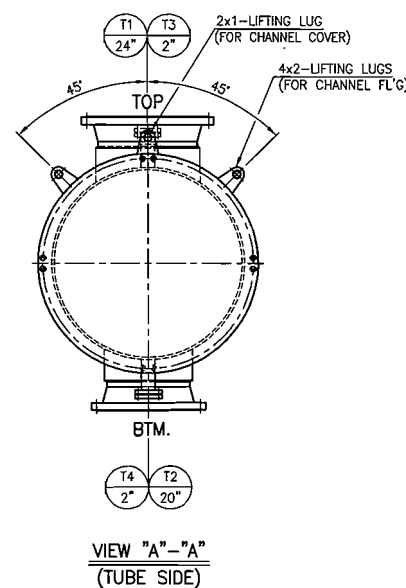
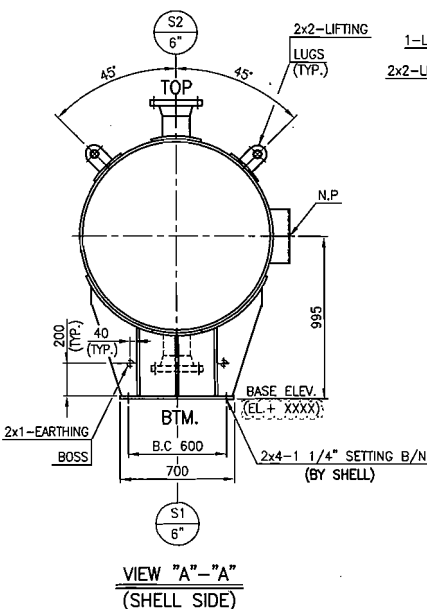
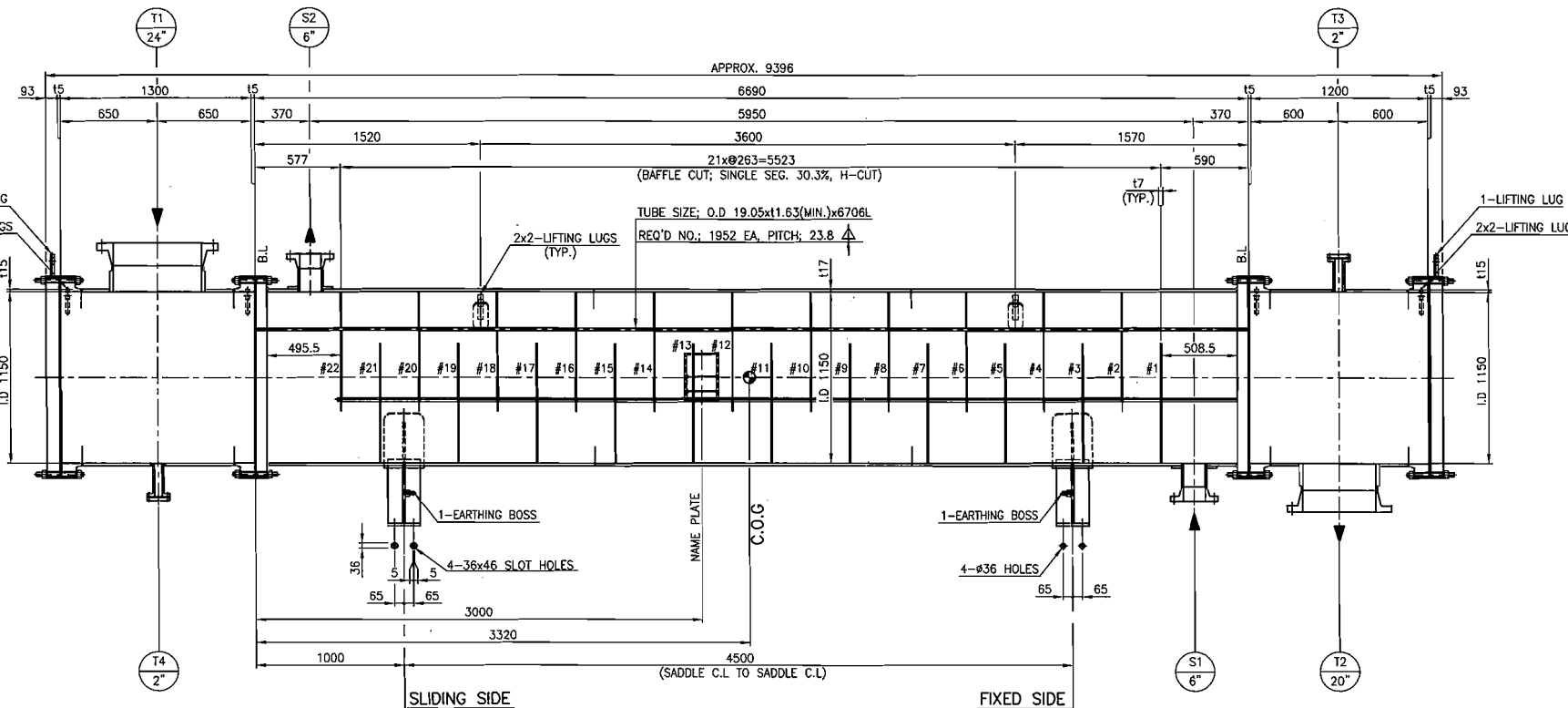
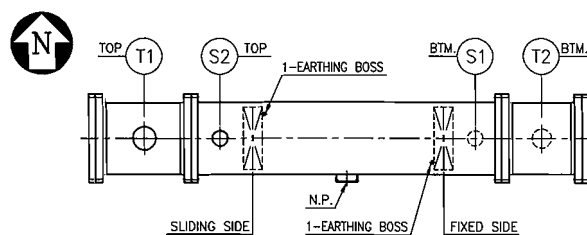


3TH ANGLE PROJECTION



KEY PLAN



SIDE ELEVATION

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

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 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:

NO.	DRAWING NAME	CLIENT DOC. NO. (ILSUNG DOC. NO.)
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.)

