





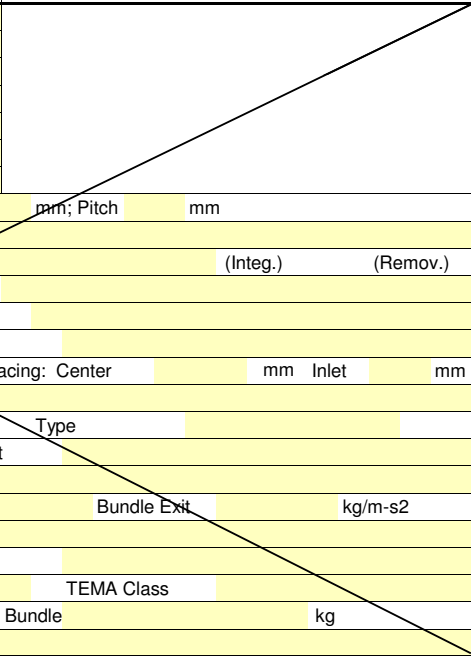






SHELL AND TUBE HEAT EXCHANGER								Data Sheet No.:		DS-CL03A-E-100-E101				REV
Produced Gas Properties - Maximum Duty and UA Case														
			Vapour Properties						Liquid Properties					
Temperature	Pressure	Heat	Mass Fraction	Density	Specific Heat	Viscosity	Thermal Conductivity	Density	Specific Heat	Viscosity	Thermal Conductivity			
°C	kPa(g)	MW		kg/m³	kJ/kg. °C	cP	W/m. °C	kg/m³	kJ/kg. °C	cP	W/m. °C			
136.3	890	0.000	0.1789	5.862	2.190	0.01407	0.04141	913.7	4.466	0.21159	0.66608			
147.0	890	3.478	0.2201	5.768	2.172	0.01379	0.04028	905.2	4.525	0.19161	0.67295			
154.3	890	6.956	0.2667	5.658	2.155	0.01347	0.03917	899.1	4.569	0.17990	0.67644			
159.2	890	10.434	0.3175	5.566	2.141	0.01319	0.03821	894.8	4.602	0.17236	0.67894			
162.7	890	13.911	0.3707	5.488	2.128	0.01297	0.03745	891.7	4.626	0.16738	0.68047			
165.2	890	17.389	0.4251	5.420	2.118	0.01278	0.03684	889.3	4.643	0.16414	0.68093			
167.1	890	20.867	0.4806	5.365	2.110	0.01263	0.03636	887.5	4.656	0.16187	0.68099			
168.6	890	24.345	0.5369	5.320	2.103	0.01251	0.03596	886.1	4.666	0.15992	0.68155			
169.8	890	27.823	0.5938	5.284	2.098	0.01242	0.03563	885.0	4.673	0.15877	0.68111			
170.7	890	31.301	0.6511	5.253	2.093	0.01233	0.03536	884.0	4.679	0.15784	0.68074			
171.5	890	34.779	0.7087	5.228	2.089	0.01227	0.03513	883.3	4.684	0.15708	0.68043			
172.2	890	38.257	0.7666	5.207	2.085	0.01221	0.03494	882.6	4.688	0.15646	0.68016			
172.7	890	41.734	0.8248	5.189	2.082	0.01216	0.03477	882.1	4.692	0.15593	0.67993			
173.2	890	45.212	0.8830	5.173	2.079	0.01211	0.03462	881.6	4.695	0.15548	0.67973			
173.6	890	48.690	0.9415	5.159	2.077	0.01207	0.03449	881.2	4.698	0.15509	0.67956			
174.0	890	52.168	1.0000	5.147	2.075	0.01204	0.03437	-	-	-	-			
			Vapour Properties						Liquid Properties					
Temperature	Pressure	Heat	Mass Fraction	Density	Specific Heat	Viscosity	Thermal Conductivity	Density	Specific Heat	Viscosity	Thermal Conductivity			
°C	kPa(g)	MW		kg/m³	kJ/kg. °C	cP	W/m. °C	kg/m³	kJ/kg. °C	cP	W/m. °C			
136.3	877.5	0.000	0.1801	5.789	2.188	0.01405	0.04131	913.8	4.466	0.21145	0.66636			
146.8	877.5	3.474	0.2216	5.695	2.170	0.01376	0.04017	905.4	4.525	0.19179	0.67310			
154.0	877.5	6.948	0.2683	5.587	2.154	0.01344	0.03906	899.4	4.568	0.18023	0.67655			
158.9	877.5	10.422	0.3191	5.497	2.139	0.01317	0.03812	895.1	4.600	0.17278	0.67905			
162.3	877.5	13.896	0.3722	5.420	2.126	0.01294	0.03736	892.1	4.624	0.16785	0.68058			
