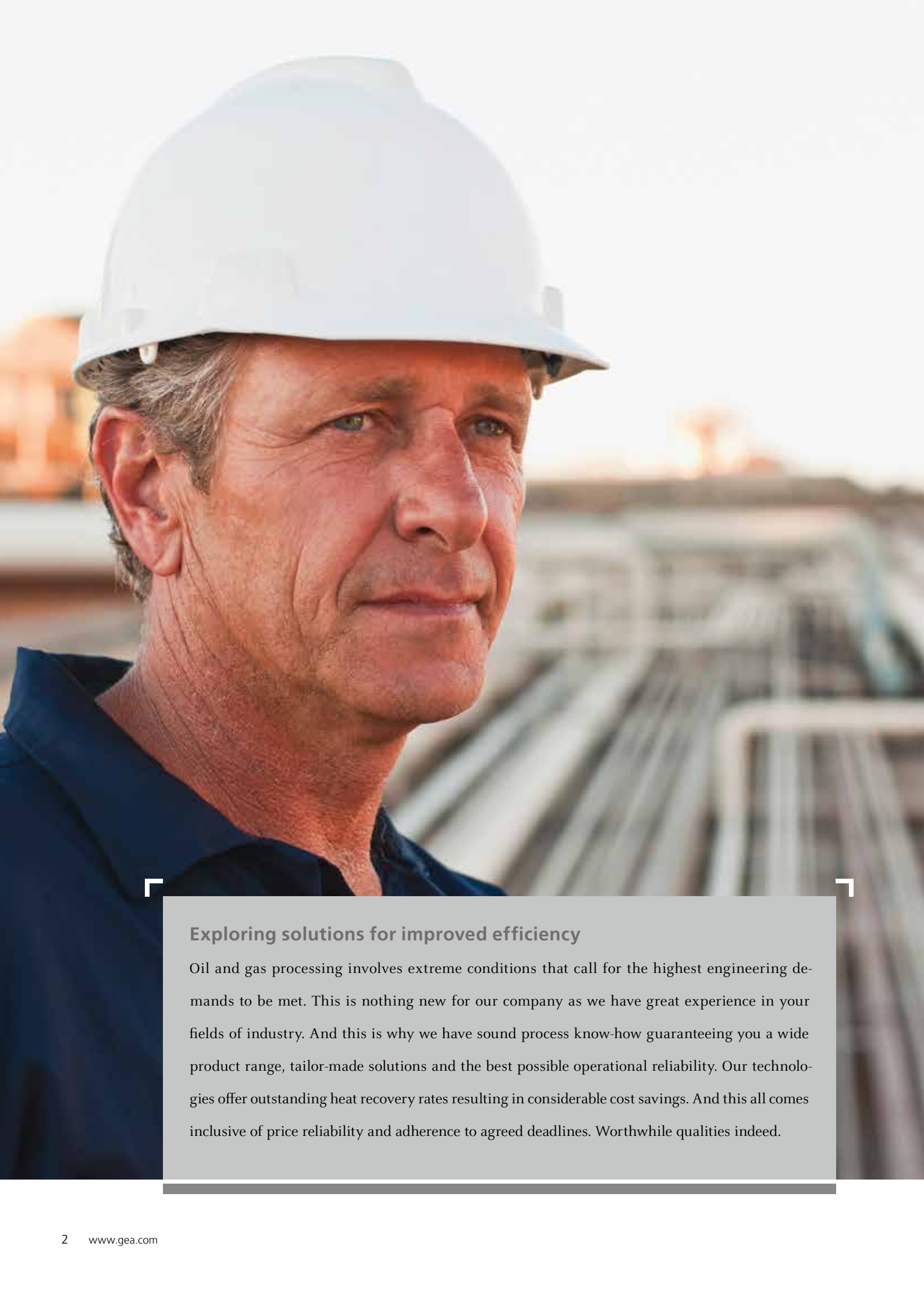




Plate heat exchangers for the oil and gas industry

Individual solutions for extreme conditions



Exploring solutions for improved efficiency

Oil and gas processing involves extreme conditions that call for the highest engineering demands to be met. This is nothing new for our company as we have great experience in your fields of industry. And this is why we have sound process know-how guaranteeing you a wide product range, tailor-made solutions and the best possible operational reliability. Our technologies offer outstanding heat recovery rates resulting in considerable cost savings. And this all comes inclusive of price reliability and adherence to agreed deadlines. Worthwhile qualities indeed.

Why GEA

Precision with tradition

Meeting the challenges of the oil and gas industry

The oil and gas industry is facing new challenges. Firstly demand for energy is on the increase, especially in the rapidly growing economies in Asia, for example. Secondly the development and production of oil and gas reserves are becoming more and more difficult and risky. Also new energy deposits, such as unconventional gas or the development of oil sands and oil shale, are becoming of greater importance.

Efficient and cost-effective energy production will be the decisive competitive factor. At the same time the top prerogative remains safety, to ensure that personnel and environment come to no harm. This means that all processes have to run reliably and efficiently. Energy recovery processes using intelligent interconnection of media flows, optimised raw materials input and processes with minimized CO₂ emissions are the key factors here. Calling for components and equipment that you can rely on absolutely.

