

## Maximising Uptime of Your Heatric Printed Circuit Heat Exchanger (PCHE)

Heatric



ENGINEERING YOUR SUCCESS.

# HEATRIC EXCHANGERS

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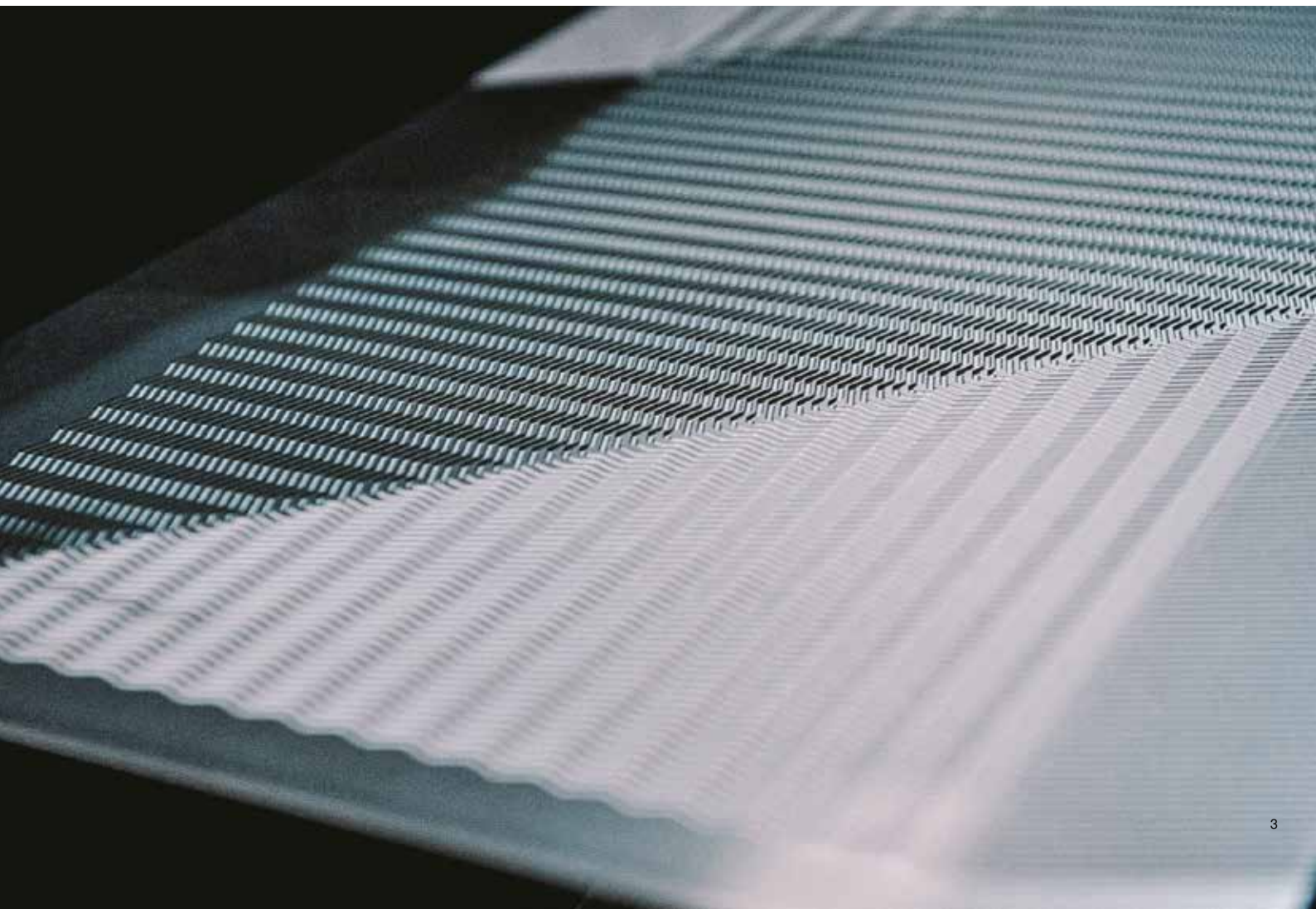
# ABOUT HEATRIC

Heatric, a division of Parker Filtration Group is a market leader in heat transfer solutions for existing and emerging energy markets. For decades Heatric have been designed, manufactured, delivered, and maintained PCHEs to the global energy industry, where they are renowned for their thermal efficiency and durability.

