

HAIRPIN HEAT EXCHANGER DATA SHEET													REV		
SERVICE		DILUENT RECOVERY / GLYCOL EXCHANGER					DATASHEET NO. DS-CL03A-E-100-E144						0A1		
SIZE	(L x W x H) 8896 x 715 x 884 mm		TYPE	Multi-Tube		HORIZ/VERT	Horizontal		CONNECTED IN	1 Parallel / 2 Series					
SHELLS / UNIT		2		SURFACE / SHELL (gross / eff) (m²)		224.07 / 223.37		SURFACE / UNIT (gross / eff)(m²)		448.14 / 446.74 (Note 1)					
MANUFACTURER		Heat Exchanger Design, Inc.		MODEL NO.		(*)		TAG Number		3A-E-144A/B (Note 1)					
PERFORMANCE (MAXIMUM DUTY CASE)													0A1		
		(IN)		SHELL SIDE		(OUT)		(IN)		TUBE SIDE		(OUT)			
FLUID CIRCULATED				TEG / H2O (60/40 wt%)						Diluent Vapour					
TOTAL FLUID		kg / hr		45843.1		45843.1		15170.4		15170.4					
VAPOR		kg / hr		0		0		15170		223.01					
LIQUID		kg / hr		45843.1		45843.1		0.4693		14947.6					
STEAM		kg / hr		0.0		0.0		0.0		0.0					
NONCONDENSABLE		kg / hr		0.0		0.0		0.0		0.0					
FLUID VAPORISED/CONDENSED		kg / hr		0.0		0.0		0.0		14947.1					
DENSITY - LIQUID / VAPOUR		kg / m³		1078.4 /		1021 /		933.46 / 9.189		642.7 /		6.701			
VISCOSITY - LIQUID / VAPOUR		cP		4.661 /		1.249 /		0.2361 / 0.0102		0.2685 /		0.0108			
SPECIFIC HEAT (LIQ / VAP)		kJ / (kg.°C)		3.223 / -		3.476 / -		4.443 / 2.112		2.580 /		1.917			
THERMAL COND (L/V)		W / (m².°C)		0.3276 / -		0.340 / -		0.686 / 0.0248		0.1134 /		0.0262			
MOLE WT - VAPOUR		MW		-		-		53.696		37.626					
MOLE WT - NONCONDENSABLES		MW		-		-		-		-					
LATENT HEAT		kJ / kg		-		-		-		-					
TEMPERATURE		°C		40.0		110.9		126.1		50.0					
INLET PRESSURE		kPa(a)		994				534							
VELOCITY		m / s		0.29				5.10							
PRESSURE DROP		kPa		ALLOW	70	CALC	46.079	ALLOW	75	CALC	19.858				
FOULING RESISTANCE		(m².°C) / kW		0.18				0.35							
HEAT EXCHANGED		kW		3059.7				MTD CORRECTED (°C)		15.6					
TRANSFER RATE		W / (m².°C)		SERVICE	437.93	CLEAN	703.47	ACTUAL		487.95					
DESIGN - MATERIAL - CONSTRUCTION														0A1	
DESIGN / TEST PRESSURE		kPa(g)		1500 / FV		/ Per Code		1155 / FV		/ Per Code					
MDMT / DESIGN TEMPERATURE		°C		-28.9		/ 178		-28.9		/ 178					
NO. PASSES PER SHELL				1				1							
CORROSION ALLOWANCE		mm		3.2				6.4 (Carbon steel components)							
CONNECTIONS		INLET		6" - 300# RFWN				8" - 150# RFWN							
SIZE &		OUTLET		6" - 300# RFWN				8" - 150# RFWN							
RATING		INTERMEDIATE		Note 3				Note 3							
TUBES:	MATERIAL	SA213-316L (SMLS)		NO.	230 U's	OD (mm)	19.05	THK. (mm)	1.651 (Avg)	NOMINAL LENGTH (m)		7.62		0A1	
