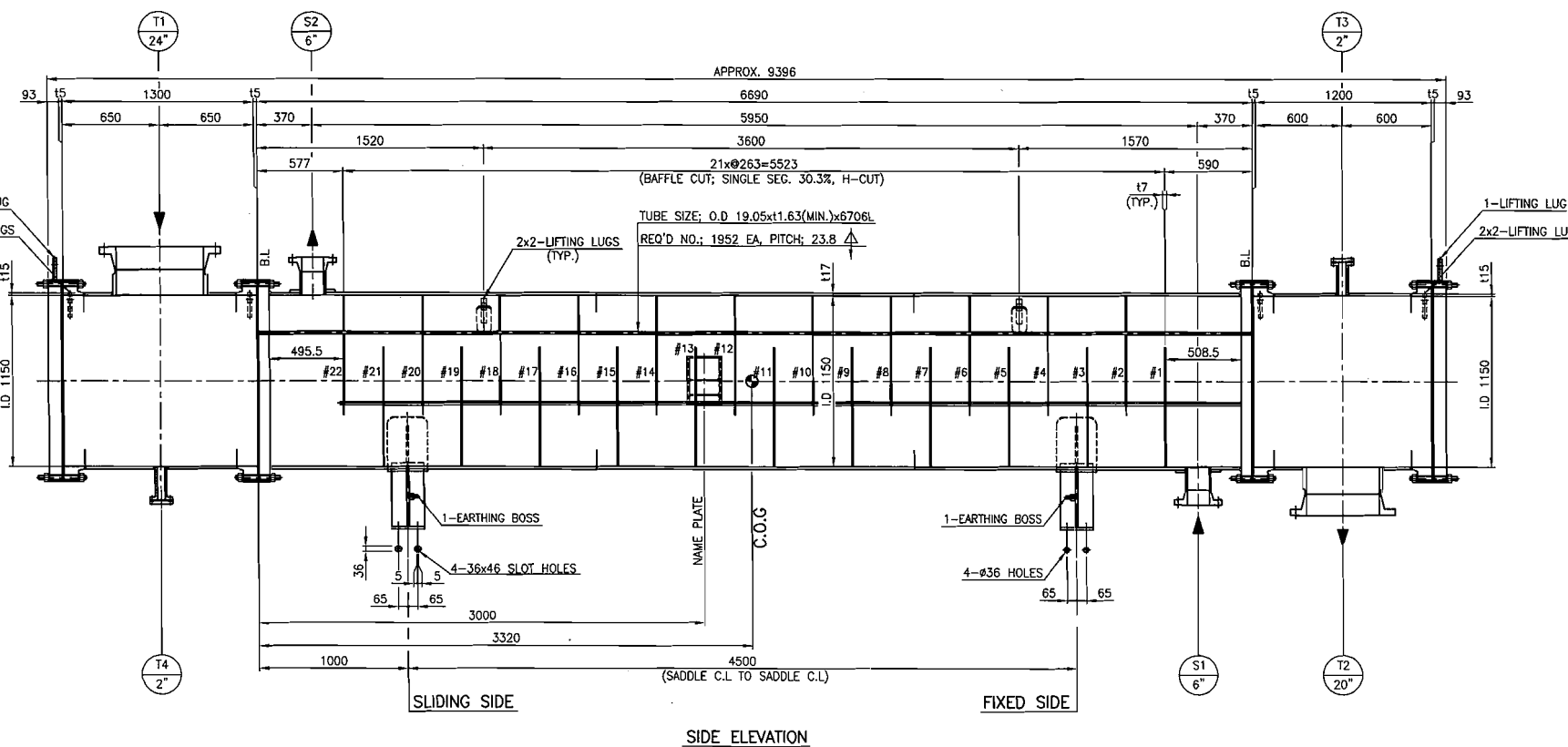
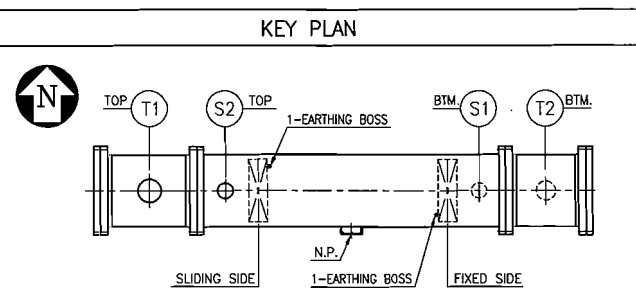
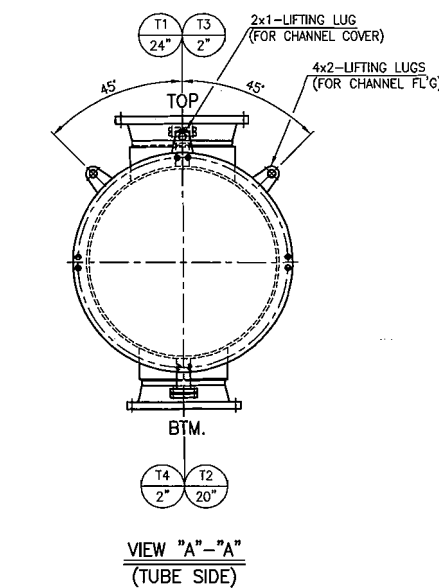
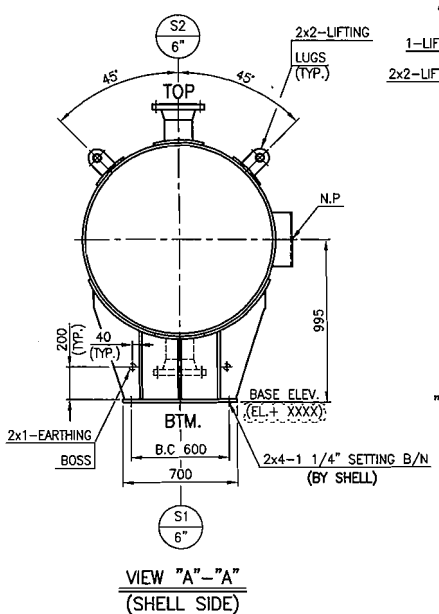


3TH ANGLE PROJECTION



DESIGN DATA			
CODE	ASME SEC. VIII DIV. 1 2010 ED. + 2011 ADD. + API 660 (8th ED. 2007) + NACE MR0175 / ISO 15156	TEMA CLASS	"R" (9TH ED. - '07)
SURFACE AREA PER UNIT SHELL (EFF.)	767.1/767.1 m ²	TYPE	H-AEL
NO. OF REQ'D	2 (TWO)	CODE STAMP/N.B. REQ'D	ASME (U)/YES
	SHELL SIDE	LOCAL REGULATION	ABSA
KIND OF FLUID	50wt% MEG, 50wt% H2O	TUBE SIDE	VRU GAS
SPECIAL SERVICE	SWEET		SOUR
PROCESS DESIGN PRESS.(INT./EXT.)	2450/F.V. kPa(g)		900/F.V. kPa(g)
DESIGN TEMP. (INT./EXT.)	110 °C		110 °C
OPER. PRESS.	1154 kPa(abs)		98 kPa(abs)
OPER. TEMP. (IN/OUT)	35.3/78.3 °C		85.7/45 °C
HYDRO. TEST PRESS.	5195 kPa(g)		2147 kPa(g)
PNEUM. TEST PRESS.	4731 kPa(g)		1254 kPa(g)
M.A.W.P. / M.A.P.	3639/4008 kPa(g)		965/1665 kPa(g)
GOWNED COMPONENT(M.A.W.P./M.A.P.)	SHELL SIDE/SHELL SIDE		CHANNEL COVER/CHANNEL COVER
M.D.M.T. AT M.A.W.P./M.A.E.P.	-45 °C AT 3639/F.V. kPa(g)		-45 °C AT 965/F.V. kPa(g)
M.M.T. (HOR. OPERATING)	54.3 °C		58.9 °C
P.W.H.T.	NO		NO
S.R.O.F. HEAD AFTER COLD FORMING	NO		NO
IMPACT TEST	YES (SEE NOTE 3)		YES (SEE NOTE 3)
RADIOGRAPH (S/H)	100%/-		100%/-
JOINT EFFICIENCY (S/H)	1.0/-		1.0/-
CORR. ALLOW. (mm)	1.5(SHELL) / 3(NOZZLES)		0.4(TUBES)/0.0
NO. OF PASS	1 (ONE)		1 (ONE)
INSULATION (BY OTHERS)	50 mm		50 mm
FIREPROOFING			mm
WIND VELOCITY	NBC CANADA 2005		
SEISMIC ZONE	NBC CANADA 2005		
PAINTING	AS PER DEP 30.48.00.31-GEN.		
WEIGHT	ERECTION	20000 kg	BUNDLE
	EMPTY	21360 kg	FULL OF WATER
	OPERATING	24500 kg	
TUBE & TUBESHEET JOINT	STRENGTH WELD WITH EXPANDING		

