

① 632311.

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 LIMITED 5505 - 52 Street S.E., Calgary, AB T2C 2W8
(Name and address of Manufacturer)

2. Manufactured for Jacobs Canada Inc. 205 Quarry Park Blvd. S.E. Calgary, AB T2C 3E7
(Name and address of Purchaser)

3. Location of Installation Canadian Natural Resources Limited, Kirby North Phase 1 Project, Conklin, AB LSD#21-73-7 W4
(Name and address)

4. Type Horizontal Heat Exchanger 13-3353B
(Horiz., vert., or sphere) (Tank, separator, jkt. vessel, heat exh., etc.) (Mfg's serial No.)

W3077.2 13-3353 A/B Rev.3 2014
(CRN) (Drawing No.) (Nat'l. Bd No.) (Year Built)

5. ASME Code, Section VIII, Div. 1 2010 - 2011a - -
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 (mm): 6094 mm

| Course(s) | | | Material | Thickness (mm) | | Long. Joint (Cat.A) | | | Circum. Joint (Cat. A,B, & C) | | | Heat Treatment | |
|-----------|--------------|--------------|---------------------|----------------|-------|---------------------|----------------|------|-------------------------------|----------------|------|----------------|------|
| No. | Diameter(mm) | Length (mm.) | Spec./Grade or Type | Nom. | Corr. | Type | Full,Spot,None | Eff. | Type | Full,Spot,None | Eff. | Temp. | Time |
| 2 | 381 | 2500 | SA516-70N | 14 | 3.2 | 1 | Full | 1.0 | 1 | Full | 1.0 | - | - |
| 1 | 381 | 1094 | SA516-70N | 14 | 3.2 | 1 | Full | 1.0 | 1 | Full | 1.0 | - | - |

7. Heads: (a) _____ (b) SA516-70N
(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(mm) | | 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) | End | 12.4 | 3.2 | | | 2:1 | | | | | X | | | |

If removable, bolts used (describe other fastening) _____

8. Type of jacket _____ Jacket closure _____
(Mat'l Spec. No., Grade, size, No.) (Describe as ogee & weld, bar, etc)

9. MAWP 3585 103 kpa at max. temp. 150 148 °C Min. design metal temp. -29 °C at 3585 kpa.
(internal) (external) (Internal) (external)

10. Impact test No, all shell material exempt per UG-20(f)(1-5).

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

11. Hydro., pneu., or comb. test press. 6151 kpa Proof test -

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA516-70N 381 50 6.4 Bolted
Stationary (Mat'l Spec. No.) Dia., mm. (subject to press.) Nom. thk. mm. Corr. Allow., mm. Attachment (welded or bolted)

13. Tubes: SA 179 19.05 14 BWG M/W 51 U*
Floating (Mat'l Spec. No.) Dia., mm. Nom. thk., mm. Corr. Allow., mm. Attachment Mat'l Spec. No., Grade or Type O.D., mm. Nom. thk., mm. 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 (b) Overall length (mm.): 324 mm

| Course(s) | | | Material | Thickness (mm) | | Long. Joint (Cat.A) | | | Circum. Joint (Cat. A,B, & C) | | | Heat Treatment | |
|-----------|---------------|-------------|---------------------|----------------|-------|---------------------|----------------|------|-------------------------------|----------------|------|----------------|------|
| No. | Diameter, mm. | Length (mm) | Spec./Grade or Type | Nom. | Corr. | Type | Full,Spot,None | Eff. | Type | Full,Spot,None | Eff. | Temp. | Time |
| 1 | 381 | 324 | SA516-70N | 14 | 3.2 | 1 | Full | 1.0 | 1 | Full | 1.0 | - | - |

15. Heads: (a) SA516-70N (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(mm) | | 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 | 12.4 | 3.2 | | | 2:1 | | | | | X | | | |
| (b) | | | | | | | | | | | | | | |

If removable, bolts used (describe other fastening) _____

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

Handwritten signature

FORM U-1 (Back)

16. MAWP 3585 103 kpa at max. temp. 150 148 °C Min. design metal temp. -29 °C at 3585 kpa.
(Internal) (external) (Internal) (external)

17. Impact test No, all channel material exempt per UG-20(f)(1-5)

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

18. Hydro., pneu., or comb. test press. 5599 kpa Proof test -

19. Nozzles, Inspection, and safety valve openings:

| Purpose (Inlet, Outlet, Drain, etc.) | No. | Diameter or Size | Flange Type | Material | | Nozzle Thickness (mm) | | Reinforcement Material | How attached | | Location (Insp. Open.) |
|---|-----|---------------------|----------------|----------|---------|-----------------------|-------|---------------------------|--------------|--------|---------------------------|
| | | | | Nozzle | Flange | Nom. | Corr. | | Nozzle | Flange | |
| Channel Inlet | 1 | 4" CI.300 | RFLWN | - | SA105-N | 22.2 | 3.2 | None | UW16.1c | - | Top Channel |
| Channel Outlet | 1 | 4" CI.300 | RFLWN | - | SA105-N | 22.2 | 3.2 | None | UW16.1c | - | Bottom Channel |
| Shell Inlet | 1 | 4" CI.300 | RFLWN | - | SA105-N | 22.2 | 3.2 | None | UW16.1c | - | Bottom Shell |
| Shell Outlet | 1 | 4" CI.300 | RFLWN | - | SA105-N | 22.2 | 3.2 | None | UW16.1c | - | Top Shell |
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20. Supports: Skirt No Lugs N/A Legs N/A Other Saddles Attached Welded to Shell
(Yes/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)
Complete Heat Exchanger, Patel Airtemp (India) Limited, EXE-1353/1, EXE-1353/2, EXE-1353/3

22. Remarks: * U-Bends and 6" straight length is stress relieved by supplier for 1 Hr.
 SAFETY VALVES: P.S.V. on piping per UG-125 (g) to be installed by owner CUBIC CAPACITY: 0.75 cu.m.
 SURFACE AREA: 36.6 sq.m.
 SERVICE: Sales Oil Tank Heater MK1 / MK2, SA105-N : 524 mm OD x 381 mm ID x 83 mm thk.
MK1 / MK2 Bolting: SA193-B7, 19.05 mm x 203 mm/222 mm lg. (24 /8 pcs.), Nuts: SA194-2H UNC (64 pcs.)
 ITEM #: 104-E-136 Constructed to Drawing #13-3353 A/B Rev.5

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. 5983 Expires March 30, 2017

Date APR 29 2014 Name Exchanger Industries Limited Signed *B. Dhill*
(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/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 APR 29 2014, 20 , 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 APR 29 2014 Signed *[Signature]* Commissions AB 40 NB 9644 A, B
(Authorized Inspector) (Nat'l Board incl. endorsements, State, Prov. and

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 _____, 20

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