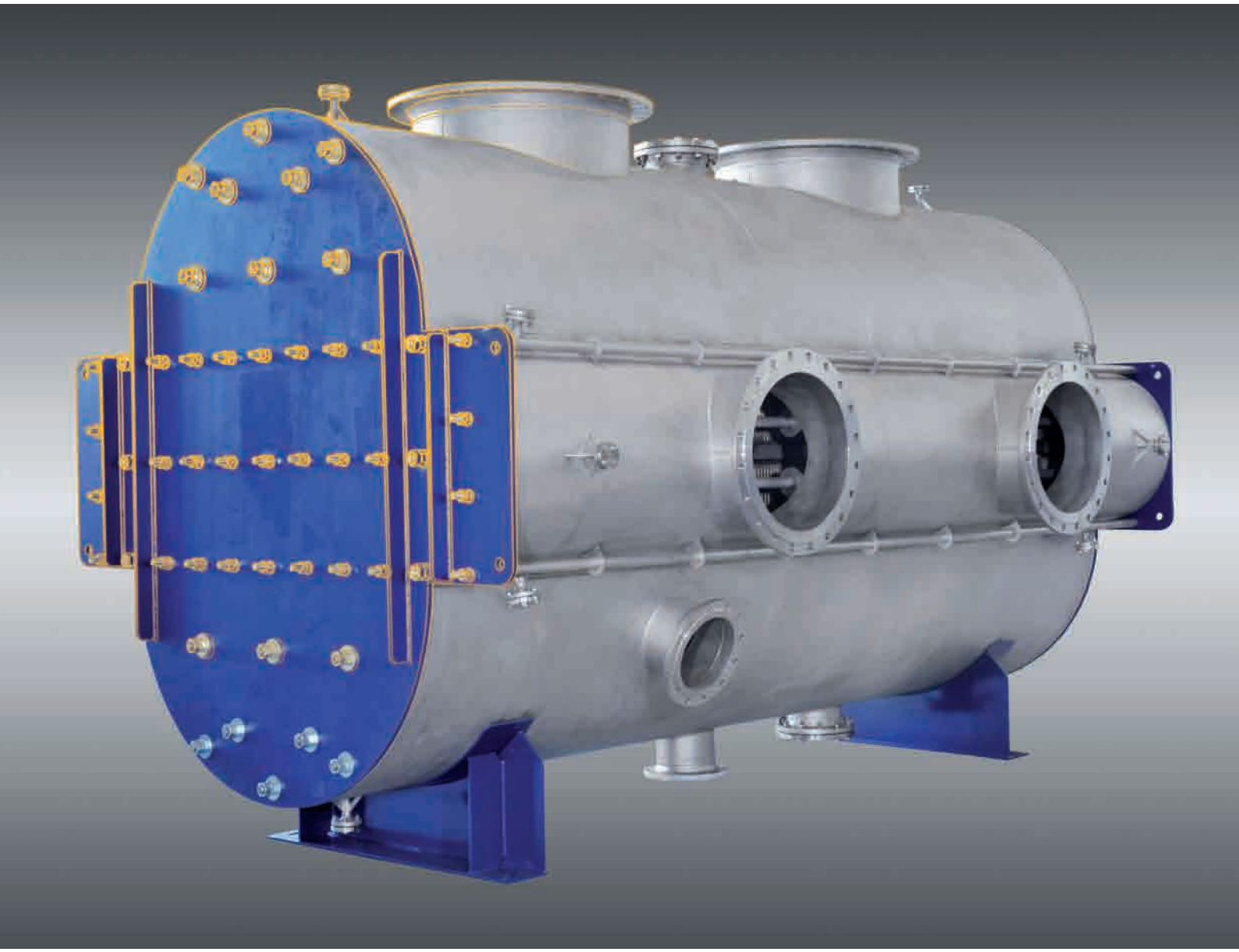
