

1. Manufactured by Western Supply Division Tulsa, Oklahoma
(Name and address of manufacturer)
2. Manufacturer for Clark Oil & Refining Corporation Blue Island, Illinois
(Name and address of purchaser)
3. Location of installation Clark Oil & Refining Corporation Blue Island, Illinois
(Name and address)
4. Type Horiz. Vessel No. W-2476-1 W-2476-1 4892 Year Built 1979
(Horiz. or vert. tank) (Mfr's Serial No.) (CRN) (Drawing) (Nat'l Brd No.)
5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1 1977 and Addenda to 6-31-78 and Code Case no. _____ Special service per UG-120(d) _____
(Date)

Manufacturers' Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: shell nozzle cylinder from Alaskan Copper Works
(Name of part, item number, mfr's name and identifying stamp)
Serial# 24995-2 partial data report attached.

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

6. Shell: Material SA240-304L Nominal Thickness 3/8 in. Corrosion Allowance 0 in. Diam. 2 ft 10 in. Length 11 ft 10 in. 7/8"
(Spec. No., Grade)
* 7. Seams: Longitudinal Db1. Butt R.T. Spot Efficiency 80 % H.T. Temp _____ F
(Welded, Db1., Sngl., Lap, Butt) (Spot or Full)
Time _____ Girth Db1. Butt R.T. Spot No. of Courses 2
(Welded Db1., Dngl., Lap, Butt) (Spot, Partial or Full)
8. Heads: (a) Material _____ (b) Material _____
(Spec. No., Grade) (Spec. No., Grade)

	Location (Top, Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio
(a)						
(b)						
	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)		
(a)						
(b)						

If removable, bolts used (describe other fastenings) _____
(Material, Spec. No., Gr., Size, No.)

9. Type of Jacket _____ Proof Test _____
10. Jacket Closure _____ If bar, give dimensions _____ If bolted, describe or sketch.
(Describe as ogee & weld, bar, etc.)
11. Constructed for max. allowable working pressure 75 psi at max. temp. 300 F Min. temp. (when less than -20 F) _____ F.
Hydrostatic, ~~pressure~~ test pressure 116 psi

Items 12 and 13 to be completed for tube sections

12. Tubesheets: Stationary—Material SA-240-304L Diam. 35 1/4" in. Nominal Thickness 2 3/8 in. Corrosion Allowance 0 in. Attachment Welded ~~XXXXXX~~ Material SA-240-304L Diam. 35 1/4 in.
(Spec. No. Gr.) (Subject to pressure) (Welded, Bolted) (Spec. No., Grade)
Nominal Thickness 2 3/8 in. Corrosion Allowance 0 in. Attachment Welded
13. Tubes: Material SA249-304 LoFi O.D. 3/4 in. Nominal Thickness 6 BWG in. ~~XXXXXX~~ Gauge Number 728 Type Straight
(Spec. No., Gr.) (Avg) (Straight or "U")

Items 14-17 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

14. Shell: Material SA515-70 Nominal Thickness 7/16 in. Corrosion Allowance 1/16 in. Diam. 2 ft 10 in. Length 21 ft 7 1/8"
(Spec. No., Gr.)
15. Seams: Longitudinal Db1. Butt R.T. Spot Efficiency 85 % H.T. Temp _____ F Time _____
(Welded, Db1., Sngl. Lap, Butt) (Spot or Full)
Girth Db1. Butt R.T. Spot No. of courses 1/1
(Welded, Db1., Sngl., Lap, Butt) (Spot, Partial, or Full)
16. Heads: (a) Material SA-516-70 (b) Material SA-516-70
(Spec. No., Grade) (Spec. No., Gr.)

	Location (Top, Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio
(a)	End	3/8"	1/16"			2:1
(b)	End	3/8"	1/16"			2:1
	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)		
(a)				Concave		
(b)				Concave		

If removable, bolts used (describe other fastenings) a/b) Db1. Butt Welded
(Material, Spec. No., Gr., Size, No.)

17. Constructed for max. allowable working pressure 75 psi at max temp. 300 F. Min. temp. (when less than -20 F) _____ F.
Hydrostatic, ~~XXXXXX~~ combination test pressure 115 psi.

Items below to be completed for all vessels where applicable

18. Safety Valve Outlets: Number _____ Size _____ Location _____

19. Nozzles:

Purpose (Inlet, Outlet, Drain)	Number	Diam. or Size	Type	Material	Nominal Thickness	Reinforcement Material	How Attached
Chan. In & Out	1-1	6"	150#	SA-53-B	Sch 80	None	Welded
Shell In & Out	1-1	12"	150#	SA240-304L	1/4"	None	Welded
Shell Out	1	3"	150#	SA312TP304L	Sch 40S	None	Welded

20. Inspection Openings:

Manholes No. _____ Size _____ Location _____

Handholes No. _____ Size _____ Location _____

Threaded No. _____ Size _____ Location _____

21. Supports: Skirt No Lugs _____ Legs _____ Other 2-Saddles Attached Welded to Shell
(Yes or no) (No.) (No.) (Describe) (Where and how)

22. Remarks: V-29; V-31 Oxidizer O.H. Condenser
*Corner joints of tubesheets not radiographed.

CERTIFICATE OF 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.

Date 8-27-79 Signed Western Supply Division by Yak Hutton
(Manufacturer) (Representative)

"U" Certificate of Authorization No. 347 expires 3-30 1982.

CERTIFICATE OF SHOP INSPECTION

Vessel made by Western Supply Division at Tulsa, Oklahoma

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 Arkansas and employed by Commercial Union Insurance Co.

of Boston, Mass. have inspected the pressure vessel described in this Manufacturers' Data Report on 9/5 1979, 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 the Manufacturers' 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 9/5/79 Signed Roger D. Loftis Commissions N.B.# 9015
(Inspector) (Nat'l Board, State, Province and No.)

CERTIFICATE OF COMPLIANCE FOR FIELD WORK

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.

Date _____ Signed _____ by _____
(Manufacturer) (Representative)

"U" Certificate of Authorization No. _____ expires _____, 19 ____.

