



## Introducing The Heatric Printed Circuit Heat Exchanger (PCHE)

Heatric



ENGINEERING YOUR SUCCESS.

# BESPOKE HEAT TRANSFER SOLUTIONS BUILT FOR DEMANDING ENVIRONMENTS

Heatric, a division of Parker Filtration Group, is a leader in the design and manufacture of Printed Circuit Heat Exchangers (PCHEs) for existing and emerging energy markets. For decades Heatric have designed, manufactured, and delivered PCHEs to the global energy industry where they are renowned for their thermal efficiency and durability. Combining innovative technology, in-house design expertise, and a global services team; Heatric delivers tailored heat exchanger solutions for optimal heat transfer effectiveness and operational excellence.

Once PCHE technology was invented at the University of Sydney, Heatric was founded in Australia in 1985. After being acquired by Meggitt in 1990, Heatric relocated to Poole, UK, where the manufacturing facility has expanded to over 20,000 m<sup>2</sup>. Our plate etching site in Birmingham, UK, is the largest stainless steel chemical etching facility in the world, by volume of material removed.

Heatric have steadily opened regional sales offices to serve emerging regions and continues to develop a culture of innovation and expertise - delivering bespoke exchanger solutions and responsive support as the energy industry expands into new applications and more demanding environments.



# HEATRIC HEAT EXCHANGERS

Heatric Printed Circuit Heat Exchangers (PCHEs) are manufactured using a specialised solid-state joining process known as 'diffusion bonding'. This process creates a heat exchanger 'core' with no joints, welds, or other potential points of failure – combining exceptional strength and integrity with high efficiency and performance.

By incorporating diffusion bonding with micro-channel technology, **Heatric PCHEs are up to 85% smaller and lighter** than traditional heat exchanger technologies, such as shell and tube heat exchangers. This reduction in size can lead to significant savings in structural costs due to the elimination of excess pipework, frames, and associated equipment.

**Heatric PCHEs are a market-proven technology with decades of operational experience** in offshore and onshore hydrocarbon processing, and power generation applications. The advanced thermal performance makes Heatric PCHEs ideal for a range of cutting-edge energy applications, such as energy storage, hydrogen conditioning and closed-loop power generation. As inventors of this technology, Heatric continue to develop and evolve heat transfer solutions for a wide range of market applications.

## Benefits of a Heatric PCHE

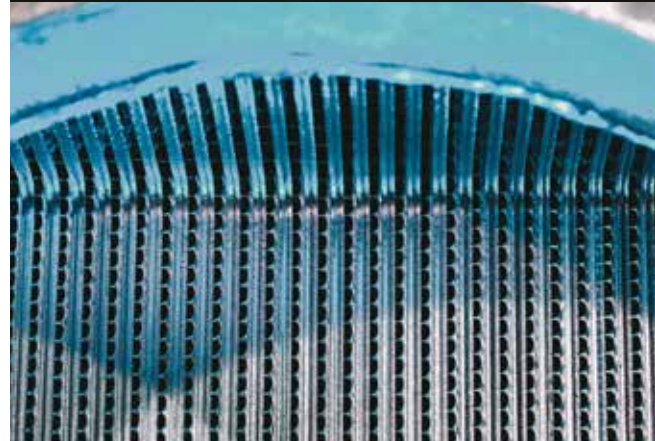
- Robustness: High integrity plate type exchangers
- Compact: Up to 85% smaller than equivalent shell & tube

**Safety:** No catastrophic failure mode, constructed from 100% fire resistant materials. No requirement for over pressure relief and not susceptible to vibration

- Pressure capability: up to 1,000 bar (14,500 psi)
- Temperature range: -270°C (-454°F) to 900°C (1650°F)
- Process optimisation: close temperature approach to 2°C
- High effectiveness with multi-stream capability
- High purity streams: no braze alloy or gaskets
- Flexibility: no restrictions on fluid pressure drop

## Materials of Construction

- Stainless steel 304
- Stainless steel 316
- Duplex (S31803)
- 6 Moly (NO8367)
- Alloy 617



