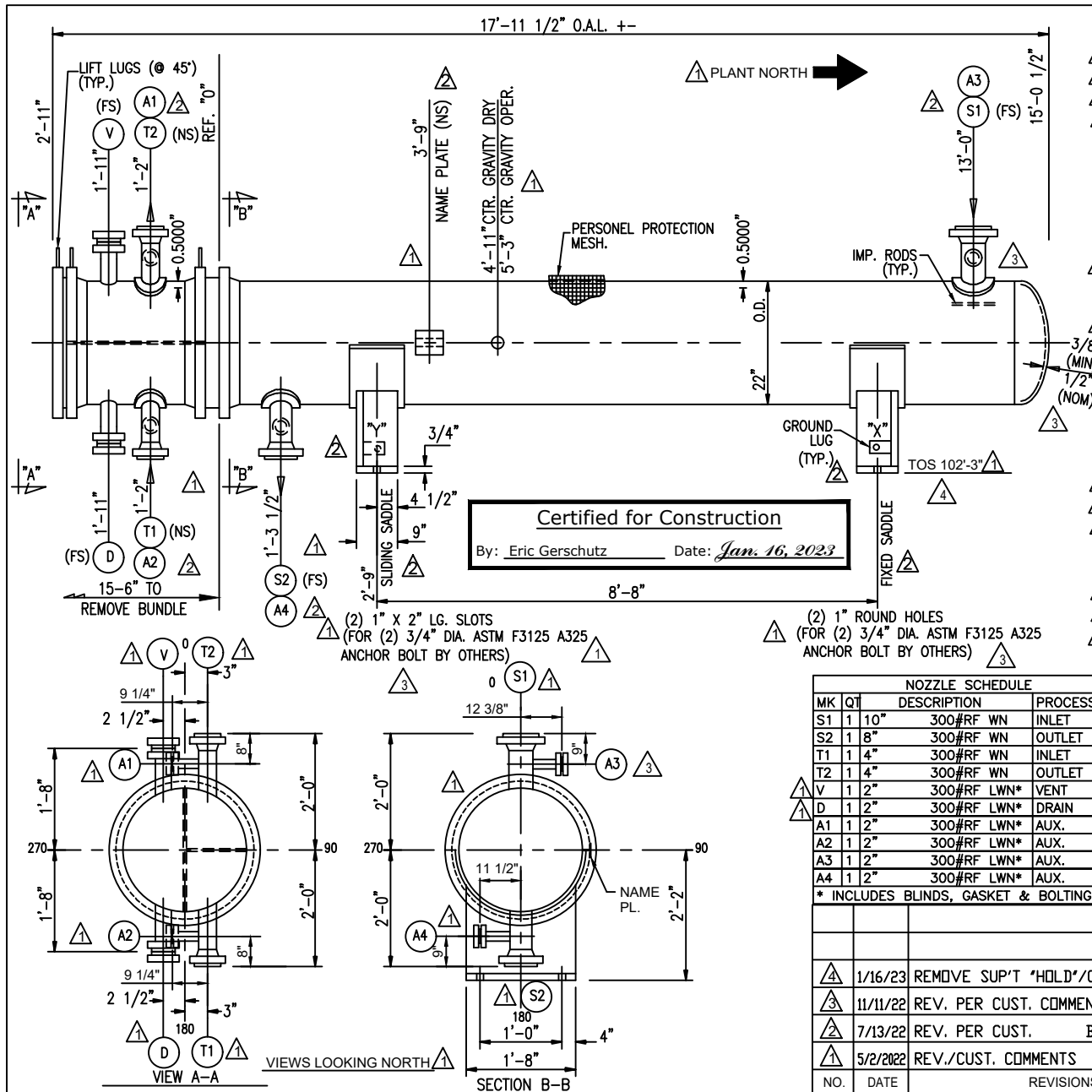
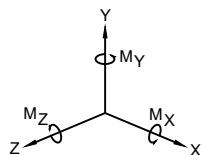
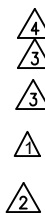
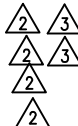




DESIGN DATA		SHELL	TUBE
DESIGN PRESSURE P.S.I.G.	95		120
M.A.W.P. P.S.I.G.	265		150
M.A.P. P.S.I.G.	345		158
LIMITED BY	TUBESHEET		CHAN. CVR.
VACUUM PRESSURE P.S.I.G.	-15 @ 300' F.		N/A
TEST PRESSURE P.S.I.G.	SHOP-449/FIELD-345		SHOP-206/FIELD-195
DESIGN TEMP. Deg.F.	300		150
MDMT Deg. F.	32		32
CORROSION ALLOWANCE	3/16" (CARBON STL.)		1/8" (CARBON STL.)
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: 5800 BUNDLE: 2150 WET: 8300 CHAN.: 1200 SHELL: 2450 CHAN. CVR: 350			
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 APPLIES			
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. Tubesheet Impact Tested at -40° f. Per UHA-51, Tubes Exempt.			
Tubes Exempt from I.T.			
MATERIAL			
CHANNEL:	SA-516-70N	BAFFLES:	SA-240-316/316L
SHELL:	SA-516-70N	TUBES:	SA-789-S31803/S32205 (SMLS)
TUBESHEETS:	SA-240-S31803/S32205		
SEE REMAINDER OF MAT'L. ON BILL OF MATERIAL			
(104) U's 3/4"	O.D.X	0.065" (AVG.) x 14'-0"	LG.
TUBE PITCH 1"	◇ 45°	SURFACE 563	(EFF) SQ.FT.
GENERAL NOTES			
ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.			
SHELLSIDE TO HAVE PERSONNEL PROTECTION MESH.			
TUBING SHALL BE SOLUTION ANNEALED.			
FIREPROOFING SUPPORTS: N/A			
SEAL WELD & EXPAND TUBES TO TUBESHEET			
GASKETS: .1750" THK. 304 SPIRAL WOUND GPHT FILLED W/ 304 S.S.			
INNER & OUTER COMP. RINGS			
10% SPARE BOLTING FOR BODY FLG'S.			
2 SETS OF SPARE GASKETS REQUIRED.			
PAINT: SEE SHT. -1A			
PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT			
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC			
SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER			
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA			
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER			
ITEM NO.: 18-X-370B			
AIR PRODUCTS P.O. NO.:4505600058 / A8KM-4-402-PO-3			
AP PROJECT NO: EN-20-7120			
VDR CODE NO.: HCO9			
SERIAL NO.: S21-13258-7			
ENGINEER: EG			
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT			
ASSEMBLY AND SPECIFICATIONS FOR			
ONE 21-168 A E U			
DWN. BY		Fabsco	
EMG			
DATE		SHELL & TUBE, LLC	
12-18-21			
CKD. BY		DWG.NO.	
GS		S21-13258-7-1	
REV.		4	
CUST. DD/DG			
NTS DD/DG			
B.W./DD			
EMG			



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	10"-150#; 2 x API-660
S2	8020	12960	10180	3240	2580	3240	8"-150#; 2 x API-660
T1	1420	2280	1800	1360	1080	1360	4"-150#; 2 x API-660
T2	1420	2280	1800	1360	1080	1360	4"-150#; 2 x API-660

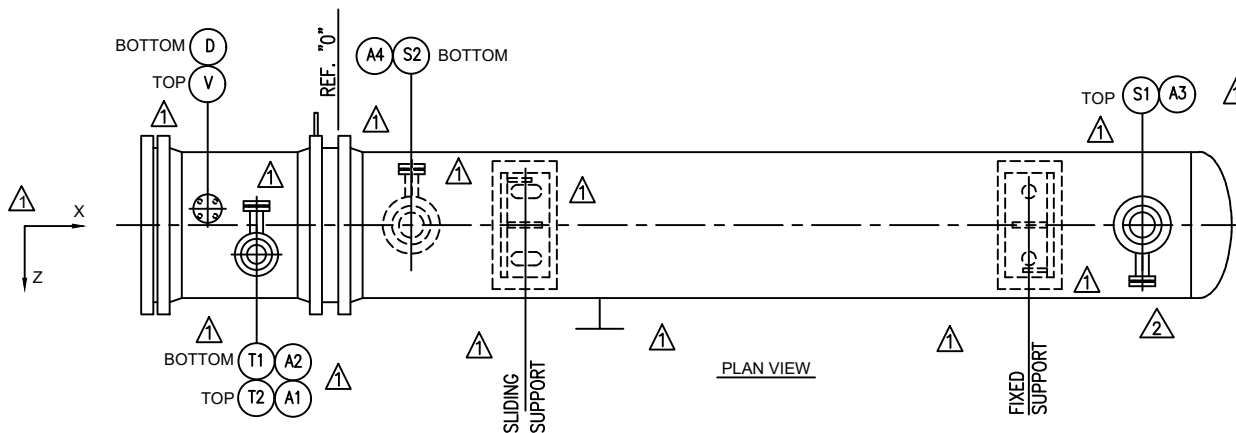


DESIGN DATA	SHELL	TUBE
OPERATING PRESSURE PSIG	63	50
OPERATING TEMP. °F.	IN: 219.8 OUT: 111.7	IN: 80 OUT: 95
HYDROTEST TEMP. °F.	60 MIN.	60 MIN.
JOINT EFF.	1	1
FLUID NAME	OFFGASES	COOLING WATER
FLUID DENSITY lb/ft ³	IN: .415 OUT: .434	IN: 62.226 OUT: 62.059
LETHAL SERVICE	TOXIC AND FLAMMABLE	COOLING WATER
DESIGN DUTY Btu/hr	2310000	
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 S1: 0.579 Site Class: D Sd1: 0.996	

PAINT:
 SOLVENT CLEAN PER SSPC-SP1
 SANDBLAST PER SSPC-SP10 (1.5-2.5 MILS ANCHOR PROFILE)
SHELLSIDE:
PRIMER: ONE COAT SHERWIN WILLIAMS ZINC CLAD II (2.5-4.0 MILS DFT)
INTERM: ONE COAT SHERWIN WILLIAMS HEAT FLEX HI-TEMP 500 (1.5-2.0 MILS D.F.T.) (COLOR: SW4003 PALLET TAN)
FINISH: ONE COAT SHERWIN WILLIAMS HEAT FLEX HI-TEMP 500 (1.5-2.0 MILS D.F.T.) (COLOR: LIGHT GRAY RAL #7035)
TUBESIDE:
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

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO.: EN-20-7120
VDR CODE NO.: HC09
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT



CHANNEL COVER TO CHANNEL FLANGE BOLTING INFO

STUD DIAMETER: 3/4" O.D.
 NUMBER STUDS: (44)
 STUD MATERIAL: SA-193-B7
 BOLT TORQUE RANGE TO BE ACHIEVED: 248 - 250 Ft. LBS.

CHAN. FLG./T'SHT./SHELL FLG. BOLTING INFO

STUD DIAMETER: 3/4" O.D.
 NUMBER STUDS: (44)
 STUD MATERIAL: SA-193-B7
 BOLT TORQUE RANGE TO BE ACHIEVED: 164 - 252 Ft. LBS.

				SUPPLEMENTAL INFORMATION		
				ONE 21 - 168 A E U		
NO.	DATE	REVISIONS		DWN. BY	 SHELL & TUBE, LLC	REV.
				EMG		
				DATE		
				5/2/2022		
NO.	DATE	REVISIONS		CKD. BY	DWG.NO.	REV.
				DiCarlo	S21-13258-7-1A	

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

- 1) STENCIL THE FOLLOWING ON THE EXCHANGER IN
3" HIGH (MIN.) WHITE BLOCK LETTERS::
- P.O. NO.: 4505600058
- ITEM NO.: 18-X-370B
- SHIPPING WT.: 5800#
- 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 $\pm 1/32"$.
- 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 METAL 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 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 & SUPPORT 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.

-----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 = 205 GALLONS (APPROXIMATELY)
VOLUME OF WATER TUBESIDE = 99 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 PER UW-11(a)(5)(b)
2) CHANNEL: SPOT RADIOGRAPH PER UW-11(a)(5)(b)

STAINLESS STEEL REQUIREMENTS

- 1) TEST WATER CHLORIDE CONTENT NOT TO EXCEED 50 PPM.
- 2) TOOLS, GRINDING WHEELS, BRUSHES, ETC. USED ON STN. STL. SHALL NOT HAVE BEEN USED PREVIOUSLY ON CARBON STEEL.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-3708
AIR PRODUCTS P.O. NO.: 4505600058 / ABKM-4-402-PO-3
AP PROJECT NO.: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

			JOB NOTES						
							DWN. BY B.W.		 Fabsco <u>SHELL & TUBE, LLC</u>
							DATE 7/14/22		
△	7/14/22	ADDED DWG./FABSCO	B.W./DD	CKD. BY <i>DiCarlo</i>	DWG. NO. S21-13258-7-1B	REV. 1			
NO.	DATE	REVISIONS							

- 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) BRINELL HARDNESS READINGS TO BE PREFORMED ON INSIDE SURFACE WHEN POSSIBLE.
- 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) HYDRO TEST WATER TEMP. AT ALL LOCATIONS SHALL BE AT LEAST 50°F. AT ALL TIMES DURING HYDROTEST.
- 8) THE TEMPERATURE OF THE HYDROTEST WATER AND THE EXCHANGER SHALL BE EQUALIZED PRIOR TO HYDROTEST.
- 9) STAMPING TO BE DONE W/ "LOW STRESS" STAMPS.
- 10) NOZ. TO CYL. WELDS, BRANCH NOZ. WELDS WHICH CAN'T BE X-RAYED SHALL BE UT.
- 11) ALL ARC STRIKES, START, STOPS SHALL BE CONFINED TO THE WELDING GROOVE OR SHALL BE REMOVED BY LIGHT GRINDING FOLLOWED BY MPT OR DPE.
- 12) THE USE OF HIGH NICKEL CONTENT C'STL. WELDING CONSUMABLES OR C-1/2Mo CONSUMABLES IS PROHIBITED.
- 13) ALL WELD SURFACES TO BE VISUALLY INSPECTED TO ENSURE THAT LAMINATIONS &/OR OTHER DEFECTS ARE NOT PRESENT.
- 14) PEENING IS NOT PERMITTED FOR PURPOSE OF CLEANING WELDS.
- 15) EXCH'S. TO BE STENCILED W/ THE FOLLOWING"
"HEIGHT" : 4'-6"
"WIDTH" : 2'-6"
"LENGTH" : 18'-0"
"WEIGHT" : 5,800#
- 16) FINISHED EXCHANGER IS TO BE WEIGHTED.
TO BE WITHIN +/- 2% OR BETTER ACCURACY.
A CALIBRATED WEIGHT CERTIFICATE SHALL BE PROVIDED.

