

Hudson Products Corporation

Solo-aire®

Air-Cooled Heat Exchanger
Specification Sheet

Item No. **012-E-030**

Job No. **K607**

Proposal No. **14-1279**

Texas Registration No. F-11837

Customer	Air Liquide: Air Liquide Global E&C Solutions US Inc		Heat Exchanged, Btu/hr	12,373,880	
Plant Location	Natchez, Mississippi		MTD. Eff, °F	24.4	Transfer Rate,
Cust. Ref. No.	1.270138-E030	Cust. P.O. No.	4607300-000 / 1.27013	Surface, ft²	Btu/(hr•ft²•°F)
Service	Water Cooler		Finned	77258	6.57
Bay Size	13.00/12-406	Model	2FPVA	Type Draft	FORCED
No. Bays per Item	1	Total No. of Items	1	Bare	3644
				Clean Tube Transfer Rate	141.9

PERFORMANCE DATA PER ITEM - TUBE SIDE

Fluid Name	Water		IN	OUT
Total Fluid Entering, lb/hr	718,046	Temperature, °F	148.28	131
Dew Point, °F		Flow Rate, liq.		
Bubble Point, °F		lb/hr vap.		
Pour Point, °F		Water, lb/hr	718046	718046
Freeze Point, °F		Steam, lb/hr		
Latent Heat, Btu/lb		Noncondensable, lb/hr		
Inlet Pressure, psia	101.53	Molecular Wt., vapor		
Pressure Drop, psi		Molecular Wt., Noncond		
allowable	14.504	Density, liq.	61.245	61.552
calculated	14.5	lb/ft³ vap.		
Velocity, ft/sec		Specific Heat, liq.	0.9999	0.9989
allowable		Btu/(lb•°F) vap.		
calculated		Thermal Conductivity, liq.	0.3787	0.3734
Foul Resistance, (hr•ft²•°F)/Btu	0.001	Btu/(hr•ft•°F) vap.		
Hydrogen		Viscosity, liq.	0.4359	0.5041
mole %		cp vap.		
Partial Pressure, psia		Degree Control Process Outlet Temperature (+/-), °F	/	

PERFORMANCE DATA PER ITEM - AIR SIDE

Face Velocity, sfm	607	Air Inlet Temp, °F	95
Air Flow Rate/Item, scfm	309,570	Air Outlet Temp, °F	132
Air Flow Rate/Fan, acfm	162,316	Min. Design Amb. Temp, °F	4
Mass Face Velocity, lb/(hr•ft²)		Altitude, ft	Sea Level
Static Pressure, in. Water	0.505	Foul Resistance, (hr•ft²•°F)/Btu	

REMARKS

The following bundles are located in one bay:
Designed using HTRI Xace Ver 7.00 SP1.

NO.	DATE	REVISION	NO.	DATE	REVISION
0	10/30/14	Issued for approval			

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TUBE BUNDLE DESIGN, MATERIAL, and CONSTRUCTION

