STYRENE PARK OFFSITE

Document Title:

Air Cooler Thermal Data Sheet

R0	22-JUN-2024	IFA	H.Torshizi	H.Torshizi	B.Sheikhbeigi
Rev.	**Issued Date**	**DESCRIPTION**	**PREPARED**	**CHECKED**	**APPROVED**

REVISION RECORD SHEET

Page	Revisions								Page	Revisions						
	R0	R1	R2	R3	R4	R5	R6			R0	R1	R2	R3	R4	R5	R6
1	X								41							
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API 661 Air-Cooled Heat Exchanger - Specification Sheet

Based on GEA Btt-Batignolles Technologies Thermiques FRANCE

Job No.		Item No.	Air Cooler
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Date	Jun 22, 2024	Revision	R0
Proposal No.	02612N	Contract No.	
Inquiry No.		Order No.	
		No. of Item	1

Manufacturer		Damafin Thermal Technology Co.	Heat exchanged	(kW)	257.
Model no.			Surface/Item-Finned tube	(m2)	1579.2
Customer		ENER Teknoloji	Bare tube	(m2)	68.101
Plant location			MTD, Eff.	(Deg. C)	6.8
Service			Transfer rate-Finned	(W/m2-K)	25.56
Type draft		FORCED	Bare tube, service	(W/m2-K)	592.72
Bay size (WxL)	(m)	2.65 x 6.4	Bare tube, clean	(W/m2-K)	679.11
No. of bays/Items		1			

Basic design data

Pressure design code	ASME VIII div 1 + API 661	Structural code	UBC 97
Tube bundle code stamped	No.	Flammable service	Yes.
Heating coil code stamped	No.	Lethal/toxic service	No.

Performance Data - Tube Side

					In		Out	
Fluid name		Propane						
Total fluid entering	(kg/hr)	3015.5	Total flow rate (Liq/Vap)	(kg/hr)	0.0000 /	3015.5	3015.5 /	0.0000
Dew/bubble point	(Deg. C)	/	Water/Steam	(kg/hr)	0.0000 /	0.0000	0.0000 /	0.0000
	(Deg. C)		Noncondensables	(kg/hr)		0.0000		0.0000
Latent heat	(kJ/kg)		Molecular Wt. (Vap/Non-cond)		/		/	
Inlet pressure	(bar)	19.800	Density (Liq/Vap)	(kg/m3)	435.84 /	40.275	435.92 /	46.077
Pressure drop (All/Calc)	(bar)	0.100 / 0.016	Specific heat (Liq/Vap)	(kJ/kg-C)	3.6067 /	2.2738	3.6051 /	2.3921
Velocity (Allow/Calc)	(m/s)	/ 0.85	Thermal cond. (Liq/Vap)	(W/m-C)	0.0764 /	0.0253	0.0764 /	0.0238
Inside fouling resistance (m2-K/W)		0.000170	Viscosity (Liq/Vap)	(cP)	0.0730 /	0.0106	0.0730 /	0.0103
		In / Out						
Temperature	(Deg. C)	73.50 / 56.32						

Performance Data - Air Side

Air inlet temperature	(Deg. C)	48.00	Face velocity	(m/s)	3.15
Air flow rate/item	(m3/s)	45.529	Minimum design ambient temp.	(Deg. C)	5.00
Mass velocity	(kg/s-m2)		Altitude	(m)	20.000
Air outlet temperature	(Deg. C)	52.28	Static pressure	(Pa)	102.95
Air flow rate/fan	(m3/s)	26.879			

Design, Material, and Construction

Design pressure	(barG)	22 + F.V	**Heating Coil**		NO.
Test pressure	(barG)		No. of tubes		
Design temperature	(Deg. C)	120.00	Tube outside diameter	(mm)	
Min. design metal temp.	(Deg. C)		Tube material		
Tube bundle			Fin material and type		
Size (WxL)	(m)	2.5 X 6.4	Fin thickness	(mm)	
No./Bay		1	ASME Code, Sec. VIII, Div. 1		
Number of tube rows		4	Heating fluid		
Bundles in parallel		1	Heating fluid flow rate	(kg/hr)	
Bundles in series			Temperature (In/Out)	(Deg. C)	/
Structure mounting		Grade	Inlet pressure	(bar)	
Pipe rack beams			Pressure drop (All/Calc)	(kPa)	/
Ladders, walkways, platforms			Design temperature	(Deg. C)	
Structure surface prep.			Design pressure	(bar)	
Header surface prep.			Inlet/Outlet nozzle		/
Louver		NO.	**Header**		
Material			Type		Plug
Action control			Material		SA-516 Gr70(N)
Action type			Corrosion Allowance	(mm)	3
			No. of passes		4
			Tube / Tubesheet		Strength weld

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Date	Jun 22, 2024	Revision	R0
Proposal No.	02612N	Contract No.	
Inquiry No.		Order No.	

Design, Material, and Construction (continued)

Header (continued)			No./Bundle		140
Slope / Split	1% on last pass / No		Length	(m)	6.096
Plug material	SA 350 LF2 CL.1		Pitch	(mm)	69.850
Gasket material	Soft Iron		Layout		Triangular
Nozzle	No.	Size, (in) / Rating/Facing	**Fin**		
Inlet	1	4 / #300	Type		Extruded
Outlet	1	2 / #300	Material		Aluminum
Vent			Thickness (Base / Tip)	(mm)	1 / 0.24
Drain			Selection temp.	(C)	
Chemical Cleaning			Outside diameter	(mm)	57.150
Min. Wall Thk.			Fin density	(fin/meter)	433.1
Tube			ASME Code, Sec. VIII, Div. 1		
Material	SA-334 6		Customer Specifications		
Tube outside diameter	(mm)	25.400			
Min wall thickness	(mm)	1.651			

Mechanical Equipment

Fan			RPM		1500
Manufacturer	Axial Fans Int Srl (or equivalent)		Service factor		
No./Bay		2	Enclosure		Exec / IP55
RPM	(Revs/min.)		Voltage		400
Diameter	(ft)	7	Phase		3
No. of blades			Cycle		50
Angle	(degrees)		Fan noise level	(dB)	max 85
Pitch adjustment		100% Manual	**Speed Reducer**		
Blade material		Aluminium	Type		V- belt
Hub material		Manufacturer Standard	Manufacturer		
@design temp	(kW)		No./Bay		2
@min. ambient temp			Service factor		
Tip speed			Speed ratio		
Driver			Support		
Type		Electrical	Vib. switch		YES
Manufacturer		OME ELECTRIC OR AVL	Enclosure		
No./Bay					
Driver	(kW)	7.5			

Controls - Air Side

Air recirculation			Louvers		
Degree control of outlet process temp.			Positioner		
(Max. Cooling),+/-	/		Signal air pressure (bar)		
Action on control signal failure			From	To	
Fan pitch			From	To	
Louvers			Supply air pressure (bar)		
Actuator air supply			From	To	
Fan			From	To	

Shipping

Plot area (WxL)	(m)	2.65 x 6.4	Total weight, Dry / Wet	(Kg) (Based On HTRI)	11,800 / 12,300
Bundle weight	(kg)		Shipping	(kg)	
Bay	(kg)				

1) STD. nominated power.