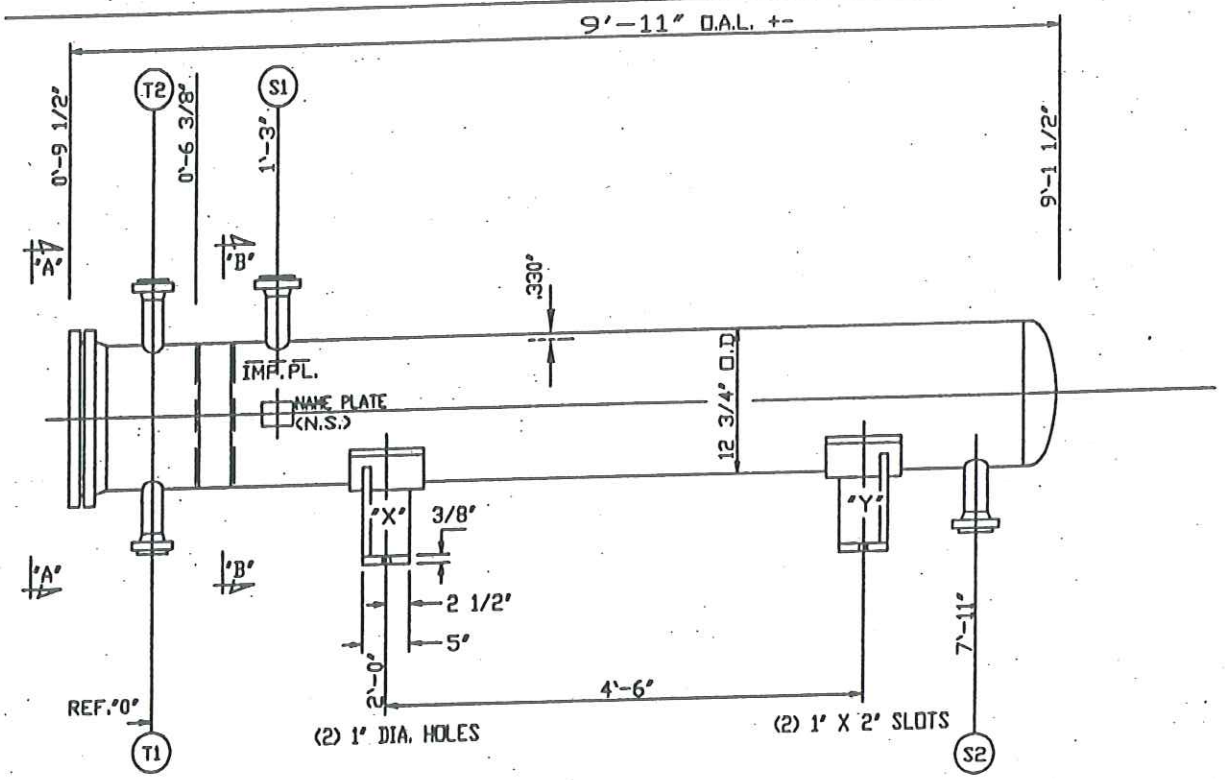
FABSCO

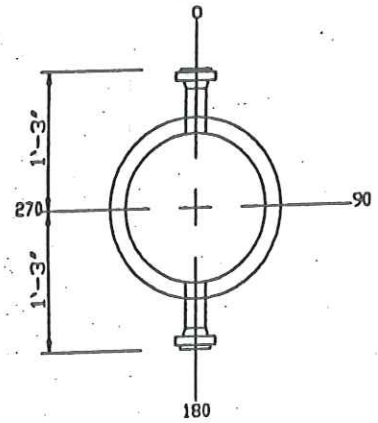
CERTIFIED FINAL

By Ron Shipman

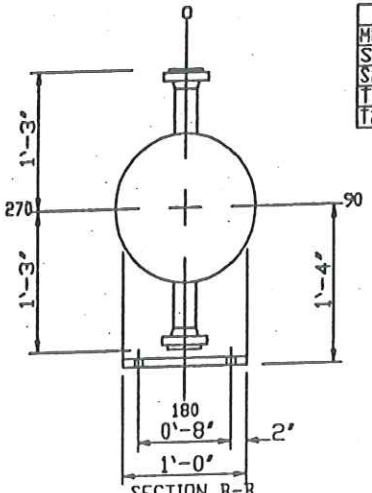
Date 5-29-97

107508





VIEW A-A



SECTION B-B

NOZZLE SCHEDULE				
MK	QT	DESCRIPTION		PROCESS
S1	1	6"	- 150#RF WN	INLET
S2	1	6"	- 150#RF WN	OUTLET
T1	1	4"	- 150#RF WN	INLET
T2	1	4"	- 150#RF WN	OUTLET

DESIGN DATA	SHELL	TUBE
DESIGN PRESSURE P.S.I.G.	75	75
TEST PRESSURE P.S.I.G.	113	113
DESIGN TEMPERATURE / MDMT Deg.F.	750/ 40	170/ 40
CORROSION ALLOWANCE	.0625"	.0625"
NUMBER OF PASSES	1	2
RADIOGRAPHIC EXAMINATION	SPOT	SPOT
HEAT TREAT REQUIRED	NO	NO

ESTIMATED WEIGHTS, LBS.

DRY: 1400 WET: 1800

SPECIFICATIONS

Δ ASME CODE SECT. VIII DIV.1, 1995 EDD. W/ 1996 ADD. (STAMP YES)
TEMA CLASS C
NATIONAL BOARD REGISTRATION REQUIRED
DESIGN REVIEWED FOR COMPLIANCE W/UG-120
IMPACT EXEMPT PER UG-20(f) & UCS-66

MATERIAL

CHANNEL: SA-106-B
SHELL: SA-106-B
TUBESHEETS: SA-516-70
BAFFLES: SA36orEQUAL
TUBES: SA-214
(34,)3/4" O.D.X.075" X 8'-0" LG.
TUBE PITCH 15/16" Δ SURFACE 107. SQ.FT.

GENERAL NOTES

ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.

NOZZLE FLG. R.F. FINISH SHALL BE 125-250 AARH.

GASKETS: .1250" THK. AID/NAF
1 SET OF SPARE GASKETS REQUIRED.
PAINT: SANDBLAST & 1 COAT SHOP PRIMER

CUST: HOWE-BAKER ENGINEERS, INC.

P.O. NO.: 140-1617-00-003
Δ ITEM NO.: E-115, J-1617
SERVICE: NATURAL GAS COOLER (LTS REDUCTION)
SHIP TO:

NO.	DATE	REVISIONS
Δ	5/27	REV ITEM NO. EMG/
Δ	5-20	REV. PER FABSCO -ED C./ RR

ASSEMBLY AND SPECIFICATIONS FOR
ONE 12- 96 NEU

DWN. BY AT
DATE 4/15/97
CKD. BY

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-1
REV. 2

SPECIAL CONTRACT REQUIRMENTS

1) 'DELETED' ⚠1

2) PLUG SHELL WITH (2) TWO TEMPLATES 18" APART AND SAME DIAMETER AS BAFFLES.
3) ALL GIRTH FLANGES, TUBESHEETS, FLAT COVERS, AND FLOATING HEAD COVERS SHALL BE MATCH MARKED TO PREVENT MISASSEMBLY IN THE FIELD.
4) AIR & SOAP TEST OMIN. 15 PSIG) WELD PADS & SUPPORT PADS.
5) SEAL WELD ALL SUPPORT & SUPPORT PADS TO SHELL.
6) ALL THREADS TO BE COATED W/ ANTI-SEIZE WHEN ASSEMBLING.
7) MAX. 225 BRINELL HARDNESS ON ALL P-1 MATERIAL WELDING.
8) CUST. INSP. TO BE NOTIFIED (2) WKS PRIOR TO START OF FAB. & FINAL INSP.

STANDARD SHOP PRACTICES

1) ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.
2) GRIND INSIDE WELDS FLUSH WITH SHELL.
3) GRIND INSIDE WELDS SMOOTH WITH CHANNELS.
4) MATCH MARK ALL COMPONENTS FOR PROPER FIT UP.
5) INSTALL SHIPPING COVERS ON ALL NOZZLES FOR SHIPMENT.

SPECIAL TEST REQUIRMENTS

1) MIN. 70 DEG. HYDRO TEST WATER
2) HYDRO TEST PRESSURE TO BE HELD FOR AT LEAST ONE HOUR.
⚠1 3) HYDRO-TEST CERT'S REQ'D.
4) HEAT TREAT CHART REQ'D.

