532-A116C

FORM U-1 MANUFACTURERS' DATA REPORT FOR PRESSURE VESSELS
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured by THERMO TRAN, INC 690 FRANKLIN, BEAUMONT TEXAS 77704
2. Manufactured for M. W. Kellogg, Houston, Texas
(Name and address of purchaser)
3. Location of Installation I.M.C. Corporation, Sterlington, La.
(Name and address)
4. Type Horiz. (Horiz. or vert. tank) Vessel No. H-1441 (Mfr's Serial No.) (CRN) H-1441 (Drawing)
139 (Nat'l Bd No.) Year Built 1976
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 1974 (Year)
and Addenda to None (Date) and Code Case no
Special service per UG-120(d)
Manufacturers' Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report:
(Name of part, item number, mfr's name and identifying stamp)

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

6. Shell. Material SA-516-70 (Spec. No., Grade) Nominal Thickness 1/2 in. Corrosion Allowance 1/8 in
Diam. 2 ft. 10 in. Length 13 ft. 2-15/16 in.
7. Seams: Longitudinal Dbl. Butt Weld (welded, Dbl., Sngl., Lap, Butt) R T Spot (Spot or Full) Efficiency 85 %
H.T. Temp - - F Time - - Girth Dbl. Butt Weld (Welded, Dbl., Sngl., Lap, Butt)
R.T. Spot (Spot, Partial, or Full) No. of Courses 2
8. Heads (a) Material SA-516-70 (Spec. No., Grade) (b) Material (Spec. No., Grade)

	Location (Top, Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio
(a)	End	1/2"Nom.				2:1
(b)						

	Conical Apex Angle	Hemispherical Radius	Flat (Diameter)	Side to Pressure (Convex or Concave)
(a)			34"	Concave
(b)				

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

9. Type of Jacket Proof Test
10. Jacket Closure (Describe as rope & weld, bar, etc.) If bar, give dimensions
If bolted, describe or sketch
11. Constructed for max. allowable working pressure 150 psi at max. temp. 150 F Min. temp. (when less than -20 F) F Hydrostatic, pneumatic, or combination test pressure 225 psi

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 April 23, 1976 Signed THERMO TRAN, INC (Manufacturer) by (Representative)

"U" Certificate of Authorization No 7121 expires DECEMBER 31 19 78

CERTIFICATE OF SHOP INSPECTION

Vessel made by THERMO TRAN, INC at BEAUMONT, TEXAS 77704

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 TEXAS and employed by HARTFORD STEAM BOILER INSPECTION & INSURANCE CO. of HARTFORD, CONN. have inspected the pressure vessel described in this Manufacturers' Data Report on 4/21/76, 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 5/14/76

Signed (Inspector) Commissions NB 7715 (Nat'l Board, State, Province and No.)

SERIAL NO. B-1441

FORM U-1 (BACK)

Items 12 and 13 to be completed for tube sections

12. Tubesheets: Stationary--Material SA-105 (Spec. No. Gr.) Diam. 35-1/2 (Subject to Pressure) in.

Nominal Thickness 5-7/8 in. Corrosion Allowance ____ in. Attachment Bolted (Welded, Bolted)

Floating--Material ____ (Spec. No., Gr.) Diam. ____ in.

Nominal Thickness ____ in. Corrosion Allowance ____ in.

Attached ____ (Where and how)

13. Tubes: Material SA-214 (Spec. No., Gr.) O.D. 3/4 in. Nominal Thickness 0.085 in. or gauge

Number 340 Type U (Straight or "U")

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

14. Shell: Material SA-516-70 (Spec. No., Gr.) Nominal Thickness 1-1/8 in. Corrosion Allowance 1/16 in.

Diam. 2 ft. 11-1/4 in. Length 1 ft. 11-1/8 in.

15. Seams: Longitudinal Dbl. Butt Weld (Welded, Db., Sngl., Lap, Butt) R.T. Full (Spot or Full) Efficiency 100 %

H.T. Temp 1150° F Time 1-1/2 hrs. Girth Dbl. Butt Weld (Welded, Dbl., Sngl. Lap, Butt)

R.T. Full (Spot, Partial or Full) No. of courses 1

16. Heads: (a) Material SA-515-70 (Spec. No., Grade) (b) Material ____ (Spec. No., Grade)

	Location (Top, Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio
(a)	End	1-1/8"Nom.				2:1
(b)						

	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)			33"	Concave
(b)				

If removable, bolts used (describe other fastenings) SA-193-B7--125,000--1-1/2"--36 (Material, Spec. No., Gr., Size, No.)

