Nation Board No. : 1244

Mfg. Representative: J-A Mak Date: Feb. 3 '16

Authorized Inspector: _____ Date: _____

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

1. Manufactured and certified by: Sewon Cellontech Co., Ltd. 211, Gongdan-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do 642-370 Republic of Korea
(Name and address of Manufacturer)

2. Manufactured for: MEG Energy, 520 – 3 Avenue SW, Calgary, Alberta, Canada, T2P 0R3
(Name and address of Purchaser)

3. Location of installation: Canada, Alberta
(Name and address)

4. Type: Horizontal (Horizontal, vertical, or sphere) | Heat Exchanger (Tank, separator, jkt. vessel, heat exch., etc.) | E0351-021 (Manufacture's serial number)

W9330.2 (CRN) | E0351-3AE325-D-01 Rev.<4> (Drawing number) | 1244 (National Board number) | 2015 (Year built)

5. ASME Code, Section VIII, Div. 1: 2010 ED. + 2011 ADD. [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): 2 (b) Overall length: 6532 mm

Course(s)			Material	Thinkness		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
2	I.D 1120mm	3266mm	SA516-70N	13mm	3.2mm	1	Spot	0.85	1	Spot	0.85	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-

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
1	APP.2	1120mm	1290mm	135mm	13mm	SA266-2N	Butt(Type 1)	Shell flange	U 1-8UNC x 390mm, 48 Sets	SA193-B7/ SA194-2H	N/A	N/A
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

7. Heads: (a) SA516-70N, Seamless (Material spec. number, grade or type) (H.T. - time and temp.) (b) N/A (Material spec. number, grade or type) (H.T. - time and 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	11mm	3.2mm	-	-	2:1	-	-	-	YES	YES	-	Seamless	1.0
(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)	-	-	-	-	-	-	-	-	-	-	-	-

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

If bar, give dimensions: N/A If bolted, describe or sketch.

9. MAWP: 1554 (Internal) F.V (External) kPag at max. temp. 214 (Internal) 214 (External) °C Min. design metal temp. -29 °C at 1554/F.V kPag

10. Impact test: Yes, See Remarks 3 [Indicate *yes or no* and the component(s) impact tested] at test temperature of See Remarks 3 °C

11. (Hydro), pneu., or comb. test pressure: 2256 kPag Proof test: N/A

Items 12 and 13 to be completed for tube sections.

12. Tubesheet	SA266-2N [Stationary (material spec. no.)]	1120 mm [Diameter (subject to press.)]	117 mm (Nominal thickness)	6.4mm (Corr. allow.)	Bolted [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	SA179 (SEAMLESS) (Material spec. no., grade or type)	31.75mm (O.D.)	2.11mm(Min.) (Nominal thickness)	238 (Number)	U [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) 1 (b) Overall length 582 mm

Course(s)			Material	Thinkness		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	I.D 1120mm	582mm	SA516-70N	13mm	3.2mm	1	Spot	0.85	1	Spot	0.85	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-

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
1	APP.2	1120mm	1290mm	139mm	13mm	SA266-2N	Butt(Type 1)	Channel flange	U 1-8UNC x 390mm, 48 Sets	SA193-B7/ SA194-2H	N/A	N/A
1	APP.2	1120mm	1290mm	139mm	13mm	SA266-2N	Butt(Type 1)	Channel cover flange	U 1-8UNC x 280mm, 48 Sets	SA193-B7/ SA194-2H	N/A	N/A
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

15. Heads: (a) SA266-2N (b) N/A

(Material spec. number, grade or type) (H.T. - time and temp.) (Material spec. number, grade or type) (H.T. - time and 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	102mm	3.2mm	-	-	-	-	-	1290mm	-	YES	-	Seamless	1.0
(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 2007 (Internal) F.V (External) kPag at max. temp. 214 (Internal) 214 (External) °C Min. design metal temp. -29 °C at 2007/F.V kPag

