

**API 661 Air-Cooled Heat Exchanger - Specification Sheet**



Based on  
**GEA**  
Btt-Batignolles  
Technologies  
Thermiques  
FRANCE

Job No.	_____	Item No.	_____	Air Cooler
Page	Page 1 of 2	By	_____	
Date	April 29, 2024	Revision	_____	B04
Proposal No.	02612N	Contract No.	_____	
Inquiry No.	_____	Order No.	_____	
		No. of Item	_____	1

Manufacturer	Damafin Thermal Technology Co.	Heat exchanged	(kW)	246.
Model no.	_____	Surface/Item-Finned tube	(m <sup>2</sup> )	1579.2
Customer	ENER Teknologi	Bare tube	(m <sup>2</sup> )	68.101
Plant location	_____	MTD, Eff.	(Deg. C)	6.8
Service	_____	Transfer rate-Finned	(W/m <sup>2</sup> -K)	26.317
Type draft	FORCED	Bare tube, service	(W/m <sup>2</sup> -K)	610.28
Bay size (WxL)	(m) 2.65 x 6.4	Bare tube, clean	(W/m <sup>2</sup> -K)	702.27
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**

Fluid name	Propane		In	Out
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) 19.867	Density (Liq/Vap)	(kg/m <sup>3</sup> ) 435.50 / 42.251	435.58 / 46.265
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) _____ / 0.81	Thermal cond. (Liq/Vap)	(W/m-C) 0.0763 / 0.0248	0.0763 / 0.0239
Inside fouling resistance (m <sup>2</sup> -K/W)	0.000170	Viscosity (Liq/Vap)	(cP) 0.0728 / 0.0105	0.0729 / 0.0103
Temperature	(Deg. C) In 67.94 / Out 56.66			

**Performance Data - Air Side**

Air inlet temperature	(Deg. C) 48.00	Face velocity	(m/s) 3.15
Air flow rate/item	(m <sup>3</sup> /s) 45.529	Minimum design ambient temp.(Deg. C)	5.00
Mass velocity	(kg/s-m <sup>2</sup> ) _____	Altitude	(m) 20.000
Air outlet temperature	(Deg. C) 52.09	Static pressure	(Pa) 102.90
Air flow rate/fan	(m <sup>3</sup> /s) 26.879		

**Design, Material, and Construction**

Design pressure	(barG) 22 + F.V	<b>Heating Coil</b>	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	_____
<b>Tube bundle</b>		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	_____ / _____
<b>Louver</b>	NO.	<b>Header</b>	
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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**Design, Material, and Construction (continued)**

<b>Header (continued)</b>				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
<b>Nozzle</b>	No.	Size, (in)	Rating/Facing	<b>Fin</b>	
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
<b>Tube</b>				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**

<b>Fan</b>				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	<b>Speed Reducer</b>	
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	
<b>Driver</b>				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. (Max. Cooling), +/-			Positioner		
Action on control signal failure			Signal air pressure (bar)		
Fan pitch			From		To
Louvers			From		To
Actuator air supply			Supply air pressure (bar)		
Fan			From		To
			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.