17. Constructed for max. allowable working pressure 1040 psi at max temp. 355 F. Min. temp. (when less than -20 F) ____ F. Hydrostatic, pneumatic, or combination test pressure 1560 psi.

Items below to be completed for all vessels where applicable

18. Safety Valve Outlets: Number In Line Size ____ Location ____

19. Nozzles:

Purpose (Inlet, Outlet, Drain)	Number	Diam. of Size	Type	Material	Nominal Thickness	Reinforcement Material	How Attached
Inlet	1	10"-600#	RFWN	Flg.SA-105	.500"	SA-516-70	Welded
Outlet	1 *	10"-600#	RFWN	Flg.SA-105	.500"	SA-516-70	Welded
Inl. & Out.	2	10"-150#	FFSO	Flg.SA-181-1	.500"	SA-516-70	Welded
Rupture	1	3"-150#	RFSO	Flg.SA-181-1	.438"	None	Welded

20. Inspection Openings:

Manholes No. ____ Size ____ Location ____

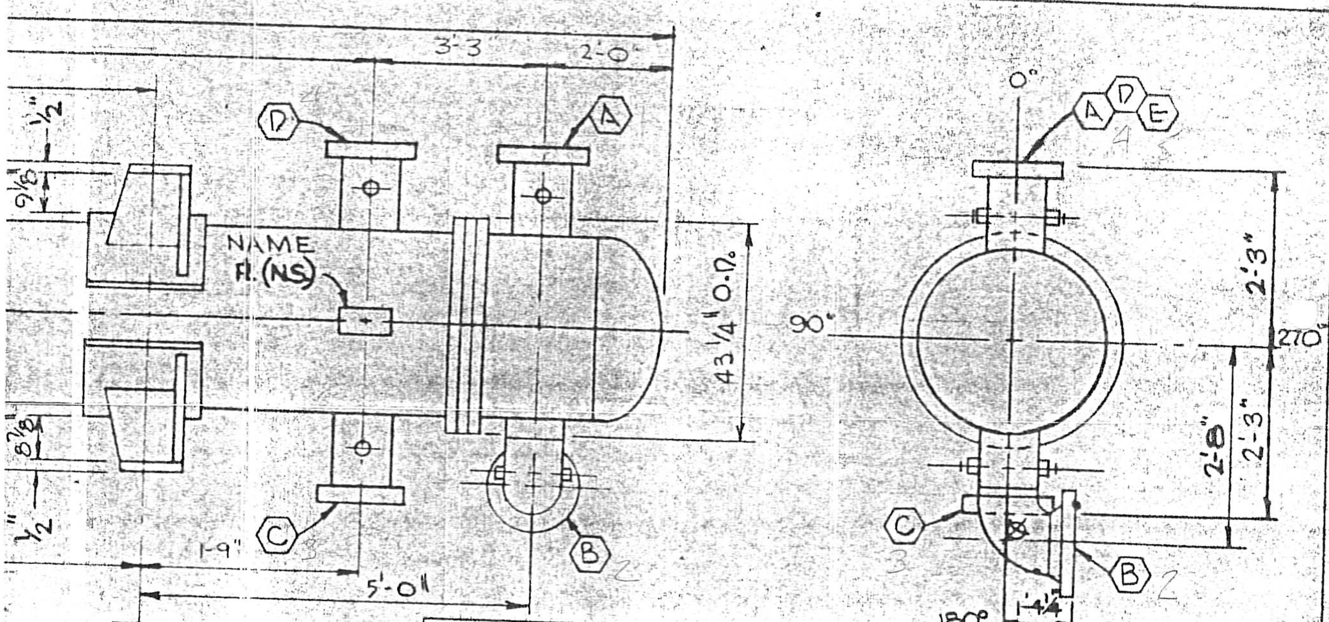
Handholes No. ____ Size ____ Location ____

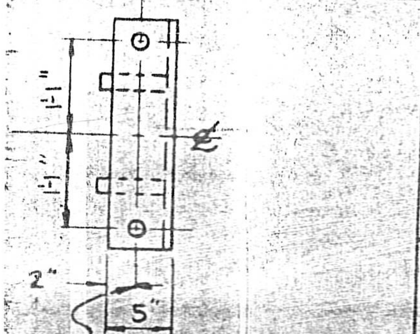
Threaded No. ____ Size ____ Location ____

21. Supports: Skirt ____ (Yes or No) Lugs ____ (No.) Legs 2 (No.) Other ____ (Describe)

Attached Welded to Shell (Where and how)

22. Remarks: * 10" X-Stg. (.500") S.R. 90° Ell - SA-234-WPB



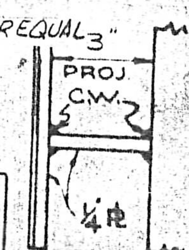


GENERAL NOTES:

