



## 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

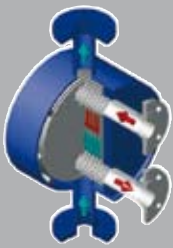


Plate & Shell, Fully Welded

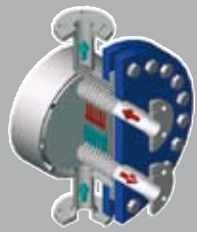


Plate & Shell, Openable

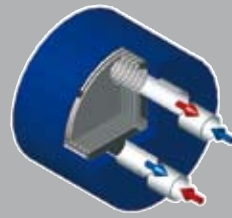
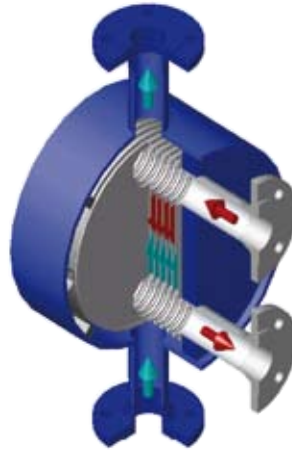


Plate & Shell, Compact

## Plate & Shell Product Family:

- Universal Heat Exchanger
- Wide Capacity Range
- Design Pressures up to 200 bar
- Large Heat Transfer Area: 1 – 2000 m<sup>2</sup>/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.

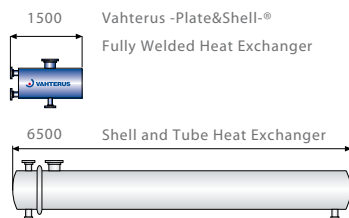
High quality, consistent and reliable products are a matter of principle to us.

## 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 m<sup>2</sup>/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 <sup>2</sup>	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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