National Board Number: 30466

Mfr. Representative: _____ Date: 7-30-15

Authorized Inspector: _____ Date: 07/31/15

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

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1. Manufactured and certified by Hudson Products Corporation., 9660 Grunwald Road, Beasley, Texas 77417
(Name and address of Manufacturer)

2. Manufactured for Fluor Enterprises Inc. / Rec Solar Grade Silicon LLC., Moses Lake, WA.
(Name and address of Purchaser)

3. Location of installation Fluor Enterprises Inc. / Rec Solar Grade Silicon LLC., Moses Lake, WA.
(Name and address)

4. Type Horizontal (Horizontal, vertical, or sphere) | Heat Exchangers (Tank, separator, jkt. vessel, heat exch., etc.) | K615-11A-A-1 (Manufacturer's serial number)

N/A (CRN) | 6A-Rev.1 (Drawing number) | 30466 (National Board number) | 2015 (Year built)

5. ASME Code, Section VIII, Div. 1 Section VIII, Div.1 2013 Edition [Edition and Addenda, if applicable (date)] | N/A (Code Case number) | N/A [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 multichamber vessels.

6. Shell: (a) Number of course(s) _____ (b) Overall length 7-1/2" x 8-11/16" x 6' 3-3/8"

Course(s)			Material	Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter	Length	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	N/A	N/A	N/A	N/A	N/A	N/A	RT4	100%	----	----	----	N/A	N/A
2						----	----	----	----	----	----	----	----

Body Flanges on Shells												
									Bolting			
No.	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Location	Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material
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7. Heads: (a) SA-240, 304/304L (Material spec. number, grade or type) (H.T. — time and temp.) (b) SA-240, 304/304L (Material spec. number, grade or type) (H.T. — time and temp.)

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemis. Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	Top&Bottom	1/2"	0.0625"	----	----	----	----	----		6-1/4" x	6' 3-3/8"	----	----	----
(b)	Ends	1/2"	0.0625"	----	----	----	----	----		5-3/4" x	0' 7-7/16"	----	----	----

Body Flanges on Heads												
									Bolting			
	Location	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material
(a)	----	----	----	----	----	----	----	----	----	----	----	----
(b)												

8. Type of jacket N/A Jacket closure N/A (Describe as ogee and weld, bar, etc.)

If bar, give dimensions ---- If bolted, describe or sketch.

9. MAWP 197/HV (Internal) 7.5 (External) at max. temp. 980/250°F (Internal) 250°F (External) Min. design metal temp. - 20 at 197.

10. Impact test Exempt per UHA-51 (d)(1)(a) [Indicate *yes* or *no* and the component(s) impact tested] at test temperature of N/A.

11. Hydro., pneu., or comb. test pressure Hydrostatic 363 PSIG Proof test N/A

Items 12 and 13 to be completed for tube sections.

12. Tubesheet	SA-240, 304/304L [Stationary (material spec. no.)]	8-11/16" x 6' 3-3/8" [Diameter (subject to press.)]	3/4" (Nominal thickness)	0.0625" (Corr. allow.)	Welded [Attachment (welded or bolted)]
	N/A [Floating (material spec. no.)]	N/A (Diameter)	N/A (Nominal thickness)	N/A (Corr. allow.)	N/A (Attachment)
13. Tubes	SA-213, TP304/304L (Material spec. no., grade or type)	1" OD (O.D.)	.065" MW (Nominal thickness)	168 (Number)	Straight [Type (straight or U)]

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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) N/A (b) Overall length ---

Course(s)			Material	Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter	Length	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
---	---	---	---	---	---	---	---	---	---	---	---	---	---

Body Flanges on Shells												
									Bolting			
No.	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Location	Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material
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15. Heads: (a) N/A (Material spec. number, grade, or type) (H.T. — time and temp.) (b) --- (Material spec. number, grade, or type) (H.T. — time and temp.)

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

Body Flanges on Heads												
									Bolting			
	Location	Type	ID	OD	Flange Thk	Min Hub Thk	Material	How Attached	Num & Size	Bolting Material	Washer (OD, ID, thk)	Washer Material
(a)	---	---	---	---	---	---	---	---	---	---	---	---
(b)												

16. MAWP N/A (Internal) --- (External) at max. temp. --- (Internal) --- (External) Min. design metal temp. --- at ---.

17. Impact test N/A [Indicate *yes* or *no* and the component(s) impact tested] at test temperature of ---.

18. Hydro., pneu., or comb. test pressure N/A Proof test ---

19. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Type	Material		Nozzle Thickness		Reinforcement Material	Attachment Details		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
Inlet-Outlet	1	10"300#	RFWN		SA-182F304/304L	S-80S		None	---	UW-12	
	1	10" HPC	TRANS	SA312,304/304L		S-80S		None	UW-16.1	---	
	1	6"300#	RFWN		SA-182F304/304L	S-80		None		UW-12	
	1	6"	PIPE	SA312,304/304L	SA-182F304/304L	S-80		None	UW-16.1		
Vents & Drains	2	1"6000#	SOCKLT	SA-182F304/304L		-----		None	UW-16.1		
	2	1"6000#	P.NIPLE	SA312,304/304L		S-160		None	UW-16.1		
	2	1" 6000#	PCAPS	SA-182F304/304L		-----		None	UW-16.1		

20. Supports: Skirt --- (Yes or no) Lugs --- (Number) Legs --- (Number) Others Header Support (4) (Describe) Attached --- (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, Manufacturer's name, and identifying number):

22. Remarks

Four Rect. Headers: Inlet Header : 7-1/2" x 7-1/4" x 6' 3-3/8", Outlet Header : 7-1/2" x 8-11/16" x 6' 3-3/8", Return Header : 5-1/2" x 6" x 6' 3-3/8" & Return A Header : 5-1/2" x 5" x 6' 3-3/8" Service: Effluent Gas Air Cooler Item No. 12-E-13331 SAP # 10071251
OVERALL DIMENSION: 8-11/16" x 6' 3-3/8" x 12' 11-1/4" Long Spot RT Customer Design Pressure 60/HV PSIG @ 980/250°F.
MAWP 6563KPag @ 220°C. Hydro 9205 KPag ** Designed In Accordance With Appendix 13, Para. 13-5 FTS # 1, FBS # 2, RTS # 1, RBS # 1

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Authorized Inspector: _____ Date: 07/31/15

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CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1.

U Certificate of Authorization Number 8728 Expires Dec.31, 2015

Date 7-30-15 Name Hudson Products Corporation (Manufacturer) Signed _____ (Representative)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and employed by HSB Global Standards of Hartford, Conn.

have inspected the pressure vessel described in this Manufacturer's Data Report on July 30, 2015, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. By signing this certificate neither the Inspector nor his/her employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his/her 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 07/31/2015 Signed _____ (Authorized Inspector) Commissions Nat'l. Bd # 14870 (A/15) [National Board (incl. endorsements)]

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the statements in this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. U Certificate of Authorization Number _____ Expires _____.

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 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 the ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of _____. By signing this certificate neither the Inspector nor his/her employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his/her 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 _____ [National Board (incl. endorsements)]

(04/14)