Proven reliability

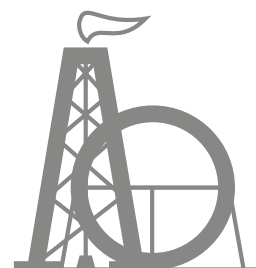
Plate heat exchangers ensure low energy input, gentle product handling and an efficient process. With GEA plate heat exchangers up to 96 % of the energy used in the process can be recovered. To achieve this all materials and components must be exactly matched to each other. And this demands not only competence in heat transfer, but also an exact knowledge of the processes. GEA has been an expert in the field of heat transfer for decades and is a pioneering force in plate heat exchanger development. The Competence and Service Center for gasketed, fully welded and brazed plate heat exchangers obtains the optimum performance from every process. To achieve this, GEA supplies the complete range of gasketed, fully-welded and brazed units. And this pioneering spirit is being strengthened with the integration into the GEA Heat Exchangers Segment of the GEA Group. Every day a wealth of expertise and experience is processed and made available to all companies within the group, resulting in valuable innovations.

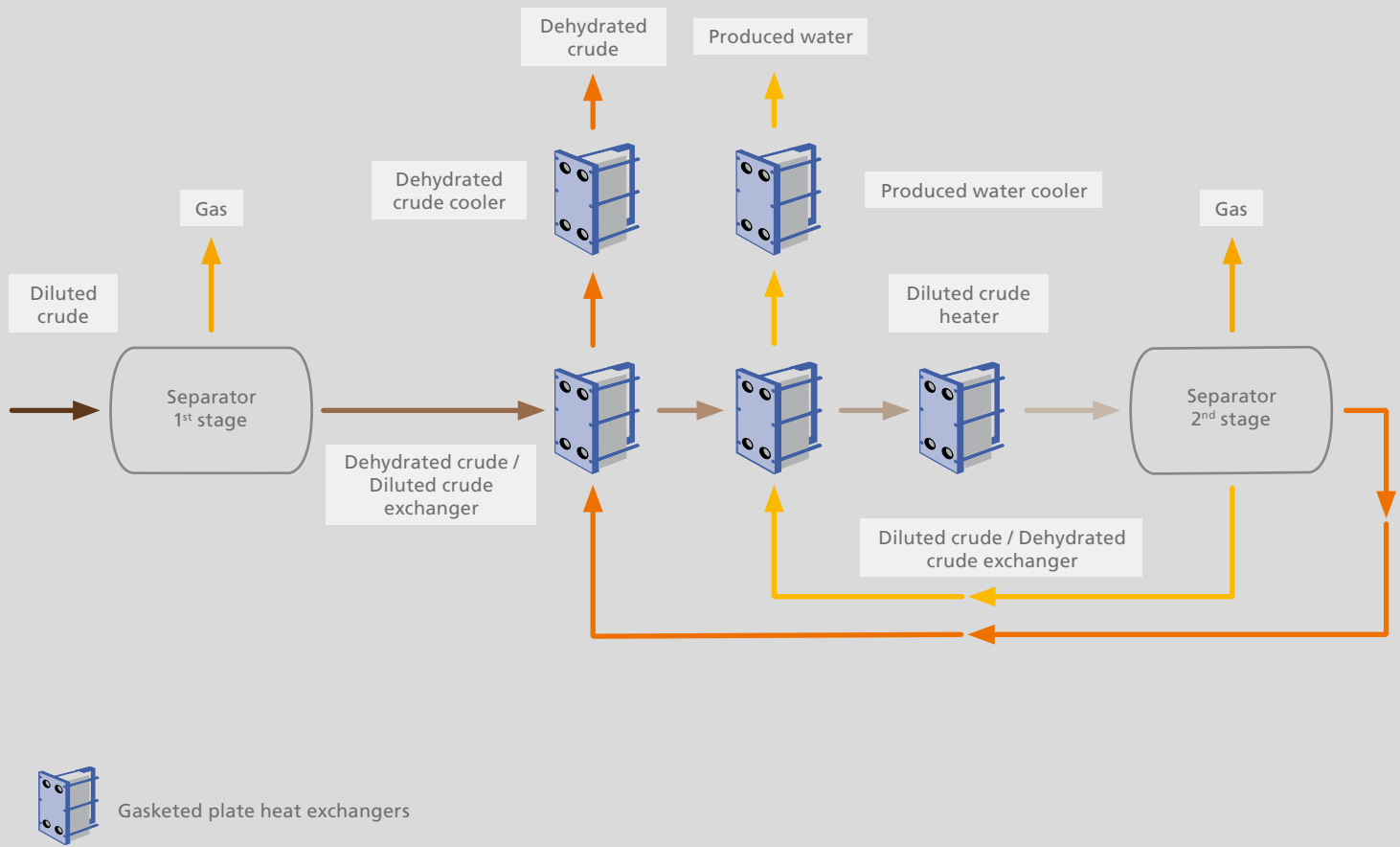
Every single one of our products utilises the latest, combined process know-how and project expertise from all heat exchanger technologies. Developed in Germany and produced in a worldwide network of modern manufacturing facilities our plate heat exchangers (PHEs) are individually tailored for heat exchanging processes: the size of their heat exchanger surfaces, the selection of the plate materials, their surface profiles and flow control properties, the wide range of gaskets and connection variants create an almost unlimited modular system for tailor-made heat exchanger solutions, offering problem-free upgrading or downsizing.



