

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS Page 1 of 3  
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 Heat Exchanger E0351-014  
(Horizontal, vertical, or sphere) (Tank, separator, jkt. vessel, heat exch., etc.) (Manufacture's serial number)  
W9046.2 E0351-3AE111-D-01 Rev.<4> 1237 2015  
(CRN) (Drawing number) (National Board number) (Year built)  
5. ASME Code, Section VIII, Div. 1 2010 ED. + 2011 ADD. N/A N/A  
(Edition and Addenda, if applicable (date)) (Code Case number) [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) 3 (b) Overall length 9138 mm

| 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 |
| 2         | I.D 1143mm | 3000mm | SA516-70N           | 13mm      | 3.2mm | 1                    | Spot             | 0.85 | 1                             | Spot             | 0.85 | -              | -    |
| 1         | I.D 1143mm | 3138mm | SA516-70N           | 13mm      | 3.2mm | 1                    | Spot             | 0.85 | 1                             | Spot             | 0.85 | -              | -    |
| -         | -          | -      | -                   | -         | -     | -                    | -                | -    | -                             | -                | -    | -              | -    |

| Body Flanges on Shells |       |        |        |            |             |          |              |              |                           |                    |                      |   |                 |
|------------------------|-------|--------|--------|------------|-------------|----------|--------------|--------------|---------------------------|--------------------|----------------------|---|-----------------|
| No.                    | Type  | ID     | OD     | Flange Thk | Min Hub Thk | Material | How Attached | Location     | Bolting                   |                    |                      |   | Washer Material |
|                        |       |        |        |            |             |          |              |              | Num & Size                | Bolting Material   | Washer (OD, ID, thk) |   |                 |
| 1                      | APP.2 | 1143mm | 1311mm | 129mm      | 13mm        | SA266-2N | Butt(Type 1) | Shell flange | U 1-8UNC x 360mm, 33 Sets | SA193-B7/ SA194-2H | N/A                  |   | N/A             |
| -                      | -     | -      | -      | -          | -           | -        | -            | -            | -                         | -                  | -                    | - | -               |
| -                      | -     | -      | -      | -          | -           | -        | -            | -            | -                         | -                  | -                    | - | -               |
| -                      | -     | -      | -      | -          | -           | -        | -            | -            | -                         | -                  | -                    | - | -               |

7. Heads: (a) SA516-70N, Seamless (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                          | 11mm      | 3.2mm | -      | -       | 2:1              | -                  | -                    | -             | -                | YES     | -          | Seamless         | 1.0  |
| (b) | -                            | -         | -     | -      | -       | -                | -                  | -                    | -             | -                | -       | -          | -                | -    |

| Body Flanges on Heads |          |      |    |    |            |             |          |              |            |                  |                      |   |                 |
|-----------------------|----------|------|----|----|------------|-------------|----------|--------------|------------|------------------|----------------------|---|-----------------|
|                       | Location | Type | ID | OD | Flange Thk | Min Hub Thk | Material | How Attached | Bolting    |                  |                      |   | Washer Material |
|                       |          |      |    |    |            |             |          |              | Num & Size | Bolting Material | Washer (OD, ID, thk) |   |                 |
| (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 1530 F.V kPag at max. temp. 178 178 °C Min. design metal temp. -29 °C at 1530/F.V kPag  
(Internal) (External) (Internal) (External)

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

11. (Hydro), pneu., or comb. test pressure 2255 kPag Proof test N/A

Items 12 and 13 to be completed for tube sections.

12. Tubesheet SA266-2N 1143 mm 99 mm 6.4mm Bolted  
(Stationary (material spec. no.)) (Diameter (subject to press.)) (Nominal thickness) (Corr. allow.) (Attachment (welded or bolted))  
N/A N/A N/A N/A N/A  
(Floating (material spec. no.)) (Diameter) (Nominal thickness) (Corr. allow.) (Attachment)  
13. Tubes SA179 (SEAMLESS) 25.4mm 2.11mm(Min.) 396 U  
(Material spec. no., grade or type) (O.D.) (Nominal thickness) (Number) (Type (straight or U))

FORM U-1 (Cont'd)