# HYDROCARBON PROCESSING

## Offshore

For decades, Heatric have been providing exceptional heat transfer technology to the offshore industry. Heatric PCHEs are renowned for their compact size, high-performance and safe operation in high integrity hydrocarbon gas processing applications, such as aboard Floating Production Storage and Offloading (FPSO) and Floating Liquefied Natural Gas (FLNG) vessels. Compared to other available heat exchanger technologies, the space and weight savings on topside bulk delivered by a Heatric PCHE translate into lower operational and transportation costs for platform operators; whilst also providing an inherently safer and more robust solution. The Heatric PCHE can comfortably operate at pressures of more than 1,000 bar (14,500 psi) and temperature ranges from  $-270^{\circ}\text{C}$  ( $-454^{\circ}\text{F}$ ) to  $900^{\circ}\text{C}$  ( $1650^{\circ}\text{F}$ ); making it a versatile heat exchanger suitable for any extreme operating environment.



## Onshore

The Heatric PCHE is the heat exchanger of choice for innovative onshore gas production and processing projects. By maximizing process efficiency and delivering greater thermal performance than other solutions, Heatric PCHEs deliver superior mechanical integrity in a compact solution. This results in improved plant efficiency and uptime for customers and the reduction in required pipework makes a Heatric PCHE an adaptable solution for any process. In addition, inherent product safety provides further advantages over alternative exchangers to give customers peace of mind for process operations. Typical onshore PCHE applications include LNG liquefaction and regasification, NGL (Natural Gas Liquids) extraction and gas dewpointing.



# DECARBONISATION

## MARINE SHIPPING

With experience operating throughout the global maritime and shipping market, the Heatric PCHE is an enabling heat transfer technology in a variety of marine applications. At sea, our compact PCHEs are prized not only for their highly efficient, reliable, and safe operation but also for the associated weight and space savings. This enables customers to reduce installed module footprints with a high-integrity heat exchanger and save on overall system costs on a variety of vessel types. For Floating Storage and Regasification Units (FSRU) or Liquefied Natural Gas Carriers (LNGC) vessels, the Heatric PCHEs temperature range supports ship-based LNG processes, with applications as Boil-off Gas (BOG) heaters, trim heaters, vaporisers, and fuel heaters (PRS/FRS) for vessel propulsion systems. In Fuel Gas Supply Systems (FGSS), Heatric PCHEs are supporting the growth of cleaner engine fuels such as methane and ammonia, replacing HSFO (heavy sulphur fuel oil) to allow owners of new marine vessels to meet industry decarbonisation regulations.

## ENERGY STORAGE

Generating clean energy to meet global demand is a challenge; but an equally complex challenge is how to capture and store energy generated from intermittent renewable sources to balance demand, stabilise the grid and ensure security of supply. Due to the compact nature and high-performance thermal capabilities, Heatric PCHE technology enables maximum process efficiency, delivering benefits in various energy storage applications, such as cryogenic and thermal energy storage (TES) systems.



## **COMBINED CYCLE GAS TURBINES (CCGT)**

Heatric are supporting the replacement of existing coal-fired power infrastructure with combined cycle gas turbines power plants, to reduce emissions in power generation. The Heatric PCHE adds critical performance and inherent safety in power generation applications, outperforming traditional heat exchanger equipment. To further support global emissions reduction and drive efficiency Heatric PCHEs support use of hydrogen-blend fuels and can operate in energy recovery systems. For example, in fuel gas heating (FGH) applications, a Heatric PCHE using only lower grade heat can add more than 1% to total roundtrip efficiency.

## **LOW-EMISSION POWER GENERATION**

Cutting-edge power generation projects are proving alternative working fluids such as hydrogen, oxygen and carbon dioxide can replace existing infrastructure with clean, commercially attractive operation. Heatric PCHEs cope comfortably with highly demanding operating temperatures and pressures used in both gaseous and liquid-state power generation processes, such as supercritical carbon dioxide for example. In Brayton, Rankine or Allam Fedvedt cycle processes, Heatric PCHEs have proven experience delivering superior end to end efficiencies, vital to proving commercial viability and supporting future scale in cutting-edge projects. onsive support as the energy industry expands into new applications and more demanding environments.



