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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 **CUST-O-FAB, INC. 8888 WEST 21st STREET SAND SPRINGS, OKLAHOMA 74063**
(Name and address of Manufacturer)

2. Manufactured for **TEXACO REFINING & MARKETING, INC. EL DORADO, KS 67042**
(Name and address of Purchaser)

3. Location of installation **TEXACO REFINING & MARKETING, INC. EL DORADO, KS 67042**
(Name and address)

4. Type: **HORIZONTAL** **HEAT EXCHANGER** **96-049**
(Horiz., vert., or sphere) (Tank, separator, etc. vessel, heat exch., etc.) (Mfg's serial No.)
NONE **96-049B, REV. 2** **4217** **1996**
(CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)
5. ASME Code, Section VIII, Div. 1 **1995** **NONE** **NONE**
Edition and Addenda (date) Code Case No. 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): **TWO** (b) Overall length (ft. & in.): **9'-7 1/2"**

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	41" ID	8'-0"	SA-240-316L		3/8"	0"	1	SPOT	0.85	1	SPOT	0.85	NONE	---
1	41" ID	1'-7 1/2"	SA-240-316L		3/8"	0"	1	SPOT	0.85	1	SPOT	0.85	NONE	---

7. Heads: (a) **SEE ITEM 12: TUBESHEET** (b)
(Mat'l Spec. No., Grade or Type) H. T. - Time & Temp. (Mat'l Spec. No., Grade or Type) H. T. - Time & Temp.

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

If removable, bolts used (describe other fastening) **NONE**
(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 **NONE** If bolted, describe or sketch.

9. MAWP **75** **15** psi at max. temp. **450** **450** °F Min. design metal temp. **-20** °F at **75** psi.
(internal) (external) (internal) (external)

10. Impact test **NO, EXEMPT PER UHA-51(d).**
(Indicate yes or no and the component(s) impact tested)

11. Hydro., pneu., or comb. test press. **113** Proof test **NONE**

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: **(2) SA-240-316L** **41"** **2 1/4"** **0", 3/16"** **WELDED**
Stationary (Mat'l Spec. No.) Dia., in. (subject to press.) Nom. thk., in. Corr. Allow., in. Attachment (welded or bolted)
NONE
Floating (Mat'l Spec. No.) Dia., in. Nom. thk., in. Corr. Allow., in. Attachment

13. Tubes: **SA-249 TP316L LOFIN** **3/4"** **0.065" (AVG) UNDER FIN** **1248** **STRAIGHT**
Mat'l Spec. No., Grade or Type O.D., in. Nom. thk., in. or gauge Number 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): **ONE** (b) Overall length (ft. & in.): **0'-11 5/16"**

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	41" ID	0'-11 5/16"	SA-516-70		1/2"	1/16"	1	SPOT	0.85	1	SPOT	0.85	NONE	---

15. Heads: (a) **SA-516-70, NONE** (b) **SA-105, NONE**
(Mat'l Spec. No., Grade or Type) H. T. - Time & Temp. (Mat'l Spec. No., Grade or Type) H. T. - Time & Temp.
(c) **SA-105, NONE** (d) **SA-516-70, NONE**
(Mat'l Spec. No., Grade or Type) H. T. - Time & Temp. (Mat'l Spec. No., Grade or Type) H. T. - Time & Temp.

Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
	Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a) END	7/16"	1/16"			2:1					XXXX	S	NONE	0.85
(b) END	46 1/8" OD x 41" ID x 3 3/4" THK ASME CODE HUB FLANGE												
(c) END	46 1/8" OD x 41" ID x 3 3/4" THK ASME CODE HUB FLANGE												
(d) END	7/16"	1/16"			2:1					XXXX	S	NONE	0.85

If removable, bolts used (describe other fastening) **(b) & (c) SA-193-B7, 3/4" DIA, 56 (each) / SA-194-2H, HEX NUTS, 112 (each)**
(Mat'l Spec. No., Grade, Size, No.)

