MEG ENERGY	CHRISTINA LAKE REGIONAL PROJECT Phase 3A EPC for Central Plant Facilities SLI Project No. 511036	SNC·LAVALIN

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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.

☐ A1	Not suitable to initiate fabrication. modify as noted, resubmit for review
☐ B1	Suitable to initiate fabrication as noted. modify as noted, resubmit for review
☐ C1	Suitable to fabricate to completion as noted. submit final documents including as-builts as required
☒ D1	Suitable to fabricate to completion. submit final documents including as-built documents as required
☐ E1	Not suitable as final documents as noted. modify as noted and resubmit.
☐ F1	Suitable as final documents. no further resubmittal required (unless revised by vendor)
☐ VX	Vendor document cancelled.

Vendor: Sewon Cellontech Co. Ltd. - P00007	No.:E0351-3AE325-D-03	Rev:4
Doc. Title: H00.01 - GENERAL ASSEMBLY (3/3) - Tag:3A-E-325A/B		
Client Code:	Project No: 511036	Date Rec'd: 2014/08/14
Reviewed by: SS Date: 26-Aug-2014	Document No: P-5310-01-0025	Submittal: 05

GENERAL NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED.
2. ALL FLANGE BOLT HOLES ARE TO STRADDLE THE NORTH/SOUTH AND VERTICAL CENTER LINES.
3. NOZZLE PROJECTIONS ARE FROM CENTER LINE OF H/EX. OR NEAREST TANGENT LINE TO GASKET CONTACT SURFACE OF FLANGE.
4. ALL WELDS TO BE CONTINUOUS EXCEPT NOTED.
5. FLANGE SHALL BE AS PER ASME B16.5(2009) UNLESS OTHERWISE STATED.
6. GASKET SEATING SURFACE SHALL BE AS FOLLOWS:
   1) FOR NOZZLE FLANGE : ASME B16.5
      - SPIRAL WOUND GASKET : Ra 3.2~6.3 μm(125~250 μinch). WITH SPIRAL SERRATION.(▽▽)
   2) FOR GIRTH FLANGE & TUBE SHEET :
      - DOUBLE MAETAL JACKET GASKET : Ra 1.6~3.2 μm(63~125 μinch).(▽▽▽)
7. BASE LINE (B.L) MEANS GASKET CONTACT SURFACE OF SHELL FLANGE.

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9. FOLLOWING DOCUMENTS ARE APPLIED TO FABRICATION & INSPECTION
   1) WPS AND PQR REFER TO E0351-COM-P-08
   2) ALL CUSTOMER SPEC. LISTED IN MATERIAL REQUISITION (MR).
10. ALL MATERIALS AND WELDER IDENTIFICATION SHALL BE WITH LOW STRESS STAMPS.
11. ALL NOZZLES SHALL BE GROUND SMOOTH AND FLUSH WITH THE INTERNAL H/EX. SURFACE.
12. NOZZLE REPADS 10" NPS AND SMALLER SHALL HAVE ONE 1 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.
13. DIMENSIONED TOLERANCES SHALL CONFORM TO ASME CODE REQUIREMENTS.
14. THE REQUIREMENTS OF IMPACT TEST FOR MATERIALS SHALL BE FOLLOWED.
    TEST SPECIMENS SHALL BE PROVIDED IN COMPLETE HEAT-TREATED CONDITION.
    1) TEST TEMPERATURE : a) -20°F [-29°C] FOR H/EX. BODY
                b) -49°F [-45°C] FOR SADDLE, LIFTING LUG
    2) TEST SPECIMENS : AS PER ASTM A370 MINIMUM 3 SETS PER HEAT.
    3) IMPACT ENERGY :
       A) AS PER UG-84
    4) APPLICABLE MATERIALS :
       A) 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	~ ≦ 9.5MM	SA516-70
CURVE D	9.6MM ≦ 32.5MM	SA516-70N
	32.6MM ≦ ~	SA516-70N+I.T

       B) FOR STANDARD FLANGE, SA105N : THE MATERIAL IS EXEMPTED AS PER UCS-66
       C) FOR PIPE, SA106-B (TH'K ≦ 25mm) : THE MATERIAL IS EXEMPTED AS PER UG-20(F)
       D) FOR SADDLE SUPPORT, SA516-70N & LIFTING LUGS : 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	~ ≦15.1MM	SA516-70N
	15.2MM ≦ ~	SA516-70N+I.T

