

 <b>MEG ENERGY</b>		<b>CHRISTINA LAKE REGIONAL PROJECT</b> <b>Phase 3A EPC for Central Plant Facilities</b> <b>SLI Project No. 511036</b>		 <b>SNC-LAVALIN</b>	
 <b>SNC-LAVALIN</b>		<input type="checkbox"/> A1 Not suitable to initiate fabrication. modify as noted, resubmit for review <input type="checkbox"/> B1 Suitable to initiate fabrication as noted. modify as noted, resubmit for review <input type="checkbox"/> C1 Suitable to fabricate to completion as noted. submit final documents including as-builts as required <input checked="" type="checkbox"/> D1 Suitable to fabricate to completion. submit final documents including as-built documents as required <input type="checkbox"/> E1 Not suitable as final documents as noted. modify as noted and resubmit. <input type="checkbox"/> F1 Suitable as final documents. no further resubmittal required (unless revised by vendor) <input type="checkbox"/> VX Vendor document cancelled.			
Vendor's drawing review for conformity with specifications and design drawing.		This review does not relieve the vendor of his responsibility for errors in design and detailing as detailed in his contract.			
Vendor: Sewon Cellontech Co. Ltd. - P00007		No.: E0351-3AE324-D-03		Rev: 4	
Doc. Title:	H00.01 - GENERAL ASSEMBLY (3/3) - Tag: 3A-E-324A/B				
Client Code:		Project No: 511036		Date Rec'd: 2014/08/14	
Reviewed by: <b>SS</b> Date: <b>26-Aug-2014</b>		Document No: P-5310-01-0022		Submittal: 05	

## GENERAL NOTES

- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED.
- ALL FLANGE BOLT HOLES ARE TO STRADDLE THE NORTH/SOUTH AND VERTICAL CENTER LINES.
- NOZZLE PROJECTIONS ARE FROM CENTER LINE OF H/EX. OR NEAREST TANGENT LINE TO GASKET CONTACT SURFACE OF FLANGE.
- ALL WELDS TO BE CONTINUOUS EXCEPT NOTED.
- FLANGE SHALL BE AS PER ASME B16.5(2009) UNLESS OTHERWISE STATED.
- GASKET SEATING SURFACE SHALL BE AS FOLLOWS:
  - FOR NOZZLE FLANGE : ASME B16.5
    - SPIRAL WOUND GASKET :  $R_a$  3.2~6.3  $\mu$ m(125~250  $\mu$ inch). WITH SPIRAL SERRATION.(ㄴㄴ)
  - FOR GIRTH FLANGE & TUBE SHEET :
    - DOUBLE METAL JACKET GASKET :  $R_a$  1.6~3.2  $\mu$ m(63~125  $\mu$ inch).(ㄴㄴㄴ)
- BASE LINE (B.L) MEANS GASKET CONTACT SURFACE OF SHELL FLANGE.

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## 9. FOLLOWING DOCUMENTS ARE APPLIED TO FABRICATION &amp; INSPECTION

- WPS AND PQR REFER TO E0351-COM-P-08
- ALL CUSTOMER SPEC. LISTED IN MATERIAL REQUISITION (MR).
- ALL MATERIALS AND WELDER IDENTIFICATION SHALL BE WITH LOW STRESS STAMPS.
- ALL NOZZLES SHALL BE GROUND SMOOTH AND FLUSH WITH THE INTERNAL H/EX. SURFACE.
- NOZZLE REPADS 10" NPS AND SMALLER SHALL HAVE ONE 1/4" WEEP HOLE. NOZZLE REPADS, GREATER THAN 10" NPS SHALL HAVE TWO 1/4" WEEP HOLES, 180° APART. ALL WEEP HOLES SHALL BE EQUIPPED WITH 1/4" NIPPLES THAT PROTRUDE 1" BEYOND THE INSULATION.
- DIMENSIONED TOLERANCES SHALL CONFORM TO ASME CODE REQUIREMENTS.
- THE REQUIREMENTS OF IMPACT TEST FOR MATERIALS SHALL BE FOLLOWED.  
TEST SPECIMENS SHALL BE PROVIDED IN COMPLETE HEAT-TREATED CONDITION.
  - TEST TEMPERATURE : a) -20°F [-29°C] FOR H/EX. BODY  
b) -49°F [-45°C] FOR SADDLE, LIFTING LUG