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 _____

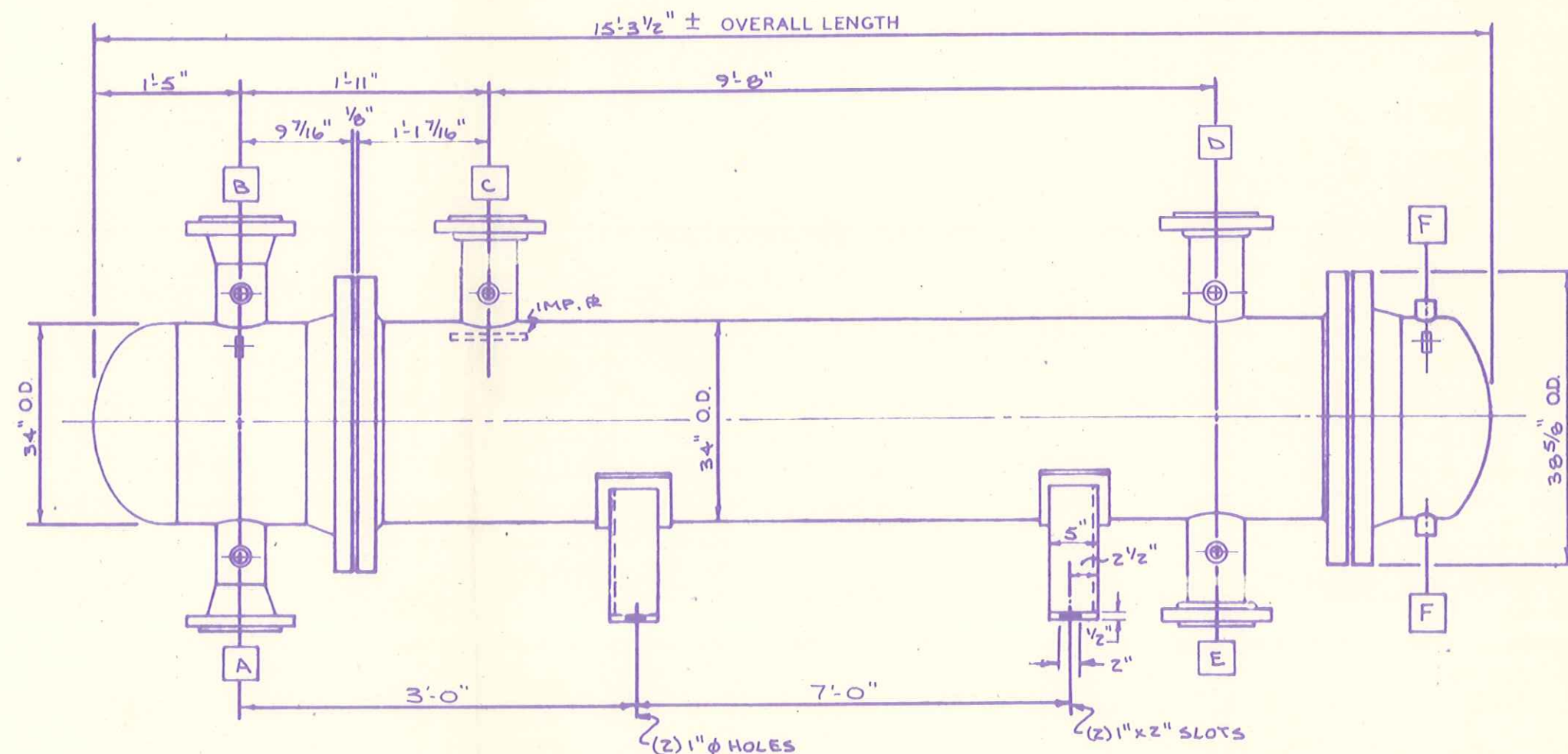
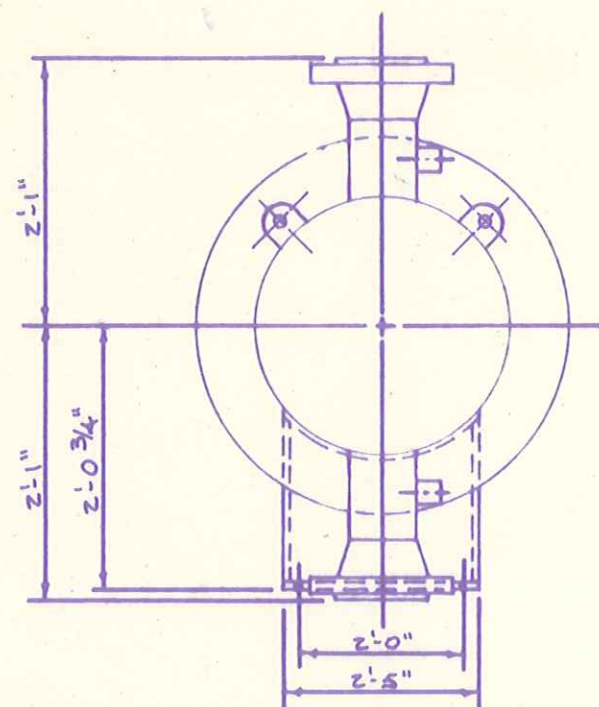
of _____ have compared the statements in this Manufacturers' Data Report with the described pressure vessel and state that parts referred to as data items _____, not included in the certificate of shop inspection, have been inspected by me and that, to the best of my knowledge and belief, the Manufacturer 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 this Manufacturers' 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.

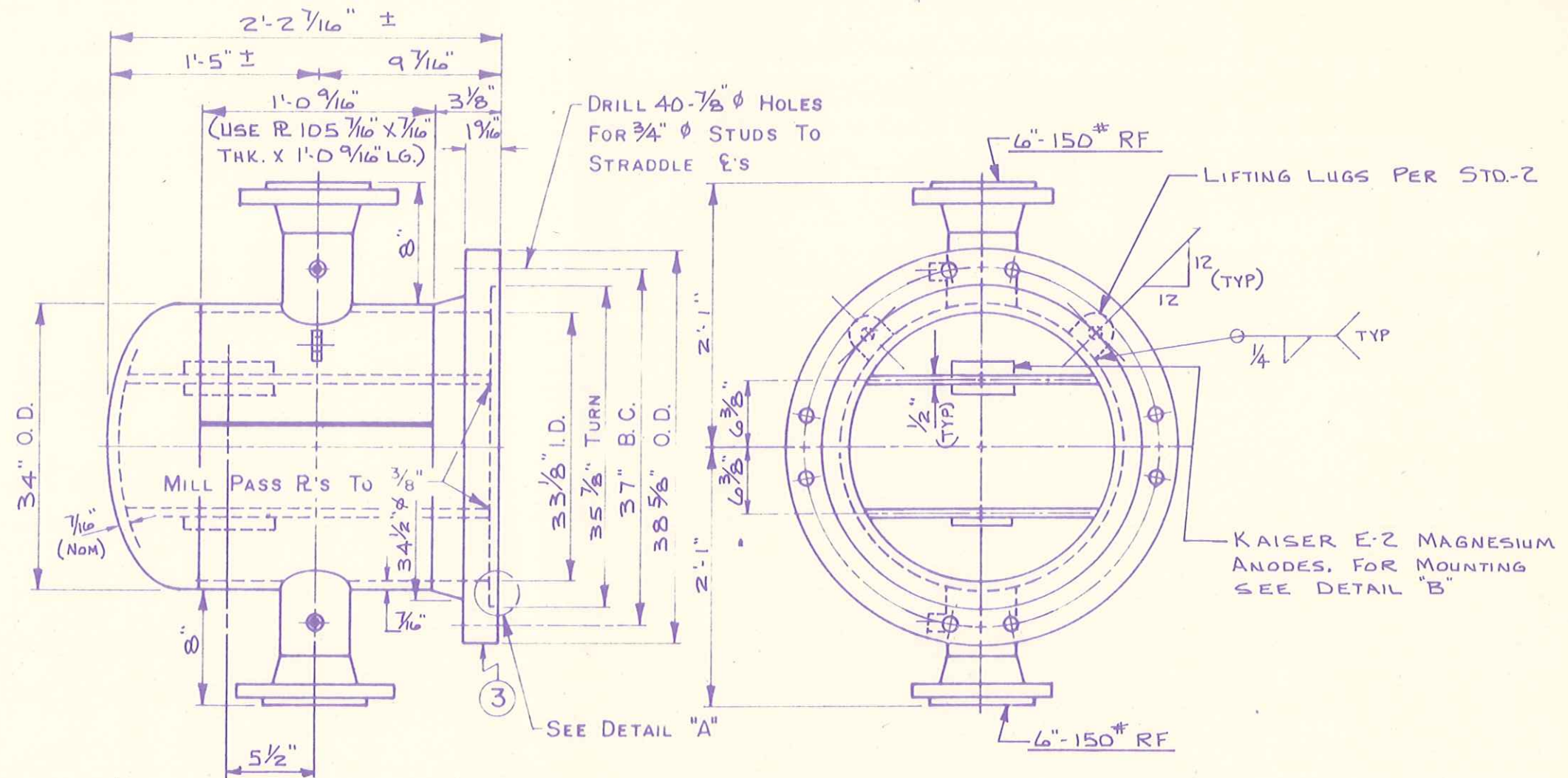
Date _____ Signed _____
(Authorized Inspector) (Commissions)

