

**Custom-made Plate & Shell  
Heat Exchanger Solutions**

**VAHTERUS**

**We build  
heat exchanger  
solutions for the  
next generation.**

**The Original  
Plate & Shell  
Heat Exchanger.**

**First sustainable  
technology.  
Custom-made  
for your business.**





# Heat Exchanger Solutions for the Next Generation

Established in 1990, Vahterus is a Finnish family business focused on sustainable heat exchanger solutions. The company is named after its home village in the Vakka-Suomi region of Western Finland. Vahterus was founded in an old sheep farm set in beautiful countryside, and after almost three decades of business and growth, we're still proud to call the village our home.

Since the beginning, our mission has been to provide the best heat exchanger solutions for our customers. Without heat exchangers, industries and households would stop running. Heat exchanger efficiency is also fundamental in the ongoing energy transition. Vahterus is the inventor, pioneer and market leader in Plate & Shell Heat Exchanger (PSHE) technology.

Our heat exchangers are built for the next generation: they save energy, are compact in size, always custom-made, and because of their fully welded structure, they're durable enough for even the most demanding conditions.

We aim to maintain our position as forerunners in our field through continuous product development, automated production technology and strong application know-how. A significant part of our research and development is done together with our customers, finding solutions to each unique requirement. Several global patents and awards granted for our innovative design and environmentally friendly products are a token of the success of our work. With headquarters and manufacturing facilities in Finland, Vahterus has subsidiaries in the UK, Germany, China and the US.

**Vahterus heat exchanger technology is utilised in various demanding processes in the oil and gas, chemical and process, energy and refrigeration industries worldwide.**



## MADE IN FINLAND

We believe in thinking globally and acting locally. Our company was founded in the village of Vahterus in the Vakka-Suomi region of Western Finland. While we expand, our headquarters and manufacturing facilities remain in Finland, which is our way of breathing life into our home region.



## VALUES OF FAMILY BUSINESS

Qualities such as our Finnish roots, simplicity and meaningfulness, caring for the environment, reliability, trustworthiness, innovation and customer focus have always been fundamental to the way we think and act as a company. Pictured here are our founders Mauri and Sinikka Kontu.

