



Toase-eh Park Sanati Gohar Ofogh
Petrochemical Co.
**CONCEPTUAL, BASIC and DETAIL DESIGN
ENGINEERING OF STYRENE PARK OFFSITE**



Document Title: Air Cooler Thermal Data Sheet

Document No.: EI027-DMF-VD-ME-DSH-002

Rev. R1

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STYRENE PARK OFFSITE

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Air Cooler Thermal Data Sheet

Rev.	Issued Date	DESCRIPTION	PREPARED	CHECKED	APPROVED
R1	1-JUL-2024	IFA	H.Torshizi	H.Torshizi	B.Sheikhbeigi
R0	22-JUN-2024	IFA	H.Torshizi	H.Torshizi	B.Sheikhbeigi



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REVISION RECORD SHEET

Page	Revisions							Page	Revisions						
	R0	R1	R2	R3	R4	R5	R6		R0	R1	R2	R3	R4	R5	R6
1	X	X						41							
2	X	X						42							
3	X	X						43							
4	X							44							
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API 661 Air-Cooled Heat Exchanger - Specification Sheet



Based on
GEA
Btt-Batignolles
Technologies
Thermiques
FRANCE

Job No. _____
Page Page 1 of 2
Date June 30, 2024
Proposal No. 02612N
Inquiry No. _____

Item No. Air Cooler
By _____
Revision R1
Contract No. _____
Order No. _____
No. of Item 2

Manufacturer	Damafin Thermal Technology Co.	Heat exchanged (kW)	257.
Model no.		Surface/Item-Finned tube (m ²)	1579.2
Customer	ENER Teknoloji	Bare tube (m ²)	68.101
Plant location		MTD, Eff. (Deg. C)	6.8
Service		Transfer rate-Finned (W/m ² -K)	25.561
Type draft	FORCED	Bare tube, service (W/m ² -K)	592.73
Bay size (WxL) (m)	2.65 x 6.4	Bare tube, clean (W/m ² -K)	679.13
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		
Latent heat (kJ/kg)		Noncondensables (kg/hr)	0.0000	0.0000	0.0000		
Inlet pressure (bar)	19.800	Molecular Wt. (Vap/Non-cond)	/	/			
Pressure drop (All/Calc) (bar)	0.100 / 0.018	Density (Liq/Vap) (kg/m ³)	435.84 / 40.275	435.93 /	46.071		
Velocity (Allow/Calc) (m/s)	/ 0.85	Specific heat (Liq/Vap) (kJ/kg-C)	3.6067 / 2.2738	3.6049 /	2.3920		
Inside fouling resistance (m ² -K/W)	0.000170	Thermal cond. (Liq/Vap) (W/m-C)	0.0764 / 0.0253	0.0764 /	0.0238		
Temperature (Deg. C)	In 73.50 / Out 56.32	Viscosity (Liq/Vap) (cP)	0.0730 / 0.0106	0.0730 /	0.0103		

Performance Data - Air Side

Air inlet temperature (Deg. C)	48.00	Face velocity (m/s)	3.15
Air flow rate/item (m ³ /s)	45.529	Minimum design ambient temp (Deg. C)	5.00
Mass velocity (kg/s-m ²)		Altitude (m)	20.000
Air outlet temperature (Deg. C)	52.28	Static pressure (Pa)	102.95
Air flow rate/fan (m ³ /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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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)	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 (1) (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.