1B
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.
98) 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" : 5'-4"
"WIDTH" : 3'-5"
"LENGTH" : 25'-5"
"WEIGHT" : 20,550#
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.
22) WELDS FROM EACH WELD PROCEDURE, WELDER/WELDING OPERATOR SHALL BE SPOT RADIOGRAPHED IF ACCESSIBLE.
23) NON PRESSURE PARTS TO PRESSURE CONTAINING COMPONENT WELDS SHALL BE 100% M.P.E. OR D.P.E.
24) ALL LONG & CIRC SEAMS, NOZZLE ATTACHMENT WELDS SHALL BE FULL PENETRATION WELDED AS SHOWN ON DWG. -13.
25) FOR OFFSET NOZZLES, THE MIN. THROAT DIMENSIONS SHALL BE MAINTAINED.
26) 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.
27) ALL SHELL & HEAD JOINTS SHALL BE BACK WELDED JOINTS.

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PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
2	8/31/22	REV. PER CUST. DD/DG
1	8/3/22	ADDED DWG./FABSCO B.W./DD

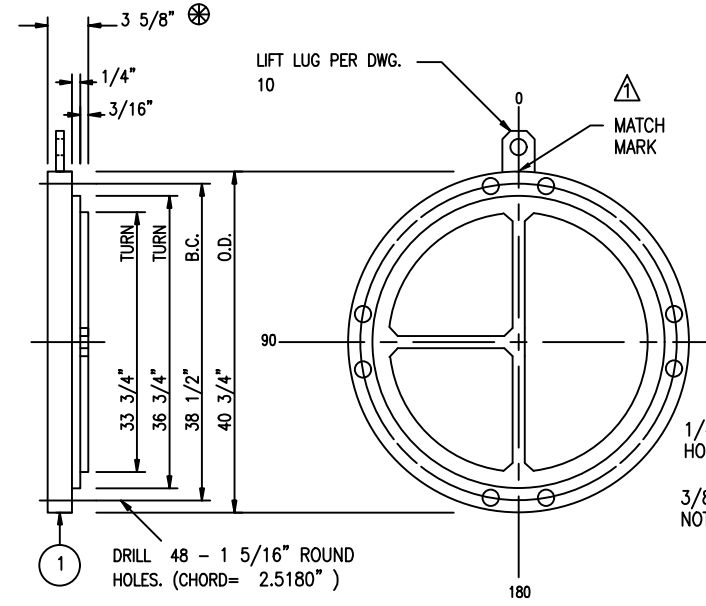
JOB NOTES (CONT.)

DWN. BY B.W.
DATE 8/3/22
CKD. BY *DiCarlo*

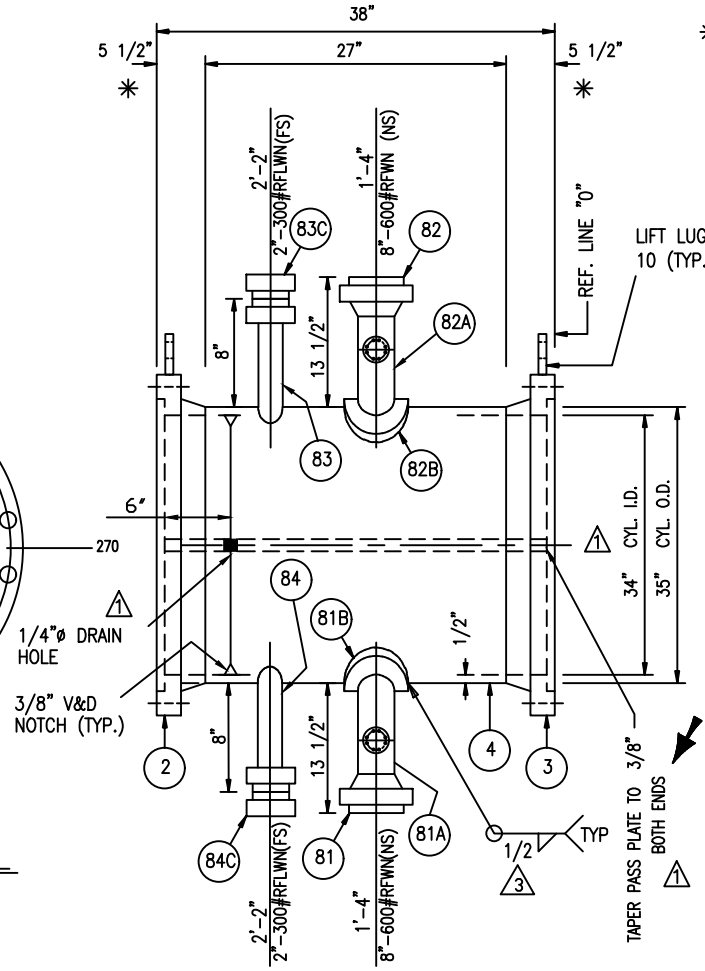
Fabsco
SHELL & TUBE, LLC

DWG. NO. S21-13258-12-1C
REV. 2

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. (1)
3) ALL COVER PASS PLATE GROOVE JUNCTIONS TO BE NOTCHED 3/8" AT 45 Deg.

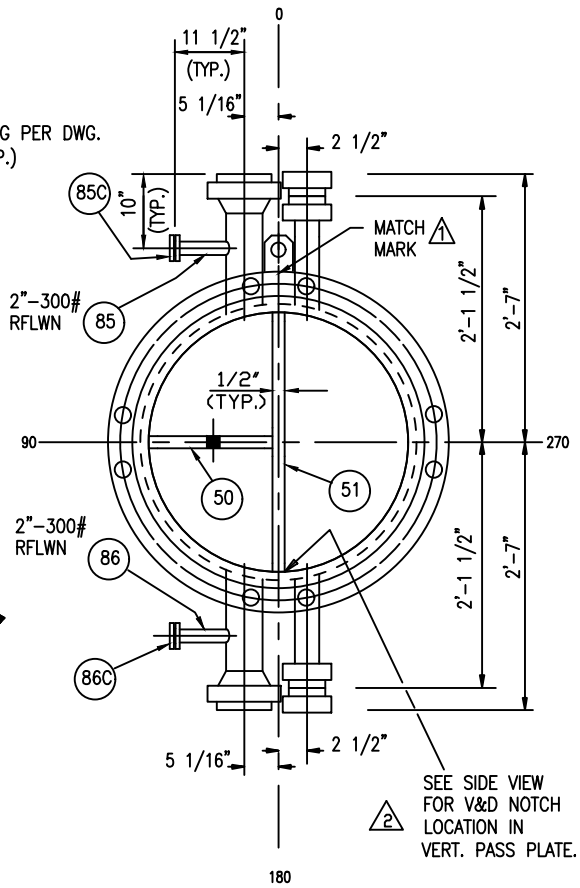


CHANNEL-COVER DETAIL



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 PER UW-11(a)(5)(b) RADIOGRAPHY.

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ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
3	11/8/22	REV. PER CUST. DD/DG
2	10/11/22	ADD NOTE/CUST. DD/DG
1	8/1/22	REV. PER CUST. B.W./DD

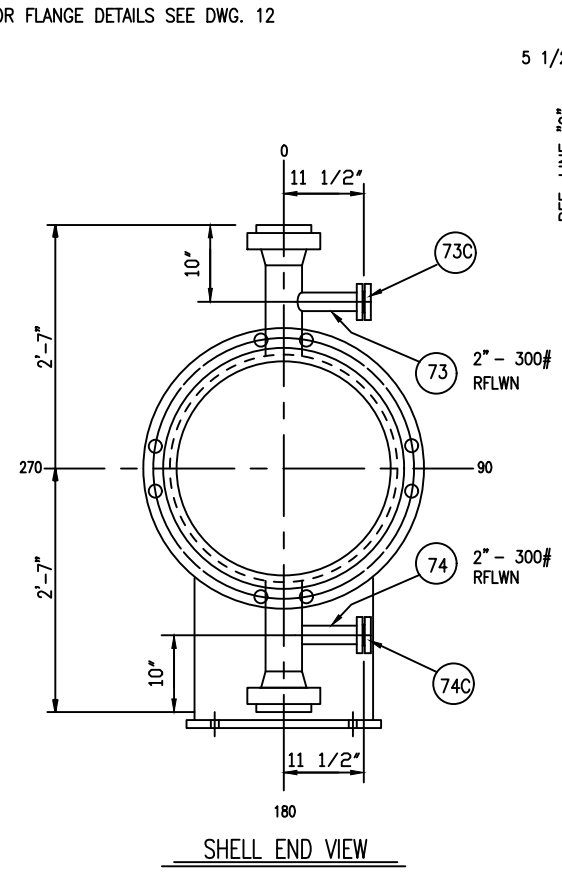
FRONT CHANNEL DETAILS

DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

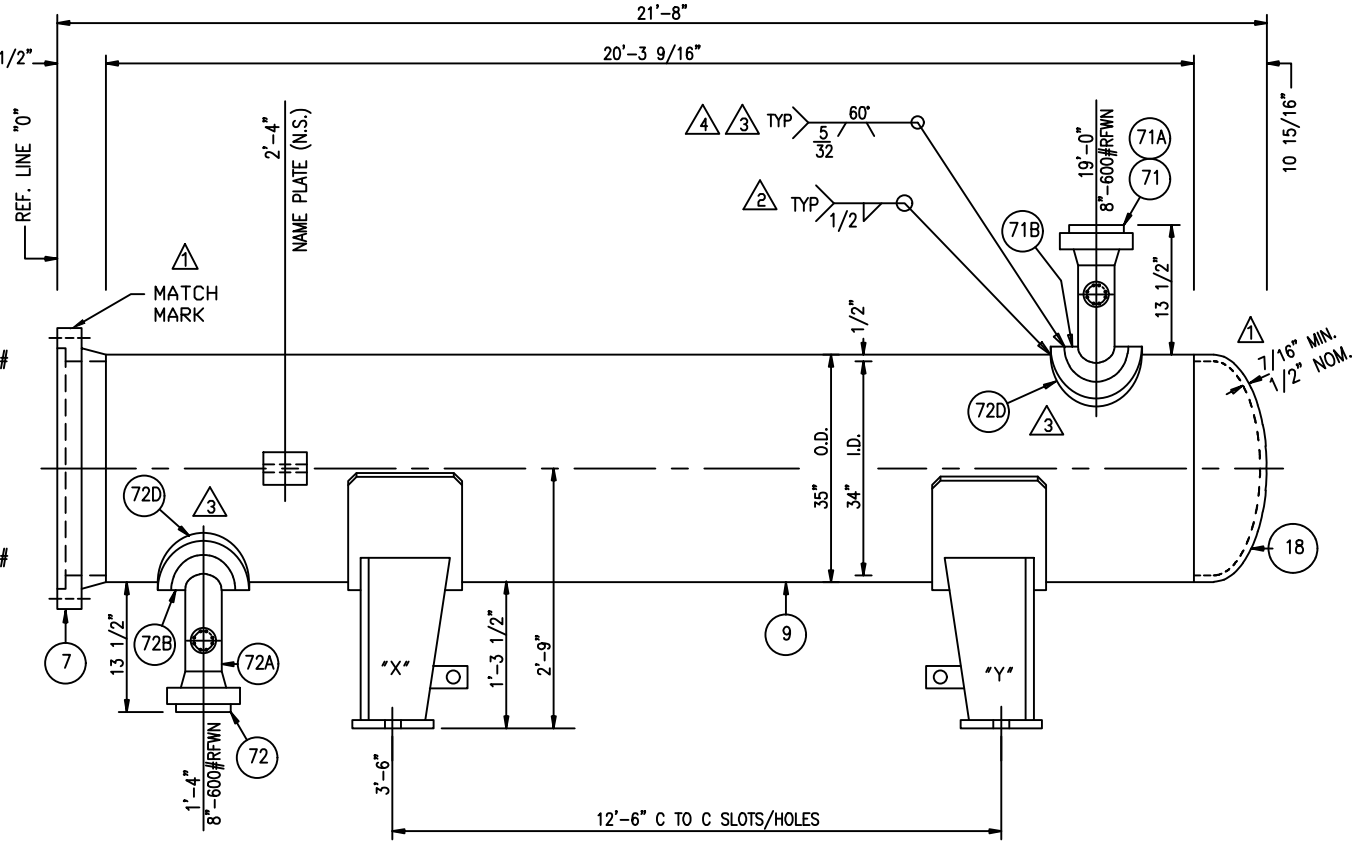
Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-12-2
REV. 3