Page 2 of 3

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 587 mm

| 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         | I.D 1143mm | 587mm  | SA516-70N           | 13mm      | 3.2mm | 1                    | Spot             | 0.85 | 1                             | Spot             | 0.85 | -              | -    |
| -         | -          | -      | -                   | -         | -     | -                    | -                | -    | -                             | -                | -    | -              | -    |
| -         | -          | -      | -                   | -         | -     | -                    | -                | -    | -                             | -                | -    | -              | -    |

| Body Flanges on Shells |       |        |        |            |             |          |              |                |                           |                    |                      |                 |   |
|------------------------|-------|--------|--------|------------|-------------|----------|--------------|----------------|---------------------------|--------------------|----------------------|-----------------|---|
| No.                    | Type  | ID     | OD     | Flange Thk | Min Hub Thk | Material | How Attached | Location       | Bolting                   |                    |                      |                 |   |
|                        |       |        |        |            |             |          |              |                | Num & Size                | Bolting Material   | Washer (OD, ID, thk) | Washer Material |   |
| 1                      | APP.2 | 1143mm | 1311mm | 130mm      | 13mm        | SA266-2N | Butt(Type 1) | Channel flange | U 1-8UNC x 360mm, 33 Sets | SA193-B7/ SA194-2H | N/A                  | N/A             |   |
| -                      | -     | -      | -      | -          | -           | -        | -            | -              | -                         | -                  | -                    | -               | - |
| -                      | -     | -      | -      | -          | -           | -        | -            | -              | -                         | -                  | -                    | -               | - |
| -                      | -     | -      | -      | -          | -           | -        | -            | -              | -                         | -                  | -                    | -               | - |

15. Heads: (a) SA516-70N, Seamless (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                          | 11mm      | 3.2mm | -      | -       | 2:1              | -                  | -                    | -             | -                | YES     | -          | Seamless         | 1.0  |
| (b) | -                            | -         | -     | -      | -       | -                | -                  | -                    | -             | -                | -       | -          | -                | -    |

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

16. MAWP 1594 F.V kPag at max. temp. 178 178 °C Min. design metal temp. -29 °C at 1594/F.V kPag  
(Internal) (External) (Internal) (External)

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 2157 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 (S1B, S2B) | 2   | NPS 10           | Cl.300 fig. | SA106-B             | SA105N | 15.09mm          | 3.2mm | SA516-70N              | Fig.UW-16.1 (d)    | Butt (Type1), None | -                      |
| VENT (W/B.F) (S3B)                   | 1   | NPS 2            | Cl.300 lwn. | SA106-B / SA234-WPB | SA105N | 8.74mm           | 3.2mm | SA516-70N              | Fig.UW-16.1 (d)    | Butt (Type1), None | -                      |
| DRAIN (W/B.F) (S4B)                  | 1   | NPS 2            | Cl.300 fig. | SA105N              | SA105N | 16.65mm          | 3.2mm | Inherent               | Fig.UW-16.1 (d)    | Integral           | -                      |
| TUBE SIDE INLET / OUTLET (T1B, T2B)  | 2   | NPS 8            | Cl.300 fig. | SA106-B             | SA105N | 12.7mm           | 3.2mm | SA516-70N              | Fig.UW-16.1 (d)    | Butt (Type1), None | -                      |
| FIELD HYDROTEST (W/B.F) (S5B,S6B)    | 2   | NPS 1            | Cl.300 lwn. | SA105N              | SA105N | 14.25mm          | 3.2mm | Inherent               | Fig.UW-16.1 (c)    | Integral           | -                      |
| FIELD HYDROTEST (W/B.F) (T3B,T4B)    | 2   | NPS 1            | Cl.300 lwn. | SA105N              | SA105N | 14.25mm          | 3.2mm | Inherent               | Fig.UW-16.1 (c)    | Integral           | -                      |

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

22. Remarks 1. Item No. : 3A-E-111F, 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 tubesheets, 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).

4. Pressure retaining cover

S3B,S4B: NPS 2 ASME 300# BL.RF, SA105N, Stud B/Heavy Hex. 2NS, SA193-B7/SA194-2H, U5/8-11UNCx100mm, 8 Sets/each.

S5B,S6B,T3B,T4B: NPS 1 ASME 300# BL.RF, SA105N, Stud B/Heavy Hex. 2NS, SA193-B7/SA194-2H, U5/8-11UNCx90mm, 4 Sets/each.

FORM U-1 (Cont'd)

Page 3 of 3

**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, Division 1.

U Certificate of Authorization Number 22,125 Expires Aug. 25, 2017  
Date Feb. 3 '16 Name Sewon Cellontech Co., Ltd. Signed J- A Paul  
(Manufacturer) (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 \_\_\_\_\_ Commissions \_\_\_\_\_  
(Authorized Inspector) [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 \_\_\_\_\_ Signed \_\_\_\_\_  
(Assembler) (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 \_\_\_\_\_ Commissions \_\_\_\_\_  
(Authorized Inspector) [National Board (incl. endorsements)]