

FORM U-1 MANUFACTURERS' DATA REPORT FOR UNFIRED PRESSURE VESSELS

As required by the Provisions of the ASME Code Rules and the National Board

99557

136-C

1. Manufactured by TEXAS METAL FABRICATING CO., INC., HOUSTON, TEXAS
(Name and address of manufacturer)
2. Manufactured for THE H.W. KELLOGG CO. 900 COMMERCIAL SQUARE, ST. LOUIS, MO.
(Name and address of purchaser)
3. Type U-202 Kind HEAT EXCH Vessel No. 4075 (Mfr. Serial) (State & State No.)
Natl. Bd. No. 352 Yr. Built 1946

Items 4-9 incl. to be completed for single wall vessels (such as air tanks), jackets of jacketed vessels, or shells of heat exchangers.

4. SHELL: Material SA212B T.S. 70000 Nominal Thickness 5/8 In. Corrosion Allowance 1/8 In. Diam. 2 Ft. 6 1/4 In. Length 12 Ft. 11 1/2 In.
(Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.)
5. SEAMS: Long WDB H.T. NO X.R. SPOT Sectioned NO Efficiency 85 %
(Welded, Dbl., Single, Lap, Butt) (Yes or No) (Spot or Complete) (Yes or No)
Girth WDB H.T. NO X.R. SPOT Sectioned NO No. of Courses 3
6. HEADS: (a) Material SA212B T.S. 70000 (b) Material SA212B T.S. 70000
Location Thickness Crown Radius Knuckle Radius Elliptical Ratio Conical Apex Angle Hemispherical Radius Flat Diameter Side to Pressure
(Top, bottom, ends) (Material, Spec. No., T.S., Size, Number) (Describe or Attach Sketch)
If removable, bolts used NO Other fastening NO
7. STAYBOLTS: NO If hollow NO Attachment NO Pitch X Diam. NO
(Material) (Size of Hole) (Threaded, Welded) (Horiz.) (Vert.) (Nominal)
8. JACKET CLOSURE: NO
(Describe as u-gate & weld, bar, etc. If bar give dimensions, if bolted, describe or sketch)
9. Constructed for max. allowable working press. 425 psi. at max. temp. 265 °F. Min. temp. (when less than -20°) NO °F. Hydrostatic } Test }
Pneumatic or } Press. 653 psi.
Combination }

Items 10 and 11 to be completed for tube sections.

10. TUBE SHEETS: Stationary. Material SA212B T.S. 70000 Diam. 2 1/4 In. Thickness 5/8 In. Attachment NO
(Kind & Spec. No.) (Subject to Pressure) (Welded, Bolted)
Floating. Material NO Diam. NO In. Thickness NO In. Attachment NO
(Kind & Spec. No.)
11. TUBES: Material SA212B O.D. 2 1/4 In. Thickness 5/8 In. Number 364 Type STRAIGHT
(Kind & Spec. No.) (Straight or U)

Items 12-15 incl. to be completed for inner chambers of jacketed vessels, or channels of heat exchangers.

12. SHELL: Material SA212B T.S. 70000 Nominal Thickness 1 1/4 In. Corrosion Allowance 1/16 In. Diam. 2 Ft. 7 1/2 In. Length 1 Ft. 1 In.
(Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.)
13. SEAMS: Long WDB H.T. NO X.R. SPOT Sectioned NO Efficiency 85 %
(Welded, Dbl., Single, Lap, Butt) (Yes or No) (Spot or Complete) (Yes or No)
Girth WDB H.T. NO X.R. SPOT Sectioned NO No. of courses EACH
14. HEADS: (a) Material SA212B T.S. 70000 (b) Material SA212B T.S. 70000 (c) Material NO T.S. NO
Location Thickness Crown Radius Knuckle Radius Elliptical Ratio Conical Apex Angle Hemispherical Radius Flat Diameter Side to Pressure
(a) Top, bottom, ends 1 1/4 3 1/2 NO 2:1 NO NO NO CONCAVE
(b) Channel A-B
(c) Floating NO
If removable, bolts used (a) NO (b) SA1025, 125, 007, 19K-1, 19K-2, 19K-3
(Material, Spec. No., T.S., Size, Number) Other fastening NO (Describe or Attach Sketch)

15. Constructed for max. allowable working press. 1040 psi. at max. temp. 355 °F. Min. temp. (when less than -20°) NO °F. Hydrostatic } Test }
Pneumatic or } Press. 1565 psi.
Combination }

Items below to be completed for all vessels where applicable.