164.8	877.5	17.370	0.4267	5.353	2.116	0.01276	0.03676	889.8	4.641	0.16462	0.68106			
166.7	877.5	20.844	0.4821	5.299	2.108	0.01261	0.03627	888.0	4.653	0.16236	0.68113			
168.1	877.5	24.318	0.5383	5.256	2.102	0.01249	0.03588	886.6	4.663	0.16042	0.68173			
169.3	877.5	27.792	0.5951	5.220	2.096	0.01240	0.03556	885.5	4.670	0.15926	0.68130			
170.2	877.5	31.265	0.6523	5.190	2.091	0.01231	0.03529	884.5	4.676	0.15834	0.68094			
171.0	877.5	34.740	0.7098	5.165	2.087	0.01225	0.03506	883.8	4.681	0.15759	0.68064			
171.6	877.5	38.214	0.7676	5.144	2.084	0.01219	0.03486	883.1	4.685	0.15696	0.68038			
172.2	877.5	41.687	0.8256	5.126	2.081	0.01214	0.03469	882.6	4.689	0.15643	0.68015			
172.6	877.5	45.161	0.8838	5.111	2.078	0.01209	0.03454	882.1	4.692	0.15598	0.67996			
173.1	877.5	48.635	0.9421	5.098	2.076	0.01206	0.03441	881.7	4.694	0.15559	0.67979			
174.0	877.5	52.109	1.0000	5.079	2.074	0.01204	0.03435	-	-	-	-			
			Vapour Properties						Liquid Properties					
Temperature	Pressure	Heat	Mass Fraction	Density	Specific Heat	Viscosity	Thermal Conductivity	Density	Specific Heat	Viscosity	Thermal Conductivity			
°C	kPa(g)	MW		kg/m³	kJ/kg. °C	cP	W/m. °C	kg/m³	kJ/kg. °C	cP	W/m. °C			
136.3	865.0	0.000	0.1815	5.717	2.186	0.01402	0.04121	913.8	4.467	0.21131	0.66665			
146.7	865.0	3.470	0.2231	5.622	2.168	0.01373	0.04007	905.6	4.525	0.19197	0.67325			
153.7	865.0	6.940	0.2699	5.516	2.152	0.01341	0.03896	899.6	4.567	0.18057	0.67667			
158.5	865.0	10.410	0.3207	5.427	2.137	0.01314	0.03802	895.5	4.599	0.17320	0.67916			
161.9	865.0	13.879	0.3739	5.352	2.125	0.01292	0.03727	892.5	4.622	0.16832	0.68069			
164.3	865.0	17.349	0.4282	5.287	2.115	0.01274	0.03667	890.2	4.638	0.16512	0.68118			
166.2	865.0	20.819	0.4836	5.234	2.107	0.01259	0.03619	888.4	4.650	0.16287	0.68127			
167.6	865.0	24.289	0.5397	5.191	2.100	0.01247	0.03580	887.0	4.660	0.16092	0.68191			
168.8	865.0	27.759	0.5965	5.156	2.094	0.01238	0.03548	885.9	4.667	0.15977	0.68149			
169.7	865.0	31.229	0.6535	5.127	2.090	0.01229	0.03521	885.0	4.673	0.15885	0.68114			
170.5	865.0	34.698	0.7110	5.103	2.086	0.01223	0.03498	884.3	4.678	0.15810	0.68084			
171.1	865.0	38.169	0.7686	5.082	2.082	0.01217	0.03479	883.6	4.682	0.15747	0.68059			
171.6	865.0	41.638	0.8265	5.064	2.079	0.01212	0.03462	883.1	4.686	0.15694	0.68037			
172.1	865.0	45.108	0.8846	5.049	2.076	0.01208	0.03447	882.6	4.688	0.15649	0.68018			
172.5	865.0	48.578	0.9428	5.036	2.074	0.01204	0.03434	882.2	4.691	0.15611	0.68001			
174.0	865.0	52.048	1.0000	5.011	2.072	0.01204	0.03434	-	-	-	-			