⚠2 P.O. NO. 140-1617-00-003
⚠2 ITEM NO. E-115, J-1617

NO.	DATE	REVISIONS
⚠2	5/27	REV. ITEM NO. EMG/RR
⚠1	5-20	REV. PER FABSCO -ED C./ RR

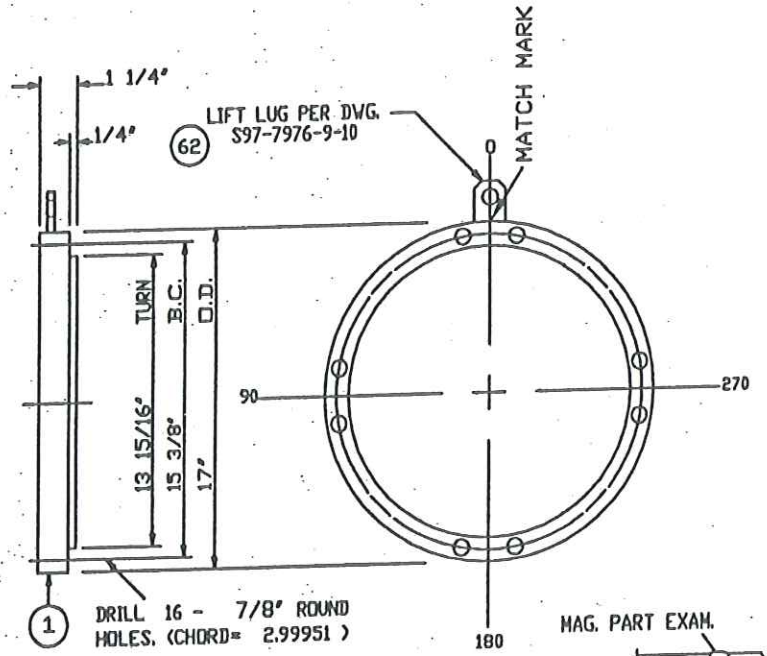
JOB NOTES

DWN. BY EMG
DATE 4/17/97
CKD. BY

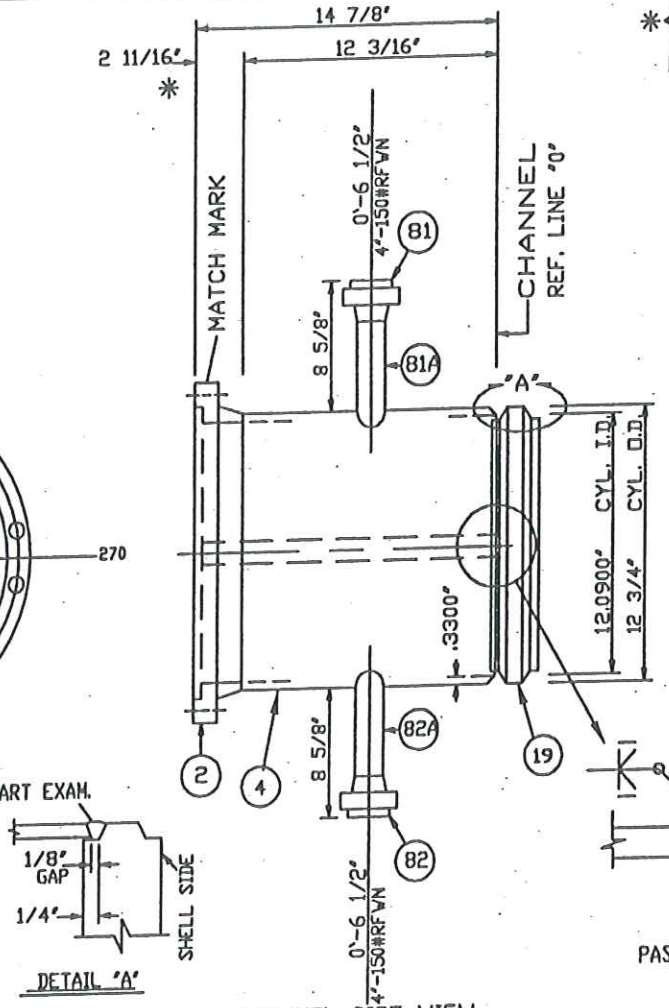
FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-1A
REV. 2

COVER NOTES:
1) MACHINE ALL COVER SURFACES TO 250 RMS UNLESS NOTED OTHERVISE.

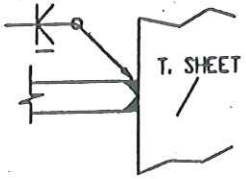


CHANNEL-COVER DETAIL



CHANNEL SIDE VIEW

DETAIL "A"



PASS R. DETAIL

* MACHINE GASKET FACING AFTER ALL WELDING.
FOR FLANGE DETAILS SEE DWG. S97-7976-9-12

P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J1617

CHANNEL END VIEW

NOTES:
1) ALL WELDING TO BE IN ACCORDANCE W/ PROCEDURES A102, M102, M189.
2) ALL BOLT HOLES TO STRADDLE CENTER LINES.
3) SEE DWG. S97-7976-9-13 FOR WELD & BEVEL DETAILS.
4) GRIND ALL INSIDE WELDS SMOOTH.
5) SPOT RADIOGRAPHY.
6) SEE DWG S97-7976-9-1A FOR JOB NOTES.

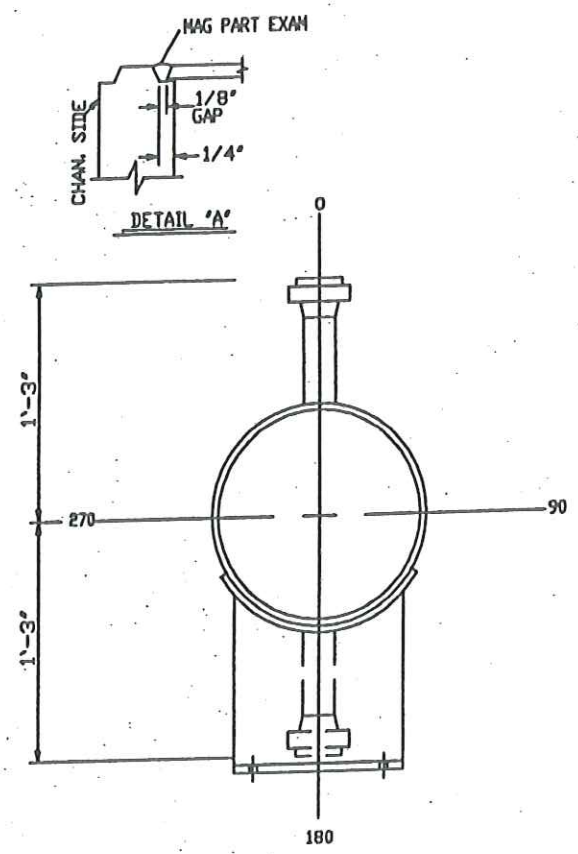
NO.	DATE	REVISIONS
1	5/27	REV. ITEM NO. EMG/

FRONT CHANNEL DETAILS

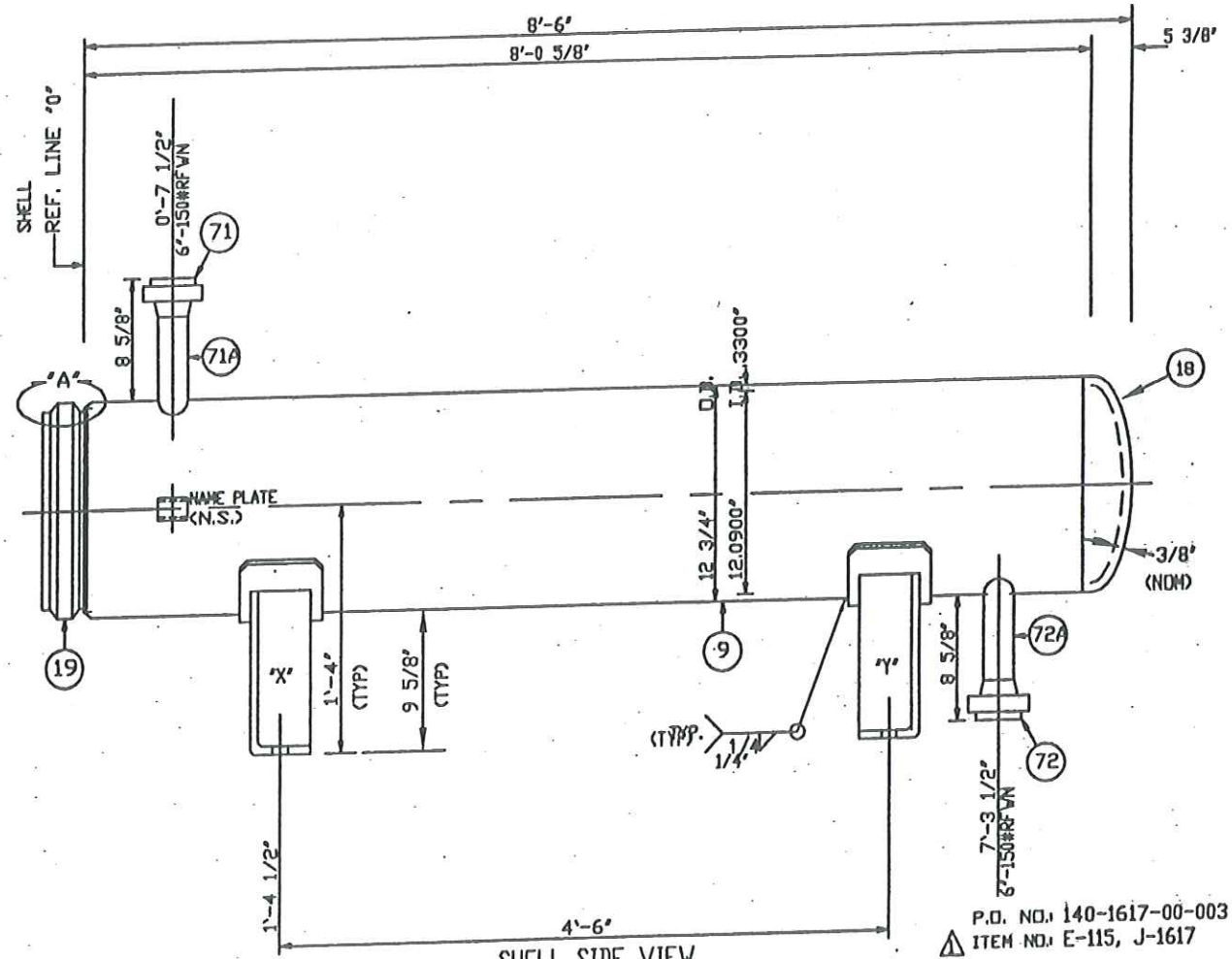
DWN. BY AT
DATE 4/17/97
CKD. BY

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-2
REV. 1



SHELL END VIEW



SHELL SIDE VIEW

P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J-1617

NOTES:
1) ALL WELDING TO BE IN ACCORDANCE W/ PROCEDURES A102, M102, M189, F130.
2) ALL BOLT HOLES TO STRADDLE CENTER LINES.
3) SEE DWG. S97-7976-9-13 FOR WELD & BEVEL DETAILS.
4) GRIND ALL INSIDE WELDS FLUSH.
5) SPOT RADIOGRAPHY.
6) SEE DWG S97-7976-9-1A FOR JOB NOTES.
7) SEE DWG S97-7976-9-9 FOR SUPPORT DETAILS.