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 PER UW-11(a)(5)(b) RADIOGRAPHY.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
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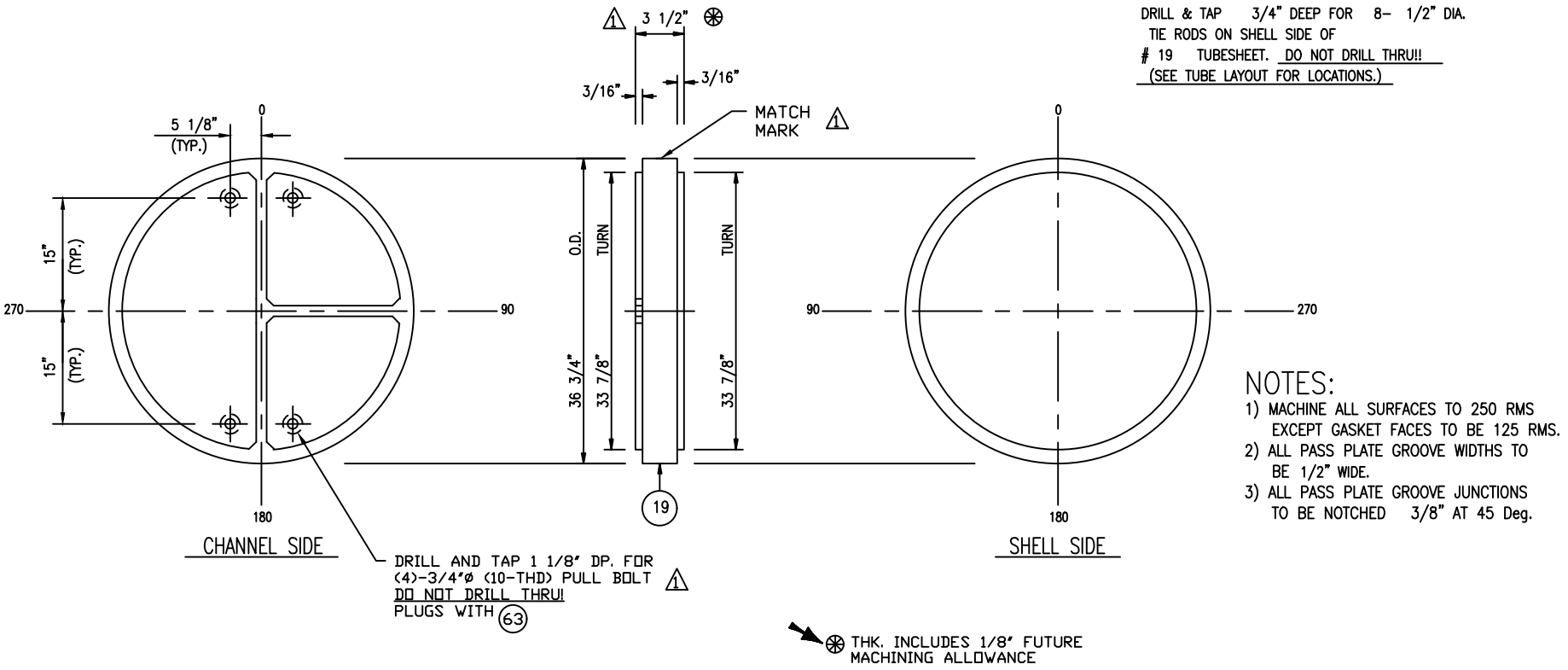
NO.	DATE	REVISIONS
4	2/24/23	REV. PER CUST. COMMENTS DD/DG
3	1/26/23	REV. PER CUST. COMMENTS DD/DG
2	11/8/22	REV. PER CUST. DD/DG
1	8/1/22	REV. PER CUST. B.W./DD

SHELL DETAILS

DWN. BY B.W.
DATE 6/3/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

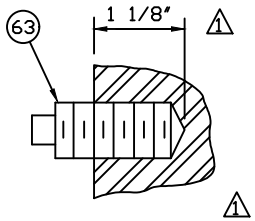
DWG.NO. S21-13258-12-3
REV. 4



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: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

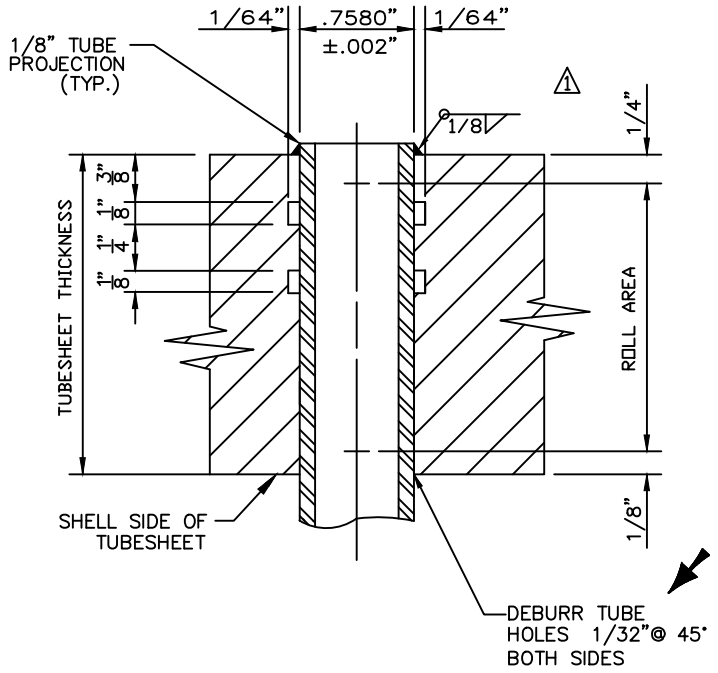
NO.	DATE	REVISIONS
1	8/1/22	REV. PER CUST. B.W./DD

TUBESHEET DETAILS

DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

Fabsco SHELL & TUBE, LLC

DWG.NO. S21-13258-12-4
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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PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

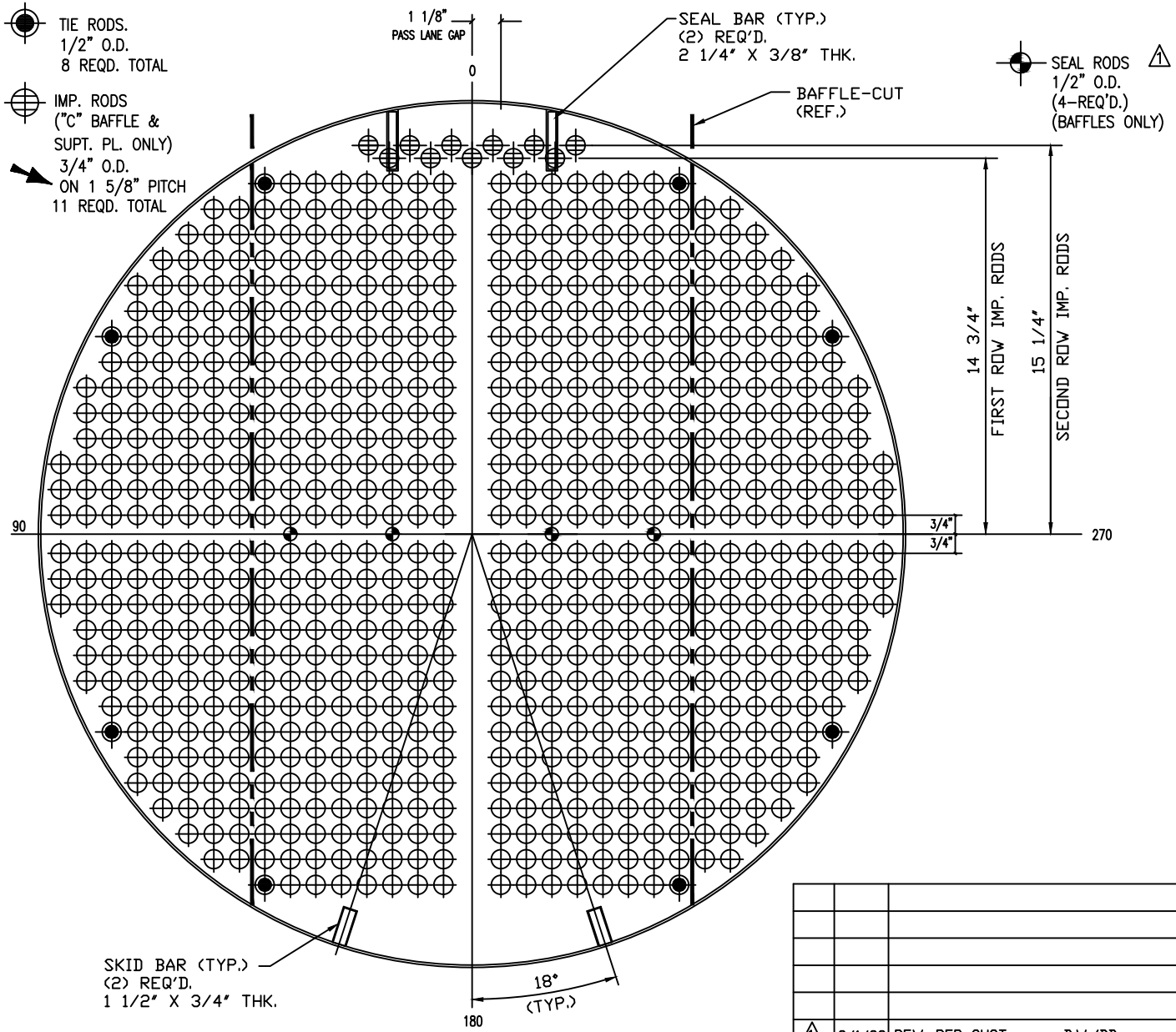
NO.	DATE	REVISIONS
1	8/1/22	REV. PER CUST. B.W/DD

TUBE SEAL WELD
& TUBE HOLE GROOVING DETAIL

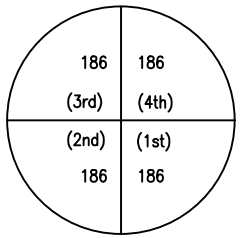
DWN. BY: B.W.
DATE: 6/2/22
CKD. BY: *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO.: S21-13258-12-4A
REV.: 1