       E) FOR GIRTH FLANGES : EXEMPT FROM IMPACT TESTING PER UG-20(f) & UCS-66
       F) FOR TUBESHEET, CHANNEL COVER : IMPACT TESTING AT -29°C

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16. HARDNESS REQUIREMENTS FOR ALL PRESSURE PARTS AND ATTACHMENTS.
    HARDNESS TESTING SHALL MEET REQUIREMENT IN 10.2.5 OF API 660.
17. WPS/PQR TO HAVE QUALIFICATION MATERIAL WITH SAME P NO.
18. H/EX. SHALL BE FOLLOWING THE INSPECTION STAMP AND REGISTRATION;

ASME "U" STAMP	NATIONAL BOARD REGISTRATION	◇4 P.ENG STAMP	ABSA 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

19. 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
20. 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
    (수압물은 깨끗한 물과 염화물 함유량 250ppm보다 작은 물로 사용하고 수압은 최소 60분유지하고 수압 온도는 최소 5°C임)
21. UPON COMPLETION OF HYDROTEST, VESSEL SHALL BE COMPLETELY DRAINED OF ALL WATER, AIR DRIED, AND CLEANED
    (수압 테스트 끝난 후 모든 수압물을 완벽히 제거한 뒤 공기로 건조시킨 뒤 깨끗하게 유지되어야 한다.)
21-1. HYDROTEST SHALL BE PERFORMED UNDER SINGLE PRESSURE CONTROLLING FOR EACH SIDE AT COMPLETELY STACKED CONDITION.
    (수압시험은 모든 열교환기가 현장설치와 같이 완전 조립된 상태에서 셸 측과 튜브 측에 대해 각각 단일 압력으로 동시에 실시해야 한다.)
22. FOR SHIPMENT/SITE STORAGE, NITROGEN PURGE SYSTEM ON BOTH SHELL AND TUBE SIDE.
    (출하/ 싸이트 보관을 위해서, SHELL SIDE와 TUBE SIDE에 질소 충전 할것.)
23. ALL WELDED ATTACHMENTS PROVIDED WITH WEEP HOLES, SHALL BE SOAP TESTED AT 175Kpag(1.78kg/cm^2) PRIOR TO HYDROSTATIC TEST.
    (수압 테스트 전에 보강 패드에 거품 테스트를 1.78kg/cm^2 할 것.)
24. FOR ELECTRICAL HEAT TRACING(AS PER SPEC. MEG-ENG-ELE-SP-0501)
    1) APPROVED EHT MANUFACTURER : TYCO THERMAL CONTROLS ◇4
    2) VOLTAGE OF 277 VAC
    3) HOLD TEMPERATURE OF 10°C. CSA APPROVAL IS REQUIRED FOR ELECTRIC COMPONENTS AND INSTALLATION. LOCATED IN HAZARDOUS AREA CLASS 1, ZONE 2.
25. FOR INSULATION(AS PER SPEC. MEG-ENG-MEC-SP-1102)

THICKNESS	MATERIAL
64MM	MINERAL FIBER

26. 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 (Avg.)	EPOXY AMINE 100~150 (Avg.)	150~225 (Avg.)	LIGHT GREY
SADDLE	NO	-	P08	SP-05	POLYAMIDE EPOXY 38~62(Avg.)	POLYAMIDE EPOXY 100~150 (Avg.)	138~212 (Avg.)	LIGHT GREY

27. 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 텐셔너를 사용)
28. U-TUBES FOR ALL CARBON SHALL BE STRESS RELIEVED AT LEAST 300mm BEYOND THE TANGENT POINT AFTER U-BENDING.
    (모든 카본 튜브는 벤딩 후 열처리 할 것.)
29. SIMULATION TEST FOR HEAT TREATMENT
    1) ALL WPS WITH PWHT SHALL BE QUALIFIED WITH AT LEAST TWO TIMES OF THE TIME USED FOR FABRICATION. (AS PER PARA.6.8 OF MEG-ENG-MEC-SP-1201)
       (WPS는 제작동안 열처리를 위해서 적어도 2배이상 시뮬레이션 테스트 되어야 한다)
    2) FOR TUBESIDE SHELL PLATE ONLY, SPPLEMENTARY REQUIREMENT S3 OF ASTM A20 IN THE PLATE PURCHASE ORDER. THE TEST COUPON SHALL UNDERGO THREE TIMES PWHT CYCLES, HEATING RATE, COOLING RATE, HOLDING TIME SHALL BE THE SAME AS PRODUCTION.
       (열처리가 되는 플레트는 경판 주문시 시뮬레이션 테스트를 3번 적용)
    3) CARBON STEEL MATERIAL(P NO.1) OF FORGING,FLANGE,PIPE,FITTING, ETC IS NOT REQUIRED THE SIMULATION TEST FOR HEAT TREATMENT AS PER UCS-85(f)
30. 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 BOUNDRY WELDS