DESIGN DATA			NOZZLE DATA					GENERAL NOTES	CUST: CLARK OIL AND REFINING CORP.	
	SHELL SIDE	TUBE SIDE	MARK	SIZE	RATING	FACING	SERVICE		DEST: BLUE ISLAND, ILLINOIS	
DESIGN PRESSURE	75 PSI	75 PSI	A	6"	150 #	RF	INLET	1. DESIGN & CONSTRUCTION IN ACCORDANCE WITH: (A) SECTION VIII 1977 EDITION OF THE ASME BOILER & PRESSURE VESSEL CODE & SO STAMPED BY NATIONAL BOARD (B) TEMA "C" 2. SPOT RADIOGRAPH CHAN. & SHELL. 3. NO HEAT TREATMENT REQ'D. 4. ALL BOLT HOLES TO STRADDLE CENTERLINES. 5. PAINT CHANNELS ONE COAT RED ZINC CHROMATE PRIMER. 6. ANODES REQ'D IN CHANNELS.	CUST. P.O.: 55665	
TEST PRESSURE	116 PSI	115 PSI	B	6"	150 #	RF	OUTLET		ITEM: <u>E-43R</u>	
DESIGN TEMPERATURE	300 °F	300 °F	C	12"	150 #	RF	INLET		TAG: V-29, V-31 OXIDIZER O.H. CONDENSER	
CORROSION ALLOWANCE	0"	1/16" C.S.	D	12"	150 #	RF	OUTLET		SERIAL: W-2476-1	
NUMBER OF PASSES	ONE	FOUR	E	3"	150 #	RF	LIQUID OUTLET		FILE: W-2476	
			F	3/4"	6000 #	CPLG.	VENT & DRAIN			
720-3/4" TUBES EA			TUBE SURFACE 4,212 SQ. FT. EA					CERTIFIED CORRECT FOR FABRICATION WESTERN SUPPLY COMPANY		
ESTIMATED WEIGHT EACH			EACH NOZZLE EQUIPPED WITH 1-3/4"-6000R CPLG. (N.S.) (PLUGGED)					BY: <i>J. J. Catlett</i> DATE: 5-11-79		
DRY	10,100 LBS.	WET	15,000 LBS.							



19-E-43R

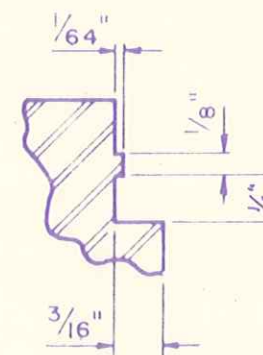
						WESTERN SUPPLY COMPANY TULSA, OKLAHOMA							
						OUTLINE DIMENSIONAL							
REV.	DESCRIPTION	DATE	BY	CK.	W.O.	REQ'D	DR.	DATE	SIZE	DWG. NO.			
							MDK	5-10-79	33" x 12'				
	ADDED LIFTING LUGS & REV. SUP'T LOCATIONS / CUST	5-29-79	MARK	TOML.	W-2476-1	ONE EXCHANGER	CK.	LOW	SCALE	NONE	TYPE	BEM	W-2476-1-AC



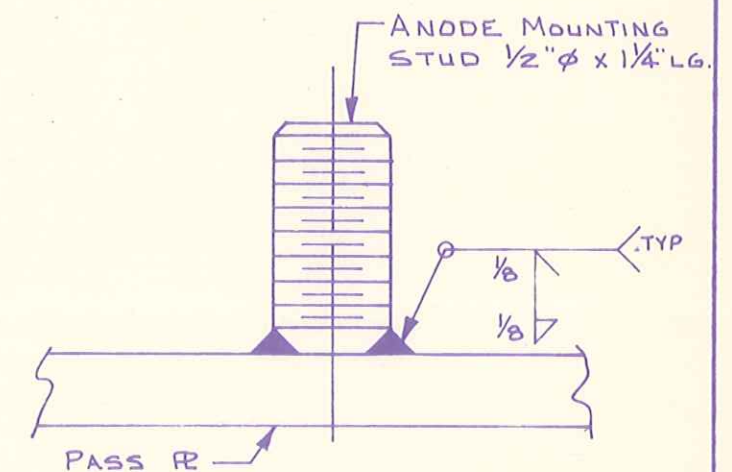
CHANNEL DETAILS

NOTES:

1. FOR WELD DETAILS SEE DWG. STD-1.
2. SPOT RADIOGRAPH CHANNEL.
3. EACH NOZZLE EQUIPPED WITH ONE $\frac{3}{4}$ "-6000# COUPLINGS (N.S.)



DETAIL "A"



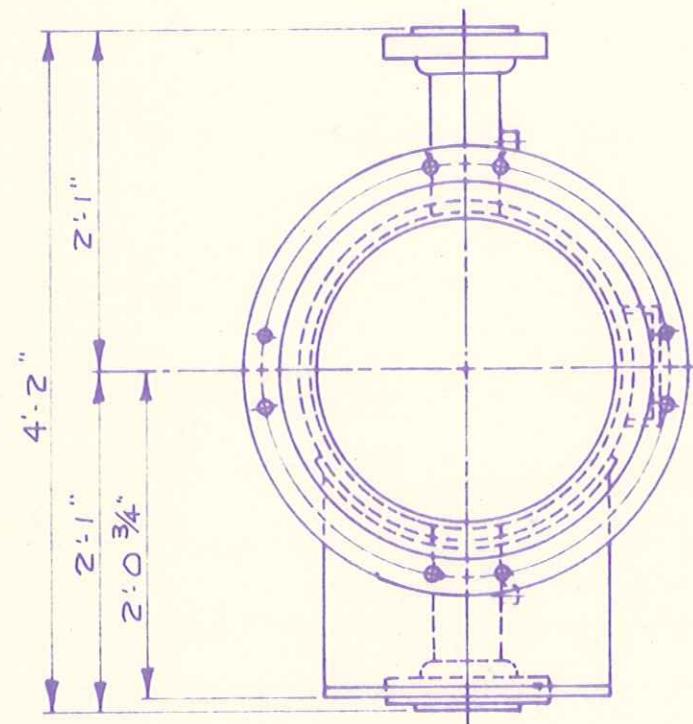
DETAIL "B"

