







SHELL AND TUBE HEAT EXCHANGER					Data Sheet No.:		DS-CL03A-E-100-E105		REV
CASE 1: Maximum Case									
Shell Side (Emulsion)									
Temperature	Pressure	Heat	Vapour Fraction	Mass Density	Specific Heat	Viscosity	Thermal Conductivity		
°C	kPa(g)	MW		kg/m <sup>3</sup>	kJ/kg- °C	cP	W/m. °C		
121.4	870.0	0.00	0.0	945.9	3.78	0.61	0.46		
123.0	873.7	2.00	0.0	944.7	3.79	0.60	0.46		
124.5	877.4	4.00	0.0	943.5	3.79	0.59	0.46		
126.0	881.0	5.99	0.0	942.4	3.80	0.59	0.46		
127.5	884.7	7.99	0.0	941.2	3.80	0.58	0.46		
129.0	888.4	9.98	0.0	940.0	3.81	0.57	0.46		
130.5	892.0	11.98	0.0	938.8	3.81	0.57	0.46		
132.0	895.7	13.97	0.0	937.7	3.82	0.56	0.46		
133.5	899.4	15.96	0.0	936.5	3.83	0.55	0.46		
135.0	903.0	17.95	0.0	935.3	3.83	0.55	0.46		
136.5	906.7	19.94	0.0	934.1	3.84	0.54	0.46		
138.0	910.3	21.93	0.0	932.9	3.84	0.53	0.46		
139.5	914.0	23.92	0.0	931.7	3.85	0.53	0.46		
141.0	917.7	25.92	0.0	930.5	3.85	0.52	0.46		
142.5	921.3	27.90	0.0	929.2	3.86	0.52	0.46		
144.0	925.0	29.90	0.0	928.0	3.87	0.51	0.46		
CASE 2: Minimum Case									
Shell Side (Emulsion)									
Temperature	Pressure	Heat	Vapour Fraction	Mass Density	Specific Heat	Viscosity	Thermal Conductivity		
°C	kPa(g)	MW		kg/m <sup>3</sup>	kJ/kg- °C	cP	W/m. °C		
137.6	870.0	0.00	0.0	934.1	3.69	0.67	0.42		
138.0	873.7	0.45	0.0	933.8	3.69	0.67	0.42		
138.4	877.4	0.90	0.0	933.5	3.69	0.66	0.42		
138.9	881.0	1.34	0.0	933.1	3.70	0.66	0.42		
139.3	884.7	1.79	0.0	932.8	3.70	0.66	0.42		
139.7	888.3	2.24	0.0	932.4	3.70	0.66	0.42		
140.2	892.0	2.69	0.0	932.1	3.70	0.66	0.42		
140.6	895.7	3.13	0.0	931.8	3.70	0.65	0.42		
141.0	899.3	3.58	0.0	931.4	3.70	0.65	0.42		
141.4	903.0	4.03	0.0	931.1	3.71	0.65	0.42		
141.9	906.7	4.47	0.0	930.7	3.71	0.65	0.42		
142.3	910.3	4.92	0.0	930.4	3.71	0.65	0.42		
142.7	914.0	5.37	0.0	930.0	3.71	0.64	0.42		
143.1	917.7	5.82	0.0	929.7	3.71	0.64	0.42		
143.6	921.3	6.27	0.0	929.4	3.72	0.64	0.42		
144.0	925.0	6.71	0.0	929.0	3.72	0.64	0.42		
REVISIONS					 				
REV NO	DATE	BY	CHK	APP	DESCRIPTION	PROJECT	CLRP PHASE 3A CENTRAL PLANT FACILITY:		
C	1-Mar-13	SS	AG	CS	Issued for Squad Check	JOB NO.	EPC		
D	11-Mar-13	SS	AG	CS	Issued for Quote		TAG NO.		
0	15-May-13	SS	SY / CS	CS	Issued for Purchase		PAGE		
0A1	10-Feb-14	SS	SY	CS	Re-Issued for Purchase		3A-E-105		
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Notes:										
(*) Seller to specify or confirm										
1) Shell 1 is a BJ12T with one 24" inlet nozzle and two 16" outlet nozzles. Shell 2 is a BJ21T with two 16" inlet nozzles and one 24" outlet nozzle.										
2) Seller shall verify and guarantee thermal rating of the unit.										
3) Emulsion fouling factor to be designed per paper "Reduce Fouling in Shell and Tube Exchangers" by Nesta and Bennett (zero fouling factor with 0.83 safety factor on emulsion convective heat transfer coefficient).										
4) Based on Nesta and Bennett's Reduced Fouling Design, emulsion velocity to be minimum 0.6 m/s and B-stream fraction to be minimum 0.65.										
5) Floating head support shall be provided.										
6) Water cut of emulsion at maximum sizing case is 73.1%. Expected chloride content of water phase of emulsion is 1140 ppm.										
7) Water cut of emulsion at minimum sizing case is 67.04%. Expected chloride content of water phase of emulsion is 1140 ppm.										
8) Exchanger is to be designed for future field hydrotest in fully corroded condition.										
9) Seller is to design and install electrical heat tracing for hold temperature of 10°C. CSA approval is required for electric components and installation. EHT cable and components shall be CSA certified for Class 1, Zone 2, Group IIA (equivalent to Class 1, Division 2, Group D). T-Code rating is T2C.										
10) Seller is to supply and install 64 mm thick mineral fiber insulation.										
11) Each shell shall be provided with a NPS 2 (300#, RFLWN) vent and drain. Vents and drains shall come complete with blind flange, gasket, bolts & nuts.										
12) Each process nozzle shall be provided with one 1" 300# RFLWN (complete with blind flange, gasket, bolts & nuts).										
13) Exchangers are not stacked.										
14) EHT design shall use voltage of 277 VAC.										
15) This document is designated for the Standard Package Catalogue per MEG Standard DMG-BAS-ST-0012										