REVISIONS								 						
REV NO	DATE	BY	CHK	APP	DESCRIPTION			PROJECT	CLRPHASE 3A CENTRAL PLANT FACILITY: EPC					
C	4-Mar-13	SS	AG	CS	Issued for Squad Check									
D	7-Mar-13	SS	AG	CS	Issued for Quote				JOB NO.	511036				
0	21-May-13	SS	SY / CS	CS	Issued for Purchase					TAG NO		3A-E-101		
0A1	4-Feb-14	SS	SY	CS	Re-Issued for Purchase				PAGE		2 of 8			

SHELL AND TUBE HEAT EXCHANGER					Data Sheet No.:		DS-CL03A-E-100-E101		REV
Service		Produced Gas / BFW Exchanger			Item No.		3A-E-101 A/B		
Size	1100 x 12192	Type	AEL	(vert/horiz)	Horizontal	Connected In	2 Parallel	1 Series	
Mfr	SEWON Cellontech	Surf/Unit/ (Eff.)	1859	m ² ; Shells/Unit	2	Surf/Shell (Eff.)	929.5	m ²	0A1
PERFORMANCE OF ONE UNIT (Min Case)									
Fluid Allocation		IN		Shell Side	OUT	IN		Tube Side	OUT
Fluid Name				BFW				Produced Gas	
Fluid Quantity, Total	kg/hr	551,433		551,433		32,254		32,254	
Vapor (In / Out)	kg/hr	0		0		32,254		4,309	
Liquid	kg/hr	551,433		551,433		0		27,945	
Steam	kg/hr					0		0	
Water	kg/hr					0		0	
Non-Condensables	kg/hr					0		0	
Fluid Vaporized / Condensed	kg/hr					0		27,945	
Temperature	°C	98.3		125.8		174.3		108.3	
Density (Liq./Vap.)	kg/m3	960.4 / -		939.2 / -		- / 5.299		932.0 / 6.677	
Viscosity (Liq./Vap.)	cP	0.284 / -		0.219 / -		- / 0.012		0.292 / 0.014	
Molecular Weight (Vapor)						19.13		21.75	
Molecular Weight (Non-Condensable)									
Specific Heat (Liq./Vap.)	kJ/(kg·°C)	4.209 / -		4.250 / -		- / 2.038		4.311 / 1.932	
Thermal Conductivity (Liq./Vap.)	W/(m·°C)	0.680 / -		0.687 / -		- / 0.034		0.630 / 0.039	
Latent Heat	kJ/kg					(Note 2)		(Note 2)	
Saturation temperature / dew point	°C								
Operating Pressure	kPaa			2850				984	
Velocity	m/s			0.5				0.38	
Pressure Drop - Allowed / Calculated	kPa	105		/ 34		15		/ 0.24	
Minimum Ambient Temperature	°C			-39				-39	
Fouling Resistance (Min.)	m ² ·°C/kW			0.18				0.35	
Heat Exchanged		17,752				kW: MTD Corrected		45.3 °C	
Transfer Rate, Service	213	Clean		549.2	Actual		413.1	W/(m ² ·°C)	
					Sketch (Bundle / Nozzle Orientation)				
Design / Test Pressure	kPag				<div style="border: 1px solid black; padding: 10px; text-align: center;"> Refer to Page 1 for Details </div>				
Design Temperature (MDMT/Max.)	°C								
No. Passes per Shell									
Corrosion Allowance	mm								
Connections	In								
Size (NPS) & Rating/ Facing	Out								
Intermediate									
Tubes	No.	OD	mm; Thk (Min/Avg.)	mm; Length	mm; Pitch	mm			
Tube Type				Material					
Shell	ID	OD				(Integ.) (Remov.)			