19-E-43R

WESTERN SUPPLY DIVISION
therma technology, inc.
TULSA, OKLAHOMA

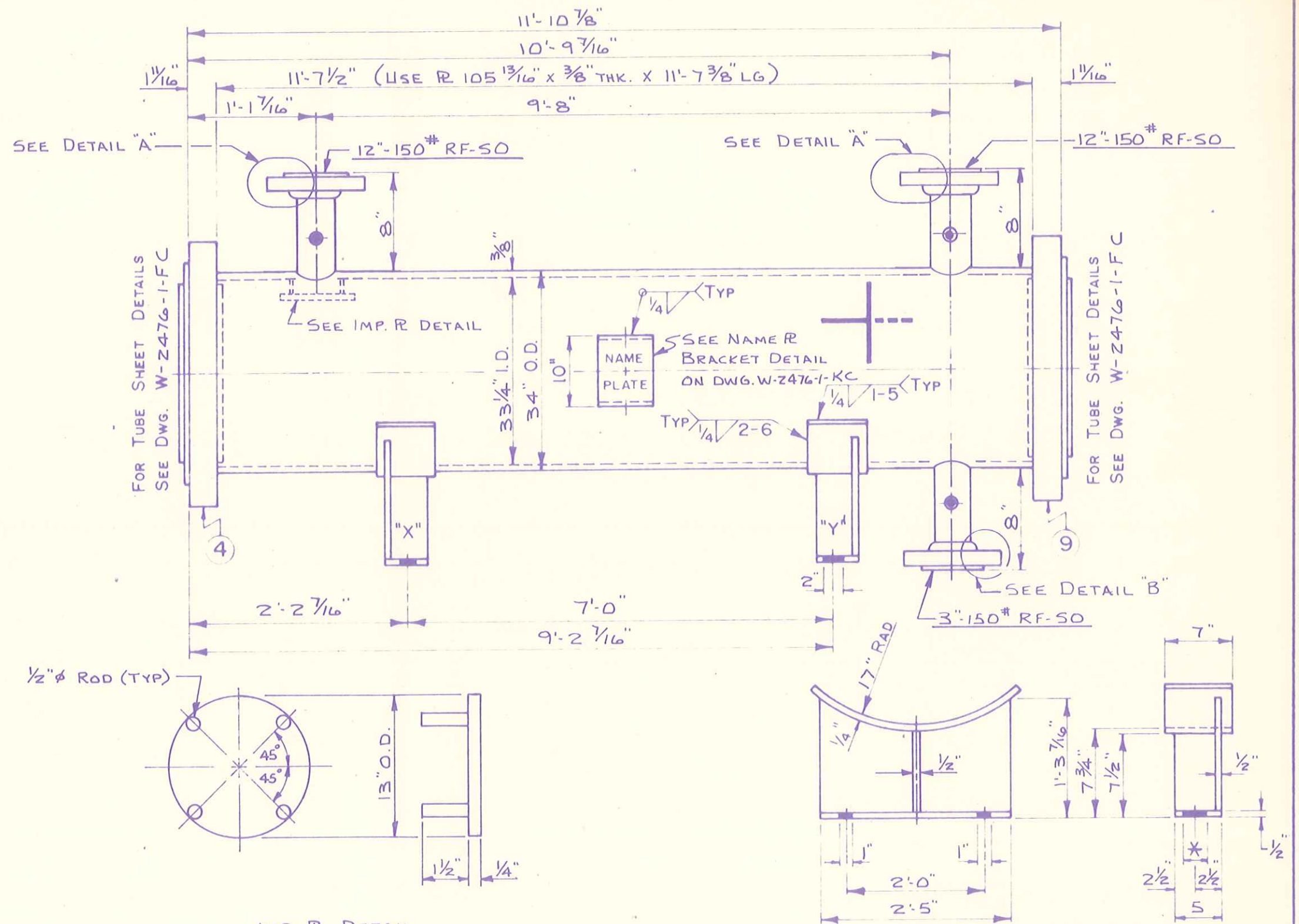
CHANNEL DETAILS

							WESTERN SUPPLY DIVISION therma technology, inc. TULSA, OKLAHOMA			
							CHANNEL DETAILS			
					W-2476-1	ONE	DR MARK	DATE 6-11-79	SIZE 33" X 12'	DWG NO W-2476-1-BC
REV	DESCRIPTION	DATE	BY	CK	W O	REQ D	CK Tom	SCALE NONE	TYPE BEM	



NOTES:

1. FOR WELD DETAILS SEE DWG. STD-1.
2. GRIND ALL WELDS FLUSH WITH I.D.
3. SPOT RADIOGRAPH SHELL.
4. EACH NOZZLE EQUIPPED WITH ONE (1) 3/4"-6000# COUPLING. (N.S.)
5. SEE DWG. W-2476-1-DC FOR DETAILS "A" & "B".

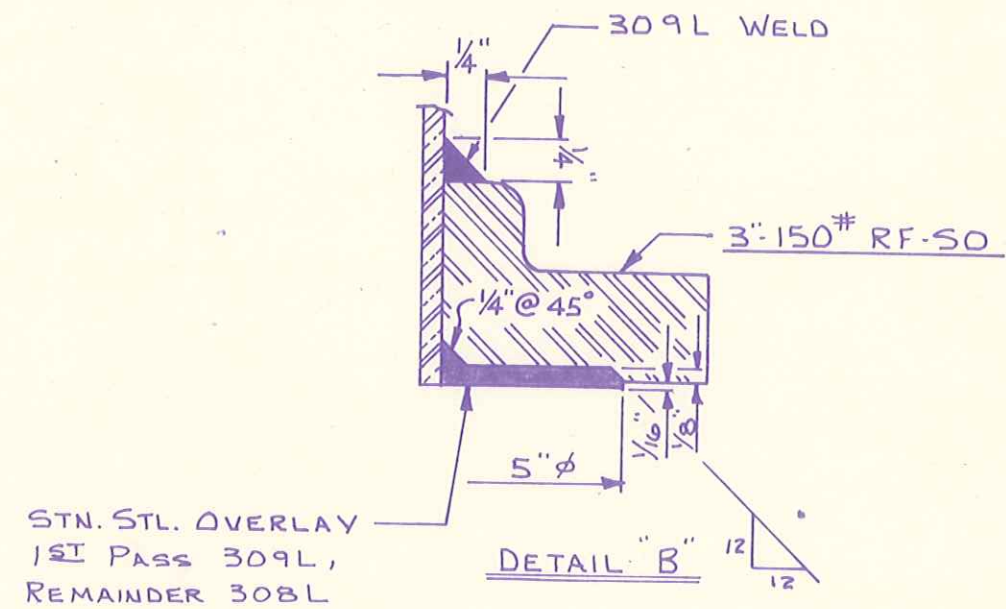
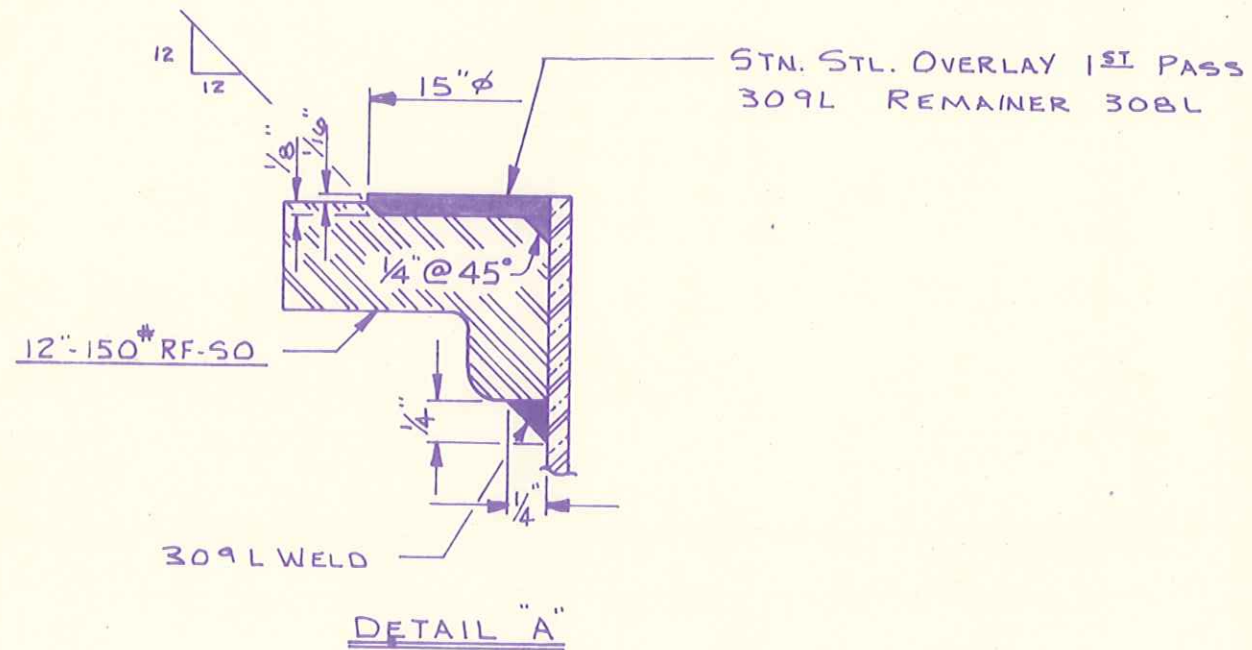