16. SAFETY VALVE OUTLETS: Number NO Size NO Location IN LINE
17. NOZZLES:
Purpose (Inlet, Outlet, Drain) Number Diam. or Size Type Material Thickness Reinforcement Material
OUTLET ONE 10"-600" WN-DE SA105-11 1 1/8" NO
INLET ONE 10"-600" WN-DE SA105-1 1 3/4" NO
IN & OUT ONE EACH 12"-14"-300" WN-DE SA105-1 500" SA105-11
18. INSPECTION Manholes, No. NO Size NO Location NO
OPENINGS: Handholes, No. NO Size NO Location NO
Threaded, No. 1-1/2 Size 1-1/2 Location 1/2" CH & CYL. FILL. CH & CYL. FILL.
19. SUPPORTS: Skirt NO Lugs NO Legs TWO Other NO Attached NO
(Yes or No) (Number) (Number) (Describe) (Where & How)

20. REMARKS: SYN/GAS-METHANATOR FEED EXCHANGER JH 11 136-C TYPE FR
CONTENTS: SHELL SIDE - METHANATOR FEED. TUBE SIDE - SYN GAS
(Brief description of purpose of the vessel, as Air Tank, After Cooler, Jacketed Cooler, etc. State contents of each part.) (Over)
* If postweld heat-treated.
* List other internal or external pressures with coincident temperature when applicable.

CUSTOMER COMMERCIAL SOLVENTS CORP.

ADDRESS

PLANT LOCATION STERLINGTON, LOUISIANAJOB NO. 5376DATE 12-7-65

ISSUE

(C)

EXCHANGER SPECIFICATION SHEET

GENERAL

1	SERVICE OF UNIT	SYNTHESIS GAS / METHANATOR FEED EXCHANGER		ITEM NO.	136-C	
2	SIZE	29-6-240	TYPE	BEM	CONNECTED IN	—
3	SURFACE PER UNIT	1,365	SHELLS PER UNIT	1	MIN. SURFACE PER SHELL	1,365

PERFORMANCE OF ONE UNIT

	SHELL SIDE	TUBE SIDE
FLUID CIRCULATED	<u>METHANATOR FEED</u>	<u>FRESH SYNTHESIS GAS</u>
TOTAL FLUID ENTERING $\#/\text{HR}$	<u>95,169</u>	<u>93,786</u>
VAPOR	<u>74,240-H₂; 1,325-A₂; 648-CH₄</u>	<u>74,306-H₂; 1,348-A₂</u>
LIQUID		
STEAM	<u>667</u>	<u>481</u>
NON-CONDENSABLES	<u>16,322-H₂; 1,869-CO; 48-CO₂</u>	<u>15,916-H₂; 1,735-CH₄</u>
FLUID VAPORIZED OR CONDENSED		
STEAM CONDENSED		
DENSITY - LIQUID		
VISCOSITY - LIQUID		
MOLECULAR WEIGHT - VAPOR	<u>8.64</u>	<u>8.7</u>
TEMPERATURE IN $^{\circ}\text{F}$	<u>110</u>	<u>330</u>
TEMPERATURE OUT $^{\circ}\text{F}$	<u>238</u>	<u>199</u>
OPERATING PRESSURE PSIG	<u>390</u>	<u>946</u>
NUMBER OF PASSES	<u>1</u>	<u>1</u>
VELOCITY FT./SEC.		
PRESS. DROP - ALLOWABLE CALC. PSIG	<u>1.8 (EXCLUDING NOZZLES)</u>	<u>1.7 (EXCLUDING NOZZLES)</u>
FOULING RESISTANCE	<u>0.00125</u>	<u>0.001</u>
HEAT EXCHANGED - B.T.U./HR.	<u>9,970,000</u>	<u>90.5</u>
TRANSFER RATE - SERVICE	<u>80.8</u>	<u>CLEAN</u>