17. Impact test Yes, See Remarks 3 at test temperature of See Remarks 3 °C

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

18. (Hydro), pneu., or comb. Test pressure 2746 kPag Proof test N/A

19. Nozzle, 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	
SHELL SIDE INLET / OUTLET (S1A, S2A)	2	NPS 12	Cl.300 flg.	SA106-B	SA105N	14.27mm	3.2mm	SA516-70N	Fig.UW-16.1 (d)	Butt (Type1), Spot	-
VENT (W/B.F) (S3A)	1	NPS 2	Cl.300 lwn.	SA105N	SA105N	16.65mm	3.2mm	Inherent	Fig.UW-16.1 (d)	Integral	-
DRAIN (W/B.F) (S4A)	1	NPS 2	Cl.300 flg.	SA106-B / SA234-WPB	SA105N	8.74mm	3.2mm	SA516-70N	Fig.UW-16.1 (d)	Butt (Type1), None	-
TUBE SIDE INLET / OUTLET (T1A, T2A)	2	NPS 8	Cl.300 flg.	SA106-B	SA105N	12.7mm	3.2mm	SA516-70N	Fig.UW-16.1 (d)	Butt (Type1), None	-
FIELD HYDROTEST (W/B.F) (S5A,S6A)	2	NPS 1	Cl.300 lwn.	SA105N	SA105N	14.25mm	3.2mm	Inherent	Fig.UW-16.1 (c)	Integral	-
FIELD HYDROTEST (W/B.F) (T5A,T6A)	2	NPS 1	Cl.300 lwn.	SA105N	SA105N	14.25mm	3.2mm	Inherent	Fig.UW-16.1 (c)	Integral	-
VENT (W/B.F) (T3A)	1	NPS 2	Cl.300 lwn.	SA105N	SA105N	16.65mm	3.2mm	Inherent	Fig.UW-16.1 (d)	Integral	-
DRAIN (W/B.F) (T4A)	1	NPS 2	Cl.300 flg.	SA106-B / SA234-WPB	SA105N	8.74mm	3.2mm	SA516-70N	Fig.UW-16.1 (d)	Butt (Type1), None	-

20. Supports: Skirt No (Yes or no) Lugs N/A (Number) Legs N/A (Number) Others 2-SADDLES (Describe) Attached Welded to shell (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 of the name of part, item number, Manufacturer's name and identifying number): N/A

22. Remarks 1. Item No. : 3A-E-325A, Sewon Job No. : E-0351

2. Over pressure protection is provided by others.

3. Impact test for all pressure parts were performed at -29°C for tubesheet and channel cover, except that the impact test of shell, girth flanges, nozzle neck & flange and stud bolt/nuts were exempted as per UCS-66, UG-20(f) and Fig. UCS-66 General Note (c).

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22. Remarks

4. Pressure retaining cover
S3A,S4A,T3A,T4A: NPS 2 ASME 300# BL.RF, SA105N, Stud B/Heavy Hex. 2NS, SA193-B7/SA194-2H,
U5/8-11UNCx100mm, 8 Sets/each.
S5A,S6A,T5A,T6A: NPS 1 ASME 300# BL.RF, SA105N, Stud B/Heavy Hex. 2NS, SA193-B7/SA194-2H,
U5/8-11UNCx90mm, 4 Sets/each.
5. PWHT was performed for channel part for 1.25hrs. at 630~640℃.

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 BOILER AND PRESSURE VESSEL CODE, Section VIII, Division1.

U Certificate of Authorization Number 22,125 Expires Aug. 25, 2017

Date Feb. 3 -16 Name Sewon Cellontech Co., Ltd. (Manufacturer) Signed J- A Park (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 CT have inspected the pressure vessel described in this Manufacturer's Data Report on _____, 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 _____ Signed _____ (Authorized Inspector) Commissions _____ [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 suvjected to a hydro-static 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)]