NO.	DATE	REVISIONS
1	5/27	REV. ITEM NO. EMG/

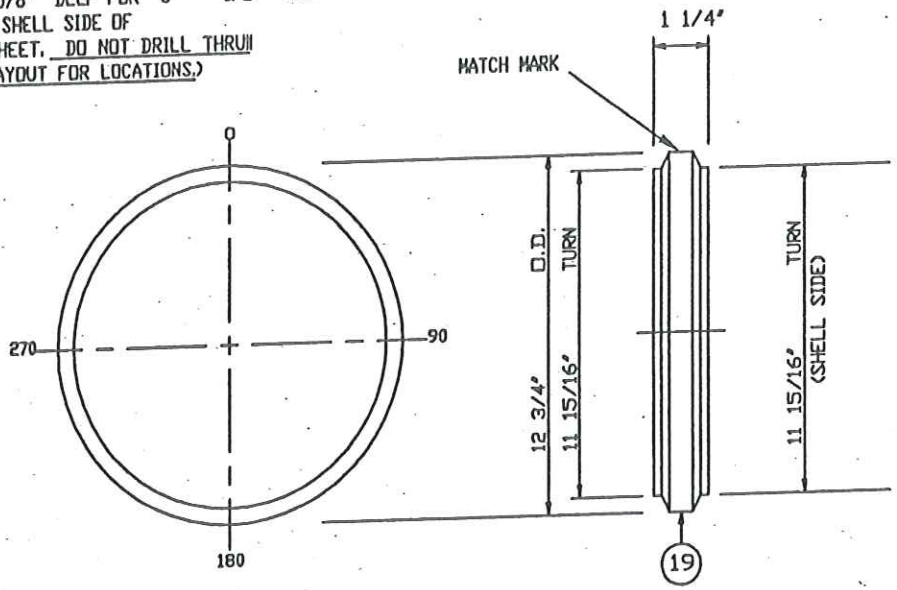
SHELL DETAILS

DWN. BY EMG
DATE 4/17/97
CKD. BY

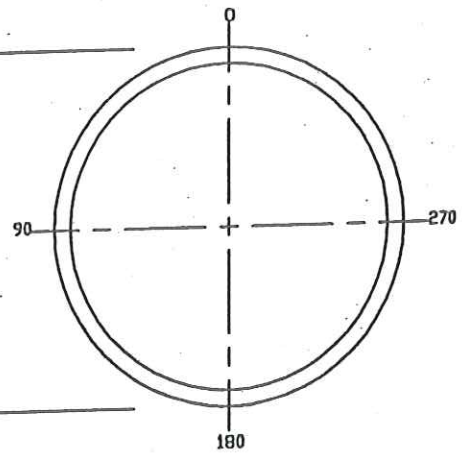
FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-3
REV. 1

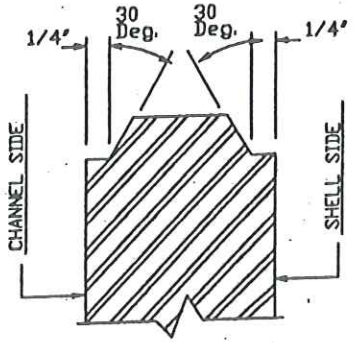
DRILL & TAP 5/8" DEEP FOR 6 - 1/2" DIA.
TIE RODS ON SHELL SIDE OF
19 TUBESHEET. DO NOT DRILL THRU!!
(SEE TUBE LAYOUT FOR LOCATIONS.)



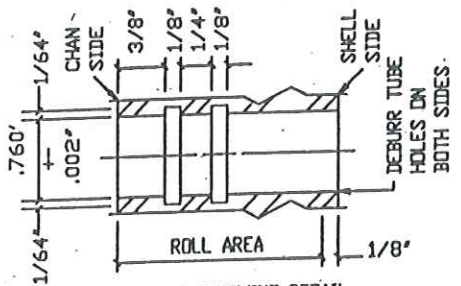
CHANNEL SIDE TUBESHEET



SHELL SIDE TUBESHEET



TUBESHEET DETAIL



TUBE HOLE GROOVING DETAIL

NOTES:
1) MACHINE ALL SURFACES TO 250 RMS

P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J-1617

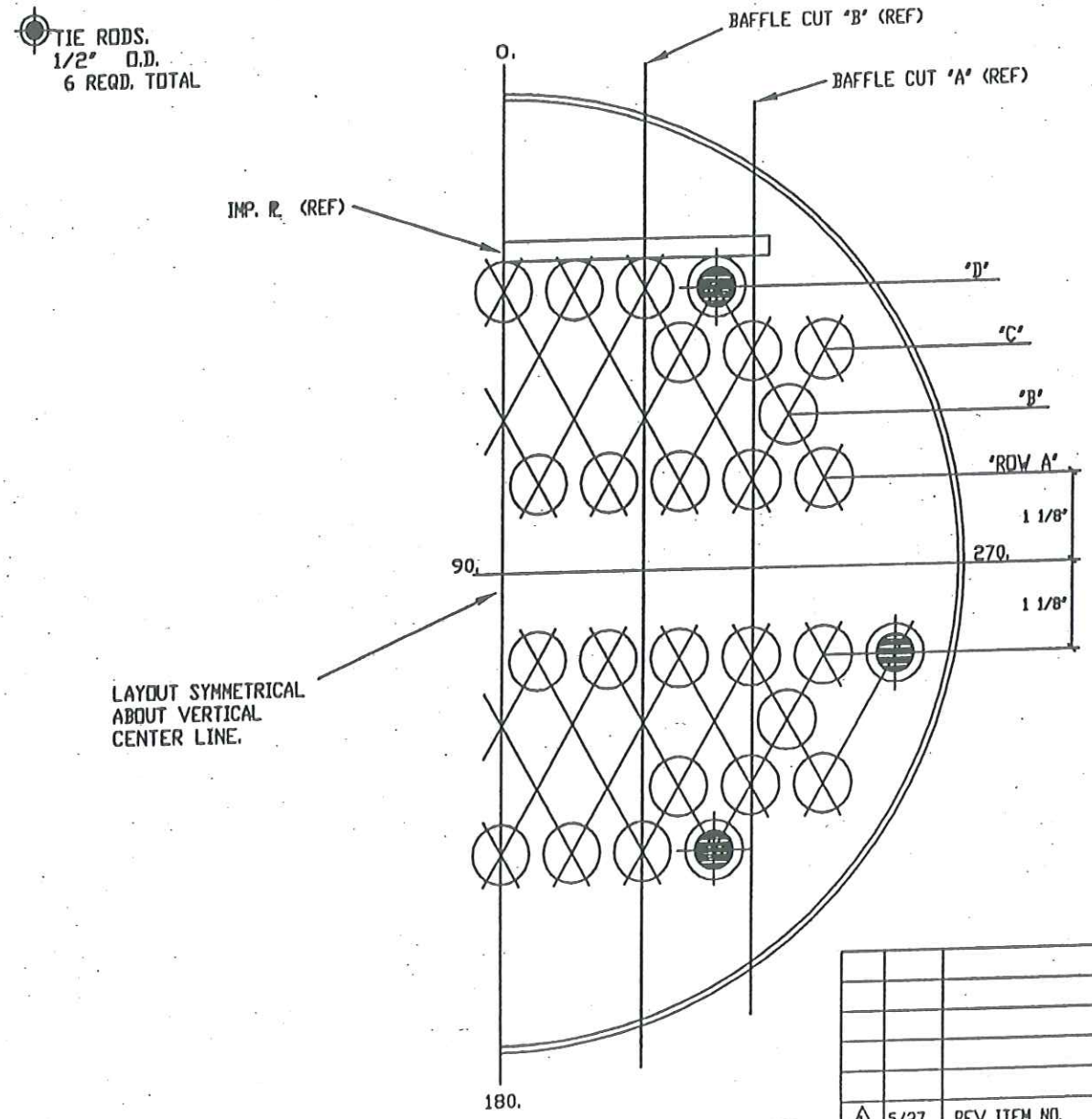
NO.	DATE	REVISIONS
1	5/27	REV ITEM NO. EMG/

TUBESHEET DETAILS

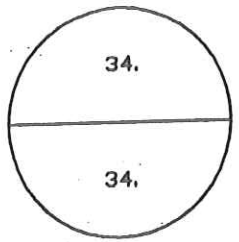
DWN. BY: EMG
DATE: 4/17/97
CKD. BY:

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-4
REV. 1



VIEW LOOKING AT SHELL SIDE OF NO. 19 TUBESHEET



TUBE DISTRIBUTION

NOTES:

1) DRILL AND REAM TUBE HOLES IN TUBESHEETS TO .7600" +- .002" DIA. FOR 34 - 3/4" O.D. U-TUBES. TOTAL HOLES = 68
2) TUBE PITCH = 15/16" TRIANGLE.
3) NUMBER OF PASSES = 2
4) SEE DRAWING S97-7976-9-4 FOR TUBE GROOVING DETAILS.
5) BAFFLE O.D. = 11 15/16"
6) O.T.L. = 10 3/8"
7) SHELL I.D. = 12.09"

P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J-1617

NO.	DATE	REVISIONS
1	5/27	REV ITEM NO. EMG

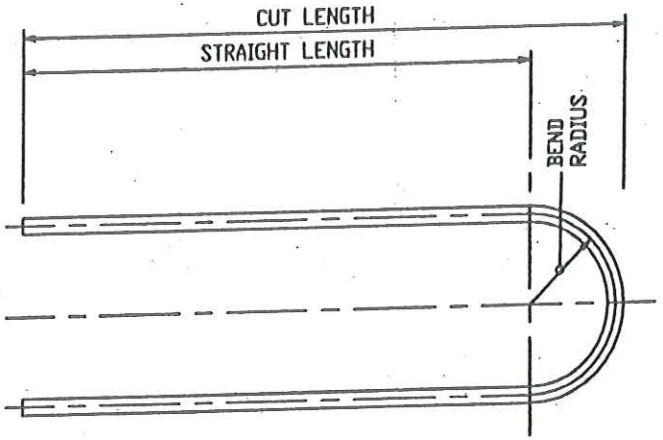
TUBE LAYOUT

DWN. BY EMG
DATE 4/17/97
CKD. BY RR

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-5
REV. 1

ROW	NO. OF TUBES	BEND RADIUS	BEND DIAMETER	BEND LENGTH	STRAIGHT LENGTH	CUT LENGTH	DEVELOPED LENGTH
A	10.	1 1/8"	2 1/4"	0'-3 9/16"	8'-0"	8'-1 1/2"	16'-3 9/16"
B	9.	1 15/16"	3 7/8"	0'-6 1/8"	8'-0"	8'-2 5/16"	16'-6 1/8"
C	10.	2 3/4"	5 1/2"	0'-8 11/16"	8'-0"	8'-3 1/8"	16'-8 11/16"
D	5.	3 9/16"	7 1/8"	0'-11 1/4"	8'-0"	8'-3 15/16"	16'-11 1/4"



TOTAL NO. REQUIRED: 34.
SIZE: 3/4" O.D. X .075" MW
MATERIAL: SA-214

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

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

P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J-1617

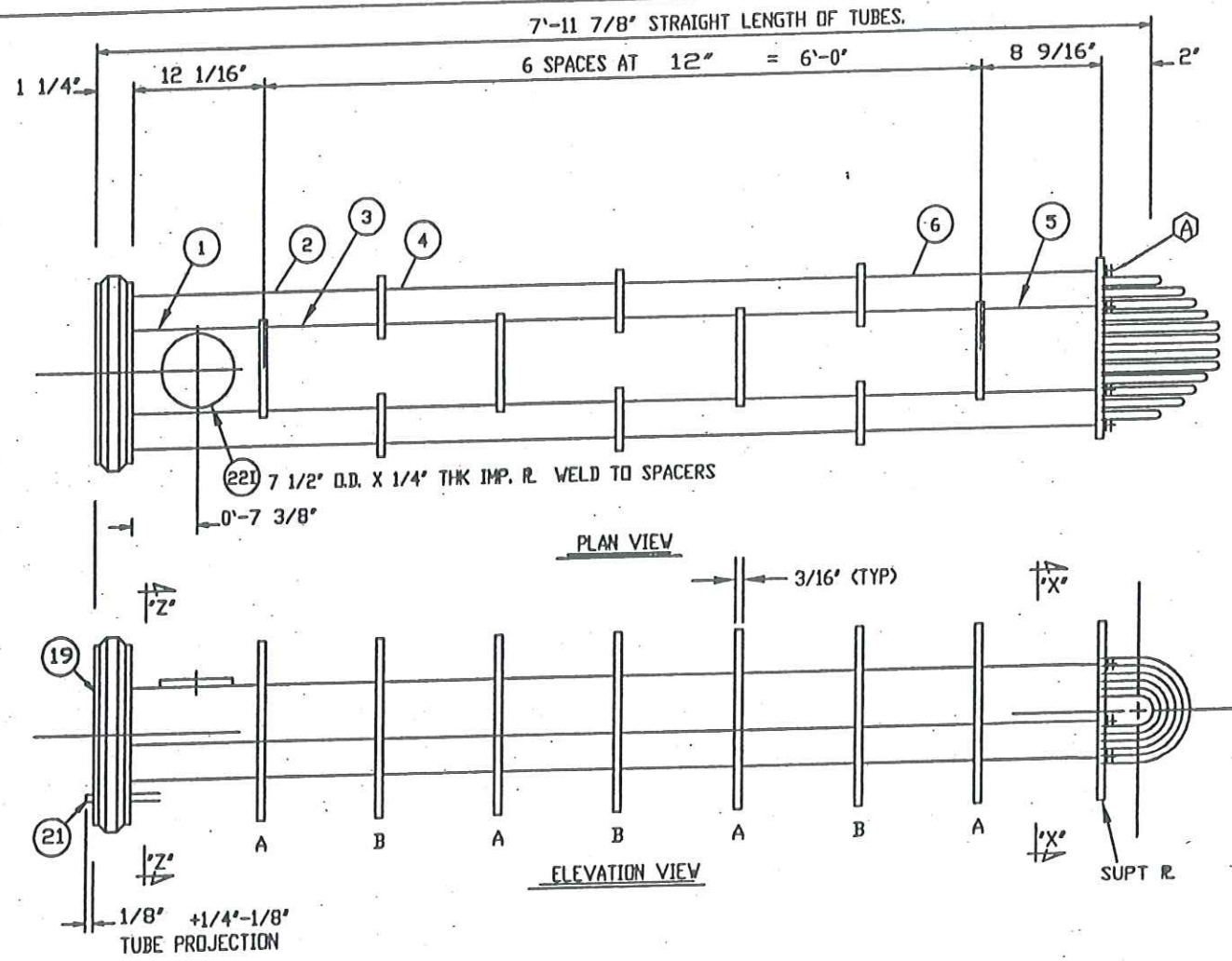
NO.	DATE	REVISIONS
1	5/27	REV ITEM NO EMG

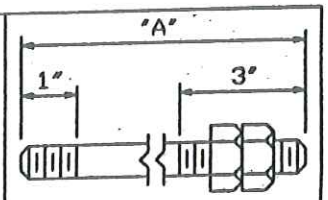
TUBE BENDING SCHEDULE

DWN. BY AT
DATE 4/15/97
CKD. BY RR

FABSCO, INC.
SAPULPA, OKLAHOMA

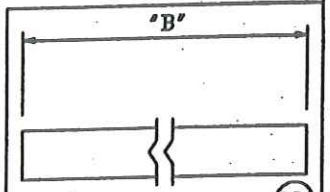
DWG.NO. S97-7976-9-6
REV. 1





1/2" O.D. TIE RODS (23)

	REQ'D.	"A"
A	6.	7'-10 7/8"
B		
C		
D		



3/4" O.D. SPACER TUBING

	REQ'D.	"B"
1	4.	12"
2	2.	23 15/16"
3	24.	11 13/16"
4	4.	23 13/16"
5	4.	8 3/8"
6	2.	20 3/8"
7		

P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J-1617

NOTES:
1) SEE DWG. NO. 8 FOR SECTION AND VIEW DETAILS.

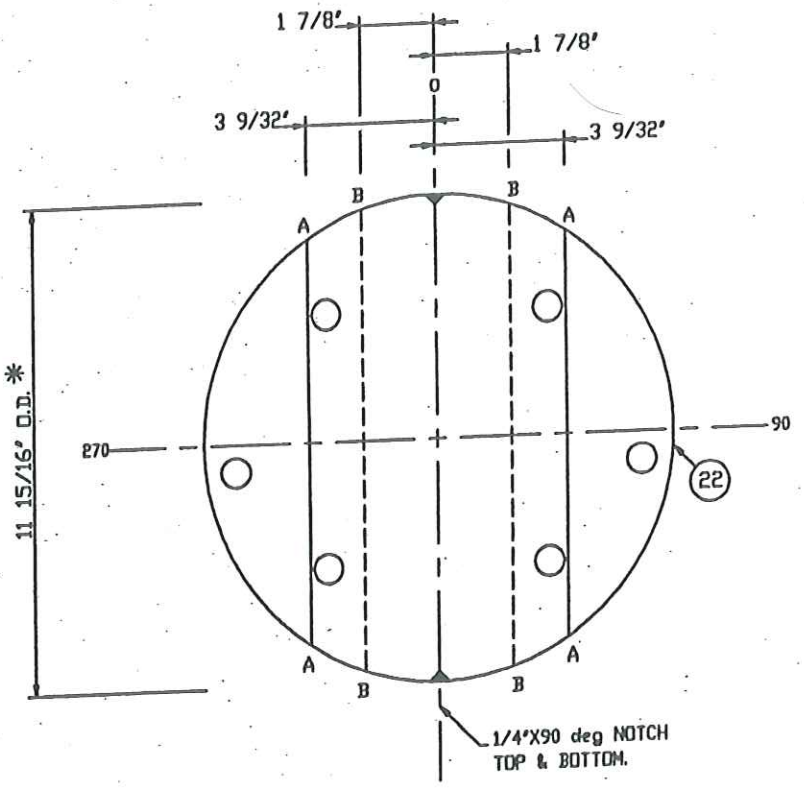
NO.	DATE	REVISIONS
1	5/27	REV ITEM NO EMG/