IMP. R. DETAIL

SUPPORT DETAILS

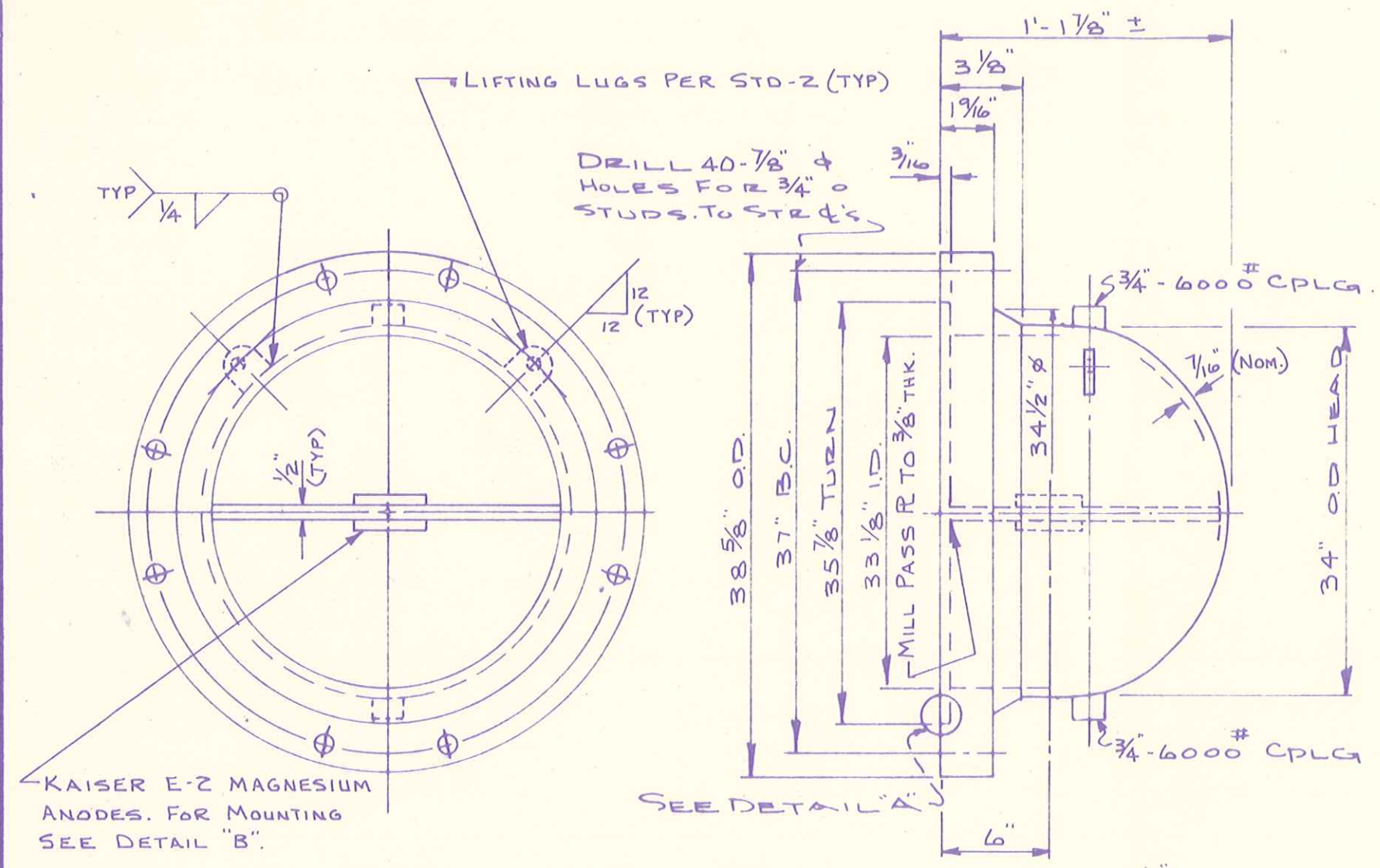
19-E-43 R * { ONE REQUIRED WITH 2- 1" Ø HOLES (X)
ONE REQUIRED WITH 2- 1" x 2" SLOTS (Y)

						WESTERN SUPPLY DIVISION			
						therma technology, inc.			
						TULSA, OKLAHOMA			
						SHELL DETAILS			
REV.	DESCRIPTION	DATE	BY	CK	W.O.	DR	MARK	DATE	5-31-79
						CK	SCALE	NONE	TYPE
									SIZE
									33" X 12"
									DWG. NO.
									W-2476-1-CC



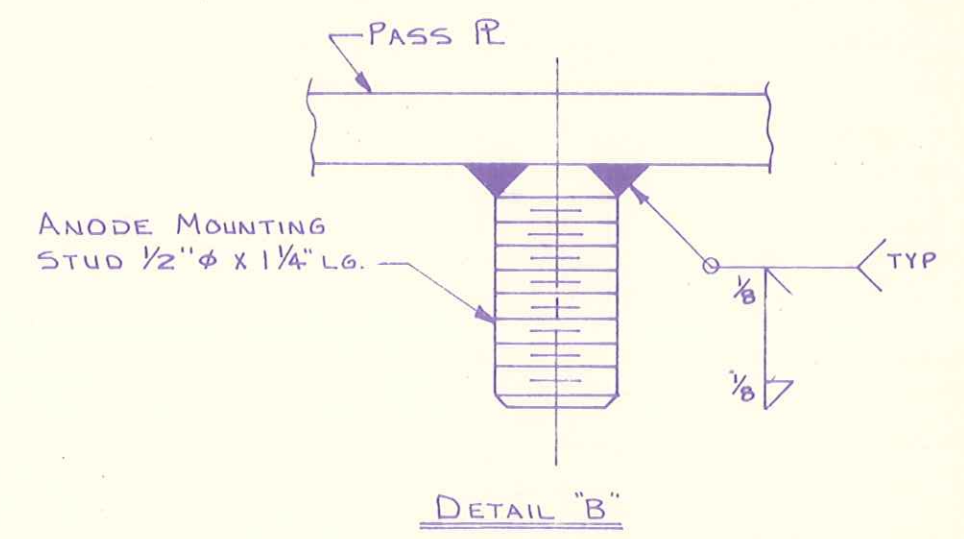
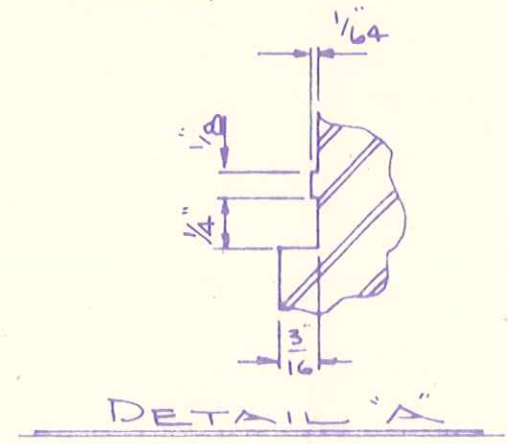
19-E-432

						WESTERN SUPPLY DIVISION			
						therma technology, inc.			
						TULSA, OKLAHOMA			
						NOZZLE OVERLAY DETAILS			
REV.	DESCRIPTION	DATE	BY	CK.	W.O.	DR. MARK	DATE	SIZE	DWG. NO.
					W-2476-1	✓	5-31-79	33" X 16'	W-2476-1-DC
						CK. TOM C.	SCALE 1/4"	TYPE BEM	