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16. MAWP 75 psi at max. temp. 200 °F Min. design metal temp. -20 °F at 75 psi
(internal) (external) (internal) (external)

17. Impact test NO, EXEMPT PER UG-20(f).

(Indicate yes or no and the component(s) impact tested)

18. Hydro., ~~pneu.~~ or ~~comb.~~ test press. 113 Proof test NONE

* SA-312 TP316L

** SA182 F316L

19. Nozzles, inspection, and safety valve openings: *** SA-240-316L

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	
CHAN INLET	1	6 NPS	150# WN	SA-106B	SA-105	0.432"	1/16"		WELDED	WELDED	BTM
CHAN OUTLET	1	6 NPS	150# WN	SA-106B	SA-105	0.432"	1/16"		WELDED	WELDED	TOP
SHELL OUTLET	2	4 NPS	150# WN	*	**	0.337"	0"		WELDED	WELDED	BTM
SHELL INLET	1	36 NPS	150# WN	***	**	3/8"	0"		WELDED	WELDED	TOP
AUX CONN	2	4 NPS	150# WN	*	**	0.337"	0"		WELDED	WELDED	SIDE
VENT	2	1 NPS	CPLG	SA-105		6000#	1/16"		WELDED		TOP
DRAIN	2	1 NPS	CPLG	SA-105		6000#	1/16"		WELDED		BTM
AUX CONN	2	4 NPS	150# WN	SA-106B	SA-105	0.337"	1/16"		WELDED	WELDED	
AUX CONN	2	3/4 NPS	CPLG	SA-105		6000#	1/16"		WELDED		
AUX CONN	10	3/4 NPS	CPLG	**		6000#	0"		WELDED		

20. Supports: Skirt NO Lugs NONE Legs TWO Others SADDLES Attached WELDED TO SHELL
(Yes or no) (No.) (No.) (Describe) (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: 41-120 TEMA TYPE "BXM" HEAT EXCHANGER
SERVICE: FLASH COLUMN CONDENSER TEMA REG. NO.: 26-96-049-191
P.O. NO.: XSED-90859-A1-JNP ITEM NO.: C-3084
SAFETY RELIEF DEVICES LOCATED ELSEWHERE IN SYSTEM
OPENING ATTACHMENTS 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. 12768

Expires APRIL 15, 19 99

Date 4/12/96 Name CUST-O-FAB, INC.

(Manufacturer)

Signed Rich B. McElroy
(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 4/12/96, 19 96, 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.

Date 4/12/96 Signed [Signature]
(Authorized Inspector)

Commissions NAHB 8225A CH 268
(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 _____

Signed _____
(Representative)

(Assembler)

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

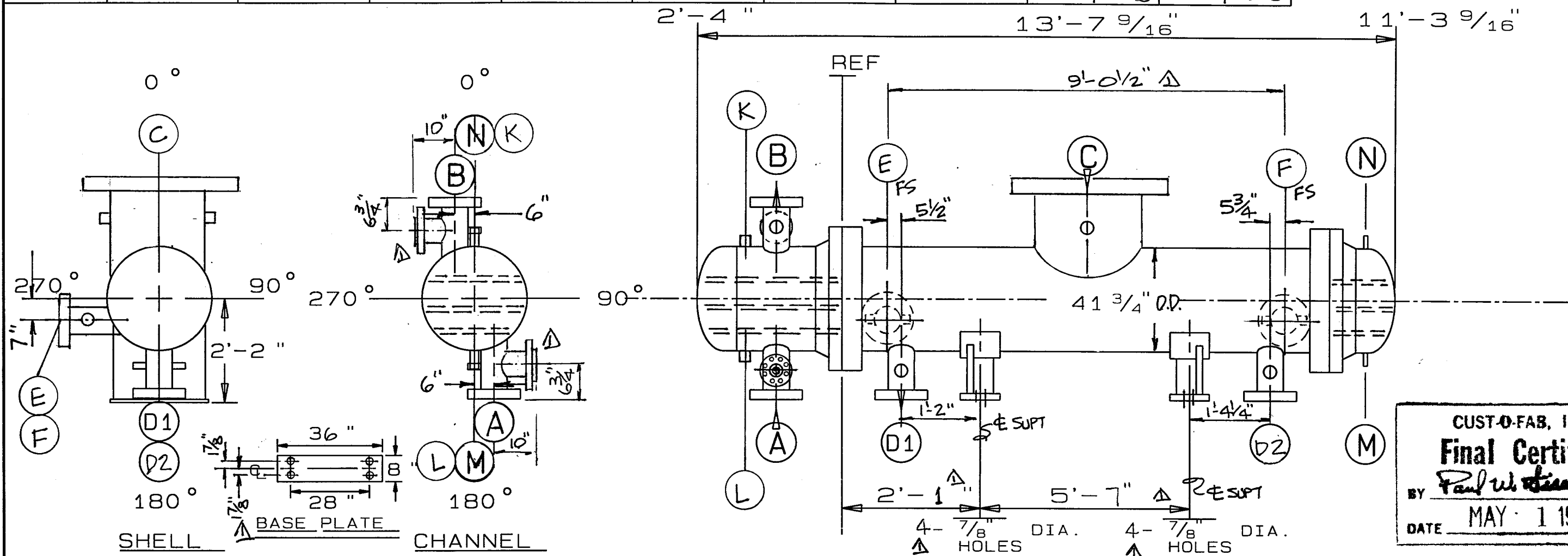
his employer makes any warranty, expressed or implied, concerning the pressure vessel described in the Manufacturer's Data Report. Furthermore,