GENERAL DESIGN				HEADER				TUBE			
Design Pressure, psig 145.04				Type Plug Header				Type Welded			
Test Pressure, psig 378				Header Material Carbon Steel				Material Stainless Steel			
Design Temp, °F 212				ASME SA-516,70				ASME SA-249,TP304			
Min Design Metal Temp, °F 4				Plug Material SA-105				OD, in 1			
Nom. Size (WxL) 13'-' 0		" x 40'		Gasket Material A-366/A-1008				Wall Thk, in. 0.065		MW	
No. of Bundles/Bay 1				Tube Rows 6		No. of Passes 3		Corrosion Allow, in. 0			
Bundles/Item in Parallel 1				Corrosion Allow, in 0.125				No./Bundle 348			
Tube Slope, in/ft				Split Header None				Length, ft. 40		Layout Triangular	
None								Pitch, in. 2.625			
ASME Code Yes		Stamp Yes		NOZZLE	No.	Size, in	Rating & Facing	Tube End Welding HPC Seal			
API 661(06)		National Board Yes		Inlet	2	8.	150 WNR	Tube End Coating None			
Special Service None				Outlet	2	8.	150 WNR	Tube Inserts None			
STRUCTURAL - WALKWAYS				Vent	1	1.	6000 Thdolet	Rows/Pass 2-2-2			
Mounting Piperack				Drain	1	1.	6000 Thdolet				
Pipe-Rack Centers				Pressure				FIN			
Walkways Header-Each End				Temp				Type Extruded			
Walkway Surface Galvanized Grating				Cleaning				Material Aluminum			
Ladders Yes				Nozzle Loads 2.0 x API 661 (06)				Stock Thickness, in. 0.158			
Bundle Frame Coating Galvanized				Nozzle Attachment Set-On				OD, in. 2.25			
Structural Steel Coating Galvanized				Trans/Pipe Min Wall, in API (06) 7.1.9.6				No./Inch 10			
Walkway Coating Galvanized				Corrosion Allow, in. 0.125				Selection Temperature, °F			

MECHANICAL EQUIPMENT

FAN				DRIVER				SPEED REDUCER			
Manufacturer Cofimco				Manufacturer Baldor				Manufacturer Gates			
Model 3658-4-24L/B3T				Type Electric Motor				Type Poly Chain GT Carbon			
No./Bay 2	Pitch Angle 7.4°			No./Bay 2	Frame 284T			No./Bay 2	S.F. 1.8		
Diameter, ft. 12	No. of Blades 4			Enclosure TEFC	Model IEEE-841			Model			
Tip Speed, fpm 9900	RPM 262.5			HP/Driver 25	S.F. 1.15			AGMA HP Rating			
BHP/Fan @ Design Ambient 18.9				RPM 1750				Ratio 6.667/1			
BHP/Fan @ Min Ambient 22.6				Volt 460	Phase 3	Cycle 60		VIBRATION SWITCH			
Pitch Adjustment 100% Manual				Space Heaters Yes (120 Volt)				Manufacturer Murphy			
AV Signal, psig to Supply, psig				Var. Freq. Drive No				Model VS-2-EX			
Blade Material Aluminum				Mounting Vertical Shaft-down				No./Bay 2	Type DPDT		
Hub Material Steel				Area Class CL I, Gr C&D, Div 2				Area Class CL I, Gr C&D, Div 2			
Inlet Bells Yes	Noise Level			SPL 2 85 DB(A) @ 3' below the fan guard.							

CONTROLS - AIR SIDE

HEATING COIL					No	AIR RECIRCULATION			No
Fluid Name				Header (Matl/Type)		Type			
Flow Rate, lb/hr /				ASME		Windskirts			
Temperature (in/out), °F /				Tube Rows	No. of Passes	LOUVERS			No
Inlet Pressure, psig				Tube (Matl/Type)		Material API 661			
Press Drop (Allow/Calc), psi /				ASME		Inlet Sqft/Bay			
Press (Design/Test), psig /				O.D., in.	Length, ft.	Outlet Bypass			
Design Temperature, °F				Wall Thickness, in		Blade Type			
Corrosion Allow, in.				No. of Tubes/Coil	Pitch, in.	Signal to Supply			
ASME Code Stamp				Fin (Matl/Type)		MISCELLANEOUS			
NOZZLE	No.	Size, in	Rating & Facing	O.D., in.	No./Inch	Fan Guards Yes		Hail Guards	No
In-Out				Stock Thickness, in.		Bug Screens		No	