DRAWING LIST

DESIGN DATA

CODE	ASME SEC. VIII DIV. 1 2010 ED. + 2011 ADD. + API 660 (8th ED. 2007) + NACE MR0175 / ISO 15156	ITEM CLASS	"R" (9TH ED. - '07)
		TYPE	H-AEL
SURFACE AREA PER UNIT/SHELL (EFF.)	767.1/767.1 m ²	CODE STAMP/ALB REQ'D	ASME (U)/YES
NO. OF REQ'D	2 (TWO)	LOCAL REGULATION	ABSA
	SHELL SIDE		TUBE SIDE
KIND OF FLUID	50wt% MEG, 50wt% H2O		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)
COVERED 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. (NOR. 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	11190 kg
EMPTY	21360 kg	FULL OF WATER	29745 kg
OPERATING	24500 kg		
TUBE & TUBESHEET JOINT	STRENGTH WELD WITH EXPANDING		

NOZZLE SCHEDULE

MARK NO.	PIPE	FLANGE	FROM C.L. TO FACE	DESCRIPTION	REMARK
S1	1 6" 80	ASME 300# W.N. R.F.	B30	SHELL SIDE INLET	
S2	1 6" 80	ASME 300# W.N. R.F.	B30	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

REV.	DATE	DESCRIPTION	DRWN	CHKD	REVD	APPD
1	2014.12.30	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM	Y.G.PARK
2	2014.12.23	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM	Y.G.PARK
3	2014.11.17	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM	Y.G.PARK
4	2014.09.04	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM	Y.G.PARK
5	2014.08.27	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM	Y.G.PARK
6	2014.08.13	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM	Y.G.PARK
7	2014.07.02	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM	Y.G.PARK
8	2014.05.30	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM	Y.G.PARK
9	2014.01.20	ISSUED FOR APPROVAL	TY-ENG	W.I.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)

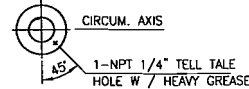
W/O NO. P-135G-007 VRU INLET GAS COOLER (GENERAL ASSEMBLY)

SCALE 1/22 CLIENT DOC. NO. CCK-4511951391-0132-B01-00001-001 REV NO. 09

ILSUNG ILSUNG CORPORATION ONSAN, KOREA VP-SG07-E11570-001

1. FABRICATION

- 1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE NOTED.
- 2) ALL BOLT-HOLES ARE TO STRADDLE NATURAL C.L. OF H/EX. UNLESS OTHERWISE NOTED.
- 3) NOZZLE PROJECTIONS ARE FROM CENTER LINE OF H/EX OR NEAREST TANGENT LINE TO GASKET FACE OF FLANGE.
- 4) ALL WELD SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED.
- 5) DIMENSIONS TO BAFFLES OR SUPPORT ARE MEASURED TO THE CENTER OF EACH PLATE.
- 6) BASE LINE (B.L.) IS INDICATED THE GASKET CONTACT SURFACE OF SHELL FLANGE.
- 7) 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
- 8) GASKET SPECIFICATION : GROOVED METAL GASKET WITH GRAPHITE [15]
 - METAL : 304 S.S. (14)
 - LAYER : GRAPHITE (10.5 ON BOTH SIDE)
- 9) GASKET SPECIFICATION : SPIRAL WOUND GASKET [14.5]
 - FILLER : GRAPHITE - INNER RING : 304 S.S
 - HOOP : 304 S.S - OUTER RING : C.S
- 10) 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.



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.)
$S_a(0.2)$	0.124
$S_a(0.5)$	0.08
$S_a(1.0)$	0.036
$S_a(2.0)$	0.011
PGA	0.036

ALLOWABLE NOZZLE LOADS							
NOZZLE MARK	SIZE	FORCES (kN)			MOMENTS (kN-m)		
		AXIAL (F_z)	CIRCUMFERENTIAL (F_y)	LONGITUDINAL (F_x)	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

- 1) 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.
- 2) 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. VIII 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-10H.10H-101H	NOTE 1,2,3,5
CHANNEL FLANGE	SA182-F51(S31803)		-45 27(AVG.)/20(MIN.)				
CHANNEL COVER	SA765-H(N)+S31803 QJ40		-45 20(AVG.)/14(MIN.)	N/A			NOTE 1,5
FLOATING FLANGE							
FLOATING HEAD							
BACKING DEVICE							
TUBESHEET	SA765-H(N)+S31803 QJ40		-45 20(AVG.)/14(MIN.)	N/A	TUBE TO TUBESHEET		NOTE 1,5
TUBE	SA789-S31803(SEAMLESS)	UCS-66(d)		N/A			NOTE 5
BAFFLE OR SUPPORT	SA516-70(N)	N/A					
IMPINGEMENT BAFFLE							
TIE ROD/2NUT	SX36(KILLED)/SA194-7M	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 GASKET							
NOZZLE BOLT/NUT							
CHANNEL GASKET	(SEE NOTE 1.9)	N/A					
NOZZLE BOLT/NUT	SA320-L7M/SA194-7M		-73 27(AVG.)/20(MIN.)	N/A			

NOTE :

