

Welded plate heat exchangers

Manufactured by Vahterus – Engineered by Kapp

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KAPP

CONSULTANTS IN HEAT TRANSFER



Plate & Shell Heat Exchangers



Plate & Shell

Vahterus Plate & Shell (PSHE) Heat Exchangers combine the benefits of traditional heat exchangers. Utilising a fully welded plate pack within a strong shell construction makes Vahterus PSHE the most compact, thermally efficient and cost effective

heat transfer solution in many applications. As a result of our innovative R&D, Vahterus PSHE is renowned as an effective, durable and compact solution in many instances where traditional Shell & Tube heat exchangers would be utilised.

Fully Welded Plate & Shell Technology

The Perfect Solution

The Best of Both Worlds

Vahterus PSHE combines the benefits of Plate & Frame and Shell & Tube heat exchangers.

Plate & Frame:

- + High Heat Transfer
- + Compact
- + Low Fouling
- + Close Approach Temperatures
- Pressure Limitations
- Temperature Limitations
- Gaskets

Shell & Tube:

- + High Pressure
- + High Temperature
- + No Gaskets
- + Low Pressure Drop
- Low Heat Transfer
- Large Size and Heavy Weight
- High Fouling



Plate & Shell

- + High Heat Transfer
- + Wide Pressure Range
- + Wide Temperature Range
- + No Gaskets
- + Compact
- + Low Fouling
- + Close Approach Temperatures

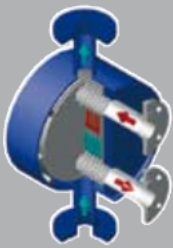


Plate & Shell, Fully Welded

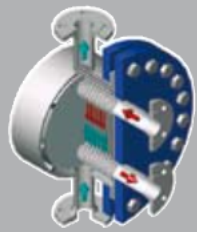


Plate & Shell, Openable

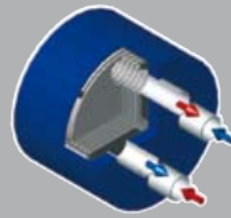
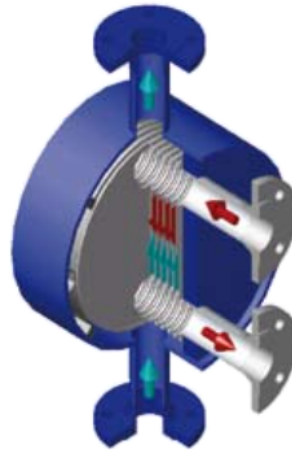


Plate & Shell, Compact

Plate & Shell Product Family:

- Universal Heat Exchanger
- Wide Capacity Range
- Design Pressures up to 200 bar
- Large Heat Transfer Area: 1 – 2000 m²/exchanger
- Applications:
 - Liquid/Liquid
 - Liquid/Gas
 - Gas/Gas
 - Condensers
 - Evaporators
 - Cascades
 - Multi-Phase / Multi-Component Systems



As the inventors and market leaders of Plate & Shell Technology, Vahterus PSHE is now used in many applications, across almost all industrial sectors. Using the thermal capabilities of corrugated plate technology, housed with a pressure vessel (shell), provides the user with a solution to many mechanical and operational issues, such as space and weight constraints. The flexibility of Vahterus PSHE can be demonstrated by the fact it can be operated in true counter-current flow (as shown above), co-current flow, by reversing either flow stream, or cross-flow, by simply moving the shell side nozzles to the side of the shell. The wide range of Vahterus PSHE plate sizes means that we can accommodate the needs of production environments ranging in scale from laboratory, to pilot plant, to full-scale production.

Plate & Shell, Fully Welded:

- Fully welded shell construction
- Available sizes: 2, 3, 4, 5, 7, 9 and 14

Plate & Shell, Openable:

- Easy to open and clean
- Available sizes: 2, 3, 4, 5, 7, 9 and 14

Plate & Shell, Compact:

- All connections in the end plate
- Available sizes: 3, 4, 5 and 7
- Minimum space requirement



Vahterus provides solutions for many heat transfer needs. We have considerable experience with heat transfer technology and continually invest in Research & Development.

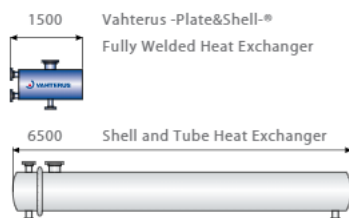
High quality, consistent and reliable products are a matter of principle to us.

Compact & Effective

Vahterus PSHE combines the benefits of Plate & Frame and Shell & Tube heat exchangers. PSHE can either be described as a fully welded, high integrity plate heat exchanger, with no gaskets; or a generic alternative to Shell & Tube, approx. 25% of the footprint, displaying both space and weight benefits.