The plate heat exchanger specialists

- Comprehensive engineering and production expertise
- Know-how transfer within the GEA Heat Exchangers segment ensures innovative technical solutions
- Special process knowledge guarantees optimum plate heat exchanger design
- Worldwide after-sales and service network





Oil and gas production

Reliability without compromise

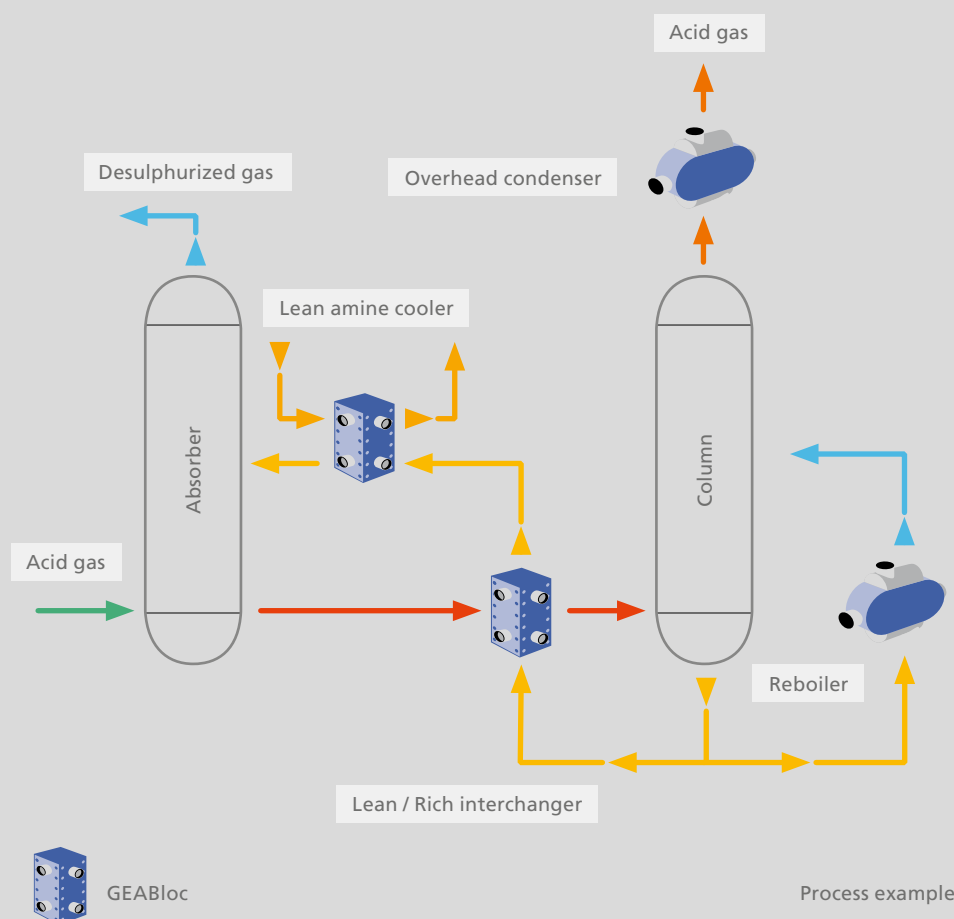


GEABloc with chevron plate geometry
– guarantees highly efficient heat transfer

The costs for oil and gas production have been increasing for years. This is why it is even more important to reduce these costs, and this can only be achieved if production runs perfectly around the clock, as even the shortest production downtime can lead to high losses for the plant operator. Maximum reliability is therefore expected from the equipment and components used. Plate heat exchangers by GEA with their robustness, low maintenance and efficient heat transfer play an essential role in oil and gas production and are a decisive competitive factor.

Every reservoir is different: Whereas thicker crude oils are produced in Venezuela and 'Tar Sands' in Canada, Saudi Arabian crude is thinner and therefore comparatively easy to process. However corrosive media, high temperatures and pressures, and multiphase material mixes are the order of the day. Plate heat exchangers by GEA feature convincing process reliability and efficient heat transfer surfaces with flow-optimised channel geometry, making them perfect for oil and gas treatment, whether in gas dehydration or product cooling using seawater.

Gas desulphurization



Manufacturing quality and production competence

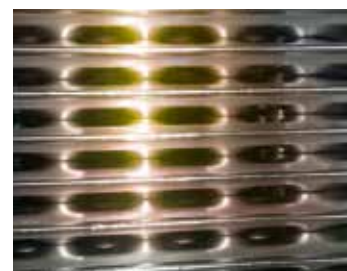
The manufacture of GEA heat exchangers requires wide-ranging know-how and the precision of GEA welders to a particularly high degree. Manufacturing quality assisted by no-compromise quality management ensures safe operation in your system.