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.)

MARK	A	B	D1	D2	C	E	F	K	N	L	M
FLOW	INLET	OUTLET	OUTLET	OUTLET	INLET	AUX	AUX	VENT			DRAIN
SIZE	6" 150	6" 150	4" 150	4" 150	36" 150	4" 150	4" 150	1" 6000	1" 6000		
FACING	RF WN	RF WN	RF WN	RF WN	RF WN	RF WN	RF WN	CPLG	CPLG		
AUX. CONN.	NS 4" 150 RF WN FS 3/4" 6000 CLPG	NS 3/4" 6000 CLPG FS 4" 150 RF WN	NS 3/4" 6000 CLPG FS 3/4" 6000 CLPG	NS 3/4" 6000 CLPG FS 3/4" 6000 CLPG	NS 3/4" 6000 CLPG FS 3/4" 6000 CLPG	NS 3/4" 6000 CLPG FS 3/4" 6000 CLPG	NS 3/4" 6000 CLPG FS 3/4" 6000 CLPG				
PROJ. FROM CTR. LINE	2'-5"	2'-5"	2'-5"	2'-5"	4'-3"	2'-5"	2'-5"				
DIST. TO REF.	9"	9"	11" Δ	9'-0 1/4" Δ	4'-11 3/4"	5 1/2"	9'-6"	1'-1 3/8"	10'-5 1/8"	1'-1 3/8"	10'-5 1/8"




