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

SNC·LAVALIN

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)

Vendor: Heat Exchanger Design, Inc. - 12427	No.: TSS4565B	Rev: 1	Date Rec'd 2013/10/30
Doc. Title: D00.01 - Thermal Data Sheet - Tag: 3A-E-397			
Client Code:	Project: MEG Phase 3A EPC		
Reviewed by: [signature] Date: Nov. 13, 2013	Document No P-5330-01-0013		Submittal 03

Heat Exchanger Design, Inc.

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HEAT EXCHANGER SPECIFICATION SHEET

			Job No.	4565B-1, 2, & 3	
Customer	MEG Energy		Reference No.	PO# P-5330-01	
Address			Proposal No.	111-13	
Plant Location	Christina Lake, AB		Date	4/10/2013	Rev 2a
Service of Unit	HP BFW Minimum Flow Recycle Cooler		Item No.	3A-E-397 A-B-C	
Size 400 x 25.4 x 1219.2mm Type	**SH 16D92-04-00-TV-6B8B**		Horz.	Conn. in 1 Parallel	1 Series
Surf/Unit (Gross/Eff) 24.63 / 24.09 m2	Shell/Unit 1		Surf/Shell (Gross/Eff) 24.63 / 24.09 m2		

PERFORMANCE OF ONE UNIT

Fluid Allocation		Shell Side		Tube Side	
Fluid Name		TEG / H20 (60/40 wt%)		BFW	
Fluid Quantity, Total	kg/hr	49402.2		258583	
Vapor (In/Out)					
Liquid		49402.2	49402.2	258583	258583
Steam					
Water					
Noncondensables					
Temperature (In/Out)	C	40.00	105.00	199.30	190.00
Specific Gravity		1.0789	1.0268	0.8663	0.8769
Viscosity	mN-s/m2	4.6610	1.3460	0.1340	0.1410
Molecular Weight, Vapor					
Molecular Weight, Noncondensables					
Specific Heat	kJ/kg-C	3.2230	3.4560	4.4900	4.4460
Thermal Conductivity	W/m-C	0.3280	0.3400	0.6650	0.6710
Latent Heat	kJ/kg				
Inlet Pressure	kPa	994.002		2294.00	
Velocity	m/s	0.41		2.55	
Pressure Drop, Allow/Calc	kPa	100.000	4.507	100.000	13.668
Fouling Resistance (min)	m2-K/W	NOTE 5		NOTE 5	

Heat Exchanged MegaWatts 2.9789		MTD (Corrected)	119.4 C	
Transfer Rate, Service	1035.79 W/m2-K	Clean	1706.81 W/m2-K	Actual 1706.81 W/m2-K

CONSTRUCTION OF ONE SHELL

Sketch (Bundle/Nozzle Orientation)

			Shell Side	Tube Side
Design/Test Pressure		kPaG	3339/FV / Code	4340/FV / Code
Design Temperature		C	-28.9 / 210	-28.9 / 210
No Passes per Shell			1	1
Corrosion Allowance		mm	3.2	3.2 (Except tubes)
Connections Size & Rating	In	inch	6" 300# RFWN	8" 300# RFWN
	Out	inch	6" 300# RFWN	8" 300# RFWN
	Intermediate			

Tube No.	92	OD 25.400 mm	Thk(Avg) 2.108 mm	Length 1.2192 m		Pitch 31.750 mm	Layout 60
Tube Type	Plain			Material		SA-179 (smls)	
Shell		SA-106B	406.4mm OD	Shell Cover		SA-516-70N	
Channel or Bonnet		SA-516-70N		Channel Cover		N/A	
Tubesheet-Stationary		SA-516-70N		Tubesheet-Floating		N/A	
Floating Head Cover		N/A		Impingement Plate		None	
Baffles-Cross	A-36	Type SINGLE-SEG. (Vert.)	%Cut (Diam) 33.00	Spacing(c/c) 304.801			
Baffles-Long	N/A		Seal Type				
Supports-Tube	A-36		U-Bend	Type			
Bypass Seal Arrangement			Tube-Tubesheet Joint	Strength Welded			
Expansion Joint		N/R	Type				
Rho-V2-Inlet Nozzle		617.43 kg/m-s2	Bundle Entrance 0.00	Bundle Exit 0.00	kg/m-s2		
Gaskets-Shell Side		Kammpro Type	Tube Side	Kammpro Type			
-Floating Head		N/A					
Code Requirements		ASME Section VIII, Div. I		TEMA Class			
Weight/Shell 1626.07		Filled with Water 2089.82		Bundle 425.59	kg		

Remarks: 1. This is HED's standard separated head Hairpin Exchanger with independent bolting. 2. Three (3) identical exchangers are required. 3. 50mm thick mineral wool insulation is included per specification. 4. 15% overdesign has been considered to account for potential fouling. 5. U-bends are stress relieved.