CONSTRUCTION

DESIGN PRESSURE PSIG	<u>435</u>	<u>1040</u>
TEST PRESSURE PSIG	<u>655</u>	<u>1560</u>
DESIGN TEMPERATURE $^{\circ}\text{F}$	<u>265</u>	<u>355</u>
TUBES	<u>STEEL NO. 364 O.D. $\frac{3}{4}$" BWG. 14 H. LENGTH 20'-0" PITCH $\frac{5}{16}$" TRI</u>	
SHELL	<u>STEEL I.D. 29" THICKNESS</u>	
CHANNEL	<u>STEEL (BONNET TYPE)</u>	
TUBE SHEETS - STATIONARY	<u>STEEL</u>	
BAFFLES - CROSS	<u>STEEL TYPE SEGMENTAL THICKNESS</u>	
BAFFLES - LONG	<u>TYPE THICKNESS</u>	
TUBE SUPPORTS	<u>STEEL THICKNESS</u>	
GASKETS -	<u>SOLID STEEL</u>	
CONNECTIONS - SHELL IN	<u>12"</u>	<u>OUT 14" SERIES 300 # RF</u>
CHANNEL IN	<u>10"</u>	<u>OUT 10" SERIES 600 # RF</u>
CORROSION ALLOWANCE - SHELL SIDE	<u>$\frac{1}{8}$"</u>	<u>TUBE SIDE $\frac{1}{16}$"</u>
JOB SPECIFICATION	<u>5376 CLASS "C" PURCH DATA SHEET</u>	
REMARKS:	<u>MANUFACTURER SHALL GUARANTEE THAT SURFACE OFFERED WILL MEET OPERATING CONDITIONS SHOWN.</u>	

EXCHANGER IS SIZED FOR FLAT
TUBE BUNDLE, I.E. NO TUBES IN
BAFFLE WINDOW OPENINGS AS SHOWN
IN SKETCH, IN ORDER TO
MINIMIZE PRESSURE DROP



RATED	<u>A.D.</u>
THERMAL CHECK	<u>SEL</u>
JOB LEADER	<u>SEL</u>
MECH. CHECK	<u>W.F.M.</u>
APPROVED	<u>AK</u>

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TEXAS METAL FABRICATING CO., INC.

HEAT EXCHANGER RECORD

CUSTOMER: INTERNATIONAL MINERALS & CHEMICALS CORP.

C O: INTERNATIONAL MINERALS & CHEMICALS CORP.

ADDRESS: P. O. BOX 626, STERLINGTON, LOUISIANA 71280

ORDER NO.: 141096

SERVICE: REPLACEMENT SHELL & BUNDLE

SIZE: 29-240 TYPE: BEM

TMF FILE NO: 81067

TMF ITEM NO: 136-C

TMF SHOP NO: 4075-1

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MATERIAL SPECIFICATION AND ANALYSIS RECORD

CUSTOMER INTERNATIONAL MINERALS & CHEMICALS CORPORATION

STERLINGTON, LOUISIANA :

TMF FILE NO 81067

PURCHASE ORDER NO 141096

ITEM NO 136-C

TMF SHOP NO 4075-1

INSPECTED BY

FOR HSBI & I CO. HOUSTON, TEXAS

SERIAL NO.

PART NO.	DESCRIPTION	SOURCE	SPECIFICATION	HEAT NO.*	CHEMICAL ANALYSIS						PHYSICAL ANALYSIS			
					C	MN	P	S	SI.		YIELD PSI	TENSILE PSI	% ELONG. (8 IN.)	% RED AREA
1	NZ. N1 NK.	PIPE DIST.	SA-106-B	N34320	.23	.70	.008	.019	.19		42,600	69,800	21/40.0	
2											FLAT & HYDRO TESTS OK			
3	NZ. N2 NK.	U.S.S.	SA-106-B	L02806	.24	.90	.005	.014	.27		44,100	74,800	21/42.0	
4											FLAT & HYDRO TESTS OK			
5	A TU. SHTS.	LUKENS	SA-516-70-N	D-6971-5	.25	1.02	.007	.025	.27		44,100	77,000	21/28.0	
6	B TU. SHTS.	LUKENS	SA-516-70-N	D-8752-4	.25	.97	.007	.023	.23		43,700	75,200	21/24.0	
7	NZ. N1,N2 PADS	ARMCO	SA-285-C	98630-	.16	.45	.010	.030	.08		38,100	61,000	28.0	
8				X89679										
9	SH. RG. #1,#2,	U.S.S.	SA-516-70	3G9535-17	.21	1.09	.010	.014	.22		52,800	82,400	22.0	
10	#3													
11	NZ. N1 WELD	SOUTHWEST	SA-106-B/	*										
12	ELL	METAL	SA-234-WPB											
13	NZ. N1,N2 FLG.	P.P.I.	SA-105	*										
14	TUBES (364)	SOUTHWEST TU	SA-214	864094701	.095	.487	.016	.018			RB-54-70			
15				50437	.080	.370	.010	.020			FLAT, REV. FLAT, FLG., E.C.			
16				64523	.100	.410	.009	.016			TESTS OK			
17				50273	.080	.360	.010	.012						
18				52877	.180	.500	.012	.031						
19				50744	.080	.380	.008	.015						
20				50436	.080	.360	.010	.014						
21				50272	.080	.370	.010	.014						
22														
23														

