


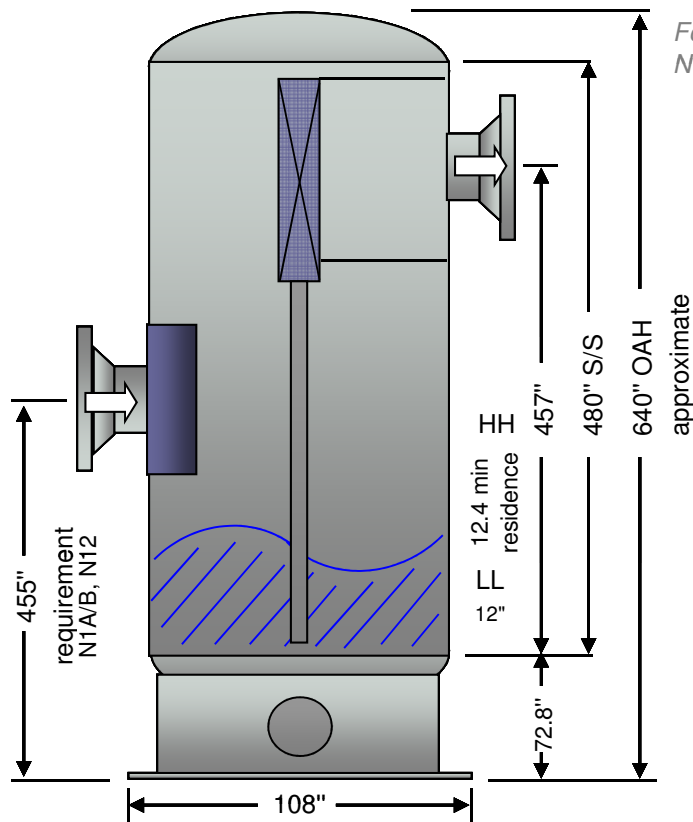


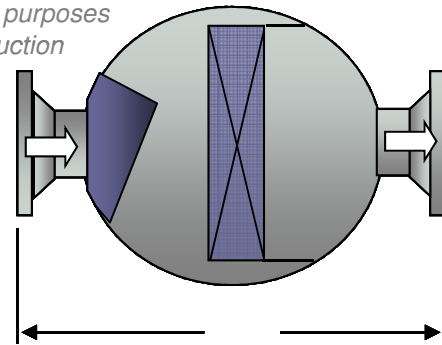
VP-CL03A-M-000-0025

PRESSURE VESSEL DATA SHEET					Data Sheet No.: DS-CL03A-M-300-V326	
Specification No.:					Requisition No.: 508298-300-45-MR-5660-0001	
PROCESS CONDITIONS						
OPERATING CASE			Case 1 (max Vapor)		Case 2 (max Condensate)	
Fluid			Blowdown		Blowdown	
Operating Pressure	Max/Norm/Min	kPag	1029		1461	
Operating Temperature	Max/Norm/Min	°C	185		200	
Design Pressure		kPag	1950 / Full Vacuum		1950 / Full Vacuum	
Design Temperature	Min/Max	°C	-29 / 214		-29 / 214	
Slug/Surge Volume		m ³	-		-	
Service (Sweet / Sour)			Sweet		Sweet	
VAPOUR						
Mass Flowrate		kg/h	84,236		62,741	
Density	((@ P & T))	kg/m ³	5.750		7.862	
Viscosity		cP	0.01513		0.0156	
Molecular Weight			18.02		18.02	
LIQUID HYDROCARBON						
Mass Flowrate		kg/h	-		-	
Density	((@ P & T))	kg/m ³	-		-	
Viscosity		cP	-		-	
Surface Tension		mN/m	-		-	
LIQUID AQUEOUS						
Mass Flowrate		kg/h	186,115		207,610	
Density	((@ P & T))	kg/m ³	881.3		864.4	
Viscosity		cP	0.145		0.134	
NOTES						
8) Steam separator shall be vane type. Vane system (Peerless type) and support to be designed, supplied and installed by Seller. Vane material shall be 316 SS. 						
9) Maximum Allowable Pressure Drop = 10 kPa for case 1 steam rate.						
10) Seller shall design and install impingement baffle on N1A, N1B and N12.						
11) Seller to provide performance data for their proposed design.						
12) The specified criteria in Table 1 (Page 3) shall be followed by the Seller for residence time and liquid level in the separator. 						
13) Seller shall confirm size of the vessel suitable for vapor/liquid separation, liquid volume hold up and levels for flows in cases 1 & 2.						
14) TURNDOWN = 27:1. Seller has confirmed that steam separator is capable of 100% turndown with no compromise on separation efficiency.						
15) Seller to guarantee OUTLET STEAM QUALITY > 99.95 % DRY @ rated flow.						
16) Seller to guarantee 100% removal of droplets >= 5 micron @ rated flow						