VIEW LOOKING AT SHELL SIDE OF NO. 19 TUBESHEET



TUBE DISTRIBUTION

NOTES:

1) DRILL AND REAM TUBE HOLES IN TUBESHEETS TO 0.7580" +- 0.0020" DIA. FOR 372 - 3/4" O.D. U-TUBES. TOTAL HOLES = 744
2) TUBE PITCH = 1" SQUARE. (90°) 1
3) NUMBER OF PASSES = 4
4) SEE DRAWING 4A FOR TUBE GROOVING DETAILS.
5) BAFFLE O.D. = 33 13/16"
6) O.T.L. = 33 1/2"

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

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

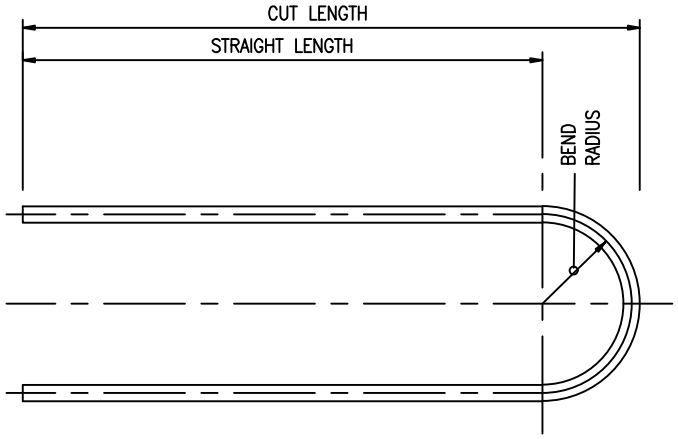
TUBE LAYOUT

DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-12-5
REV. 1

ROW	NO.OF TUBES	BEND RADIUS	BEND DIAMETER	BEND LENGTH	STRAIGHT LENGTH	CUT LENGTH	DEVELOPED LENGTH
A	28	1 1/8"	2 1/4"	0'-3 9/16"	20'-0"	20'-1 1/2"	40'-3 9/16"
B	28	2 1/8"	4 1/4"	0'-6 11/16"	20'-0"	20'-2 1/2"	40'-6 11/16"
C	28	3 1/8"	6 1/4"	0'-9 7/8"	20'-0"	20'-3 1/2"	40'-9 7/8"
D	28	4 1/8"	8 1/4"	1'-1"	20'-0"	20'-4 1/2"	41'-1"
E	28	5 1/8"	10 1/4"	1'-4 1/8"	20'-0"	20'-5 1/2"	41'-4 1/8"
F	28	6 1/8"	12 1/4"	1'-7 1/4"	20'-0"	20'-6 1/2"	41'-7 1/4"
G	28	7 1/8"	14 1/4"	1'-10 7/16"	20'-0"	20'-7 1/2"	41'-10 7/16"
H	26	8 1/8"	16 1/4"	2'-1 9/16"	20'-0"	20'-8 1/2"	42'-1 9/16"
J	26	9 1/8"	18 1/4"	2'-4 11/16"	20'-0"	20'-9 1/2"	42'-4 11/16"
K	26	10 1/8"	20 1/4"	2'-7 13/16"	20'-0"	20'-10 1/2"	42'-7 13/16"
L	24	11 1/8"	22 1/4"	2'-11"	20'-0"	20'-11 1/2"	42'-11"
M	22	12 1/8"	24 1/4"	3'-2 1/8"	20'-0"	21'-0 1/2"	43'-2 1/8"
N	20	13 1/8"	26 1/4"	3'-5 1/4"	20'-0"	21'-1 1/2"	43'-5 1/4"
O	14	14 1/8"	28 1/4"	3'-8 3/8"	20'-0"	21'-2 1/2"	43'-8 3/8"
P	12	15 1/8"	30 1/4"	3'-11 9/16"	20'-0"	21'-3 1/2"	43'-11 9/16"
Q	6	16 1/8"	32 1/4"	4'-2 11/16"	20'-0"	21'-4 1/2"	44'-2 11/16"



TOTAL NO. REQUIRED: 372
SIZE: 3/4" (.083" MIN.)
MATERIAL: SA-334-6 (SMLS)

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.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

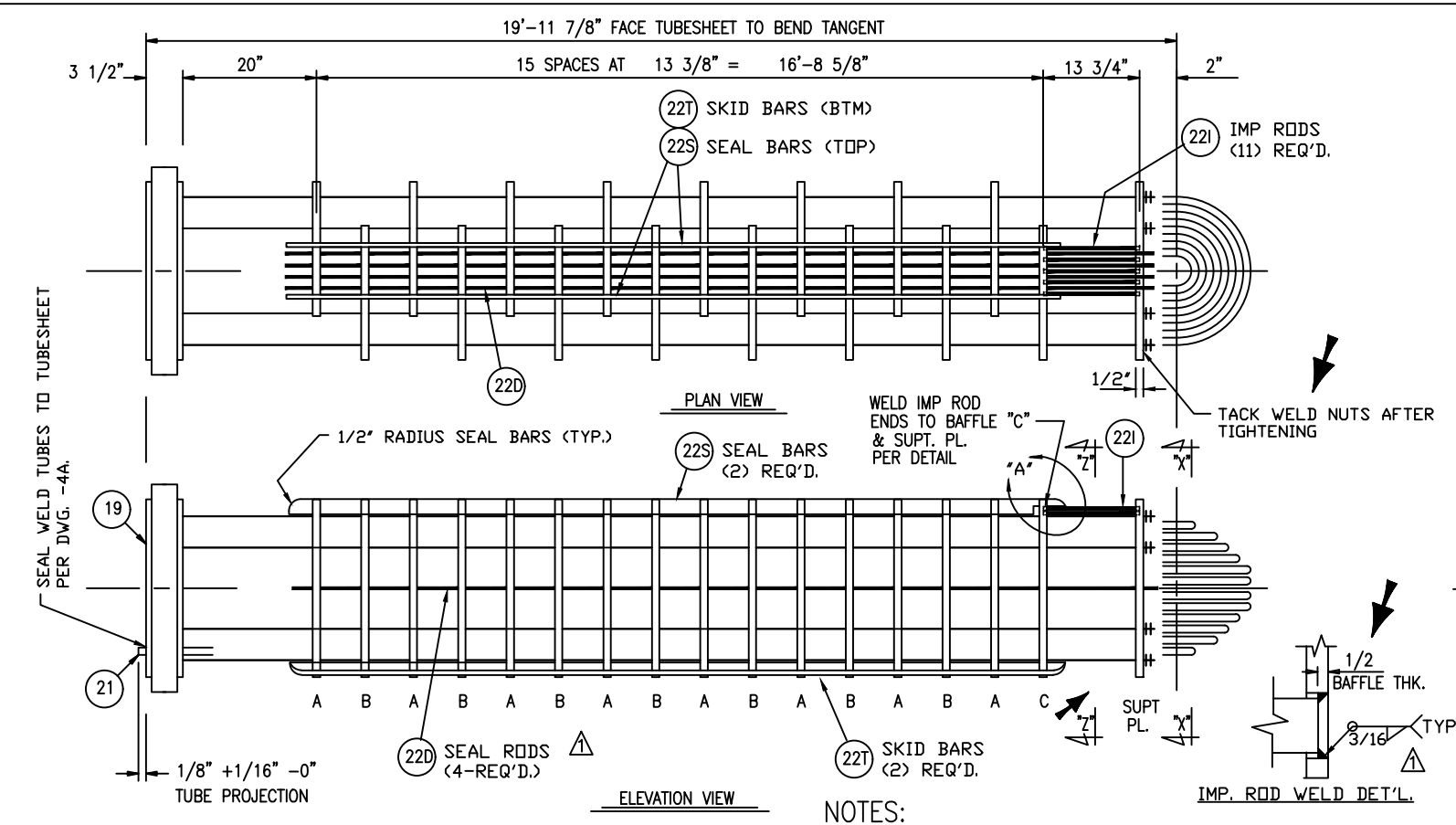
NO.	DATE	REVISIONS

TUBE BENDING SCHEDULE

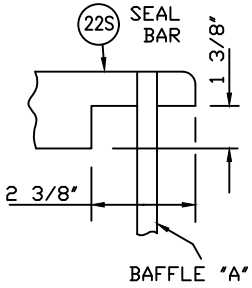
DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

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DWG.NO. S21-13258-12-6
REV. 0



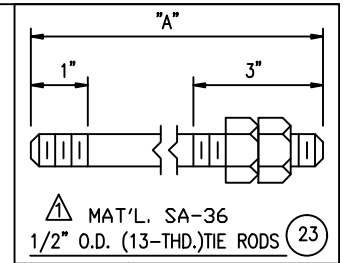
IMP. ROD WELD DET'L.



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

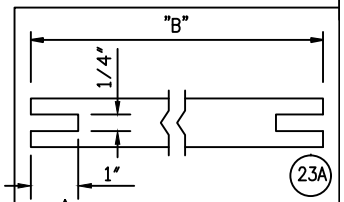
NOTES:

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. RADIUS EACH END OF SEAL BARS & SKID BARS. 1/4"(MIN.) FILLET WELD. 1 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	19'-9"
2		
3		



(23A)

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

	REQ'D.	"B"
A	6	19 13/16"
B	2	33 3/16"
C	60	13 1/16"
D	28	26 7/16"
E	6	13 5/16"
F	2	26 11/16"

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058/ A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

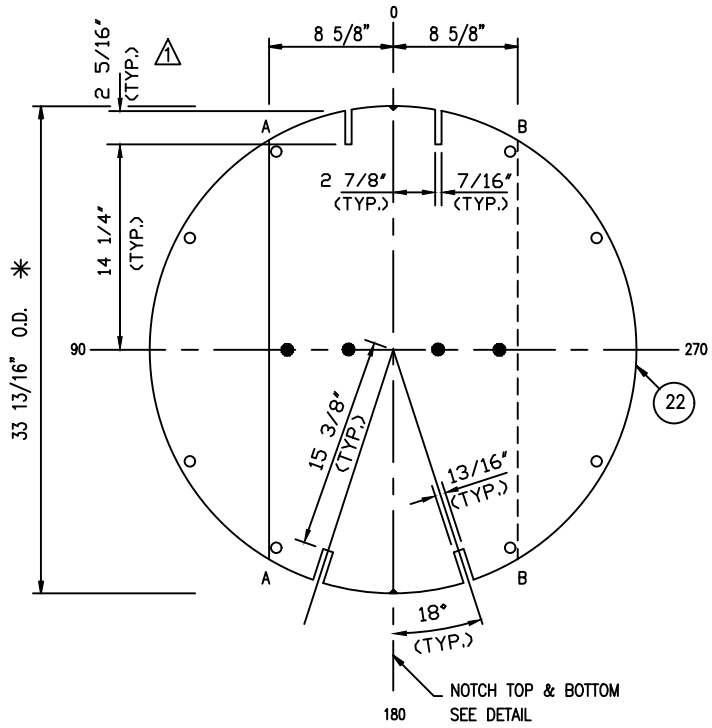
NO.	DATE	REVISIONS
1	8/3/22	REV. PER CUST. B.W./DD

