

No	Date	By
0	26-Aug-11	PM
1	3-Jan-12	PM
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EXCHANGER INDUSTRIES

CROSSFLOW HEAT EXCHANGER SPECIFICATION SHEET

11-5029 100HX110 C3

V3.00T

Sheet No.	of
Date	November 13, 2012
Proposal No.	P11A-12424
Job No.	11-5029
Item No.	100-HX-110
Customer Ref	Po H338083-PM001

Customer	N-Solv Corporation	c/o Hatch Ltd.
Plant Location	N-Solv Dover Demonstration Facility - Ft McMurray	
Service of Unit	De-Methanizer Condenser	
Model	1S8.5 20 7 2	Forced Draft
Surface Area Bundle - Bare / Extended	623 / 13,196	ft ²
Net Bare Area Total	623	ft ²
Heat Exchanged	1,422,500	BTU/hr
MTD, Effective	26.14	°F
Transfer Rate - Fin Surface	4.12	Bare Tube, Service
87.30	(U),	Clean
97.75	BTU/hft ² °F	

PERFORMANCE DATA - TUBE SIDE

Fluid Name	Overhead Gas From Demethanizer		Vapour Ref Temp	°F	127.38	100.63
Total Fluid Entering	Lb/Hr	10,622	Specific Heat	BTU/Lb°F	0.5665	0.5258
Vapour	Lb/Hr	10,622	192	Viscosity	cP	0.0110
Liquid	Lb/Hr	10,430	Conductivity	BTU/hft°F	0.0139	0.0139
Non-condensable	Lb/Hr		Density	Lb/ft ³	2.887	2.446
Water Substance	Lb/Hr		Molecular Weight Vapour		41.98	37.02
Fluid Condensed	Lb/Hr	10,430	Liquid Ref Temp	°F	127.38	100.63
Temperature In/Out	°F	127.38	100.63	Specific Heat	BTU/Lb°F	0.8461
Average Latent Heat	BTU/Lb	121	Viscosity	cP	0.0740	0.0800
Pressure	psia	303.13	Conductivity	BTU/hft°F	0.0451	0.0486
Velocity In/Out	ft/s	8.98	Density	Lb/ft ³	27.37	28.38
Press Drop Allow/Calc	psi	3.63	0.90	Fouling at tube id / fin surface	hft ² °F/BTU	0.001021

PERFORMANCE DATA - AIR SIDE

Air Quantity, Total	499,003	Lb/Hr	Altitude above Sea Level	837	ft
Volume Flow per Fan	58,962	cuft/min	Temperature In (Dry Bulb)	86.00	°F
Bundle Static Pressure	0.4910	inWg	Temperature Outlet	97.80	°F
Face Velocity (act / std.)	872.2 / 819.8	ft/min	Min Design Ambient	-40.00	°F

DESIGN - MATERIALS - CONSTRUCTION

Design Pressure	334 psig	Vacuum	FV @ 300°F	Test Pressure	per Code	psig	Design Temperature	230 °F	MDMT	-45 °F
TUBE BUNDLE	8.42 x 21 ft	Header Type				Fabricated Box	Tube Material	SA-179		
Model	122B2L4 20 4	Materials				SA-516-70 N SA-350-LF2-CL1 SA-333-6	Tube OD	1	Wall	0.083 in Minimum
Tube to Tubesheet Joint	Rolled 2 RG	No of Rows				4 No Passes	4	Tubes per bundle	122	Seamless
1 Bundle	Steel Frame	Slope				None	Length	20	ft	
1 Bundle per Bay	In Parallel	Plug Material				SA-350-LF2-CL1	Transverse Pitch	2.625	in	
1 Bays Per Unit	In Parallel	Gasket Material				C1010 / C1020	Longitudinal Pitch	2.3125	in	
Ladder & Walkway	One End	Corrosion Allow.				0.1181 in	Fin Type	L-Finned		
Structure Mount	Grade	Inlet Nozzles				1 - 3 in	Fin Material	Aluminum		
Surface Preparation	Galvanize	Outlet Nozzles				1 - 3 in	Fin OD	2.25	Fin Strip Stock Thick.	0.016 in
Bugscreens	Yes	Special Nozzles				Vent & Drain Cplg both headers	10 fpi	Fin Des Temp 270.0 °F		
Hail Guards	Yes	Rating & Facing				C300 RFWN	Code	ASME Sec VIII Div 1		
Louvers	Auto Outlet	TI				PI	Code Stamp	Yes	API-661	Yes
Vibration Switch	Murphy VS-2EX	Chem Cleaning				No CC Nozzles	Specification			