Process reliability for the offshore industry

A great number of offshore oil fields are currently being developed, which is why crude oil processing directly on the platform or FPSO (Floating Production Storage and Off-loading Unit) is continually increasing. The compact plate heat exchangers by GEA are perfectly suited for the naturally restricted space available. Reliability is absolutely essential in the offshore sector, as spare parts or maintenance personnel have to be flown to the platform by helicopter at great expense.

Thanks to first-class materials these plate heat exchangers are more than a match for even the roughest conditions at sea. High quality requirements placed on the welding engineering and processing coupled with continuous design optimization ensure a long service life and maximum reliability.

The susceptibility to fouling is low, as high turbulence in the flow gap improves heat transfer and prevents deposits being formed. This keeps maintenance expenditure to a minimum. Plate heat exchangers generally have a completely accessible plate pack to guarantee easy servicing.



GEABloc with double dimple plate geometry – for demanding high-viscosity media or for vacuum condensation



Oil and gas processing

Optimum energy balance

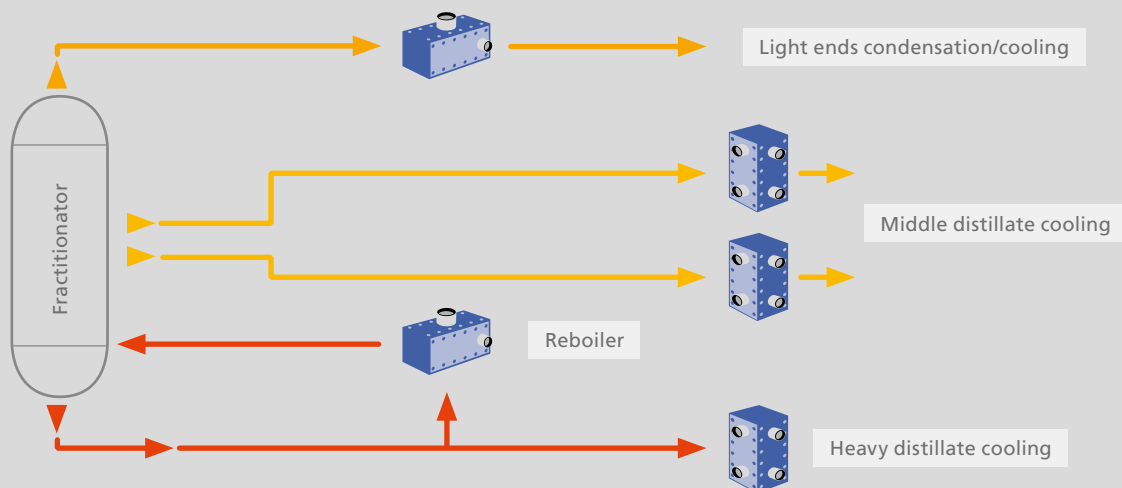


GEABloc BT 75 as overhead condenser

Plant operators involved in processing oil and gas are facing new challenges due to regional legal requirements and global climate objectives: Emissions have to be reduced. And the best way to guarantee success here is to revise the existing energy concept. In the past years plate heat exchangers have become established in process applications, mainly in the downstream sector. In many applications shell-and-tube heat exchangers could be replaced by innovative plate heat exchangers, which have developed into a real alternative. Their main advantages are high thermal efficiency, compact dimensions, low maintenance costs and the reduction of operating costs by saving primary energy and cutting emissions.

Whether in crude oil preheating, distillation (ADU/VDU), fluid catalytic cracking, either as overhead condensers, interchangers or reboilers – there are many possibilities of improving the energy balance in these process plants. Intelligent interconnection of media flows, optimised raw materials input and processes with minimized primary energy input are the key factors. The intelligent use of GEA plate heat exchangers reduces CO₂ emissions.

Reboilers and Condensers



Heat exchanger surfaces and nozzle sizes are designed to suit process conditions, enabling very compact reboiler and condenser solutions. All parts in contact with the product are made from pure metals or high-quality stainless steel grades.



GEABloc

New opportunities for the onshore industry

GEA is opening up new opportunities for improving the energy balance. For example, a vertical multipass GEABloc condenser was integrated into a distillation column in a petrochemical plant of the Brazilian manufacturer Braskem, where condenser and condensate supercooling are combined in a single unit. In addition to the savings resulting from reduced maintenance costs and installation space it was also possible to increase the efficiency of the process.