	TUBE LAYOUT	60°		TUBE PITCH (mm)	23.813			TUBE TO TUBESHEET JOINT	Seal Welded (two grooves)&Expanded						
SHELL:	MATERIAL	SA-106-B				ID (mm)	438.15	OD (mm)	457.2						
FINS:	MATERIAL	N/A		HGT.	N/A	THK.	N/A	NO. / TUBE	N/A						
TUBE CLOSURE TYPE:		Separated Head		RETURN BONNET MATERIAL		SA-516-70N		TUBESHEET SA240 316L		CHANNEL		SA-240-316L			
LIFTING LUGS:		Yes		GROUNDING LUG:		Yes		NAME PLATE:		Yes					
INSULATION:		SHELL: 50mm thick mineral wool		CHANNEL:		50mm thick mineral wool									
TUBE SUPPORTS:		SS304		BAFFLES:	Material	SS304	Type	Single Segmental	Cut (%)	36 Vertical	Spacing (mm)	330		0A1	
EXCHANGER SUPPORT BRACKET:		A-36													
GASKETS:		SHELL SIDE:		Kammpro Type				TUBE SIDE:		Kammpro Type					
ρv² - INLET NOZZLE				BUNDLE ENTRANCE				BUNDLE EXIT							
CODE REQUIREMENTS		ASME Section VIII, Division 1.				TEMA CLASS									
WEIGHT/SHELL (kg)		5760		FILLED WITH WATER (kg)		7950									
Notes:															
(*) Seller to confirm or specify.															
1) An additional 10% surface area has been included in exchanger design.															
2) Maximum expected concentration in the heat exchanger outlet vapor phase is 12.92 wt% CO₂ and 0.508 wt% H₂S.															
3) Exchangers shall be stacked, Seller shall provide interconnecting pipe segments and stud bolts, nuts, gaskets required to complete the interconnecting connections and supports. Bottom exchanger is 3A-E-144A and top exchanger is 3A-E-144B.															
4) When practical, pressure component weld shall be of full penetration type.															
5) Seller shall glycol heat trace the heat exchangers for holding temperature of 10°C and provide 50 mm thick mineral wool insulation. Heat tracing and Insulation shall be per Project Specifications MEG-ENG-MEC-SP-1103 and MEG-ENG-MEC-SP-1102, respectively.															
6) Surface preparation and painting shall be per Project Specification MEG-ENG-MEC-SP-1101.															
7) Exchanger shall be designed for future field hydrotest in the fully corroded condition.															
Notes continued on Page 2.															
REVISIONS						<div>MEG Energy Corp.</div> <div>SNC • LAVALIN</div>									
REV. NO.	DATE	BY	CHK	APP	DESCRIPTION										
0A1	12-June-2014	TA	SY	CS	Re-Issued for Purchase	PROJECT		CLRP Phase 3A Central Plant Facility: EPC							
						JOB NO.		511036	Tag No.	3A-E-144A/B					
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12345678910111213141516171819202122232425262728293031323334353637383940414243444546474849505152535455565758596061