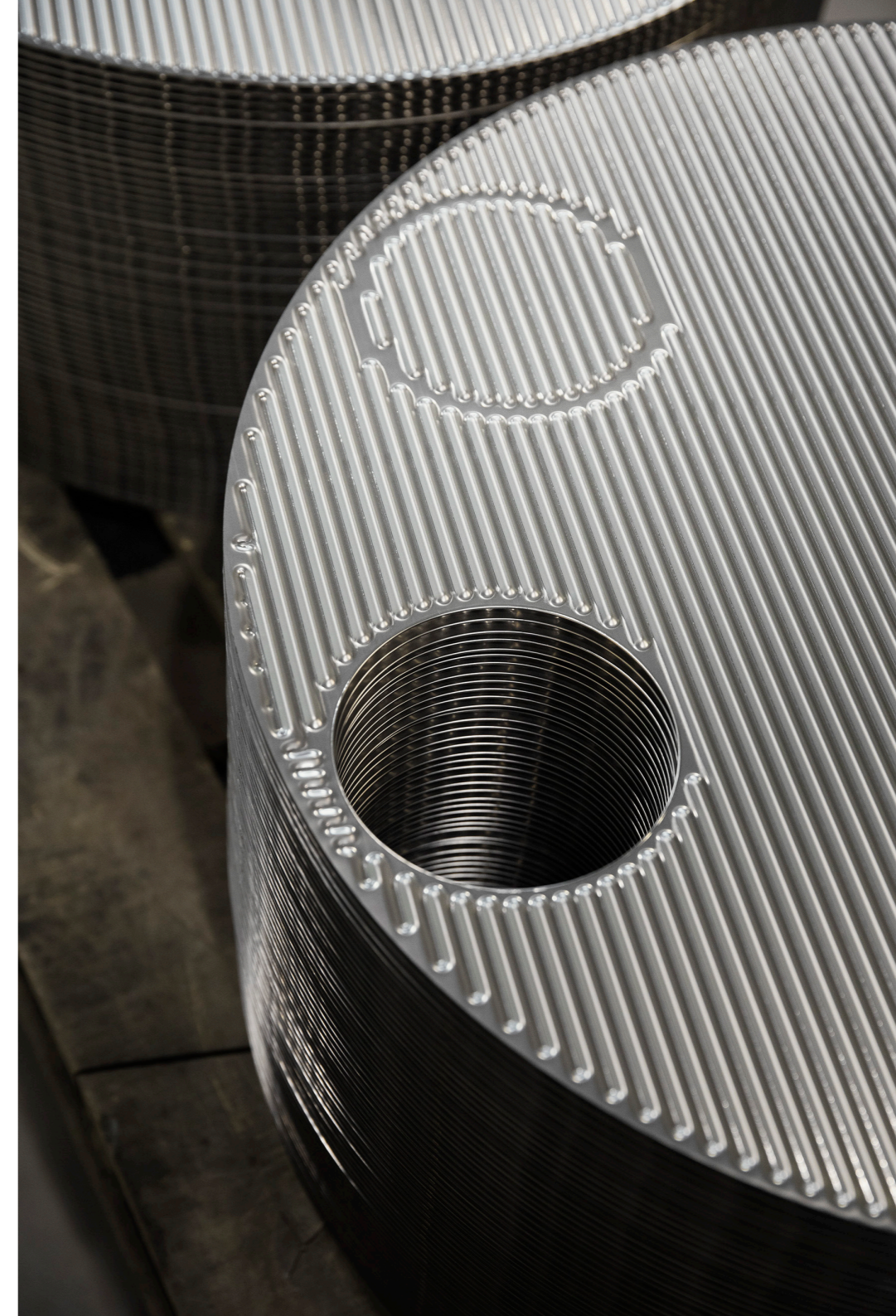


**TOGETHER  
WE SUCCEED**

People make the company, and in a kind, positive atmosphere everything that matters is easier. We believe in deep collaboration, conversation and working together – in our teams, and with our customers.

**PLATE & SHELL  
TECHNOLOGY**

Vahterus is the inventor, pioneer and market leader in Plate & Shell Heat Exchanger (PSHE) technology. The core of our heat exchangers is a fully welded plate pack enclosed in a strong shell structure, which eliminates the need for a gasket.





### ACCURATE SIZING

Our PSHE product range contains nine different plate sizes, which means there's a suitable plate size for every application. Thanks to our advanced manufacturing techniques, we can provide plates of different thicknesses to meet customer needs.



### PROBLEM SOLVED

Without heat exchangers, industries and households would stop running. Learning from real life problems and finding solutions to each unique requirement is what makes our work feel meaningful. A significant part of our research and development is done together with our customers.



VAHTERUS PSHE FULLY WELDED

# The Original Plate & Shell Heat Exchanger

Our unique Plate & Shell Heat Exchanger (PSHE) is at the forefront of heat exchanger technology. The core of this heat exchanger is a fully welded plate pack enclosed in a strong shell structure, which eliminates the need for a gasket. Due to its advanced construction, Vahterus PSHE combines the best features of plate & frame and shell & tube heat exchangers.

Our PSHE has numerous advantages over traditional heat exchangers. It's compact and light in weight, and since it has no gaskets, it can withstand higher pressure and temperatures than plate & frame heat exchangers. The structural properties of PSHEs also make them durable, easy to maintain and energy-efficient.

## How do the circular plates work?

Our PSHE product range contains nine different plate sizes, which means there's a suitable plate size for every application. Thanks to our advanced manufacturing techniques, we can provide plates of different thicknesses to meet customer needs. The material of the plate is also chosen individually for every application. After pressing and cutting, the plates are welded together, with the gaps between the plates functioning as channels for hot and cold heat circulation. The plate pack is then installed in a cylindrical shell. Hot and cold circulations run in opposite directions on each side of the plates, and each gap has alternately a 'plate side' circulation and a 'shell side' circulation. The circulation is directed into the pack of plates and out through combination pipes.

**Fully welded and gasket free, the structural properties of Vahterus heat exchangers make them durable, easy to maintain and energy-efficient.**



## Qualities of the PSHE Technology

### Energy efficient

The strong turbulent flow between the plates in a Plate & Shell Heat Exchanger (PSHE) makes the process highly energy-efficient. Unlike with traditional plate heat exchangers, circulation is possible at higher temperatures and pressure. PSHEs are also compatible with strict temperature programmes. In district heating applications, for example, every extra degree of temperature recovered translates directly to money saved.

### Compact

Our PSHEs are 60–70% smaller than traditional shell & tube heat exchangers. Thanks to their compactness, PSHEs are an excellent choice for retrofitting. PSHEs are also light, and thus easy to transport and install. They can be used in locations where weight limits apply, and require no additional support structures.