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HEADER DESIGN REMARKS

GENERAL		NOZZLES				MATERIAL REQ'MT / TESTING	
Nitrogen Purge	Yes	Flange Finish		125-250 AARH		Flange	None
Slide Pads (Type)	Fluorgold Teflon	Flange Gaskets		Non-Asbestos		Pipe	N/A
Slide Pad Location	All Headers	Nozzle Cover		1/4" steel w/rubber gskt		Transition	Seamless
Lethal Design	No					Plate	None
Total Header Movement	0.625"	Conn.	Location			Tube	Eddy Current per SA-450
Thrust Blocks	No	Vent	Outlet Header (set-on)			Plug	None
Weld Maps	On Header Detail Drawing	Drain	Inlet Header (set-on)			Plug Type	Shoulder (bar stock)
TEMA	No	Press.				Mat'l Origin	Domestic/Foreign
NACE	No	Temp.					
		Clean.					
HEADER COATING		Coats	DFT (mils)	Color	Header Plate	Minimum Thickness, in	
Surface Prep	SSPC-SP10				Tube Sheet	API 661 (06)	
Primer	S/W Zinc Clad II LV	1	3.0-5.0	Gray-Green	Plug Sheet	API 661 (06)	
Intermediate	Recoatable Epoxy	1	4.0-6.0	Light Gray	Top and Bot.	API 661 (06)	
Finish	Acrolon 218 HS	1	3.0-6.0	White	End Plate	API 661 (06)	

SHOP INSPECTION & TEST PLAN

MATERIAL INSPECTION / TESTING		WELD INSPECTION			BUNDLE TESTING	
Mill Test Reports	Yes	Weld PMI	None		Hydrostatic Test	1.5 X MAWP
Mill Certs.	Yes	Radiograph	Spot		Submerged Test	No
PWHT	Yes	Part / Stiff Weld NDE	None		Soap Test	No
Mat'l PMI	None	Tube End Weld NDE	Air and Soap Test		ASSEMBLY & BAY TESTING	
Nozzle Cut Out	MT	Tube Mock-Up	No		Preassembly	Base Bay [6]
Plate Edges	MT	Hardness Test	API 661 (06)		Disassembly	See Remarks [5]
		Welds	Root Pass	Final	Mechanical Run-In	Yes
		Ext. Hdr Weld	None	MT	Noise	2 Point Noise Test
		Nozzle to Header	None	MT	Fan Performance	No
		Flange to Pipe	None	MT	Vibration	API-661

SPECIALS

WALKWAY & LADDERS		CONTROLS - AIR FAILURE		LOUVER ACTUATORS	
Design Specification	Cust Standard	AV Fans	N/A	Outlet	N/A
Header WW Width	2'-6 (762mm)	Outlet Louvers	N/A	By Pass	N/A
Mech. WW Width	N/A	Inlet Louvers	N/A	Inlet	N/A
Outrigger Width	N/A	By Pass Louvers	N/A	Manual Over-ride	N/A
Side Access Width	N/A	ACCESSORIES			
Type Handrails	Pipe	ND Removable Fan Assembly	N/A	Motor Starters	N/A
Type Grating	1-1/4"x3/16" Serrated	Natural Draft Stack	N/A	Motor Start-Stop Switch	N/A
Type Gates	Intrepid Double Bar	Spreader Bar	N/A	Motor Removal Beams	In Plenum
ND Maint. Grids	No	Fireproofing Clips	N/A	Metric Drawings	No
SHIPMENT		Spare Parts	Start-up & 2 years	VFD Controls	N/A
Width Limitation	None Specified			Grease Lines	316 Stainless Steel
Weight Limitation	None Specified	Unit Support Beam	No	Fan Shafts	AISI 1144 Stressproof
Bundle Covers	Yes	Civil Eng. Stamp	N/A	Anti-Windmill Device	No
Crating	No	Access Door	N/A		

REMARKS

[1] Extended lube lines to the columns shall be provided. [2] Fans shall be dynamically balanced. [3] Wind skirts shall be provided around the units. [4] 2.2 m clearance shall be provided below the fan rings. [5] Trial fit up of walkways, ladders & substructure & disassembled to base bay. [6] Disassemble to base bay with windskirts.

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ADDITIONAL REMARKS

[7] Spare parts :

Plugs - 20%

Belts and bearings (Motors and Drives) - 100%

(1) Set of blades for each size / type of fan.