HAIRPIN HEAT EXCHANGER DATA SHEET

SERVICE     *DILUENT RECOVERY / GLYCOL EXCHANGER*     DATASHEET NO.     *DS-CL03A-E-100-E144*

TEG / Water (60/40 wt%) - Maximum Duty Case

	Temperature °C	Pressure kPag	Heat Flow MW	Vapour Mass Fraction	Specific Heat (kJ/kg°C)	Viscosity (cp)	Mass Density kg/m³	Thermal Cond. (W/m°C)
	40.0	900.0	0.00	0.0	3.223	4.661	1078.44	0.3276
	44.9	895.3	0.20	0.0	3.240	4.041	1074.96	0.3295
	49.8	890.6	0.41	0.0	3.258	3.545	1071.41	0.3311
	54.7	886.0	0.61	0.0	3.275	3.146	1067.80	0.3325
	59.5	881.3	0.82	0.0	3.293	2.819	1064.14	0.3337
	64.3	876.6	1.02	0.0	3.310	2.549	1060.43	0.3348
	69.1	871.9	1.23	0.0	3.327	2.323	1056.67	0.3357
	73.9	867.2	1.43	0.0	3.344	2.131	1052.87	0.3365
	78.6	862.5	1.64	0.0	3.361	1.967	1049.01	0.3371
	83.3	857.9	1.84	0.0	3.378	1.824	1045.12	0.3377
	88.0	853.2	2.05	0.0	3.395	1.700	1041.18	0.3382
	92.6	848.5	2.25	0.0	3.412	1.590	1037.21	0.3386
	97.2	843.9	2.45	0.0	3.428	1.492	1033.20	0.3390
	101.8	839.2	2.66	0.0	3.444	1.403	1029.16	0.3394
	106.4	834.6	2.86	0.0	3.460	1.323	1025.09	0.3397
	110.9	830.0	3.06	0.0	3.476	1.249	1021.03	0.3400

Diluent Vapour - Maximum Duty Case

						Vapour Phase					Mixed Liquid Phase				Light Liq. Surface Tension	Heavy Liq. Surface Tension
	Temperature °C	Pressure kPag	Heat Flow MW	Vapour Mass Fraction	Heat of Vaporization (kJ/kg)	Molecular Weight	Specific Heat (kJ/kg°C)	Viscosity (cp)	Mass Density (kg/m³)	Thermal Conductivity (W/m°C)	Specific Heat (kJ/kg°C)	Viscosity (cp)	Mass Density (kg/m³)	Thermal Conductivity (W/m°C)	(dyne/cm)	(dyne/cm)
	50.00	365.00	0.00	0.0147	876.05	37.63	1.917	0.0108	6.701	0.0262	2.580	0.2685	642.66	0.1134	13.20	67.73
	65.11	369.94	0.20	0.0363	869.66	47.47	1.935	0.0101	8.321	0.0241	2.669	0.2385	628.07	0.1094	11.83	65.04
	75.61	374.88	0.40	0.0881	871.77	55.39	1.961	0.0095	9.695	0.0224	2.738	0.2238	619.62	0.1073	10.98	63.14
	81.42	379.82	0.60	0.1724	870.62	59.53	1.979	0.0091	10.47	0.0217	2.785	0.2221	618.02	0.1075	10.61	62.08
	84.93	384.76	0.81	0.2721	862.22	61.44	1.991	0.0090	10.86	0.0214	2.824	0.2281	620.57	0.1093	10.47	61.43
	87.58	389.73	1.01	0.3762	861.51	62.39	2.000	0.0090	11.09	0.0213	2.864	0.2397	625.78	0.1123	10.44	60.94
	89.86	394.54	1.20	0.4770	864.49	62.86	2.007	0.0090	11.23	0.0213	2.910	0.2576	633.29	0.1167	10.46	60.51
	92.24	399.66	1.41	0.5819	861.98	63.08	2.014	0.0090	11.31	0.0214	2.975	0.2880	644.75	0.1241	10.53	60.07
	94.85	405.05	1.63	0.6876	858.78	63.08	2.021	0.0090	11.35	0.0215	3.076	0.3466	663.12	0.1377	10.65	59.58
	97.46	410.06	1.84	0.7778	858.52	62.88	2.028	0.0091	11.33	0.0217	3.227	0.4638	690.76	0.1626	10.81	59.09
	100.42	415.06	2.04	0.8576	851.28	62.42	2.036	0.0092	11.24	0.0219	3.494	0.8158	741.33	0.2228	11.06	58.53
	104.02	420.04	2.25	0.9195	849.66	61.48	2.045	0.0093	11.02	0.0222	3.980	0.4074	842.87	0.4063	11.50	57.84
	108.59	425.00	2.45	0.9509	847.27	59.64	2.058	0.0095	10.59	0.0228	4.375	0.2711	931.91	0.6523	12.67	56.96
	113.16	430.00	2.65	0.9689	845.24	57.34	2.071	0.0097	10.08	0.0233	4.428	0.2458	936.46	0.6832	14.58	56.08
	117.08	435.00	2.86	0.9868	847.94	55.16	2.082	0.0099	9.632	0.0238	4.443	0.2361	933.46	0.6860	16.45	55.32
	126.13	440.00	3.06	1.0000	839.97	53.70	2.112	0.0102	9.188	0.0248	---	---	---	---	---	---