### Custom-built

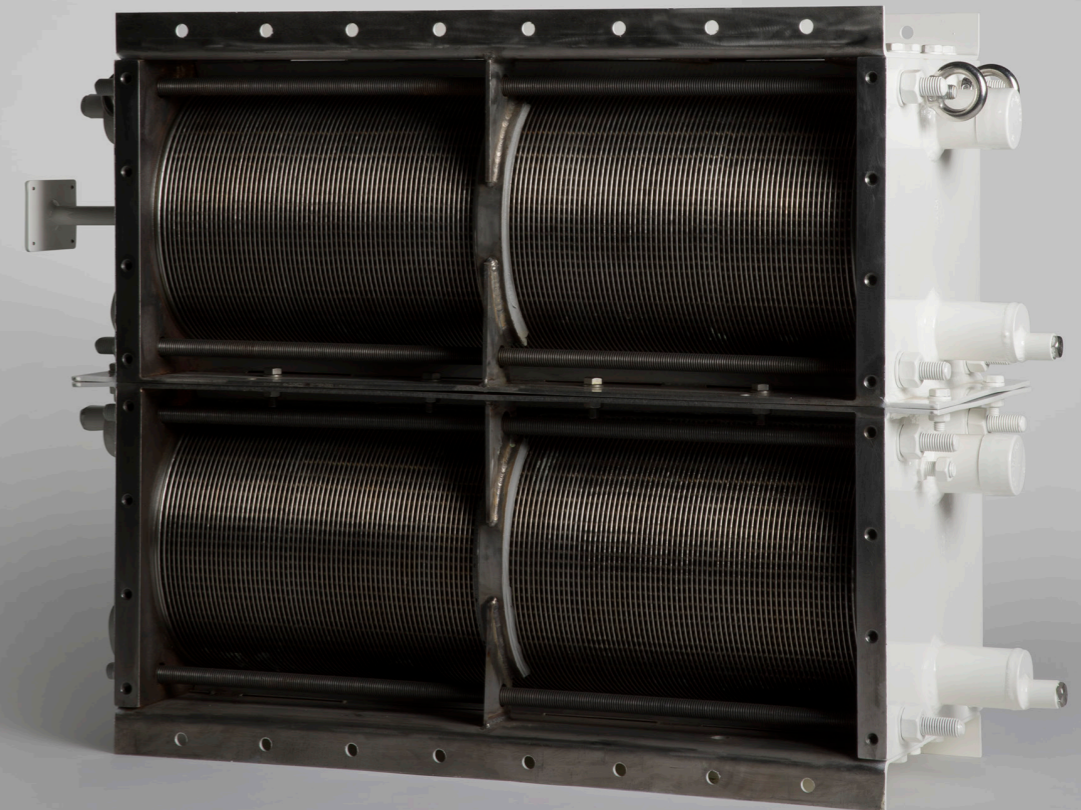
To achieve the best possible solution for your needs, the heat exchanger is designed with your input from the very beginning. Our years of experience mean we know heat exchangers inside out, so you can count on us to supply systems optimised for even the most challenging conditions. Accurate thermal sizing maximises benefits while minimising costs and material consumption.

### Fully welded

PSHEs are constructed to be strong, compact and safe. They withstand extremely high pressure, stress variation and thermal shocks. Like the plate pack, the surrounding shell is fully welded. The plate pack and shell are not, however, welded together, which allows them to expand and contract with heat variation. The plate pack consists of circular plates, which guarantees even distribution of stress.

### Easy maintenance

The welded construction of our PSHEs makes them reliable and easy to maintain. They have no gaskets, so there's no risk of them breaking or leaking. In addition, PSHEs are not susceptible to fouling. We can customise efficient heat exchanger cleaning systems for even the toughest of environments.





VAHTERUS PSHE OPENABLE

## Dimensions

PSHE model name	Heat transfer area, m <sup>2</sup>	Nozzles Plate, DN	Nozzles Shell, DN
<b>PSHE 2</b>	<b>0.5 – 5</b>	<b>25</b>	<b>20 – 80</b>
<b>PSHE 3</b>	<b>1 – 50</b>	<b>50</b>	<b>25 – 250</b>
<b>PSHE 4</b>	<b>3 – 100</b>	<b>80</b>	<b>25 – 300</b>
<b>PSHE 5</b>	<b>5 – 200</b>	<b>100</b>	<b>25 – 350</b>
<b>PSHE 6</b>	<b>6 – 350</b>	<b>125</b>	<b>25 – 500</b>
<b>PSHE 7</b>	<b>8 – 550</b>	<b>150</b>	<b>25 – 500</b>
<b>PSHE 9</b>	<b>15 – 1000</b>	<b>200</b>	<b>25 – 700</b>
<b>PSHE 14</b>	<b>30 – 2000</b>	<b>300</b>	<b>25 – 1000</b>