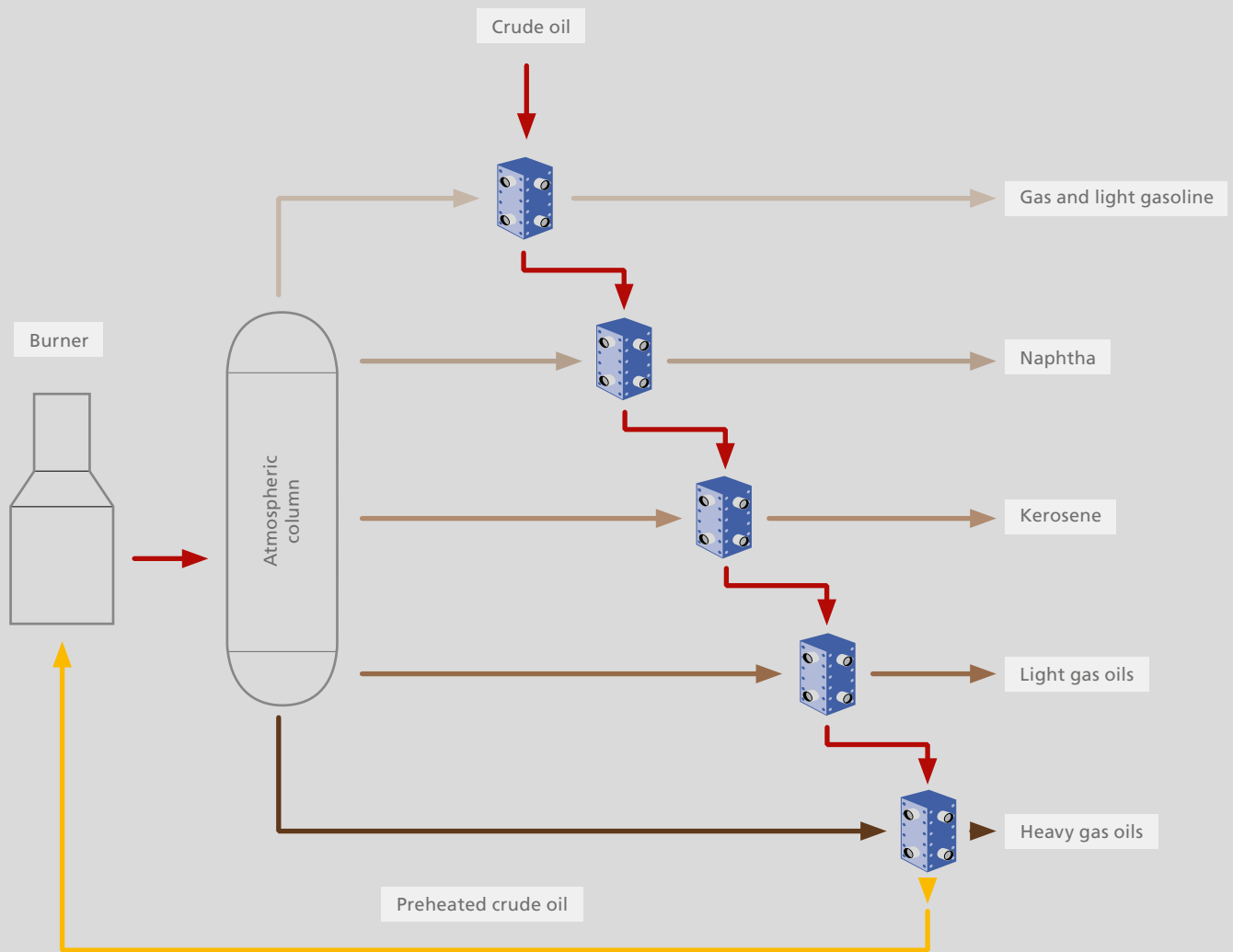
Operationally reliable components are necessary – even in demanding applications. Fouling is a universal problem that can negatively influence operation and that must therefore be prevented as much as possible. Fouling impairs heat transfer efficiency so that more energy has to be provided for the evaporation and heating process. The high turbulence and wall shear stress in the plate heat exchanger reduce fouling considerably, resulting above all in reduced operating costs thanks to energy savings, a longer service life and extended maintenance cycles.

Advantages at a glance

- Energy-saving
- Environmentally sustainable
- Low CO₂ emissions
- Improvement in company earnings
- Excellent service and simple maintenance



Refinery – Atmospheric Distillation



96 % recovery of process energy

GEA plate heat exchangers can recover up to 96 % of the energy input into the process. Excellent thermal efficiency in heating, cooling, condensing and evaporation makes a substantial contribution to reducing your costs and environmental impact.



GEABloc

Oil and gas processing

Optimum heat recovery

Improve your energy balance. An example illustrates how quickly heat recovery systems pay for themselves:

Heat recovery – Example of a refinery

Instead of cooling heavy naphtha from 188°C to 58°C using an air-cooled heat exchanger and venting the waste heat into the environment, it makes sense to utilize this heat. With GEA plate heat exchangers the energy can be used for steam generation, resulting in savings in raw materials. GEA can provide a sensible use of this heat. With plate heat exchangers the energy can for example be charged to Boiler Feed Water (BFW) and used for steam generation. The heat recovery is equivalent to an output of around 3.86 MW, saving around 7000 tonnes of CO₂ per year – with a production running time of 8000 h/a. The investment costs of the plate heat exchanger are amortized in less than two months.

Two heat exchangers in one – Example of process condensation

During the revamp of the production facilities in Brazil the operating company had to install a new overhead condenser on a distillation column. The basic objective of achieving process stability was more problematic due to the fact that this cooling water has a strong tendency to fouling. However due to the high costs for erection and maintenance the client rejected the idea of a system comprising two separate units, i.e. one unit for condensing and one for supercooling. Therefore the operator and GEA agreed to install a GEABloc condenser tailored to meet the customer's requirements in vertical design. This integrates both a condenser and a supercooler in a single plate heat exchanger. This solution saves the client both valuable installation space and maintenance costs and also increases the process efficiency.