17) The nozzle sizes are the same size as the line sizes. The steam and 2 phase flow lines are sized based on $\rho v^2 = 14400 \text{ kg/m}^2 \cdot \text{sec}$ (C=120 in SI Unit). Seller to confirm all nozzle sizes.						
18) Inlet nozzles N1A, N1B and N12 shall be located above HHLL. To be confirmed during detailed engineering.						
19) The maximum chloride and TDS concentrations are 25000 ppm and 50000 ppm respectively.						
20) Seller shall supply the base plate template.						
21) Bottom half of the separator and blowdown liquid line (up to Seller termination point) shall be insulated (Hot - 64 mm) and electrically heat traced (as per material requisition). 						
22) Seller shall provide and shop install 64mm thick calcium silicate insulation with 0.5mm thick x 32mm (pitch) x 6mm (depth) corrugated aluminum cladding.						
23) All NDE shall comply with the project specifications.						
24) Skirt support and lifting trunnion/tailing lug shall be designed for MDMT of -45°C.						
25) All process nozzles shall be designed to withstand loading and moments as specified in the allowable nozzle loads specification.						
26) All internal attachments shall be attached to the vessel with full penetration welds.						
27) Skirt length (measured from bottom head weld seam to underneath of base ring) shall be 1849 mm. To be confirmed during detailed engineering.						
28) All uninsulated carbon steel surfaces (skirt, nozzles, supports, structural steel) shall be painted per the project painting specification.						
29) All attachment welds (internal and external) shall be MT examined after final PWHT.						
30) Nozzles N1, N2 & N12 shall be provided with the pipe support and guide type VS-6. Seller shall design and install suitable support clips using the support/guide detail drawing and loads supplied by Buyer. Piping loads imposed to the vessel wall shall be considered in the vessel design calculations.						
REVISIONS						
REV NO.	DATE	BY	CHK	APP	DESCRIPTION	
A	12-Jan-12	SS	MN	SP	Issued for Squad Check	PROJECT MEG Energy Christina Lake Regional Project
B	24-Jan-12	SS	MN	SP	Issued for Quote	Phase 03A- Central Plant Facilities
0	16-Apr-12	SS	RW	SE	Issued for Purchase	JOB NO. 508298 TAG NO. 3A-V-326
						PAGE 2 of 3