NOZZLE SCHEDULE									
MARK NO.	REQ'D	PIPE SIZE	SCH.	RATING	TYPE	FACING	FROM C.L. TO FACE	DESCRIPTION	REMARK
S1	1	6"	80	ASME 300#	W.N.	R.F.	830	SHELL SIDE INLET	
S2	1	6"	80	ASME 300#	W.N.	R.F.	830	SHELL SIDE OUTLET	
T1	1	24"	t10	ASME 150#	W.N.	R.F.	900	TUBE SIDE INLET	
T2	1	20"	t10	ASME 150#	W.N.	R.F.	900	TUBE SIDE OUTLET	
T3	1	2"	-	ASME 150#	L.W.N.	R.F.	800	TUBE SIDE VENT	W/B.F.
T4	1	2"	-	ASME 150#	L.W.N.	R.F.	800	TUBE SIDE DRAIN	W/B.F.

ITEM NO.				
1	E-11570			
2	E-11580			
2014.12.30	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
2014.12.23	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
2014.11.17	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
2014.09.04	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
2014.08.27	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
2014.08.13	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
2014.07.02	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
2014.05.30	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
2014.01.20	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
REV.	DATE	DESCRIPTION	DRWN	CHKD

CLIENT		SHELL CANADA ENERGY	
PROJECT		CARMON CREEK PROJECT	
P/O NO.	4511951391	TITLE	E-11570 (SEE ITEM NO. TABLE)
W/O NO.	P-135G-007		VRU INLET GAS COOLER (GENERAL ASSEMBLY)
SCALE	1/22	CLIENT DOC. NO.	CCK-4511951391-0132-B01-00001-001
		REV NO.	09
DRAWING LIST		ILSUNG CORPORATION	
		ONSAN, KOREA	
		VP-SG07-E11570-001	

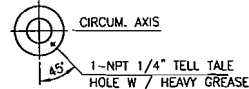
Document Number:	CCK-4511951391-0132-B01-00001-001	Rev:	09
Approval Status:	☒ 1 - Approved, No Comment - Proceed with Fabrication/Construction ☐ 2 - Approved, Note Comments - Revise and Resubmit. Proceed with Fabrication/Construction ☐ 3 - Not Approved, Revise and Resubmit - do not proceed with Fabrication/Construction ☐ 4 - Information Only		
VENDORS PLEASE NOTE: Permission to proceed does not constitute acceptance or approval of design details, calculations, analysis, test methods or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligation			
Responsible Engineer Signature:	Wayne Gossett (Wayne.Gossett@shell.com)	Date:	02/09/2015

DOCUMENT NUMBER:	SHELL REV:
TAGS:	
APPROVAL STATUS:	☐ 1 - APPROVED, NO COMMENT - PROCEED WITH FABRICATION ☐ 2 - APPROVED WITH COMMENTS - REVISE AND RESUBMIT. PROCEED WITH FABRICATION ☐ 3 - NOT APPROVED, REVISE AND RESUBMIT ☐ 4 - INFORMATION ONLY
SUPPLIER PLEASE NOTE: PERMISSION TO PROCEED DOES NOT CONSTITUTE ACCEPTANCE OR APPROVAL OF DESIGN DETAILS, CALCULATIONS, ANALYSES, TEST METHODS OR MATERIAL DEVELOPED OR SELECTED BY THE VENDOR AND DOES NOT RELIEVE SUPPLIER FROM FULL COMPLIANCE WITH CONTRACTUAL OBLIGATION.	
RESPONSIBLE ENGINEER SIGNATURE:	DATE:

9	GENERAL NOTE	CCK-4511951391-0132-B01-00001-001
8	DETAIL OF SHIPPING SADDLE	VP-SG07-E11570-009
7	DETAIL OF NAME PLATE	VP-SG07-E11570-008
6	DETAIL OF NOZZLE	VP-SG07-E11570-007
5	DETAIL OF SUPPORT SADDLE	VP-SG07-E11570-006
4	DETAIL OF TUBE BUNDLE	VP-SG07-E11570-005
3	DETAIL OF TUBE ARRANGEMENT	VP-SG07-E11570-004
2	DETAIL OF BODY	VP-SG07-E11570-003
1	GENERAL ASSEMBLY	VP-SG07-E11570-002
NO	DRAWING NAME	CLIENT DOC. NO. (ILSUNG DOC. NO.)

1. FABRICATION

- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE NOTED.
- ALL BOLT HOLES ARE TO STRADDLE NATURAL C.L. OF H/EX. UNLESS OTHERWISE NOTED.
- NOZZLE PROJECTIONS ARE FROM CENTER LINE OF H/EX OR NEAREST TANGENT LINE TO GASKET FACE OF FLANGE.
- ALL WELD SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED.
- DIMENSIONS TO BAFFLES OR SUPPORT ARE MEASURED TO THE CENTER OF EACH PLATE.
- BASE LINE (B.L.) IS INDICATED THE GASKET CONTACT SURFACE OF SHELL FLANGE.
- GASKET SEATING SURFACE SHALL COMPLY WITH THE FOLLOWING :
 - GIRTH FLANGE : 125 TO 250 MICRO INCH AARH
 - STANDARD NOZZLE FLANGE : 125 TO 250 MICRO INCH AARH
- GASKET SPECIFICATION : GROOVED METAL GASKET WITH GRAPHITE [15]
 - METAL : 304 S.S (14)
 - LAYER : GRAPHITE (10.5 ON BOTH SIDE)
- GASKET SPECIFICATION : SPIRAL WOUND GASKET [14.5]
 - FILLER : GRAPHITE - INNER RING : 304 S.S
 - HOOP : 304 S.S - OUTER RING : C.S
- ALL EXTERNAL REINFORCEMENT PADS SHALL BE PROVIDED WITH 1/4" NPT TELL-TALE HOLE FOR VENTING PURPOSE SHALL BE PACKED WITH SHIPPED HEAVY GREASE AFTER TESTING. LONG. AXIS



2. DESIGN NOTE

SEISMIC AND WIND LOAD	
	OPERATING
SEISMIC AT BASE	SHEAR (kN) 23.77
	MOMENT (kN-m) 22.58
WIND AT BASE	SHEAR (kN) 6.26
	MOMENT (kN-m) 5.94

WIND AND SEISMIC	
GROUND SNOW LOAD S_s	2.3 kPa
WIND:	
PREVAILING DIRECTION	SW
MAX. (1/50) WIND SPEED	28 m/s (51 kPa TABLE C-1 ABC CODE)
SEISMIC (ABC CODE SECTION 4.1.8)	
SITE CLASS	D (ABC TABLE 4.1.8.4.A.)
$S_o(0.2)$	0.124
$S_o(0.5)$	0.08
$S_o(1.0)$	0.036
$S_o(2.0)$	0.011
PGA	0.036