With a global dedicated services team, Heatric strive to deliver exceptional technical and operational servicing expertise in your local region. Decades of design and operational experience allow us to deliver unrivalled insight, to never become the bottleneck in your process. With a specialised in-house engineering team, Heatric understand the structure and complexity of heat exchangers and provide inimitable services to maximise operational uptime around scheduled maintenance.

We provide lifecycle support throughout every stage of project development - from engineering support during FEED and installation support during asset commissioning. Once the heat exchanger enters operation, we on hand to provide heat exchanger cleaning to prevent unscheduled downtime and to ensure the unit is operated efficiently and safely. Our work meets the highest standards of health and safety, matching practises and expectations of international clients, operators, and contracting companies across all sites.

This document details the range of services available to maintain and maximise operational performance for your Heatric PCHE, without degrading unit life.



# FIELD SERVICE SUPPORT

Heatric has a team of heat exchanger specialists called Field Service Engineers (FSEs) who have deep technical knowledge of our design and manufacturing process, as well as industry operational practises. Their expertise enables customer success through a range of expert services; including recommending strainer installation for heat exchanger protection, operator training to share best practice to maximise vessel lifetime, and mobilising to customer sites at short notice if emergency support is required.



## OPERATOR TRAINING

From decades of experience in heat exchanger manufacturing and design, our wealth of knowledge is available to share with operators and installation managers. We offer guidance on common operator mistakes, best practises for exchanger maintenance and instructions to ensure the unit operates effectively for its full lifetime. Operator training can be delivered on client site and is recommended to educate operators unfamiliar with Heatric PCHE technology.



## INTERNAL / EXTERNAL INSPECTION

Heatric FSEs have market-leading knowledge of our heat exchangers and can conduct a thorough internal and external inspection of the Heatric heat exchanger; to provide technical insight into the health and integrity of the unit. Following inspection, our team provide a technical report with recommendations and actions to improve unit lifetime, based on inspection findings and operational history.