- TEST SPECIMENS : AS PER ASTM A370 MINIMUM 3 SETS PER HEAT.
- IMPACT ENERGY :
  - AS PER UG-84

## 4) APPLICABLE MATERIALS :

- FOR SHELL & HEADS WITH REINF. PAD, SA516-70N : THE MATERIAL SHALL BE USED WITH NORMALIZED SA516-70 MARKED AS "N" TO EXEMPT FROM IMPACT TEST (NORMALIZED SA516-70 PLATES CLASSIFIED AS CURVE D ARE EXEMPTED AS PER FIG UCS-66 )

UCS-66	MDMT -29°	MATERIAL
CURVE B	$\sim \leq 9.5$ MM	SA516-70
CURVE D	$\sim \leq 32.5$ MM	SA516-70N
	$\sim \leq 32.5$ MM	SA516-70N+LT

- FOR STANDARD FLANGE, SA105N : THE MATERIAL IS EXEMPTED AS PER UCS-66

- FOR PIPE, SA106-B (TH'K $\leq$ 25mm) : THE MATERIAL IS EXEMPTED AS PER UG-20(F)

- FOR SADDLE SUPPORT, SA516-70N : THE MATERIAL SHALL BE USED WITH NORMALIZED SA516-70 MARKED AS "N" TO EXEMPT FROM IMPACT TEST (NORMALIZED SA516-70 PLATES CLASSIFIED AS CURVE D ARE EXEMPTED AS PER FIG UCS-66 )

UCS-66	MDMT -45°C	MATERIAL
CURVE D	$\sim \leq 15.1$ MM	SA516-70N
	$\sim \leq 15.2$ MM	SA516-70N+LT

- FOR GIRTH FLANGES, FLOATING HEAD FLANGE : EXEMPT FROM IMPACT TESTING PER UG-20(f) & UCS-66

- FOR TUBESHEET, FLOATING TUBESHEET, CHANNEL COVER : IMPACT TESTING AT -29°C

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- HARDNESS REQUIREMENTS FOR ALL PRESSURE PARTS AND ATTACHMENTS.  
HARDNESS TESTING SHALL MEET REQUIREMENT IN 10.2.5 OF API 660.

- WPS/PQR TO HAVE QUALIFICATION MATERIAL WITH SAME P NO.

- H/EX. SHALL BE FOLLOWING THE INSPECTION STAMP AND REGISTRATION;

ASME "U" STAMP	NATIONAL BOARD REGISTRATION	ENG STAMP	ASBA REGISTRATION WITH CRN
1) ALL DRAWINGS 2) ALL CALCULATION 3) WPS & PQR	YES	1) ALL DRAWINGS 2) ALL CALCULATION	1) ALL DRAWINGS 2) ALL CALCULATION

- NDE REPORTS WILL BE APPROVED BY SNT-TC-1A, LEVEL III PERSONNEL.

IN ADDITION, NDE PERSONNEL ARE QUALIFIED TO SNT-TC-1A AS PER PARA 6.21 OF MEG-ENG-MEC-SP-1201

- HYDROTEST WATER SHALL BE CLEAN WATER WITH LESS THAN 250ppm CHLORIDE CONTENT.  
HYDROTEST PRESSURE SHALL BE MAINTAINED FOR A MINIMUM OF 60MINUTES  
HYDROTEST WATER TEMP. AT A MINIMUM OF 5°C  
(수압시험용 깨끗한 물과 염화물 함유량 250ppm보다 작은 물로 사용하고 수온은 최소 5°C임)

- UPON COMPLETION OF HYDROTEST, VESSEL SHALL BE COMPLETELY DRAINED OF ALL WATER, AIR DRIED, AND CLEANED  
(수압 테스트 끝난 후 모든 수압물질을 완전히 제거한 뒤 공기로 건조시킨 뒤 깨끗하게 유지되어야 한다.)

- HYDROTEST SHALL BE PERFORMED UNDER SINGLE PRESSURE CONTROLLING FOR EACH SIDE AT COMPLETELY STACKED CONDITION.  
(수압시험은 모든 열교환기가 완전히 겹쳐진 상태에서 설비 쪽과 튜브 쪽에 대해 각각 단일 압력으로 동시에 실시해야 한다.)