BUNDLE DETAILS

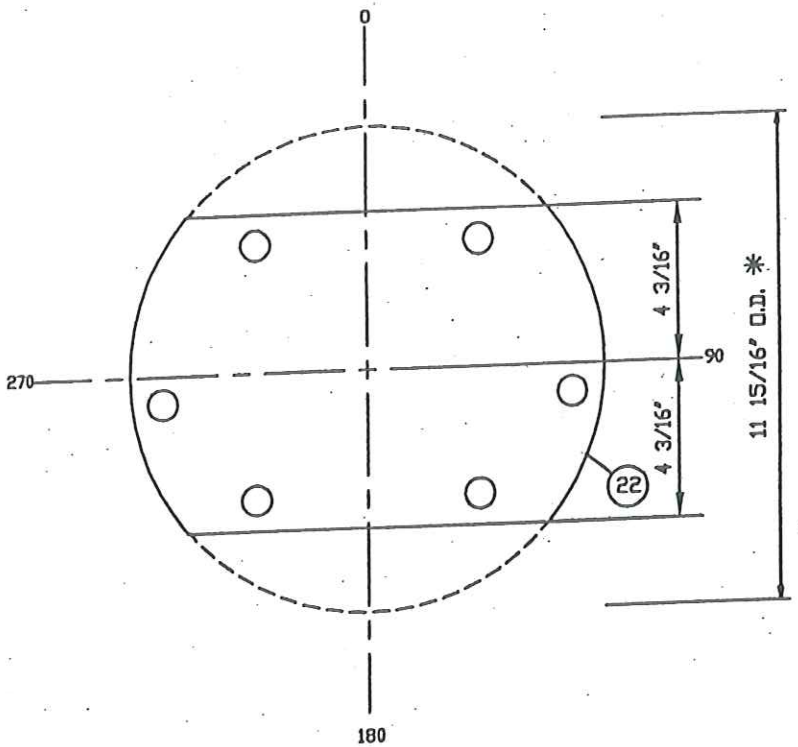
DWN. BY DCM
DATE 4-18-97
CKD. BY

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DWG.NO. S97-7976-9-7
REV. 1



VIEW ZZ OF BAFFLES
3/16 THK.
4, -REQ'D. CUT AAAA
3, -REQ'D. CUT BBBB



VIEW XX OF BAFFLES
3/16" THK.
1 -REQ'D

P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J-1617

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.

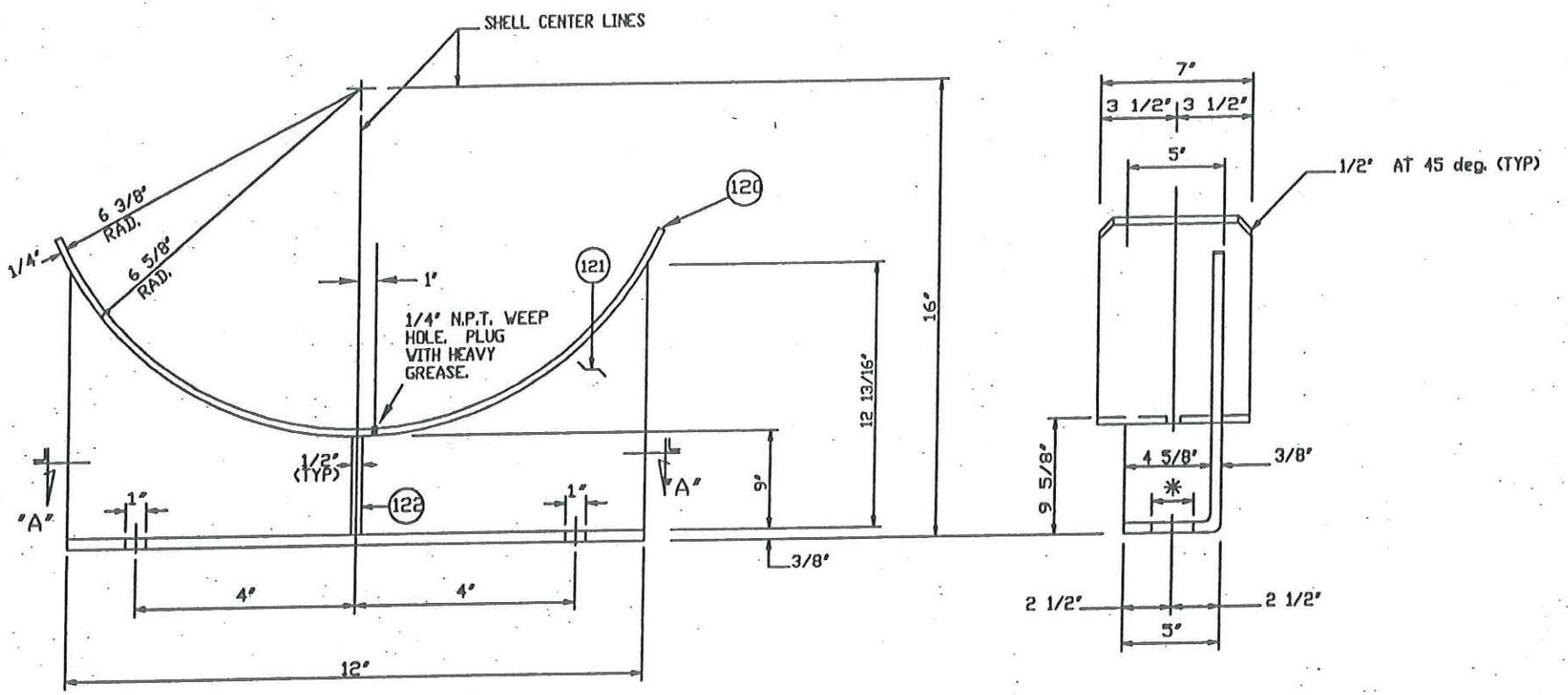
NO.	DATE	REVISIONS
1	5/27	REV. ITEM NO. EMG/RR

BAFFLE DETAILS

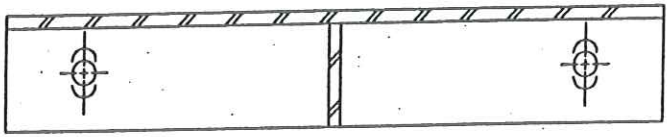
DWN. BY EMG
DATE 4/17/97
CKD. BY RR

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-8
REV. 1



P.O. NO. 140-1617-00-003
ITEM NO. E-115, J-1617



SECTION "A-A"

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

ALL FILLET WELDS ARE 1/4"

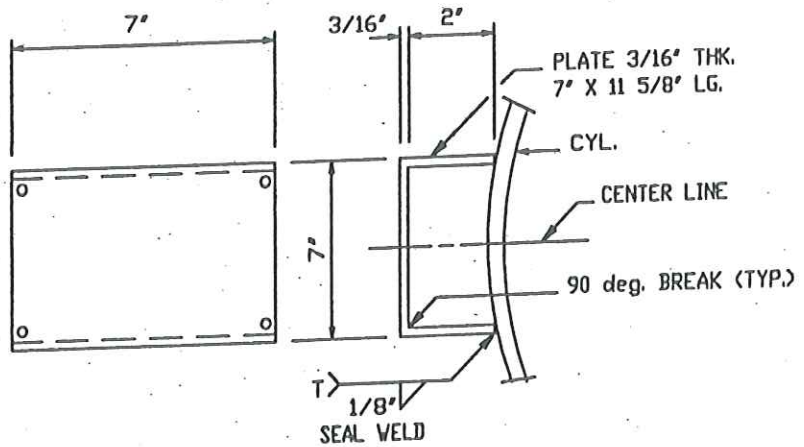
NO.	DATE	REVISIONS
1	5/27	REV. ITEM NO. EMG/PR

SUPPORT DETAILS

DWN. BY DCM
DATE 4-18-97
CKD. BY

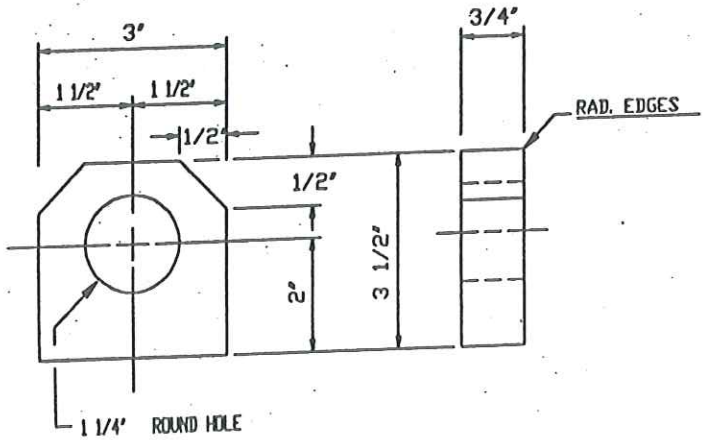
Fabsco
a harsco company

DWG.NO. S97-7976-9-9
REV. 1



(ONE) REQ'D.

NAME PLATE BRACKET DETAIL



NO. REQUIRED (1)

LIFTING LUG DETAIL

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

NATL. BD. NO. #

CERTIFIED BY

FABSCO INC.