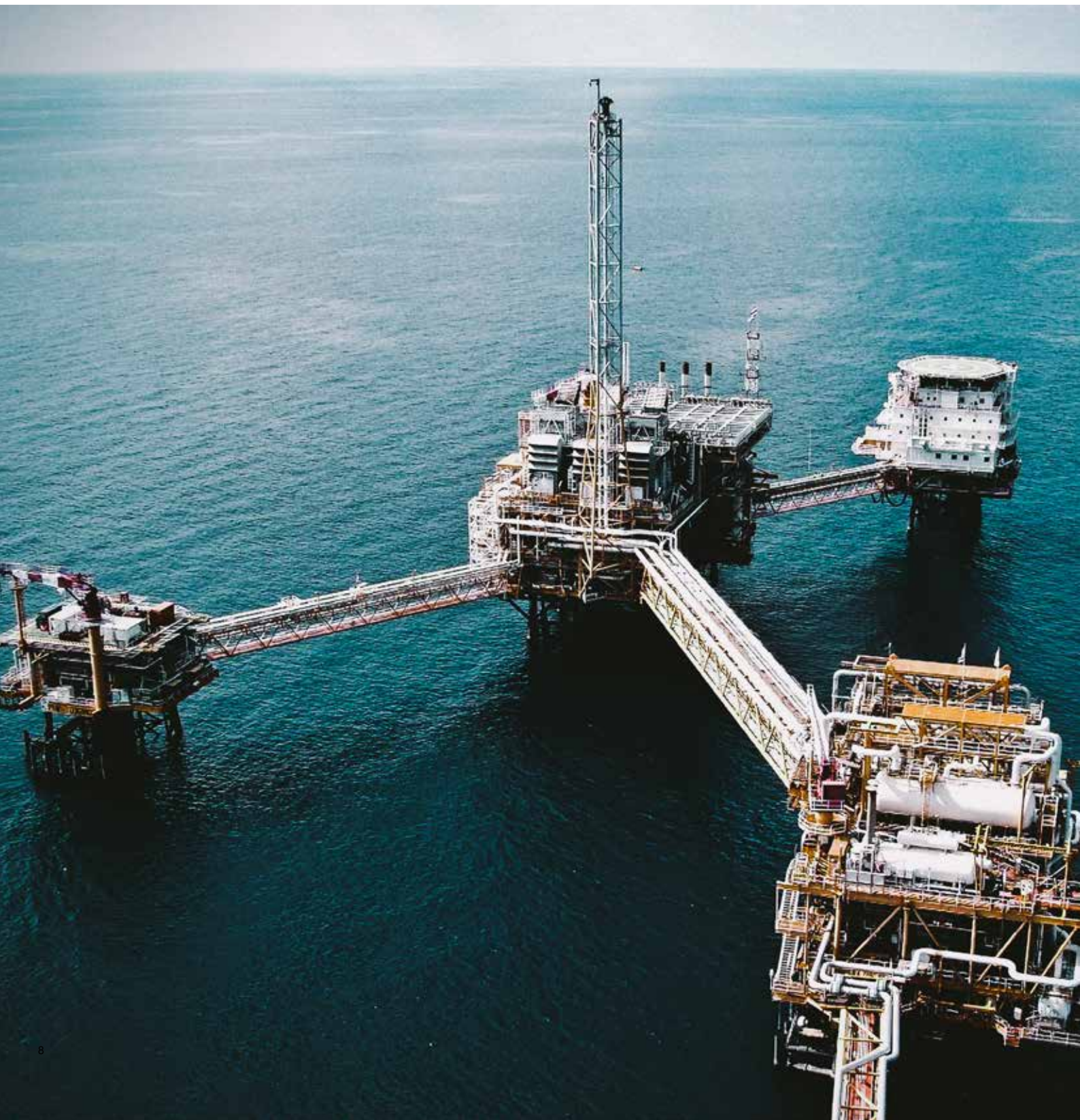
## COMMISSIONING REVIEW

Heatric can support with platform and installation commissioning; advising on how platform operations can be tailored ahead of start-up to maximise production schedules without impacting on exchanger health or expected unit lifetime. A thorough commissioning review can reduce last-minute issues, guarantee successful start-up of new installations, and avoid common operational pitfalls with Heatric PCHE technology.



## SITE SURVEY

By surveying the operational environment of the exchanger and connected systems, we can provide technical support and operational recommendations, which to prevent downtime, maximise performance and ensure success of future maintenance. Onsite visits can also highlight the need for preventative maintenance, such as strainers in connected systems, to improve overall process efficiency.



## PERFORMANCE REVIEW

Heatric's vast operational experience and exchanger knowledge provides customers with unrivalled insights and performance recommendations that can improve uptime and performance of operational units. Changes to operating parameters should be evaluated to understand the potential impact of new operations on existing equipment or the risks to downstream operating equipment, avoiding costly mistakes and loss of production.



# HEAT EXCHANGER CLEANING

During operation, working fluid being processed through the exchanger can lead to debris build-up and fouling, restricting flow and pressure. Heat exchanger cleaning will restore the vessel to maximum capacity - either through circulation of a chemical mixture to remove foulant, puffing debris clear of the exchanger or through air pressure or manual ultra-high-pressure cleaning of exchanger channels. Heat exchanger cleaning can be performed either in-situ at customer platforms, or at our facilities, depending on the timescale.



## CHEMICAL CIRCULATION

Improving exchanger performance can be achieved through circulation of a specific chemical blend to remove as much foulant from the exchanger core as possible. Cleaning is supported by a written technical document which provides bespoke recommendations on best operating practice and cleaning strategy to maximise exchanger performance and lifetime.