- 17) LIFTING POINTS & CENTER OF GRAVITY SHALL BE MARKED ON EXCHANGER.
- 18) THE ENTIRE SURFACE OF FORGINGS INCLUDING WELD BEVEL SHALL BE EXAMINED BY MT AFTER FINISH MACHINING & PRIOR TO WELDING.
- 19) EXCHANGER SHALL BE IN A MANNER WHICH KEEPS NOZZLES FROM TOUCHING THE TRUCK BEDS AND/OR SURFACES AT OFF-LOADING AREA AT JOBSITE.
- 20) 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.
- 21) REQUIRED PREHEAT TEMPERATURE SHALL ALSO APPLY TO THERMAL CUTTING AND TACK WELDING.
- 22) PREHEAT ALL JOINT TO A MINIMUM OF 125° F. WHEN MOISTURE REMOVAL IS REQUIRED.
- 23) PMI OF MATERIALS WILL BE BASED ON TESTING PREFORMED AFTER FABRICATION. PMI OF WELD CONSUMABLES PRIOR TO WELDING SHALL BE PREFORMED. THE RESULT OF CHEM. ANALYSIS SHALL MEET THE DEPOSIT ANALYSIS OF UNDILUTED WELD METAL.
- 24) PMI AS FOLLOWS:
 - A) 5% OF TUBES.
 - B) 100% OF ALL PRESSURE CONTAINING WELDS.
 - C) 100% PRESSURE RETAINING PARTS.
 - D) VERIFIED MATERIALS SHALL BE MARKED WITH "PMI" OR "PMI-B"
 - E) CHEMICAL COMPOSITION FOR 2205 DUPLEX SS MATERIAL:
Ni= 4.50-6.50% (MIN.) N=0.14-0.20 (MIN.)
Cr= 22.0-23.0% (MIN.) Mo= 3.00-3.50% (MIN)
 - F) RESULTS OF PMI SHALL BE RECORDED ON REPORT FORMS & NOTED ON DWG'S.

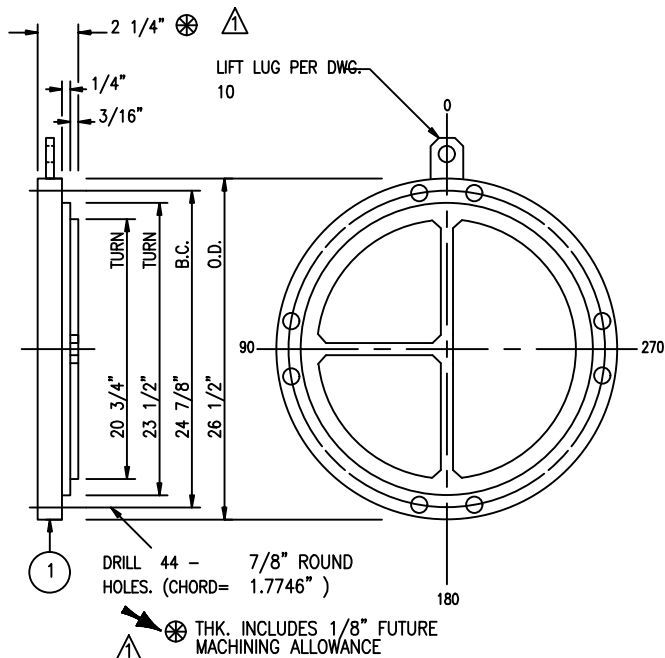
- 25) FOR SET ON NOZZLES, THE BASE METAL ADJACENT TO AUX. NOZZLE OPENINGS ON MAIN NOZZLES SHALL BE THOROUGHLY U.T. & M.P.E. TO ENSURE THAT THERE ARE NO FLAWS. (ETC. LAMINATIONS)
- 26) WELDS FROM EACH WELD PROCEDURE, WELDER/WELDING OPERATOR SHALL BE SPOT RADIOGRAPHED IF ACCESSIBLE.
- 27) NON PRESSURE PARTS TO PRESSURE CONTAINING COMPONENT WELDS SHALL BE 100% M.P.E. OR D.P.E.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 45056000058 / ABKM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

			JOB NOTES (CONT.)		
			DWN. BY	Fabsco <u>SHELL & TUBE, LLC</u>	
			GO		
			DATE		
			7/14/22		
			CKD. BY	DWG. NO.	REV.
			<i>DiCarlo</i>	S21-13258-7-1C	1
△	7/14/22	ADDED DWG./FABSCO GO/DD			
NO.	DATE	REVISIONS			

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 5/8" WIDE.
- 3) ALL COVER PASS PLATE GROOVE JUNCTIONS TO BE NOTCHED 3/8" AT 45 Deg.

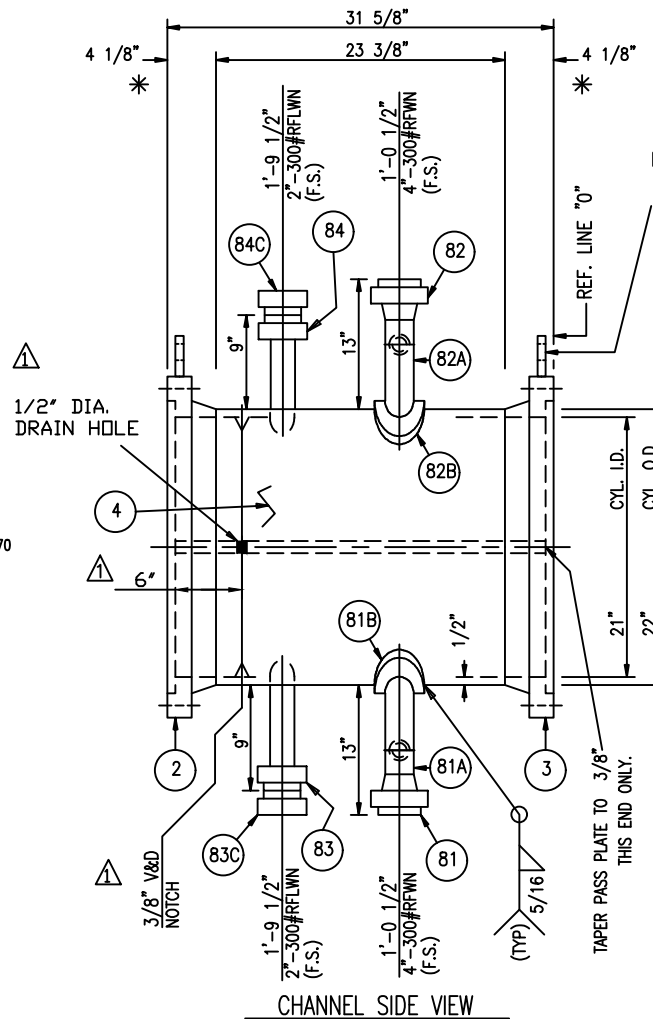


CHANNEL-COVER DETAIL

NOTES:

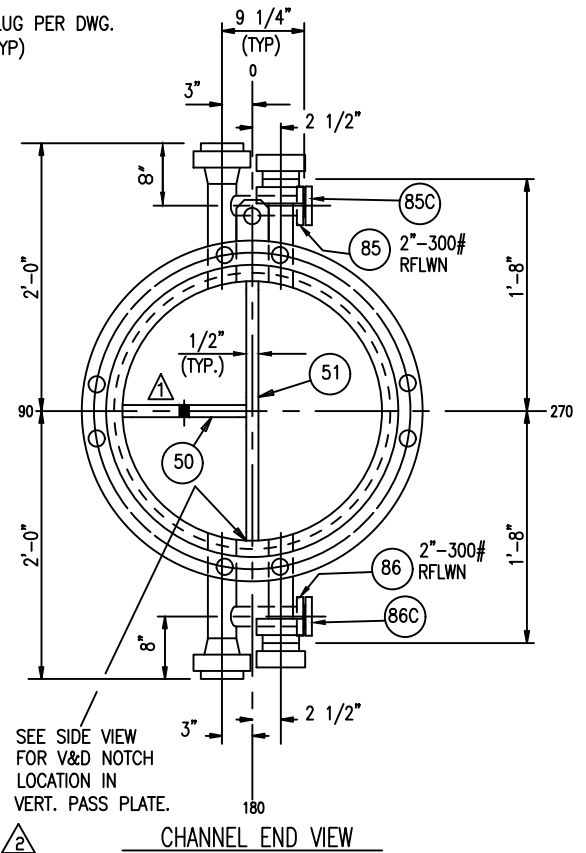
- 1) ALL WELDING TO BE IN ACCORDANCE W/ PROCEDURES ON DWG. -18.
- 2) ALL BOLT HOLES TO STRADDLE CENTER LINES.
- 3) FOR WELD AND BEVEL DETAILS SEE DWG. -13.
- 4) GRIND ALL INSIDE WELDS SMOOTH.
- 5) SPOT PER UW-11(a)(5)(b) RADIOGRAPHY.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
 EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
 SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
 LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
 PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
 ITEM NO.: 18-X-370B
 AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
 AP PROJECT NO: EN-20-7120
 VDR CODE NO.: BE04
 SERIAL NO.: S21-13258-7
 ENGINEER: EG
 CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT



CHANNEL SIDE VIEW

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



CHANNEL END VIEW

FRONT CHANNEL DETAILS

Fabsco
 SHELL & TUBE, LLC

DWN. BY
 B.W.

DATE
 5/9/22

CKD. BY
 DiCarlo

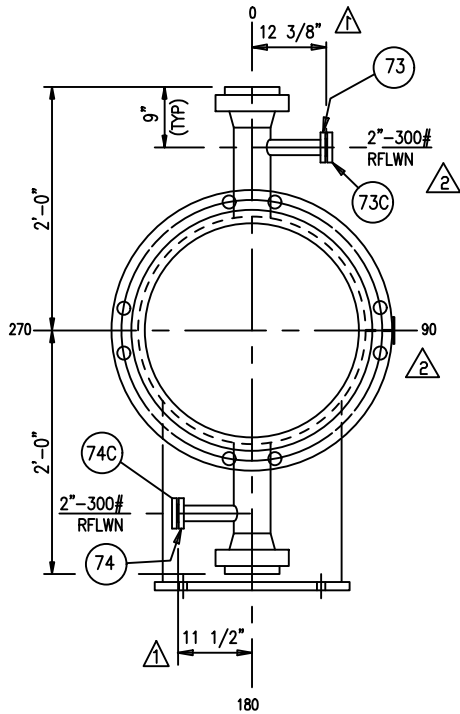
DWG. NO.

S21-13258-7-2

REV.
 2

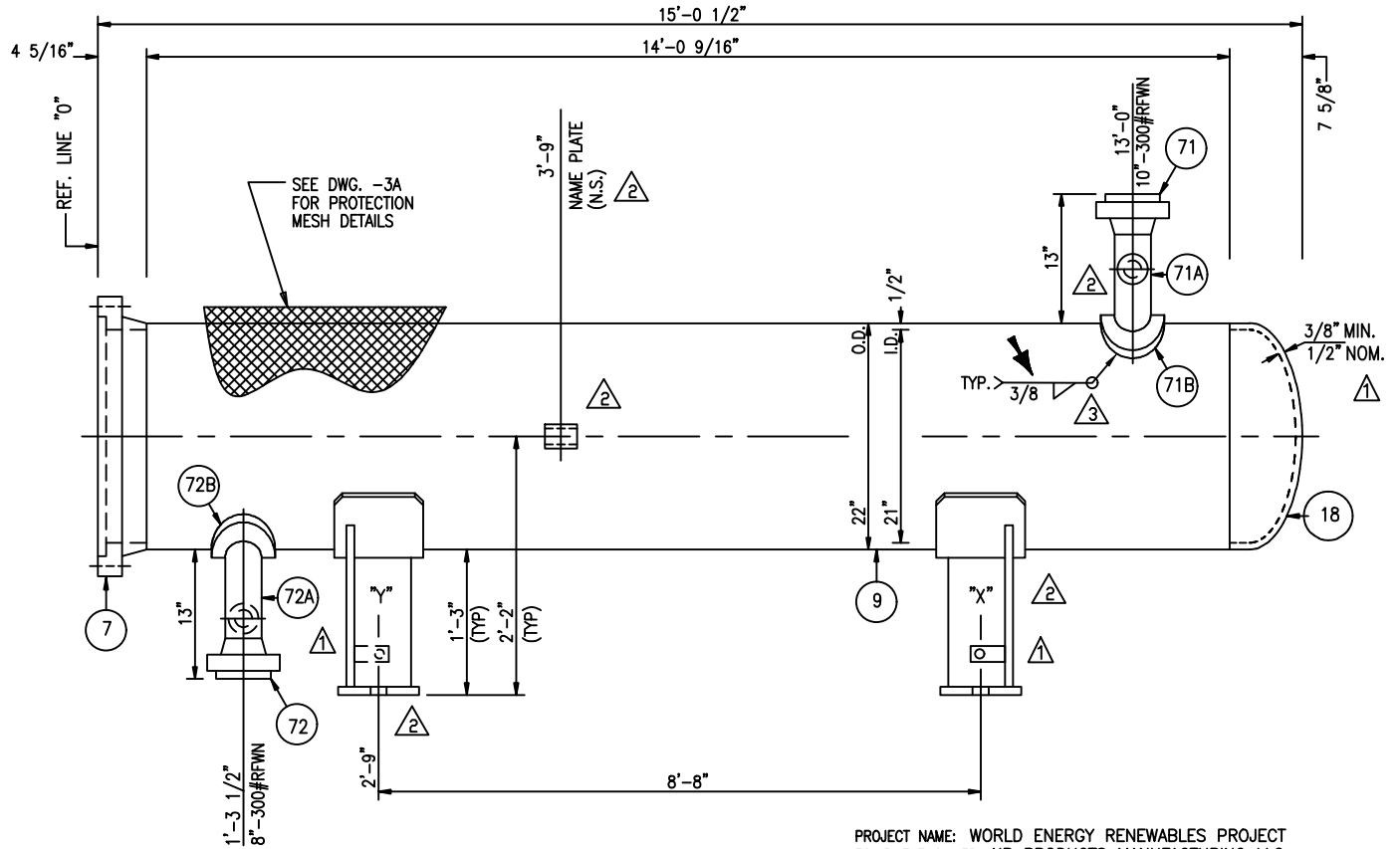
NO.	DATE	REVISIONS
Δ	11/11/22	ADDED NOTE/CUST. DD/DG
Δ	7/13/22	REV. PER CUST. B.W./DD

