



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



Document Title: Condenser Data Sheet

Document No.: EI027-HSE-VD –ME–DSH–004- R0

Rev. R0

Page 1 of 4

STYRENE PARK OFFSITE

Commented:

Please to be implemented and endorsed acc to below Engineering Document :

- PFD For STYREN (EI027-000-ED-PR-PFD-501-R3)

- P&ID For STYREN (EI027-000-ED-PR-PID-522-R4)

Document Title:

Condenser Data Sheet

| Rev. | Issued Date | DESCRIPTION | PREPARED | CHECKED | APPROVED |
|------|-------------|-------------|----------|---------|----------|
| R0 | 16-03-2024 | IFA | F.sh | M.O | A.M |



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



Document Title: Condenser Data Sheet

Document No.: EI027-HSE-VD –ME–DSH–004- R0

Rev. R0

Page 2 of 4

REVISION RECORD SHEET

| Page Page | Revisions | | | | | | | Page | Revisions | | | | | | |
|--------------|-----------|----|----|----|----|----|----|------|-----------|----|----|----|----|----|----|
| | R0 | R1 | R2 | R3 | R4 | R5 | R6 | | R0 | R1 | R2 | R3 | R4 | R5 | R6 |
| 1 | X | | | | | | | 41 | | | | | | | |
| 2 | X | | | | | | | 42 | | | | | | | |
| 3 | X | | | | | | | 43 | | | | | | | |
| 4 | X | | | | | | | 44 | | | | | | | |
| 5 | | | | | | | | 45 | | | | | | | |
| 6 | | | | | | | | 46 | | | | | | | |
| 7 | | | | | | | | 47 | | | | | | | |
| 8 | | | | | | | | 48 | | | | | | | |
| 9 | | | | | | | | 49 | | | | | | | |
| 10 | | | | | | | | 50 | | | | | | | |
| 11 | | | | | | | | 51 | | | | | | | |
| 12 | | | | | | | | 52 | | | | | | | |
| 13 | | | | | | | | 53 | | | | | | | |
| 14 | | | | | | | | 54 | | | | | | | |
| 15 | | | | | | | | 55 | | | | | | | |
| 16 | | | | | | | | 56 | | | | | | | |
| 17 | | | | | | | | 57 | | | | | | | |
| 18 | | | | | | | | 58 | | | | | | | |
| 19 | | | | | | | | 59 | | | | | | | |
| 20 | | | | | | | | 60 | | | | | | | |
| 21 | | | | | | | | 61 | | | | | | | |
| 22 | | | | | | | | 62 | | | | | | | |
| 23 | | | | | | | | 63 | | | | | | | |
| 24 | | | | | | | | 64 | | | | | | | |
| 25 | | | | | | | | 65 | | | | | | | |
| 26 | | | | | | | | 66 | | | | | | | |
| 27 | | | | | | | | 67 | | | | | | | |
| 28 | | | | | | | | 68 | | | | | | | |
| 29 | | | | | | | | 69 | | | | | | | |
| 30 | | | | | | | | 70 | | | | | | | |
| 31 | | | | | | | | 71 | | | | | | | |
| 32 | | | | | | | | 72 | | | | | | | |
| 33 | | | | | | | | 73 | | | | | | | |
| 34 | | | | | | | | 74 | | | | | | | |
| 35 | | | | | | | | 75 | | | | | | | |
| 36 | | | | | | | | 76 | | | | | | | |
| 37 | | | | | | | | 77 | | | | | | | |
| 38 | | | | | | | | 78 | | | | | | | |
| 39 | | | | | | | | 79 | | | | | | | |
| 40 | | | | | | | | 80 | | | | | | | |



| | | | | |
|---|----------------|--------------------------|----------|--------|
| Model no. | | Heat exchanged | (kW) | 252. |
| Customer | | Surface/Item-Finned tube | (m2) | 1579.2 |
| Plant location | | Bare tube | (m2) | 68.101 |
| Service | | MTD, Eff. | (Deg. C) | 6.8 |
| Type draft Please clarified | FORCED | Transfer rate-Finned | (W/m2-K) | 26.509 |
| Bay size (WxL) | (m) 2.65 X 6.4 | Bare tube, service | (W/m2-K) | 614.72 |
| No. of bays/ | 1 | Bare tube, clean | (W/m2-K) | 708.15 |
| Items | | | | |

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) | 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 | (bara) | 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 |
| Temperature | (Deg. C) | In 67.94 | Out 56.66 | | | | |

Performance Data - Air Side

| | | | | | |
|------------------------|-----------|--|-----------------------------|----------|--------|
| Air inlet temperature | (Deg. C) | 48.00 | Face velocity | (m/s) | 3.25 |
| Air flow rate/item | (m3/s) | 46.975 | Minimum design ambient temp | (Deg. C) | 5.00 |
| Mass velocity | (kg/s-m2) | Shall be recheck based on max ambient temperature | Altitude | (m) | 20.000 |
| Air outlet temperature | (Deg. C) | 52.06 | Static pressure | (Pa) | 108.40 |
| 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 | Strength weld |



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 | | | Fin | |
| Inlet | No. | Size, (in) | Rating/Facing | Type |
| Outlet | 1 | 6 | #300 | Extruded |
| Vent | 2 | 4 | #300 | Material |
| Drain | | | Suitable coating shall be considered such as Heresite | |
| Chemical Cleaning | | | Thickness (Base / Tip) (mm) | 1 / 0.24 |
| Min. Wall Thk. | | | Selection temp. (C) | |
| Tube | | | Outside diameter (mm) | 57.150 |
| Material | Please specify pipe schedule | | SA-334 6 | Fin density (fin/meter) |
| Tube outside diameter (mm) | | | 25.400 | 433.1 |
| Min wall thickness (mm) | | | 1.651 | ASME Code, Sec. VIII, Div. 1 |
| | | | Customer Specifications | |
| | | | For flexibility of system, it is better consider more fans | |

Mechanical Equipment

| | | | | |
|--------------------|------------------------------------|-------------|----------------------|---|
| Fan | | | RPM | 1500 |
| Manufacturer | Axial Fans Int Srl (or equivalent) | | Service factor | |
| No./Bay | 2 | | Enclosure | Exec / IP55 |
| RPM | Shall be specified | (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 | VFD shall be considered to control the condenser fans |
| Blade material | | | Type | Direct drive should be considered |
| Hub material | | | Manufacturer | V- belt |
| @design temp (kW) | | | No./Bay | 2 |
| @min. ambient temp | | | Service factor | |
| Tip speed | | | Speed ratio | |
| Driver | | | Support | |
| Type | Shall be specified | | Vib. switch | YES |
| Manufacturer | | | 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.