Channel or Bonnet									
Tubesheet - Stationary									
Floating Head Cover									
No. of Cross Baffles	Type				Spacing: Center mm Inlet mm				
Baffles - Long				Seal Type					
Tube Supports				U-Bend Support Type					
Pairs of Seal Strips	Pass Lane	Seal Rod No.				Tube-to-Tubesheet Joint			
Expansion Joint				Type					
ρ v ² - Inlet Nozzle				Bundle Entrance			Bundle Exit kg/m-s2		
Gaskets - Shell Side				Tube Side					
Floating Head				Channel Cover Davit					
Code Requirements				TEMA Class					
Weight / Shell				Filled with Water			Bundle kg		
Radiographic Inspection:									
Notes:									
REVISIONS						 			
REV NO	DATE	BY	CHK	APP	DESCRIPTION	PROJECT	CLRP PHASE 3A CENTRAL PLANT FACILITY: EPC		
C	4-Mar-13	SS	AG	CS	Issued for Squad Check	JOB NO.	511036	TAG NO.	3A-E-101
D	7-Mar-13	SS	AG	CS	Issued for Quote				
0	21-May-13	SS	SY / CS	CS	Issued for Purchase				
0A1	4-Feb-14	SS	SY	CS	Re-Issued for Purchase			PAGE	3 of 8

SHELL AND TUBE HEAT EXCHANGER							Data Sheet No.:		DS-CL03A-E-100-E101				REV
Produced Gas Properties - Minimum Case													
			Vapour Properties					Liquid Properties					
	Temperature	Pressure	Heat	Mass Fraction	Density	Specific Heat	Viscosity	Thermal Conductivity	Density	Specific Heat	Viscosity	Thermal Conductivity	
	°C	kPa(g)	MW		kg/m³	kJ/kg. °C	cP	W/m. °C	kg/m³	kJ/kg. °C	cP	W/m. °C	
	108.3	890.0	0.000	0.1329	6.849	1.933	0.01441	0.03907	932.0	4.311	0.29174	0.62966	
	129.1	890.0	1.184	0.1643	6.704	1.971	0.01450	0.03923	916.5	4.401	0.23502	0.64596	
	143.4	890.0	2.368	0.2097	6.584	1.997	0.01422	0.03838	906.6	4.489	0.20192	0.66234	
	152.9	890.0	3.552	0.2610	6.354	2.013	0.01380	0.03745	899.6	4.552	0.18389	0.67163	
	159.0	890.0	4.736	0.3164	6.129	2.022	0.01342	0.03666	894.6	4.595	0.17377	0.67628	
	163.1	890.0	5.920	0.3747	5.950	2.027	0.01313	0.03603	891.2	4.626	0.16748	0.67921	
	165.9	890.0	7.104	0.4345	5.804	2.031	0.01290	0.03555	888.7	4.646	0.16363	0.68035	
	167.9	890.0	8.288	0.4954	5.690	2.033	0.01272	0.03518	886.7	4.660	0.16114	0.68060	
	169.4	890.0	9.472	0.5571	5.601	2.034	0.01257	0.03488	885.3	4.670	0.15911	0.68125	
	170.6	890.0	10.656	0.6194	5.530	2.035	0.01246	0.03464	884.2	4.678	0.15796	0.68079	
	171.5	890.0	11.840	0.6821	5.472	2.036	0.01237	0.03444	883.2	4.684	0.15705	0.68042	
	172.3	890.0	13.024	0.7452	5.425	2.036	0.01229	0.03427	882.5	4.689	0.15633	0.68011	
	172.9	890.0	14.208	0.8086	5.385	2.037	0.01222	0.03413	881.9	4.693	0.15573	0.67985	
	173.4	890.0	15.392	0.8722	5.352	2.037	0.01217	0.03401	881.3	4.696	0.15523	0.67962	
	173.9	890.0	16.576	0.9360	5.323	2.037	0.01212	0.03391	880.9	4.699	0.15481	0.67943	
	174.3	890.0	17.760	0.9999	5.299	2.038	0.01208	0.03382	880.5	4.702	0.15446	0.67927	
			Vapour Properties					Liquid Properties					