BUNDLE DETAILS

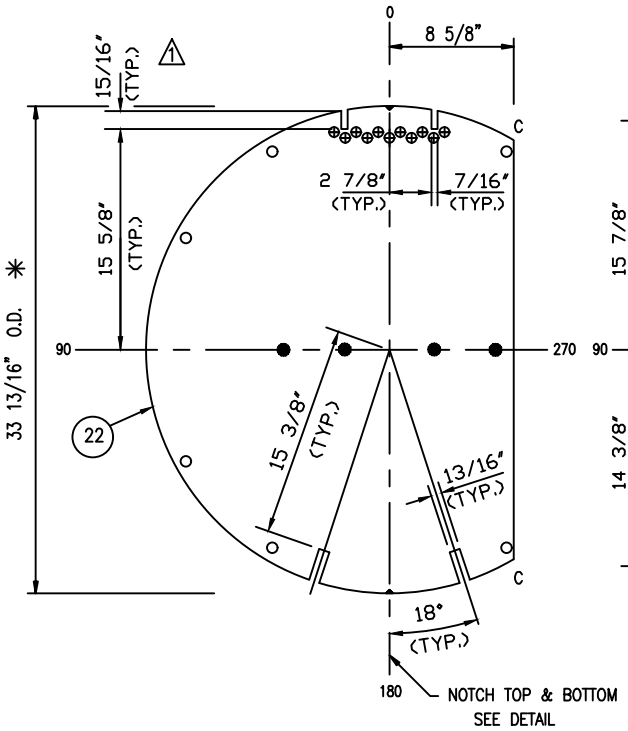
DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

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SHELL & TUBE, LLC

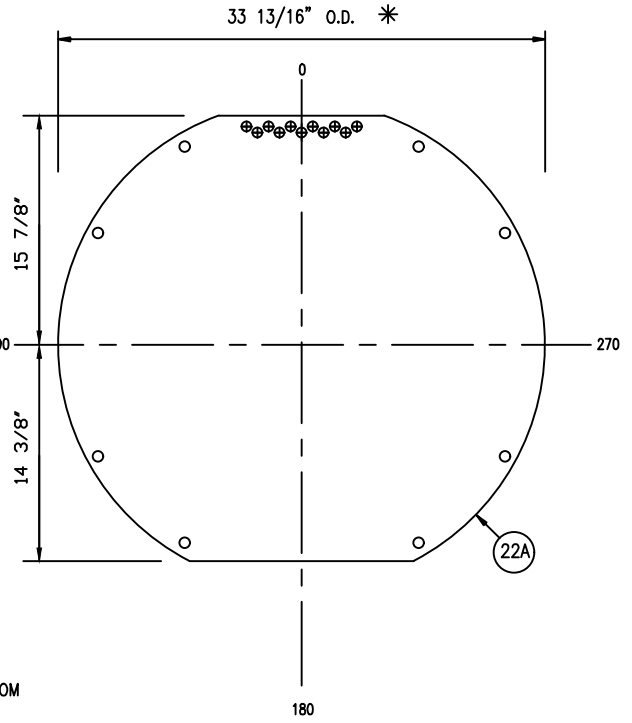
DWG.NO. S21-13258-12-7
REV. 1



VIEW ZZ OF BAFFLES
5/16" THK.
8 -REQD. CUT AA
7 -REQD. CUT BB



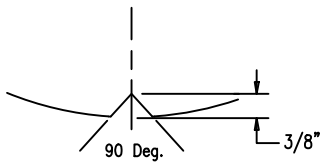
VIEW ZZ OF BAFFLES
5/16" THK.
1 -REQD. CUT CC



VIEW XX OF SUPT.PL.
1/2" THK.
1-REQ'D.

⊕ DENOTES (11) 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

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: *DEPROPANIZER OVERHEAD CONDENSER*
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
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.

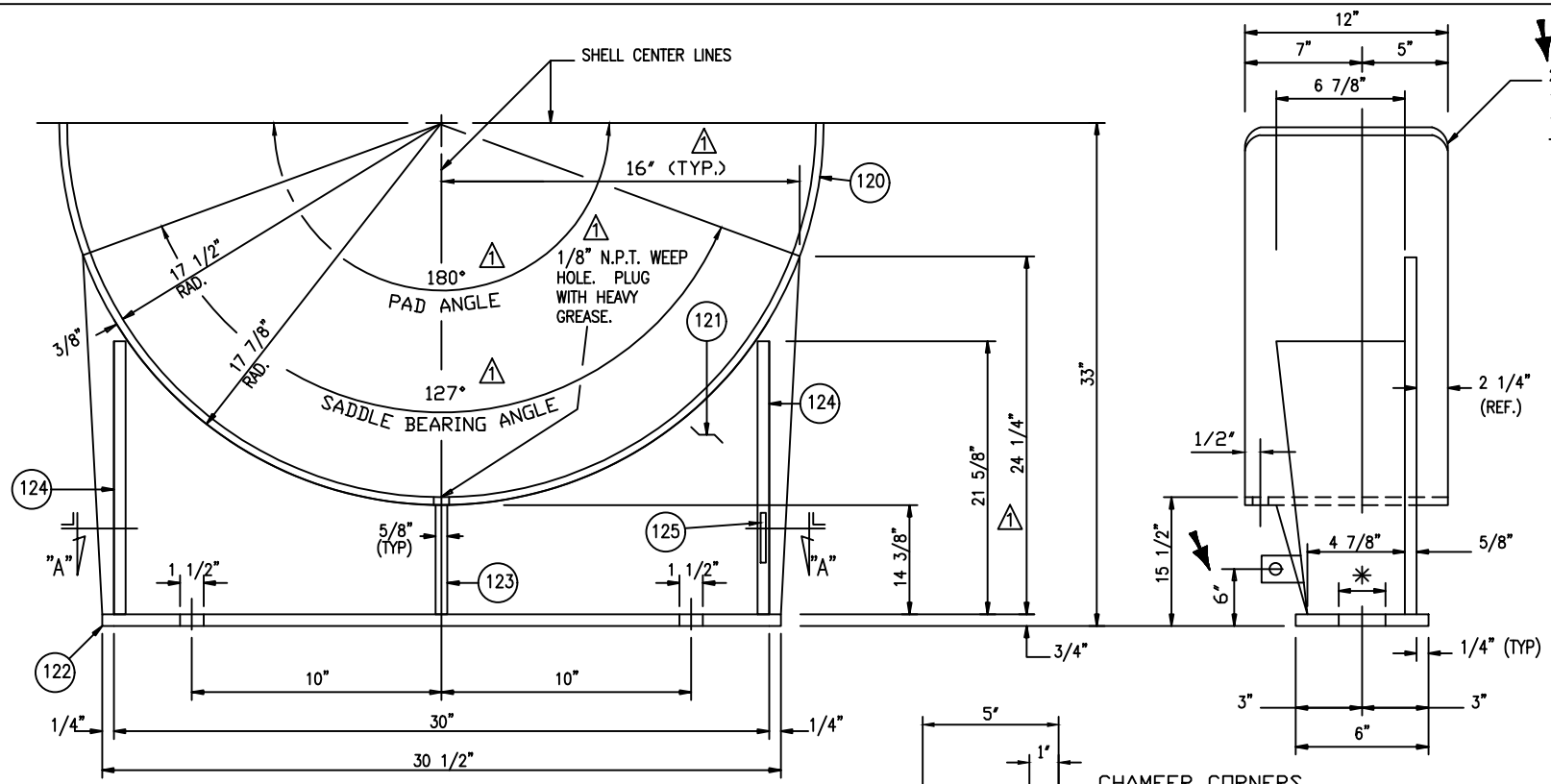
NO.	DATE	REVISIONS
1	8/1/22	REV. PER CUST. B.W./DD

BAFFLE DETAILS

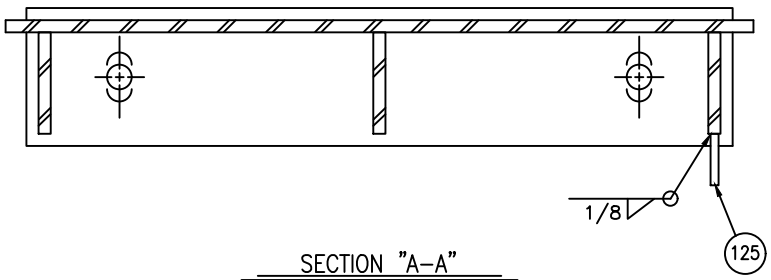
DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

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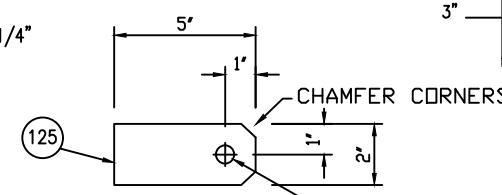
DWG.NO. S21-13258-12-8
REV. 1



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



SECTION "A-A"



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

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

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

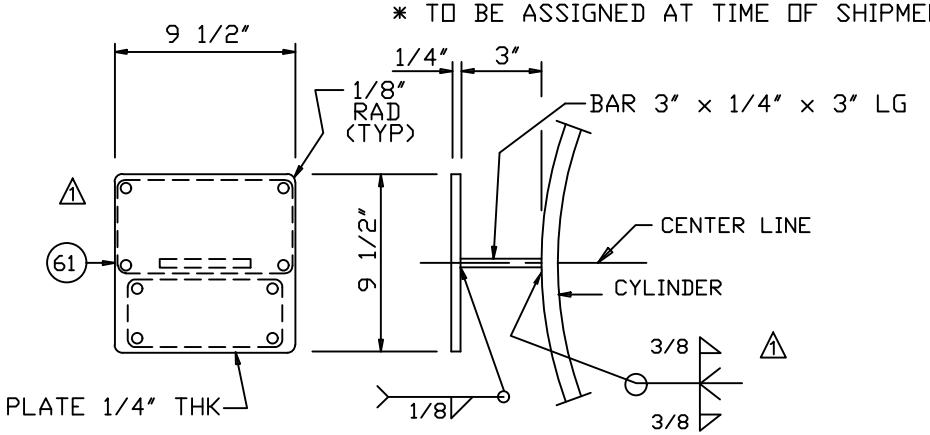
SUPPORT DETAILS

DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

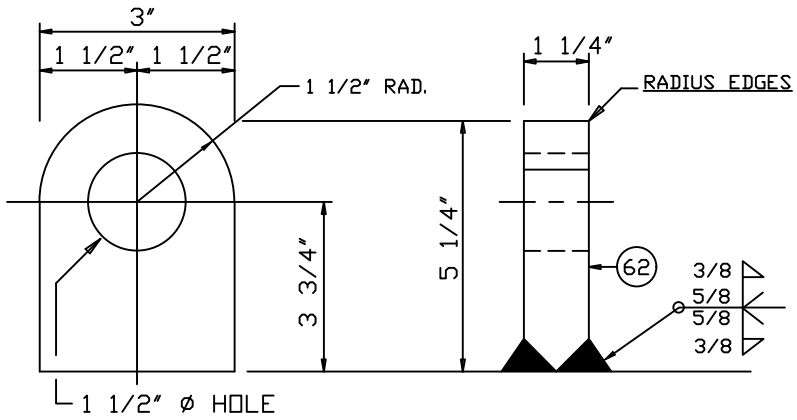
DWG.NO. S21-13258-12-9
REV. 1

* TO BE ASSIGNED AT TIME OF SHIPMENT



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-4

	MAWP		**MAWT**		
SHELL	364	**PSI AT**	400	**° F.**	
	MAEWP		**MAWT**		
SHELL	15	**PSI AT**	300	**°F.**	
	MDMT		**MAWP**		
SHELL	-45	**°F. AT**	364	**PSI**	
	MAWP		**MAWT**		
TUBES	307	**PSI AT**	150	**° F.**	
	MAEWP		**MAWT**		
TUBES	N/A	**PSI AT**	N/A	**°F.**	
	MDMT		**MAWP**		
TUBES	32	**°F. AT**	307	**PSI**	

SERIAL NUMBER	**YEAR BUILT**	**ITEM/TAG NUMBER**
S21-13258-12	2023	18-X-375

1 P.O. NO.: 4505600058 WT.: 20550 LBS. TEST DATE:

DEPROPANIZER OVERHEAD CONDENSER

INFORMATION NAME PLATE

HYDRO TEST PRESS PSIG.,TUBESIDE: SHOP-410/FIELD-399

HYDRO TEST PRESS PSIG.,SHELLSIDE: SHOP-525/FIELD-473

DESIGN PRESS.: SHELLSIDE=360 PSI; TUBESIDE=280 PSI

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

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: HC09
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

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

LIFT LUG DETAIL w/ NAME PLATE & BRACKET

DWN. BY B.W.