ALLOWABLE NOZZLE LOADS							
NOZZLE MARK	SIZE	FORCES (kN)			MOMENTS (kN-m)		
		AXIAL (F _x)	CIRCUMFERENTIAL (F _y)	LONGITUDINAL (F _z)	CIRCUMFERENTIAL (M _y)	TORSIONAL (M _z)	LONGITUDINAL (M _x)
S1,S2	6"	5.11	5.11	5.11	4.20	4.20	4.20
T1	24"	20.49	20.49	20.49	41.89	41.89	41.89
T2	20"	16.46	16.46	16.46	30.11	30.11	30.11

MEAN METAL TEMPERATURE		
CASE	SHELL (°C)	TUBE (°C)
NORMAL OPERATING	53.9	59.8

3. MATERIALS

- MATERIAL FOR EXTERNAL SUPPORTS WELD TO SHELL OR HEAD SHALL BE OF THE SAME GRADE AND WELDING COMPONENTS (P NO. AND G NO.) AS SPECIFIED FOR THE SHELL OR HEADS.
 - M.D.M.T : -45 °C, HOWEVER THE FOLLOWING REGARDLESS OF THE THICKNESS SHALL BE IMPACT TESTED AT -45 °C
 - LIFTING LUGS
- FOR WELDING OF THE ABOVE COMPONENTS, FOR WITH IMPACT TEST AT -45 °C ARE REQUIRED.

3) TABLE OF MATERIALS

COMPONENTS	MATERIAL	EXEMPTION (ASME SEC. IIC, DIV. 1)	IMPACT TEST (TEMP. (°C) ENERGY VALUE (J))	PRODUCTION IMPACT TEST	JOINT NO.	WPS NO.	REMARK
SHELL	SA516-70(N)		-45 20(AVG.)/14(MIN.)	YES	A-02-04.B-03-06	GT.SM-1.1-107F OF GT.SM.SA-1.1-107F	NOTE 1,2,3,5
SHELL FLANGE	-						
CHANNEL	SA240-S31803		-45 27(AVG.)/20(MIN.)	YES	A-01.05 B-01.02.07.08	GT.SM-10K1.0H-101H	NOTE 1,2,3,5
CHANNEL FLANGE	SA182-F51(S31803)		-45 27(AVG.)/20(MIN.)				
CHANNEL COVER	SA765-11(N)+S31803 CLAD		-45 20(AVG.)/14(MIN.)	N/A			NOTE 1,5
FLOATING FLANGE	-						
FLOATING HEAD	-						
BACKING DEVICE	-						
TUBESHEET	SA765-11(N)+S31803 CLAD		-45 20(AVG.)/14(MIN.)	N/A	TUBE TO TUBESHEET		NOTE 1,5
TUBE	SA788-S31803(SEAMLESS)	UCS-66(d)		N/A			NOTE 5
BAFFLE OR SUPPORT	SA516-70(N)	N/A					
IMPERMEABLE BAFFLE	-						
TIE ROD/2NUT	SA36(KILLED)/SA194-2HM	N/A			INTERNAL ATTACHMENT		
BAFFLE SPACER	SA333-6	N/A					
PASS PARTITION PLATE	-						
SETTING B/N (H.D.G.)	SA325/SA563-A	N/A					
SUP'T SADDLE	SA516-70(N)		-45 20(AVG.)/14(MIN.)	N/A	EXTERNAL ATTACHMENT		
EARTH BOSS	SA105(N)	N/A					
NAME PLATE	SA240-304	N/A					
FLANGE	SA350-LF2 CL.1(N)		-45 20(AVG.)/14(MIN.)	N/A			NOTE 1,5
PIPE	SA333-6		-45 20(AVG.)/14(MIN.)	N/A			NOTE 5
FITTING	-						
CHANNEL NOZZLE	FLANGE SA182-F51(S31803)		-45 27(AVG.)/20(MIN.)	N/A			NOTE 1,5
PIPE	-						
BOSS	SA182-F51(S31803)		-45 27(AVG.)/20(MIN.)	N/A			NOTE 1,5
FITTING	-						
STUD BOLT/NUT	-						
-SHELL COVER	-						
-STATIONARY	SA320-L7M/SA194-7M		-73 27(AVG.)/20(MIN.)	N/A			NOTE 4
-CHANNEL COVER	SA320-L7M/SA194-7M		-73 27(AVG.)/20(MIN.)	N/A			NOTE 4
-FLOATING HEAD	-						
GASKET	-						
-SHELL COVER	-						
-STATIONARY	(SEE NOTE 1.8)	N/A					
-CHANNEL COVER	(SEE NOTE 1.8)	N/A					
-FLOATING HEAD	-						
SHELL NOZZLE	GASKET -						
BOLT/NUT	-						
CHANNEL NOZZLE	GASKET (SEE NOTE 1.9)	N/A					
BOLT/NUT	SA320-L7M/SA194-7M		-73 27(AVG.)/20(MIN.)	N/A			

NOTE :

- 100% UT SCAN IN STRICT ACCORDANCE WITH SA-388.
- (1) SET OF TEST COUPONS REQUIRED.
 - COUPONS SHALL MATCH THE SHELL HEAT NUMBER & THICKNESS.
 - (1) SET OF COUPONS SHALL BE PROVIDED FOR EACH TYPE OF EDGE PREP.
 - SIZE OF COUPON TO BE 200x400 LG. 400 DIMENSION TRANSVERSE TO ROLLING GRAIN DIRECTION.
 - EDGE PREP ON 400 DIMENSION (1) SIDE ONLY.
- FOR EACH VESSEL, ONE TEST PLATE SHALL BE MADE FOR EACH WELDING PROCEDURE USED FOR JOINTS OF CATEGORIES A AND B.
- STUDS, NUTS AND GASKETS : MANUFACTURER'S CERTIFICATION OF COMPLIANCE REQUIRED WITH THE REFERENCED ASME OR ASIM SPECIFICATION. THE DOCUMENT SHALL BE IDENTIFIED WITH THE PO NUMBER AND ITEM CODE NUMBER AND SHALL BE SIGNED BY THE MANUFACTURER'S AUTHORIZED AGENT.
- ALL PRESSURE RETAINING PARTS MATERIALS SHALL MEET ASME SECTION II 2010 EDITION & 2011 ADDENDA FOR MATERIAL SPECIFICATIONS AND GENERAL SPECIFICATIONS TO THE PRODUCT FORM.