SAPULPA, OKLAHOMA

W

RT3

		MAWP		TEMP	
	SHELL SIDE	75	PSI AT	750	°F
		MDMT		PRESS.	
	SHELL SIDE	40	°F AT	75	PSI
		MAWP		TEMP	
	TUBE SIDE	75	PSI AT	170	°F
		MDMT		PRESS.	
	TUBE SIDE	40	°F AT	75	PSI

SERIAL NO.	YEAR BUILT	HEATING SURFACE
S97-7976-9	1997	107. SQ.FT.

P.O. NO.	TEST PRESS.	SHELL SIDE		TUBE SIDE	
140-1617-00-003		113	PSI	113	PSI

ITEM NO.	SIZE	TEMA TYPE
E-115, J-1617	12- 96	N E U

SERVICE: NATURAL GAS COOLER (LTS REDUCTION)

TO BE ASSIGNED AT TIME OF SHIPMENT

P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J-1617

NO.	DATE	REVISIONS
1	5/27	REV ITEM NO ENG/

NAME PL., BRKT. & LIFT LUGS

DWN. BY: DCM

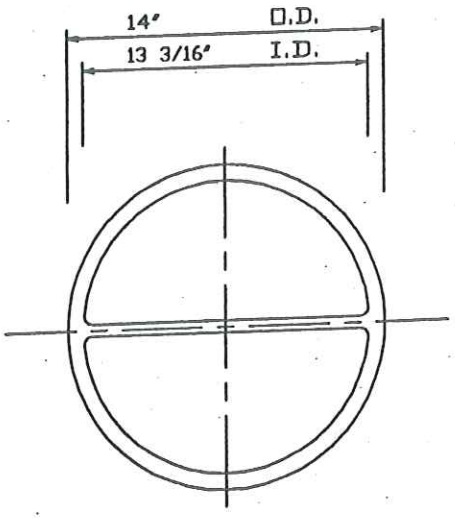
DATE: 4-18-97

CKD. BY:

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DWG.NO. S97-7976-9-10

REV. 1



(1)-REQUIRED.
CHANNEL COVER GASKET.
1/8" AIDJNAF
RIB WIDTH TO BE 7/16 WIDE.

NOTES:

1) QUANTITIES SHOWN FOR ONE SET (2)-SETS REQUIRED TOTAL.
   (1) SET TO BE USED IN EXCHANGER &
   (1) SET TO BE BOXED AND MARKED W/ P.O. AND ITEM NO. AND SHIPPED W/ EXCHANGER.
2 ALL RADII TO BE 1/4".
3) ALL JACKETED GASKETS TO HAVE LAP OF GASKET NEAR SIDE.

P.O. NO.: 140-1617-00-003
⚠ ITEM NO.: E-115, J-1617

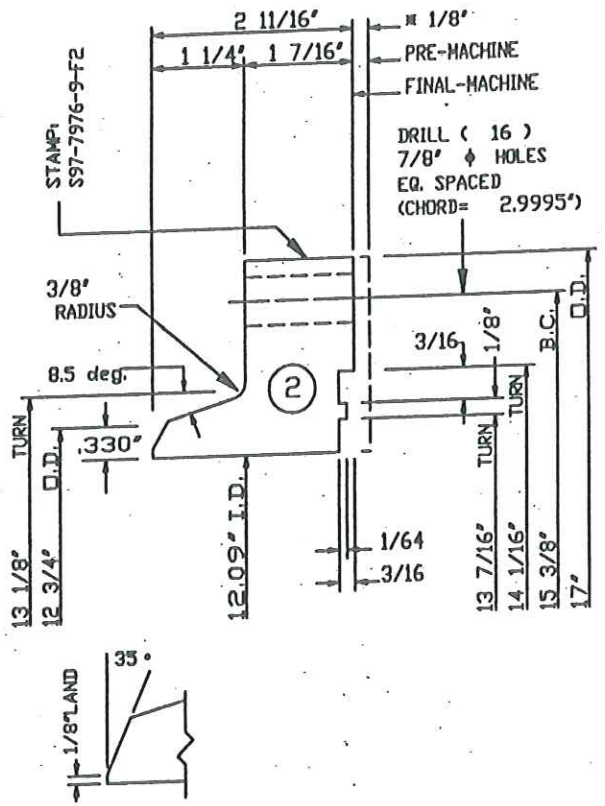
NO.	DATE	REVISIONS
⚠	5/27	REV. ITEM NO. EMG/PR

GASKET DETAILS

DWN. BY AT
DATE 4/15/97
CKD. BY

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-11
REV. 1



2 GIRTH FLANGE (ONE) REQ'D.

P.O. NO.: 140-1617-00-003
⚠ ITEM NO.: E-115, J-1617

NOTES:
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.

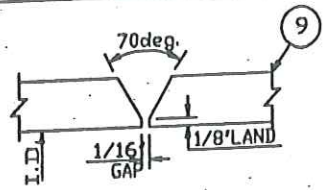
NO.	DATE	REVISIONS
⚠	5/27	REV ITEM NO EMG/[illegible]

GIRTH FLANGES

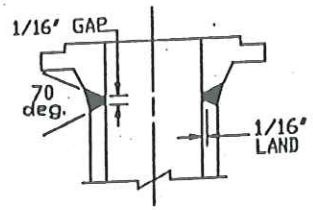
DWN. BY EMG
DATE 4/17/97
CKD. BY

FABSCO, INC.
SAPULPA, OKLAHOMA

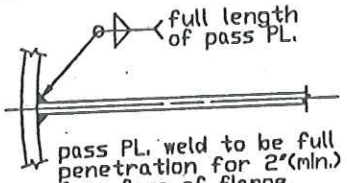
DWG.NO. S97-7976-9-12
REV. 1



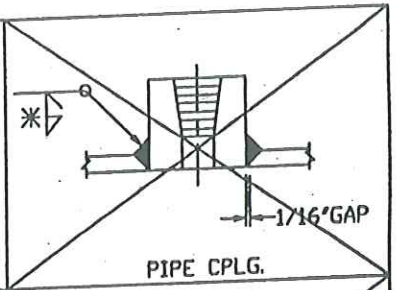
SHELL GIRTH SEAMS



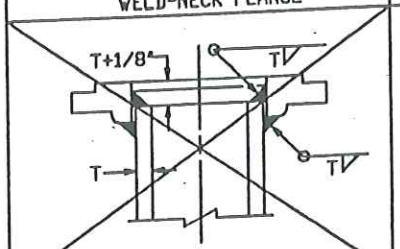
WELD-NECK FLANGE



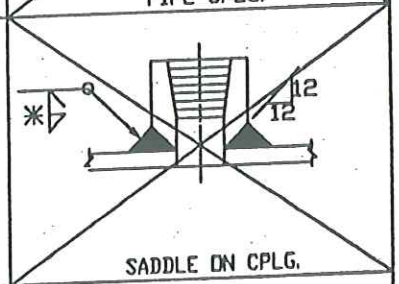
PASS PLATE WELD



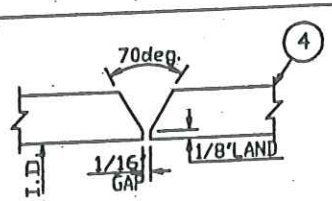
PIPE CPLG.



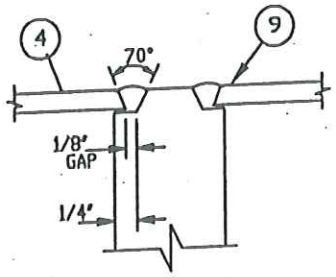
SLIP ON FLANGE



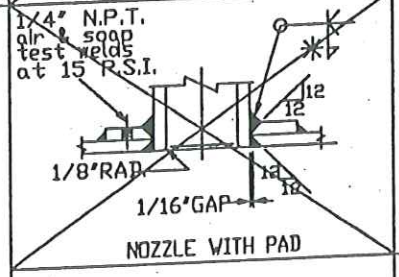
SADDLE ON CPLG.



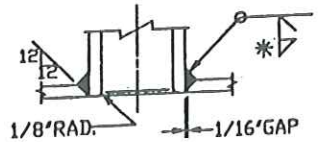
FRONT CHAN GIRTH SEAMS



TUBESHEET TO CHANNEL AND SHELL GIRTH SEAMS



NOZZLE WITH PAD



NOZZLE W/OUT PAD

P.O. NO.: 140-1617-00-003
⚠ ITEM NO.: E-115, J-1617

GENERAL NOTES
1) SEE DWG. S97-7976-9-1A FOR JOB NOTES.
2) ALL WELDING TO BE IN ACCORDANCE W/ ASME CODE(SECTION IX
*3)ALL FILLET WELDS TO BE 3/8" UNLESS NOTED OTHERWISE.

NO.	DATE	REVISIONS
⚠	5/27	REV ITEM NO. EMG/

WELD & BEVEL DETAILS

DWN. BY: EMG
DATE: 4/17/97
CKD. BY:

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-13
REV. 1

MK.NO.	QUAN.	MATERIAL DESCRIPTION	MATERIAL	NO.	
21	34	TUBES 3/4" O.D.X .0750" MIN. PER BEND SCHEDULE.	SA-214		
		FORGED RING MATERIAL			
2	1	FLG 17" O.D. X 12.09" I.D.X 2 11/16" THK (f)	SA-105		
		TUBESHEETS & COVERS			
19	1	TUBESHEET 12 3/4" O.D.X 1 1/4" THK (f)	SA-516-70		
1	1	COVER 17" O.D.X 1 1/4" THK (f)	SA-516-70		
		BAFFLES			
22	8	BAFFLES 12 5/16" O.D.X 3/16" THK	SA36orEQUAL		
		HEADS			
18	1	ELLIP HD. 12 3/4" O.D.X 3/8" THK(nom) W/2" SF	SA-516-70		
		CYLINDERS			
9	1	SMLS.PIPE 12 3/4" ODX(.3300" SCH30)X 8'-0 5/8" LG.	SA-106-B		
4	1	SMLS.PIPE 12 3/4" ODX(.3300" SCH30)X 1'-0 3/16" LG.	SA-106-B		

NOTES:
1) SA-53-B ACCEPTABLE IN LIEU OF SA-106-B.
2) ALL WELD BEVELS PER DETAIL SHT ATTACHED.
3) ALL FORMED HEADS IN ACCORDANCE W/ UCS-79.
4) MTR'S REQUIRED FOR PRESS PARTS, PLATE & HEADS.