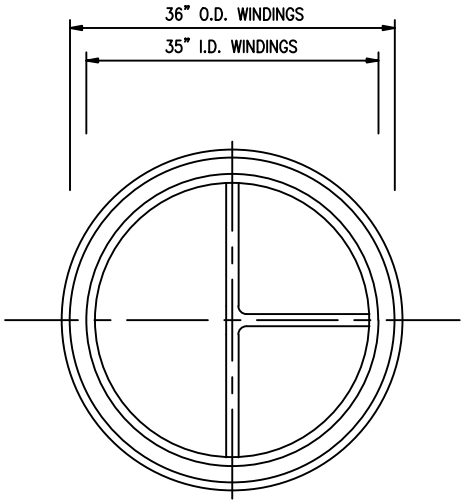
DATE 6/2/22

CKD. BY *DiCarlo*

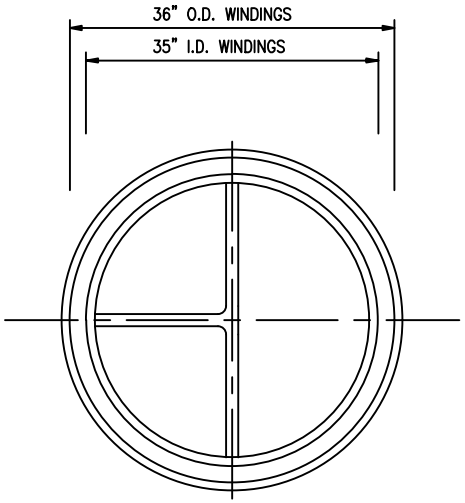
Fabsco SHELL & TUBE, LLC

DWG. NO. S21-13258-12-10

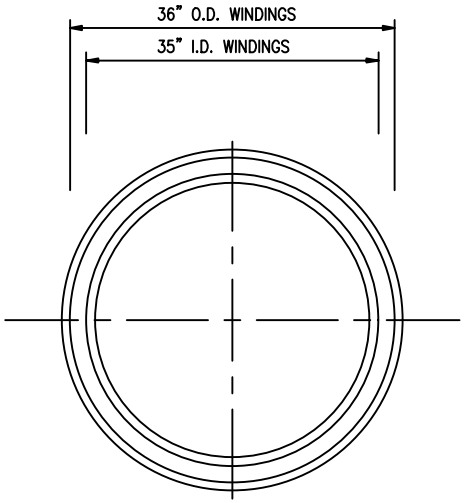
REV. 1



(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 7/16" WIDE 304 S.S. DBL. JACKETED
W/ GRAPHITE FILLER AND 1/64" THK. GRAPHITE
FACE ON BOTH SIDES
TEST PRESSURE:
SHOP: 410/FIELD: 399



(1)–REQUIRED.
CHANNEL GASKET.
0.175" THK. 304 S.S. SPIRAL WOUND
W/ GRAPHITE FILLER & INNER / OUTER COMP. RINGS (B)
⚠1 RIB TO BE 3/6" 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: 410/FIELD: 399



(1)–REQUIRED.
SHELL GASKET.
0.175" THK. 304 S.S. SPIRAL WOUND
W/ GRAPHITE FILLER & INNER / OUTER COMP. RINGS (C)
TEST PRESSURE:
SHOP: 525/FIELD: 473

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

(A) 36.7500 O.D. X .1250 THICK: MATERIAL=SA-240-304
34.2500 I.D. X .1250 THICK: MATERIAL=SA-240-304
(B) 36.7500 O.D. X .1250 THICK: MATERIAL=SA-240-304
34.2500 I.D. X .1250 THICK: MATERIAL=SA-240-304
(C) 36.7500 O.D. X .1250 THICK: MATERIAL=SA-240-304
34.2500 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 1/8" O.D.
NUMBER STUDS: (48)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 760.3-778.4 FT. LBS

CHAN. FLG./T'SHT./SHELL FLG. BOLTING INFO
STUD DIAMETER: 1 1/8" O.D.
NUMBER STUDS: (48)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 628.9-778.4 FT. LBS.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

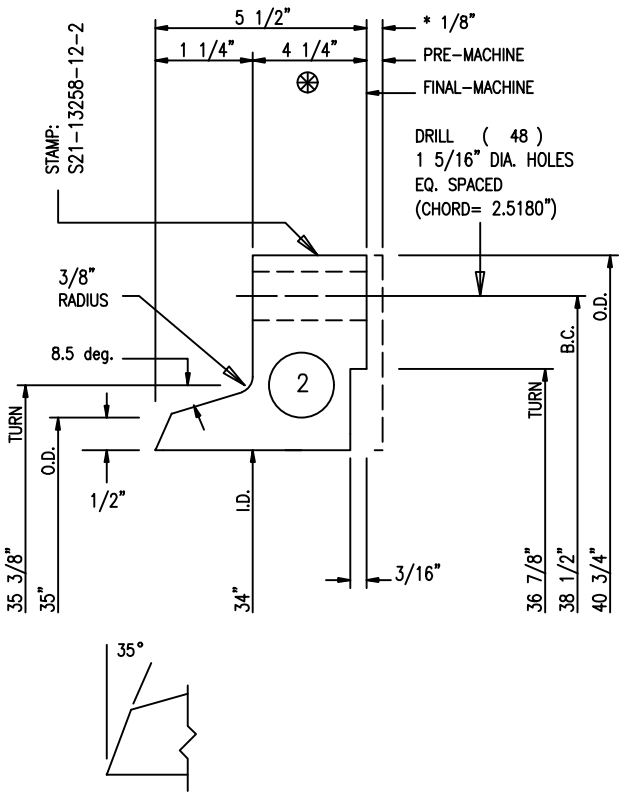
NO.	DATE	REVISIONS
⚠1	8/1/22	REV. PER CUST. B.W./DD

GASKET DETAILS

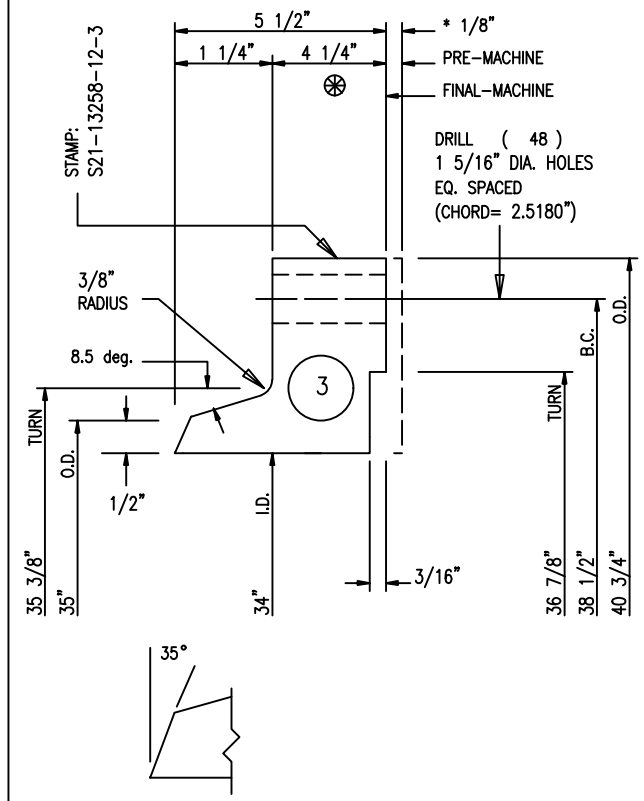
DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

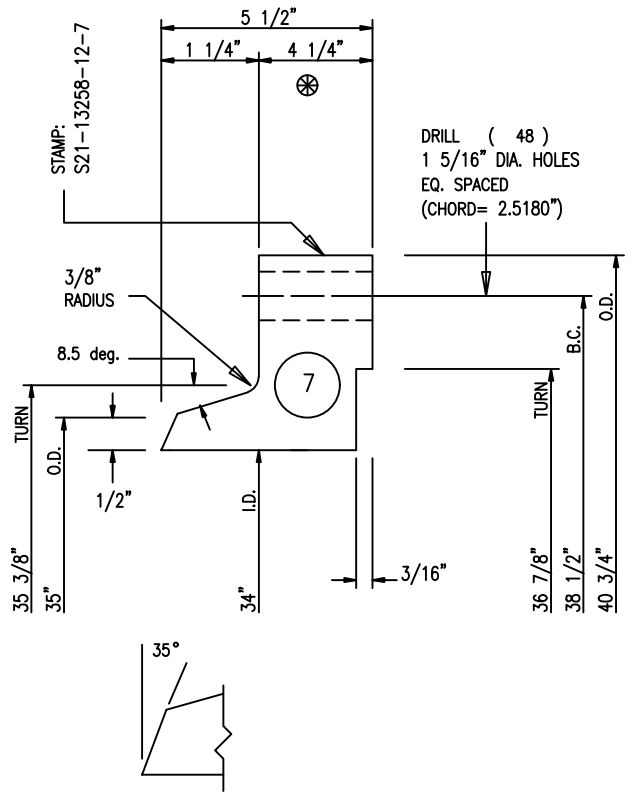
DWG.NO. S21-13258-12-11
REV. 1



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 CLS.
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: ***DEPROPANIZER OVERHEAD CONDENSER***
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PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