	Temperature	Pressure	Heat	Mass Fraction	Density	Specific Heat	Viscosity	Thermal Conductivity	Density	Specific Heat	Viscosity	Thermal Conductivity	
	°C	kPa(g)	MW		kg/m³	kJ/kg. °C	cP	W/m. °C	kg/m³	kJ/kg. °C	cP	W/m. °C	
	108.3	877.5	0.000	0.1332	6.763	1.932	0.01440	0.03903	932.0	4.311	0.29167	0.62978	
	128.9	877.5	1.184	0.1649	6.621	1.970	0.01448	0.03916	916.6	4.401	0.23514	0.64616	
	143.2	877.5	2.368	0.2105	6.502	1.996	0.01419	0.03830	906.9	4.488	0.20221	0.66253	
	152.6	877.5	3.552	0.2619	6.273	2.012	0.01377	0.03737	899.9	4.551	0.18430	0.67174	
	158.6	877.5	4.736	0.3173	6.052	2.021	0.01340	0.03658	895.0	4.593	0.17425	0.67638	
	162.6	877.5	5.920	0.3757	5.876	2.026	0.01310	0.03596	891.6	4.623	0.16798	0.67931	
	165.4	877.5	7.104	0.4355	5.733	2.029	0.01287	0.03548	889.1	4.643	0.16414	0.68047	
	167.4	877.5	8.288	0.4964	5.620	2.031	0.01269	0.03510	887.2	4.657	0.16165	0.68074	
	168.9	877.5	9.472	0.5581	5.533	2.033	0.01255	0.03481	885.8	4.667	0.15962	0.68144	
	170.1	877.5	10.656	0.6204	5.463	2.034	0.01244	0.03456	884.7	4.675	0.15846	0.68099	
	171.0	877.5	11.841	0.6831	5.406	2.034	0.01235	0.03437	883.7	4.681	0.15756	0.68063	
	171.8	877.5	13.025	0.7461	5.359	2.035	0.01227	0.03420	883.0	4.686	0.15683	0.68032	
	172.4	877.5	14.209	0.8094	5.320	2.035	0.01221	0.03406	882.4	4.690	0.15623	0.68007	
	172.9	877.5	15.393	0.8730	5.288	2.036	0.01215	0.03394	881.8	4.693	0.15574	0.67985	
	173.4	877.5	16.577	0.9367	5.259	2.036	0.01210	0.03384	881.4	4.696	0.15532	0.67966	
	174.3	877.5	17.761	1.0000	5.228	2.036	0.01208	0.03380	-	-	-	-	
			Vapour Properties					Liquid Properties					
	Temperature	Pressure	Heat	Mass Fraction	Density	Specific Heat	Viscosity	Thermal Conductivity	Density	Specific Heat	Viscosity	Thermal Conductivity	
	°C	kPa(g)	MW		kg/m³	kJ/kg. °C	cP	W/m. °C	kg/m³	kJ/kg. °C	cP	W/m. °C	
	108.3	865.0	0.000	0.1336	6.677	1.932	0.01439	0.03899	932.0	4.311	0.29159	0.62990	
	128.8	865.0	1.184	0.1655	6.539	1.969	0.01446	0.03909	916.8	4.401	0.23528	0.64636	
	142.9	865.0	2.368	0.2113	6.419	1.995	0.01416	0.03822	907.1	4.487	0.20252	0.66272	
	152.2	865.0	3.552	0.2628	6.193	2.010	0.01374	0.03729	900.3	4.549	0.18473	0.67186	
	158.2	865.0	4.736	0.3183	5.974	2.019	0.01337	0.03650	895.4	4.591	0.17474	0.67647	
	162.2	865.0	5.920	0.3767	5.801	2.024	0.01308	0.03588	892.0	4.621	0.16850	0.67941	
	164.9	865.0	7.103	0.4365	5.661	2.028	0.01285	0.03540	889.6	4.640	0.16466	0.68060	
	166.9	865.0	8.287	0.4973	5.551	2.030	0.01267	0.03503	887.7	4.654	0.16218	0.68088	
	168.4	865.0	9.471	0.5590	5.464	2.031	0.01253	0.03473	886.3	4.664	0.16013	0.68163	
	169.6	865.0	10.655	0.6212	5.396	2.032	0.01242	0.03449	885.2	4.672	0.15897	0.68119	
	170.5	865.0	11.839	0.6839	5.340	2.033	0.01233	0.03429	884.3	4.678	0.15807	0.68083	
	171.2	865.0	13.023	0.7469	5.294	2.033	0.01225	0.03413	883.5	4.683	0.15734	0.68054	