FOR FLANGE DETAILS SEE DWG. 12



SHELL END VIEW

2:1 ELLIP. HEAD NORMALIZING TEMP.
CYCLE, HOLD TIME, LOADING TEMP.
AND UNLOADING TEMP'S ARE ON
THE C.M.T.R.'S FURNISHED WITH
DATA BOOK.



SHELL SIDE VIEW

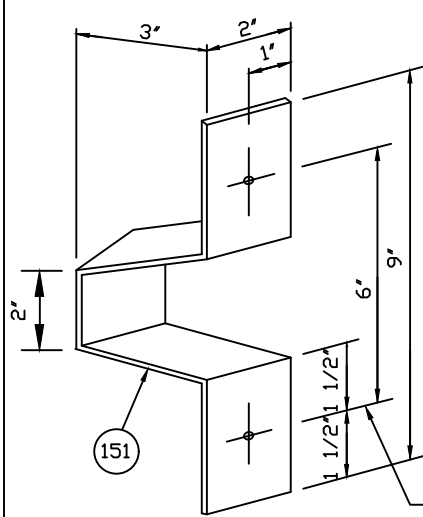
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NOTES:

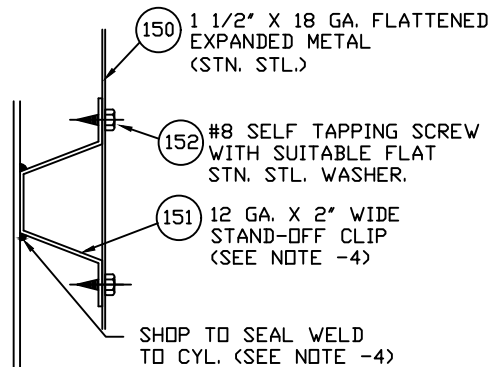
- 1) ALL WELDING TO BE IN ACCORDANCE W/ PROCEDURES ON DWG. -18
- 2) ALL BOLT HOLES TO STRADDLE CENTER LINES.
- 3) FOR WELD AND BEVEL DETAILS SEE DWG. -13.
- 4) FOR SUPPORT DETAILS SEE DWG. -9.
- 5) GRIND ALL INSIDE WELDS FLUSH.
- 6) SPOT PER UW-11 (a)(5)(b) RADIOGRAPHY.

SHELL DETAILS			
			DWN. BY B.W.
			DATE 5/9/22
			CKD. BY DiCarlo
			DWG.NO. S21-13258-7-3
NO.	DATE	REVISIONS	REV. 3
1	1/16/23	REV. PER CUST. COMMENTS DD/DG	
2	11/11/22	REV. PER CUST. & FABSCO DD/DG	
3	7/13/22	REV. PER CUST. B.W./DD	

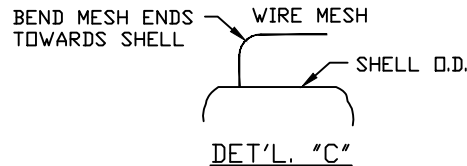
Fabscos
SHELL & TUBE, LLC



STAND-OFF CLIP DETAIL



INSTALLATION DETAIL
(SEE NOTE -2)

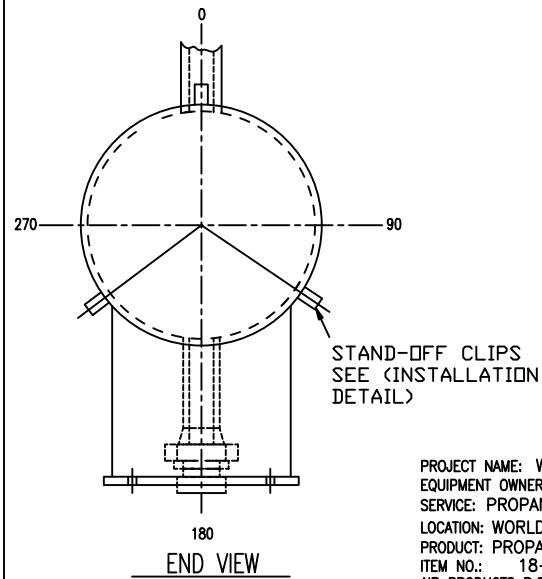


OVERLAP DETAIL

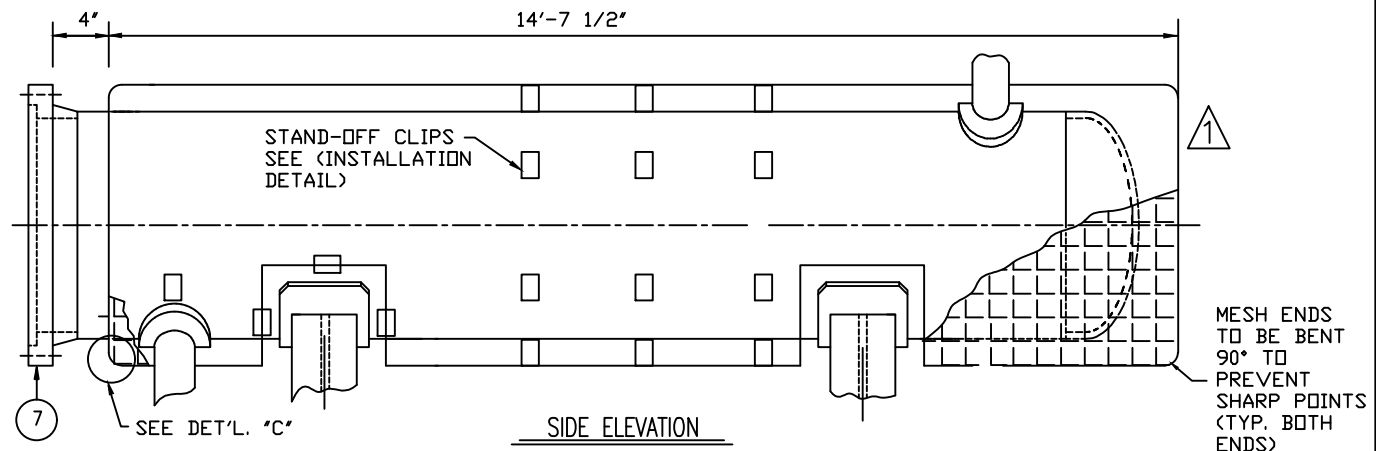
DET'L. "C"

GENERAL NOTES

1. APPLICABLE SPECIFICATIONS. ABKM-PP-000-500540-A GALVANIZING SPECIFICATION.
2. STAND-OFF CLIPS SHALL BE INSTALLED IN ROWS AT 24" SPACING IN TWO (2) DIRECTIONS. MAX. DISTANCE FROM EDGE OF EXPANDED METAL TO CENTERLINE OF STAND-OFFS SHALL BE 6".
3. EXPANDED METAL SHALL BE PRE-ROLLED OR FORMED WITH ALL EXPOSED EDGES CUT SUCH THAT FULL DIAMONDS FORM A CLEAN EDGE AND ALL SHARP EDGES ARE SMOOTH AND FREE OF BURRS.
4. STAND OFF CLIPS SHALL BE SHOP WELDED TO THE CYL/HD & BE THE SAME MATERIAL. BOLTING HARDWARE & EXPANDED METAL SHALL BE STN. STL.
5. ALL PARTS INCLUDING HARDWARE SHALL BE SUPPLIED BY FABSCO.
6. ALL PARTS SHALL BE IDENTIFIED WITH A METAL TAG INDICATING ITEM NO., PO NO. & PIECE MARK NO. INSTALLATION HARDWARE SHALL BE BOXED & TAGGED AS ABOVE WITH TEN PERCENT (10%) EXTRA TO ACCOUNT FOR LOSS OR DAMAGE.
7. STANDOFF DISTANCE SHALL BE 3" MIN.



END VIEW



SIDE ELEVATION

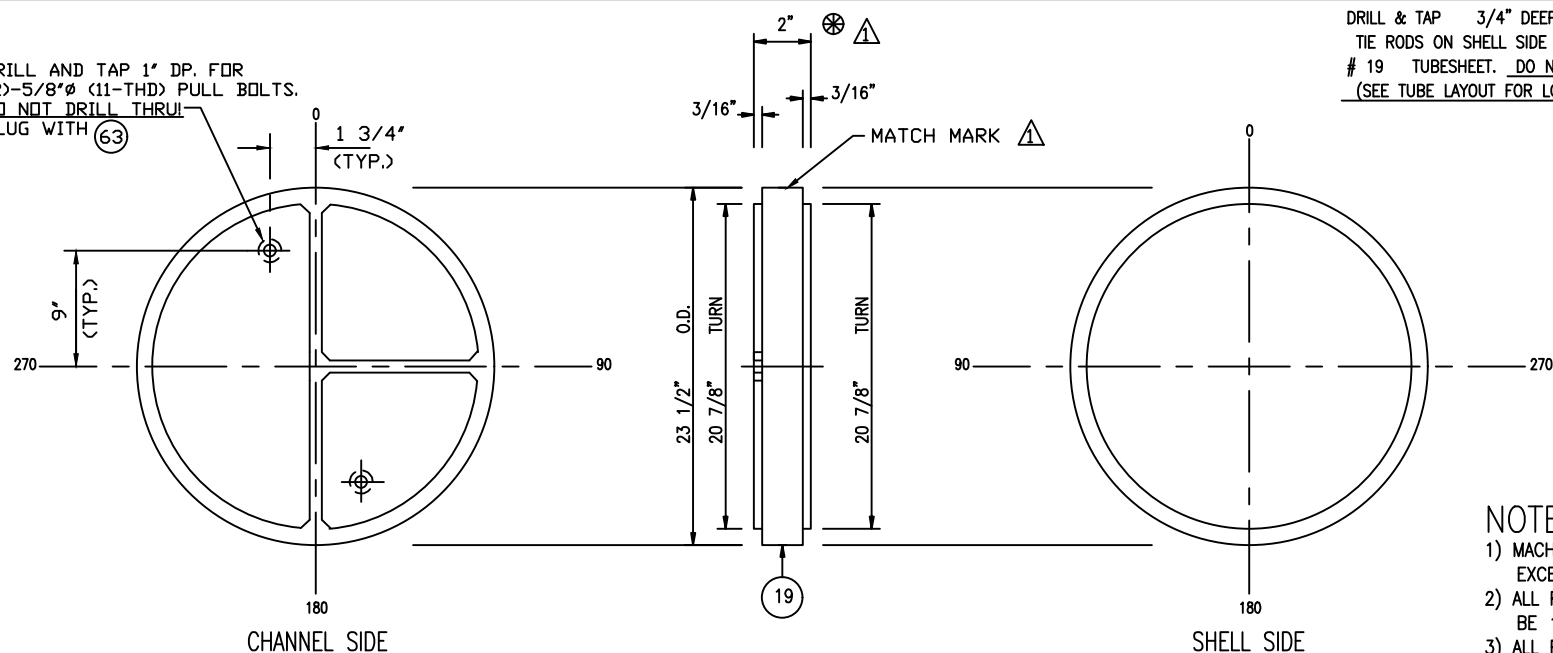
PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058 / ABKM-4-402-PO-3
AP PROJECT NO.: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

			SHELL MESH DETAILS		
			DWN. BY	Fabsco SHELL & TUBE, LLC	
			B.W.		
			DATE		
			5/9/22		
△	7/13/22	REV. PER FABSCO	B.W./DD		
NO.	DATE	REVISIONS			
			CKD. BY	DWG.NO.	REV.
			DiCarlo	S21-13258-7-3A	1

Fabscos
SHELL & TUBE, LLC

DRILL AND TAP 1" DP. FOR
(2)-5/8"Ø (11-THD) PULL BOLTS.
DO NOT DRILL THRU!
PLUG WITH (63)

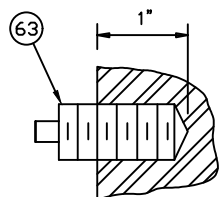
DRILL & TAP 3/4" DEEP FOR 8- 1/2" DIA.
TIE RODS ON SHELL SIDE OF
19 TUBESHEET. DO NOT DRILL THRU!!
(SEE TUBE LAYOUT FOR LOCATIONS.)