Notes (cont'd)

8) NPS 1 connections complete with blind flanges for field hydrotest shall be provided at the highest and lowest points on the tube channels and and on the shell.

9) Hardness test is required. Hardness 200 HBW maximum on shell side.

10) Full radiography and spot radiography (10% minimum) is required respectively for tube side and shell side butt welds capable of being radiographed.

11) Tube side is in sour service. Materials and fabrication shall be in accordance with NACE MR0175-2002.

12) Supports shall be designed for wind and seismic loads per project specifications.

13) U-tube bends shall be stress-relieved.

14) This document is designated for the Standard Package Catalogue per MEG Standard DMG-BAS-ST-0012.

REVISIONS

REV. NO.	DATE	BY	CHK	APP	DESCRIPTION
0A1	12-June-2014	TA	SY	CS	Re-Issued for Purchase

MEG Energy Corp.

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PROJECT

CLRP Phase 3A Central Plant Facility: EPC

JOB NO.

511036

Tag No.

3A-E-144A/B

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REV

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0A1

HED - DS-CL03A-E-100-E144-R0A1



## REV

**0A**

PERFORMANCE (MINIMUM DUTY CASE)									
		(IN) SHELL SIDE (OUT)		(IN) TUBE SIDE (OUT)					
FLUID CIRCULATED		TEG / H2O (60/40 wt%)				Diluent Vapour			
TOTAL FLUID	kg / hr	46041.9		46041.9		14238.2		14238.2	
VAPOR	kg / hr	0		0		14237.8		0	
LIQUID	kg / hr	46041.9		46041.9		0.4		14238.2	
STEAM	kg / hr	0.0		0.0		0.0		0.0	
NONCONDENSABLE	kg / hr	0.0		0.0		0.0		0.0	
FLUID VAPORISED/CONDENSED	kg / hr	0.0		0.0		0.0		14238.2	
DENSITY - LIQUID / VAPOUR	kg / m³	1078.4	/	1031.1	/	940.53	/	10.194	618.1 /
VISCOSITY - LIQUID / VAPOUR	cP	4.661	/	1.446	/	0.2550	/	0.0097	0.2212 /
SPECIFIC HEAT (LIQ / VAP)	kJ / (kg.°C)	3.223	/ -	3.436	/ -	4.419	/	2.118	2.562 /
THERMAL COND (L/V)	W / (m.°C)	0.3276	/ -	0.3392	/ -	0.6839	/	0.0238	0.1053 /
MOLE WT - VAPOUR	MW	-		-		57.539			
MOLE WT - NONCONDENSABLES	MW	-		-		-		-	
LATENT HEAT	kJ / kg	-				-			
TEMPERATURE	°C	40.0		99.6		117.2		50.0	
INLET PRESSURE	kPa(a)	994				534			
VELOCITY	m / s	0.31				3.97			
PRESSURE DROP	kPa	ALLOW	70	CALC	46.99	ALLOW	75	CALC	15.40
FOULING RESISTANCE	(m².°C) / kW	0.18				0.35			
HEAT EXCHANGED	kW	2539.7				MTD CORRECTED (°C)		15.5	
TRANSFER RATE	W / (m².°C)	SERVICE	366.66	CLEAN	632.87	ACTUAL		451.81	