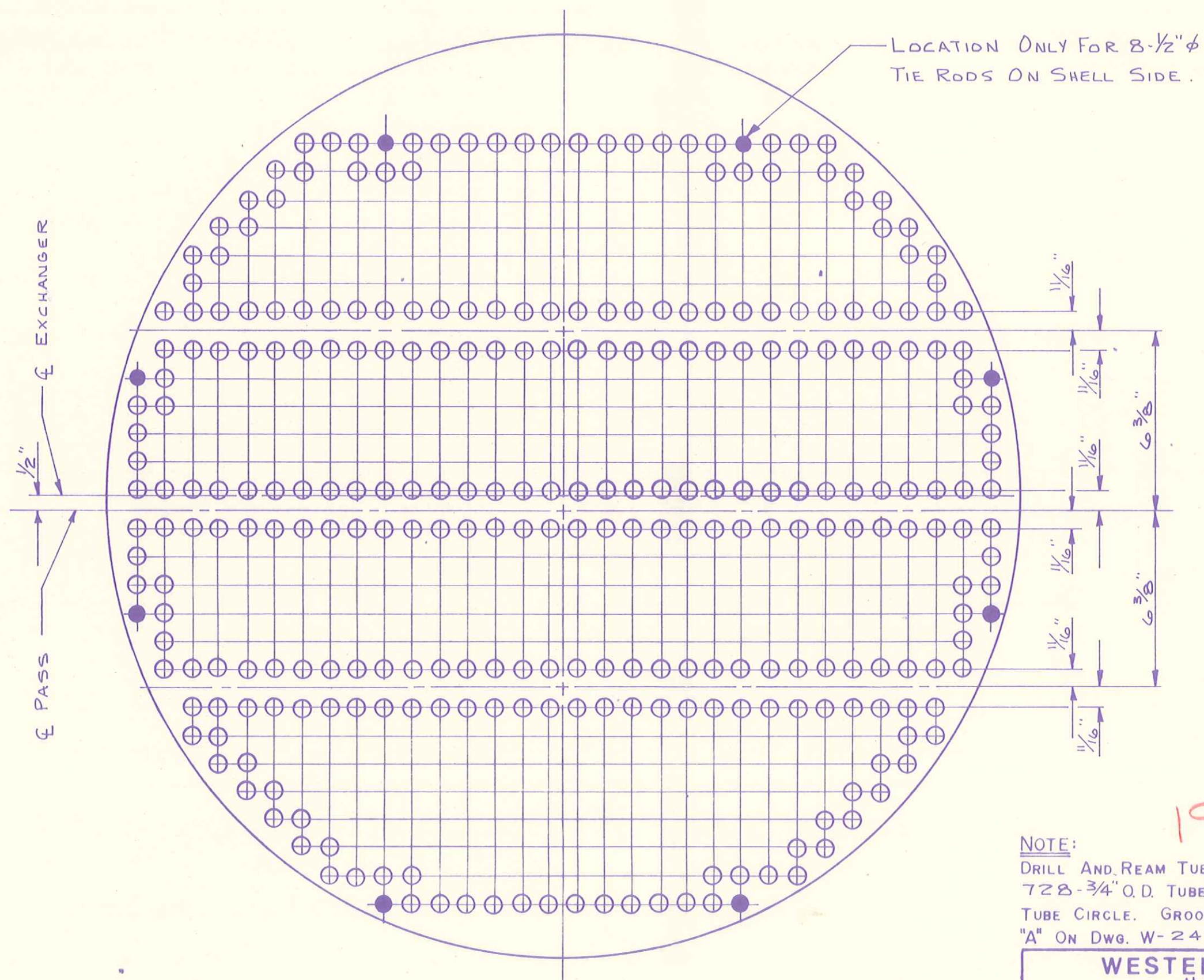
BACK CHANNEL

- NOTES:
 1. FOR WELD DETAILS SEE DWG. STD.-1.
 2. SPOT RADIOGRAPH CHANNEL.



19-E-43R

					WESTERN SUPPLY COMPANY			
					TULSA, OKLAHOMA			
					BACK CHANNEL DETAIL			
					DR. MARK	DATE 6-11-79	SIZE 33" X 12'	DWG. NO.
					CK. Tom C.	SCALE 1/4"	TYPE BEM	W-2476-1-EC
REV.	DESCRIPTION	DATE	BY	CF	W-2476-1	ONE	REQ'D	



176
188
186
178

TUBES PER PASS

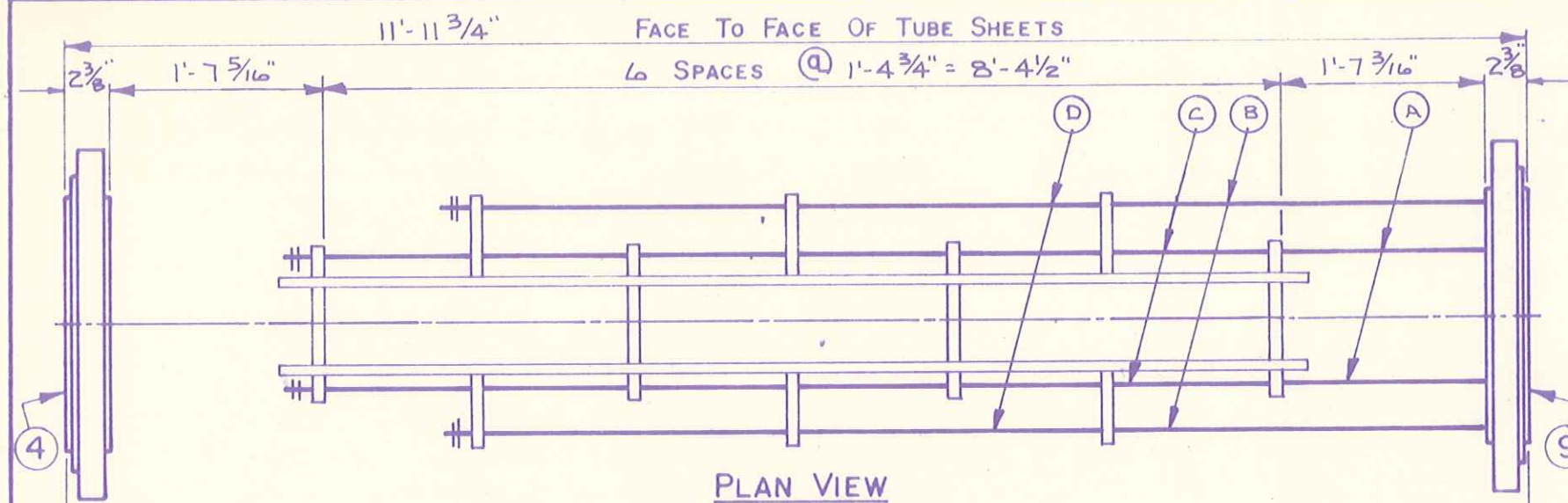
19-E-43R

NOTE:
 DRILL AND REAM TUBE HOLES TO .758" ±.002" FOR
 728-3/4" O.D. TUBES ON 1" □ PITCH AND 32 3/4"
 TUBE CIRCLE. GROOVE TUBE HOLES PER DETAIL
 "A" ON DWG. W-2476-1-FC