* DENOTES MAT'L. ORDERED ON PRELIMINARY BILL OF MATERIAL.

P.O. NO.:140-1617-00-003
ITEM NO.:E-115, J1617

PRE-BILL ISSUE
DATE: _____

FINAL-BILL ISSUE
DATE: _____

NO.	DATE	REVISIONS
1	5/27	REV ITEM NO EMG/

BILL OF MATERIAL

DWN. BY AT
DATE 4/15/97
CKD. BY RR

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-14
REV. 1

MK.NO.	QUAN.	MATERIAL DESCRIPTION		MATERIAL	NO.	COST
		ANSI FLANGES				
71	1	ANSI 6" - 150 # RF WN W/ (X-HVY BORE)		SA-105 *		
72	1	ANSI 6" - 150 # RF WN W/ (X-HVY BORE)		SA-105 *		
81	1	ANSI 4" - 150 # RF WN W/ (X-HVY BORE)		SA-105 *		
?	1	ANSI 4" - 150 # RF WN W/ (X-HVY BORE)		SA-105 *		
71A	1	SMLS.PIPE 6 5/8" ODX(.4320" X-HVY)X 7"	LG.	SA-106-B		
72A	1	SMLS.PIPE 6 5/8" ODX(.4320" X-HVY)X 7"	LG.	SA-106-B		
81A	1	SMLS.PIPE 4 1/2" ODX(.3370" X-HVY)X 7"	LG.	SA-106-B		
82A	1	SMLS.PIPE 4 1/2" ODX(.3370" X-HVY)X 7"	LG.	SA-106-B		
		* 125-250 AARH ON R.F.				
		COUPLINGS				

* DENOTES MAT'L. ORDERED ON PRELIMINARY BILL OF MATERIAL.

⚠ P.O. NO.:140-1617-00-003
ITEM NO.:E-115, J-1617

PRE-BILL ISSUE
DATE: _____

FINAL-BILL ISSUE
DATE: _____

NO.	DATE	REVISIONS
⚠	5/27	REV. ITEM NO EMG/

BILL OF MATERIAL

DWN. BY AT
DATE 4/15/97
CKD. BY

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG.NO. S97-7976-9-15
REV. 1

MK.NO.	QUAN.	MATERIAL DESCRIPTION	MATERIAL	[illegible] NO.	COST
		BOLTING AND GASKETS			
40	1	LOT OF GASKETS PER DWG. S97-7976-9-11			
41	16	3/4" ROUND X 10 THREAD STUDS X 4 3/4" LG. 1&2	SA-193-B7		
42	32	3/4" HEAVY HEX NUTS	SA-194-2H		
		MISC. MATERIAL			
60	1	STD. NAME PLATE	STN. STL.		
61	1	STD. NAME PL BRKT	SA36orEQUAL		
62	1	STD. LIFTING LUGS	SA36orEQUAL		
23	48	FT. 1/2" O.D. TIE RODS	SA36orEQUAL		
23B	12	1/2" HEX TIE ROD NUTS	SA36orEQUAL		
23A	48	FT. 3/4" O.D. SPACER TUBING	SA36orEQUAL		
22I	1	7 1/2" O.D. X 1/4" THK IMP. PLATE	SA36orEQUAL		
50	1	PASS PLATES 12" X 3/8" THK X 14 7/8" LG.	SA36orEQUAL		
		SUPPORT MATERIAL			
120	2	PLATE 7" X 1/4" THK X 19" LG.	SA36orEQUAL		
121	2	PLATE 12" X 3/8" THK X 17 1/2" LG.	SA36orEQUAL		
122	2	PLATE 4 5/8" X 1/2" THK X 9" LG.	SA36orEQUAL		
		WOODEN NOZZLE COVERS REQUIRED PER SHOP STANDARD			
		PAINT: PER DWG. S97-7976-9-1			

* DENOTES MAT'L. ORDERED ON PRELIMINARY BILL OF MATERIAL.

⚠ P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J-1617

PRE-BILL ISSUE
DATE: _____

FINAL-BILL ISSUE
DATE: _____

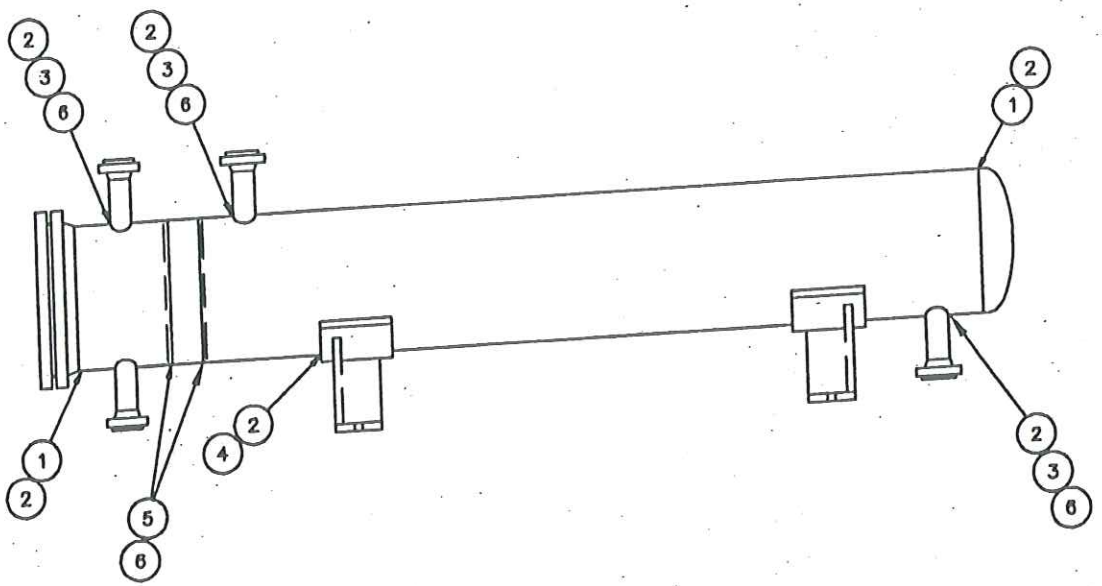
NO.	DATE	REVISIONS
⚠	5/27	REV ITEM NO ENG/

BILL OF MATERIAL

DWN. BY: AT
DATE: 4/15/97
CKD. BY:

FABSCO, INC.
SAPULPA, OKLAHOMA

DWG. NO. S97-7976-9-16
REV. 1



MK.	PROC. #	RADIOGRAPHY	U.T. EXAM.	MAG. PART / LIQ. PENET.	SPECIAL
1	A102			NOTE 'A'	
2	M102			NOTE 'A'	
3	M189			NOTE 'A'	
4	F130			NOTE 'A'	
5	A324			NOTE 'A'	
6	M324				
7					

NOTES

A) LIQUID PENETRANT TEST ALL TEMPORARY ATTACHMENTS.

NO.	DATE	REVISIONS
1	5/27	REV. ITEM NO EMG/

CUST: HOWE-BAKER ENGINEERS, INC.

P.O. NO.: 140-1617-00-003 1

ITEM NO.: E-115, J-1617

SERVICE: NATURAL GAS COOLER (LTS REDUCTION)

SHIP TO:

WELD MAP

Fabsco
a harsco company

DWN. BY	DCM
DATE	4-17-97
CKD. BY	
DWG.NO.	S97-7976-9-WM
REV.	1

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS

As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by: FABSCO, PLANT 1, 200 NORTH MAIN, SAPULPA, OK 74066
(Name and address of Manufacturer)

Manufactured for: HOWE-BAKER ENGINEERS, INC., 3102 E. 5TH ST., TYLER, TX 75701
(Name and address of Purchaser)

3. Location of installation: HOWE-BAKER ENGINEERS, INC., "ADDRESS UNKNOWN"
(Name and address)

4. Type: HORIZONTAL (Horiz., vert., or sphere) | HEAT EXCHANGER (Tank,separator,jkt. vessel, heat exh., etc.) | S97-7976-9 (Mfg's serial No.)

NONE (CRN) | S97-7976-9 (Drawing No.) | 4476 (Nat'l. Bd. No.) | 1997 (Year built)

5. ASME Code, Section VIII, Div. 1: 1995 ED AND 1996 ADD (Edition and Addenda (date)) | N/A (Code Case No.) | N/A (Special service per UG-120(d))

Items 6 -11 incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multi-chamber vessels.

6. Shell (a) No. of course(s): 1 (b) Overall length (ft. & in.): 8'-0 5/8"

Course(s)			Material	Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B, C)			Heat Treatment	
No.	Diameter, in.	Length (ft. & in.)	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1.	12 3/4"	8'-0 5/8"	SA-106B	.330"	1/16"	NA	NA	NA	1	SPOT	85%		

7. Heads: (a) SA516-70 (Mat'l Spec. No., Grade or Type) H. T. - Time & Temp. (b) S (Mat'l Spec. No., Grade or Type) H. T. - Time & Temp.