THK. INCLUDES 1/8" FUTURE
MACHINING ALLOWANCE

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.

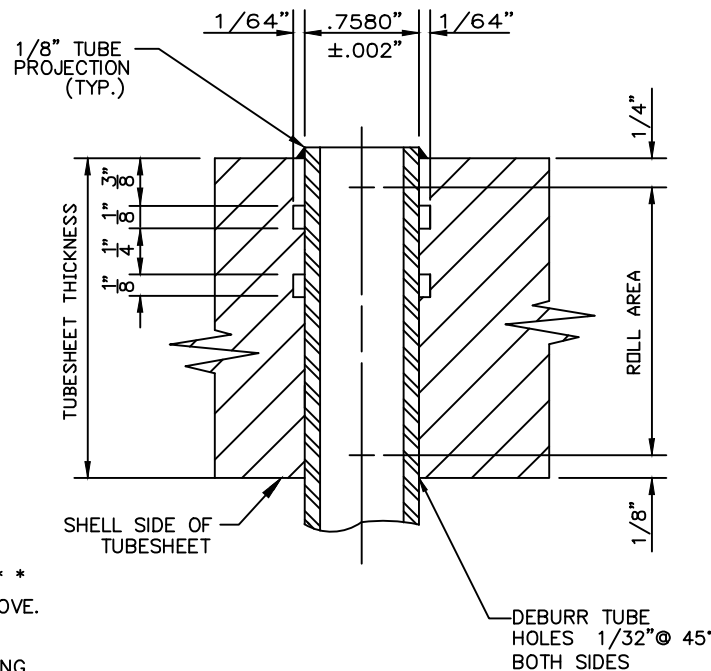


(65) **PULLBOLT PLUG DETAIL**
(EYE BOLT TO SHIP LOOSE W/ EXCHANGER)

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

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LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058 / ABKM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

TUBESHEET DETAILS			
			DWN. BY B.W.
			DATE 5/9/22
Δ	7/13/22	REV. PER CUST. B.W./DD	CKD. BY DiCarlo
			DWG.NO. S21-13258-7-4
NO.	DATE	REVISIONS	REV. 1

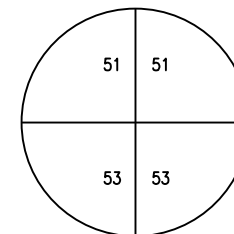
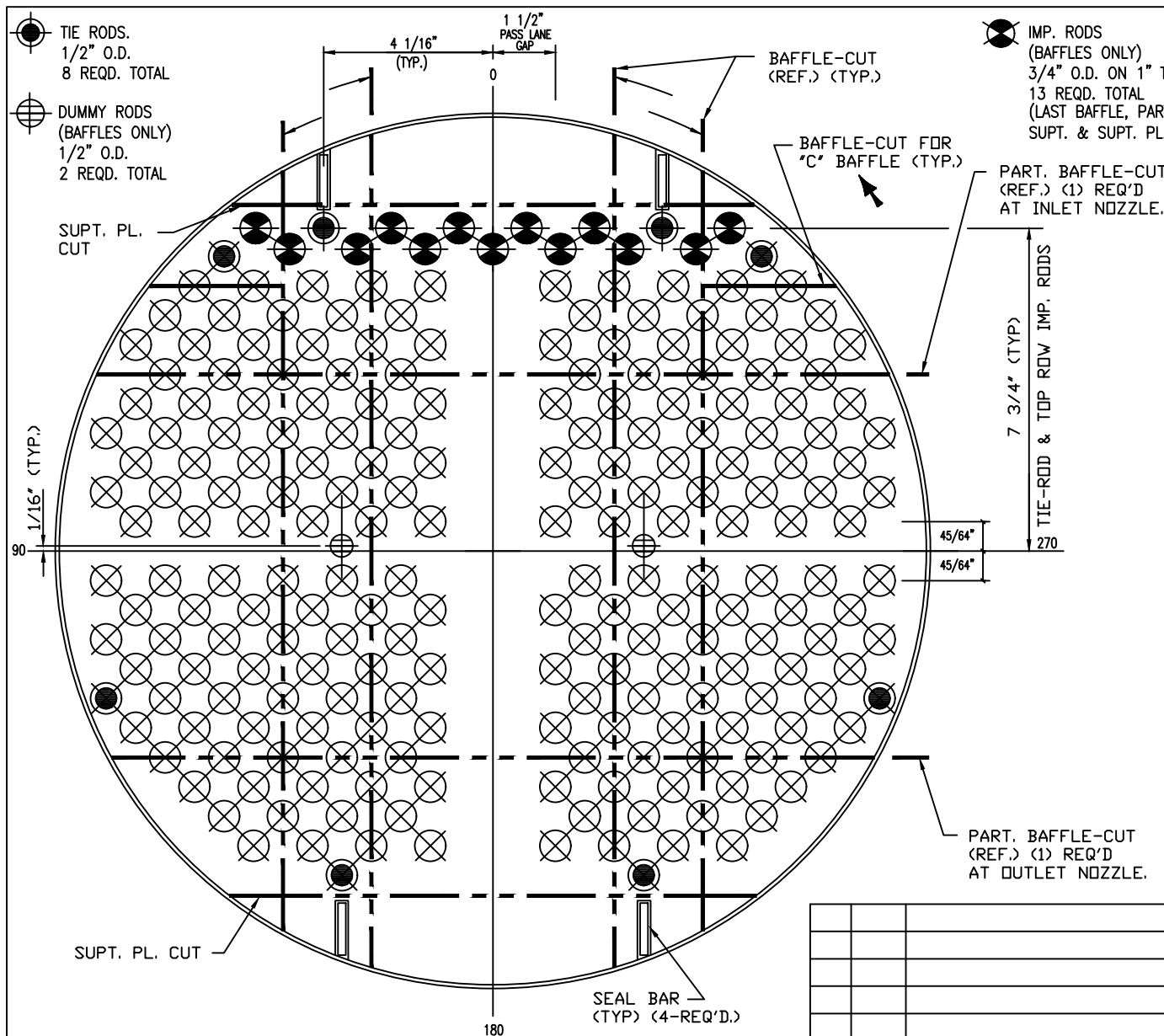


TUBE TO TUBESHEET SEAL WELD AND FABRICATION SEQUENCE

1. DRILL, REAM AND RING GROOVE TUBE HOLES PER DETAIL ABOVE.
2. CLEAN AREAS TO BE WELDED AND ROLLED WITH DEGREASER.
3. TUBESHEET HOLES & TUBES WILL BE CHECKED FOR OVERSIZING AND TOLERANCES PRIOR TO INSTALLING INTO POSITION. ALL TUBE SHALL HAVE CORRECT PROTRUSION FROM TUBESHEET AS REQUIRED ON DWG. -7
INSTALL TUBES IN BUNDLE AND SET PROJECTIONS. 2
4. FUSION WELD USING GTAW PROCESS USING WPS: "T-219". 3
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. FINAL ROLL TUBES INTO TUBESHEET PER DETAIL ABOVE. TUBES TO BE ROLLED FOR TUBESHEET THICKNESS SHOWN ABOVE. STOP SHALL BE USED ON TUBE ROLLER TO THAT ASSURES EXPANSION IS WITHIN LIMITS OF ROLL AREA. TUBE WALL REDUCTION TO BE 2-3% MAX. TUBE ROLLING CHART TO BE DONE. 1
8. REPEAT STEP 5.
9. THE FERRITE CONTENT OF TUBE WELDS SHALL BE CHECKED USING EITHER A MAGNE-GAGE OR FISCHER FERRITE SLOPE CALIBRATED IN ACCORDANCE WITH AWS A4.2. A MIN. OF THREE (3) TESTS SHALL BE MADE OF EACH 1.7m (5 FT.) OF WELD. THE AVERAGE VALUE OF THE TESTS ON EACH WELD SHALL BE 30-70% FERRITE. A REPORT SHALL BE FILLED OUT.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PD-3
AP PROJECT NO.: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

TUBE SEAL WELD & TUBE HOLE GROOVING DETAIL			Fabsco SHELL & TUBE, LLC	
10/23/23	REV. PER FABSCO	DD/DG	DWN. BY B.W.	Fabsco SHELL & TUBE, LLC
11/11/22	REV. NOTE #3/CUST.	DD/DG	DATE 5/9/22	
7/13/22	REV. PER. CUST.	B.W./DD	CKD. BY DiCarlo	
NO.	DATE	REVISIONS	DWG. NO. S21-13258-7-4A	REV. 3



TUBE DISTRIBUTION

NOTES:

- 1) DRILL AND REAM TUBE HOLES IN TUBESHEETS TO 0.7580" $\pm$ 0.0020" DIA. FOR 104 - 3/4" O.D. U-TUBES. TOTAL HOLES = 208
- 2) TUBE PITCH = 1" ROT. SQUARE.
- 3) NUMBER OF PASSES = 4
- 4) SEE DRAWING 4A FOR TUBE GROOVING DETAILS.
- 5) BAFFLE O.D. = 20 13/16"
- 6) O.T.L. = 20 9/16"

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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 PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
 ITEM NO.: 18-X-370B
 AIR PRODUCTS P.O. NO: 4505600058 / A8KM-4-402-PO-3
 AP PROJECT NO: EN-20-7120
 VDR CODE NO.: BE04
 SERIAL NO.: S21-13258-7
 ENGINEER: EG
 CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

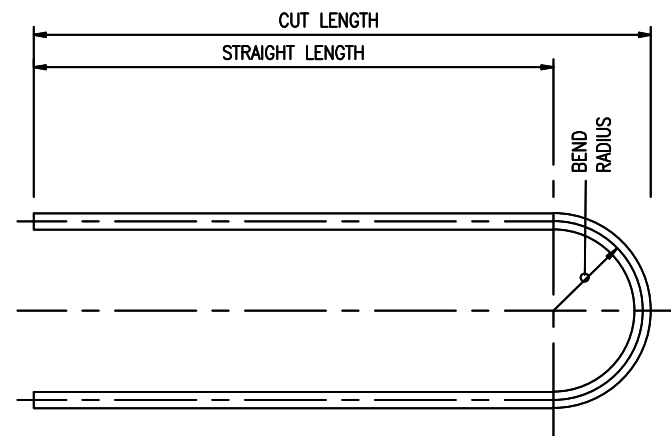
VIEW LOOKING AT SHELL SIDE OF NO. 19 TUBESHEET

TUBE LAYOUT			
		DWN. BY	Fabsco SHELL & TUBE, LLC
		B.W.	
		DATE	
		5/9/22	
		CKD. BY	DWG.NO.
		DiCarlo	S21-13258-7-5
NO.	DATE	REVISIONS	REV.
			0

ROW	NO.OF TUBES	BEND RADIUS	BEND DIAMETER	BEND LENGTH	STRAIGHT LENGTH	CUT LENGTH	DEVELOPED LENGTH
A	10	1 1/2"	3"	0'-4 3/4"	14'-0"	14'-1 7/8"	28'-4 3/4"
B	9	2 1/4"	4 1/2"	0'-7 1/8"	14'-0"	14'-2 5/8"	28'-7 1/8"
C	10	2 15/16"	5 7/8"	0'-9 1/4"	14'-0"	14'-3 5/16"	28'-9 1/4"
D	9	3 5/8"	7 1/4"	0'-11 7/16"	14'-0"	14'-4"	28'-11 7/16"
E	10	4 3/8"	8 3/4"	1'-1 3/4"	14'-0"	14'-4 3/4"	29'-1 3/4"
F	9	5 1/16"	10 1/8"	1'-3 15/16"	14'-0"	14'-5 7/16"	29'-3 15/16"
G	10	5 3/4"	11 1/2"	1'-6 1/8"	14'-0"	14'-6 1/8"	29'-6 1/8"
H	9	6 1/2"	13"	1'-8 7/16"	14'-0"	14'-6 7/8"	29'-8 7/16"
J	9	7 3/16"	14 3/8"	1'-10 5/8"	14'-0"	14'-7 9/16"	29'-10 5/8"
K	8	7 7/8"	15 3/4"	2'-0 3/4"	14'-0"	14'-8 1/4"	30'-0 3/4"
L	7	8 5/8"	17 1/4"	2'-3 1/8"	14'-0"	14'-9"	30'-3 1/8"
M	4	9 5/16"	18 5/8"	2'-5 5/16"	14'-0"	14'-9 11/16"	30'-5 5/16"

NOTES:

- 1) THE NITROGEN CONTENT SHALL BE 0.14%-0.20%.
- 2) EACH HEAT LOT OF DUPLEX TUBE MATERIAL SHALL BE CORROSION TEST PER ASTM A923 TEST METHOD "C". AND SHALL MEET THE GIVEN CRITERIA.
IN ADDITION, ONE SPECIMEN REPRESENTING EACH HEAT LOT OF DUPLEX STN. STL. SHALL RECEIVE A MICROSTRUCTURAL EXAMINATION PER THE REQUIREMENTS OF ASTM A923 TEX METHOD "A".
THE PRESENCE OF POSSIBLY AFFECTED, AFFECTED OR CENTERLINE STRUCTURES SHALL BE GROUNDS FOR REJECTION OF THE SOLUTION ANNEALED BATCH REPRESENTED BY THE SPECIMEN, AND THE BATCH SHALL REQUIRE REHEAT TREATMENT AND RETESTING.
THE SAMPLE SIZE SHALL BE A 25mm (1") LONG TUBE SPECIMEN FOR EACH HEAT LOT.
- 3) TUBING SHALL BE SOLUTION ANNEALED WITHIN THE TEMPERATURE RANGE LISTED FOR THE PARTICULAR GRADE IN ASME SA-789 FOR SUFFICIENT TIME TO ELIMINATE INTERMETALLIC PRECIPITATES AND THEN RAPIDLY COOLED BY WATER QUENCHING, OR AIR, OR INERT GAS COOLING TO BELOW 315deg C. (600deg F.).
OTHER HEAT TREATMENTS AND QUENCHING MEDIA OTHER THAN WATER MUST BE APPROVE BY THE CUSTOMER.
- 4) NO WELD REPAIRS OF BASE MATERIALS AND NO REPAIR OF TUBE DENTS ARE PERMITTED. THESE TUBE SECTIONS SHALL BE REJECTED.
- 5) HARDNESS TESTING OF TUBING SHALL BE DONE IN ACC. W/ SA-789, EXCEPT THAT THE MAXIMUM HARDNESS SHALL BE ROCKWELL C 28.
FAILURE TO MEET THIS HARDNESS REQUIREMENT SHALL CONSTITUTE FAILURE OF THE SPECIMEN AND SHALL RESULT IN HARDNESS TESTING BEING REQUIRED ON EACH LENGTH IN THE HEAT LOT REPRESENTED BY THE SPECIMEN.
- 6) ELECTRIC RESISTANCE SOLUTION ANNEAL U-BENDS PLUS 1'-0" OF STRAIGHT LENGTH AT 1900-1950deg F. FOLLOWED BY RAPID COOL.
- 7) AFTER HEAT TREATING, OTHER THAN BRIGHT ANNEAL PROCEDURES, ALL TUBING SHALL RECEIVE A DESCALING TREATMENT OF PICKLING FOLLOWED BY NEUTRALIZING AND APPROPRIATED RINSING TREATMENT.
ALL MILL SCALE SHALL BE REMOVED.