DESIGN - MATERIAL - CONSTRUCTION			
DESIGN / TEST PRESSURE	kPa(g)	/	/
MDMT / DESIGN TEMPERATURE	°C	/	/
NO. PASSES PER SHELL			
CORROSION ALLOWANCE	mm		
CONNECTIONS	INLET		
SIZE &	OUTLET		
RATING	INTERMEDIATE		
TUBES:	MATERIAL	NO.	OD (mm)
	TUBE LAYOUT	TUBE PITCH	THK. (mm)
SHELL:	MATERIAL		NOMINAL LENGTH (m)
FINS:	MATERIAL	HGT.	TUBE TO TUBESHEET JOINT
			OD (mm)
			NO. / TUBE
TUBE CLOSURE TYPE:			MATERIAL
			TUBESHEET
LIFTING LUGS:	GROUNDING LUG:	NAME PLATE:	
INSULATION:	SHELL:	CHANNEL:	
TUBE SUPPORTS:	BAFFLES:		
EXCHANGER SUPPORT BRACKET:			
GASKETS:	SHELL SIDE:	TUBE SIDE:	
pv <sup>2</sup> - INLET NOZZLE	BUNDLE ENTRANCE	BUNDLE EXIT	
CODE REQUIREMENTS	TEMA CLASS		
WEIGHT/SHELL (kg)	FILLED WITH WATER (kg)		

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HAIRPIN HEAT EXCHANGER DATA SHEET



SERVICE DILUENT RECOVERY / GLYCOL EXCHANGER DATASHEET NO. DS-CL03A-E-100-E144

TEG / Water (60/40 wt%) - Minimum Duty Case

	Temperature	Pressure	Heat Flow	Vapour	Specific Heat	Viscosity	Mass Density	Thermal Cond.	
	°C	kPa(g)	MW	Mass Fraction	(kJ/kg°C)	(cp)	kg/m³	(W/m°C)	
	40.0	900.0	0.00	0.0	3.223	4.661	1078.44	0.3276	
	44.1	895.3	0.17	0.0	3.237	4.133	1075.54	0.3292	
	48.2	890.6	0.34	0.0	3.252	3.696	1072.59	0.3306	
	52.3	886.0	0.51	0.0	3.267	3.333	1069.59	0.3318	
	56.3	881.3	0.68	0.0	3.281	3.027	1066.56	0.3329	
	60.4	876.6	0.85	0.0	3.296	2.768	1063.50	0.3339	
	64.4	871.9	1.02	0.0	3.310	2.546	1060.40	0.3348	
	68.4	867.2	1.19	0.0	3.325	2.355	1057.26	0.3355	
	72.3	862.6	1.36	0.0	3.339	2.189	1054.09	0.3362	
	76.3	857.9	1.53	0.0	3.353	2.043	1050.89	0.3368	
	80.2	853.2	1.70	0.0	3.367	1.915	1047.66	0.3373	
	84.1	848.6	1.87	0.0	3.381	1.801	1044.40	0.3378	
	88.0	843.9	2.04	0.0	3.395	1.698	1041.11	0.3382	
	91.9	839.2	2.20	0.0	3.409	1.606	1037.80	0.3386	
	95.8	834.6	2.37	0.0	3.423	1.522	1034.47	0.3389	
	99.6	830.0	2.54	0.0	3.436	1.446	1031.14	0.3392	