	171.8	865.0	14.207	0.8102	5.256	2.034	0.01219	0.03399	882.9	4.687	0.15675	0.68029	
	172.4	865.0	15.391	0.8736	5.223	2.034	0.01213	0.03387	882.4	4.690	0.15625	0.68007	
	172.8	865.0	16.575	0.9373	5.196	2.034	0.01209	0.03377	881.9	4.693	0.15583	0.67989	
	174.3	865.0	17.759	1.0000	5.158	2.035	0.01208	0.03378	-	-	-	-	
REVISIONS							 						
REV NO	DATE	BY	CHK	APP	DESCRIPTION		PROJECT	CLRP PHASE 3A CENTRAL PLANT FACILITY: EPC					
C	4-Mar-13	SS	AG	CS	Issued for Squad Check								
D	7-Mar-13	SS	AG	CS	Issued for Quote								
0	21-May-13	SS	SY / CS	CS	Issued for Purchase								
0A1	4-Feb-14	SS	SY	CS	Re-Issued for Purchase		JOB NO.	511036	TAG NO	3A-E-101			
									PAGE	4 of 8			

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SHELL AND TUBE HEAT EXCHANGER					Data Sheet No.:		DS-CL03A-E-100-E101		REV
Service		Produced Gas / BFW Exchanger			Item No.		3A-E-101 A/B		
Size	1100 x 12192	Type	AEL	(vert/horiz)	Horizontal	Connected In	2 Parallel	1 Series	
Mfr	SEWON Cellontech	Surf/Unit/ (Eff.)	1859	m ² ; Shells/Unit	2	Surf/Shell (Eff.)	929.5	m ²	0A1
PERFORMANCE OF ONE UNIT (Start-up Case)									
Fluid Allocation		IN		Shell Side	OUT	IN		Tube Side	OUT
Fluid Name				BFW				Produced Gas	
Fluid Quantity, Total		kg/hr	669,123		669,123		139,759		139,759
Vapor (In / Out)		kg/hr	0		0		139,759		77,719
Liquid		kg/hr	669,123		669,123		0		62,040
Steam		kg/hr					0		0
Water		kg/hr					0		0
Non-Condensables		kg/hr					0		0
Fluid Vaporized / Condensed		kg/hr					0		62,039
Temperature		°C	98.3		146.0		166.0		151.9
Density (Liq./Vap.)		kg/m3	960.4 / -		921.5 / -		- / 4.981		902.1 / 4.922
Viscosity (Liq./Vap.)		cP	0.284 / -		0.186 / -		- / 0.012		0.179 / 0.013
Molecular Weight (Vapor)							17.87		17.74
Molecular Weight (Non-Condensable)									
Specific Heat (Liq./Vap.)		kJ/(kg·°C)	4.209 / -		4.294 / -		- / 2.161		4.575 / 2.245
Thermal Conductivity (Liq./Vap.)		W/(m·°C)	0.680 / -		0.687 / -		- / 0.037		0.685 / 0.041
Latent Heat		kJ/kg					(Note 2)		(Note 2)
Saturation temperature / dew point		°C							
Operating Pressure		kPaa			2850				984
Velocity		m/s			0.62				9.35
Pressure Drop - Allowed / Calculated		kPa	105	/	49		15	/	11.3
Minimum Ambient Temperature		°C			-39				-39
Fouling Resistance (Min.)		m ² ·°C/kW			0.18				0.35
Heat Exchanged			37,608			kW: MTD Corrected	35.6		°C
Transfer Rate, Service		575	Clean		3193	Actual	1095		W/(m ² ·°C)
Sketch (Bundle / Nozzle Orientation)									
Design / Test Pressure		kPag							
Design Temperature (MDMT/Max.)		°C							
No. Passes per Shell									
Corrosion Allowance		mm							
Connections		In							
Size (NPS) & Rating/ Facing		Out							
		Intermediate							
Tubes	No.	OD	mm; Thk (Min/Avg.)	mm; Length	mm; Pitch	mm			
Tube Type				Material					
Shell		ID	OD				(Integ.)	(Remov.)	