- 1) 100% UT SCAN IN STRICT ACCORDANCE WITH SA-388.
- 2) (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.
- 3) FOR EACH VESSEL, ONE TEST PLATE SHALL BE MADE FOR EACH WELDING PROCEDURE USED FOR JOINTS OF CATEGORIES A AND B.
- 4) STUDS, NUTS AND GASKETS : MANUFACTURER'S CERTIFICATION OF COMPLIANCE REQUIRED WITH THE REFERENCED ASME OR ASTM SPECIFICATION. THE DOCUMENT SHALL BE IDENTIFIED WITH THE PO NUMBER AND ITEM CODE NUMBER AND SHALL BE SIGNED BY THE MANUFACTURER'S AUTHORIZED AGENT.
- 5) 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	
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 (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	
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:

2014.12.30	ISSUED FOR APPROVAL	TY-ENG	WJLEE	K.BKIM	Y.G.PARK	
2014.11.17	ISSUED FOR APPROVAL	TY-ENG	WJLEE	K.BKIM	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						

ASME-U

SWEET SERVICE
(SHELL SIDE)SOUR SERVICE
(TUBE SIDE)

ITEM NO.	
1	E-11570
2	E-11580

Document Number: CCK-4511951391-0132-B04-00002-001 Rev: 06

Approval Status:

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

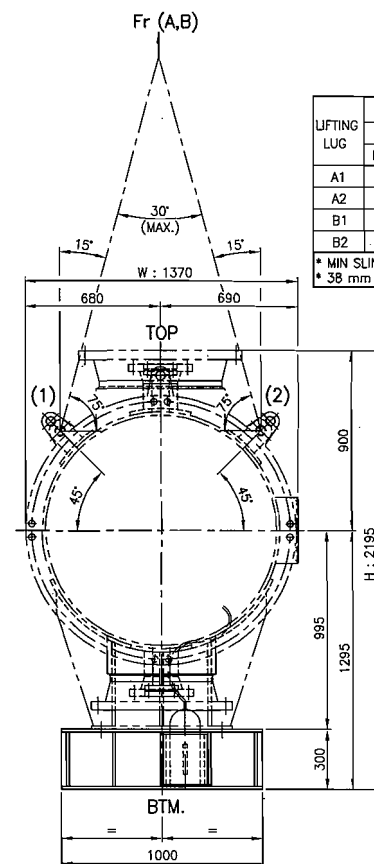
☐ 2 - Approved, Note Comments - Revise and Resubmit. Proceed with Fabrication/Construction

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

☐ 4 - Information Only

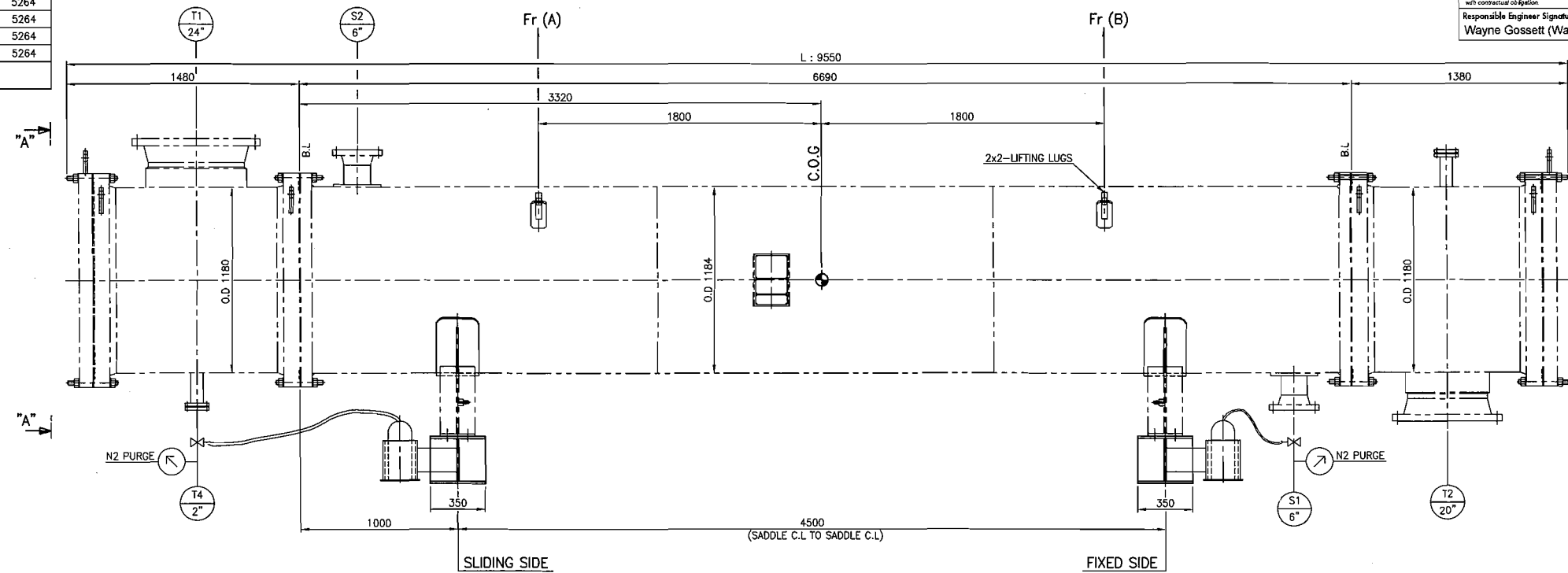
VENUES PLEASE NOTE: Permission to proceed does not constitute acceptance or approval of design details, calculations, analysis, test methods or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligation.