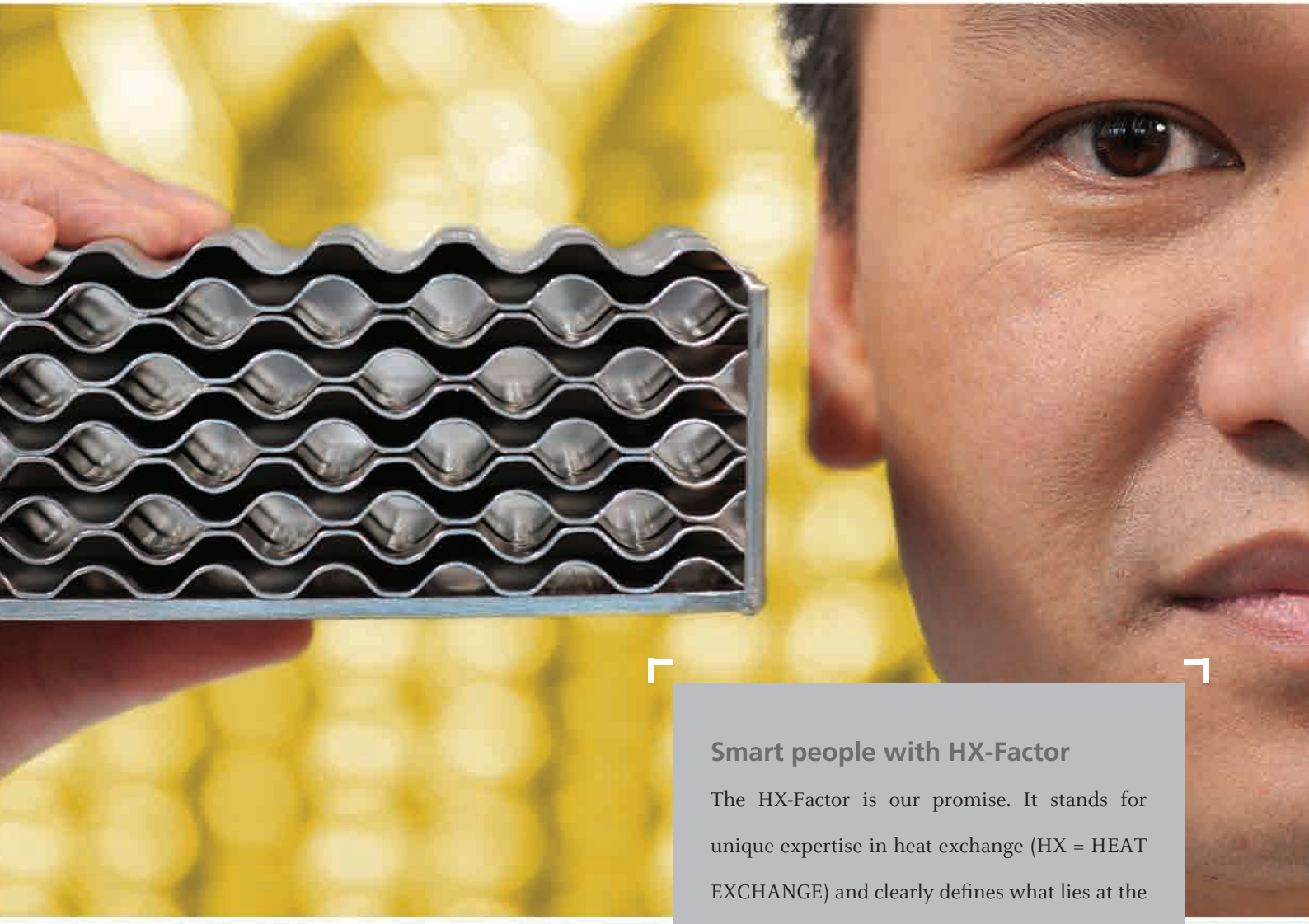