Document Number: CCK-4511951391-0132-B01-00001-002	Rev: 02
Approval Status: ☒ 1 - Approved, No Comment - Proceed with Fabrication/Construction ☐ 2 - Approved, Note Comments - Revise and Resubmit. Proceed with Fabrication/Construction ☐ 3 - Not Approved, Revise and Resubmit - do not proceed with Fabrication/Construction ☐ 4 - Information Only	
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Responsible Engineer Signature: Wayne Gossett (Wayne.Gossett@shell.com)	Date: 01/22/2015

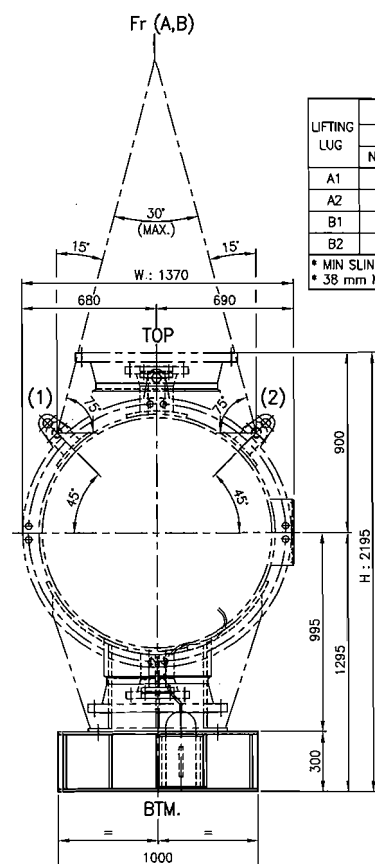
DOCUMENT NUMBER: CCK-4511951391-0132-B01-00001-002	SHELL REV: 02
TAGS: E-11570, E-11580	
APPROVAL STATUS: ☐ 1 - APPROVED, NO COMMENT - PROCEED WITH FABRICATION ☐ 2 - APPROVED WITH COMMENTS - REVISE AND RESUBMIT. PROCEED WITH FABRICATION ☐ 3 - NOT APPROVED, REVISE AND RESUBMIT ☐ 4 - INFORMATION ONLY	
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RESPONSIBLE ENGINEER SIGNATURE:	DATE:

ASME - U
SWEET SERVICE
(SHELL SIDE)
SOUR SERVICE
(TUBE SIDE)

ITEM NO.	
1	E-11570
2	E-11580

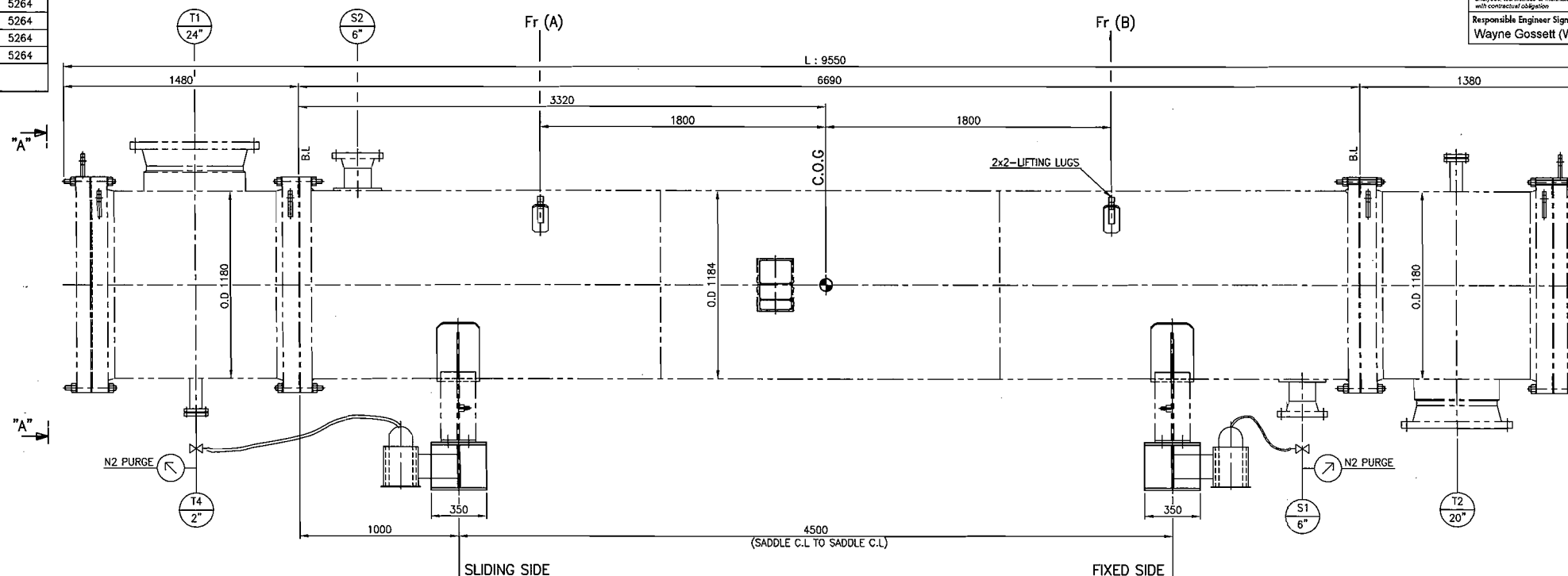
2014.12.30	ISSUED FOR APPROVAL	TY-ENG	W.LLEE	K.B.KIM	Y.G.PARK	
2014.11.17	ISSUED FOR APPROVAL	TY-ENG	W.LLEE	K.B.KIM	Y.G.PARK	
REV.	DATE	DESCRIPTION	DRWN	CHKD	REVD	APPD
CLIENT SHELL CANADA ENERGY						
PROJECT CARMON CREEK PROJECT						
P/O NO. 4511951391	TITLE E-11570 (SEE ITEM NO. TABLE) VRU INLET GAS COOLER (GENERAL NOTE)					
W/O NO. P-135G-007						
SCALE NONE	CLIENT DOC. NO. CCK-4511951391-0132-B01-00001-002	REV NO. 02				
ILSUNG ILSUNG CORPORATION ONSAN, KOREA						
VP-SG07-E11570-009						

Document Number:	CCK-4511951391-0132-B04-00002-001	Rev:	06
Approval Status:	☒ 1 - Approved, No Comment - Proceed with Fabrication/Construction ☐ 2 - Approved, Note Comments - Revise and Resubmit. Proceed with Fabrication/Construction ☐ 3 - Not Approved, Revise and Resubmit - do not proceed with Fabrication/Construction ☐ 4 - Information Only		
REVISIONS PLEASE NOTE: Permission to proceed does not constitute acceptance or approval of design details, calculations, analysis, test methods or materials developed or selected by the supplier and does not release supplier from full compliance with contractual obligation.			
Responsible Engineer Signature:	Wayne Gossett (Wayne.Gossett@shell.com)		Date:
			03/27/2015



LIFTING LUG	SLIDING LOAD (DEG. FROM VERTICAL)			
	0°		75°	
	NET (kg)	GROSS (kg)	NET (kg)	GROSS (kg)
A1	5000	5085	5176	5264
A2	5000	5085	5176	5264
B1	5000	5085	5176	5264
B2	5000	5085	5176	5264

• MIN SLING LENGTH FOR 15° = 1930 mm
• 38 mm MINIMUM SHACKLE PIN DIAMETER



VIEW "A" - "A"

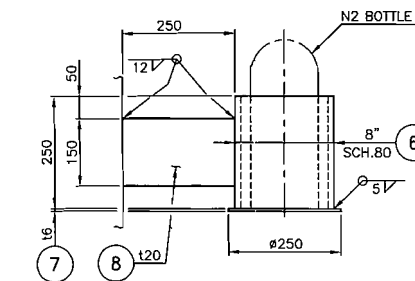
SIDE ELEVATION

SLIDING SIDE

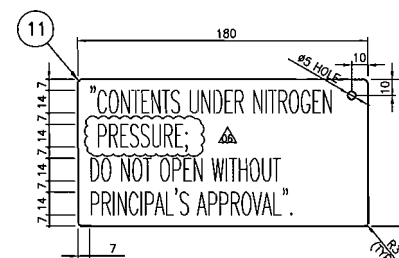
FIXED SIDE

DETAIL OF TEMPORARY FLANGE COVER

NOZZLE NO.	SIZE	RATING	COVER TH'K
S1	6"	300#	t16
S2	6"	300#	t16
T1	24"	150#	t16
T2	20"	150#	t14



DETAIL "B"

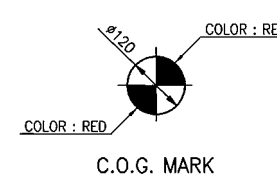


TAG PLATE

PACKAGE NO.	E-11570 (SEE ITEM NO. TABLE)
PACKAGE STYLE	STEEL SKID
DIMENSION	9.55Lx1.37Wx2.19SH
MEASUREMENT	28.72
NET WEIGHT	20000
GROSS WEIGHT	20340
SADDLE WEIGHT	340