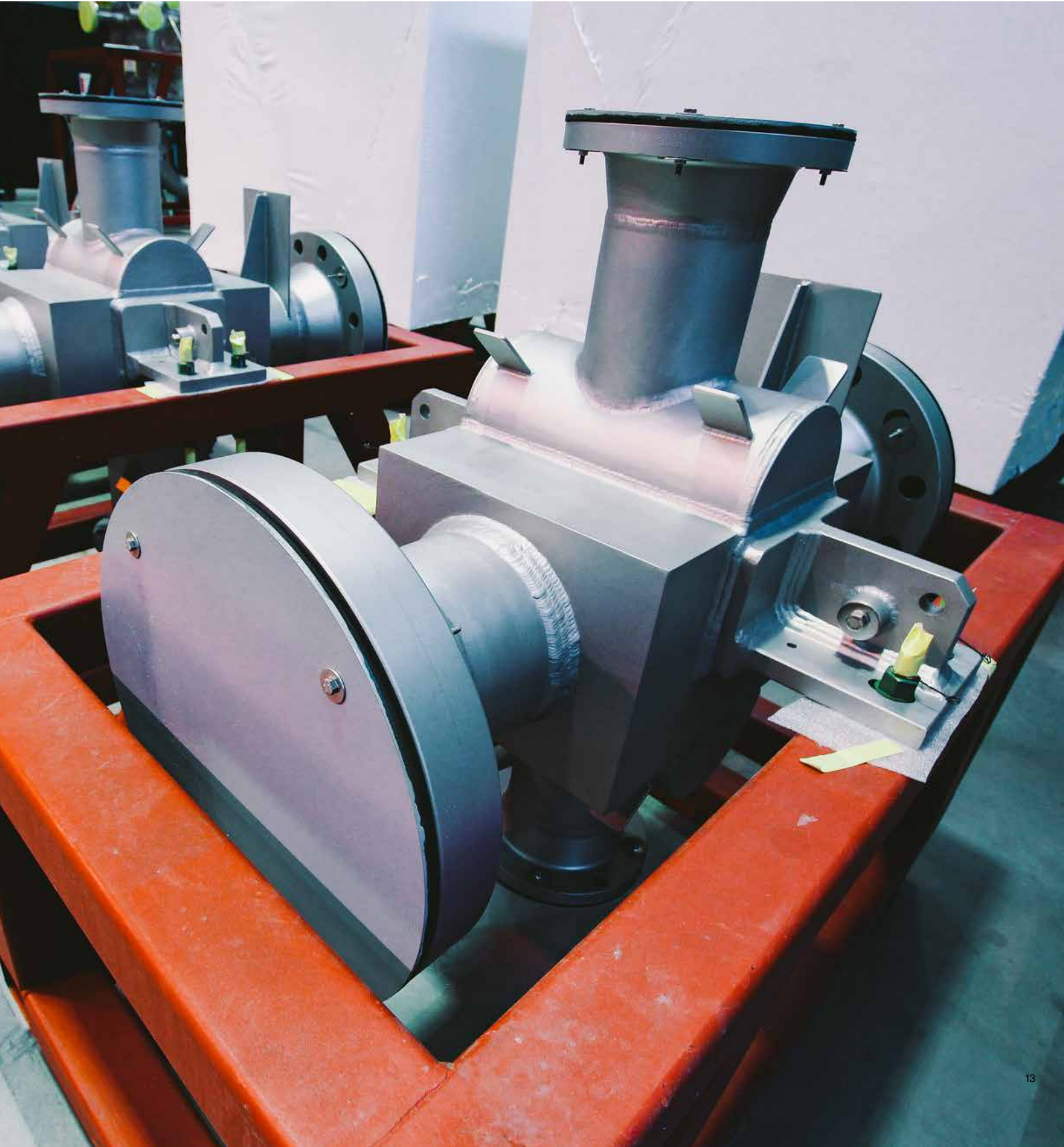
## ULTRA-HIGH PRESSURE WATER JETTING

Ultra-High Pressure (UHP) water jetting is an invasive and safe procedure to remove the maximum volume of foulant from heat exchanger channels, leading to improved performance following higher surface area and volume. UHP cleaning is supported by a written technical document which provides bespoke recommendations on best operating practice and cleaning strategy to maximise exchanger performance and lifetime.



## BACK PUFFING

Back puffing is a cleaning process that involves removing foulant and debris from an exchanger using high-pressure gas. The fouled heat exchanger is sealed and pressurised, then unsealed at high speed to give the gas a route to atmosphere, blasting the gas through the heat exchanger at high force. This process can be conducted in-situ, utilised as a standalone treatment, or paired with either chemical or UHP cleaning to ensure all foulant is removed for greater results.