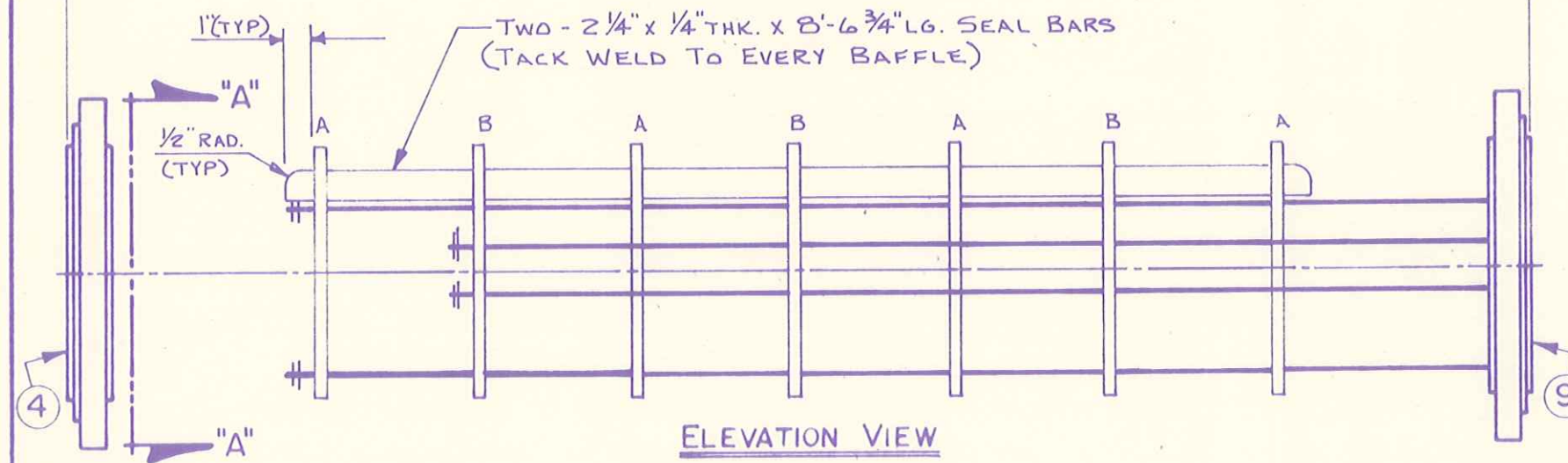
WESTERN SUPPLY DIVISION				
therma technology, inc.				
TULSA, OKLAHOMA				
TUBE LAYOUT				
DR MARK	DATE 5-30-79	SIZE 33" X 12'	DWG. NO	
CK TEM G	SCALE NONE	TYPE BEM	W-2476-1-GC	

VIEW LOOKING AT TUBE SIDE OF #4 TUBE SHEET

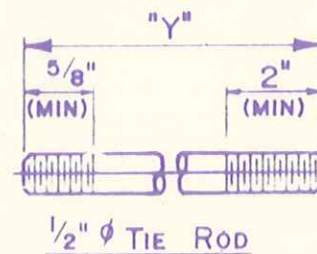
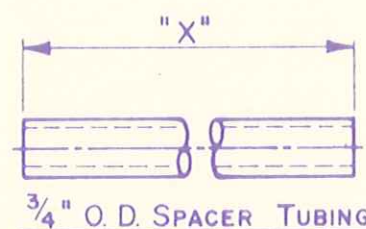
REV.	DESCRIPTION	DATE	BY	CK	W O	REQ D



PLAN VIEW



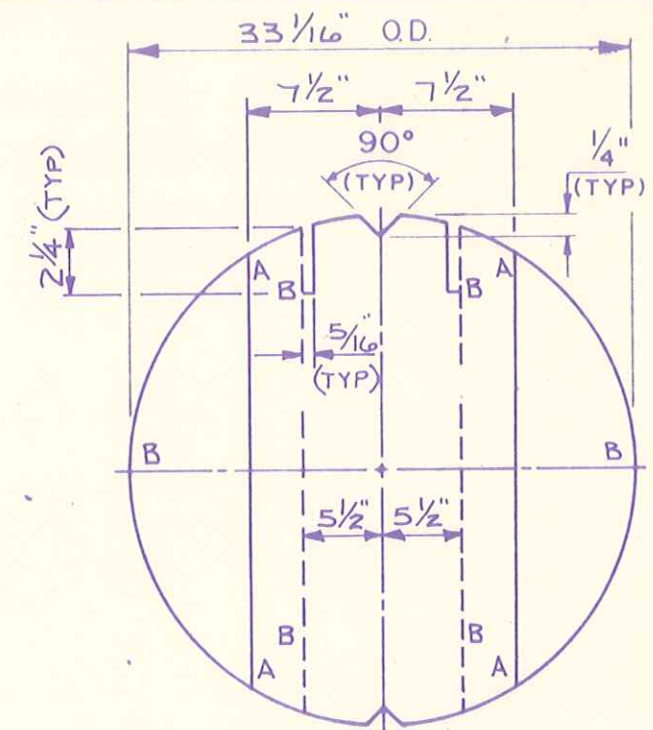
ELEVATION VIEW



Mk'D	REQ'D	"X"	Mk'D	REQ'D	"X"	REQ'D	"Y"
(A)	4	1'-7 3/16"	(B)	4	2'-11 5/16"	4	10'-2 3/8"
(B)	4	2'-11 5/16"	(C)	24	1'-4 7/16"	4	8'-9 5/8"
(C)	24	1'-4 7/16"	(D)	8	2'-9 3/16"		
(D)	8	2'-9 3/16"					

NOTES:

1. DRILL $2\frac{5}{32}$ " DIA. HOLES FOR TUBES.
2. DRILL $\frac{9}{16}$ " DIA. HOLES FOR TIE RODS.
3. DEBURR ALL TUBE HOLES.
4. REMOVE ALL SHARP CORNERS ON BAFFLES.



VIEW "A-A" BAFFLES

- 4 - REQ'D CUT "AAAA"
 3 - REQ'D CUT "BBB-BBB"
 5/16" THK.