Responsible Engineer Signature: Wayne Gossett (Wayne.Gossett@shell.com) Date: 03/27/2015



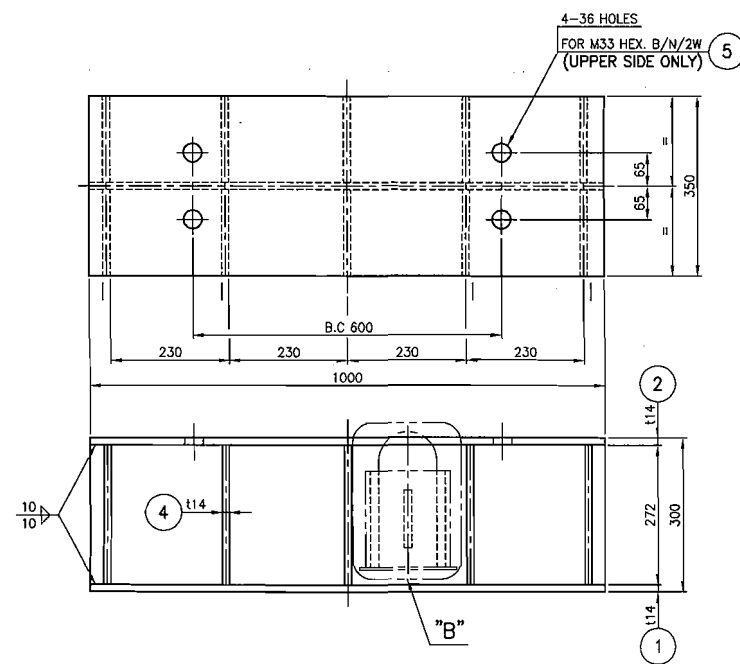
LIFTING LUG	SLIDING LOAD (DEG. FROM VERTICAL)			
	0°		75°	
	NET (kg)	GROSS (kg)	NET (kg)	GROSS (kg)
A1	5000	5085	5176	5264
A2	5000	5085	5176	5264
B1	5000	5085	5176	5264
B2	5000	5085	5176	5264

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

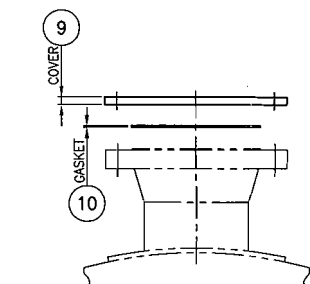


VIEW "A"- "A"

SIDE ELEVATION

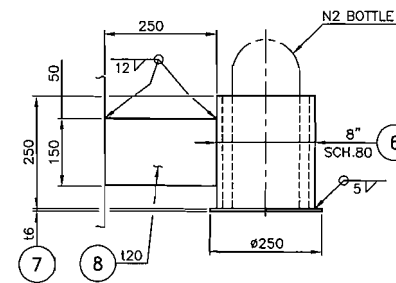


DETAIL OF SHIPPING SKID

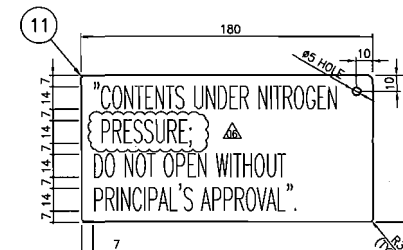


DETAIL OF TEMPORARY FLANGE COVER

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"

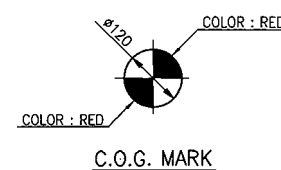


TAG PLATE

PACKAGE NO.	E-11570 (SEE ITEM NO. TABLE)
PACKAGE STYLE	STEEL SKID
DIMENSION	9.55x1.37x2.195H M
MEASUREMENT	28.72 M ³
NET WEIGHT	20000 kg
GROSS WEIGHT	20340 kg
SADDLE WEIGHT	340 kg

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	t11
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	t16
6	BOTTLE SUP'T PIPE	SA53-B	2		EA	8" SCH.80
5	HEX. B/N/2W	SA307-B/SA563-N/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
1	2015.03.20	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
2	2015.03.05	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
3	2014.11.26	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
4	2014.09.04	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
5	2014.08.13	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM
6	2014.07.02	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM

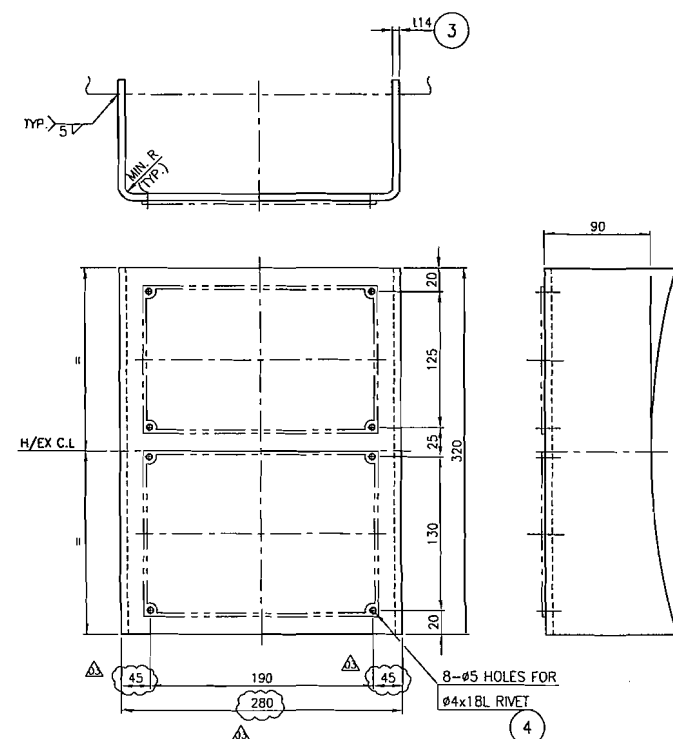
CLIENT SHELL CANADA ENERGY					
PROJECT CARMON CREEK PROJECT					
P/O NO.	4511951391	TITLE	E-11570 (SEE ITEM NO. TABLE)		
W/O NO.	P-135G-007		VRU INLET GAS COOLER (DETAIL OF SHIPPING SADDLE)		
SCALE	NONE	CLIENT DOC. NO.	CCK-4511951391-0132-B04-00002-001	REV. NO.	06
ILSUNG ILSUNG CORPORATION					
VP-SG07-E11570-008					