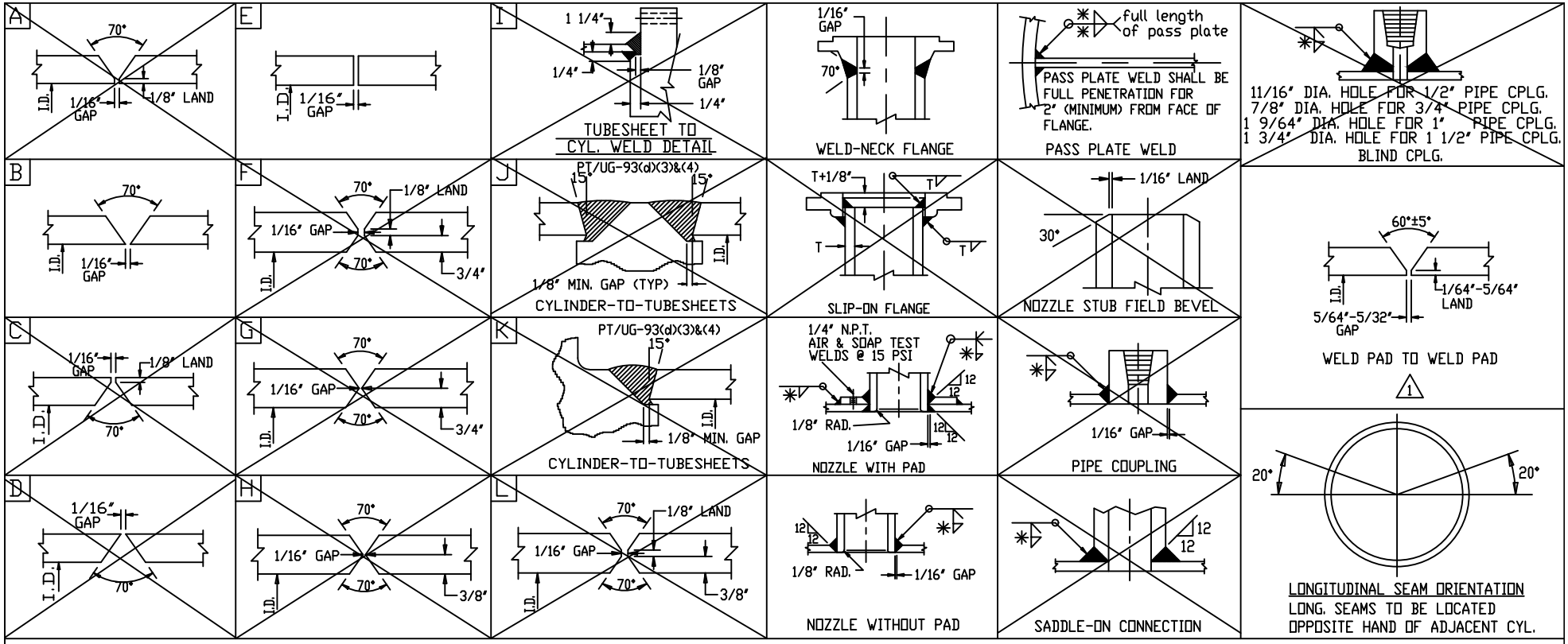
NO.	DATE	REVISIONS

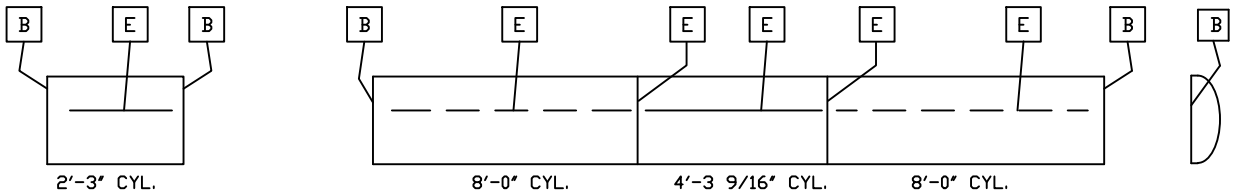
GIRTH FLANGES

DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

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





PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
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
1	1/26/23	REV. PER CUST. COMMENTS DD/DG

WELD & BEVEL DETAILS

DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-12-13
REV. 1

MK.NO.	QUAN.	DESCRIPTION	MATERIAL	NOZ MK.	SUPPLIER	P.O. NO.	DUE
21 △	372	TUBES 3/4" O.D.X 0.0830" (MIN) THK PER BEND SCHEDULE 12)	SA-334-6				
△			SMLS.				
△		FORGED RING MATERIAL					
2 △	1	FLG 40 3/4" O.D.X 34" I.D.X 5 1/2" THK (f) 6)7)8)12)	SA-350LF2CL1				
3 △	1	FLG 40 3/4" O.D.X 34" I.D.X 5 1/2" THK (f) 6)7)8)12)	SA-350LF2CL1				
7 △	1	FLG 40 3/4" O.D.X 34" I.D.X 5 1/2" THK (f) 6)7)8)12)	SA-350LF2CL1				
△							
△							
△		TUBESHEETS & COVERS					
19 △1	1	TUBESHEET 36 3/4" O.D.X 3 1/2" THK (f) 6)7)8)12)	SA-350LF2CL1				
1 △	1	COVER 40 3/4" O.D.X 3 5/8" THK (f) 6)7)8)12)	SA-350LF2CL1				
△							
△							
△		BAFFLES					
22 △	16	BAFFLES PER DWG. -8	SA-516-70				
22A △1	1	SUPT PL. PER DWG. -8	SA-516-70				
△							
△							
△		HEADS					
18 △	1	ELLIP HD. 34" I.D.X 7/16" THK(min) W/2" SF 8)12)	SA-516-70N				
△							
△							
△		CYLINDERS					
9 △	1	R&W CYL 34" I.D.X 1/2" THK X 20'-3 9/16" LG.					
△		1-CYL 8'-0"; 1-CYL 8'-0"; 1-CYL 4'-3 9/16" 8)12)	SA-516-70N				
4 △	1	R&W CYL 34" I.D.X 1/2" THK X 2'-3" LG. 8)12)	SA-516-70N				
△							
△							
△							
△							
△							
△2		NOZZLE SHIPPING CVR MAT'L (REMOVE BEFORE INSTALLING)					
180 △2	4	PL. 16 1/2" O.D. X 3/8" THK. W/(12) 9/16" DIA. HOLES	C.-STL.				
△2		EQUALLY SPACED ON 13 3/4" B.C. (8"-600#)					
181 △2	4	GASKETS: 0.175" THK. 304 S.S. SPIRAL WOUND GRAPHITE					
△3		FILLED, STYLE "CG", C-STL. COMP RING FOR (8"-600# RF)					
182 △2	48	1/2" HEX HD. ALL THD. BOLTS X 4 1/4" LG. W/(1) HEX NUT	C.-STL.				
△2		AND (2) FLAT WASHERS EACH (8"-600#)					
△							
△4		NITROGEN PURGE MATERIAL					
108 △4	2	1/4" NPT GAGE W/ -30 TO 30 PSI (MINIMUM) DIAL	C.-STL.				
109 △4	2	1/4" X 1" NPT BUSHING	C.-STL.				
110 △4	2	1" - 3000 # SCREWED TEE	SA-234-WPB				
111 △4	4	1" NPT PIPE NIPPLE 0.179" (SCH. 80) X 2" LG. (TOE)	SA-106-B				
112 △4	4	1" NPT PIPE NIPPLE 0.179" (SCH. 80) X 1 1/2" LG. (TBE)	SA-106-B				
113 △4	4	1" - 50 # (MAX.) THD. BALL VALVE	C-STL.				
114 △4	4	1" - 3000 # HEX HEAD PLUG	C-STL.				
115 △4	2	1" 3M FS THRD 90 ELL	SA-105				
△							
△		FOR BILL OF MATERIAL NOTES SEE DWG. -17					

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058/ A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: FA01
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
4	1/26/23	REV. PER CUST. COMMENTS DD/DG
3	11/8/22	REV. PER FABSCO DD/DG
2	10/11/22	REV. PER FABSCO DD/DG
1	8/1/22	REV. PER CUST. B.W./DD

BILL OF MATERIAL

DWN. BY B.W.
DATE 6/3/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-12-14
REV. 4

MK.NO.	QUAN.	DESCRIPTION	MATERIAL	NOZ MK.	SUPPLIER	P.O. NO.	DUE
△		ANSI FLANGES					
71 △	1	ASME 8" – 600 # RF WN W/ (SchXH BORE) 5)8)9)12)	SA–350LF2CL1	S1			
72 △	1	ASME 8" – 600 # RF WN W/ (SchXH BORE) 5)8)9)12)	SA–350LF2CL1	S2			
81 △	1	ASME 8" – 600 # RF WN W/ (SchXH BORE) 5)8)9)12)	SA–350LF2CL1	T1			
82 △	1	ASME 8" – 600 # RF WN W/ (SchXH BORE) 5)8)9)12)	SA–350LF2CL1	T2			
73 △	1	ASME 2" – 300 # RF LWN X 9" LG(2.000"BORE) 5)8)9)12)	SA–350LF2CL1	A3			
74 △	1	ASME 2" – 300 # RF LWN X 9" LG(2.000"BORE) 5)8)9)12)	SA–350LF2CL1	A4			
83 △	1	ASME 2" – 300 # RF LWN X 9 3/4" LG(2.000"BORE) 5)8)9)12)	SA–350LF2CL1	V			
84 △	1	ASME 2" – 300 # RF LWN X 9 3/4" LG(2.000"BORE) 5)8)9)12)	SA–350LF2CL1	D			
85 △	1	ASME 2" – 300 # RF LWN X 9" LG(2.000"BORE) 5)8)9)12)	SA–350LF2CL1	A1			
86 △	1	ASME 2" – 300 # RF LWN X 9" LG(2.000"BORE) 5)8)9)12)	SA–350LF2CL1	A2			
73C △	1	ASME 2" – 300 # RF BLIND FLG. 5)8)9)12)	SA–350LF2CL1	A3			
74C △	1	ASME 2" – 300 # RF BLIND FLG. 5)8)9)12)	SA–350LF2CL1	A4			
83C △	1	ASME 2" – 300 # RF BLIND FLG. 5)8)9)12)	SA–350LF2CL1	V			
84C △	1	ASME 2" – 300 # RF BLIND FLG. 5)8)9)12)	SA–350LF2CL1	D			
85C △	1	ASME 2" – 300 # RF BLIND FLG. 5)8)9)12)	SA–350LF2CL1	A1			
86C △	1	ASME 2" – 300 # RF BLIND FLG. 5)8)9)12)	SA–350LF2CL1	A2			
71A △1	1	SMLS.PIPE 8" X(0.5000" SchXH)X 10" LG. 8)12)	SA–333–6	S1			
72A △1	1	SMLS.PIPE 8" X(0.5000" SchXH)X 10" LG. 8)12)	SA–333–6	S2			
81A △	1	SMLS.PIPE 8" X(0.5000" SchXH)X 1'–0" LG. 8)12)	SA–106–B	T1			
82A △2	1	SMLS.PIPE 8" X(0.5000" SchXH)X 1'–0" LG. 8)12)	SA–106–B	T2			
71B △	1	WELD PAD 12 3/4" O.D.X 9 1/8" I.D.X 1/2" THK		S1			
△		ROLL TO 17 1/2" IR 8)12)	SA–516–70N				
71D △4	1	PAD RING 16" O.D.X 13" I.D.X 1/2" THK		S1			
△		ROLL TO 17 1/2" IR 8)12)	SA–516–70N				
72B △	1	WELD PAD 12 3/8" O.D.X 9 1/8" I.D.X 1/2" THK		S2			
△		ROLL TO 17 1/2" IR 8)12)	SA–516–70N				
71D △4	1	PAD RING 16" O.D.X 13" I.D.X 1/2" THK		S2			
△		ROLL TO 17 1/2" IR 8)12)	SA–516–70N				
81B △	1	WELD PAD 13 7/16" OD X 12 3/4" OD X 9 13/16" ID X		T1			
△		9 1/8" ID X 1/2" THK. ROLL TO 17 1/2" IR 8)12)	SA–516–70N				
82B △	1	WELD PAD 13 7/16" OD X 12 3/4" OD X 9 13/16" ID X		T2			
△		9 1/8" ID X 1/2" THK. ROLL TO 17 1/2" IR 8)12)	SA–516–70N				
△							
△							
△							
△							
△		HYDROTEST GASKETS (RETURN TO STOCK AFTER TEST)					
185 △5	4	GASKETS: 0.175" THK. 304 S.S. SPIRAL WOUND GRAPHITE					
△		FILLED, STYLE "CG", C–STL. COMP RING FOR (8"–600# RF)					
△							
△							
△							
△							
△							
△							
△		FOR BILL OF MATERIAL NOTES SEE DWG. –17					
△							
△							
△							