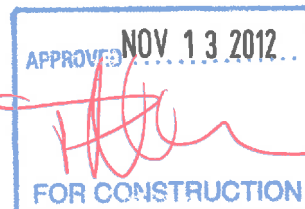
MECHANICAL EQUIPMENT

Fan Make	Moore Fan c/w VT Seal			DRIVER	Electric Motor		SPEED REDUCER	V-Belts	
Model	5419B7A4			Manufacturer		Sheaves 4.75 / 19.00 in			
Fans per Bay	2	No Blades	4	Fan RPM	434.0	No. per Bay		2	
Diameter	7	ft	Angle	13.48 °	Driver Power		15.00	Hp	
Blade Pitch Adjusts	Manually			Motor RPM		1,750		Model 3VX900	
Material Bode / Hub	Aluminum			Enclosure		TEFC VFD compatible		Drives per Bay 2 Belts per Drive 4	
Fan Design Draw	9.08 Hp			Voltage / Phase / Cycle		575/3/60		AGMA Rating 22.88 Hp	
Fan Draw Min Ambient	13.62 Hp			Area Class		Non-Hazardous		Ratio 4.00 CD 25.4 in	
Plot Area	12.08	x	19.00	ft	per bay		Bundle Weight, Dry 6,370 Lb		Bundle Weight, Full of Water 7,140 Lb
Air Failure Action:	Louvers Fail Open							Fan Pitch	N/A
Control of Process: VFD motors - Process outlet						Recirculation: None			
Inspection	Spot UT & MPT			Heat Treatment		1150°F for 1 hour / in weld		Heating 5.25" Pitch 2 Pass Glycol Coil	

NOTES:

- Flows and duties shown above are 110% of normal.
- 70" fandeck to Base of Columns - Floor and access platform 85.5 in (2170 mm) above grade.
- Fan speed controlled by VFD (by others).
- C4 Case does not control.

- See Documentation and Drawing 10-5029 for additional mechanical, paint and inspection details.
- Rev 1 - Po Issue - Add Louvers & Heater - Process Revision - Nozzles - Editorial.
- Rev 2 - As Built - Editorial



Revision

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EXCHANGER INDUSTRIES

CROSSFLOW HEAT EXCHANGER SPECIFICATION SHEET

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V3.007

Sheet No.	of
Date	November 13, 2012
Proposal No.	P11A-12424
Job No.	11-5029
Item No.	100-HX-110
Customer Ref	Po H338083-PM001

Customer	N-Solv Corporation	c/o Hatch Ltd.
Plant Location	N-Solv Dover Demonstration Facility - Ft McMurray	
Service of Unit	De-Methanizer Condenser	
Model	1S8.5 20 7 2	Forced Draught
Surface Area Bundle - Bare / Extended	57.9 / 1,225.9	m ²
Net Bare Area Total	57.9	m ²
Root Area Ratio	21.17	
Heat Exchanged	417	kW
MTD, Effective	14.52	°C
Transfer Rate - Fin Surface	0.0238	Bare Tube, Service 0.5048 (U), Clean 0.5653 kW/m ² °C

PERFORMANCE DATA - TUBE SIDE

Fluid Name	Overhead Gas From Demethanizer		Vapour Ref Temp	°C	52.99	38.13
Total Fluid Entering	Kg/Hr	4,818	Specific Heat	kJ/Kg°C	2.3716	2.2015
Vapour	Kg/Hr	4,818	Viscosity	cP	0.0110	0.0110
Liquid	Kg/Hr	4,731	Conductivity	W/m°C	0.0240	0.0240
Non-condensable	Kg/Hr		Density	kg/m ³	46.240	39.180
Water Substance	Kg/Hr		Molecular Weight Vapour		41.98	37.02
Fluid Condensed	Kg/Hr	4,731	Liquid Ref Temp	°C	52.99	38.13
Temperature In/Out	°C	52.99	Specific Heat	kJ/Kg°C	3.5424	3.2422
Average Latent Heat	kJ/KG	283	Viscosity	cP	0.0740	0.0800
Pressure	kPaa	2,090.00	Conductivity	W/m°C	0.0781	0.0841
Velocity In/Out	m/s	2.74	Density	kg/m ³	438.5	454.5
Press Drop Allow/Calc	kPa	25.0	Fouling at tube id / fin surface	m ² °C/kW	0.1798	

