LOT 759SH-1149AR

107591

ASME

National Board Number: 2058

Mfr. Representative: [signature] Date: APR. 10/2015

Authorized Inspector: [signature] Date: April 13, 2015

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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: Ilsung Coporation #74 Daejeong-Ro, Onsan-Eub, Ulju-Gun, Ulsan 689-892, Republic Korea.
(Name and address of Manufacturer)

2. Manufactured for: SHELL CANADA ENERGY 400 4AVE. S.W., BOX 100, STATION M, CALGARY, ALBERTA T2P 0J4
(Name and address of Purchaser)

3. Location of installation: CARMON CREEK EXPANSION IN PEACE RIVER COMPLEX, ALBERTA, CANADA
(Name and address)

4. Type: Horizontal (Horizontal, vertical, or sphere) | Heat Exchanger (Tank, separator, jkt. vessel, heat exch., etc.) | 14-HE-074 (Manufacturer's serial number)

W8068.2 (CRN) | (•16) (Drawing number) | 2058 (National Board number) | 2015 (Year built)

5. ASME Code, Section VIII, Div. 1: 2010 ED, 2011 ADD (July.01,2011) (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): 3 (b) Overall length: 7585mm

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 860mm	2600mm	SA516-70(•1)	15mm	1.5mm	1	Full	1.0	1	Full	1.0	625°C	1.1Hr.
1	I.D 860mm	2385mm	SA516-70(•1)	15mm	1.5mm	1	Full	1.0	1	Full	1.0	625°C	1.1Hr.
	(BLANK)												

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	(•2)	860mm	1054mm	97mm	15mm	(•3)	Single, butt weld	End	48,1 1/8"-8UN×420L	SA320-L7M	58, 32, 6mm	ASTM-F436
(BLANK)												

7. Heads: (a) SA516-70(•1) / H.T-1,1Hr&625°C (•13) (b) –
(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	12.75mm	1.5mm	–	–	2:1	–	–	–	YES	YES	–	–	–
(b)	(BLANK)													

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)	(BLANK)											
(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: 2551kPa (Internal) F.V (External) at max. temp. 200°C (Internal) 200°C (External) Min. design metal temp. -45°C at 2551kPa.

10. Impact test: YES(SHELL-A02) at test temperature of -45°C.
(Indicate yes or no and the component(s) impact tested)

11. Hydro., ~~pneu., or comb.~~ test pressure: 4000kPa Proof test: –

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA765-II(•1) (Stationary (material spec. no.)) | 860mm (Diameter (subject to press.)) | 106mm (Nominal thickness) | 3mm (Corr. allow.) | Bolted (Attachment (welded or bolted))

– (Floating (material spec. no.)) | – (Diameter) | – (Nominal thickness) | – (Corr. allow.) | – (Attachment)

Tubes: SA179 (Material spec. no., grade or type) | 19.05mm (O.D.) | 2.03mm (Nominal thickness) | 368 (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 540mm

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 860mm	540mm	SA516-70(•1)	14mm	1.5mm	1	Full	1.0	1	Full	1.0	624°C	1.1Hr.
	(BLANK)												

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	(•2)	860mm	1054mm	100mm	14mm	(•3)	Single, butt weld	End	48,1 1/8"-8UN×310L	SA320-L7	58, 32, 6mm	ASTM-F436
1	(•2)	860mm	1054mm	100mm	14mm	(•3)	Single, butt weld	End	(•15)	(•15)	(•15)	(•15)
(BLANK)												

15. Heads: (a) SA765-II(•1)/H.T-624°C 1.1Hr (b) -
(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	95mm	1.5mm	-	-	-	-	-	1054mm	-	-	-	-	-

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)	(BLANK)											
(b)												

16. MAWP 2515 kPa (Internal) F.V (External) at max. temp. 160°C (Internal) 160°C (External) Min. design metal temp. -45°C at 2515 kPa.

17. Impact test YES(CHANNEL-A01) at test temperature of -45°C.
(Indicate yes or no and the component(s) impact tested)

18. Hydro., ~~pneum. or comb.~~ test pressure 3900 kPa 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	
SHELL SIDE INLET	1	DN 200	Cl. 300 flg.	(•6)	(•6)	28.15mm	3.0mm	INHERENT	(•4)	(•5)	-
SHELL SIDE OUTLET	1	DN 200	Cl. 300 flg.	(•6)	(•6)	28.15mm	3.0mm	INHERENT	(•4)	(•5)	-
SHELL SIDE VENT(•7)	1	DN 100	Cl. 300 fwn.	(•6)	(•6)	22.25mm	3.0mm	INHERENT	(•4)	-	-
SHELL SIDE DRAIN(•7)	1	DN 100	Cl. 300 flg.	(•8)	(•6)	8.58mm	3.0mm	INHERENT	(•4)	(•5)	-
TUBE SIDE INLET	1	DN 150	Cl. 300 flg.	SA333-6	(•6)	10.97mm	3.0mm	SA516-70(•1)	(•4)	(•5)	-
TUBE SIDE OUTLET	1	DN 150	Cl. 300 flg.	SA333-6	(•6)	10.97mm	3.0mm	SA516-70(•1)	(•4)	(•5)	-
TUBE SIDE VENT(•12)	1	DN 50	Cl. 300 fwn.	(•6)	(•6)	16.65mm	3.0mm	INHERENT	(•4)	-	-
TUBE SIDE DRAIN(•12)	1	DN 50	Cl. 300 flg.	(•8)	(•6)	8.74mm	3.0mm	INHERENT	(•4)	(•5)	-

20. Supports: Skirt NO (Yes or no) Lugs N/A (Number) Legs N/A (Number) Others 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, Manufacturer's name, and identifying number):
N/A

22. Remarks •1. Normalized condition. •2. Mandatory App.2 Fig.2-4(6) •3. SA765-II(•1) •4. FIG. UW-16.1 (d)
•5. Single Butt, RT-None, 0.7 •6. SA350-LF2 CL.1(•1) •7. Pressure retaining cover : (•6), SA320-L7M/SA194-7M, 3/4"-10UNC×130L, 8 SETS.
•8. SA420-WPL6 + (•6) 9. Nameplate is located on the shell. 10. Inspection opening is removable bundle.
11. Safety valve will be installed in system by others. •12. Pressure retaining cover : (•6), SA320-L7/SA194-7, 5/8"-11UNC×100L, 8 SETS.
•13. Heads were performed stress relief at the H.T-880°C. & 0.6 Hr. 14. Length of tube bundle : 7724.6mm
•15. Shell flange and channel flange were connected by same bolting materials, refer to shell side bolting of ITEM No.6.
•16. VP-SG07-E10180-001 Rev.7(AS BUILT DWG. REV.8)

National Board Number 2658

Mfr. Representative S.S.Kim Date APR. 17/2015

Authorized Inspector [signature] Date Apr. 18, 2015

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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 32,997 Expires DEC. 04, 2016

Date APR.17/2015 Name ILSUNG CORPORATION. (Manufacturer) Signed S.S.Kim (Representative)

CERTIFICATE OF SHOP INSPECTION

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

have inspected the pressure vessel described in this Manufacturer's Data Report on Apr. 18, 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 Apr. 18. 2015 Signed S.JANG (Authorized Inspector) Commissions NB#14412(A,N) (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 nd 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))