

41-E-104

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

Manufactured and certified by Heat Exchanger Design, Inc. 901 E. Beecher Street, Indianapolis, IN 46203

(Name and address of Manufacturer)

2. Manufactured for Range Fuels Soperton Plant, LLC, 11101 W 120th Ave., Suite 200, Broomfield, CO 80021

(Name and address of Purchaser)

3. Location of Installation Unknown

(Name and address)

4. Type: Horizontal Heat Exchanger 4017A 4017A Rev.1 2930 2009  
(Horiz., vert., or sphere) (Tank, separator, jkt. vessel, heat exch., etc.) (Mfg's serial No.) (CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)

5. ASME Code, Section VIII, Div. 1 2007, A08

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): (3) (b) Overall length (ft & in.): 20'-11.75"

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
(2)	15.688" ID	9'-8.88"	SA-333Gr.P11		1.156"	None	S	--	100%	--	--	--	1200 F.	2 hr.
(1)	37" ID	1'-0"	SA-387Gr.11		1.75"	None	1	Full	100%	--	--	--	1200 F.	2 hr.
--	--	--	--		--	--	--	--	--	--	--	--	--	--

7. Heads: (a) None

(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) --

(Mat'l Spec. No., Grade, size, No.)

8. Type of Jacket None

Jacket closure --

(Describe as ogee & weld, bar, etc.)

If bar, give dimensions --

If bolted, describe or sketch

9. MAWP 1650 F.V. 650 650 20 °F Min. design metal temp. 20 °F at 1650/F.V. psi.  
(Internal) (external) (internal) (external)

10. Impact test Yes, expansion joint cylinder & end plates. Shell pipe exempt per Fig UCS-66.1 and remaining items per UG-20(f).

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

11. Hydro., pneu., or comb. test press. 2145

Proof test --

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA-387Gr.11 16.063" 3" None 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-213Gr.T11 5/8" .083" (259) 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): (1) inlet, (1) outlet (b) Overall length (ft & in.): Inlet: 1'-0", Outlet: 1'-0"

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
(2)	15.688" ID	1'-0"	SA-333Gr.P11		1.156"	None	S	--	100%	1	Spot	85%	1200 F.	2 hr.
--	--	--	--		--	--	--	--	--	--	--	--	--	--
--	--	--	--		--	--	--	--	--	--	--	--	--	--

15. Heads: (a) SA-182Gr.F11

(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) Ends	4.125"	None	--	--	--	--	--	24.375"	Flat	Flat	--	--	--
(b)	--	--	--	--	--	--	--	--	--	--	--	--	--

If removable, bolts used (describe other fastening) --

(48) 1 1/4"-8 x 13" long studs SA-193Gr.B7 / (96) nuts SA-194Gr.2H

16. MAWP 1650 F.V. psi at max. temp. 700 700 °F Min. design metal temp. 20 °F at 1650/F.V. psi.  
(internal) (external) (internal) (external)

17. Impact test Yes, tubesheets, channel body flanges & covers. Channel pipes exempt per Fig UCS-66.1 and remaining items per UG-20(f).

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

hydro., pneu., or comb. test press. 2145

Proof test --

18. 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	
Shell Inlet	(1)	8"	Cl.900 rtjwn	SA-335Gr.P11	SA-182Gr.F11	.906"	None	Not Required	UW-16.1(c)	Fig.2-4(6)	Bottom
Shell Outlet	(1)	8"	Cl.900 rtjwn	SA-335Gr.P11	SA-182Gr.F11	.906"	None	Not Required	UW-16.1(c)	Fig.2-4(6)	Top
Tube Inlet	(1)	6"	Cl.900 rtjwn	SA-335Gr.P11	SA-182Gr.F11	.864"	None	Not Required	UW-16.1(c)	Fig.2-4(6)	Top
Tube Outlet	(1)	6"	Cl.900 rtjwn	SA-335Gr.P11	SA-182Gr.F11	.864"	None	Not Required	UW-16.1(c)	Fig.2-4(6)	Bottom
Shell Vent	(1)	1"	Cl.900 rtjwn	SA-182Gr.F11	SA-182Gr.F11	.53125"	None	Not Required	UW-16.1(c)	Integral	Top
Shell Drain	(1)	1"	Cl.900 rtjwn	SA-182Gr.F11	SA-182Gr.F11	.53125"	None	Not Required	UW-16.1(c)	Integral	Bottom
X-Jt Vent/Drain	(2)	3/4"	Thrd. Cplg.	SA-182Gr.F11	--	6000#	None	Not Required	UW-16.1(a)	--	Top/Btm

20. Supports: Skirt No Lugs -- Legs -- Others Saddle Supports Attached Welded to shell bottom.  
(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: 1) Relief valving to be supplied in customers piping. 2) No radiography performed on nozzles, 100% Eff. 3) Channel body pipes machined to .96875" thk weld prep. to tubesheets at ID. 4) Maximum mean metal temperature differential is 80 deg. F.

#### 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. 23,740

Expires 9/27

Date 10/1/09

Name Heat Exchanger Design, Inc.

(Manufacturer)

Signed

20 11  
[Signature]  
(Representative)

#### CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of IN, and employed by HSB CT of Hartford, CT. have inspected the pressure vessel described in this Manufacturer's Data Report on 10/1 20 09, 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 10/1/09

Signed

[Signature]  
(Authorized Inspector)

Commissions

12846A, IN #1787  
(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 \_\_\_\_\_

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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 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 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 \_\_\_\_\_ Signed \_\_\_\_\_

(Authorized Inspector)

Commissions \_\_\_\_\_

(Nat'l Board incl. endorsement, State, Province and No.)