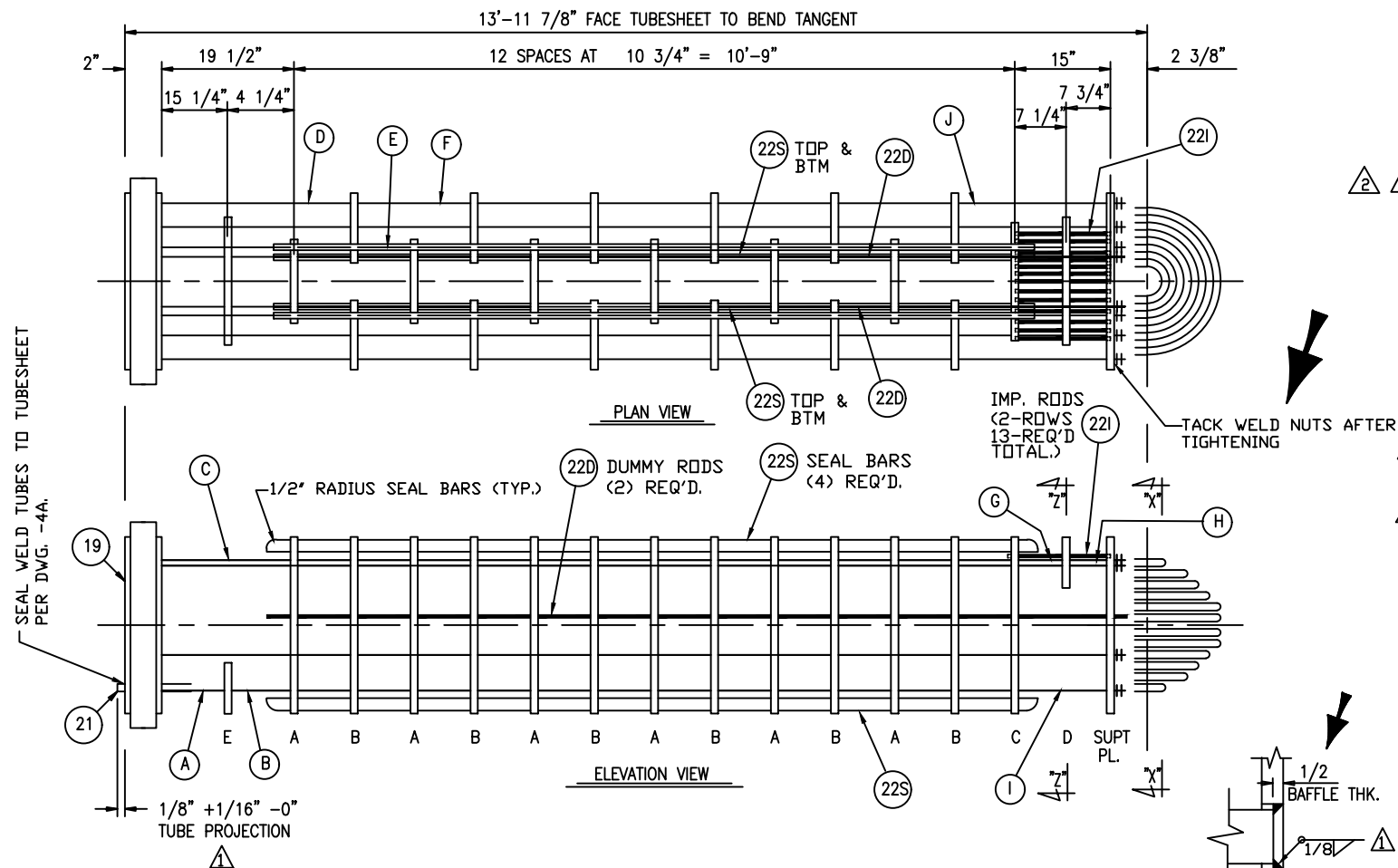
TOTAL NO. REQUIRED: 104
 SIZE: 3/4" .065" (AVG)
 MATERIAL: SA-789S31803/S32205 (SMLS)

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.

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 PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
 ITEM NO.: 18-X-370B
 AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
 AP PROJECT NO: EN-20-7120
 VDR CODE NO.: BE04
 SERIAL NO.: S21-13258-7
 ENGINEER: EG
 CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

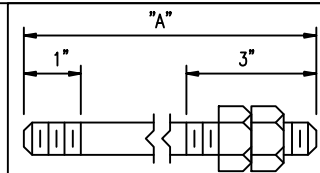
			TUBE BENDING SCHEDULE		
			DWN. BY		
			B.W.		
			DATE		
			5/9/22		
			CKD. BY	DWG.NO.	REV.
			DiCarlo	S21-13258-7-6	0
NO.	DATE	REVISIONS			



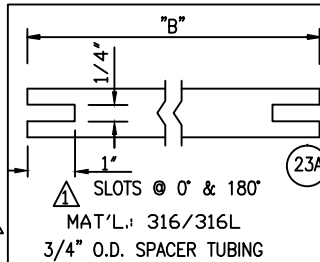
NOTES:

- 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. RADIUS EACH END OF SEAL BAR W/ 1/4" (MIN.) F.W.
- 3) DUMMY TUBES SHALL EXTEND 1" PAST FIRST AND LAST BAFFLE. WELD TO FIRST AND LAST BAFFLE W/ 1/4" (MIN.) F.W.

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VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT



△ MAT'L: 316/316L 1/2" O.D. -13 NC TIE RODS (23)	
REQ'D.	"A"
① 8	13'-10"

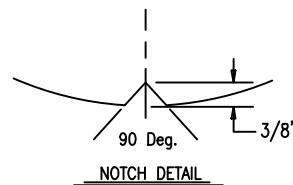
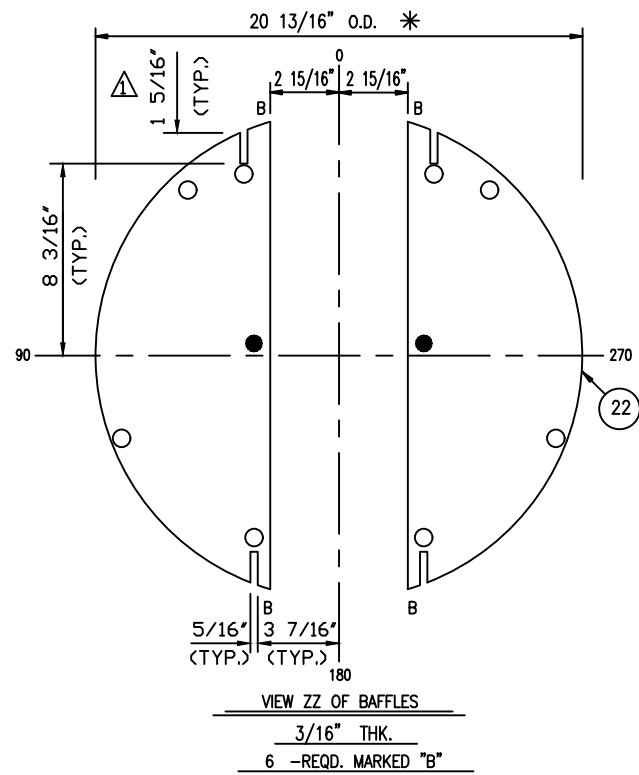
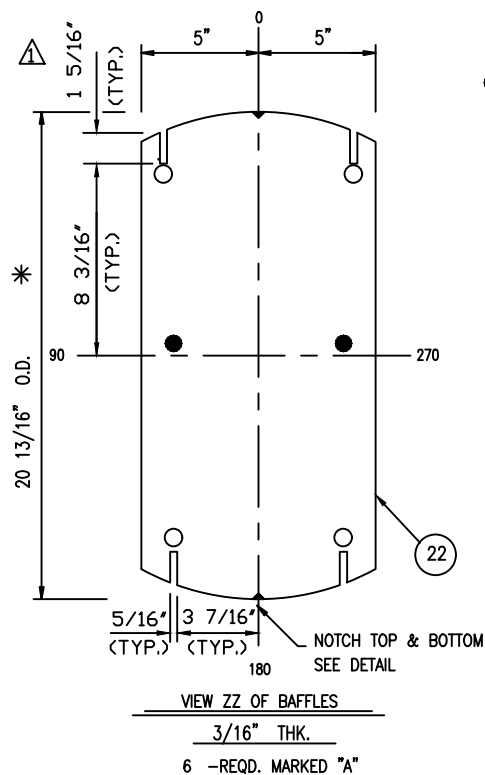


REQ'D.	"B"
① 2	15 1/8"
② 2	4 1/16"
③ 2	19 3/8"
④ 4	30 1/8"
⑤ 50	10 9/16"
⑥ 20	21 5/16"
⑦ 4	7 1/16"
⑧ 4	7 1/2"
⑨ 2	14 3/4"
⑩ 2	25 1/2"

BUNDLE DETAILS

Fabscos
SHELL & TUBE, LLC

		DWN. BY B.W.		DATE 5/9/22		CKD. BY DiCarlo		DWG. NO. S21-13258-7-7		REV. 2	
△	11/11/22	REV. MAT'L PER FABSCO	DD/DG								
△	7/14/22	REV. PER CUST.	B.W./DD								
NO.	DATE	REVISIONS									

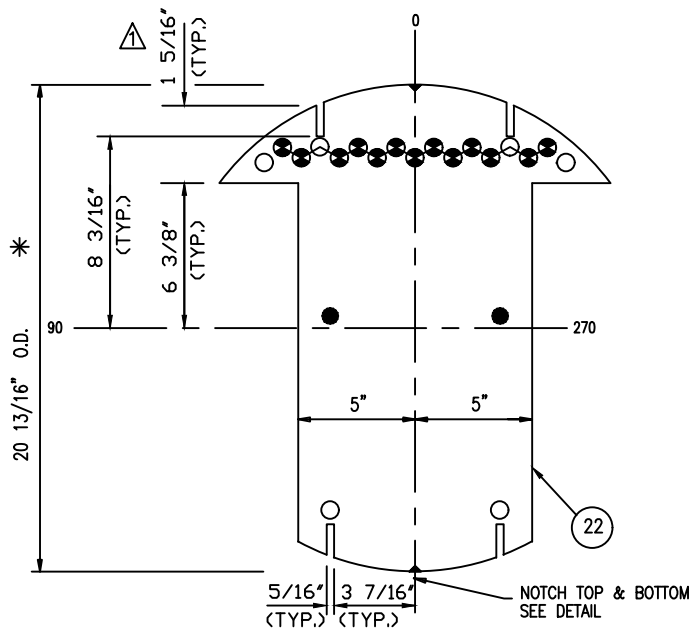


PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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VDR CODE NO.: BE04
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ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

NOTES:

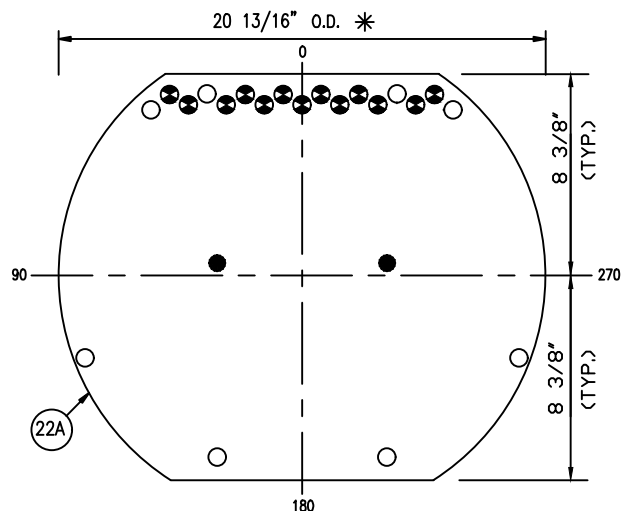
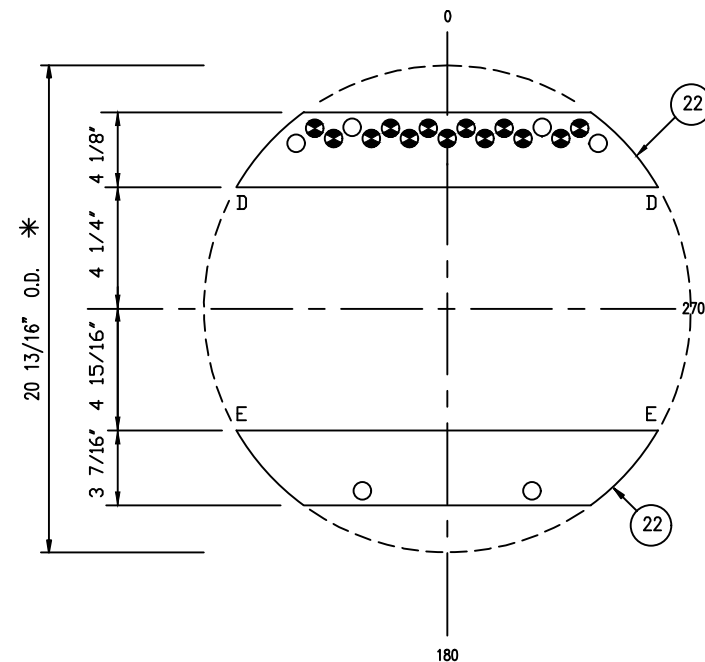
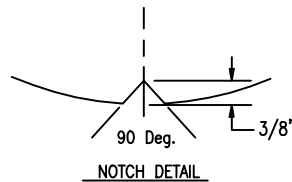
- 1) DRILL TUBE HOLES IN BAFFLES 25/32" DIA. & DEBURR.
- 2) DRILL TIE ROD HOLES 9/16" DIA.
SEE TUBE LAYOUT FOR LOCATION.
- 3) RADIUS ALL CORNERS ON BAFFLE CUTS.
- 4) CHECK SHELL I.D. BEFORE MACHINING BAFFLE O.D.
- 5) MACHINE O.D. OF BAFFLES TO 250 RMS.

			BAFFLE DETAILS			
			DWN. BY B.W.		Fabsco SHELL & TUBE, LLC	
			DATE 5/9/22			
			CKD. BY DiCarlo		DWG.NO. S21-13258-7-8	REV. 1
△	7/14/22	REV. PER CUST. B.W./DD				
NO.	DATE	REVISIONS				



● DENOTES (13) 25/32" HOLES
FOR 3/4" O.D. IMP. RODS.
"DRILL BAFFLE "C",
"D" & SUPT. PL. ONLY
(SEE TUBE LAYOUT FOR LOCATION)

● DENOTES (2) 17/32" HOLES
FOR (2) 1/2" O.D. DUMMY RODS
(SEE TUBE LAYOUT FOR LOCATION)



NOTES:

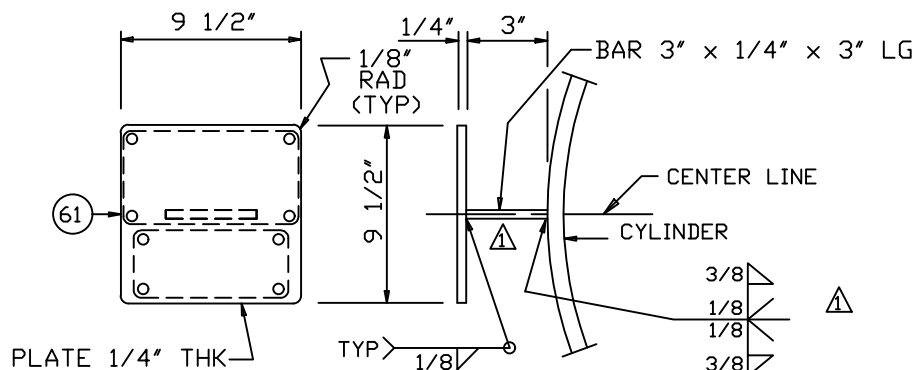
- 1) DRILL TIE ROD HOLES IN BAFFLES 25/32" DIA. & DEBURR.
- 2) DRILL TIE ROD HOLES 9/16" DIA.
SEE TUBE LAYOUT FOR LOCATION.
- 3) RADIUS ALL CORNERS ON BAFFLE CUTS.
- * 4) CHECK SHELL I.D. BEFORE MACHINING BAFFLE O.D.
- 5) MACHINE O.D. OF BAFFLES TO 250 RMS.

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
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LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO.: EN-20-7120
VDR CODE NO.: BEO4
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

			BAFFLE DETAILS (CON'T)			
			DWN. BY B.W.		Fabsco SHELL & TUBE, LLC	
			DATE 5/9/22			
△	7/14/22	REV. PER CUST.	B.W./DD			
NO.	DATE	REVISIONS		CKD. BY DiCarlo	DWG.NO. S21-13258-7-8A	REV. 1

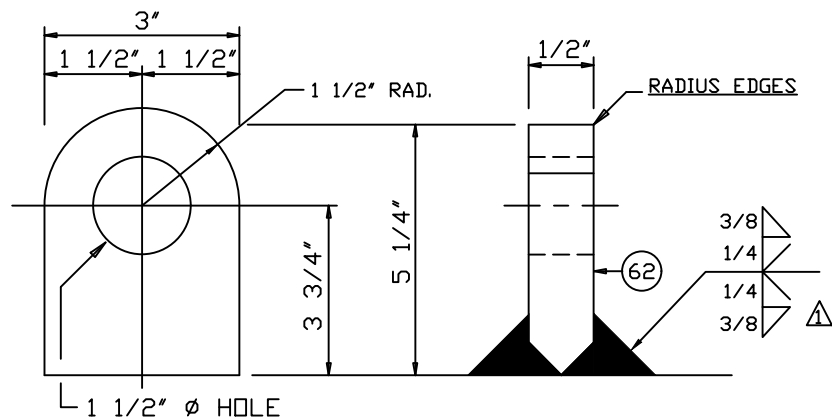
Fabsco
SHELL & TUBE, LLC

* TO BE ASSIGNED AT TIME OF SHIPMENT



NAME PLATE BRACKET DETAIL

(ONE) REQUIRED



LIFTING LUG DETAIL

3-REQUIRED

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO.: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

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



U

RT-2



NAT'L BD. *

CERTIFIED BY

FABSCO SHELL & TUBE, LLC
SAPULPA, OKLAHOMA

	MAWP		MAWT	
SHELL	265	PSI AT	300	° F.
	MAEWP		MAWT	
SHELL	15	PSI AT	300	° F.
	MDMT		MAWP	
SHELL	32	° F. AT	265	PSI
	MAWP		MAWT	
TUBES	150	PSI AT	150	° F.
	MAEWP		MAWT	
TUBES	N/A	PSI AT	N/A	° F.
	MDMT		MAWP	
TUBES	32	° F. AT	150	PSI

SERIAL NUMBER

YEAR BUILT

ITEM/TAG NUMBER

S21-13258-7

2022

18-X-370B

P.O. NO.: 4505600058

WT.: 5800 LBS.

TEST DATE:

PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER

INFORMATION NAME PLATE

HYDRO TEST PRESS PSIG..TUBESIDE: SHOP-206/FIELD-195

HYDRO TEST PRESS PSIG..SHELLSIDE: SHOP-449/FIELD-345

DESIGN PRESS.: SHELLSIDE=95 PSIG; TUBESIDE=120 PSIG

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

LIFT LUG DETAIL w/
NAME PLATE & BRACKET

DWN. BY
B.W.

DATE
5/9/22

CKD. BY
DiCarlo

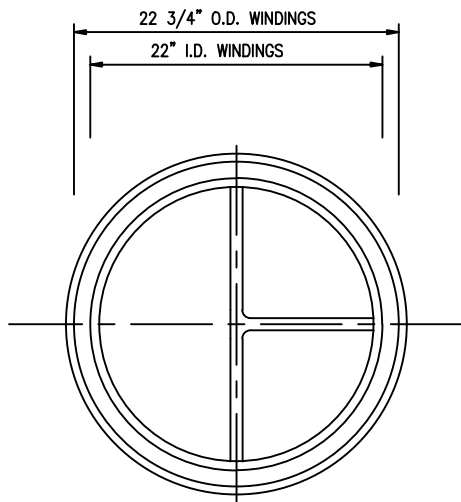
Fabscos
SHELL & TUBE, LLC

DWG. NO.

S21-13258-7-10

REV.
3

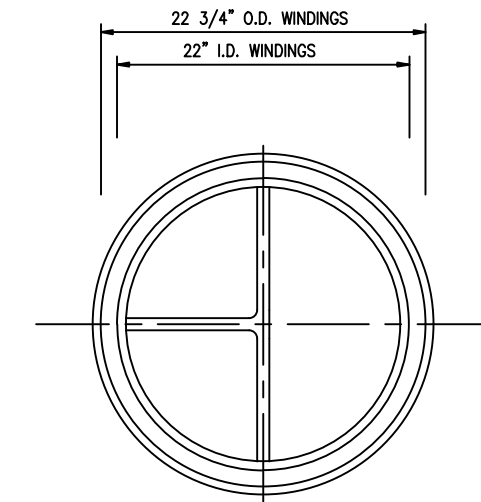
NO.	DATE	REVISIONS	
△	11/9/23	REV. PER FABSCO DD/DG	
△	10/23/23	REV. PER FABSCO DD/DG	
△	7/14/22	REV. PER CUST. B.W./DD	



(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 3/8" WIDE 304L S.S. DBL. JACKETED
W/ GRAPHITE FILLER AND 1/64" THK. GRAPHITE
FACE ON BOTH SIDES
TEST PRESSURE:
SHOP: 206/ FIELD: 195

CHANNEL COVER TO CHANNEL FLANGE BOLTING INFO

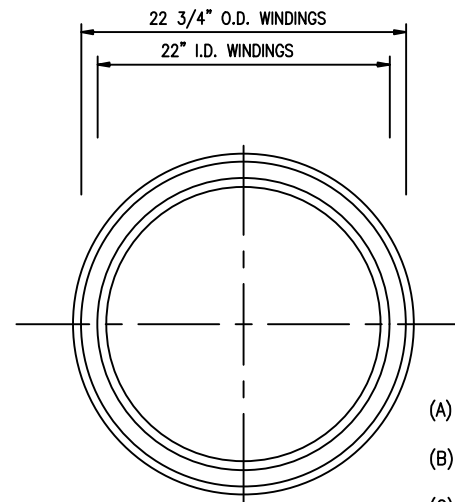
STUD DIAMETER: 3/4" O.D.
NUMBER STUDS: (44)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 248 - 250 Ft. LBS.



(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 304L S.S. DBL. JACKETED
W/ GRAPHITE FILLER AND 1/64" THK. GRAPHITE
FACE ON BOTH SIDES
TEST PRESSURE:
SHOP: 206/ FIELD: 195

CHAN. FLG./T'SHT./SHELL FLG. BOLTING INFO

STUD DIAMETER: 3/4" O.D.
NUMBER STUDS: (44)
STUD MATERIAL: SA-193-B7
BOLT TORQUE RANGE TO BE ACHIEVED: 164 - 252 Ft. LBS.



(1)-REQUIRED.
SHELL GASKET.
0.175" THK. 304 S.S. SPIRAL WOUND
W/ GRAPHITE FILLER & INNER / OUTER COMP. RINGS (C)
TEST PRESSURE:
SHOP: 449/ FIELD: 345