Diluent Vapour - Minimum Duty Case

						Vapour Phase					Mixed Liquid Phase					Light Liq.	Heavy Liq.
	Temperature	Pressure	Heat Flow	Vapour Mass Fraction	Heat of Vaporization	Molecular Weight	Specific Heat	Viscosity	Mass Density	Thermal Conductivity	Specific Heat	Viscosity	Mass Density	Thermal Conductivity		Surface Tension	Surface Tension
	°C	kPag	MW		(kJ/kg)		(kJ/kg°C)	(cp)	(kg/m³)	(W/m°C)	(kJ/kg°C)	(cp)	(kg/m³)	(W/m°C)		(dyne/cm)	(dyne/cm)
	50.00	365.00	0.00	0.0000	596.36	---	---	---	---	---	2.562	0.2212	618.10	0.1053		12.25	67.73
	66.03	369.99	0.17	0.0006	593.80	53.53	1.901	0.0096	9.501	0.0221	2.667	0.1924	599.86	0.1003		10.69	64.87
	75.95	374.97	0.34	0.0443	592.44	61.60	1.956	0.0088	10.991	0.0206	2.737	0.1797	590.08	0.0979		9.85	63.08
	79.44	379.96	0.51	0.1357	591.08	63.81	1.979	0.0086	11.48	0.0203	2.770	0.1791	588.95	0.0979		9.63	62.44
	81.30	384.92	0.68	0.2389	585.78	64.50	1.990	0.0086	11.69	0.0203	2.795	0.1822	590.52	0.0988		9.55	62.10
	82.70	389.59	0.83	0.3362	588.65	64.80	1.997	0.0086	11.83	0.0204	2.819	0.1871	593.17	0.1002		9.51	61.84
	84.13	394.61	1.00	0.4417	587.31	64.97	2.004	0.0086	11.95	0.0205	2.851	0.1950	597.42	0.1023		9.50	61.58
	85.70	400.00	1.19	0.5539	586.95	65.06	2.011	0.0086	12.04	0.0206	2.897	0.2084	604.33	0.1059		9.50	61.29
	87.27	405.00	1.35	0.6546	585.67	65.07	2.018	0.0087	12.11	0.0207	2.958	0.2298	614.35	0.1116		9.52	60.99
	89.06	410.00	1.52	0.7510	584.39	65.00	2.026	0.0087	12.15	0.0208	3.055	0.2715	631.30	0.1224		9.58	60.66
	91.22	415.00	1.69	0.8403	581.90	64.81	2.034	0.0088	12.15	0.0210	3.234	0.3806	664.91	0.1488		9.69	60.26
	94.11	420.00	1.86	0.9160	581.89	64.38	2.044	0.0089	12.05	0.0213	3.643	0.9413	751.34	0.2485		9.96	59.72
	98.66	425.00	2.03	0.9595	580.67	63.15	2.059	0.0090	11.71	0.0217	4.330	0.3086	932.41	0.6288		11.03	58.86
	104.16	430.00	2.20	0.9743	578.16	61.07	2.076	0.0092	11.16	0.0224	4.404	0.2682	944.19	0.6807		13.49	57.81
	108.89	435.00	2.37	0.9888	577.06	59.01	2.090	0.0095	10.667	0.0229	4.419	0.2550	940.53	0.6839		15.83	56.91
	117.23	440.00	2.54	1.0000	577.12	57.54	2.118	0.0097	10.193	0.0238	---	---	---	---		---	---

REVISIONS						 			
REV. NO.	DATE	BY	CHK	APP	DESCRIPTION	PROJECT		CLRP Phase 3A Central Plant Facility: EPC	
0A1	12-June-2014	TA	SY	CS	Re-Issued for Purchase				
						JOB NO.		511036	Tag No.
									3A-E-144A/B
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12345678910111213141516171819202122232425262728293031323334353637383940414243444546474849505152535455565758596061

HAIRPIN HEAT EXCHANGER DATA SHEET

SERVICE *DILUENT RECOVERY / GLYCOL EXCHANGER* DATASHEET NO. *DS-CL03A-E-100-E144*

SIZE *(L x W x H) 8896 x 715 x 884 mm* TYPE *Multi-Tube* HORIZ/VERT *Horizontal* CONNECTED IN *1 Parallel / 2 Series*

SHELLS / UNIT *2* SURFACE / SHELL (gross / eff) (m<sup>2</sup>) *224.07 / 223.37* SURFACE / UNIT (gross / eff)(m<sup>2</sup>) *448.14 / 446.74 (Note 1)*