## SAMPLE ANALYSIS

Heatric delivers superior problem-solving capabilities from knowledge collected over decades of heat exchanger operations. This knowledge can be applied to determine the cause of foulant in blocked heat exchanger units through a sample analysis evaluation. We can deliver a technical report detailing the appropriate chemical selection for circulation based on exact foulant composition, to successfully remove foulant and to return the heat exchanger to full operation.



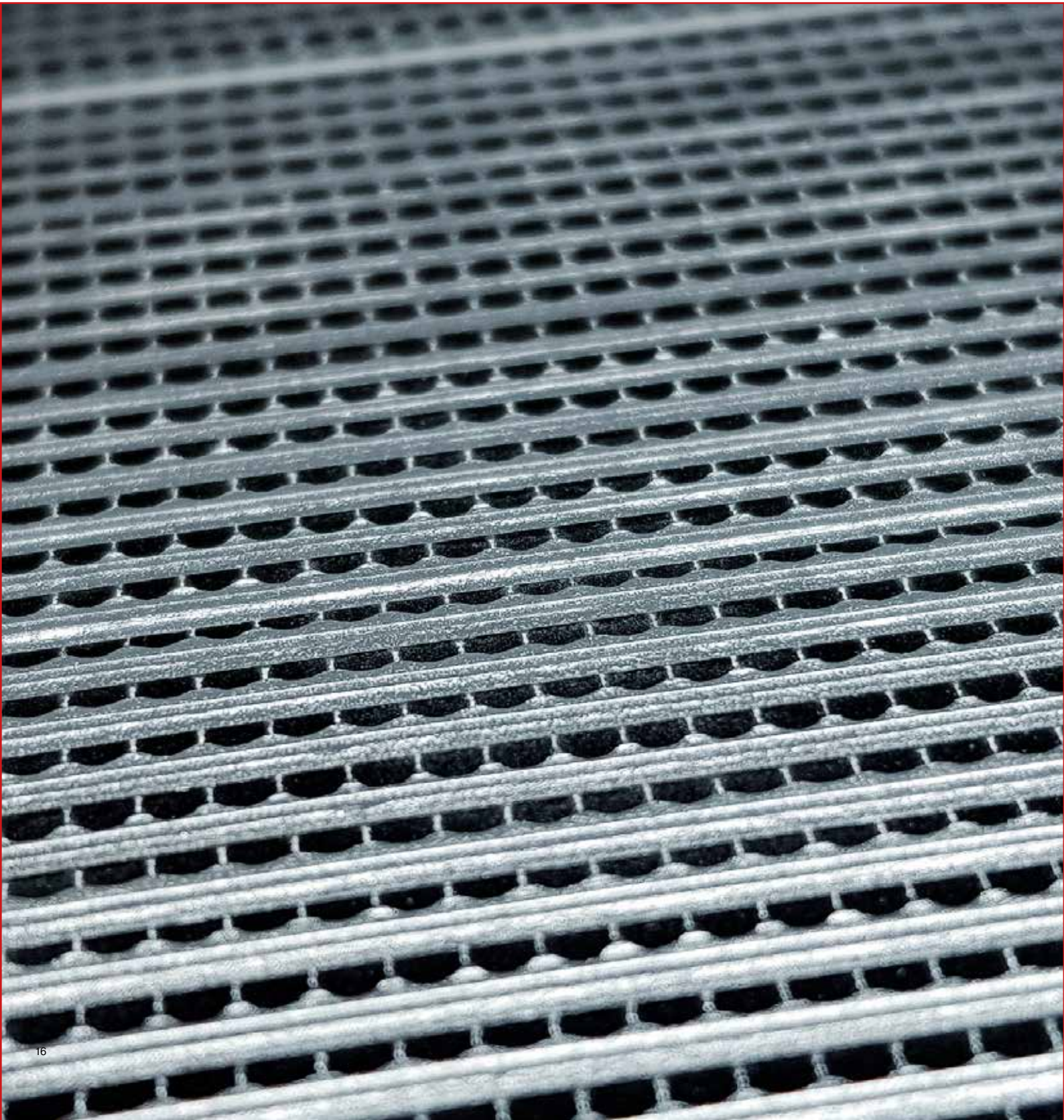
# SERVICE SUPPORT

In the event of a unit failure, we are on-hand to support customers with several options to restore production to full capacity, such as re-coring a vessel; performing temporary weld repairs to prevent further damage; conducting failure analysis on the vessel to identify the cause and scale of the damage to the unit; and recommending appropriate actions for future operation.



