



Based on
GEA
 Btt-Batignolles
 Technologies
 Thermiques
 F R A N C E

- Relative humidity should be as per project site condition
- Air inlet temperature at winter is 37 C
- Cooler should be designed for 30% turn down with below design conditions:
- 1- Inlet propane temperature is 73 C
- 2- Flowrate is 1219 kg/hr
- Please provide native HTRI file

Air Cooler

 B00

| | | | |
|--------------------|--------------------------------|--|--------|
| | Inquiry No. _____ | Order No. _____ | |
| | | No. of Item | 1 |
| Manufacturer | Damafin Thermal Technology Co. | Heat exchanged (kW) | 252. |
| Model no. | | Surface/Item-Finned tube (m ²) | 1443.9 |
| Customer | ENER Teknoloji Co. | Bare tube (m ²) | 62.264 |
| Plant location | | MTD, Eff. (Deg. C) | 6.9 |
| Service | | Transfer rate-Finned (W/m ² -K) | 25.983 |
| Type draft | FORCED | Bare tube, service (W/m ² -K) | 602.53 |
| Bay size (WxL) (m) | 2.35 X 6.4 | Bare tube, clean (W/m ² -K) | 696.17 |
| 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 | | | | | |
|---|----------------------------------|--|-----------------------------|-----------------|--|
| Fluid name | | Propane | | | |
| Total fluid entering (kg/hr) | 3089.2 | Total flow rate (Liq/Vap) (kg/hr) | In Out | | |
| Dew/bubble point (Deg. C) | / | Water/Steam (kg/hr) | 0.0000 / 3089.2 | 3089.2 / 0.0000 | |
| | | 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 ³) | 435.50 / 42.251 | 435.62 / 46.245 | |
| Pressure drop (All/Calc) (bar) | 0.200 / 0.022 | Specific heat (Liq/Vap) (kJ/kg-C) | 3.6130 / 2.3072 | 3.6108 / 2.3958 | |
| Velocity (Allow/Calc) (m/s) | / 0.99 | Thermal cond. (Liq/Vap) (W/m-C) | 0.0763 / 0.0248 | 0.0763 / 0.0239 | |
| Inside fouling resistance (m ² -K/W) | 0.000170 | Viscosity (Liq/Vap) | 0.0729 / 0.0103 | | |
| Temperature (Deg. C) | In Out | | | | |
| | 67.94 56.64 | | | | |

calculated face velocity to be less than 4 m/s

| Performance Data - Air Side | | | |
|--|--------|--------------------------------------|--------|
| Air inlet temperature (Deg. C) | 48.00 | Face velocity (m/s) | 4.00 |
| Air flow rate/item (m ³ /s) | 53.067 | Minimum design ambient temp.(Deg. C) | -17.78 |
| Mass velocity (kg/s-m ²) | | Altitude (m) | 0.000 |
| Air outlet temperature (Deg. C) | 51.92 | Static pressure (Pa) | 175.45 |
| Air flow rate/fan (m ³ /s) | 28.998 | | |

22 barg and FV

| Design, Material, and Construction | | | |
|------------------------------------|-----------|---------------------------------|-----------------|
| Design pressure (barG) | 23.000 | 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) | 2.2 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 temp | |
| Structure surface prep. | | Design pressure | |
| Header surface prep. | | Inlet/Outlet | |
| Louver | NO. | Header | |
| Material | | Type | Plug |
| Action control | | Material | SA-516 Gr60, 70 |
| Action type | | Corrosion Allowance (mm) | 3 |
| | | No. of passes | 4 |
| | | Tube / Tubesheet | Expanded |

Please use grade 70N. It should be noted that MDMT is -45

seal weld + Heavy Expanded

API 661 Air-Cooled Heat Exchanger - Specification Sheet



Based on
GEA
Btt-Batignolles
Technologies
Thermiques
FRANCE

Job No. _____
Page _____ Page 2 of 2
Date _____ February 24, 2024
Proposal No. _____ 02612N
Inquiry No. _____

Item No. _____ Air Cooler
By _____
Revision _____ B00
Contract No. _____
Order No. _____

Design, Material, and Construction (continued)

| | | | | | | | |
|---------------------------|---------|------------|---------------|------------------------|-------------|------------|-----|
| Header (continued) | | | | SA 350 LF2 CL.1 | | No./Bundle | 128 |
| Slope / Split | No / No | | | Length | (m) | 6.096 | |
| Plug material | | | SA-105 | Pitch | (mm) | 66.670 | |
| Gasket material | | | Soft Iron | Layout | | Triangular | |
| Nozzle | No. | Size, (in) | Rating/Facing | Fin | | | |
| Inlet | 1 | 6 | #300 | Type | | Extruded | |
| Outlet | 1 | 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 Co | | | |
| Material | | | SA-334 6 | Customer | | | |
| Tube outside | | | 25.400 | | | | |
| Min wall thic | | | 2.108 | | | | |

SA 350 LF2 CL.1

SA-105

1.65. This deviation from API is acceptable

Motor should be Exec Suitable for Zone 2

Mechanical Equipment

| | | | | | |
|--------------------|------------------------------------|------------------------------------|--|----------------------|------------------|
| Fan | | Axial Fans Int Srl (or equivalent) | | RPM | 1500 |
| Manufacturer | Axial Fans Int Srl (or equivalent) | | | Service factor | |
| No./Bay | 2 | | | Enclosure | Safe Area / IP55 |
| RPM | (Revs/min.) | | | Voltage | 400 |
| Diameter | 6 | | | Phase | 3 |
| No. of blades | Please specify | | | 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 | 1.8 |
| Tip speed | | | | Speed ratio | |
| Driver | | | | Support | |
| Type | Please specify | | | Vib. switc | YES |
| Manufacturer | Please specify | | | Enclosure | |
| No./Bay | Please specify | | | | |
| Driver | (kW) 11 | | | | |

Please specify

Please specify

1.8

motor power to be suitable for MDMT 5C

Please specify

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) | 2.35 X 6.4 | Total | (kg) | (Based On HTRI) | 10,500 |
| Bundle weight | (kg) | | Shipping | (kg) | | |
| Bay | (kg) | | | | | |

1) Std , Nominated Power.