MANUFACTURER *Heat Exchanger Design, Inc.* MODEL NO. *(\*)* TAG Number *3A-E-144A/B (Note 1)*

PERFORMANCE (MAXIMUM FLOW CASE)

		(IN)	SHELL SIDE	(OUT)	(IN)	TUBE SIDE	(OUT)
FLUID CIRCULATED		<i>TEG / H2O (60/40 wt%)</i>			<i>Diluent Vapour</i>		
TOTAL FLUID	kg / hr		<i>50547.8</i>	<i>50547.8</i>		<i>15640.1</i>	<i>15640.1</i>
VAPOR	kg / hr		<i>0</i>	<i>0</i>		<i>15640.1</i>	<i>0</i>
LIQUID	kg / hr		<i>50547.8</i>	<i>50547.8</i>		<i>0.0</i>	<i>15640.1</i>
STEAM	kg / hr		<i>0.0</i>	<i>0.0</i>		<i>0.0</i>	<i>0.0</i>
NONCONDENSABLE	kg / hr		<i>0.0</i>	<i>0.0</i>		<i>0.0</i>	<i>0.0</i>
FLUID VAPORISED/CONDENSED	kg / hr		<i>0.0</i>	<i>0.0</i>		<i>0.0</i>	<i>15441.8</i>
DENSITY - LIQUID / VAPOUR	kg / m <sup>3</sup>	<i>1078.4</i>	/	<i>1031.1</i>	/	<i>- / 10.013</i>	<i>617.4 / -</i>
VISCOSITY - LIQUID / VAPOUR	cP	<i>4.661</i>	/	<i>1.443</i>	/	<i>- / 0.0098</i>	<i>0.2212 / -</i>
SPECIFIC HEAT (LIQ / VAP)	kJ / (kg.°C)	<i>3.223</i>	/ -	<i>3.437</i>	/ -	<i>- / 2.122</i>	<i>2.571 / -</i>
THERMAL COND (L/V)	W / (m.°C)	<i>0.3276</i>	/ -	<i>0.3392</i>	/ -	<i>- / 0.0238</i>	<i>0.1056 / -</i>
MOLE WT - VAPOUR	MW		<i>-</i>	<i>-</i>		<i>56.784</i>	<i>40.221</i>
MOLE WT - NONCONDENSABLES	MW		<i>-</i>	<i>-</i>		<i>-</i>	<i>-</i>
LATENT HEAT	kJ / kg		<i>-</i>	<i>-</i>		<i>-</i>	<i>-</i>
TEMPERATURE	°C		<i>40.0</i>	<i>99.7</i>		<i>118.1</i>	<i>50.0</i>
INLET PRESSURE	kPa(a)		<i>994</i>	<i>994</i>		<i>534</i>	<i>534</i>
VELOCITY	m / s		<i>0.34</i>	<i>0.34</i>		<i>5.66</i>	<i>5.66</i>
PRESSURE DROP	kPa	ALLOW	<i>70</i>	CALC	<i>55.945</i>	ALLOW	<i>75</i> CALC <i>21.65</i>
FOULING RESISTANCE	(m <sup>2</sup> .°C) / kW		<i>0.18</i>	<i>0.18</i>		<i>0.35</i>	<i>0.35</i>
HEAT EXCHANGED	kW		<i>2791.1</i>	<i>2791.1</i>		MTD CORRECTED (°C)	<i>18.4</i>
TRANSFER RATE	W / (m <sup>2</sup> .°C)	SERVICE	<i>339.71</i>	CLEAN	<i>698.16</i>	ACTUAL	<i>482.2</i>
DESIGN / TEST PRESSURE	kPa(g)		/	/			
MDMT / DESIGN TEMPERATURE	°C		/	/			
NO. PASSES PER SHELL							
CORROSION ALLOWANCE	mm						
CONNECTIONS	INLET						
SIZE &	OUTLET						
RATING	INTERMEDIATE						
TUBES: MATERIAL	NO.	OD (mm)	THK. (mm)	NOMINAL LENGTH (m)			
TUBE LAYOUT	TUBE PITCH			TUBE TO TUBESHEET JOINT			
SHELL: MATERIAL				OD (mm)			
FINS: MATERIAL	HGT.			NO. / TUBE			
TUBE CLOSURE TYPE:				MATERIAL			
				TUBESHEET			
LIFTING LUGS:	GROUNDING LUG:			NAME PLATE:			
INSULATION: SHELL:				CHANNEL:			
TUBE SUPPORTS:	BAFFLES:						
EXCHANGER SUPPORT BRACKET:							
GASKETS: SHELL SIDE:				TUBE SIDE:			
ρv <sup>2</sup> - INLET NOZZLE	BUNDLE ENTRANCE			BUNDLE EXIT			
CODE REQUIREMENTS	TEMA CLASS						
WEIGHT/SHELL (kg)	FILLED WITH WATER (kg)						