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18–X–375
AIR PRODUCTS P.O. NO.: 4505600058/ A8KM–4–402–PO–3
AP PROJECT NO: EN–20–7120
VDR CODE NO.: FA01
SERIAL NO.: S21–13258–12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
5	6/20/23	REV. PER FABSCO DD/DG
4	1/26/23	REV. PER CUST. COMMENTS DD/DG
3	11/8/22	NO REV./RESUBMIT FOR APPL DD
2	10/11/22	REV. PER FABSCO DD/DG
1	9/1/22	REV. PER FABSCO B.W./DD

BILL OF MATERIAL

DWN. BY B.W.
DATE 6/3/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21–13258–12–15
REV. 5

MK.NO.	QUAN.	DESCRIPTION	MATERIAL	NOZ MK.	SUPPLIER	P.O. NO.	DUE
△		BOLTING & GASKETS					
40 △	1	LOT OF GASKETS PER DWG. −11					
41 △	48	1 1/8" ROUND X 8−THREAD STUDS X 13 3/8" LG. 1&2 12)	SA−193−B7				
42 △	48	1 1/8" ROUND X 8−THREAD STUDS X 17 1/4" LG. 3&7 12)	SA−193−B7				
43 △	384	1 1/8" HEAVY HEX NUTS 8−THREAD 12)	SA−194−2H				
44 △1	192	1 1/8" NARROW SERIES WASHERS	F−436−1				
△							
△		SPARE STUDS & NUTS (TO SHIP LOOSE W/EXCH.)					
141 △	5	1 1/8" ROUND X 8−THREAD STUDS X 13 3/8" LG. 1&2 12)	SA−193−B7				
142 △	5	1 1/8" ROUND X 8−THREAD STUDS X 17 1/4" LG. 3&7 12)	SA−193−B7				
143 △	38	1 1/8" HEAVY HEX NUTS 8−THREAD 12)	SA−194−2H				
144 △1	19	1 1/8" NARROW SERIES WASHERS	F−436−1				
△							
△		BLIND FLANGE MATERIAL					
171 △	48	STUDS: 5/8" DIA. (11−THD.) X 5 3/4" LG.(2"−300# RF) 12)	SA−193−B7				
172 △	192	NUTS: 5/8" (11−THD.) HVY. HEX (2"−300# RF) 12)	SA−194−2H				
173 △	6	GASKETS: 0.175" THK 316 SS SPIRAL WOUND GRAPHITE					
△		FILLED, STYLE "CGI" W/316 SS INNER RING &					
△		C−STL. OUTER RING FOR (2"−300# RF)					
174 △1	96	5/8" NARROW SERIES WASHERS	F−436−1				
△							
△		MISC. MATERIAL					
60 △	1	STD. NAME PLATE	STN.STL.				
61 △1	1	NAME PL BRKT PER DWG. −10	SA−516−70				
62 △	3	LIFTING LUGS PER DWG. −10 8)12)	SA−516−70N				
23 △	159	FT. 1/2" O.D. TIE RODS	SA−36				
23B △	16	1/2" TIE ROD HEX NUTS	SA−563A				
23A △	159	FT. 3/4" O.D. SPACER TUBING	SA−214				
22D △1	4	1/2" O.D. SEAL RODS X 18'−0 3/4" LG.	SA−36				
22I △	11	3/4" O.D. IMP RODS X 1'−1 3/4" LG.	SA−36				
22S △	2	SEAL BARS 2 1/4" X 3/8" THK X 16'−11" LG.	SA−36				
22T △	2	SKID BARS 1 1/2" X 3/4" THK X 16'−11" LG.	SA−36				
50 △	1	PASS PLATES 16 5/8" X 1/2" THK X 3'−2 1/4" LG. 8)12)	SA−516−70N				
51 △	1	PASS PLATES 33 7/8" X 1/2" THK X 3'−2 1/4" LG. 8)12)	SA−516−70N				
63 △1	4	SQ. HD. PULLBOLT PLUGS: 3/4" DIA. (10−THD.) X 3 1/2" LG.	C−STL.				
65 △1	4	SHOULDER ANCHOR BOLTS: 3/4" OD (10−THD.) W/ 2" LG	ASTM A489				
△		SHANK (TO SHIP LOOSE W/ EXCHANGER)					
△							
△		SUPPORT MATERIAL					
120 △	2	PLATE 12" X 3/8" THK X 55 1/2" LG. 8)12)	SA−516−70N				
121 △1	2	PLATE 32" X 5/8" THK X 24 1/4" LG.	SA−516−70				
122 △	2	PLATE 6" X 3/4" THK X 30 1/2" LG.	SA−516−70				
123 △	2	PLATE 6 7/8" X 5/8" THK X 14 3/8" LG.	SA−516−70				
124 △	4	PLATE 6 7/8" X 5/8" THK X 21 5/8" LG.	SA−516−70				
125 △	2	GROUNDING LUGS: 2" X 1/4" THK. X 5" LG.	SA−240−304				
△							
△		FOR BILL OF MATERIAL NOTES, SEE DWG. −17					
△2		" DELETED "					
△2		" DELETED "					
△		PAINT PER DWG. −1B					

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18−X−375
AIR PRODUCTS P.O. NO.: 4505600058/ A8KM−4−402−PO−3
AP PROJECT NO: EN−20−7120
VDR CODE NO.: FA01
SERIAL NO.: S21−13258−12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
△2	6/20/23	REV. PER FABSCO DD/DG
△1	8/1/22	REV. PER CUST. B.W./DD

BILL OF MATERIAL

DWN. BY B.W.
DATE 6/3/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21−13258−12−16
REV. 2

MK.NO.	QUAN.	DESCRIPTION	MATERIAL	NOZ MK.	SUPPLIER	P.O. NO.	DUE
△		NOTES:					
△		1) ALL WELD BEVELS PER WELD & BEVEL DETAIL DWG ATTACHED					
△		2) ALL FORMED HEADS TO BE IN ACCORDANCE WITH UCS-79.					
△		3) ALL COLD FORMED PRESSURE PARTS, INCLUDING BUT NOT					
△		LIMITED TO CYLINDER & HEADS, TO BE CERTIFIED AS					
△		REQ'D. BY ASME SECTION VIII, DIV. 1, para. UG-79(c).					
△		4) C.M.T.R'S. REQ'D. FOR ALL MATERIAL. ACCEPTABLE					
△		COUNTRY'S OF ORIGIN ARE AUSTRIA, BELGIUM, CANADA,					
△		CZECH REPUBLIC, DENMARK, FINLAND, FRANCE, GERMANY,					
△		IRELAND, ITALY, JAPAN, LUXEMBOURG, THE NEATHERLANDS,					
△		NORWAY, MEXICO, POLAND, SPAIN, SOUTH KOREA,					
△		SOUTH AFRICA, SWEDEN, SWITZERLAND, TAIWAN, UNITED					
△1		KINGDOM, UNITED STATES OF AMERICA.					
△		5) NOZ. FLG'S TO HAVE 125-250 MICROINCH RA FINISH.					
△		6) FLANGE'S TO BE AS FOLLOWS:					
△		A) BODY FLG. FORGINGS TO BE U.T. PER SA-388 &					
△		ASME CODE SECT VIII DIV. 2, PARA 3.3.4.					
△		B) THE ENTIRE SURFACE OF FORGING, AFTER FINISH					
△		MACHINING, SHALL BE M.P.E OR D.P.E.					
△		7) ANY REQUIRED TEST SPECIMENS FOR MECHANICAL TESTING					
△		SHALL BE TAKEN FROM THE SAME HEAT LOT AT 1/2T.					
△		8) CARBON EQUIVALENT (CE) SHALL BE CALCULATED USING THE					
△		FOLLOWING FORMULA, UNLESS CODE REQUIREMENTS ARE MORE					
△		CONSERVATIVE: C.E. SHALL NOT EXCEED .42					
△		CE=C+(Mn)/6+(Cr+Mo+V)/5+(Ni+Cu)/15					
△		9) FLG. FACINGS SHALL BE PROTECTED DURING FABRICATION & SHIPPING.					
△		10) TEMPERING TEMPERATURE SHALL NOT BE LESS THAN 1200°F.					
△		11) ALL NORMALIZED MATERIAL TO BE FINE GRAIN PRACTICE.					
△		12) ALL CARBON STEEL FORGINGS, PLATE, PIPE, TUBES,					
△		BOLTING, SHALL BE KILLED EXCEPT FOR BAFFLES AND					
△		"MISC. MATERIAL" HEADING.					
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PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058/
A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: FA01
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

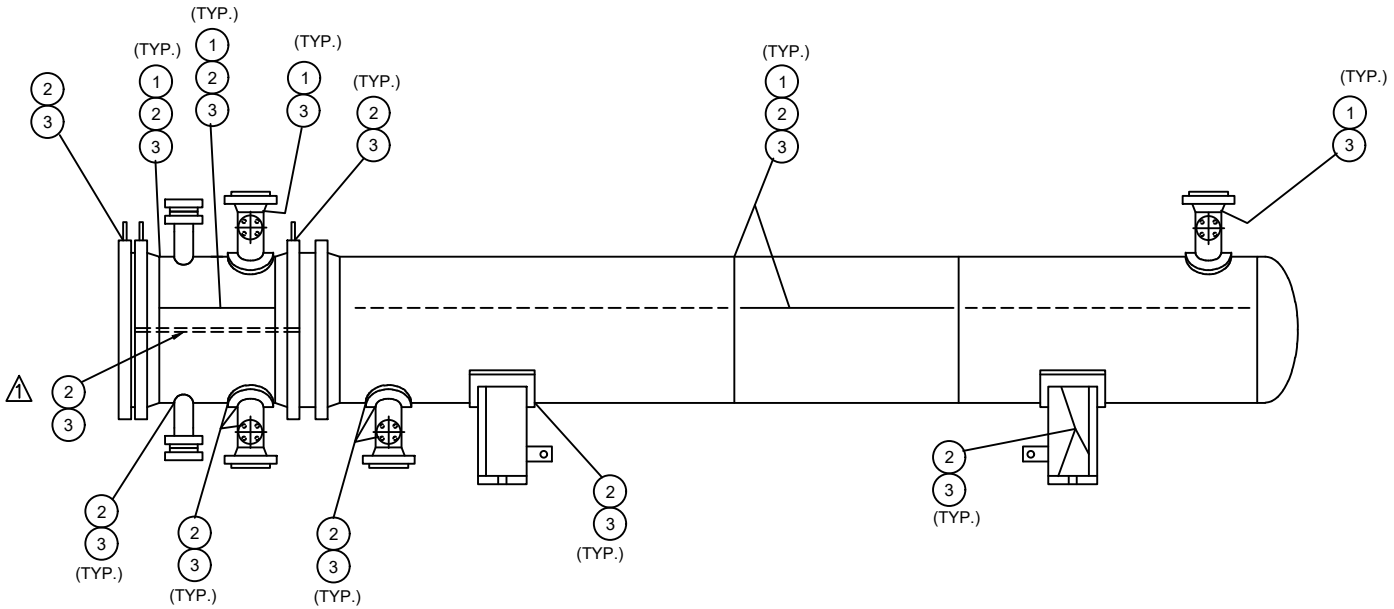
NO.	DATE	REVISIONS
△1	8/3/22	REV. PER CUST. B.W./DD