Channel or Bonnet									
Tubesheet - Stationary									
Floating Head Cover									
No. of Cross Baffles		Type					Spacing: Center	mm	Inlet
Baffles - Long									
Tube Supports			U-Bend Support				Type		
Pairs of Seal Strips		Pass Lane	Seal Rod No.				Tube-to-Tubesheet Joint		
Expansion Joint							Type		
ρ v ² - Inlet Nozzle				Bundle Entrance			Bundle Exit		kg/m-s2
Gaskets - Shell Side							Tube Side		
Floating Head							Channel Cover Davit		
Code Requirements							TEMA Class		
Weight / Shell			Filled with Water				Bundle		kg
Radiographic Inspection:									
Notes:									
REVISIONS						 			
REV NO	DATE	BY	CHK	APP	DESCRIPTION	PROJECT	CLRP PHASE 3A CENTRAL PLANT FACILITY: EPC		
C	4-Mar-13	SS	AG	CS	Issued for Squad Check	JOB NO.	511036	TAG NO.	3A-E-101
D	7-Mar-13	SS	AG	CS	Issued for Quote				
0	21-May-13	SS	SY / CS	CS	Issued for Purchase				
0A1	4-Feb-14	SS	SY	CS	Re-Issued for Purchase			PAGE	5 of 8

SHELL AND TUBE HEAT EXCHANGER							Data Sheet No.:		DS-CL03A-E-100-E101				REV
Produced Gas Properties - Start-up Case													
				Vapour Properties					Liquid Properties				
	Temperature	Pressure	Heat	Mass Fraction	Density	Specific Heat	Viscosity	Thermal Conductivity	Density	Specific Heat	Viscosity	Thermal Conductivity	
	°C	kPa(g)	MW		kg/m³	kJ/kg. °C	cP	W/m. °C	kg/m³	kJ/kg. °C	cP	W/m. °C	
	151.9	890.0	0.000	0.5548	5.041	2.248	0.01323	0.04080	901.3	4.580	0.17797	0.68508	
	154.0	890.0	1.354	0.5700	5.036	2.243	0.01319	0.04062	900.5	4.584	0.17683	0.68503	
	155.5	890.0	2.798	0.5863	5.032	2.238	0.01315	0.04044	899.7	4.589	0.17536	0.68572	
	156.8	890.0	4.340	0.6039	5.027	2.233	0.01310	0.04025	898.9	4.594	0.17431	0.68553	
	158.0	890.0	5.992	0.6228	5.023	2.228	0.01306	0.04005	898.0	4.599	0.17327	0.68532	
	159.0	890.0	7.768	0.6433	5.018	2.223	0.01301	0.03985	897.2	4.603	0.17224	0.68510	
	160.0	890.0	9.681	0.6655	5.014	2.217	0.01296	0.03964	896.4	4.608	0.17122	0.68488	
	160.9	890.0	11.750	0.6897	5.010	2.211	0.01291	0.03943	895.5	4.613	0.17022	0.68465	
	161.7	890.0	13.996	0.7160	5.005	2.205	0.01286	0.03921	894.7	4.618	0.16922	0.68441	
	162.4	890.0	16.445	0.7450	5.001	2.199	0.01281	0.03898	893.8	4.622	0.16824	0.68416	
	163.1	890.0	19.124	0.7768	4.998	2.193	0.01275	0.03874	893.0	4.627	0.16727	0.68390	
	163.8	890.0	22.072	0.8120	4.994	2.187	0.01270	0.03850	892.1	4.632	0.16631	0.68364	
	164.4	890.0	25.333	0.8511	4.991	2.181	0.01265	0.03826	891.3	4.637	0.16536	0.68336	
	164.9	890.0	28.961	0.8949	4.987	2.174	0.01259	0.03800	890.4	4.642	0.16443	0.68308	
	165.5	890.0	33.024	0.9442	4.984	2.168	0.01253	0.03774	889.6	4.647	0.16350	0.68279	
	166.0	890.0	37.608	1.0000	4.981	2.161	0.01248	0.03747	-	-	-	-	
				Vapour Properties					Liquid Properties				
	Temperature	Pressure	Heat	Mass Fraction	Density	Specific Heat	Viscosity	Thermal Conductivity	Density	Specific Heat	Viscosity	Thermal Conductivity	
	°C	kPa(g)	MW		kg/m³	kJ/kg. °C	cP	W/m. °C	kg/m³	kJ/kg. °C	cP	W/m. °C	
	151.9	877.5	0.000	0.5690	4.974	2.236	0.01312	0.04033	900.0	4.587	0.17611	0.68497	
	154.0	877.5	3.272	0.6050	4.965	2.225	0.01303	0.03994	898.3	4.597	0.17363	0.68539	