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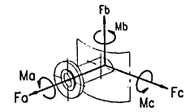
32. EXCHANGERS SHALL BE STACKED. PER API 660, EXCHANGERS SHALL BE HYDROTESTED STACKED.
33. FLANGE JOINTS(SHELL COVER/SHELL, SHELL/CHANNEL & CHANNEL/CHANNEL COVER) SHALL BE PROVIDED WITH SOFT REMOVABLE COVERS AS SPECIFIED IN MEG-ENG-MEC-SP-1102
34. APPLICABLE PURCHASER SPECIFICATIONS

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-CL03A-Q-050-0001	1	SITE-SPECIFIC ENVIRONMENTAL DATA

35. NDE FOR LONGITUDINAL BAFFLE WELD TO SHELL : PT
36. 100% RT SHALL BE PERFORMED FOR LONGITUDINAL WELDS COVERED BY THE WEAR PLATE + PLUS 50mm ON EACH SIDE.
37. FOR STACKED HEAT EXCHANGERS, AFTER HYDROTEST, EACH HEAT EXCHANGER SHALL BE SHIPPED SEPARATELY.
    (스택 열교환기 경우, 수압시험 후 각기 열교환기로 출하됨)
38. 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 ◇4				
WEIGHT (Kg/Set)		EMPTY	OPERATING	TEST
		26,480	28,560	20,650
WIND LOAD	SHEAR (N)	9525	9525	3143
	MOMENT (N-mm)	38783918	38783918	12798693
SEISMIC LOAD	SHEAR (N)	85279	91978	
	MOMENT (N-mm)	247310260	266736345	

FOR APPROVAL ASME-U

REFERENCE DRAWING

1. GENERAL ASSEMBLY (1/3) [FOR 3A-E-325A] E0351-3AE325-D-01
2. GENERAL ASSEMBLY (2/3) [FOR 3A-E-325B] E0351-3AE325-D-02

REV.	DATE	DESCRIPTIONS FOR REVISION	DRW'N	CHK'D	REV'D	APP'D
◇4	2014 07.31	REVISED AS MARKED	B.C.CHIN	J.W.KIM 08.05.2014		H.U.KOO 08.05.2014
◇3	2013 11.25	REVISED AS MARKED	B.C.CHIN	J.W.KIM 11.26.2013		H.U.KOO 11.26.2013
◇2	2013 10.17	REVISED AS MARKED	B.C.CHIN	J.W.KIM 10.18.2013		H.U.KOO 10.18.2013
◇1	2013 08.21	REVISED AS MARKED	B.C.CHIN	J.W.KIM 08.22.2013		H.U.KOO 08.22.2013
◇0	2013 07.08	FOR APPROVAL	B.C.CHIN	J.W.KIM 07.09.2013		H.U.KOO 07.09.2013

PROJECT: CLRP PHASE 3A CENTRAL PLANT FACILITY: EPC

CUSTOMER: MEG ENERGY CORP.

CLIENT: SNC·LAVALIN — SNC ◆ LAVALIN INC.

TITLE: BLOWDOWN DISPOSAL/GLYCOL EXCHANGER (3A-E-325A/B) GENERAL ASSEMBLY (3/3)

SEWON CELLONTECH CO.,LTD. CHANGWON, KOREA

OWNER JOB NO.	PROJECTION METHOD	SCALE
511036	THIRD ANGLE PROJECTION	SEE DWG.

P/O NO.	OWNER DWG. NO.
P-5310-01	-

SEWON JOB NO.	SEWON DWG. NO.	WORKS
E-0351	E0351-3AE325-D-03	C ◇4