## RE-CORE

'Re-coring' an exchanger is the process of removing and replacing a compromised exchanger core, whilst utilising as many original heat exchanger components as possible to remedy the existing heat exchanger unit. The use of unaffected, existing components reduces overall cost, making this an attractive alternative to restore the unit to maximum efficiency. As an invasive service, this option is recommended only as a short-term solution to re-establish production.



## WELD REPAIR

Weld repairs can be conducted to mend identified inter-stream leaks within an exchanger core, by welding individual channels. Due to the design of the exchanger, this highly precise process cannot fully repair a damaged exchanger core but can be conducted in the event of an emergency, to extend the life of an existing unit whilst a new core or unit is being manufactured.



## FAILURE INVESTIGATION

Investigating the root cause of a heat exchanger failure is a cost-effective investment to ensure successful heat exchanger operation. Failure investigations can be conducted by a specialist FSE to determine the definitive cause for the failure of an exchanger. As a Heatric PCHE has no catastrophic failure mode due to the design, this investigation can highlight potential weaknesses in the operation of the exchanger and provide recommendations on changes to operating conditions to avoid future failures.



## MAINTENANCE NOZZLE RETROFIT

Maintenance nozzles provide improved access for future cleaning activities. If they were not included as part of the initial heat exchanger manufacture, they can be fitted to headers of an existing Heatric PCHE. The addition of maintenance nozzles is perfect for units which are integrated into complex process systems, in difficult-to-reach areas due to pipework or accessibility. This service can be conducted onshore at a Heatric location or in the field, depending on the installed location of the unit.



# PREVENTATIVE MAINTENANCE

Preventative maintenance can improve the life expectancy of installed equipment and reduce the frequency and cost implications of unscheduled shutdowns. As standard, we recommend utilising the application of strainers to help filter out debris and particulates from input flow - protecting the exchanger channels from blocking. Operational spare heat exchangers are also recommended to maintain production in an emergency or unscheduled service.



## SPARE PCHE's

It is recommended operators secure a spare heat exchanger, to protect against production downtime should an in-situ asset require emergency repair or cleaning. Unplanned production shutdowns are extraordinarily complex and expensive due to the volume of production that can be lost. Heatric PCHEs often have a long lead time due to the design complexity and manufacturing process; owning a duplicate heat exchanger can be a lifeline in times of crisis.



## STRAINERS

Acting as the first line of defence against drops in operating pressure and volume, our strainers protect the heat exchanger channels from becoming fouled or blocked. Heatric strainers are designed with a unique four-layer mesh which is engineered to minimise impact on operating performance. Each strainer is bespoke and created to customer requirements, to reduce the frequency of maintenance intervals without sacrificing performance.



## ADDITIONAL SERVICES

We offer various additional services to ensure our heat exchangers are maintained to optimal condition for our customers. These services include unit preservation for long-term transportation and storage, and leak testing to comprehend the integral status of a Heatric PCHE. Results are used to recommend the best course of action to reinstate the unit into active production.