GEAFlex - fully welded plate heat exchanger

Specialist for phase changes and pressure resistance up to 100 bar



Smart people with HX-Factor

The HX-Factor is our promise. It stands for unique expertise in heat exchange (HX = HEAT EXCHANGE) and clearly defines what lies at the Segments core - e.g. our GEAFlex plate with tubular and wavelike channels. It stands pressures of up to 100 bar and has a long tradition in several industries. This plate has been successfully working in turbine cycles of power plants for more than 20 years. We are dedicated to design cost efficient plate heat exchangers with excellent thermal performance and maximum mechanical stability. That's what we call the HX-Factor!

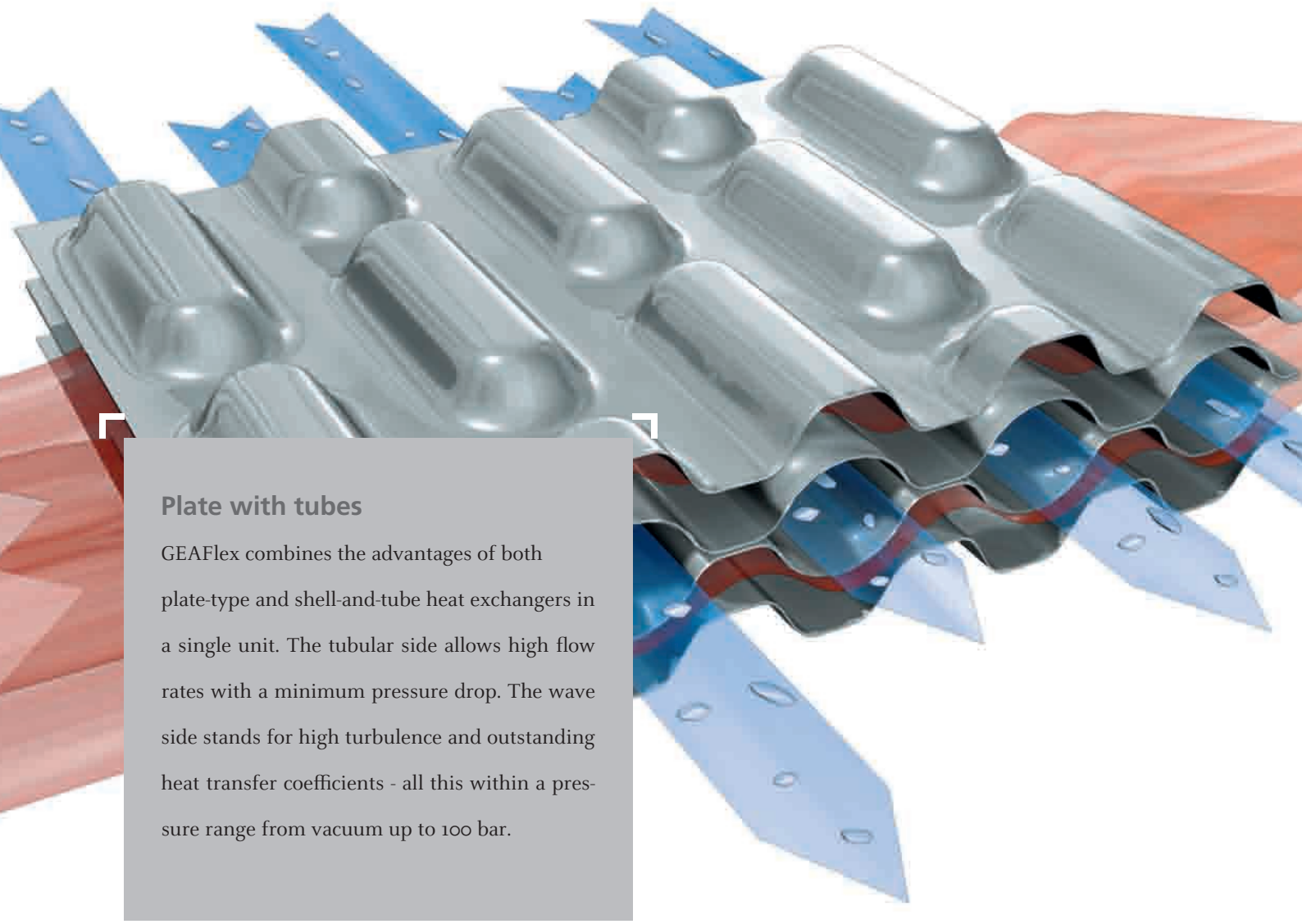
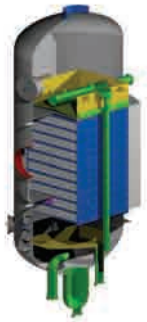


Plate with tubes

GEAFlex combines the advantages of both plate-type and shell-and-tube heat exchangers in a single unit. The tubular side allows high flow rates with a minimum pressure drop. The wave side stands for high turbulence and outstanding heat transfer coefficients - all this within a pressure range from vacuum up to 100 bar.

The new standard for economic solutions

The GEAFlex design is based on standardized modules and plate packs for different pressure ratings. Each size is optimized to enable reliable and long-term operations.
The asymmetrical flow gap (tube/wave) 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.
With tube diameters of 6 or 9 mm fluids with particles and high fouling risk can be handled.
The wide and open cross section of the tubular side is most advantageous for condensation under vacuum, large gas volume flow rates and two-phase applications like gas heating or gas cooling with partial condensation (gas drying).
Various design options are available for different requirements. Depending on the operating pressure, headers in adequate shape or round vessels are used. Long-time experience and proven reliability of the mechanical design ensure carefree and long-standing operation of the GEAFlex.
Longtime experience, e.g. in power stations since 1992, and proven reliability of the mechanical design ensure carefree and long-standing operation of the GEAFlex.



EVAPplus - plate falling film evaporator

Established and innovative:

- 700 000 m² of heat transfer area installed
- 12 000 m² of heat transfer area installed in one plate falling-film evaporator for the sugar industry

GEAFlex

Reliability & safety have top priority



GEAFlex plate

Your advantages at a glance

- Up to 100 bar operating pressure on the wave side
- A safe operation due to fully welded design (gas-proof design)
- Standardized modules and housings for economic solutions
- Know how and long-time experience lead to reliable product quality

Inside GEAFlex

- GEAFlex plates are alternately welded to build a plate pack. The open ends of the plate pack are closed with distribution headers. Pressure plates are bolted with the fully welded housing and ensure mechanical stability.
- Crossflow is the basic flow-mode. Cross- and counterflow can be set up with internal baffle plates.

