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	February 27, 2024	Revision	B01
Proposal No.		Contract No.	
Inquiry No.		Order No.	
		No. of Item	1

Manufacturer			Heat exchanged	(kW)	252.
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)	26.509
Type draft		FORCED	Bare tube, service	(W/m2-K)	614.72
Bay size (WxL)	(m)	2.65 x 6.4	Bare tube, clean	(W/m2-K)	708.15
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	No.
Heating coil code stamped	No.	Lethal/toxic service	No.

Performance Data - Tube Side

					In	Out
Fluid name		propane				
Total fluid entering	(kg/hr)	3089.2	Total flow rate (Liq/Vap)	(kg/hr)	0.0000 / 3089.2	3089.2 / 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)	19.867	Density (Liq/Vap)	(kg/m3)	435.50 / 42.251	435.58 / 46.266
Pressure drop (All/Calc)	(bar)	0.200 / 0.015	Specific heat (Liq/Vap)	(kJ/kg-C)	3.6130 / 2.3072	3.6115 / 2.3963
Velocity (Allow/Calc)	(m/s)	/ 0.83	Thermal cond. (Liq/Vap)	(W/m-C)	0.0763 / 0.0248	0.0763 / 0.0239
Inside fouling resistance (m2-K/W)		0.000170	Viscosity (Liq/Vap)	(cP)	0.0728 / 0.0105	0.0729 / 0.0103
		In / Out				
Temperature	(Deg. C)	67.94 / 56.66				

Performance Data - Air Side

Air inlet temperature	(Deg. C)	48.00	Face velocity	(m/s)	3.25
Air flow rate/item	(m3/s)	46.975	Minimum design ambient temp.	(Deg. C)	5.00
Mass velocity	(kg/s-m2)		Altitude	(m)	20.000
Air outlet temperature	(Deg. C)	52.06	Static pressure	(Pa)	109.07
Air flow rate/fan	(m3/s)	27.733			

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		Seal Weld + Heavy Expanded

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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	6 / #300	Type		Extruded
Outlet	2	4 / #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			Type		V- belt
Hub material			Manufacturer		
@design temp	(kW)		No./Bay		2
@min. ambient temp			Service factor		
Tip speed			Speed ratio		
Driver			Support		
Type			Vib. switch		YES
Manufacturer			Enclosure		
No./Bay					
Driver (1)	(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)	11,000 / 11,400
Bundle weight	(kg)		Shipping	(kg)	
Bay	(kg)				

1) STD. nominated power.