*CERTIFIED MILL TEST REPORTS AVAILABLE FOR INSPECTION

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FOP U-2 MANUFACTURERS' PARTIAL DATA PORT
A part of a Pressure Vessel Fabricated by One Manufacturer for Another Manufacturer
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

- 1(a) Manufactured by TEXAS METAL FABRICATING COMPANY, A TRINITY INDUSTRIES COMPANY 7000 OLD KATY ROAD, HOUSTON, TEXAS
(Name and address of manufacturer of part)
- (b) Manufactured for INT MINERALS AND CHEMICAL CORP. STERLINGTON LOUISIANA
(Name and address of manufacturer of vessel)
2. Manufacturer's Serial No. of Part 4075-1 CRN 4075-1 Drawing No. 4075-1 Nat'l Bd. No. 81 Year Built 81
3. (a) Drawing Prepared by TEXAS METAL FABRICATING CO.
(b) Description of Part Inspected SHELL AND BUNDLE FOR HEAT EXCHANGER
4. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME Boiler and Pressure Vessel Code. The construction, and workmanship conform to ASME Rules, Section VIII, Division 1 1980 (Year)
and Addenda through S 1981 (Date) and Code Case No.
5. Special Service per UG-120(d)
6. Postweld Heat Treatment: Temperature F. Time
Items 7-12 incl. to be completed for single walled vessels, jackets of jacketed vessels, or shells of heat exchangers
7. Shell: Material SA 516-70 (Spec. No., Grade) Nominal Thickness 5/8 in. Corrosion allowance 1/8 in.
I.D. Diam. 2 ft 5 in. Length 19 ft 1 in.
8. Seams: Longitudinal WDB (Welded, Dbl., Sngl. Lap. Butt) R.T. SPOT (Spot or Full) Efficiency 85 %
H.T. Temp. F Time Girth WDB (Welded Dbl., Sngl., Lap. Butt)
R.T. SPOT (Spot, Partial, or Full) No. of Courses 3
9. Heads (a) Material (Spec. No., Grade) (b) Material

	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.)

10. Type of Jacket Proof Test
11. Jacket Closure (Describe as ogee & weld, bar, etc.) If bar, give dimensions

If bolted, describe or sketch.

12. Constructed for max. allowable working pressure 435 psi at max. temp. 265 F Min. temp.
(when less than -20 F) F. Hydrostatic, pneumatic, or combination test pressure 653 psi.

Items 13 and 14 to be completed for tube sections

13. Tubesheets: Stationary — Material SA 516-70 (Spec. No., Gr.) Diam. 29 I.D. (Subject to pressure) in.
Nominal Thickness 5 1/2 Corrosion Allowance 1/8 in. Attachment WELDED (Welded, Bolted)

Floating — Material (Spec. No., Gr.) Diam. in.

Nominal Thickness in. Corrosion Allowance in.
Attachment

14. Tubes: Material SA - 214 (Spec. No., Gr.) O.D. 3/4 in. Nominal Thickness (.085 MW) in. or gauge
Number 364 Type ST (Straight or "U")

Items 15-18 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers

15. Shell: Material (Spec. No., Grade) Nominal Thickness in. Corrosion Allowance in.
Diam. ft. in. Length ft. in.

16. Seams: Longitudinal (Welded, Dbl. Sngl. Lap. Butt) R.T. (Spot or Full) Efficiency %
H.T. Temp. F Time Girth R.T. (Spot, Partial or Full) No. of courses

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17. Heads: (a) Material _____ (Spec. No. Grade) _____ (b) Material _____ (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.) _____

18. Constructed for max. allowable working pressure _____ psi at max. temp. _____ F. Min. temp. (when less than -20 F) _____ F. Hydrostatic, pneumatic, or combination test pressure _____ psi.

