SEPT 10/18

(A) 550316

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

1. Manufactured and certified by: EXCHANGER INDUSTRIES (A Division of Premetalco Inc.) 5505 - 52 Street S.E., Calgary, AB T2C 2W8
(Name and address of Manufacturer)

2. Manufactured for: GRB Engineering Ltd., 1000, 707 - 7th Avenue S.W., Calgary, AB T2P 3H6
(Name and address of Purchaser)

3. Location of installation: Cenovus Energy, Pelican Lake SAGD - GRB Project #172, Pelican Lake, AB LSD# 12-7-82-22-W4M
(Name and address)

4. Type: Horizontal (Horiz., vert., or sphere) | Heat Exchanger (Tank, separator, jkt. vessel, heat exh., etc.) | 10-3155A (Mfg's serial No.)

V2159.2 (CRN) | 10-3155A/B Rev.2 (Drawing No.) | - (Nat'l. Bd No.) | 2010 (Year Built)

5. ASME Code, Section VIII, Div. 1: 2007-2009 (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): 1 (b) Overall length (ft & in.): 22' - 5 1/2"

| 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 |
| 1 | 16" | 22' - 5 1/2" | SA333-6 | 1.219" | 1/8" | S | - | 1.0 | 1 | Full | 1.0 | 1150°F | 1.5 Hrs. |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

7. Heads: (a) _____ (b) SA516-70N 1.5 Hrs. @ 1150°F
(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 Min. | Thickness Corr. | Radius Crown | Radius Knuckle | Elliptical Ratio | Conical Apex Angle | Hemispherical Radius | Flat Diameter | Side to Pressure Convex | Side to Pressure Concave | Category A Type | Category A Full,Spot,None | Category A Eff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | | | | | | | | | | | | | | |
| (b) | End | 1.125" | 1/8" | | | 2:1 | | | | | X | | | |

If removable, bolts used (describe other fastening) _____ (Mat'l Spec. No., Grade, size, No.)

Type of jacket _____ Jacket closure _____ (Describe as ogee & weld, bar, etc)

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

9. MAWP 1860 (internal) - (external) psi at max. temp. 428 (internal) - (external) °F Min. design metal temp. -20 °F at 1860 psi.

10. Impact test: No, nozzle necks, tubes & tubesheet exempt per UG-20(f)(1-5). at test temperature of N/A °F.
Covers exempt per UCS-66(a). Cylinder & flanges exempt per UCS-66(g).
(Indicate yes or no and the component(s) impact tested)

11. Hydro.,pneu.,or comb.test press. 2418 psi Proof test -

**Items 12 and 13 to be completed for tube sections.**

12. Tubesheet:

| Stationary (Mat'l Spec. No.) | Dia., in. (subject to press.) | Nom. thk. in. | Corr. Allow., in. | Attachment (welded or bolted) |
|---|---|---|---|---|
| SA516-70N | 13.562" | 3.9375" | 3/16" | Bolted |
| Floating (Mat'l Spec. No.) | Dia., in. | Nom. thk., in. | Corr. Allow., in. | Attachment |
| | | | | |

13. Tubes:

| Mat'l Spec. No., Grade or Type | O.D., in. | Nom. thk., in. or gauge | Number | Type (Straight or U) |
|---|---|---|---|---|
| SA 179 | 3/4" | 12 BWG M/W | 39 | 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 (b) Overall length (ft & in.): 1' - 7/8"

| 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 |
| 1 | 16" | 1' - 7/8" | SA333-6 | 1.219" | 1/16" | S | - | 1.0 | 1 | Full | 1.0 | 1150°F | 1.5 Hrs. |
| | | | | | | | | | | | | | |

15. Heads: (a) SA516-70N 1.5 Hrs. @ 1150°F (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 Min. | Thickness Corr. | Radius Crown | Radius Knuckle | Elliptical Ratio | Conical Apex Angle | Hemispherical Radius | Flat Diameter | Side to Pressure Convex | Side to Pressure Concave | Category A Type | Category A Full,Spot,None | Category A Eff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | End | 1.125" | 1/16" | | | 2:1 | | | | | X | | | |
| (b) | | | | | | | | | | | | | | |

If removable, bolts used (describe other fastening). SA193-B7, 1 5/8" x 15" lg. (16 pcs.)
(Mat'l Spec. No., Grade, size, No.)

# FORM U-1 (Back)

16. MAWP 1860 (internal) - (external) psi at max. temp. 428 (internal) - (external) °F Min. design metal temp. -20 °F at 1860 psi

17. Impact test No, nozzle necks, tubes & tubesheet exempt per UG-20(f)(1-5). at test temperature of N/A °F.
Covers exempt per UCS-66(a). Cylinder & flanges exempt per UCS-66(g).
(Indicate yes or no and the component(s) impact tested)

18. Hydro., pneu., or comb. test press. 2418 psi Proof test -

19. 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 | |
| Channel Inlet | 1 | 3" Cl.900 | RFWN | SA266-4N | SA350-LF2 | .875" | 1/16" | None | UW16.1c | Welded | Bottom Channel |
| Channel Outlet | 1 | 3" Cl.900 | RFWN | SA266-4N | SA350-LF2 | .875" | 1/16" | None | UW16.1c | Welded | Top Channel |
| Shell Inlet | 1 | 3" Cl.900 | RFWN | SA266-4N | SA350-LF2 | .875" | 1/8" | None | UW16.1c | Welded | Top Shell |
| Shell Outlet | 1 | 3" Cl.900 | RFWN | SA266-4N | SA350-LF2 | .875" | 1/8" | None | UW16.1c | Welded | Bottom Shell |
| | | | | | | | | | | | |
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20. Supports: Skirt No (Yes/no) Lugs N/A (No.) Legs N/A (No.) Other 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 the name of part, item number, mfg's. name and identifying number)

22. Remarks: Tema Flanges: MK.1 & MK.2: SA350-LF2, Cl.1 Thickness: 3.6875" & 3.8125" Tema type: "R"
SAFETY VALVES: P.S.V. on piping per UG-125 (g) to be installed by owner CUBIC CAPACITY: 23.23 cu.ft.
SURFACE AREA: 346.7 sq.ft.
SERVICE: BFW/Emulsion Exchanger *U-Bends stress relieved for 1 Hr. @ 1150°F.
ITEM #: E-200A Constructed to Drawing #10-3155A/B Rev.2

## 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. 5983 Expires March 30 ,20 11

Date SEP 0 3 2010 Name Exchanger Industries (A Division of Premetalco Inc.) (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/or the State or Province of ALBERTA and employed by ABSA of CALGARY, ALBERTA have inspected the pressure vessel described in this Manufacturer's Data Report on SEP - 3 2010 ,20 , 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 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 in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date SEP - 3 2010 Signed (Authorized Inspector) Commissions #11 (Nat'l Board incl.endorsements,State,Prov.and

## 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 ,20

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/or the State or Province 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 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 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 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 inspection.

Date Signed (Authorized Inspector) Commissions (Nat'l Board incl. endorsement, State, Province and No.)