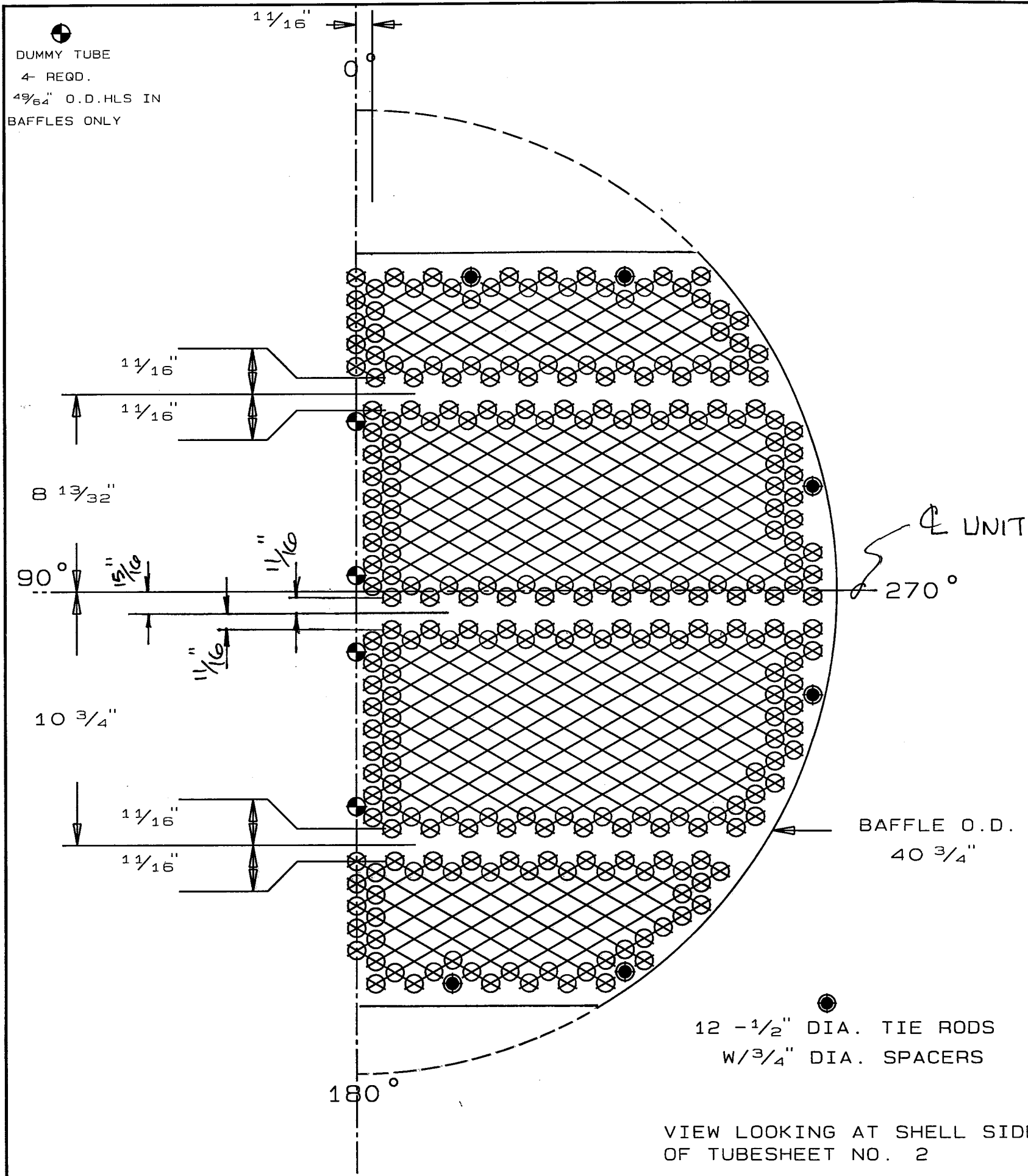
CUST-O-FAB, INC.
Final Certified
 BY *Paul W. [Signature]*
 DATE MAY 1 1996

ESTIMATED WEIGHTS			SPECIFICATION FOR ONE UNIT				FABRICATION REQUIREMENTS		<div>CUST-O-FAB, INC. SAND SPRINGS, OKLAHOMA</div>		
			SHELL SIDE		TUBE SIDE						
DRY 14000.			DESIGN PRESS	75/-15	PSIG	75	PSIG	TEMA CLASS R		CUSTOMER: TEXACO REF & MKTG, INC P.O. NO: XSED-90859-A1-JNP	
WET 21800.			TEST PRESS	113	PSIG	113	PSIG	ASME CODE SECTION VIII			
			DESIGN TEMP	450 /- 20	° F	200 /- 20	° F	DIV. 1, '95 ED			
			CORR.ALLOW.	NONE		1/16"		ASME CODE STAMP IS REQUIRED			
			NO.PASSES	ONE		6		NATIONAL BOARD NO. IS REQUIRED		SCALE: NONE DATE: 01-29-96	
			NO.TUBES	1248	3/4"	ODX .065A.	UNDER FIN WALL	HEAT TREAT: NONE			
			TUBE MATERIAL	SA-249TP316L LO-FIN				SPOT XRAY SHELL		DIMENSIONAL OUTLINE	
			TUBE SURFACE	5981	SQ.FT./SHELL			SPOT XRAY CHANNEL			
	3/18/96	Rev Noz. NIM Loc / GP / Rm.	TUBE PITCH	15/16"	TRI.		SB/SP6 & PRIME W/ INOR. ZINC		DRAWN BY: PETE		
	2/4/96	Rev Cost / Rm.	MATERIAL	SHELL SIDE: 316L STN STL - CHANNELS: CARBON STEEL				(CARBO-ZINC 11 (GRAY GREEN))			
REV	DATE	DESCRIPTION	GASKET MAT'L	SIDJNAF				(CARBON STEEL ONLY)		CHECKED BY: RIC	
REVISIONS			2	SPARE SET		GASKETS		ALL BOLTHLS. TO STD'L QS.			