EXCHANGER IS CONSTRUCTED & STAMPED TO ASME CODE, SECTION VIII, DIVISION I, LATEST REV & TEMA CLASS R & CUSTOMER SPECS; * *
ALL BOLT HOLES ARE TO STRADDLE ℄'s UNLESS NOTED OTHERWISE. NOZZLES AS INDICATED BELOW TO HAVE 6000# CPLGS W/ PLUGS.
POST WELD HEAT TREAT CHANNELS
RADIOGRAPH - SPOT SHELL & 100% CHAN
SHIPPING WT. _ 15,900#
FULL OF H_2O _ 20,200#
BUNDLE WT. _ 8,500#

	SHELL	TUBES
CORROSION ALLOW	1/8	1/16"
No OF PASSES	2	2

PAINT:
COMMERCIAL BLAST COMPLETE EXCH ~ PAINT EXTERNAL SURFACES THE SAME DAY. APPLY ONE COAT OF INORGANIC ZINC TO A DRY FILM THICKNESS OF 2.5 MILS. D.F.T. (AMERCOAT D-6, RUST BAN 188 OR EQUAL)

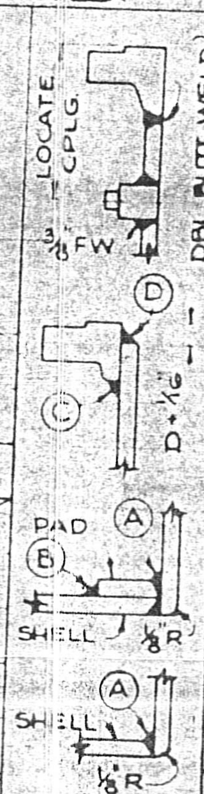


...O. JOB # 5103-P
...GTON, LOUISIANA
5103-P-C21-103C
...O. 116-C
...INTERSTAGE COOLER

REVISIONS:
(A) REV. PER CUST. 3-27-75 (GR)

USE 3/4 6000# FULL CPLGS IN NOZZLES SA-105

...CATE ...LG.	NOZZLE CPLGS.
4 1/4"	(2) 3/4"
4 1/4"	(2) 3/4"
45°	(2) 3/4"
1/2"	(2) 3/4"