Notes:

Refer to Page 1

REVISIONS

REV. NO.	DATE	BY	CHK	APP	DESCRIPTION
0A1	12-June-2014	TA	SY	CS	Re-Issued for Purchase

MEG Energy Corp.

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PROJECT

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REV

HED - DS-CL03A-E-100-E144-R0A1

HAIRPIN HEAT EXCHANGER DATA SHEET



SERVICE DILUENT RECOVERY / GLYCOL EXCHANGER DATASHEET NO. DS-CL03A-E-100-E144

Diluent Vapour Composition

Maximum Duty Case Minimum Duty Case

		Overall Phase				Overall Phase	
	Component	Mole Fraction		Component	Mole Fraction		
	CO2 (Note *)	0.000961		CO2	0.001693		
	H2S (Note *)	0.000105		H2S	0.000224		
	Nitrogen	0.000092		Nitrogen	0.000009		
	Methane	0.018998		Methane	0.003905		
	Ethane	0.002298		Ethane	0.000015		
	Propane	0.004479		Propane	0.000499		
	i-Butane	0.006184		i-Butane	0.001401		
	n-Butane	0.009350		n-Butane	0.056100		
	i-Pentane	0.233938		i-Pentane	0.333128		
	n-Pentane	0.203085		n-Pentane	0.230099		
	n-Hexane	0.082631		n-Hexane	0.064813		
	n-Heptane	0.020997		n-Heptane	0.016985		
	n-Octane	0.006476		n-Octane	0.005653		
	n-Nonane	0.001341		n-Nonane	0.001435		
	n-Decane	0.000662		n-Decane	0.000137		
	n-C11	0.000207		n-C11	0.000000		
	n-C12	0.000073		n-C12	0.000000		
	n-C13	0.000031		n-C13	0.000000		
	n-C14	0.000011		n-C14	0.000000		
	n-C15	0.000010		n-C15	0.000000		
	n-C20	0.000001		n-C20	0.000000		
	Benzene	0.007251		Benzene	0.000000		
	Toluene	0.004983		Toluene	0.000000		
	o-Xylene	0.000893		o-Xylene	0.000000		
	E-Benzene	0.001700		E-Benzene	0.000000		
	124-Mbenzene	0.000125		124-Mbenzene	0.000000		
	Cyclopentane	0.008890		Cyclopentane	0.000000		
	Mcyclohexane	0.007321		Mcyclohexane	0.000000		
	Cyclohexane	0.011146		Cyclohexane	0.000000		
	H2O	0.364440		H2O	0.282812		
	Bitumen	0.001322		Bitumen	0.001092		
	Total	1.000000		Total	1.000000		

Note \*: Maximum expected concentration in the heat exchanger outlet vapour phase is 12.92 wt% C02 and 0.508 wt% H2S

REVISIONS						<div><div> MEG Energy Corp.</div><div> SNC • LAVALIN</div></div>			
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0A1	12-June-2014	TA	SY	CS	Re-Issued for Purchase				
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