## Plate materials

- AISI 316L
- AISI 904L
- 254 SMO
- Alloy C22, C276
- Duplex
- Titanium gr.1, gr.11
- Nickel
- Others on request

## Shell materials

- Carbon steel
- AISI 316L
- AISI 904L
- 254 SMO
- Alloy C22, C276
- Duplex
- Titanium
- Others on request

## Mechanical design

- Full vacuum to 150 bar
- From -196°C to +600°C

## Design code

- AD-2000
- ASME VIII, Div.1
- EN 13445
- Lloyd's Register
- R.I.N.A.
- ABS Europe Ltd
- Bureau Veritas
- PD5500
- DNV GL Marine
- KGS South Korea
- EAC
- Others on request

## Quality system

- ISO 9001:2015
- ISO 3834-2:2005
- ISO 14001:2004
- PED module B+D
- PED module H
- SELO China
- ASME U and R Stamp
- OHSAS 18001:2007

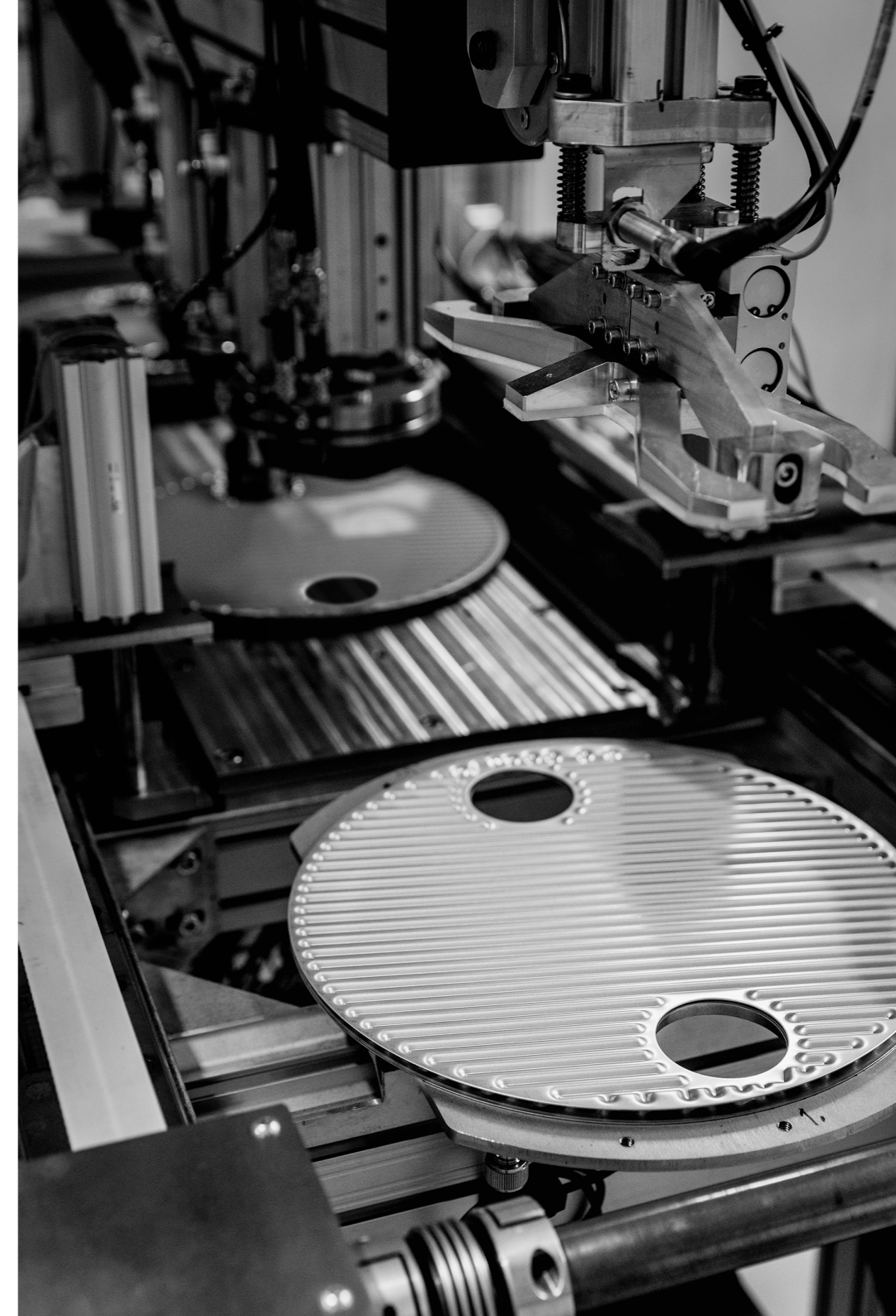


#### **DRIVE FOR EXCELLENCE**

Since the beginning, our mission has been to provide the best heat exchanger solutions for our customers. Several global patents and awards granted for our innovative design and environmentally friendly products are a token of the success of our work.

#### **AHEAD OF THE GAME**

We aim to maintain our position as forerunners in our field through continuous product development, automated production technology and strong application know-how. Highly automated plate production and modern welding solutions enhance our product quality.





#### FULLY WELDED

PSHEs are constructed to be strong, compact and safe. They withstand extremely high pressure, stress variation and thermal shocks. The welded plate pack consists of round plates, which guarantees even distribution of stress. Like the plate pack, the surrounding shell is fully welded.



#### FINNISH ROOTS, GLOBAL NETWORK

We provide heat exchanger solutions to customers on all continents. With headquarters and manufacturing facilities in Finland, Vahterus has subsidiaries in the UK, Germany, China and the US, and a global network of more than 50 distributors.