## **CCUS (CARBON CAPTURE, UTILISATION AND STORAGE)**

Capturing and utilising existing emissions from traditional hydrocarbon production both minimises its environmental impact and enables growth of low-carbon (blue) hydrogen supply. During onshore CO<sub>2</sub> compression and liquefaction, the high-pressure and high-temperature capabilities in Heatric PCHEs, combined with a close temperature approach, add value throughout the production landscape. With its compact size the Heatric PCHE has various CCUS applications in many environments. On FPSOs, Heatric PCHEs drive superior compression processes for offshore wellheads to enable EOR (enhanced oil recovery), improving production volumes and project profitability.

## **HYDROGEN**

A key element in future energy processes, the Heatric PCHE is suited to a range of applications across the hydrogen value chain, including electrolyser cooling, hydrogen compression and liquefaction, and hydrogen storage systems. Offering a simplified safety case along with unrivalled thermal performance and pressure capability, each Heatric PCHE is designed bespoke to maximise system efficiency and heat transfer effectiveness using unique working fluid flow patterns.



# HEAT EXCHANGER SERVICES

With over 30 years' operational experience and a global support team, Heatric are on hand to provide support and peace of mind for customers. Our dedicated personnel provide end-to-end support throughout every stage of the product lifecycle – ranging from pre-start-up engineering support and feasibility studies, through to heat exchanger cleaning; to ensure maximum production in accordance with scheduled downtime.

## Field Service Support

Heatric employ a global team of heat exchanger specialists, called Field Service Engineers (FSEs), to ensure your exchanger operation is always running smoothly. Their operational experience in a range of energy industries means they have a wealth of expertise to recommend best practises to maximise your PCHE vessel lifetime; as well as provide on-site physical support to your facility by inspecting vessel health and proposing appropriate actions if required.

## PCHE Cleaning

During operation, remnants of product being processed through the exchanger can lead to build-up of debris and fouling which restricts flow and pressure. Heatric provide several methods of exchanger cleaning to restore the vessel to maximum capacity – either circulation of a chemical mixture to remove fouling, puffing debris clear of the exchanger through air pressure or manual ultra high-pressure cleaning of exchanger channels in-situ.

## Preventative Maintenance

Heatric have various products and services focused on minimizing down-time of operating PCHE vessels. One recommended practice is the application of in-line strainers (where appropriate) to help filter out debris and particulates from input flow - protecting the exchanger channels from blockages - acting as the first line of defence against drops in operating pressure and volume. In the event of a failure, there are several options available to get production resumed such as re-coring a vessel or performing welding repairs to prevent further damage. Heatric FSEs can also conduct failure and analysis on failed vessels to identify the cause and scale of the damage to the unit and related processes – providing recommendations for sustainable future operation.