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
H/EX. NO. (B)	CONSTR. SHELL 1
SHELL TUBE CAT. TUBE 1	YEAR
PROCESS DESIGN PRESS. 2450/F.V. 900/F.V. kPa.g	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 Δ 767.1 m ²	SEE NOTE 7
STRESS RELIEVED NO NO	DATE
RADIOGRAPH(S/H) 100%/- 100%/-	REG. No. (CRN No.)
PMI	CLAD: S31803, CHANNEL: S31803

4-#5 HOLES

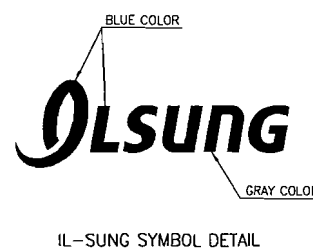
EQUIPMENT NAME PLATE



NAME PLATE BRACKET DETAIL

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

SEE NOTE 5

CRN NO. (C)	
CERTIFIED BY ILSUNG CORPORATION	
U	3639 kPa.g AT 110 °C
W	F.V. kPa.g AT 110 °C
RT1/RT1	-45 °C AT 3639 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.	

4-#5 HOLES

ASME NAME PLATE

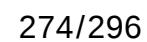
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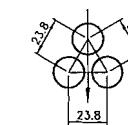
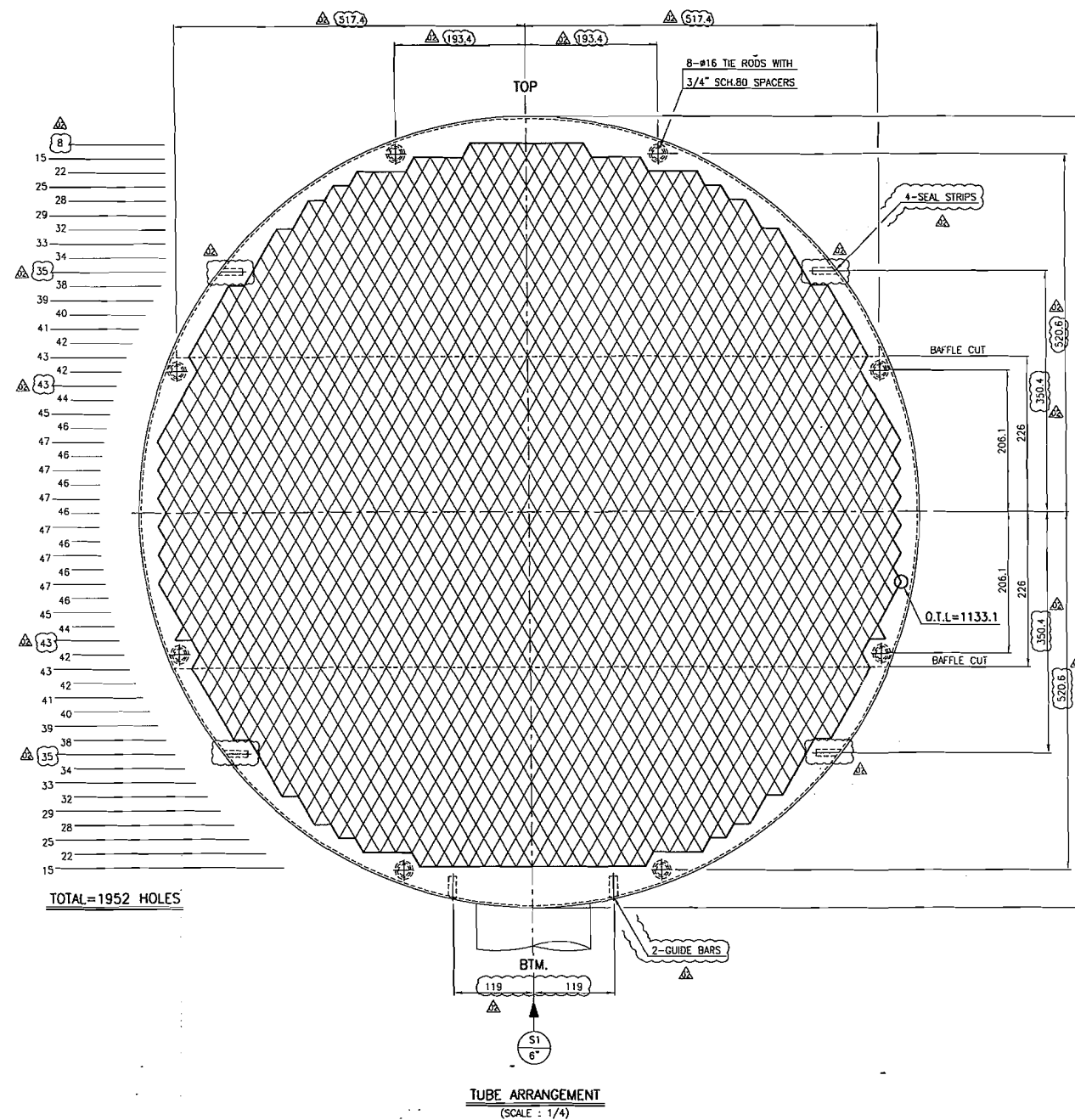
- UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MM (INCH).
- FINISH: "FACE" MACHINED AND POLISHED INCLUDING CAST LETTERING. BACKGROUND KNURLED AND PAINTED BLACK.
- DATA: DATA ON POLISHED SURFACE IS TO BE INSERTED (IN THE ENGLISH LANGUAGE) BY MEANS OF ENGRAVING OR HARD STAMPING AND MUST BE CLEARLY LEGIBLE. 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)