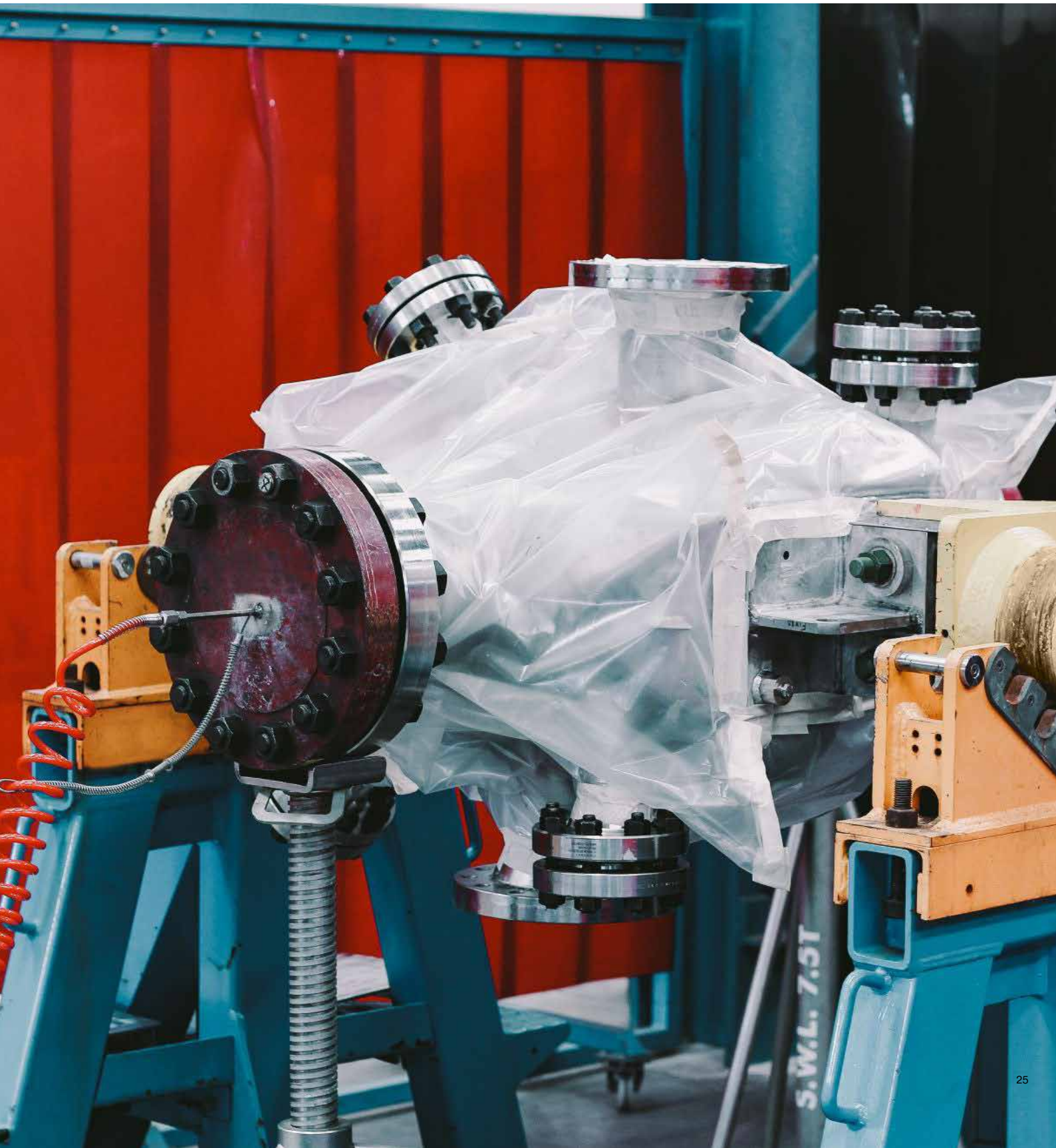
## NITROGEN PRESERVATION

Typically pressurised to between 5-8 psi, a Heatric PCHE is preserved with nitrogen to ensure internal cleanliness ahead of unit installation. Nitrogen preservation is recommended for units destined for storage period of over 12 months, commonly seen on operational spare units or when transporting units to extreme environments to ensure the unit arrives in perfect condition.



## HELIUM LEAK TESTING

Helium leak tests can be completed to confirm the mechanical integrity of an exchanger through prolonged pressurisation using helium, identifying any damage to the exchanger core or casing. Test results are used to recommend the best course of action to return the unit into active service, such as weld repairs or re-coring the unit.









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@meggitt.com](mailto:htrc-info@meggitt.com)  
[www.parker.com/heatric](http://www.parker.com/heatric)  
T: +44 (0) 1202 627000