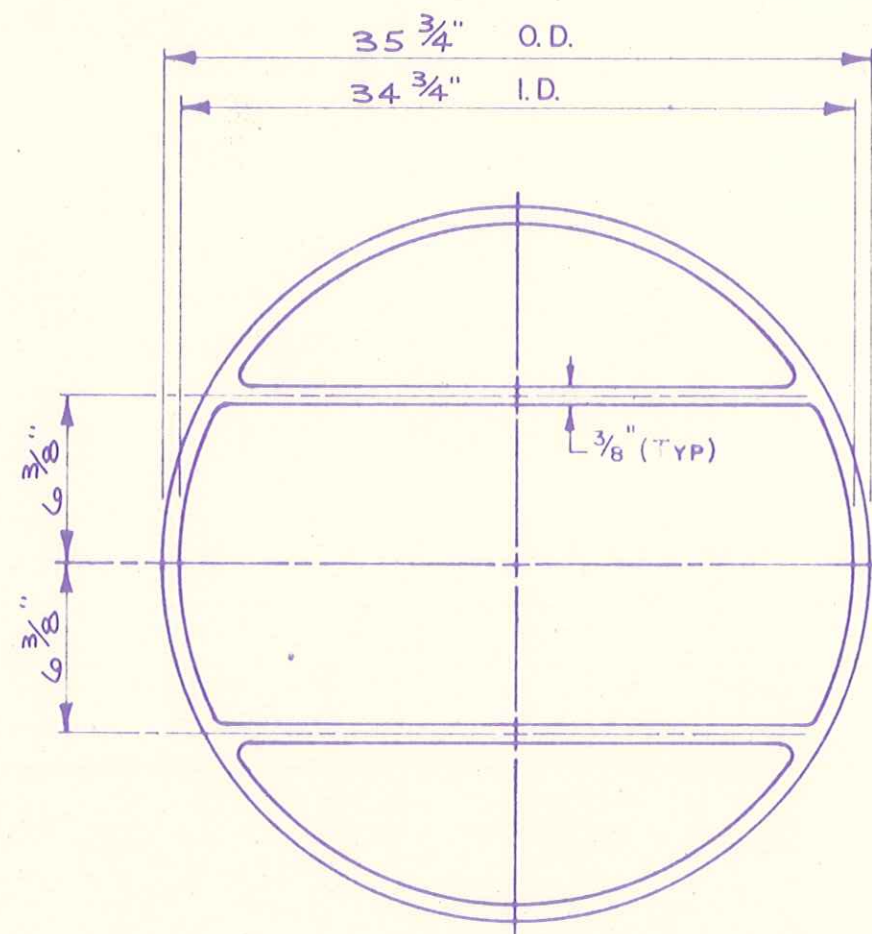
19-E-43R

WESTERN SUPPLY DIVISION
 therma technology, inc.
 TULSA, OKLAHOMA

BUNDLE DETAILS

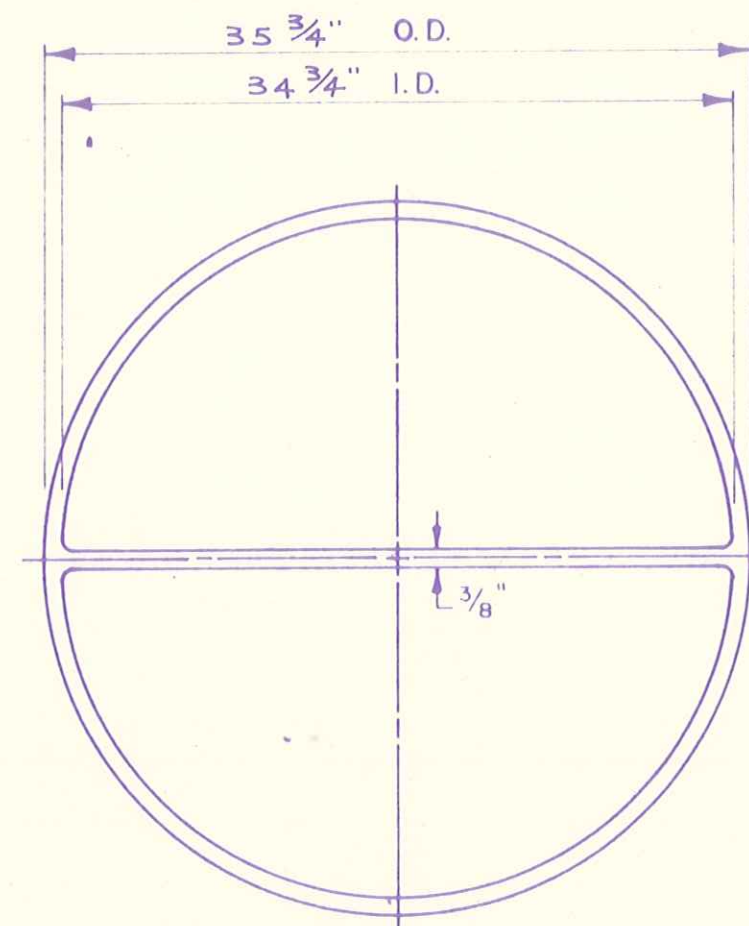
REV	DESCRIPTION	DATE	BY	CK	W O	REQ D	DR MARK	DATE	SIZE	DWG. NO
							Tom C.	6-12-79	33" X 12'	W-2476-1-HC
								SCALE	TYPE	
								NONE	BEM	

ALL RIB RADII ARE 1/4"



FRONT CHANNEL
GASKET

ONE REQ'D
1/8" THK ARMCO IRON
JACKETED ASBESTOS
FILLED



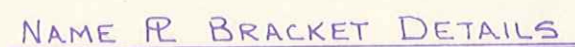
BACK CHANNEL
GASKET

ONE REQ'D
1/8" THK ARMCO IRON
JACKETED ASBESTOS
FILLED

REQ'D AS NOTED
FOR ONE SET

19-E-432

						WESTERN SUPPLY DIVISION			
						therma technology, inc.			
						TULSA, OKLAHOMA			
						GASKET DETAILS			
						DR	DATE	SIZE	DWG NO
						MARK	5-30-79	33"x12'	
						CK	SCALE	TYPE	
						TOM C.	NONE	BEM	
REV.	DESCRIPTION	DATE	BY	CK	W O	REQ'D			
						W-2476-1	ONE SET		W-2476-1-JC



NAME R DETAILS

19-E-43R

							WESTERN SUPPLY DIVISION therma technology, inc. TULSA, OKLAHOMA			
							NAME PLATE			
					W-2476-1	ONE EACH	DR. MARK	DATE 5-30-79	SIZE 33"x12'	DWG. NO.
REV.	DESCRIPTION	DATE	BY	CK.	W. O.	REQ'D.	CK. Tom C.	SCALE NONE	TYPE BEM	W-2476-1-KC

WESTERN SUPPLY DIV.
 therma technology, inc.

BILL OF MATERIAL

SHEET 1 OF 2

CUSTOMER CLARK OIL AND REFINING CORP.ONE REQ'D, TYPE BEM, 33" X 12" LG.DR. BY MDK CK. BY LOW DATE 5-9-79SCHEDULED TO SHIP: SEPT. 21, 1979

REV.	BY	CK	DATE	DESCRIPTION	B/M NO.	DATE	ISSUED BY	WORKED BY	DATE
1	MARK	Tom G.	6-18-79	W.S.D.V.		5-11	#	DRH	5-11
						6-11	#	MTA	6-11

	MATERIAL SPECIFICATION	QTY. FOR ONE	TOTAL QTY. REQ'D	REV.	I. B. M. PART NUMBER	X-STOCK ← D. O.	UNIT OF MEAS.	KEY PUNCH QUANTITY	USED	VENDOR / REMARKS	PURCHASE ORDER NUMBER	DATE PROM.	DATE REC'D.
	SA-105-N	1	1										
	SA-515-70	1	1		02093		LB	197					
	SA-516-70	1	1										
	SA-105	2	2		1558		EA	2					
	MAGNESIUM	3	3		4300		EA	3					
	SA-53-B	2	2		1035		IN	12					
PASS R	SA-36	2	2		2004		LB	2.30					
	SA-240-304L	1	1										
	SA-105	2	2										
	✓	1	1										
	SA-312-TP304L	1	1										
2'S)	SA-240-304L	2	2										
	SA-102-F304L	3	3		1878		EA	3					
	✓	3	3		1753		EA	3					
	STN. STL.	1	1		EXP								
76-1-KC	304 S.S.	1	1							CUT DROP P. O. 33186			
PADS)	✓	2	2		3570		FI	7					
	STL.												
	SA-105-N	1	1										
	SA-516-70	1	1										
	MAGNESIUM	2	2		4300		EA	2					
R.)	SA-36	1	1		2004		LB	1.5					
	SA-240-304L	1	1										
	✓	1	1										
3/8" ENDS)	LO-FIN SA-249-304	728	728										
	SA-240-304	7	7										
	✓	1	1							CUT DROP P. #33, 86			
	STN. STL.	76'	76'	1	3342		FI	80					
	✓	76'	76'	1	252		FI	76					
	✓	16	16		3447		EA	16					
	✓	2	2										

19-E-43 R

W-2476-1

WESTERN SUPPLY DIV.
therma technology, inc.

BILL OF MATERIAL

SHEET 2 OF 2

CUSTOMER CLARK OIL AND REFINING CORP.
ONE REQ'D, TYPE BEM, 33" B.X 12' LG.
DR. BY MARK CK. BY TOM C. DATE 6-12-79
SCHEDULED TO SHIP: SEPT. 21, 1979

REV.	BY	CK	DATE	DESCRIPTION	B/M NO.	DATE	ISSUED BY	WORKED BY	DATE
					42	6-12	F	Dlt	6-18

19-E-43 R