PERFORMANCE DATA - AIR SIDE

Air Quantity, Total	226,344	Kg/Hr	Altitude above Sea Level	255	m
Volume Flow per Fan	1,670	cum/min	Temperature In (Dry Bulb)	30.00	°C
Bundle Static Pressure	12.47	mmWg	Temperature Outlet	36.56	°C
Face Velocity (act / std.)	265.8 / 249.9	m/min	Min Design Ambient	-40.00	°C

DESIGN - MATERIALS - CONSTRUCTION

Design Pressure	2,300 kPag	Vacuum	FV @ 149°C	Test Pressure	per Code kPag	Design Temperature	110 °C	MDMT	-43 °C
TUBE BUNDLE	2.57 x 6.40	m	Header Type	Fabricated Box		Tube Material	SA-179		
Model	122B2L4 20 4		Materials	SA-516-70 N SA-350-LF2-CL1 SA-333-6		Tube OD	25.40	Wall	2.11 mm
Tube to Tubesheet Joint	Rolled 2 RG		No of Rows	4	No Passes	4	Tubes per bundle	122	Seamless
1 Bundle	Steel Frame		Slope	None		Length	6.096 m		
1 Bundle per Bay	In Parallel		Plug Material	SA-350-LF2-CL1		Transverse Pitch	66.68 mm		
1 Bays Per Unit	In Parallel		Gasket Material	C1010 / C1020		Longitudinal Pitch	58.74 mm		
Ladder & Walkway	One End		Corrosion Allow.	3.00 mm		Fin Type	L-Finned		
Structure Mount	Grade		Inlet Nozzles	1 - 76.2 mm		Fin Material	Aluminum		
Surface Preparation	Galvanize		Outlet Nozzles	1 - 76.2 mm		Fin OD	57.15	Fin Strip Stock Thick.	0.41 mm
Bugscreens	Yes		Special Nozzles	Vent & Drain Cplg both headers		394	fpm	Fin Des Temp	132.2 °C
Hail Guards	Yes		Rating & Facing	C300 RFWN		Code	ASME Sec VIII Div 1		
Louvers	Auto Outlet		Ti	PI		Code Stamp	Yes	API-661	Yes
Vibration Switch	Murphy VS-2EX		Chem Cleaning	No CC Nozzles		Specification			

MECHANICAL EQUIPMENT

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Fan Make				DRIVER			SPEED REDUCER		V-Belts
Moore Fan c/w VT Seal				Electric Motor					
Model 5419B7A4				Manufacturer			Sheaves 121 / 483 mm		
Fans per Bay 2 No Blades 4 Fan RPM 434.0				No. per Bay 2			Manufacturer		
Diameter 2.13 m Angle 13.48 °				Driver Power 11.19 kW			Model 3VX900		
Blade Pitch Adjusts Manually				Motor RPM 1,750			Drives per Bay 2 Belts per Drive 4		
Material Bode / Hub Aluminum				Enclosure TEFC VFD compatible			AGMA Rating 17.06 kW		
Fan Design Draw 6.77 kW				Volt / Phase / Cycle 575/3/60			Ratio 4.00 CD 645 mm		
Fan Draw Min Ambient 10.16 kW				Area Class Non-Hazardous			Support Structure		
Plot Area 3.68 x 5.79 m per bay				Bundle Weight, Dry 2,890 kg			Bundle Weight, Full of Water 3,240 kg		
Air Failure Action: Louvers Fail Open							Fan Pitch N/A		
Control of Process: VFD motors - Process outlet							Recirculation: None		
Inspection Spot UT & MPT				Heat Treatment 621°C for 1 hr / 25.4mm weld				Heating 133mm Pitch 2 Pass Glycol Coil	

NOTES:

- Flows and duties shown above are 110% of normal.
- 7'0" fandeck to Base of Columns - Floor and access platform 85.5 in (2170 mm) above grade.
- Fan speed controlled by VFD (by others).
- C4 Case does not control.

- See Documentation and Drawing 10-5029 for additional mechanical, paint and inspection details.
- Rev 1 - Po Issue - Add Louvers & Heater - Process Revision - Nozzles - Editorial.
- Rev 2 - As Built - Editorial