#### **OPTIMISED SOLUTIONS**

Our years of experience mean we know heat exchangers inside out and can optimise systems for even the most challenging conditions. Light and compact, our PSHEs are easy to transport and install, and can be used in locations where weight limits apply.

#### **QUALITY IS EVERYTHING**

The welded plate pack is the core of the Vahterus heat exchanger. In order for the heat exchanger to work as planned, the welding must be of the highest quality. Uncompromising work and demanding testing guarantee maximum durability.



**Custom-built  
heat exchanger  
solutions for the  
chemical and  
process, energy  
and refrigeration  
industries.**





## Chemical and Process

Most chemical and process plants work on continuous processes. Custom-made Plate & Shell Heat Exchangers are ideal for improving the capacity of an existing process, and also for building a new optimised plant. Their counter-current design, effective heat transfer, and low fouling maximise energy efficiency. The recovery of process heat decreases energy consumption and CO<sub>2</sub> emissions.

Speciality chemicals and pharmaceuticals are often produced in batch processes, which involve rapid temperature changes. PSHEs withstand these, and their fully welded design, protective shell construction and high quality make them safe and easy to use.

**Industry uses: refinery, petrochemical, speciality and fine chemical, pharmaceutical, industrial gas, fertilizer, food and beverage, pulp and paper.**

### Applications for PSHEs

- Product heaters and coolers
- Gas heaters and coolers
- Heat-recovery exchangers like feed/effluent exchangers
- Overhead condensers and gas liquefiers
- Thermosyphon and kettle reboilers
- Reactor temperature-control heat exchangers
- Cryogenic applications
- Various utility applications