TAG NO:		C-3084		DWG. NO. 96-049B - 1	
SERVICE:		FLASH COLUMN CONDENSER			
SIZE:		41-120 BXM			

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 DUMMY TUBE
 4- REQD.
 49/64" O.D.HLS IN
 BAFFLES ONLY



- NOTES :
1. TC=40.5000 INCH. OTCL =39.7500 INCH.
 2. TUBE PITCH = .9375 INCH.
 3. PITCH TYPE IS TRIANGULAR
 4. TOTAL NO. TUBES = 1248

 CUST-O-FAB, INC.
 SAND SPRINGS, OKLAHOMA

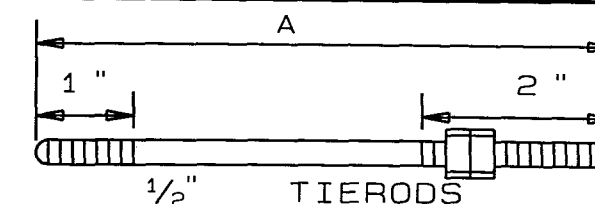
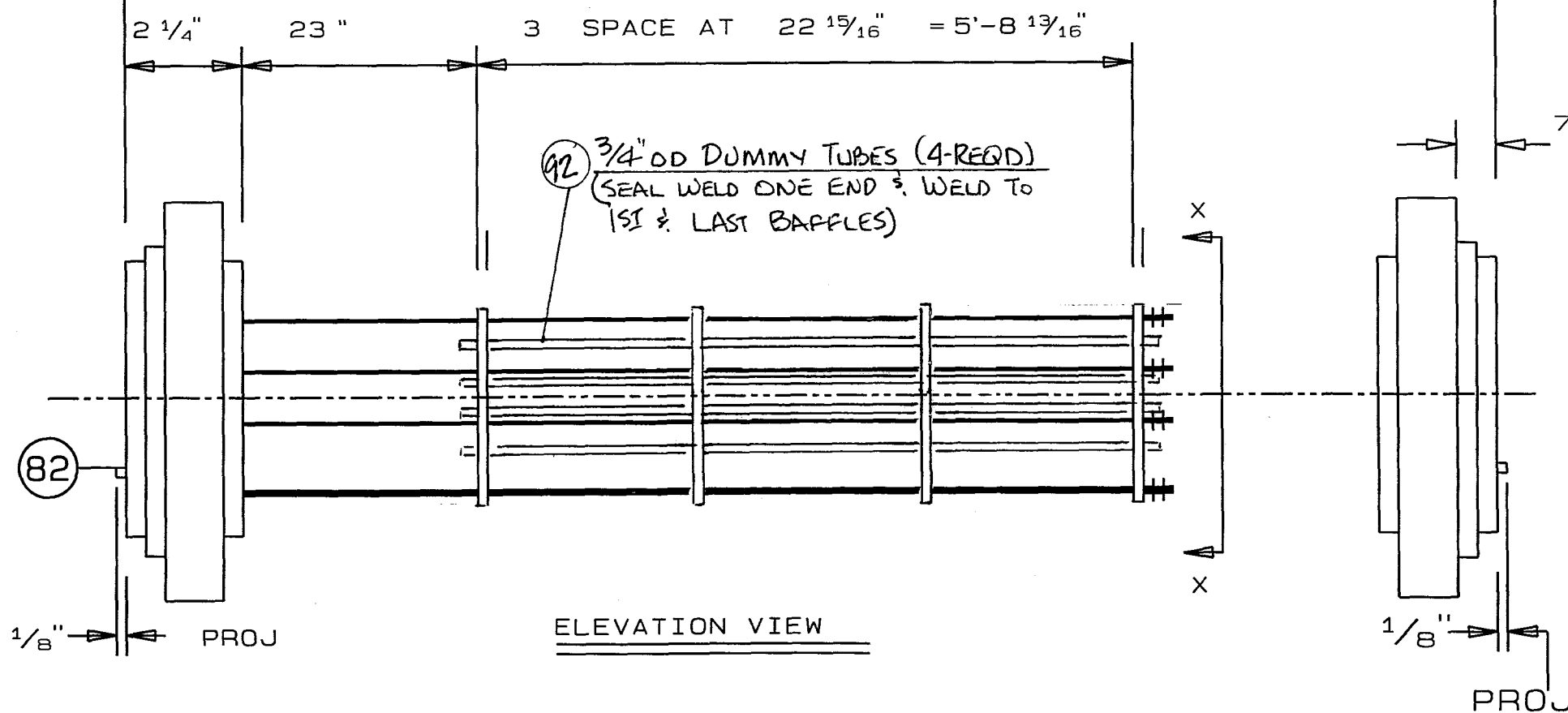
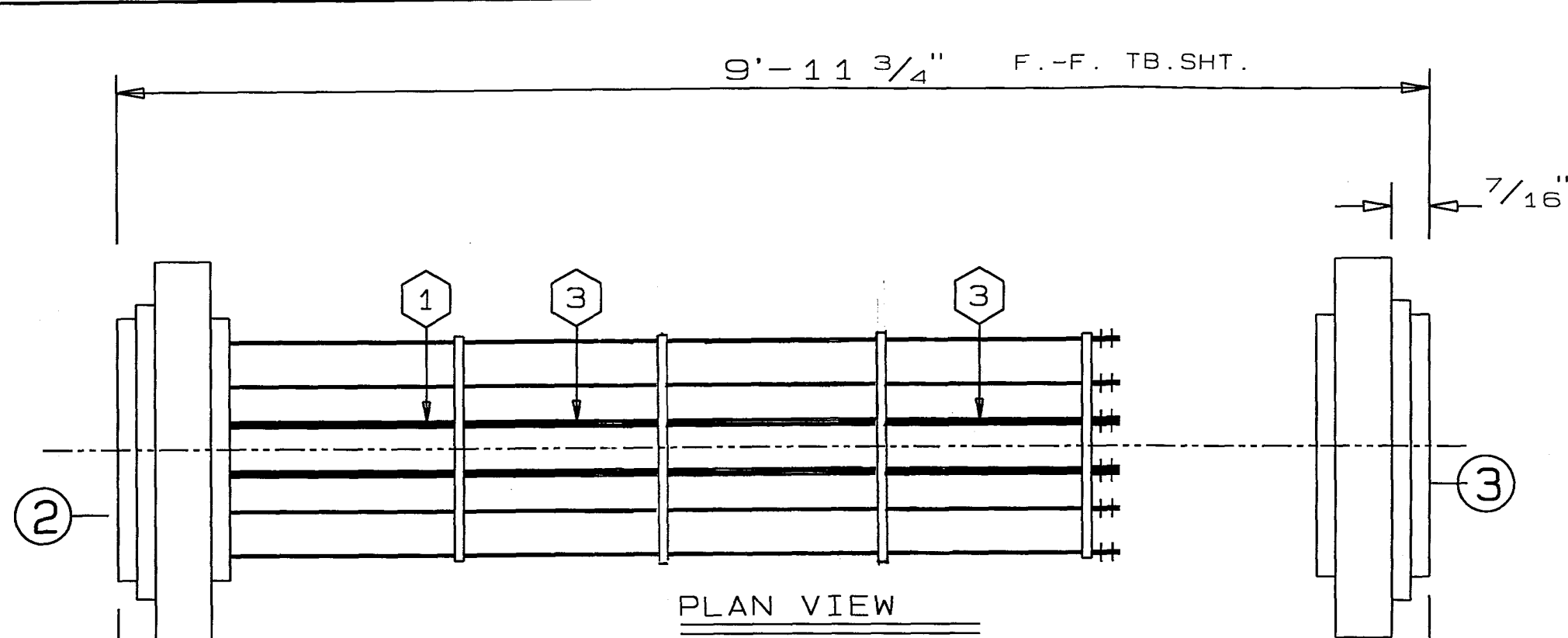
CUSTOMER: TEXACO REF & MKTG, INC
 P.O. NO: XSED-90859-A1-JNP

SCALE: NONE	TUBE LAYOUT	DRAWN BY: PETE
DATE: 01-29-96		CHECKED BY: RIC

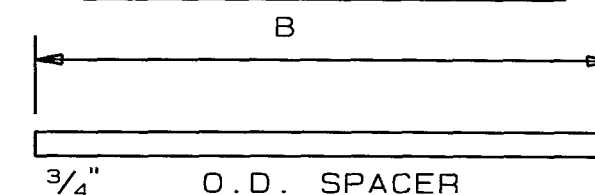
TAG NO: C-3084

DWG. NO.
 96-049B - 8

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NO.	A
12	7'-10 5/16"