	155.5	877.5	5.954	0.6348	4.959	2.217	0.01296	0.03964	897.1	4.604	0.17213	0.68508	
	156.8	877.5	8.536	0.6638	4.953	2.210	0.01290	0.03937	896.1	4.610	0.17085	0.68480	
	158.0	877.5	11.060	0.6922	4.949	2.204	0.01284	0.03912	895.1	4.615	0.16974	0.68453	
	159.0	877.5	13.542	0.7204	4.944	2.198	0.01279	0.03889	894.3	4.620	0.16874	0.68429	
	160.0	877.5	15.998	0.7485	4.941	2.192	0.01274	0.03868	893.5	4.624	0.16786	0.68406	
	160.9	877.5	18.430	0.7764	4.938	2.187	0.01270	0.03848	892.8	4.628	0.16705	0.68384	
	161.7	877.5	20.845	0.8043	4.935	2.182	0.01265	0.03829	892.1	4.632	0.16633	0.68364	
	162.4	877.5	23.245	0.8320	4.933	2.177	0.01261	0.03811	891.5	4.636	0.16566	0.68345	
	163.1	877.5	25.635	0.8598	4.930	2.173	0.01258	0.03795	891.0	4.639	0.16505	0.68327	
	163.8	877.5	28.014	0.8875	4.929	2.169	0.01254	0.03779	890.5	4.642	0.16449	0.68310	
	164.4	877.5	30.385	0.9152	4.927	2.165	0.01251	0.03764	890.0	4.644	0.16396	0.68294	
	164.9	877.5	32.750	0.9429	4.925	2.162	0.01248	0.03750	889.5	4.647	0.16348	0.68278	
	165.5	877.5	35.100	0.9705	4.924	2.158	0.01245	0.03737	889.1	4.649	0.16303	0.68264	
	166.0	877.5	37.608	1.0000	4.922	2.155	0.01243	0.03724	-	-	-	-	
				Vapour Properties					Liquid Properties				
	Temperature	Pressure	Heat	Mass Fraction	Density	Specific Heat	Viscosity	Thermal Conductivity	Density	Specific Heat	Viscosity	Thermal Conductivity	
	°C	kPa(g)	MW		kg/m³	kJ/kg. °C	cP	W/m. °C	kg/m³	kJ/kg. °C	cP	W/m. °C	
	151.9	865.0	0.000	0.5838	4.908	2.223	0.01301	0.03985	898.7	4.595	0.17414	0.68549	
	154.0	865.0	3.228	0.6183	4.900	2.214	0.01293	0.03949	897.3	4.603	0.17237	0.68513	
	155.5	865.0	5.905	0.6471	4.895	2.207	0.01287	0.03922	896.2	4.609	0.17109	0.68485	
	156.8	865.0	8.487	0.6751	4.890	2.200	0.01281	0.03897	895.3	4.614	0.16998	0.68459	
	158.0	865.0	11.009	0.7027	4.886	2.194	0.01276	0.03874	894.5	4.619	0.16900	0.68435	
	159.0	865.0	13.497	0.7300	4.883	2.189	0.01271	0.03853	893.7	4.623	0.16813	0.68413	
	160.0	865.0	15.955	0.7571	4.880	2.184	0.01266	0.03833	893.0	4.627	0.16734	0.68392	
	160.9	865.0	18.392	0.7841	4.877	2.179	0.01262	0.03815	892.4	4.631	0.16663	0.68373	
	161.7	865.0	20.811	0.8110	4.875	2.174	0.01258	0.03798	891.8	4.634	0.16598	0.68354	
	162.4	865.0	23.217	0.8379	4.873	2.170	0.01255	0.03781	891.3	4.637	0.16538	0.68337	
	163.1	865.0	25.611	0.8647	4.871	2.166	0.01252	0.03766	890.8	4.640	0.16483	0.68320	
	163.8	865.0	27.996	0.8915	4.869	2.162	0.01248	0.03751	890.3	4.643	0.16432	0.68305	
	164.4	865.0	30.372	0.9182	4.867	2.159	0.01245	0.03737	889.9	4.645	0.16385	0.68290	
	164.9	865.0	32.742	0.9449	4.866	2.156	0.01243	0.03724	889.5	4.648	0.16341	0.68276	
	165.5	865.0	35.101	0.9716	4.865	2.153	0.01240	0.03712	889.1	4.650	0.16299	0.68263	
	166.0	865.0	37.608	1.0000	4.864	2.149	0.01237	0.03699	-	-	-	-	
REVISIONS							 MEG Energy Corp.  SNC-LAVALIN						
REV NO.	DATE	BY	CHK	APP	DESCRIPTION				PROJECT CLRPHASE 3A CENTRAL PLANT FACILITY: EPC				
C	4-Mar-13	SS	AG	CS	Issued for Squad Check				JOB NO. 511036				
D	7-Mar-13	SS	AG	CS	Issued for Quote				TAG NO 3A-E-101				
0	21-May-13	SS	SY / CS	CS	Issued for Purchase				PAGE 6 of 8				
0A1	4-Feb-14	SS	SY	CS	Re-Issued for Purchase								