# Energy

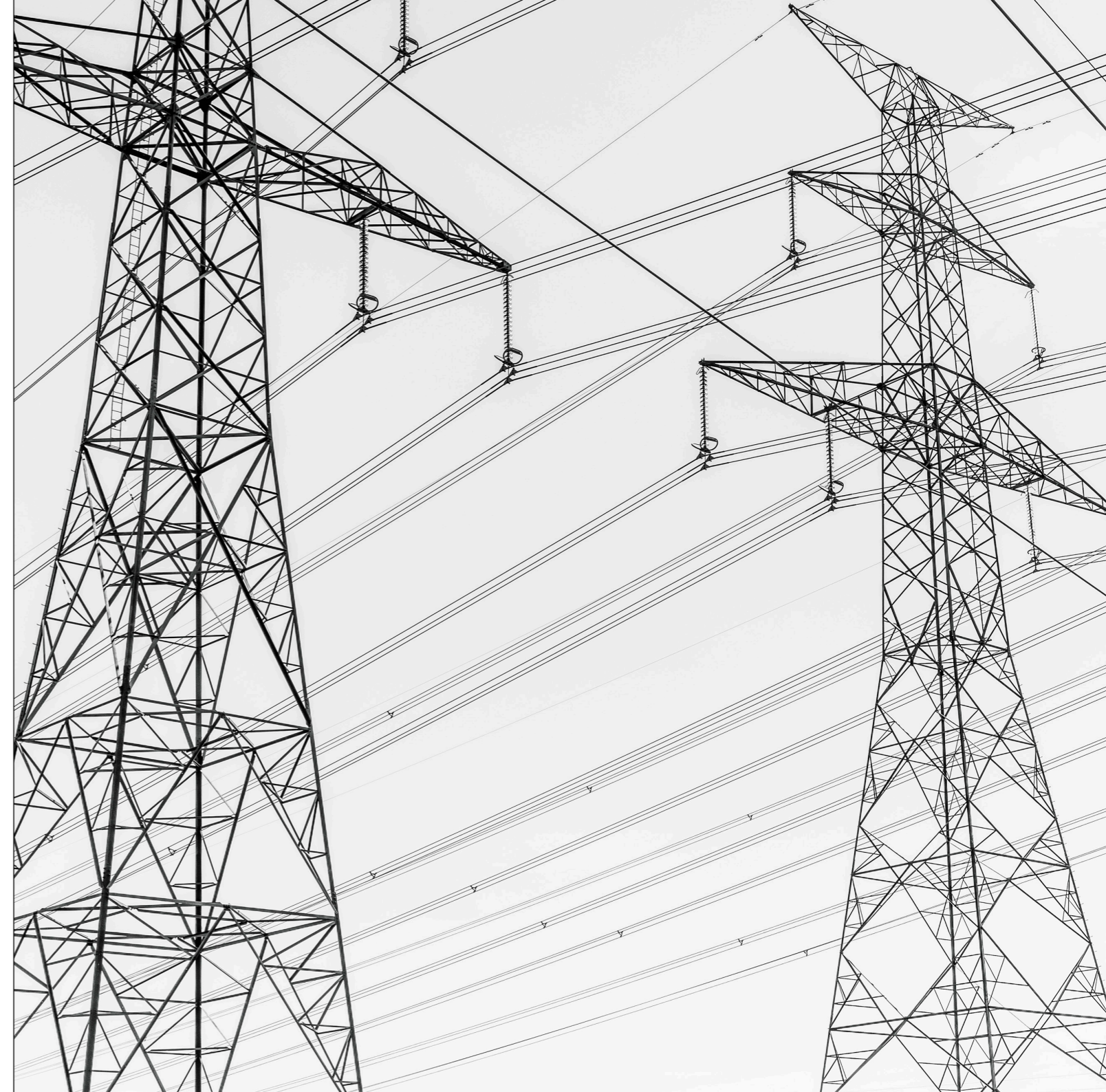
High pressure and high temperature capacities make Vahterus heat exchangers very compatible with energy-industry applications: power plants, oil and gas processing plants and industrial steam applications. Our PSHEs save space, are lightweight and always designed according to our customers' specific needs: the size, thickness and materials of the plate are chosen individually for every application.

Due to the robustness and efficient use of materials, PSHE is an excellent choice in cryogenic applications. The fully welded construction prevents leaks and assures efficient heat exchanger capacities. Our PSHEs can be customised for new installations, retrofittings and replacement of traditional technologies.

**Industry uses: heat and power, oil and gas production, oil and gas tankers, LNG carriers and terminal.**

## Applications for PSHEs

- Steam condensers and generators
- Condensate heaters and coolers
- Exhaust gas recovery
- LNG applications
- Crude oil heaters and coolers
- Gas heaters and coolers
- Hydrocarbon condensers and evaporators







# Refrigeration

Vahterus has brought many innovations to the refrigeration industry and remains active in developing new solutions for the future. Our focus is on applications that use natural refrigerants, where PSHEs are the perfect fit. We work closely with the world's leading chiller manufacturers to develop customised products and entire product ranges. As heat recovery is becoming more and more important in the fight against global warming, we have developed new technologies for the growing market of heat pumps.

Vahterus PSHEs have a fully welded construction and low refrigerant charge, which guarantees maximum safety. Their compact design saves space and because there are no gaskets, units are low-maintenance and easy to clean.

**Industry uses: cold storage, ice rinks, marine applications, air conditioning, process cooling, food and beverage.**

## Applications for PSHEs

- Evaporators
- Droplet separators
- Evaporators/droplet separators (Combined)
- Cascades
- Desuperheaters
- Oil coolers
- Subcoolers
- Condensers

## Key solutions

- Chillers
- Heat pumps
- Absorbtion plants
- Transcritical solutions

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