Items below to be completed for all vessels where applicable

19. Safety Valve Outlets: Number _____ Size _____ Location Para UG125

20. Nozzles: NOTE 34

Purpose (Inlet, Outlet, Drain)	Number	Diam. or Size	Type	Material	Nominal Thickness	Reinforcement Material	How Attached
<u>OUTLET</u>	<u>N1</u>	<u>12"</u>	<u>WNF</u>	<u>SA106B</u>	<u>.500</u>	<u>A 285-C</u>	<u>WELDED</u>
<u>INLET</u>	<u>N2</u>	<u>14"</u>	<u>WN</u>	<u>SA106B</u>	<u>.500</u>	<u>A 285-C</u>	<u>"</u>

21. Inspection Openings:

Manholes No. _____ Size _____ Location _____

Handholes No. _____ Size _____ Location _____

Threaded No. _____ Size _____ Location _____

22. Supports: Skirt _____ Lugs _____ Legs _____ Other SADDLES
(Yes or no) (No.) (No.) (Describe)

Attached WELDED (Where and how)

23. Remarks: ITEM 136-C

CERTIFICATE OF COMPLIANCE

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

Date 9-14-81 Signed TEXAS METAL FABRICATING (Manufacturer) V. J. J. J. (Representative)

"U" Certificate of Authorization No. 1844 expires Mar 30, 1982

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 Texas and employed by HARTFORD STEAM BOILER INSPECTION & INS. CO of Hartford, Conn. have inspected the part of a pressure vessel described in this Manufacturer's Partial Data Report on 9-14- 19 81, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this part in accordance with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the part described in this Manufacturers' Partial 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 9-14-81

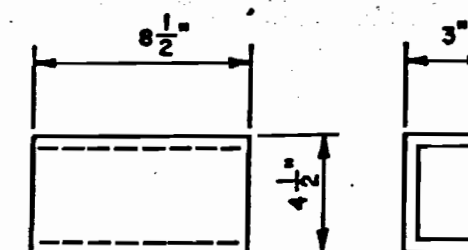
Signed J. W. Lane (Authorized Inspector) Commissions Tex. 1081 (Nat'l Board, State, Province and No.)

		NATIONAL BOARD NO. 3	
U W PART. RT-3	ITEM NO. 1	SIZE 29 x 240	
	MAX. ALLOW. WORKING PRESSURE	PSI	435 1040
	MAX. TEMPERATURE	°F	265 355
	MAX. TEST PRESSURE	PSI	653 XXXXXX
	MFG. SERIAL NO.		2
DATE 	WT. 11,100#	P.O. NO. 141096	
DIVISION I 			
TEXAS METAL FABRICATING CO. A TRINITY INDUSTRIES COMPANY HOUSTON, TEXAS			

NAME R: MATERIAL - T 302 STAINLESS STEEL.
 STENCIL NUMBERS BELOW IN BLOCKS AS INDICATED.

NOTE: CUSTOMER TO REMOVE ORIGINAL NAME R. AND ATTACH ADJACENT TO THE
 TMF PARTIAL NAME R. TRANSFER TO BE WITNESSED BY AN AUTHORIZED
 CODE INSPECTOR TO COMPLETE CODE REQUIREMENTS.

136-C	4075-1	
1 CUSTOMER ITEM NO.	2 TMF SERIAL NO.	3 NATIONAL BOARD NO.



NAME R. BRACKET DETAIL

MAT'L: $\frac{1}{8}$ " THK. CARBON STL.
 C.W. TO SHELL

AS-BUILT PRINT

SEP 17 '81



FABRICATION DETAIL — NAME R - PARTIAL

REFERENCE
 81067

NO. 4075-1

SHEET 2

⚠ REVISE SHOP TEST
 ON TUBE SIDE

Handwritten: 7-29-81

Handwritten: 99557