- FOR SHIPMENT/SITE STORAGE, NITROGEN PURGE SYSTEM ON BOTH SHELL AND TUBE SIDE.  
(출하/사이트 보관을 위해서, SHELL SIDE와 TUBE SIDE에 질소 충전 함것.)

- ALL WELDED ATTACHMENTS PROVIDED WITH WEEP HOLES, SHALL BE SOAP TESTED AT 175Kpag(1.78kg/cm<sup>2</sup>) PRIOR TO HYDROSTATIC TEST.  
(수압 테스트 전에 보강 파드에 거품 테스트를 1.78kg/cm<sup>2</sup> 할 것.)

- FOR ELECTRICAL HEAT TRACING(AS PER SPEC. MEG-ENG-ELE-SP-0501)

- APPROVED EHT MANUFACTURER : TYCO THERMAL CONTROLS

- VOLTAGE OF 277 VAC

- HOLD TEMPERATURE OF 10°C. CSA APPROVAL IS REQUIRED FOR ELECTRIC COMPONENTS AND INSTALLATION.  
LOCATED IN HAZARDOUS AREA CLASS 1, ZONE 2.

- FOR INSULATION(AS PER SPEC. MEG-ENG-MEC-SP-1102)

THICKNESS	MATERIAL
64MM	MINERAL FIBER

- FOR SURFACE PREPARATION AND PAINTING(AS PER SPEC. MEG-ENG-MEC-SP-1101)

PART	INSUL.	OPERATING TEMP(°C)	COATING NO.	SURFACE PREPARATION	PRIMER COAT PRODUCT NAME DFT (MICRON)	FINISH COAT PRODUCT NAME DFT (MICRON)	TOTAL DFT (MICRON)	FINISH COLOR
SHELL HEAD T/S, HEAD NOZZLE	YES	98.3 ~ 136.3	P10	SP-05	EPOXY AMINE 50-75 (μg)	EPOXY AMINE 100-150 (μg)	150-225 (μg)	LIGHT GREY
SADDLE	NO	-	P08	SP-05	POLYAMIDE EPOXY 30-60(μg)	POLYAMIDE EPOXY 100-150 (μg)	130-210 (μg)	LIGHT GREY

- FOR GIRTH FLANGE BOLTING OF 1 1/2" DIAMETER AND LARGER, THE STUB FOR THE GIRTH FLANGE SHALL BE USED A BOLT TENSIONING TOOL(AS PER PARA.7.8.7 OF MEG-ENG-MEC-SP-5201)  
(1 1/2" 볼트부터 볼트 텐서나 사용)

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- POSTWELD HEAT AND STRESS RELIEF TREATMENT CONDITIONS.

MAX. TH'K [mm]	HOLDING TIME (HOURS)	MAX. HEAT RATE °F[°C]/HR	MAX. COOL RATE °F[°C]/HR	HOLDING TEMP. °F [°C]	APPLICATION PART
SEE DWG	MIN. 1	431.6 [222]	532.4 [278]	MIN. 1112 [MIN. 600]	ALL PART ON THE PRESSURE BOUNDARY WELDS

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- STRESS RELIEF AFTER FORMING (PER UCS-79) : MIN. 600°C (OR NO.30 ABOVE FOR SHELL SIDE / PER NO.30 ABOVE FOR TUBE SIDE)  
(포밍 후 열처리하는 UCS-79따라 적용)

- EXCHANGERS SHALL BE STACKED. PER API 660, EXCHANGERS SHALL BE HYDROTESTED STACKED.

