



## 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



Plate & Shell, Fully Welded



Plate & Shell, Openable

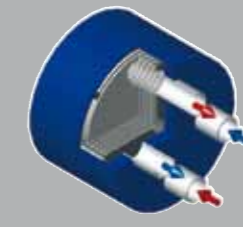


Plate & Shell, Compact

## 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 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, 6, 7, 9 and 14

### Plate & Shell, Openable:

- Easy to open and clean
- Available sizes: 2, 3, 4, 5, 6, 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

- 25 000 ft<sup>2</sup>/exchanger

#### Mechanical Design

- Full vacuum to 150 bar possible
- -164 to +899°C

### 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 6	0.35	125	25-500
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

### 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 & R Stamp
- SELO, China
- AD-2000 HPO
- Germanischer Lloyd
- Lloyd's Register
- R.I.N.A
- ABS Europe Ltd.
- Bureau Veritas
- DNV
- MKE South Korea

### Materials:

Shell:	Plates:
• AISI 316	• AISI 316L
• St 35.8/1 / P235GH	• Titanium, Grade 1
• P265GH	• C22
• P355NL2	• C276
• EN 1.4547, SMO254	• Nickel 201
• EN 1.4539, 904L	• EN 1.4547, SMO254
	• EN 1.4539, 904L
	• EN 1.4462, Duplex
	• other materials on request



**Vahterus Oy**  
Pruukintie 7  
FI-23600 Kalanti  
FINLAND  
Tel. +358 2 840 70  
Fax +358 2 840 7299  
sales@vahterus.com

**Vahterus Americas, LLC**  
PO Box 77264  
Charlotte  
NC 28271  
USA  
Tel. +1 704 846 5050  
sales.americas@vahterus.com

**Vahterus Deutschland GmbH**  
Magnolienweg 26  
63741 Aschaffenburg  
GERMANY  
Tel. +49 6021 181 700  
webmaster@vahterus.de

**Vahterus Heat Exchangers  
Shanghai Co., Ltd**  
Room 816, Enterprise Square  
Mei Yuan Road 228,  
Zha Bei District  
200070 Shanghai  
CHINA  
Tel. +86 21 638 00848 \*113  
sales\_china@vahterus.com

**Vahterus (UK) Ltd**  
12-14 Derby Road, Melbourne  
Derbyshire DE73 8FE  
UK  
Tel. +44 1332 863175  
vahterus.uk@vahterus.com

www.vahterus.com