



Plate & Shell Heat Exchangers



Energy Technology

Vahterus Plate & Shell (PSHE) and Plate & Ring (PRHE) Heat Exchangers combine the benefits of traditional heat exchangers. Utilising a fully welded plate pack within a strong shell construction makes Vahterus PSHE and PRHE the most compact, thermally efficient and cost effective heat transfer solution in many applications in the field of Energy Technology.

Applications

- District Heating and Cooling
- Feed Water Pre-Heating
- Vent, Surface, and Dumping Condensers
- Condensate Coolers/Excess Water Heaters
- Exhaust Gas Heat Recovery
- Oil Coolers and Heaters

Fully Welded Plate & Shell Technology

Perfect Solution for Energy Industry Processes

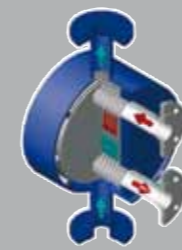


Plate & Shell, Fully Welded



Plate & Shell, Openable

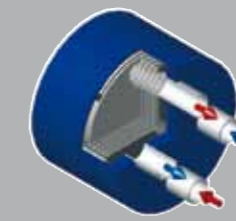


Plate & Shell, Compact

Compact and Efficient

Vahterus Plate & Shell (PSHE) and Plate & Ring (PRHE) Heat Exchangers combine the benefits of Plate Heat Exchangers and Shell & Tube Heat Exchangers. PSHE/PRHE can either be described as fully welded, high integrity heat exchangers, with no gaskets; or a generic alternative to Shell&Tube heat exchangers, approx 25% of the footprint, displaying both space and weight benefits.

In Powerplants, District Heating and Industrial Steam Applications, Vahterus Heat Exchangers are proven as a mechanically strong and thermally efficient solution. PSHE/PRHE are an ideal solution for both new installations, retrofits and/or replacement of conventional technologies (as shown below). They have also displayed environmental benefits for "Green Energy" applications, where customers have observed improved energy efficiencies and recovery/re-use of previous system energy losses.



Successful replacement of S&T Heat exchanger in powerplant with significant space saving. 16MW PSHE 9HH-348/1/1 heating district heating water 64°C to 110°C using 0.9bar steam.

Steam Applications

Vahterus PSHE provide many benefits in designing and operating steam systems. Utilising their compact and flexible shell construction, PSHE can be customised to individual steam applications, providing a powerful solution to the special requirements of steam systems. PSHE is easy to control on both the steam and condensate side; and since the heat transfer is very efficient, the control is fast and accurate, based on the compact nature (small volume) of the exchanger.



HVAC Condenser
950 kW Steam to water condenser
PSHE 3HH-44/1/1



22 MW Steam Generator
with PSHE 7HH-460/1/1
with droplet separation.
Primary side 38 barg steam
from boiler, secondary 19 barg
"black" steam



Vent Condenser
312 kW Condensate tank
venting with PSHE 3HH-120/2/1

Steam Applications

- Steam Condensers
- Dump/Surface Condensers
- Steam Generators / Clean Steam Generators
- Vent Condensers
- Thermal Oil Heaters
- Condensate Coolers
- Process Water/Liquid Heaters
- CIP-Water Heaters

Green Energy Applications

Vahterus PSHE, with their efficient heat transfer and high integrity, can provide solutions to improve energy efficiency and in alternative energy applications. The fully welded construction of Vahterus heat exchangers permits heat recovery from very demanding applications; notably when processing aggressive chemicals, and in applications at high pressures and/or high temperatures. As well as traditional heat recovery applications, Vahterus has experience in "green energy systems" like industrial heat pumps, landfill gas recovery, organic Rankine cycle and solar energy applications.



Industrial Heat Pump
in Meat Processing Plant



Gas drying Heat Exchanger
in Landfill Gas Recovery system



Heat Exchangers for Organic Rankine Cycle Applications:
Evaporators, Recuperators / Preheaters and Condensers

Power Plant & District Heating Applications

- Steam Condensers
- Feedwater Pre-Heaters
- District Heating Water Heaters
- Condensate Coolers
- Fuel Oil Heaters
- Gas Heaters and Coolers
- Vent Condensers
- Excess Water Heaters
- Continuous Blowdown Heat Recovery
- Steam Generators
- Steam De-Superheaters

Powerplant and District Heating Applications

In traditional Coal, Gas, Oil or Biomass fired powerplants Vahterus Plate&Shell and Plate&Ring Heat Exchangers are widely used.



Condensate Preheating
PSHE 14HH - 452/2/1
Condensate preheater,
24 MW, before feed water tank



District Heating
PSHE 9LL - 522/1/1
DH condenser, 55 MW



6 MW Process Water Heater
PSHE 5LL - 134/1/1
Process water heated with thermal oil



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

- 2 000 m²/exchanger

Mechanical Design

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

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 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



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