- FLANGE JOINTS(SHELL COVER/SHELL, SHELL/CHANNEL & CHANNEL/CHANNEL COVER) SHALL BE PROVIDED WITH SOFT REMOVABLE COVERS AS SPECIFIED IN MEG-ENG-MEC-SP-1102

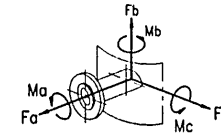
- APPLICABLE PURCHASER SPECIFICATIONS

NO.	DOCUMENT NO.	REV.	TITLE
1	MEG-ENG-MEC-SP-5201	0	SPECIFICATION FOR SHELL AND TUBE HEAT EXCHANGERS
2	MEG-ENG-MEC-SP-1201	0	PIPING AND EQUIPMENT WELDING SPECIFICATION
3	MEG-ENG-MEC-SP-4201	0	SPECIFICATION FOR PRESSURE VESSELS
4	MEG-ENG-MEC-SP-1101	0	SPECIFICATION FOR PAINTING AND PROTECTIVE COATING
5	MEG-ENG-MEC-SP-1102	0	GENERAL SPECIFICATION FOR INSULATION
6	MEG-ENG-MEC-SP-1205	0	ALLOWABLE NOZZLE LOADS FOR MECHANICAL EQUIPMENT
7	MEG-ENG-ELE-SP-0501	0	ELECTRICAL HEAT TRACING SPECIFICATION
8	MEG-ENG-MEC-SP-1104	0	PROTECTION OF GOODS DURING SHIPMENT
9	SP-CLO3A-Q-050-0001	1	SITE-SPECIFIC ENVIRONMENTAL DATA

- 100% RT SHALL BE PERFORMED FOR LONGITUDINAL WELDS COVERED BY THE WEAR PLATE + PLUS 50mm ON EACH SIDE.

- FOR STACKED HEAT EXCHANGERS, AFTER HYDROTEST, EACH HEAT EXCHANGER SHALL BE SHIPPED SEPARATELY.  
(스택 열교환기 경우, 수압시험 후 각각 열교환기로 출하함)

- SA325 ANCHOR BOLTS WHICH ARE DESIGNED FOR SUPPORTS ARE SUPPLIED BY OTHERS.



MAXIMUM ALLOWABLE NOZZLE LOADS						
NOZZLE	Fa (N)	Fb (N)	Fc (N)	Ma (Nm)	Mb (Nm)	Mc (Nm)
S1A,B (12")	10680	13080	13080	18830	13310	13310
S2A,B (12")	10680	13080	13080	18830	13310	13310
T1A,B (8")	6050	7430	7430	8070	5710	5710
T2A,B (8")	6050	7430	7430	8070	5710	5710

MAXIMUM FOUNDATION LOADING DATA				
WEIGHT (Kg/Set)		EMPTY	OPERATING	TEST
WIND LOAD	SHEAR (N)	14,430	26,470	21,270
	MOMENT (N-mm)	12627	12627	4167
SEISMIC LOAD	SHEAR (N)	21157180	21157180	6981869
	MOMENT (N-mm)	28170	51675	
		69017235	126603530	

FOR APPROVAL ASME-U

## REFERENCE DRAWING

- GENERAL ASSEMBLY (1/3) [FOR 3A-E-324A] E0351-3AE324-D-01
- GENERAL ASSEMBLY (2/3) [FOR 3A-E-324B] E0351-3AE324-D-02

REV.	DATE	DESCRIPTIONS FOR REVISION	DRWN	CHK'D	REVD	APP'D
1	2014 07 31	REVISED AS MARKED	B.C.CHIN	J.W.KIM		H.U.KOO
2	2013 11 25	REVISED AS MARKED	B.C.CHIN	J.W.KIM		H.U.KOO
3	2013 10 17	REVISED AS MARKED	B.C.CHIN	J.W.KIM		H.U.KOO
4	2013 08 21	REVISED AS MARKED	B.C.CHIN	J.W.KIM		H.U.KOO
5	2013 07 08	FOR APPROVAL	B.C.CHIN	J.W.KIM		H.U.KOO

PROJECT				CLRP PHASE 3A CENTRAL PLANT FACILITY: EPC			
CUSTOMER				MEG ENERGY CORP.			
CLIENT				SNC • LAVALIN INC.			
TITLE				MP BLOWDOWN/GLYCOL EXCHANGERS			
3A-E-324A/B				GENERAL ASSEMBLY (3/3) 2014 07 31			
SEWON CELLONTECH CO., LTD.				CHANGWON, KOREA			
OWNER JOB NO.	511036	PROJECTION METHOD	THIRD ANGLE PROJECTION	SCALE	SEE DWG.		
P/O NO.	P-5310-01	OWNER DWG. NO.					
SEWON JOB NO.	E-0351	SEWON DWG. NO.	E0351-3AE324-D-03	WORKS	C		