ITEM NO.	
1	E-11570
2	E-11580

ASME - U
SWEET SERVICE (SHELL SIDE)
SOUR SERVICE (TUBE SIDE)



C.O.G. MARK

NOTE

1. THE VESSEL TAG NUMBER SHALL BE STENCILED ON EACH VESSEL IN 150mm HIGH LETTERS.
2. UNPAINTED SURFACES WHICH ARE SUSCEPTIBLE TO CORROSION, INCLUDING FLANGE FACINGS, SHALL BE COATED WITH A RUST PREVENTATIVE THE RUST PREVENTATIVE SHALL BE AN EASILY REMOVABLE TYPE.
3. ALL TEMPORARY SHIPPING FLANGE COVERS, SHIPPING BOLTS AND NUTS SHALL BE PAINTED IN A DIFFERENT COLOR THAN H/EX.
4. TEMPORARY COVERS SHALL HAVE A MINIMUM OF FOUR(4) BOLTS AND BE FULLY FASTENED.
5. EXCHANGER SHALL BE PURGED WITH INERT (NITROGEN) TO A MAXIMUM PRESSURE OF 100kPa (15psi) MINIMUM PURGE PRESSURE IS 35 kPa (5 psi).
6. EXCHANGER SHELLS SHALL BE TAGGED WITH RED COLOURED WATERPROOF LABELS.

ITEM	NAME OF PART	MATERIAL	Q'TY	SP1	UNIT	REMARK
11	TAG PLATE	304 S.S.	1	EA	t1	
10	TEMPORARY GASKET	NON-ASBESTOS	4	EA	SEE TABLE	
9	TEMPORARY COVER	SA283-C	4	EA	SEE TABLE	
8	RIB PLATE	SA283-C	2	EA	t20	
7	BTM. PLATE	SA283-C	2	EA	t6	
6	BOTTLE SUP'T PIPE	SA53-B	2	EA	8" SCH.80	
5	HEX. B/N/2W	SA307-B/SA563-A/SA283-C	8	SETS	M33x100L	
4	RIB PLATE	SA283-C	20	EA	t14	
3	WEB PLATE	SA283-C	2	EA	t14	
2	UPPER PLATE	SA283-C	2	EA	t14	
1	LOWER PLATE	SA283-C	2	EA	t14	

(2) SETS TO BE MANUFACTURED

REV.	DATE	DESCRIPTION	DRWN	CHKD	REVD	APPD
1	2015.03.20	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM	Y.G.PARK
2	2015.03.05	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM	Y.G.PARK
3	2014.11.26	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM	Y.G.PARK
4	2014.09.04	ISSUED FOR APPROVAL	TY-ENG	W.L.LEE	K.B.KIM	Y.G.PARK
5	2014.08.13	ISSUED FOR APPROVAL	TY-ENG	W.L.LEE	K.B.KIM	Y.G.PARK
6	2014.07.02	ISSUED FOR APPROVAL	TY-ENG	W.L.LEE	K.B.KIM	Y.G.PARK

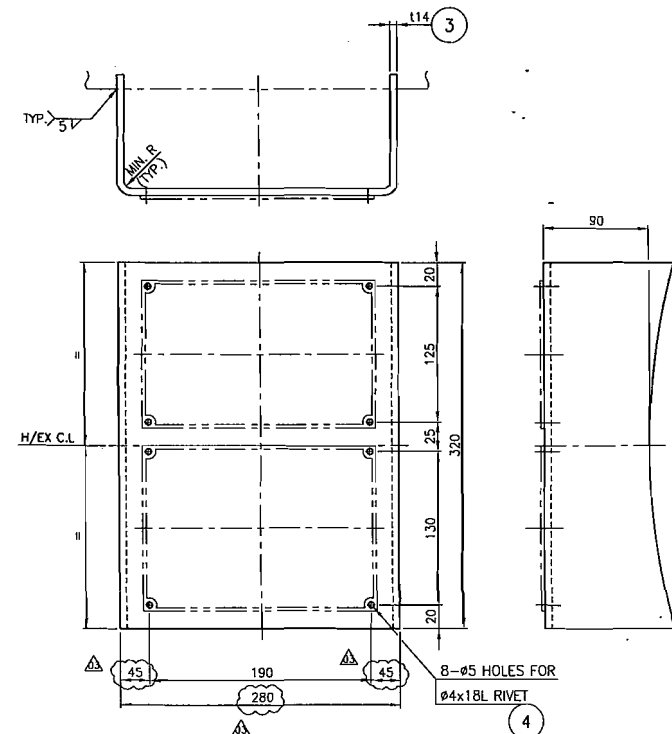
CLIENT	SHELL CANADA ENERGY
PROJECT	CARMON CREEK PROJECT
P/O NO.	4511951391
W/O NO.	P-135G-007
SCALE	NONE
CLIENT DOC. NO.	CCK-4511951391-0132-B04-00002-001
REV. NO.	06
ILSUNG DOC. NO.	VP-SG07-E11570-008

ILSUNG ILSUNG CORPORATION
ONSAN, KOREA

Document Number: CCK-4511951391-0132-D04-00002-001	Rev: 04
Approval Status: ☒ 1 - Approved, No Comment - Proceed with Fabrication/Construction ☐ 2 - Approved, Note Comments - Revise and Resubmit. Proceed with Fabrication/Construction ☐ 3 - Not Approved, Revise and Resubmit - do not proceed with Fabrication/Construction ☐ 4 - Information Only	
VENDORS PLEASE NOTE: Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligation.	
Responsible Engineer Signature: Wayne Gossett	Date: 01/06/2015

MANUFACTURER ILSUNG CORPORATION	
MANUF. SERIAL NO. (A)	CODE (SEE NOTE 1)
H/EX. NO. (B)	CONSTR. SHELL 1 TUBE 1
PROCESS DESIGN PRESS. 2450/F.V. 900/F.V. kPa.g	YEAR (SEE NOTE 8)
DESIGN TEMP. 110 110 °C	VESSEL CATEGORY 1
TEST PRESS. NEW (S/F) 5195/4731 2147/1254 kPa.g	27 2
VOLUME (3.15) (5.16) m ³	(SEE NOTE 6)
SURFACE AREA 767.1 m ²	(SEE NOTE 7)
STRESS RELIEVED NO NO	DATE (C)
RADIOGRAPH(S/H) 100%/- 100%/-	REG. No. (CRN No.)
PMI	CLAD : S31803 , CHANNEL : S31803

EQUIPMENT NAME PLATE



NAME PLATE BRACKET DETAIL

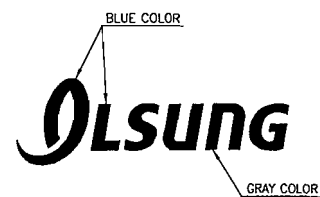
DOCUMENT NUMBER: CCK-4511951391-0132-D04-00002-001	SHELL REV: 03
TAGS: E-11580, E-11570	
APPROVAL STATUS: ☐ 1 - APPROVED, NO COMMENT - PROCEED WITH FABRICATION ☐ 2 - APPROVED WITH COMMENTS - REVISE AND RESUBMIT. PROCEED WITH FABRICATION ☐ 3 - NOT APPROVED, REVISE AND RESUBMIT ☐ 4 - INFORMATION ONLY	
SUPPLIER PLEASE NOTE: PERMISSION TO PROCEED DOES NOT CONSTITUTE ACCEPTANCE OR APPROVAL OF DESIGN DETAILS, CALCULATIONS, ANALYSES, TEST METHODS OR MATERIAL DEVELOPED OR SELECTED BY THE VENDOR AND DOES NOT RELIEVE SUPPLIER FROM FULL COMPLIANCE WITH CONTRACTUAL OBLIGATION.	
RESPONSIBLE ENGINEER SIGNATURE:	DATE:

CERTIFIED BY ILSUNG CORPORATION	
U M.A.W.P. 3639 kPa.g AT 110 °C 965 kPa.g AT 110 °C	W M.A.W.P. F.V. kPa.g AT 110 °C F.V. kPa.g AT 110 °C
RT1/RT1 M.D.M.T. -45 °C AT 3639 kPa.g -45 °C AT 965 kPa.g	-/- MFR'S SERIAL NO. (A)
YEAR BUILT (SEE NOTE 8)	
CAUTION: THE CODE REQUIRED PRESSURES AND TEMPERATURES MARKED ON THE HEAT EXCHANGER RELATE TO THE BASIC DESIGN CONDITIONS. THE HEAT EXCHANGER DESIGN HAS BEEN EVALUATED FOR SPECIFIC OPERATING CONDITIONS AND SHALL BE RE-EVALUATED BEFORE IT IS OPERATED AT DIFFERENT OPERATING CONDITIONS.	

ASME NAME PLATE

TABLE

ITEM NO.	A	B	C
E-11570	14-HE-080	1132-E-11570	W7852.2
E-11580	14-HE-081	1132-E-11580	W7852.2



IL-SUNG SYMBOL DETAIL

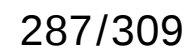
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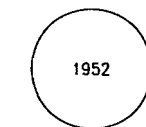
- UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MM[INCH].
- FINISH : "FACE" MACHINED AND POLISHED INCLUDING CAST LETTERING. BACKGROUND KNURLED AND PAINTED BLACK.
- DATA : DATA ON POLISHED SURFACE IS TO BE INSERTED (IN THE ENGLISH LANGUAGE) BY MEANS OF ENGRAVING OR HARD STAMPING AND MUST BE CLEARLY LEGIBLE. THE HEIGHT OF THE LETTERING SHOULD BE APPROX. 4mm[5/32"]
- FOR NAME PLATE LOCATION, SEE ASS'Y DWG. OF EQUIPMENT.
- AFTER COMPLETION OF THE ITEMS, "ASME & N.B" CERTIFICATION MARK SHALL BE APPLIED UNDER WITNESS OF THE A.I.
- SPACE FOR AUTHORITY APPROVAL STAMP.
- DATE OF AUTHORITY APPROVAL. (EXAMPLE : 31 DEC. 1981)
- "YEAR BUILT" SHALL BE STAMPED AS YEAR AFTER HYDRO. TEST (FOR EXAMPLE : 2012)

ITEM	NAME OF PART	MATERIAL	Q'TY	SP1	UNIT	REMARK
4	RIVET	304 S.S	16	EA	ø4x18L	
3	NAME PLATE BRACKET	SA516-70(N)	2	EA	114	
2	ASME NAME PLATE	SA240-304	2	EA	13	
1	EQUIPMENT NAME PLATE	SA240-304	2	EA	13	
(1) SETS TO BE MANUFACTURED						
REV.	DATE	DESCRIPTION	DRWN	CHKD	REVD	APPD
2015.01.02		ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM	Y.G.PARK
2014.07.02		ISSUED FOR APPROVAL	TY-ENG	W.J.LEE	K.B.KIM	Y.G.PARK
2014.06.10		ISSUED FOR APPROVAL	TY-ENG	W.J.LEE	K.B.KIM	Y.G.PARK

CLIENT SHELL CANADA ENERGY	
PROJECT CARMON CREEK PROJECT	
P/O NO. 4511951391	TITLE E-11570 (SEE ITEM NO. TABLE) VRU INLET GAS COOLER (DETAIL OF NAME PLATE)
W/O NO. P-135G-007	SCALE NONE
CLIENT DOC. NO. CCK-4511951391-0132-D04-00002-001	REV NO. 03
ILSUNG CORPORATION ONSAN, KOREA	
VP-SG07-E11570-007	

ASME - U
SWEET SERVICE
(SHELL SIDE)
SOUR SERVICE
(TUBE SIDE)





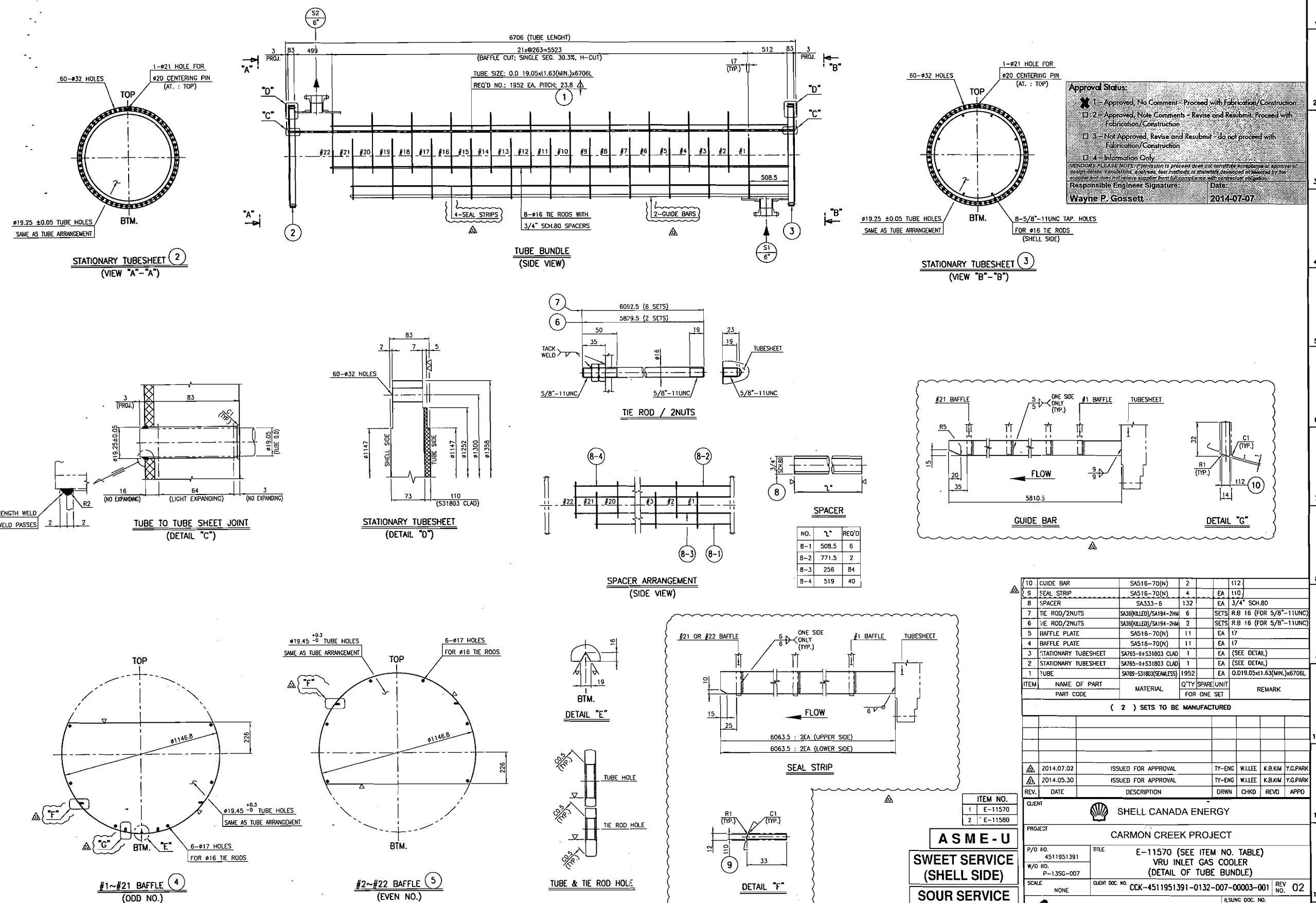
NUMBER OF TUBE HOLES

TOTAL=1952 HOLES

TUBE ARRANGEMENT
(SCALE : 1/4)