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
ITEM	NAME OF PART	MATERIAL	Q'TY	SP1	UNIT
	PART CODE			FOR ONE SET	REMARK
(1) SETS TO BE MANUFACTURED					
Δ	2015.01.02	ISSUED FOR APPROVAL	TY-ENG	H.S.JEON	K.B.KIM Y.G.PARK
Δ	2014.07.02	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM Y.G.PARK
Δ	2014.06.10	ISSUED FOR APPROVAL	TY-ENG	W.I.LEE	K.B.KIM Y.G.PARK
REV.	DATE	DESCRIPTION	DRWN	CHKD	REVD

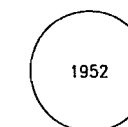
CLIENT	SHELL CANADA ENERGY	
PROJECT	CARMON CREEK PROJECT	
P/O NO.	4511951391	TITLE
W/O NO.	P-135G-007	E-11570 (SEE ITEM NO. TABLE)
SCALE	NONE	VRU INLET GAS COOLER (DETAIL OF NAME PLATE)
CLIENT DOC. NO.	CCK-4511951391-0132-D04-00002-001	REV NO.
		03
ILSUNG CORPORATION		VP-SG07-E11570-007
ONSAN, KOREA		

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





TUBE LAYOUT



NUMBER OF TUBE HOLES

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

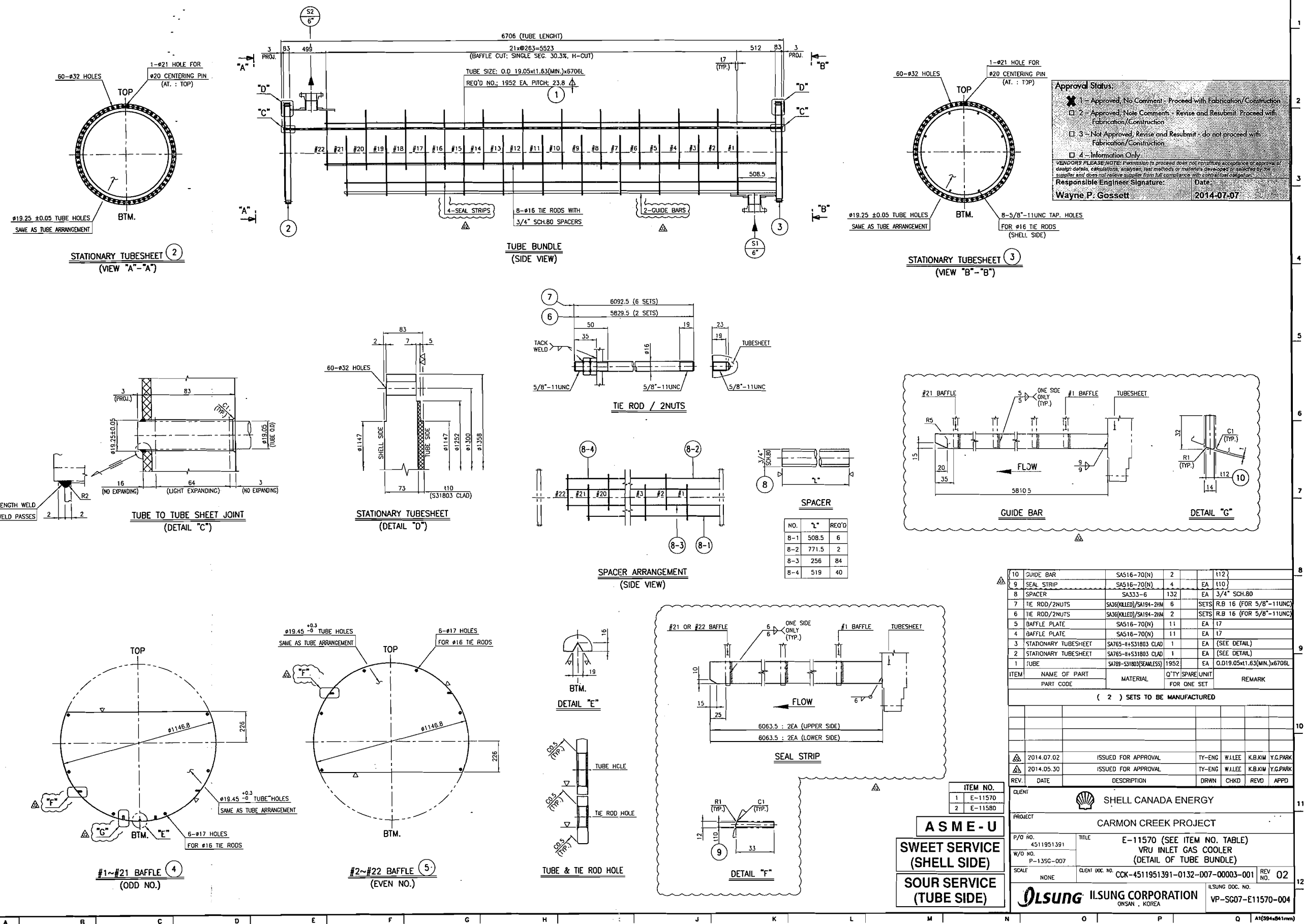
☐ 4 - Information Only

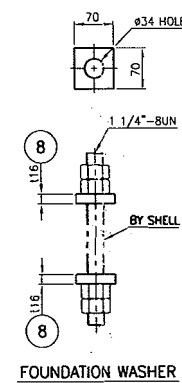
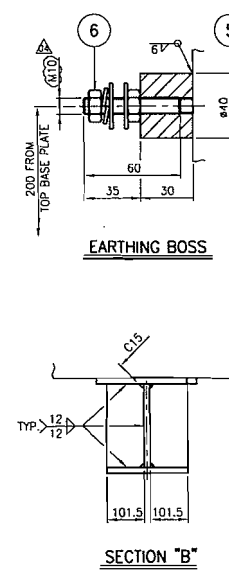