Benefits of PSHE

- No Gaskets or Brazing
- High Integrity / Total Containment
- Strong and Safe Construction
- Unique Protection and Resistance to Thermal and Pressure Cycling
- Thermally Efficient
- Compact and Low Weight
- Flexible Construction
- Proven, Reliable Technology
- Low Fouling
- Minimal Maintenance Requirement
- Close Approach Temperatures



Technical Specification

Maximum Heat Transfer Area

- 2000 m²/exchanger

Mechanical Design

- Full vacuum to 200 bar possible
- -200 to +900°C

Quality Systems:

- ISO 9001:2000
- EN ISO 3834-2
- PED Module B+D
- ASME U Stamp
- OHSAS 18001
- ISO 14001



Approvals:

- PED
- ASME U Stamp
- SELO, China
- AD-2000 HP0
- Germanischer Lloyd
- Lloyd's Register
- R.I.N.A
- ABS Europe Ltd.
- Bureau Veritas
- DNV

Materials:

| Shell: | Plates: |
|-------------|-------------|
| • St 35.8 | • AISI 316L |
| • AISI 316L | • AISI 904L |
| • AISI 904L | • 254 SMO |
| • 254 SMO | • Hastelloy |
| • Hastelloy | • Duplex |
| • Duplex | • Titanium |
| • etc. | • Nickel |
| | • etc. |

Main Data:

| | Area/plate, m ² | Plate side nozzles, DN | Shell side nozzles, DN |
|---------|----------------------------|------------------------|------------------------|
| PSHE 2 | 0.032 | 25 | 20-80 |
| PSHE 3 | 0.076 | 50 | 25-250 |
| PSHE 4 | 0.15 | 80 | 25-300 |
| PSHE 5 | 0.26 | 100 | 25-350 |
| PSHE 7 | 0.46 | 150 | 25-500 |
| PSHE 9 | 0.80 | 200 | 25-700 |
| PSHE 14 | 1.55 | 300 | 25-1000 |
| PRHE 12 | 1.00 | 200 | 25-1000 |



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Plate & Shell Heat Exchangers



Oil & Gas Industries

Vahterus Plate & Shell (PSHE) Heat Exchangers combine the benefits of traditional heat exchangers. Utilising a fully welded plate pack within a strong shell construction makes Vahterus PSHE the most compact, thermally efficient and cost effective

heat transfer solution in many Oil & Gas applications. PSHE is an ideal solution for Upstream Processes, such as Oil & Gas Production, Handling and Transportation; and Downstream Processes, such as Refineries and Petrochemical Plants.

Fully Welded Plate & Shell Technology

The Perfect Solution for Upstream and Downstream Processes



Oil & Gas Production

- Crude Oil Coolers and Heaters
- Gas Coolers and Heaters
- Amine Coolers
- Heat Exchangers for Dehydration Packages
- Refrigeration Applications

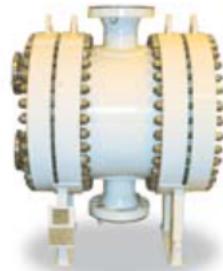
Oil & Gas Production



5530 kW Crude Oil Cooler operating on a Production Platform, PSHE 9HH-324/1/1 (titanium plates)



1465 kW Crude Oil Inlet Heater for a Crude Oil Testing Vessel, PSHE 5HH-412/1/1 (91 bar design)



2135 kW 2nd Stage Suction Cooler (sweet natural gas) operating on a Gas Production Platform, PSHE 7HH-256/1/1 (55 bar design, titanium plates, duplex shell)



190 kW Lean/Rich TEG Interchanger operating on a Gas Production Platform, PSHE 5HH-220/1/1 (duplex shell)



Oil & Gas Handling and Transportation

- Oil Heaters and Coolers
- LPG Coolers and Heaters
- LPG Condensers
- Heat Exchangers for Gas Treatment Facilities in Gas Terminals

Oil & Gas Handling and Transportation in Vessels and Terminals



1290 kW LPG Cargo Condenser on LPG Vessel, PSHE 9LL-222/1/1 (titanium plates)



4800 kW LPG Cargo Heater on LPG Vessel, PSHE 9LL-222/1/1 (titanium plates)



695 kW LNG BOG Heater in a Gas Terminal, PSHE 5LL-124/1/1 (-125 to 200°C Design Temperatures)



1200 kW Lean/Rich TEG Interchanger and 290 kW Liquid Ring Water Cooler for an Onshore Gas Terminal, PSHE 5HH-276/3/3 and PSHE 5HH-103/3/3

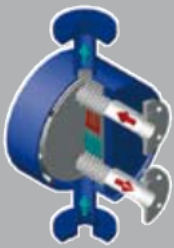


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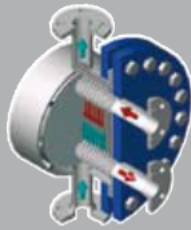


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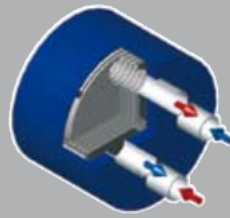


Plate & Shell, Compact

Refineries



1700 kW Gasoline Cooler in Oil Refinery, PSHE 7HH-354/1/1



480 kW Raffinate Stripper Bottoms Cooler, PSHE 5HH-148/1/1



5500 kW Gasoline Partial Evaporator in Oil Refinery, PSHE 5HH-544/4/4



Refineries

- Heaters
- Coolers
- Condensers
- Evaporators
- Cascade Evaporators

Petrochemical Plants



660 kW Benzene Condenser, PSHE 5HH-126/1/1



500-1000 kW Multipurpose Cooler, PSHE 5HH-106/1/1



Petrochemical Plants

- Heaters
- Coolers
- Condensers
- Economizers
- Evaporators



5400 kW Propane Condenser at Polymer Plant, PSHE 9HH-622/1/1



30 MW Effluent Economiser at Ethylene Oxide Plant, PSHE 14HH-968/2/2

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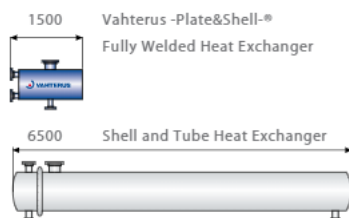
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