With the new vertical GEABloc overhead condenser by GEA these problems are now in the past.

- Highest heat transfer efficiency with reduced installation space and lower costs for the GEABloc thanks to the new Unequal Multipass Design.
- Separate supercooling section is possible in the same GEABloc unit.
- Unequal Multipass means that different media systems can have a different number of flow channels – depending on the distribution of the vapour/liquid mix – used to best achieve thermal/hydraulic optimization.
- GEABloc in robust design using Comb Liner Technology
- Savings in erection costs, space requirements and pipework, as only a single vertical unit is required.



GEA plate heat exchangers ensure optimum energy balance and increase the efficiency of downstream processes.

Our clients in the oil and gas industry

- Petrobras
- Shell
- ExxonMobil
- Eni
- Technip
- KBR



EcoWeld fully-welded plate heat exchangers

GEABloc – Easy to open, quick to clean

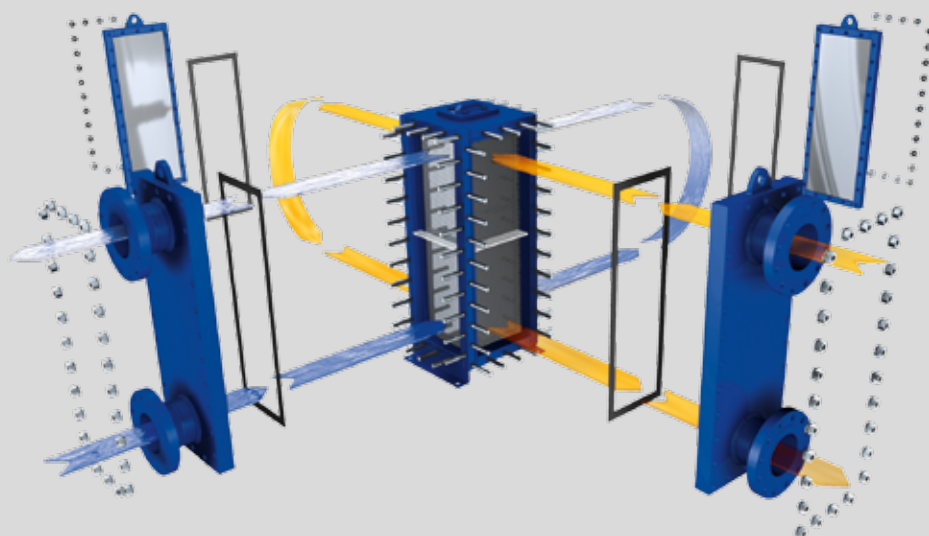
GEABloc – Simply uncomplicated

- Easy cleaning and maintenance thanks to problem-free opening
- Fully welded plate pack
- Suitable for temperatures up to 350°C and pressures of up to 35 bars
- Low space requirements and installation expenditure
- Access to both media sides
- Chevron and double dimple patterns



Adaptable and flexible for oil, gas and petrochemicals

The GEABloc is a fully welded plate heat exchanger that finds use predominantly in the oil and gas sector, chemical industry and in petrochemicals. The solid bolted frame comprises 4 pillars, top and bottom end plates as well as four thrust panels. These can be removed quickly and allow all-round access for thorough and simple cleaning, maintenance and repair of the fully welded plate pack. Two different plate corrugation designs are available. The double dimple pattern is preferred for high-viscosity media, whereas the chevron offers effective heat transfer.



Easy to open – quick to clean

All components coming into contact with the media are made from high-quality alloys or special metals. The bolted baffle plate brackets allow easy cleaning.

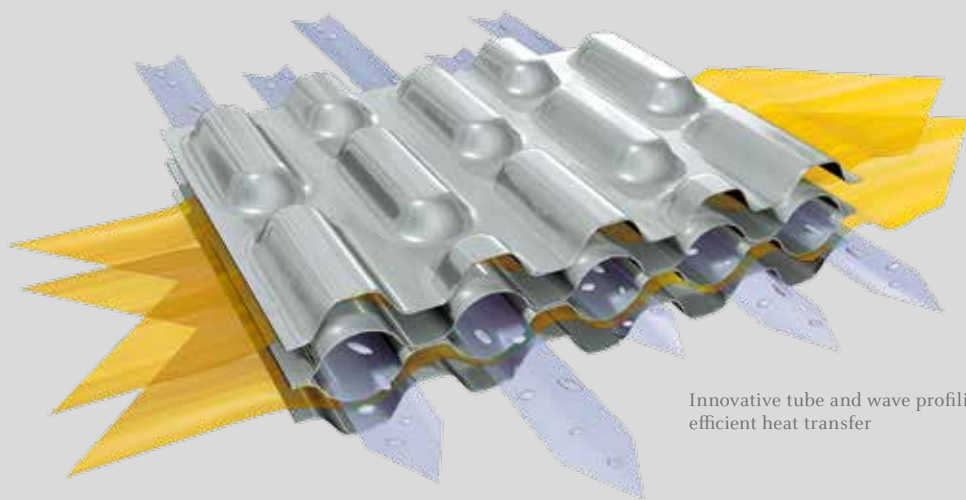
EcoWeld fully-welded plate heat exchangers

GEAFlex – for special applications

Asymmetry and flexibility in a new dimension

GEAFlex combines the advantages of shell-and-tube with plate heat exchangers in a single unit. Contaminated media are fed in on the tube side, the large free flow cross-section prevents clogging of the flow gap and even at large flow rates, pressure loss on this side is extremely low.