Approval Status: ☒ 1 - Approved, No Comment - Proceed with Fabrication/Construction ☐ 2 - Approved, Note Comments - Revise and Resubmit. Proceed with Fabrication/Construction ☐ 3 - Not Approved, Revise and Resubmit - do not proceed with Fabrication/Construction ☐ 4 - Information Only	
<i>VENDORS - PLEASE NOTE: Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligation.</i>	
Responsible Engineer Signature: Wayne P. Gossett	Date: 2014-07-07

[illegible]



Approval Status:	
☒	1 - Approved, No Comment - Proceed with Fabrication/Construction
☐	2 - Approved, Note Comments - Revise and Resubmit, Proceed with Fabrication/Construction
☐	3 - Not Approved, Revise and Resubmit - do not proceed with Fabrication/Construction
☐	4 - Information Only
VENDORS PLEASE NOTE: Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods or materials developed or submitted by the supplier and does not relieve supplier from full compliance with contractual obligations.	
Responsible Engineer Signature: Wayne P. Gossett	
Date: 2014-07-07	

ITEM	NAME OF PART	MATERIAL	Q'TY	SPARE UNIT	REMARK
10	GUIDE BAR	SA516-70(N)	2		(112)
9	SEAL STRIP	SA516-70(N)	4		EA (110)
8	SPACER	SA333-6	132		EA 3/4" SCH.80
7	TIE ROD/2NUTS	SA36(KILLED)/SA194-2HM	6		SETS R.B 16 (FOR 5/8"-11UNC)
6	TIE ROD/2NUTS	SA36(KILLED)/SA194-2HM	2		SETS R.B 16 (FOR 5/8"-11UNC)
5	BAFFLE PLATE	SA516-70(N)	11		EA 17
4	BAFFLE PLATE	SA516-70(N)	11		EA 17
3	STATIONARY TUBESHEET	SA765-H+S31803 CLAD	1		EA (SEE DETAIL)
2	STATIONARY TUBESHEET	SA765-H+S31803 CLAD	1		EA (SEE DETAIL)
1	TUBE	SA765-S31803(SEAMLESS)	1952		EA 0.019.05x1.63(MIN.)x6706L

(2) SETS TO BE MANUFACTURED

REV.	DATE	DESCRIPTION	DRWN	CHKD	REVD	APPD
2014.07.02		ISSUED FOR APPROVAL	TY-ENG	WJLEE	K.B.KIM	Y.G.PARK
2014.05.30		ISSUED FOR APPROVAL	TY-ENG	WJLEE	K.B.KIM	Y.G.PARK

CLIENT SHELL CANADA ENERGY

PROJECT CARMON CREEK PROJECT

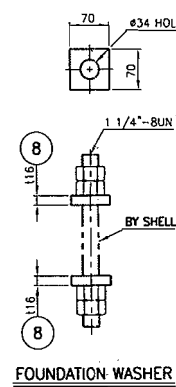
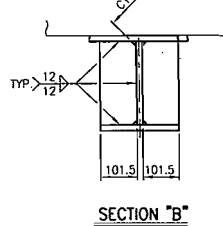
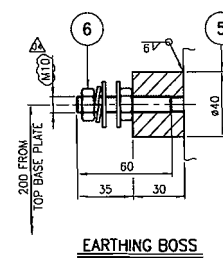
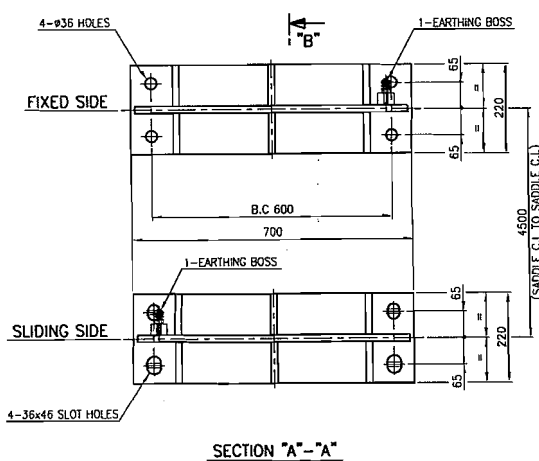
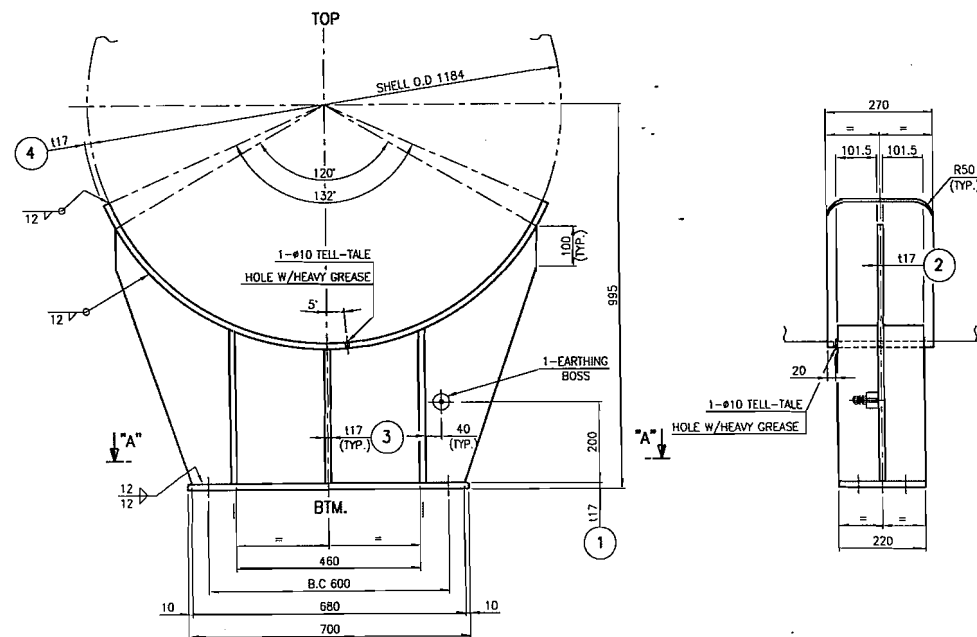
P/O NO. 4511951391 TITLE E-11570 (SEE ITEM NO. TABLE)

W/O NO. P-135G-007 VRU INLET GAS COOLER (DETAIL OF TUBE BUNDLE)

SCALE NONE CLIENT DOC. NO. CCK-4511951391-0132-007-00003-001 REV NO. 02

ILSUNG ILSUNG CORPORATION ONSAN, KOREA ILSUNG DOC. NO. VP-SG07-E11570-004

ASME - U
SWEET SERVICE
(SHELL SIDE)
SOUR SERVICE
(TUBE SIDE)



Approval Status:

☒ 1 - Approved, No Comment - Proceed with Fabrication/Construction

☐ 2 - Approved, Note Comments - Revise and Resubmit - Proceed with Fabrication/Construction

☐ 3 - Not Approved, Revise and Resubmit - do not proceed with Fabrication/Construction

☐ 4 - Information Only

VENDOR'S PLEASE NOTE: Permission to proceed does not constitute acceptance or approval of design details, calculations, analysis, test methods or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligations.