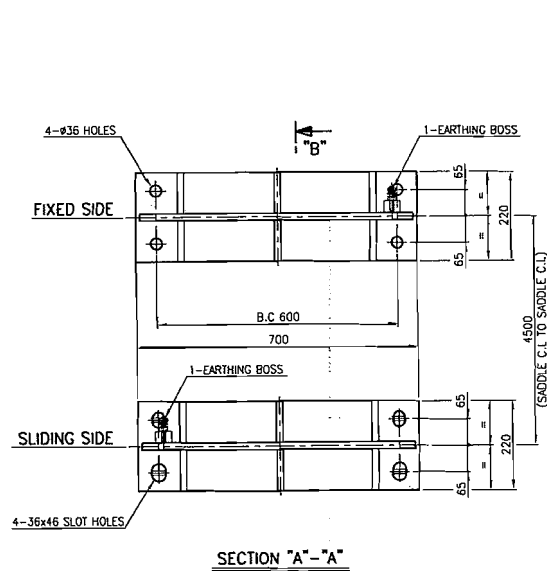
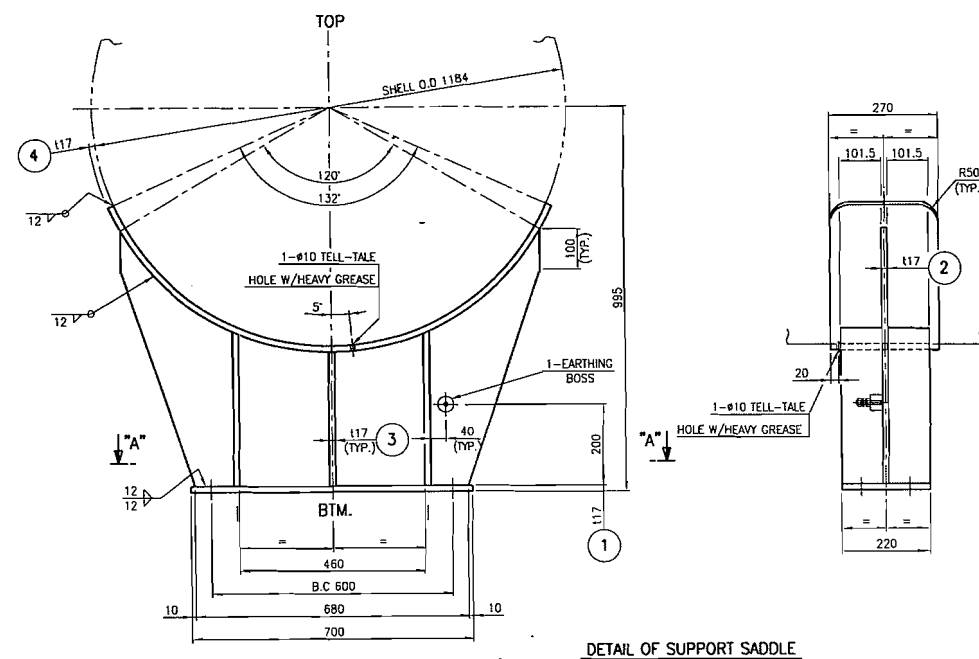
VENDORS PLEASE NOTE: Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods or materials developed or selected by the supplier and does not relieve supplier from full compliance with contract obligation.

Responsible Engineer Signature: **Date:**

Wayne P. Gossett **2014-07-07**

ITEM	NAME OF PART PART CODE	MATERIAL	Q'TY	SPEC UNIT	FOR ONE SET	REMARK
(2) SETS TO BE MANUFACTURED						
△	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
REV.	DATE	DESCRIPTION	DWRN	CHKD	REVO	APPD
CUSTOMER	SHELL CANADA ENERGY					
PROJECT	CARMON CREEK PROJECT					
P/O NO. 4511951391	TITLE	E--11570 (SEE ITEM NO. TABLE) VRU INLET GAS COOLER (DETAIL OF TUBE ARRANGEMENT)				
W/O NO. P--13SG--007						
SCALE	NONE	CUSTOMER DOC. NO.	CCK-4511951391-0132-D07-000002-001	REV NO.	02	
			ILSUNG CORPORATION ONSAN , KOREA			
			ILSUNG DOC. NO.		VP-SG07-E11570-003	





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 relieve supplier from full compliance with contractual obligations.