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

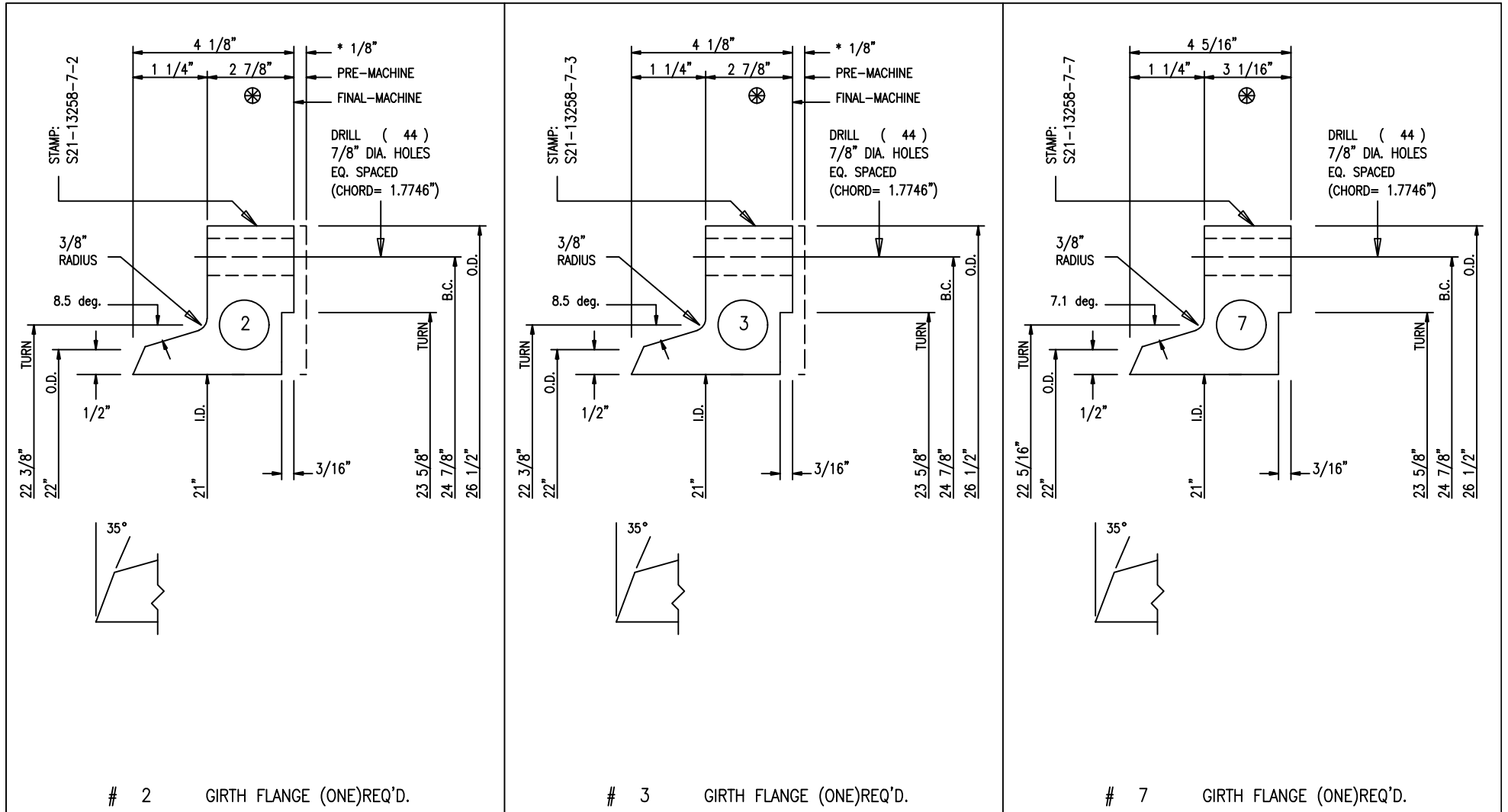
- (A) 23.5000 O.D. X .1250 THICK: MATERIAL=SA-240-304
21.2500 I.D. X .1250 THICK: MATERIAL=SA-240-304
(B) 23.5000 O.D. X .1250 THICK: MATERIAL=SA-240-304
21.2500 I.D. X .1250 THICK: MATERIAL=SA-240-304
(C) 23.5000 O.D. X .1250 THICK: MATERIAL=SA-240-304
21.2500 I.D. X .1250 THICK: MATERIAL=SA-240-304

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"

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

			GASKET DETAILS			
			DWN. BY B.W.	Fabsco SHELL & TUBE, LLC		
			DATE 5/9/22			
△	7/14/22	REV. PER CUST.	B.W./DD	CKD. BY <i>DiCarlo</i>	DWG.NO. S21-13258-7-11	REV. 1
NO.	DATE	REVISIONS				



NOTES:		PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT		GIRTH FLANGES	
1) MACHINE ALL SURFACES TO 250 RMS		EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC			
EXCEPT GASKET SURFACES MACHINE TO 125 RMS.		SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER		DWN. BY	Fabsco SHELL & TUBE, LLC
2) ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.		LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA		B.W.	
3) * FINAL MACHINE FACING AFTER FINAL WELDING.		PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER		DATE	
		ITEM NO.: 18-X-3708		5/9/22	
		AIR PRODUCTS P.O. NO.: 4505600058/A8KM-4-402-PO-3		CKD. BY	DWG.NO.
		AP PROJECT NO: EN-20-7120		DiCarlo	S21-13258-7-12
		VDR CODE NO.: BE04			REV.
		SERIAL NO.: S21-13258-7			0
		ENGINEER: EG			
		CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT			
		NO.	DATE	REVISIONS	

1) MACHINE ALL SURFACES TO 250 RMS	
EXCEPT GASKET SURFACES MACHINE TO 125 RMS.	
2) ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.	
3) * FINAL MACHINE FACING AFTER FINAL WELDING.	
* THK. INCLUDES 1/8" FUTURE MACHINING ALLOWANCE	

MK.NO.	QUAN.	DESCRIPTION			MATERIAL	NOZ MK.	SUPPLIER	P.O. NO.	DUE
21	△	104	TUBES	3/4" ODX 0.0650" (AVG) THK PER BEND SCHEDULE 13)	SA-789S31803				
	△				/S32205(SMLS)				
	△			FORGED RING MATERIAL					
2	△	1	FLG 26 1/2"	O.D.X 21" I.D.X 4 1/8" THK (f) 6/7/8/12)	SA-350LF2CL1				
3	△	1	FLG 26 1/2"	O.D.X 21" I.D.X 4 1/8" THK (f) 6/7/8/12)	SA-350LF2CL1				
7	△	1	FLG 26 1/2"	O.D.X 21" I.D.X 4 5/16" THK (f) 6/7/8/12)	SA-350LF2CL1				
	△								
	△			TUBESHEETS & COVERS					
19	△	1	TUBESHEET 23 1/2"	O.D.X 2" THK (f) 13/14)	SA-240S31803				
	△				/S32205				
1	△	1	COVER	26 1/2" O.D.X 2 1/4" THK (f) 7/8/12/15)	SA-516-70N				
				BAFFLES					
22	△	14	BAFFLES	PER DWG. -8 & -8A	SA-240-316/316L				
22A	△	1	SUPT PL.	PER DWG. -8A	SA-240-316/316L				
	△			HEADS					
18	△	1	ELLIP HD. 21"	I.D.X 3/8" THK(min) W/2" SF 8/12)	SA-516-70N				
	△			CYLINDERS					
9	△	1	R&W CYL 21"	I.D.X 1/2" THK X 14'-0 9/16" LG.					
	△			1-CYL 8'-0" 1-CYL 6'-0 9/16" LG. 8/12)	SA-516-70N				
4	△	1	R&W CYL 21"	I.D.X 1/2" THK X 23 3/8" LG. 8/12)	SA-516-70N				
	△								
	△			NOZZLE SHIPPING CVR MAT'L (REMOVE BEFORE INSTALLING)					
180	△	2	ASME 4"	- 300 # RF BLIND FLANGES	SA-105				
181	△	16	STUDS: 3/4"	DIA. (10-THD.) X 5 1/2" LG. (4"-300# RF)	SA-193-B7				
182	△	32	NUTS: 3/4"	(10-THD.) Hvy. HEX (4"-300# RF)	SA-194-2H				
183	△	2	GASKETS: 0.175"	THK 304 SS SPIRAL WOUND GRAPHITE					
	△			FILLED, STYLE "CG", C-STL. COMP. RING (4"-300# RF)					
184	△	32	3/4"	NARROW SERIES WASHERS	F-436-1				
185	△	1	PL. 15"	O.D. X 3/8" THK. W/(12) 9/16" DIA. HOLES	C.-STL.				
	△			EQUALLY SPACED ON 13" B.C. (8"-300#)					
186	△	1	GASKETS: 0.175"	THK. 304 S.S. SPIRAL WOUND GRAPHITE					
	△			FILLED, STYLE "CG", C-STL. COMP RING FOR (8"-300# RF)					
187	△	12	1/2"	HEX HD. ALL THD. BOLTS X 3 1/2" LG. W/(1) HEX NUT	C.-STL.				
	△			AND (2) FLAT WASHERS EACH (8"-300# RF)					
188	△	1	PL. 17 1/2"	O.D. X 3/8" THK. W/(16) 9/16" DIA. HOLES	C.-STL.				
	△			EQUALLY SPACED ON 15 1/4" B.C. (10"-300#)					
189	△	1	GASKETS: 0.175"	THK. 304 S.S. SPIRAL WOUND GRAPHITE					
	△			FILLED, STYLE "CG", C-STL. COMP RING FOR (10"-300# RF)					
190	△	16	1/2"	HEX HD. ALL THD. BOLTS X 4" LG. W/(1) HEX NUT	C.-STL.				
	△			AND (2) FLAT WASHERS EACH (10"-300# RF)					
	△			NITROGEN PURGE MATERIAL					
108	△	2	1/4"	NPT GAGE W/ -30 TO 30 PSI (MINIMUM) DIAL	C.-STL.				
109	△	2	1/4"	X 1" NPT BUSHING	C.-STL.				
110	△	2	1"	- 3000 # SCREWED TEE	SA-234-WPB				
111	△	4	1"	NPT PIPE NIPPLE 0.179" (SCH. 80) X 2" LG. (TOE)	SA-106-B				
112	△	4	1"	NPT PIPE NIPPLE 0.179" (SCH. 80) X 1 1/2" LG. (TBE)	SA-106-B				
113	△	4	1"	- 50 # (MAX.) THD. BALL VALVE	C-STL.				
114	△	4	1"	- 3000 # HEX HEAD PLUG	C-STL.				
115	△	2	1"	3M FS THRD 90 ELL	SA-105				
	△			SEE DWG. -17 FOR BILL OF MATERIAL NOTES					
	△			SEE DWG. -17 FOR BILL OF MATERIAL NOTES					

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: PROPANE RECOVERY COMPRESSOR

INTERSTAGE COOLER

LOCATION: WORLD ENERGY, PARAMOUNT, CA, USA
PRODUCT: PROPANE RECOVERY COMPRESSOR

INTERSTAGE COOLER

ITEM NO.: 18-X-3708

AIR PRODUCTS P.O. NO.: 4505600058 /

ASKM-4-402-PO-3

AP PROJECT NO: EN-20-7120

VDR CODE NO.: FA01

SERIAL NO.: S21-13258-7

ENGINEER: EG

CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

BILL OF MATERIAL

Fabsco
SHELL & TUBE, LLC

DWN. BY

B.W.

DATE

5/9/22

CKD. BY

DiCarlo

DWG.ND. S21-13258-7-14

REV. 3

MK.NO.	QUAN.	DESCRIPTION				MATERIAL	NOZ MK.	SUPPLIER	P.O. NO.	DUE
△		ANSI FLANGES								
71	1	ASME 10" - 300 #	RF WN	W/ (SchXH BORE)	5)8)12)	SA-350LF2CL1	S1			
72	1	ASME 8" - 300 #	RF WN	W/ (SchXH BORE)	5)8)12)	SA-350LF2CL1	S2			
81	1	ASME 4" - 300 #	RF WN	W/ (Schstd BORE)	5)8)12)	SA-350LF2CL1	T1			
82	1	ASME 4" - 300 #	RF WN	W/ (Schstd BORE)	5)8)12)	SA-350LF2CL1	T2			
73	2	ASME 2" - 300 #	RF LWN	X 9" LG(2.000"BORE)	5)8)12)	SA-350LF2CL1	A3			
74	2	ASME 2" - 300 #	RF LWN	X 9" LG(2.000"BORE)	5)8)12)	SA-350LF2CL1	A4			
83	1	ASME 2" - 300 #	RF LWN	X 11" LG(2.000"BORE)	5)8)12)	SA-350LF2CL1	D			
84	1	ASME 2" - 300 #	RF LWN	X 11" LG(2.000"BORE)	5)8)12)	SA-350LF2CL1	V			
85	1	ASME 2" - 300 #	RF LWN	X 9" LG(2.000"BORE)	5)8)12)	SA-350LF2CL1	A1			
86	1	ASME 2" - 300 #	RF LWN	X 9" LG(2.000"BORE)	5)8)12)	SA-350LF2CL1	A2			
73C	2	ASME 2" - 300 #	RF BLIND FLG.		5)8)12)	SA-350LF2CL1	A3			
74C	2	ASME 2" - 300 #	RF BLIND FLG.		5)8)12)	SA-350LF2CL1	A4			
83C	1	ASME 2" - 300 #	RF BLIND FLG.		5)8)12)	SA-350LF2CL1	D			
84C	1	ASME 2" - 300 #	RF BLIND FLG.		5)8)12)	SA-350LF2CL1	V			
85C	1	ASME 2" - 300 #	RF BLIND FLG.		5)8)12)	SA-350LF2CL1	A1			
86C	1	ASME 2" - 300 #	RF BLIND FLG.		5)8)12)	SA-350LF2CL1	A2			
71A	1	SMLS,PIPE 10" X(0.5000" SchXH)	X 11" LG.	8)12)		SA-106-B	S1			
72A	1	SMLS,PIPE 8" X(0.5000" SchXH)	X 10 1/2" LG.	8)12)		SA-106-B	S2			
81A	1	SMLS,PIPE 4" X(0.237" Schstd)	X 1'-0" LG.	8)12)		SA-106-B	T1			
82A	1	SMLS,PIPE 4" X(0.237" Schstd)	X 1'-0" LG.	8)12)		SA-106-B	T2			
71B	3	WELD PAD 19 3/4" OD X 19"	OD X 12" ID X				S1			
△		11 1/4" ID X 3/8" THK.		ROLL TO 11" IR	8)12)	SA-516-70N				
72B	1	WELD PAD 13 3/16" OD X 12 3/4"	OD X 9 9/16" ID X				S2			
△		9 1/8" ID X 3/8" THK.		ROLL TO 11" IR	8)12)	SA-516-70N				
81B	1	WELD PAD 9 1/8" OD X 8 3/4"	OD X 5 3/8" ID X				T1			
△		5" ID X 3/8" THK.		ROLL TO 11" IR	8)12)	SA-516-70N				
82B	1	WELD PAD 9 1/8" OD X 8 3/4"	OD X 5 3/8" ID X				T2			
△		5" ID X 3/8" THK.		ROLL TO 11" IR	8)12)	SA-516-70N				
△										
△										
△										
△										
40	1	LOT OF GASKETS PER DWG. -11								
41	44	3/4" ROUND X 10-THREAD STUDS	X 9 1/4" LG.	1&2	12)	SA-193-B7				
42	44	3/4" ROUND X 10-THREAD STUDS	X 11 3/4" LG.	3&7	12)	SA-193-B7				
43	352	3/4" HEAVY HEX NUTS 10-THREAD			12)	SA-194-2H				
43	176	3/4" NARROW SERIES WASHERS				F-436-1				
△										
△										
△		SPARE STUDS & NUTS (TO SHIP LOOSE W/EXCH.)								
141	2	5 3/4" DIA. (10-THD.) STUDS	X 9 1/4" LG.	1&2	12)	SA-193-B7				
142	2	5 3/4" DIA. (10-THD.) STUDS	X 11 3/4" LG.	3&7	12)	SA-193-B7				
143	1	35 3/4" Hvy HEX NUTS (8-THD.)			12)	SA-194-2H				
144	2	18 3/4" NARROW SERIES WASHERS				F-436-1				
△										
△										
△										
△		FOR BILL OF MATERIAL NOTES, SEE DWG. -17								
△										
△										
△										
△										

PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: PROPANE RECOVERY COMPRESSOR

LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR
INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058 / 48KM-4-402-PO-3

AP PROJECT NO: EN-20-7120
VDR CODE NO.: FA01
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

BILL OF MATERIAL

DWN. BY
B.W.