WELD DTLS

THE M.W. KELLOGG ... EXCHANGER DIVISION ... NC ... JB

THERMOTRAN
BEAUMONT, TEXAS

NAT'L. BD No 139
ITEM NO 116-C
SIZE 33-156

		SHELL SIDE	TUBE SIDE
MAX DESIGN	P.S.I.	150	1040
MAX TEST	P.S.I.	225	1560
MAX TEMP	F°	150°	355

MFG SERIAL No H-1441 WT. 15,900 DATE
P.O.# 5103-P-C21-103C
W PRT PHT

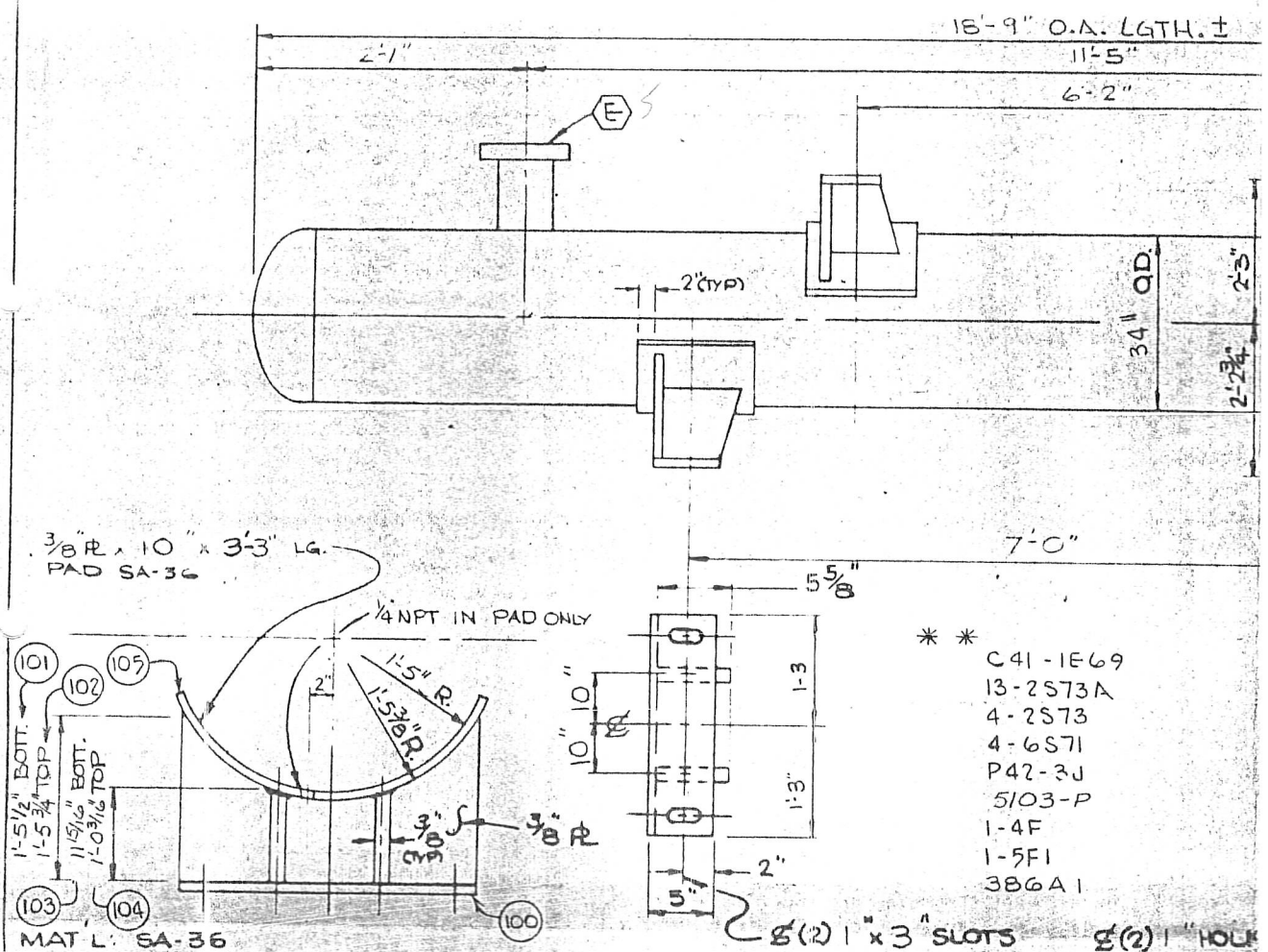
MAT'L: BRACKET ~ CAR STL NAME PL ~ 1/16 x 4" x 8" STN STL
NAME PLATE DETAIL
OCT 24 1975

CUSTOMER M.W. KELLOGG
SERVICE SYNTHESIS GAS COMPRESSOR INTERSTAGE COOLER

No REQ'D	TYPE	TUBE SURFACE
ONE	BFU	1822 SQ FT

DRAWN | CHKD | CERT.

THERMOTRAN
BEAUMONT, TEXAS
DWG No H-1441
SHEET No C1 of 11



MAT'L: SA-36

ALL WELDS TO BE 3/16" CONTINUOUS WELDS

M.W.K.

STERLIN

P.O. NO

ITEM

SERVICE: SYNTHESIS GAS COMPRESSOR

SHOP NOTE:

(1.) ALL MACHINED SURFACE TO BE COATED W/ RUST BAN # 328 OR EQUAL.

(2.) FINAL HYDRO-TEST WATER TO BE CLEAN SOLUTION OF 2.7% SODIUM NITRITE, 0.3% MONOSODIUM PHOSPHATE, & 0.17% NACCONOL-DB OR EQUIVALENT WETTING AGENT.

* 10" - X-STG (.500) SR 90° ELL SA-234-WPB

MARK Nº	Nº REQ'D	SIZE	SERVICE	TYPE FLG & MATERIAL	NOZZ. NECK & MATERIAL	CUT LGTH.	PAD SIZE & MAT'L.	WELD SIZES A	B	C	D
N5	1	3" 150# RF	RUPTURE	3" SCH 160 SA-53-B FLG SA-181 I	3" SCH 160 (.438) SA-53-B	10½"		3/8"		½"	¼"
N4	1	10" 150# RF	OUTLET	10" SCH STD FLG SA-105	10" X-STG (.500) SA-53-B	11¼"	13¾" O.D. x 3/8" THK SA-516-70	3/8"	3/8"	9/16"	¼"
N3	1	10" 150# RF	INLET	10" SCH STD FLG SA-181 I	10" X-STG (.500) SA-53-B	11¼"	13¾" O.D. x 3/8" THK SA-516-70	3/8"	3/8"	9/16"	¼"
N2	1	10" 150# RF	OUTLET	10" SCH STD FLG X-STG SA-105	10" X-STG (.500) SA-53-B	* 7 1/8"	18½" O.D. x 1⅛" SA-516-70	3/4"	3/4"		
N1	1	10" 150# RF	INLET	10" SCH STD FLG X-STG SA-105	10" X-STG (.500) SA-53-B	5⅝"	18½" O.D. x 1⅛" SA-516-70	3/4"	3/4"		

ENG EXCH 1A 7-66

ISS.	DATE	BY	APPR.