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

8	S.O. WASHER	SA283-C	16	EA	116	
6	EARTH B/2N/2W/S.W	SA193-BB/SA194-B	2	SETS	M10.60L	
5	EARTHING BOSS	SA105(N)	2	EA	117	
4	REINF. PAD	SA516-70(N)	2	EA	117	
3	WEB 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
	PART CODE				FOR ONE SET	
(2) SETS TO BE MANUFACTURED						
2014.09.04	ISSUED FOR APPROVAL	TY-ENG	W.L.LEE	K.B.KIM	Y.G.PARK	
2014.08.13	ISSUED FOR APPROVAL	TY-ENG	W.L.LEE	K.B.KIM	Y.G.PARK	
2014.07.02	ISSUED FOR APPROVAL	TY-ENG	W.L.LEE	K.B.KIM	Y.G.PARK	
2014.05.30	ISSUED FOR APPROVAL	TY-ENG	W.L.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

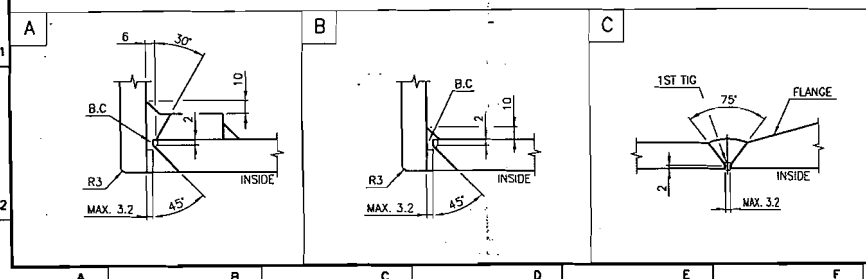
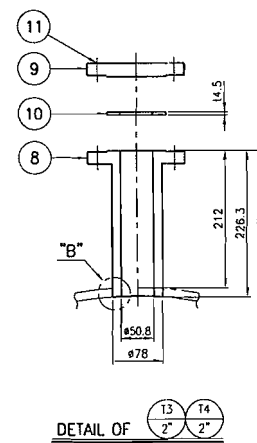
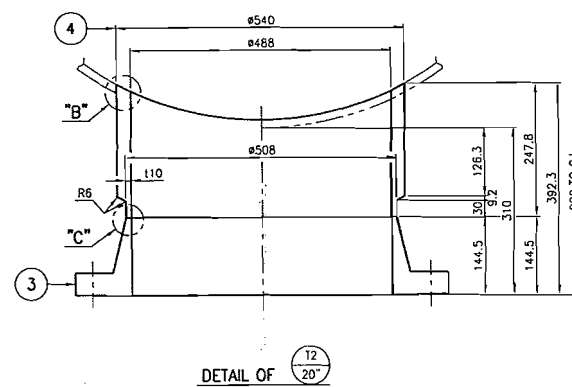
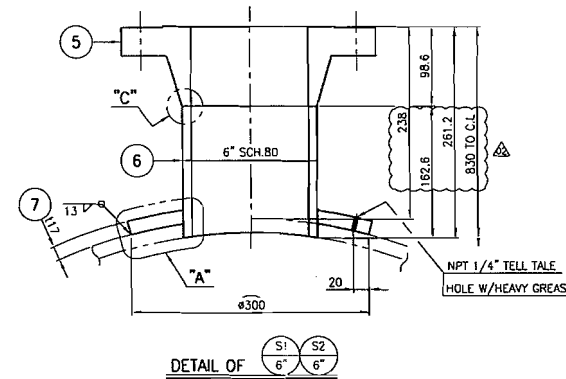
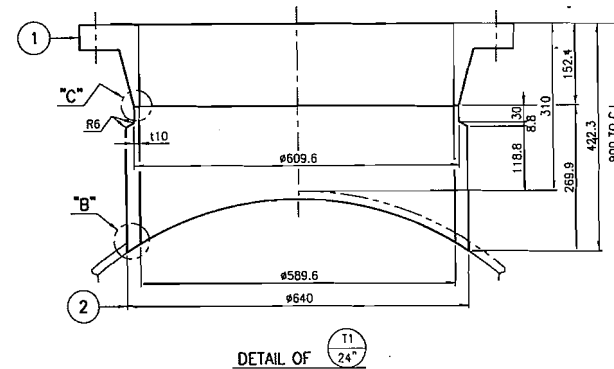
PROJECT CARMON CREEK PROJECT

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

W/O NO. P-135C-007 VRU INLET GAS COOLER

SCALE NONE CLIENT DOC. NO. CCK-4511951391-0132-007-00004-001 REV NO. 04

ILSUNG ILSUNG CORPORATION 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 relieve 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"-11UNC-9SL
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	t17
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	ø540
3	FLANGE (110)	SA182-F51(S31803)	1	EA	20" ASME 150# W.N-RF
2	SELF REINF. NECK	SA182-F51(S31803)	1	EA	ø640
1	FLANGE (110)	SA182-F51(S31803)	1	EA	24" ASME 150# W.N-RF

ITEM	NAME OF PART	MATERIAL	QTY	SPI	UNIT	REMARK
	PART CODE				FOR ONE SET	

(2) SETS TO BE MANUFACTURED

	2014.08.13	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
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)

W/O NO.: P-1356-007 VRU INLET GAS COOLER (DETAIL OF NOZZLE)

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

ILSUNG ILSUNG CORPORATION VP-SC07-E11570-006

ONSAN, KOREA

ASME - U

SWEET SERVICE
(SHELL SIDE)

SOUR SERVICE
(TUBE SIDE)