PRESSURE VESSEL DATA SHEET					Data Sheet No.: DS-CL03A-M-300-V326																																														
Specification No.:					Requisition No.: 508298-300-45-MR-5660-0001																																														
CONNECTION SCHEDULE																																																			
Mark	Nominal Size NPS	Qty	Flange		Service	Projection (mm)																																													
			ASME Class	Type																																															
N1A	12	1	300	RFWN	Steam Inlet c/w half-pipe inlet device (*)	368 *																																													
N1B	16	1	300	RFWN	Steam Inlet c/w half-pipe inlet device (*)	419 *																																													
N2	16	1	300	RFWN	Steam Outlet	419 *																																													
N3	8	1	300	RFWN	Blowdown Liquid Outlet, c/w vortex breaker (electrically traced)	By Seller																																													
N4	10	1	300	RFWN	Vent/Spare, c/w blind flange, gasket, bolts and nuts	368 *																																													
N5	2	1	300	RFWN	Temperature Indicator Transmitter - TIT	267 *																																													
N6A/B	2	2	300	RFWN	Level Gauge - LG	267 *																																													
N7A/B	3	2	300	RFWN	Level Indicator Transmitter - LIT	267 *																																													
N8A/B	3	2	300	RFWN	Level Indicator Transmitter - LIT (Redundant)	267 *																																													
N9	2	1	300	RFWN	Pressure Gauge - PG	267 *																																													
N10	8	1	300	RFWN	Inspection Nozzle, c/w blind flange, gasket, bolts and nuts	318 *																																													
N12	12	1	300	RFWN	Make up steam c/w half-pipe inlet device (*)	368 *																																													
M1	24	1	300	RFWN	Manway, c/w blind flange, gasket, bolts and nuts, davit	419 *																																													
VESSEL SKETCH																																																			
					Nozzles N1A, N1B and N12 shall be located above HHLL. Nozzles N6B, N7B, N8B shall be located below LLLL.																																														
					Plan View - Platform "A": 180° platform at (T.O.G) elevation of 6849 mm measured from underneath of base ring.																																														
					Table 1 - Retention Time and Minimum Distances																																														
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For Illustrative purposes
Not for Construction



108" ID Vertical Gas Separator

OPERATING CONDITIONS

Flowrate	84,236	kg/hr
Pressure	1,029	kpag
Temperature	200	°C
Specific Gravity	0.62	
Pressure Drop	1	psid

DESIGN CONDITIONS

Code	ASME Section 8 Div. 1	
Pressure	283	psig
Temperature	417	°F
MDMT	-20	°F
Corrosion Allowance	0.1260	inch

TESTING

Hydrotesting	Per UG-99
Radiography	Full
Ultrasonic	Per Spec
Magnetic Particle	Per Spec
Dye Penetrant	Per Spec
Post Weld Heat Treatment	Per Code
Hardness	None
Charpy Impact	Per Code

PAINTING

Internal:	Brush Clean and light oil
Sandblast	Per Spec
Primer	Per Spec
Intermediate Coat	Per Spec
Finish Coat	Per Spec

PERFORMANCE GUARANTEE

Solids Removal	None
Liquids Removal	100.00%
	5 microns and larger

*See proposal for detailed performance guarantee

SCHEDULE OF OPENINGS

Item	Qty	Size	Class	Type	Service
1	1	16	300	RFWN	Inlet #1
2	1	16	300	RFWN	Gas Outlet
3	1	24	300	RFWN	Manway, w/Davit
4	1	8	300	RFWN	Blow Down/Auto Drain
5	2	12	300	RFWN	Inlet #2, Make up Steam
6	4	3	300	RFWN	Level Transmitter DP-LIT
7	4	2	300	RFWN	Level Gauge/Temp/PG
8	1	10	300	RFWN	Vent/Spare
9	1	4	300	RFWN	Vent
10	1	8	300	RFWN	Inspection

MATERIAL SPECIFICATIONS

Shell	SA-516-70N
Heads	SA-516-70N
Flanges	SA-105N
Pipe	SA-106 GrB
Weld Fittings	SA-234-WPB
Skirt	SA-516-70N

INTERNALS

Vanes	P8X
Material	316L Removable
Inlet Deflector	Yes (N1A/B, N12)

EXTERNALS

Supports	Skirt and base
Lifting Lugs	Yes
Insulation Rings	Yes
Grounding Lugs	Yes
Closure Type	None

Reference:	085354-R-3215-01-Christina Phase 2B	Approximate Empty Weight	80,000 lbs.
Tag #:	2B-V-326	Qty:	1
		Rev.	0

Peerless AE:	Andrew Roberts
Direct Number:	403-252-2600
Email Address:	aroberts@peerlessmfg.ca
Peerless Ref.:	206031-3 R2
Date:	1/3/2011