Responsible Engineer Signature: Wayne P. Gossett Date: 2014-09-08

8	SO. WASHER	SA283-C	16	EA	116	
=== DELETED ===						
6	EARTH B/2N/2W/S.W	SA193-BB/SA194-B	2	SETS	M10x60L	
5	EARTHING BOSS	SA105(N)	2	EA	#40	
4	REINF. PAD	SA516-70(N)	2	EA	117	
3	RIB PLATE	SA516-70(N)	12	EA	117	
2	WEB PLATE	SA516-70(N)	2	EA	117	
1	BASE PLATE	SA516-70(N)	2	EA	117	
ITEM	NAME OF PART	MATERIAL	Q'TY	SP1	UNIT	REMARK
(2) SETS TO BE MANUFACTURED						
2014.09.04	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM	Y.G.PARK	
2014.08.13	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM	Y.G.PARK	
2014.07.02	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM	Y.G.PARK	
2014.05.30	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM	Y.G.PARK	
REV.	DATE	DESCRIPTION	DRWN	CHKD	REVD	APPD

ITEM NO.	
1	E-11570
2	E-11580

ASME - U

SWEET SERVICE (SHELL SIDE)

SOUR SERVICE (TUBE SIDE)

CLIENT SHELL CANADA ENERGY

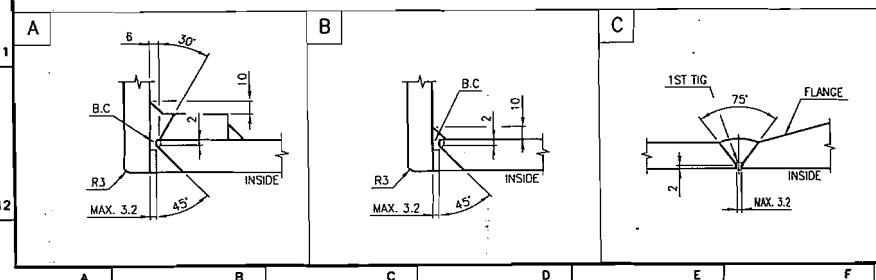
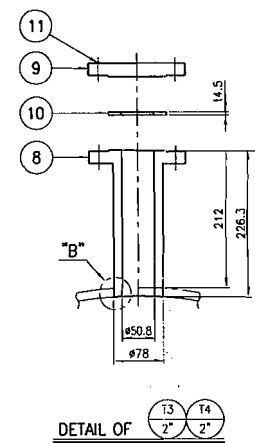
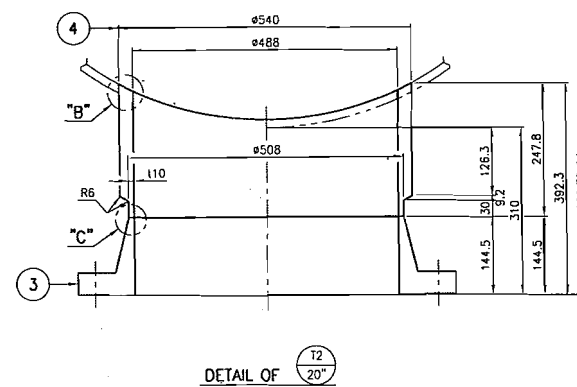
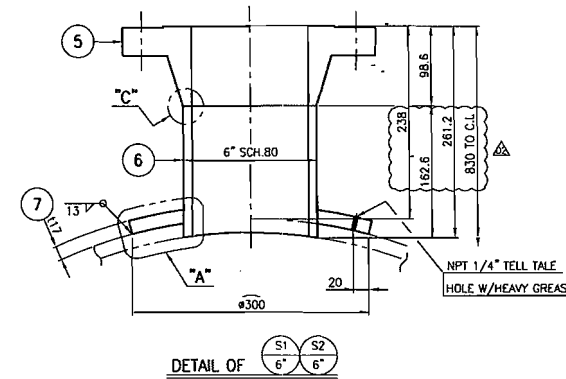
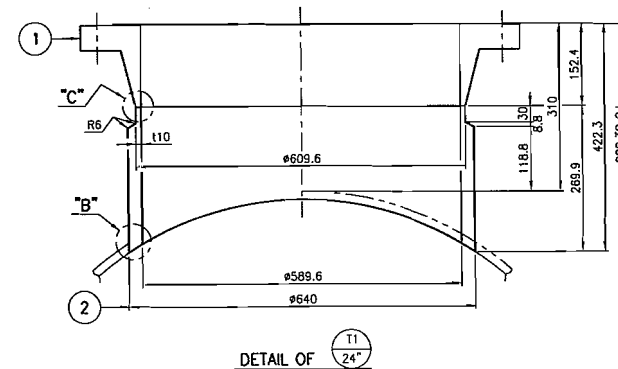
PROJECT CARMON CREEK PROJECT

P/O NO. 4511951391 TITLE E-11570 (SEE ITEM NO. TABLE)

W/O NO. P-135C-007 VRU INLET GAS COOLER (DETAIL OF SUPPORT SADDLE)

SCALE NONE CLIENT DOC. NO. CCK-4511951391-0132-D07-00004-001 REV. NO. 04

ILSUNG ILSUNG CORPORATION ONSAN, KOREA ILSUNG DOC. NO. VP-SG07-E11570-005



Approval Status:

☒ 1 - Approved, No Comment - Proceed with Fabrication/Construction

☐ 2 - Approved, Note Comments - Revise and Resubmit - Proceed with Fabrication/Construction

☐ 3 - Not Approved, Revise and Resubmit - do not proceed with Fabrication/Construction

☐ 4 - Information Only

VENDOR'S PLEASE NOTE: Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods or materials developed or selected by the supplier and does not release supplier from full compliance with contractual obligations.

Responsible Engineer Signature: **Wayne P. Gossett** Date: **2014-08-21**

NOTE:

1. GASKET MAT'L: SPIRAL WOUND GASKET [14.5]
- FILLER: GRAPHITE
 - HOOP: 304 S.S
 - INNER RING: 304 S.S
 - OUTER RING: C.S

11	STUD BOLT/2H.N	SA320-L7M/SA194-7M	8	SETS	5/8"-11UNCx95L
10	GASKET	SEE NOTE 1	2	EA	14.5 2" ASME 150# RF
9	BLIND FLANGE	SA182-F51(S31803)	2	EA	2" ASME 150# B.L.D.-RF
8	FLANGE	SA182-F51(S31803)	2	EA	2" ASME 150# L.W.N.-RF
7	REINF. PAD	SA516-70(N)	2	EA	117
6	NOZZLE NECK	SA333-6	2	EA	6" SCH.80
5	FLANGE (SCH.80)	SA350-LF2 CL.1(N)	2	EA	6" ASME 300# W.N.-RF
4	SELF REINF. NECK	SA182-F51(S31803)	1	EA	#540
3	FLANGE (110)	SA182-F51(S31803)	1	EA	20" ASME 150# W.N.-RF
2	SELF REINF. NECK	SA182-F51(S31803)	1	EA	#640
1	FLANGE (110)	SA182-F51(S31803)	1	EA	24" ASME 150# W.N.-RF

ITEM	NAME OF PART	MATERIAL	Q'TY	SP1	UNIT	REMARK
	PART CODE				FOR ONE SET	

(2) SETS TO BE MANUFACTURED

CLIENT: **SHELL CANADA ENERGY**

PROJECT: **CARMON CREEK PROJECT**

P/O NO.: **4511951391** TITLE: **E-11570 (SEE ITEM NO. TABLE)**

W/O NO.: **P-135C-007** VRU INLET GAS COOLER (DETAIL OF NOZZLE)

SCALE: **NONE** CLIENT DOC. NO.: **CCK-4511951391-0132-007-00005-001** REV. NO.: **02**

ILSUNG CORPORATION ONSAN, KOREA ILSUNG DOC. NO.: **VP-SG07-E11570-006**

ASME - U

SWEET SERVICE (SHELL SIDE)

SOUR SERVICE (TUBE SIDE)