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical	Conical	Hemispherical	Flat	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle	Ratio	Apex Angle	Radius	Diameter	Convex	Concave	Type	Full, Spot, None	Eff.
(a)	END	3/8"	1/16"			2:1					X			
(b)														

If removable, bolts used (describe other fastening) (Mat'l Spec. No., Grade, size, No.)

8. Type of jacket: NONE Jacket closure: NONE (Describe as ogee & weld, bar, etc.)

If bar, give dimensions If bolted, describe or sketch.

9. MAWP 75 (internal) (external) psi at max. temp. 750 (internal) (external) °F Min. design metal temp. 40 °F at 75 psi.

10. Impact test: IMPACT EXEMPT PER UG-20(f) & UCS-66
(Indicate yes or no and the component(s) impact tested)

11. Hydro., pneu., or comb. test press. 113 Proof test

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA516-70 (Stationary (Mat'l Spec. No.)) | 12 3/4" (Dia., in. (subject to press.)) | 1 1/4" (Nom. thk., in.) | 1/8" (Corr. Allow., in.) | WELDED (Attachment (welded or bolted))

(Floating (Mat'l Spec. No.)) | (Dia., in.) | (Nom. thk., in.) | (Corr. Allow., in.) | (Attachment)

13. Tubes: SA-214 (Mat'l Spec. No., Grade or Type) | 3/4" (O.D., in.) | .75" MIN (Nom. thk., in. or gauge) | 34 (Number) | U (Type (Straight or U))

Items 14 - 18 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

14. Shell (a) No. of course(s): 1 (b) Overall length (ft. & in.): 1'-0 3/16"

Course(s)			Material	Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B, C)			Heat Treatment	
No.	Diameter, in.	Length (ft. & in.)	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1.	12 3/4"	1'-0 3/16"	SA-106B	.330"	1/16"	NA	NA	NA	1	SPOT	85%		

15. Heads: (a) SA516-70 (Mat'l Spec. No., Grade or Type) H. T. - Time & Temp. (b) (Mat'l Spec. No., Grade or Type) H. T. - Time & Temp.

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical	Conical	Hemispherical	Flat	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle	Ratio	Apex Angle	Radius	Diameter	Convex	Concave	Type	Full, Spot, None	Eff.
(a)	END	1 1/4"	1/16"						17"					
(b)														

If removable, bolts used (describe other fastening) SA193-B7, 16, 3/4" STUDS WITH SA194-2H NUTS
(Mat'l Spec. No., Grade, Size, No.)

16. MAWP 75 (internal) (external) psi at max. temp. 170 (internal) (external) °F Min. design metal temp. 40 °F at 75 psi.

17. Impact test IMPACT EXEMPT PER UG-20(f) & UCS-66
(Indicate yes or no and the component(s) impact tested)

18. Hydro., pneu., or comb. test press. 113 Proof test

19. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
INLET/OUTLET	1 EA	6"-150#	RFWN	SA-106B	SA-105	.432"	1/16"		WELDED	WELDED	SHELL
INLET/OUTLET	1 EA	4"-150#	RFWN	SA-106B	SA-105	.337"	1/16"		WELDED	WELDED	CHANNEL

20. Supports: Skirt (Yes or no) Lugs (No.) Legs 2 (No.) Others (Describe) Attached WELDED TO SHELL (Where and how)

21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report:
(List the name of part, item number, mfg's. name and identifying number)
NONE

22. Remarks:
SERVICE: NATURAL GAS COOLER (LTS REDUCTION) CHANNEL INCLUDES 1 TEMA FLANGE SA-105
P.O. NO.: 140-1617-00-003
ITEM NO.: E-115, J1617
ATTACHMENTS WELDED PER UW 16

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

U Certificate of Authorization No. 10625 Expires APRIL 14 ,19 98

Date 5-23-97 Name FABSCO, PLANT 1 (Manufacturer) Signed (Representative)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of OKLAHOMA and employed by COMMERCIAL UNION INSURANCE COMPANY of BOSTON, MA have inspected the pressure vessel described in this Manufacturer's Data Report on 5-21 ,19 97 , and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

CU 108

Date 5/28/97 Signed Mark Haught Commissions OK 657 NB 7935 "A"
(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME Code, Section VIII, Division 1.

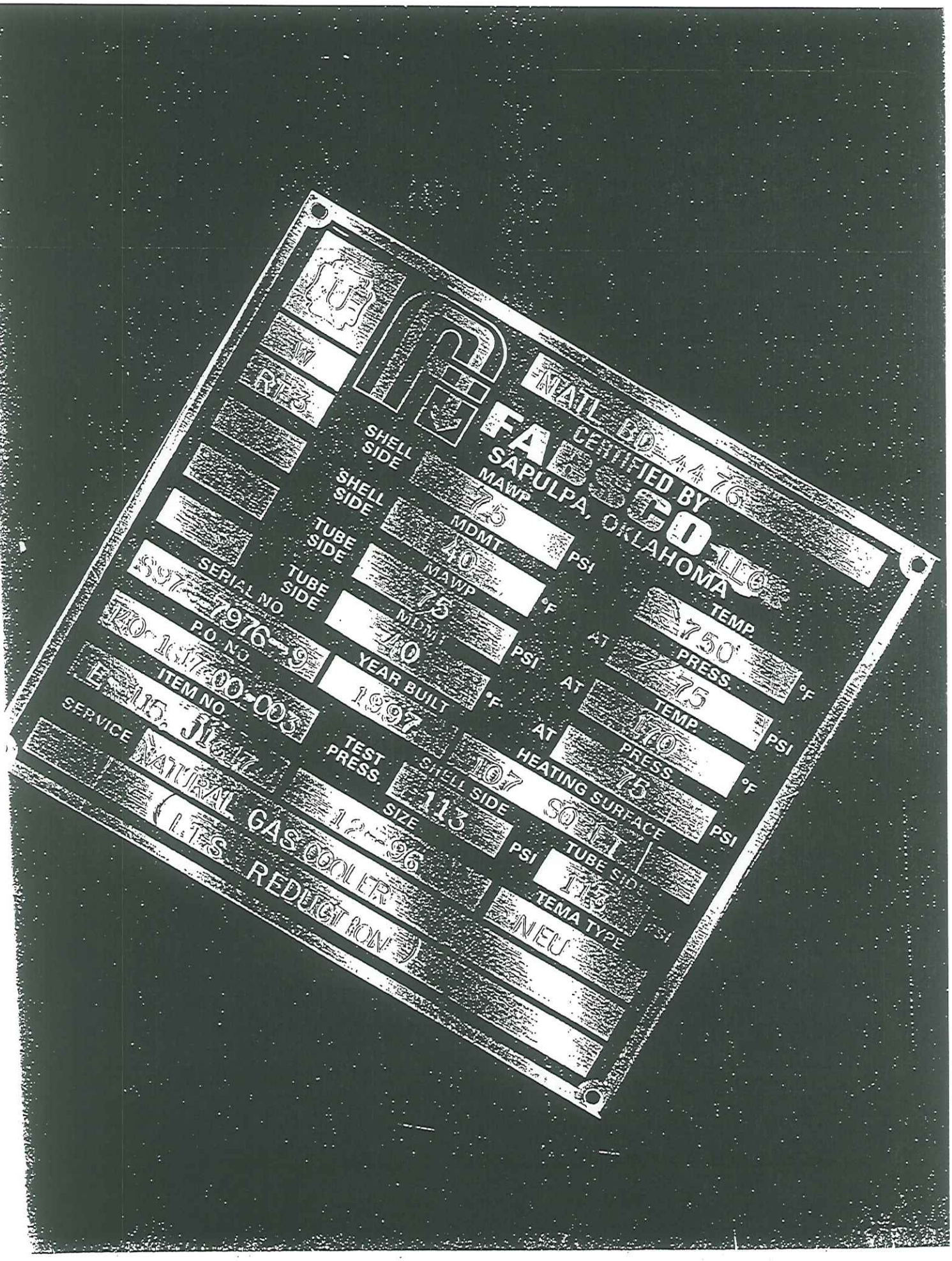
U Certificate of Authorization No. Expires ,19

Date Name (Assembler) Signed (Representative)

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of and employed by of have compared the statements in this Manufacturer's Data Report with the described pressure vessel and state that parts referred to as data items , not included in the certificate of shop inspection, have been inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel in accordance with ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of psi. By signing this certificate neither the inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in the Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date Signed (Authorized Inspector) Commissions (Nat'l Board incl. endorsement, State, Province and No.)


FABCO
CERTIFIED BY
SAPULPA, OKLAHOMA
NAT'L BD 4476
SHELL SIDE
MAWP
75
PSI
SHELL SIDE
MDMT
40
°F
TUBE SIDE
MAWP
75
PSI
TUBE SIDE
MDMT
-10
°F
SERIAL NO.
97-1976-9
P.O. NO.
10-017200-003
ITEM NO.
E-115, 116
SERVICE
NATURAL GAS COOLER
(LTS REDUCTION)
YEAR BUILT
1997
TEST PRESS.
SHELL SIDE
113
PSI
TUBE SIDE
115
PSI
SIZE
12-96
TEMA TYPE
NEU
TEMP.
750
°F
AT
PRESS.
AT
75
TEMP
PSI
AT
70
PRESS.
°F
HEATING SURFACE
107
SQ FT