TAG	NO.	B
1	12	23"
3	36	22 7/16"

NOTES

1. SEE SHEET 10 FOR VIEW XX
2. ROLL TUBES 2" DEEP

MAT'L: 316L STN STL

COF CUST-O-FAB, INC.
SAND SPRINGS, OKLAHOMA

CUSTOMER: TEXACO REF & MKTG, INC

P.O. NO: XSED-90859-A1-JNP

SCALE: NONE

BUNDLE
DETAILS

DRAWN BY: PETE

DATE: 01-29-96

CHECKED BY: RIC

TAG NO: C-3084

DWG. NO.
96-049B - 9

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6"

NAT'L BD. NO. 4217

COF CERTIFIED BY
CUST-O-FAB, INC.
SAND SPRINGS, OKLA

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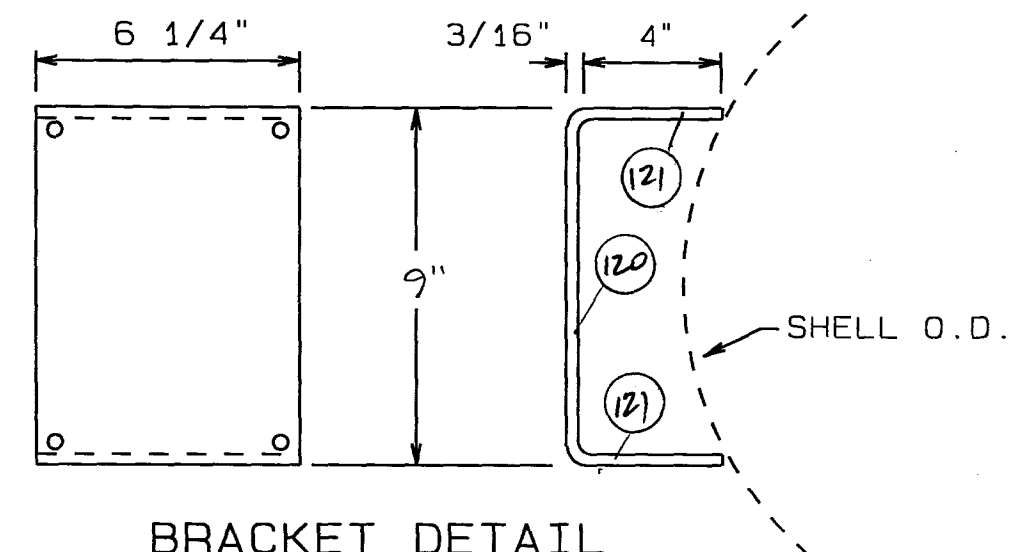
RT3

	MAWP	TEMP	TEST
SHELL SIDE	75* PSIG @	450 °F	113 PSIG
TUBE SIDE	75 PSIG @	200 °F	113 PSIG
SHELL SIDE MIN DESIGN METAL TEMP	-20 °F @	75 PSIG	
TUBE SIDE MIN DESIGN METAL TEMP	-20 °F @	75 PSIG	
SERIAL NO.	96-049	YEAR BUILT	1996
SIZE	41-120	TYPE	BXM
CUSTOMER	TEXACO REF & MKTG, INC		
P.O. NO.	XSED-90859-A1-JNP		
ITEM NO.	C-3084		
SERVICE	FLASH COLUMN CONDENSER		
*15.0PSI EXTERNAL AT 450 ° F			

8 1/4"

NAME PLATE DETAIL

ONE-REQ'D. MATERIAL: 18-8 STN. STL.



BRACKET DETAIL

ONE-REQ'D. MATERIAL: SA-240-316L

COF CUST-O-FAB, INC.
SAND SPRINGS, OKLAHOMA

CUSTOMER: TEXACO REF & MKTG, INC

P.O. NO: XSED-90859-A1-JNP

SCALE: NONE

NAME PLATE
DETAIL

DRAWN BY: PETE

DATE: 01-29-96

CHECKED BY: RIC

TAG NO: C-3084

DWG. NO.
96-049B - 13

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