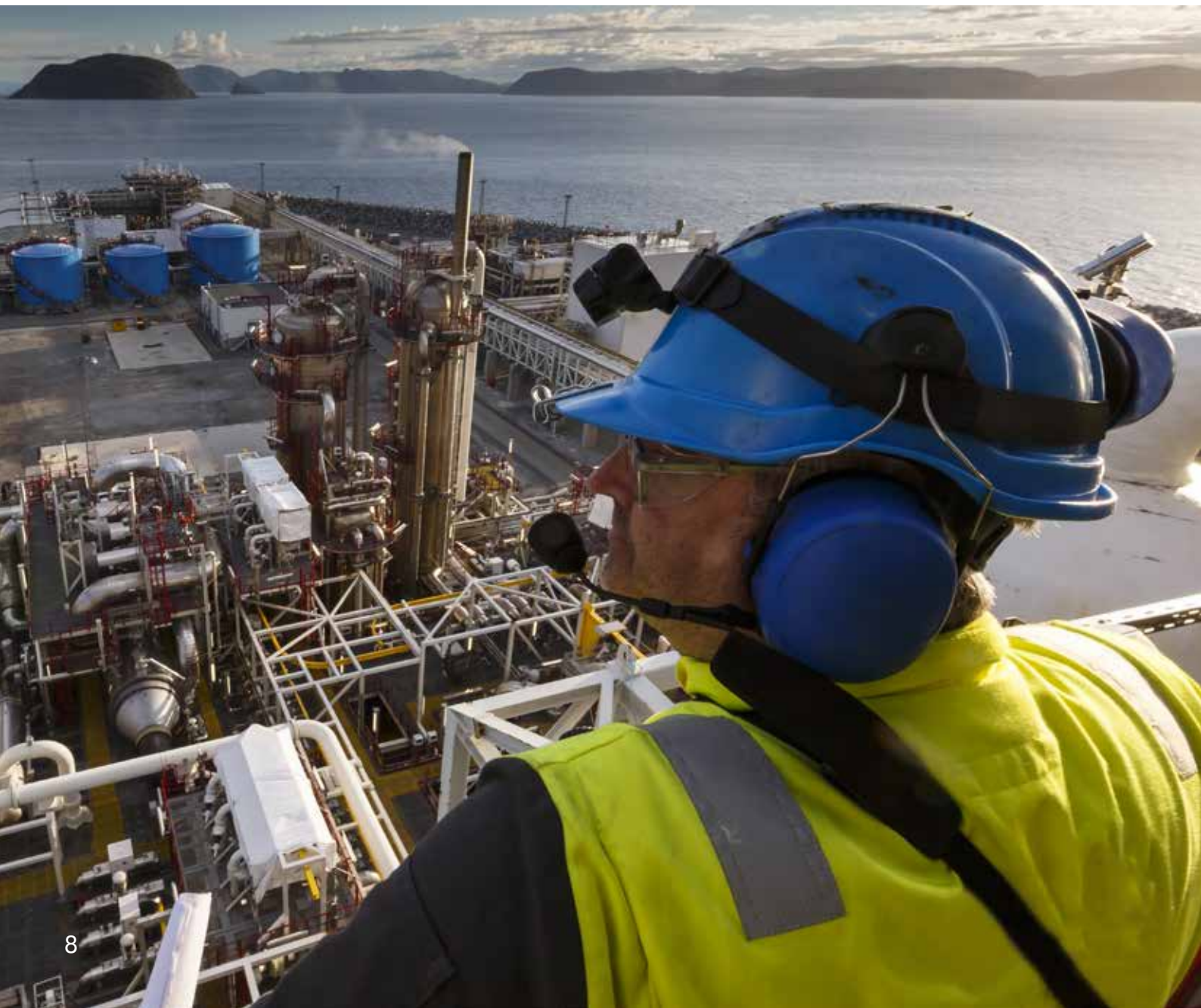


# QUALITY & ASSURANCE

Heatric have a company-wide commitment to quality and safety, from our products and manufacturing process to the safety of our staff. Our 20,000 m<sup>2</sup> production facilities include the world's largest stainless steel chemical etching plant – dedicated to quality control and safety. Every critical process is performed in-house and is subject to our integrated management system, itself certified by Lloyd's Register and UKAS to the following accreditation standards:

- BS EN ISO 9001
- BS EN ISO 14001
- BS EN ISO 45001

Heatric operate to the highest standards of health and safety; matching practices and expectations of international clients, operators, and EPC contracting companies across all our facilities. Heatric are certified to both ASME 'R' and ASME 'U' standards, alongside DNV certification for manufacture of pressure vessels. Around the globe, Heatric provide world-wide customer service and technical support teams, providing a global and expert service wherever you or your heat exchanger are located.



# YOUR PARTNER IN TRANSFORMATION

Solving the challenges of innovative energy applications is the very essence of what Heatric represent. Every Heatric PCHE possesses an unrivalled capacity to transform the economics of any process in which heat transfer plays a critical part. As the inventor of printed circuit heat exchanger technology, Heatric have evolved the unmatched heat transfer expertise and understanding available to customers, allowing for more creative and innovative solutions to industry challenges.

With thousands of PCHE units manufactured and in operation worldwide, Heatric combine decades of in-house heat exchanger design and manufacturing knowledge with operational insight to tailor our transformational PCHE technology to your process needs. With full lifecycle support, Heatric are your partner in transformation; ensuring superior thermal performance and maximum unit uptime.

Contact us to find out how we can enable your project.



**Heatric**

[www.parker.com](http://www.parker.com)



European Headquarters  
La Tuiliere 6, 1163 Etoy,  
Switzerland  
Tel: +41 21 821 85 00

**Heatric UK – Head Office,**  
46 Holton Road, Holton Heath, Poole,  
Dorset, BH16 6LT, United Kingdom  
[htrc-info@parker.com](mailto:htrc-info@parker.com)  
[www.parker.com/heatric](http://www.parker.com/heatric)  
T: +44 (0) 1202 627000