DATE
5/9/22

CKD. BY
DiCarlo

REV.
3

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					
△		KINGDOM, UNITED STATES OF AMERICA & UKRAINE. (TUBES)					
△		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, & H.T.					
△		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, TUBING, PIPE,					
△		BOLTING, SHALL BE KILLED EXCEPT FOR BAFFLES AND					
△		"MISC. MATERIAL" HEADING.					
△		13) DUPLEX STAINLESS STEEL REQUIREMENTS ARE AS FOLLOWS:					
△		A) TUBE REQUIREMENTS ARE ON BEND SCH. DWG. -6					
△		B) FOR ALL MAT'L, THE NITROGEN CONTENT SHALL BE 0.14%-0.20%					
△		C) MATERIALS, EXCEPT FOR TUBING, SHALL BE FURNISHED FULLY					
△		ANNEALED, WATER-QUENCHED, AND PICKLED.					
△		D) ASTM A923 TESTING TO BE AS FOLLOW:					
△		D.1) SUPPLIERS CAN PROPOSE TO USE SIMILAR TESTING					
△		IN ACC. W/ ISO 17781 FOR BUYERS APPROVAL.					
△		D.2) FOR ALL PRODUCT FORMS, EXCEPT TUBING, EACH LOT OF					
△		DUPLEX STM. STL. MATERIAL SHALL BE IMPACT TESTED IN					
△		ACC. W/ TEST METHOD B OF ASTM A923.					
△		THE RAPID SCREENING TEST INCLUDED IN ASTM A923 SHALL					
△		NOT BE USED TO ACCEPT MATERIAL.					
△		D.3) THE TEST METHOD B CRITERIA SHALL BE >54 J (>40FT/LB)					
△		(3-SPECIMENS) AT -40deg C (-40degF) OR A LOW TEMPERATURE.					
△		LATERAL EXPANSION MEASUREMENTS SHALL BE REPORTED FOR					
△		INFORMATION AND IF APPLICABLE, TO MEET CODE REQUIREMENTS.					
△		FOR TEST METHOD C, THE CRTIREA GIVEN IN ASTM A923 SHALL BE MET.					
△		14) TO BE IMPACT TESTED @ -40°F. PER UHA-51.					
△		15) TO BE U.T. PER SA-435, SUPPL. REQ'T S1.					

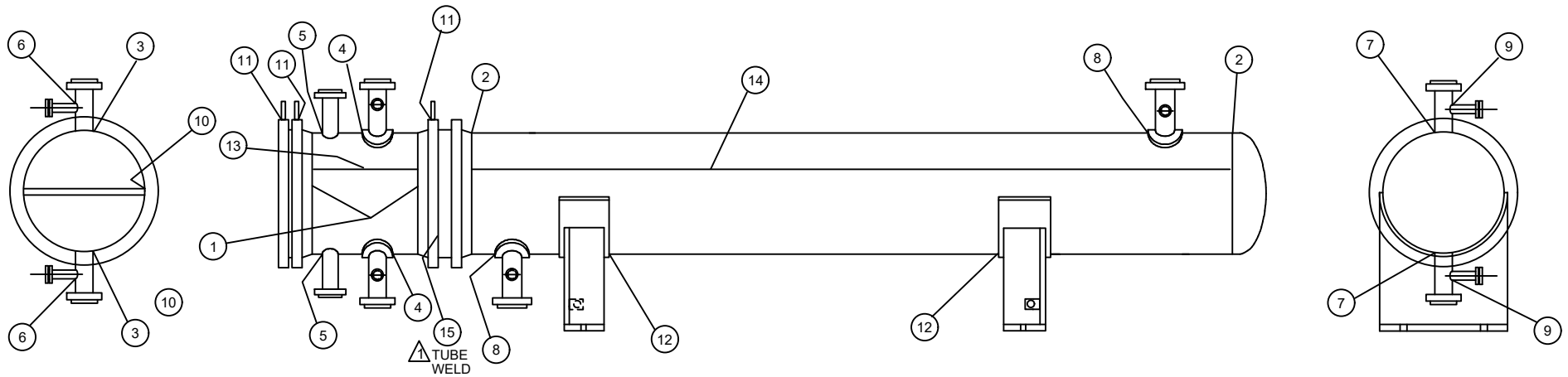
PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
LOCATION: WORLD ENERGY, PARAMOUNT, CA USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058/
ABKM-4-402-P0-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

REV. 0
DWG.ND. S21-13258-7-17
DiCarlo

		BILL OF MATERIAL NOTES			
		DWN. BY		Fabsc SHELL & TUBE, LLC	
		DC			
		DATE		5/9/22	
		CKD. BY		DVG.NO.	
		DiCarlo		S21-13258-7-17	
		REV.		0	

Fabsc

SHELL & TUBE, LLC

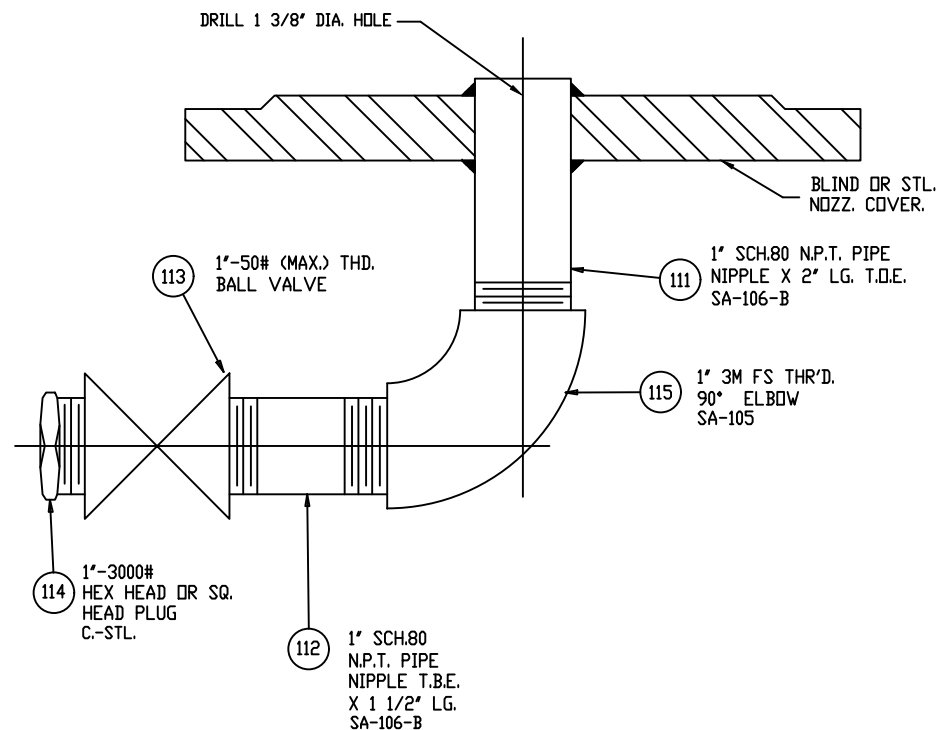
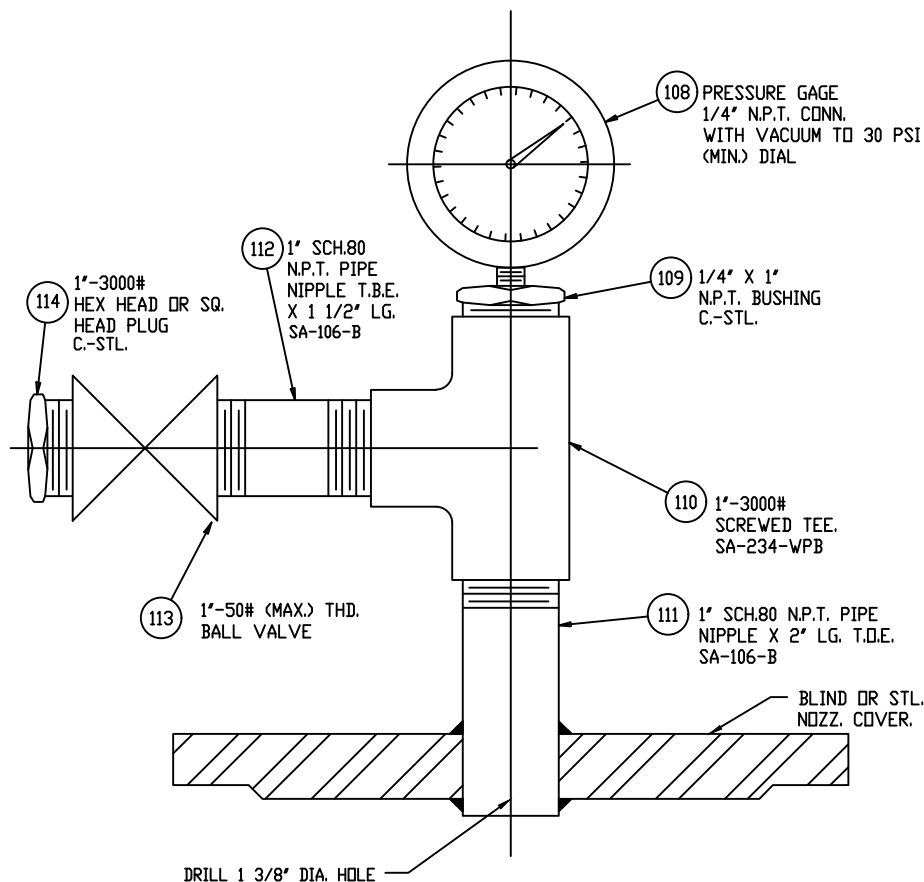


	X-RAY	U.T.	M.T.	P.T.	W.F.M.T.	BRINELL	MK.
CHANNEL CIRCULAR SEAM	X		X	X	X	X	(1)
SHELL CIRCULAR SEAM	X		X	X	X	X	(2)
CHANNEL NOZZLE TO PIPE	X	X	X	X	X	X	(3)
CHANNEL WELD PAD TO PIPE	X	X	X	X	X	X	(4)
CHANNEL V & D TO PIPE		X	X	X	X	X	(5)
CHANNEL AUX. TO PIPE		X	X	X	X	X	(6)
SHELL NOZZLE TO PIPE	X	X	X	X	X	X	(7)
SHELL WELD PAD TO PIPE		X	X	X	X	X	(8)
SHELL AUX. TO PIPE			X	X	X	X	(9)
PASS PLATE TO CYLINDER		X	X	X	X	X	(10)
LIFT LUG WELDS			X	X			(11)
SUPPORT PAD TO CYLINDER			X	X	X	X	(12)
CHANNEL LONG SEAM	X		X	X	X	X	(13)
SHELL LONG SEAM	X		X	X	X	X	(14)
TEMPORARY ATTACHMENT LOCATIONS			X	X			
TUBE SEAL WELD				X			(15)



PROJECT NAME: WORLD ENERGY RENEWABLES PROJECT
 EQUIPMENT OWNER: AIR PRODUCTS MANUFACTURING LLC
 SERVICE: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
 LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
 PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
 ITEM NO.: 18-X-370B
 AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
 AP PROJECT NO: EN-20-7120
 VDR CODE NO.: QD07
 SERIAL NO.: S21-13258-7
 ENGINEER: EG
 CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

			NDE MAP		
			DWN. BY	Fabsco	
			B.W.		
			DATE	SHELL & TUBE, LLC	
			5/4/22		
			CKD. BY	DWG. No.	REV.
			DiCARLO	S21-13258-7-19	1
NO.	DATE	REVISIONS			
△	7/14/22	REV. PER CUST. B.W./DD			



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 NOZZ. 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
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LOCATION: WORLD ENERGY, PARAMOUNT, CA. USA
PRODUCT: PROPANE RECOVERY COMPRESSOR INTERSTAGE COOLER
ITEM NO.: 18-X-370B
AIR PRODUCTS P.O. NO.: 4505600058 / A8KM-4-402-PO-3
AP PROJECT NO: EN-20-7120
VDR CODE NO.: BE04
SERIAL NO.: S21-13258-7
ENGINEER: EG
CUSTOMER / CLIENT: WORLD ENERGY PARAMOUNT

PRESSURE GAGE & VALVE DETAIL FOR NITROGEN PURGE			Fabsco SHELL & TUBE, LLC	
			DWN. BY DD	
			DATE 1/16/23	
			CKD. BY DG	
			DWG.NO. S21-13258-7-20	
			REV. 1	
NO.	DATE	REVISIONS		
1	1/16/23	ADDED DETAIL/CUST. DD/DG		