The asymmetrical flow gap (tube / plate) makes it a strong player as condenser, evaporator and heat exchanger for thermal treatment of two-phase mixtures in chemistry, petrochemical plants and in the oil and gas industry. The GEAFlex expands the existing product portfolio and responds flexibly to specific customer's requirements – especially in demanding process conditions.



Innovative tube and wave profiling for efficient heat transfer

Problem-free use with difficult substances

GEAFlex plate heat exchangers are the best choice for gaseous, liquid and two-phase media in the chemical and petrochemical industry.

GEAFlex – Maximum flexibility

- A fine combination: the GEAFlex unites the advantages of plate-type and shell-and-tube heat exchangers in a single unit
- Contaminated media can be used on the tube side with a large free flow cross-section
- Operation in a vacuum with minimum pressure losses
- Heat transfer surfaces of over 12.000m² possible in a single unit
- Large condensation performance of up to 200 MW and condensate supercooling in a single unit
- Variable temperature limits up to 550°C
- Variable pressure limits up to 60 bars
- High pressure differences between the media



NH / NT Series

Designed for high pressure

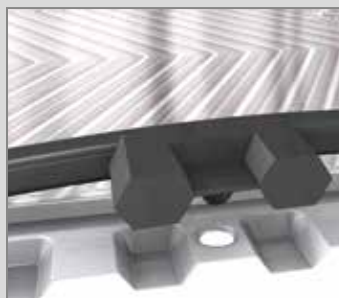
Advantages at a glance

- New plate design for higher pressure resistance
- Low investment with minimum maintenance costs
- Optimised media distribution
- Simplified installation
- Fast and reliable gasket replacement
- Optional product extras available

The newly designed NH Series is based completely on the product properties of the NT series and reveals its strengths in all applications where special pressure resistance is called for – without making any compromises with regard to high-efficiency heat transfer.

The key is the combination of special materials and the innovative design that differs from the NT Series with the changed corrugation area. The high-performance plate is designed for operating pressures of up to 28 bars. Plate materials like titanium or also special materials such as 254 SMO®, Alloy 59, Alloy 686 and C-276 can also be embossed.

The result is the NH Series with a plate concept that easily handles the pressure involved in oil and gas production and offers outstanding service.



EcoLoc gasket system:
Our innovative, glueless EcoLoc gaskets enable quick and easy replacement of gaskets



OptiWave plate design
The optimised corrugation ensures ideal flow across the entire plate width, thus providing maximum heat transfer rates.



OptiWave Design optimized to resist pressure

The modified corrugation of the NH plate provides higher pressure resistance – enabling the use of efficient gasketed plate heat exchangers at pressure levels that have been covered by fully welded units exclusively until not long ago.

LWC Series

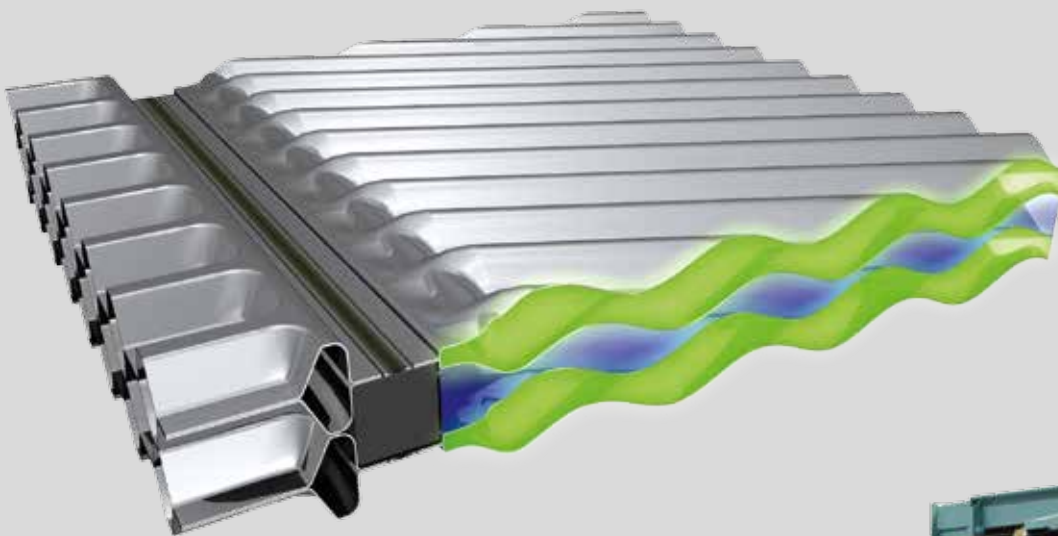
Double NT technology for critical media

Conventionally gasketed plate heat exchangers quickly reach their limits when critical media are involved. GEA solves this problem using state-of-the-art technology: the laser-welded cassettes of the LWC plate heat exchanger allow aggressive media to flow safely.