BILL OF MATERIAL NOTES

DWN. BY B.W.
DATE 6/2/22
CKD. BY *DiCarlo*

Fabsco
SHELL & TUBE, LLC

DWG.NO. S21-13258-12-17
REV. 1



MK.	PROC. #
1	A-353
2	F-148
3	M-360
4	T-234

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18–X–375
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM–4–402–PO–3
AP PROJECT NO: EN–20–7120
VDR CODE NO.: QD07
SERIAL NO.: S21–13258–12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

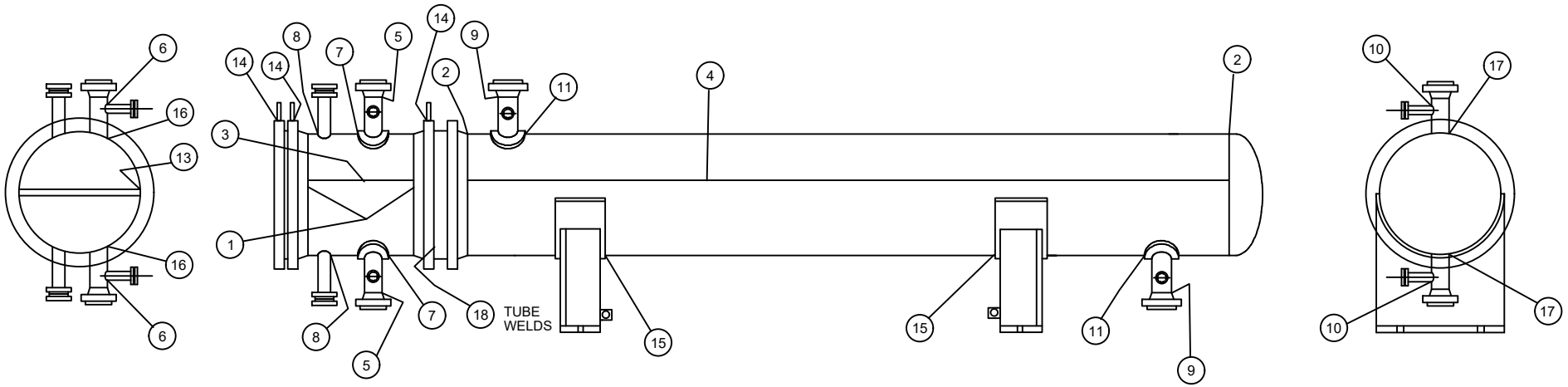
NO.	DATE	REVISIONS
1	8/2/22	REV. PER CUST. B.W./DD

WELD MAP

DWN. BY: B.W.
DATE: 6/1/22
CKD. BY: MO

Fabsco
SHELL & TUBE, LLC

DWG. No.: S21–13258–12–18
REV.: 1



	X-RAY	U.T.	M.T.	P.T.	W.F.M.T.	BRINELL	MK.
CHANNEL CIRCULAR SEAM	X		X	X	X	X	1
SHELL CIRCULAR SEAM	X		X	X	X	X	2
CHANNEL LONG SEAM	X	X	X	X	X	X	3
SHELL LONG SEAM	X	X	X	X	X	X	4
CHANNEL NOZZLE FLANGE TO PIPE	X	X	X	X	X	X	5
CHANNEL AUX. TO PIPE		X	X	X	X	X	6
CHANNEL WELD PAD TO CYLINDER		X	X	X	X	X	7
CHANNEL V & D TO CYLINDER		X	X	X	X	X	8
SHELL NOZZLE FLANGE TO PIPE	X	X	X	X	X	X	9
SHELL AUX. TO PIPE			X	X	X	X	10
SHELL WELD PAD TO CYLINDER		X	X	X	X	X	11
DELETED							
PASS PLATE TO CYLINDER		X	X	X	X	X	13
LIFT LUG WELDS			X	X			14
SUPPORT PAD TO CYLINDER			X	X	X	X	15
CHANNEL NOZZLE TO CYLINDER		X	X	X			16
SHELL NOZZLE TO CYLINDER		X	X	X			17
TEMPORARY ATTACHMENT LOCATIONS			X	X			
TUBE SEAL WELD				X			18

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: *DEPROPANIZER OVERHEAD CONDENSER*
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: QD07
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

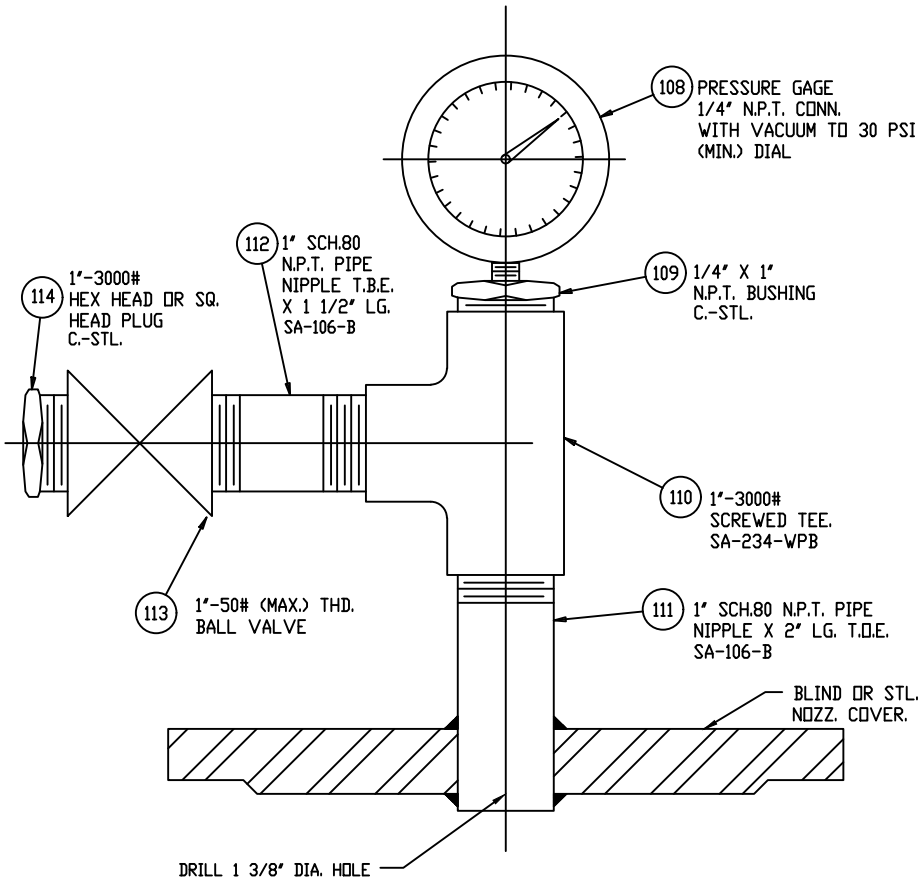
NO.	DATE	REVISIONS

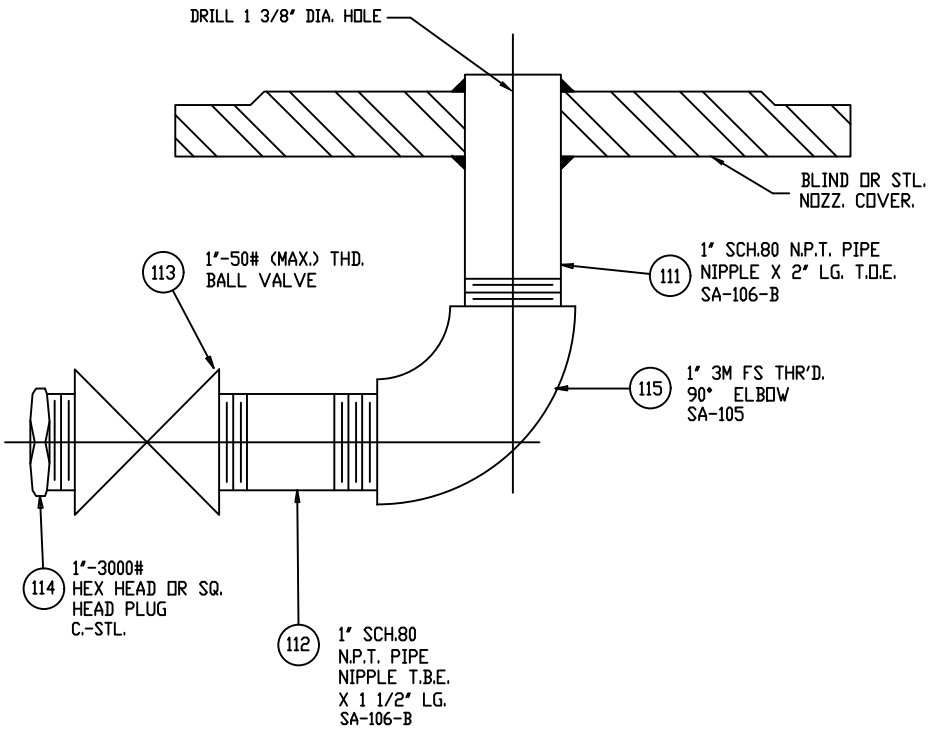
NDE MAP

DWN. BY: B.W.
DATE: 6/2/22
CKD. BY: *MO*

Fabsco
SHELL & TUBE, LLC

DWG. No.: S21-13258-12-19
REV.: 0





NOTES:
1) A VACUUM MUST BE CREATED INSIDE EXCHANGER WHICH IS TO BE BROKEN BY INTRODUCING 10 PSI DRY NITROGEN THROUGH VALVE.
2) POSITIVE PRESS. TO READ 10 PSI CONTINUOUS.
3) GAGE & VALVE TO REMAIN ON EXCHANGER AND BE PROTECTED AGAINST BREAKAGE DURING SHIPMENT.
4) STENCIL ON CAUTION TAG & WIRE TO NOZ. CVR., "WARNING, THIS EXCHANGER IS UNDER POSITIVE PRESSURE, RELIEVE PRESSURE BEFORE OPENING ANY CLOSURE."
5) ALL OPENINGS TO BE PLUGGED OR CAPPED BEFORE SHIPMENT.
6.) 2-GAGE REQUIRED. (1-SHELLSIDE & 1-TUBESIDE).

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: ***DEPROPANIZER OVERHEAD CONDENSER***
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: DEPROPANIZER OVERHEAD CONDENSER
ITEM NO.: 18-X-375
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-12
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NO.	DATE	REVISIONS
1	1/26/23	ADDED DETAIL/CUST. DD/DG

PRESSURE GAGE & VALVE DETAIL FOR NITROGEN PURGE

DWN. BY: DD
DATE: 1/26/23
CKD. BY: DG

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SHELL & TUBE, LLC

DWG.NO. S21-13258-12-20
REV. 1