CLIENT I.M.C. Corporation

LOCATION Sterlington, Louisiana

KELLOGG

EXCHANGER SPECIFICATION SHEET

JOB NO. 5103

GENERAL

1	SERVICE OF UNIT	Syn. Gas Compr. Interstage Cooler		ITEM NO.	116-C
2	SIZE	33-6-156	TYPE BFU	CONNECTED IN	
3	SURFACE PER UNIT	1819 Ft^2	SHELLS PER UNIT One	MIN. SURFACE PER SHELL	1819 Ft^2

PERFORMANCE OF ONE UNIT

			SHELL SIDE	TUBE SIDE
4	FLUID CIRCULATED		Cooling Water	Synthesis Gas
5	TOTAL FLUID ENTERING	#/Hr.	306,500	107,813
6	VAPOR			85,340 N_2 ; 18,424 H_2
7	LIQUID		613 GPM	
8	STEAM			580
9	NON-CONDENSABLES			1,981 CH_4 ; 1488 A
10	FLUID VAPORIZED OR CONDENSED			
11	STEAM CONDENSED			315
12	GRAVITY - LIQUID			.993
13	VISCOSITY - LIQUID			
14	MOLECULAR WEIGHT - VAPOR			8.71 IN 8.70 OUT
15	TEMPERATURE IN	°F	90	207
16	TEMPERATURE OUT	°F	120	105
17	OPERATING PRESSURE	PSIG	45	935
18	NUMBER OF PASSES		Two	Two
19	VELOCITY	FT./SEC.		
20	PRESS. DROP - ALLOWABLE CALC.	PSIG	3.6	3.0 (EXCL NOZ)
21	FOULING RESISTANCE		.00167	.001
22	HEAT EXCHANGED - B.T.U./HR.	9,200,000		°F M.T.D. (CORRECTED) 41
23	TRANSFER RATE - SERVICE	123		CLEAN

CONSTRUCTION

24	DESIGN PRESSURE	PSIG	150		1040		
25	TEST. PRESSURE	PSIG	Per Code		Per Code		
26	DESIGN TEMPERATURE	°F	150		355		
27	TUBES C.S.	NO. 340U's	O.D. 3/4"	BWG. 14MW	LENGTH 13'-0"	PITCH 1" SQ.	
28	SHELL C.S. - Integral	I.D. 33"	O.D.		THICKNESS		
29	SHELL COVER C.S. - Integral				FLOATING HEAD COVER		
30	CHANNEL C.S. - Bonnet Type				CHANNEL COVER		
31	TUBE SHEETS - STATIONARY C.S.				FLOATING		
32	BAFFLES - CROSS C.S.		TYPE Segm.		THICKNESS		
33	BAFFLES - LONG C.S.		TYPE Lamiflex		THICKNESS		
34	TUBE SUPPORTS				THICKNESS		
35	GASKETS - FLTG COVER		SHELL Solid Steel		CHANNEL Solid Steel		
36	CONNECTIONS - SHELL-IN	10"	OUT 10"		SERIES 150 #FF		
37	CHANNEL-IN	10"	OUT 10"		SERIES 600 #RF		
38	CORROSION ALLOWANCE - SHELL SIDE	1/8"			TUBE SIDE 1/16"		
39	JOB SPECIFICATION Job 5103 Class "C" Purchasing Specification Summary Sheet						
40	REMARKS: MANUFACTURER SHALL GUARANTEE THAT SURFACE OFFERED WILL MEET OPERATING CONDITIONS SHOWN.						

41 Note:
42 1. See design sketch for long baffle.
43 2. Provide 3" 150 #RF rupture disc
44 connection on shell.
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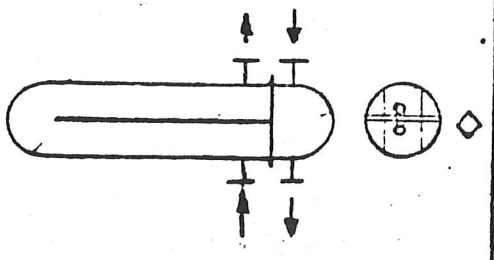

RATED	
THERMAL CHECK	
JOB LEADER	WW
MECH. CHECK	
APPROVED	