The LWC series is based on the NT plate technology and is manufactured using the most modern computation, design and manufacturing methods. Our LWC plate heat exchangers work according to the principle of completely separated flow channels. Only this strict separation makes many industrial applications possible altogether.

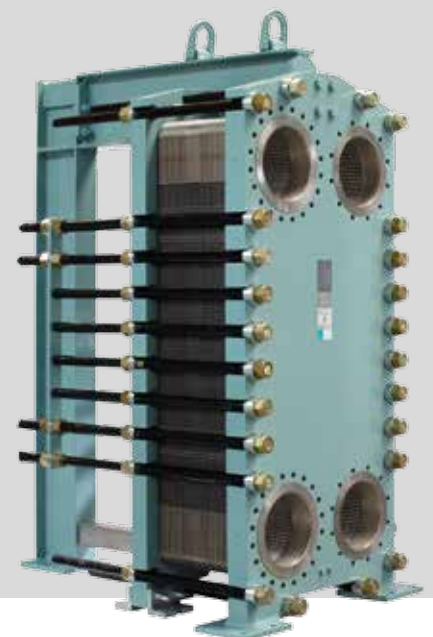
Your advantages at a glance

- Laser-welded cassette ensures maximum process safety even with aggressive media
- Small investment due to maximised heat transfer
- Reliable function due to tried-and-tested engineering
- Simple installation, product-side access for cleaning



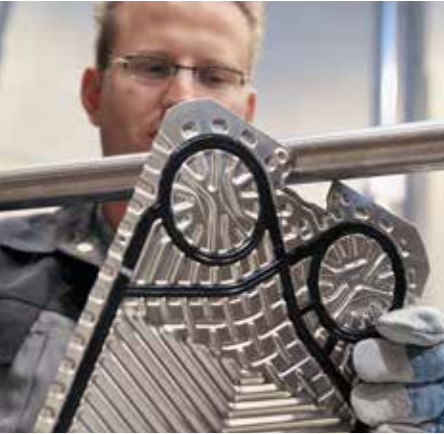
LWC 350 – the largest laser-welded cassette in gas processing

The impressive LWC 350 units made by GEA are used on FSRU (Floating Storage and Regasification Units) that can retransform the liquefied natural gas back into the gas phase on board ships.



Service specialist EcoServe

24/7 After-sales and Service



Global service based on experience

GEA – and its subsidiary EcoServe After-sales and Service for plate heat exchangers – offers you a round-the-clock reliable and direct comprehensive range of services. From installation through maintenance and spare parts supply right up to preventative measures such as our innovative leakage testing we cover an extremely wide range and stay in close contact with our customers. As the leading specialist for plate heat exchangers of all types and manufacturing brands we have established a global service network available to our customers around the clock, also providing meticulous maintenance of equipment from other manufacturers.

Specialist expertise, available at short notice, always on time

To enable maximum efficiency and availability of your processes, you can benefit from numerous synergies within the GEA Group and the experience of our highly trained technical staff. We offer consulting services when you are considering renewing or expanding your existing facilities to ensure precise and careful installation. If the plate heat exchanger is delivered to your site in dismantled condition, we can take care of assembly and pressure testing on site. A further aspect of our service is preventative maintenance, as plate heat exchangers can become soiled and are subject to wear. We provide visual inspections as a preventative service and advise you of any necessary cleaning or service works, including the level of costs to be expected. Minor soiling can also be mechanically removed directly on site. However, the safer option is mechanical or chemical treatment of the plates in our specialist workshops.

Original spare parts

Our primary objective is to keep your equipment running at all times. Problem-free plate heat exchanger operation calls for high-quality spare parts with an absolutely exact fit. Only this can guarantee a tight fit, efficient function and a long service life. In addition to OEM parts we also use certified products by other quality suppliers, where the attractive value-for-money factor is highly popular with our customers. Our warehouses keep a constant supply of plates and gaskets for almost every brand and model or we can obtain these at short notice.

Reliable service is essential to make a product good and keep the customer satisfied. With EcoServe you can enjoy a comprehensive service network with a team of specialist technicians – throughout the world!





Commissioning and start-up

Servicing and maintenance

Erection services

Spare parts

24-hour service

Consulting

Leakage testing

Modernization

Training courses

Round-the-clock

EcoServe is the leading service specialist for all types of plate heat exchangers and all manufacturing brands. Our service is based on over 20 years of experience in after sales and service and backed by the expertise and competence of GEA as internationally renowned manufacturer of high-performance plate heat exchangers. With a global service network we are always there to help you - wherever you are in the world.





We live our values.

Top performance • Passion • Integrity • Commitment • GEA-versity

The GEA Group is a global mechanical engineering group with a billion Euro revenue and has operations in over 50 countries. The company was founded in 1881 and is one of the largest suppliers of innovative equipment and process technologies. GEA Group is listed on the STOXX® Europe 600 Index.

GEA Heat Exchangers

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