We have long time experience and extensive know-how in pressing and welding of thin plate materials. GEAFlex Plate Heat Exchangers are fully welded and have been well proven for many years. Safe operation for the people and the environment with a long and carefree service life is supported by the fully welded and gas-proof design without using any gaskets. Our aim is the economical solution with a strong technical performance and attractive lead times for our clients. The GEAFlex standard series offers a robust and compact design with outstanding heat transfer. We have extended the pressure range for GEAFlex to up**100bar.**

GEAFlex plates

- Asymmetrical corrugation: one side is formed like tubes with a diameter of 6 or 9mm, the other side is shaped like waves
- Volume flow rates between the hot and cold side can be remarkably different.
- Tube and wave sides can be arranged as single- or multipass and allows for cross-flow or cross- and counterflow

Cleaning

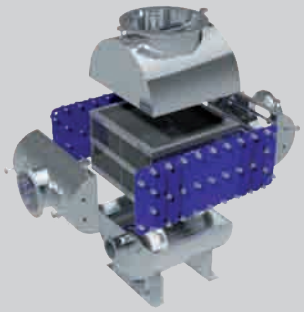
- CIP is the standard cleaning method. Additional provisions for mechanical cleaning of tube and wave side can be integrated

GEAFlex standard series

- Modular concept of plate packs and housing for different pressure ratings
- Heat transfer areas of up to 2.500 m² in standard units and up to 12.000m² on special request
- Connections of up to 3.000mm in diameter.
- Condensation capacities of 200MW in a single unit

Certification

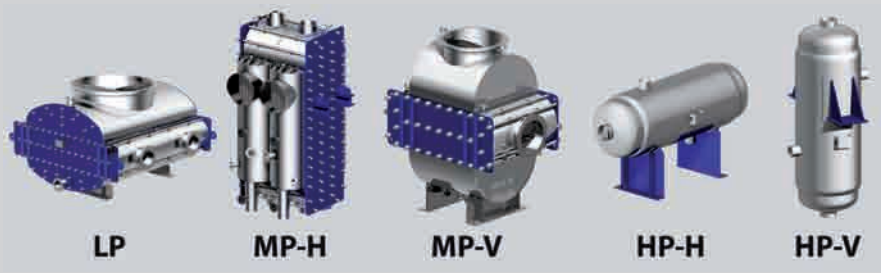
- Design and fabrication according to international codes such as EN13445 / ASME / AD2000



Explosion view of GEAFlex

GEAFlex series

Technical data

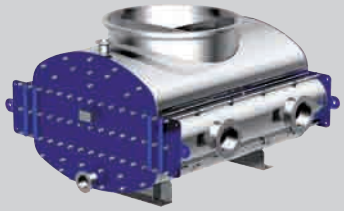


GEAFlex standard features

Pressure rating		DS1	DS2-3	DS4	DS5-7
Plate & plate pack design					
Plate corrugation		wave-tube	wave-tube	wave-tube	wave-tube
Tube diameter	mm	6,0/9,0	6,0/9,0	6,0/9,0	6,0/9,0
Plate thickness	mm	0,8	0,8	0,8	1,5
Plate width	mm	330	330	330	330
Plate length	mm	1000-3600	1000-3600	1000-3600	800-10300
Number of plate packs / unit		1	1-4	1-4	1-2
Maximum dimensions of plate pack in one unit (length x width x height)	mm	3600x4600x1100	3600x3600x1700	3441x3586x1686	10300x750x750
Maximum heat transfer area / unit	m²	2500	2540	2540	1040
Casing & connections					
Casing type		LP	MP-H	MP-V	HP-H/V
Connections		DN100-DN3000	DN100-DN1000	DN100-DN1000	DN100-DN800
Design conditions					
Maximum operating pressure on tube side		-1 / 0,5	-1 / 16	25	16
Maximum operating pressure on wave side		10	25	45	60/80/100
Maximum operating temperature		110	300	300	150
Materials EN (ASTM)					
Plate pack		1.4301 (304) / 1.4404 (316L)	1.4301 (304) / 1.4404 (316L)	1.4301 (304) / 1.4404 (316L)	1.4301 (304) / 1.4404 (316L)
Casing		1.4541 (321) / 1.4571 (316Ti)	1.4541 (321) / 1.4571 (316Ti)	1.4541 (321) / 1.4571 (316Ti)	1.4541 (321) / 1.4571 (316Ti)
Materials on request (extract)		1.4539 (904L) /	1.4547 (31254) /	1.4462 (31803) /	Nickel-alloys

GEAFlex - vacuum condenser

High performance and low weight



Condensation processes in vacuum need low pressure drop at high volume flow rates. The tubular side of the GEAFlex plate pack shows ideal suitability for this purpose because of a short flow path and a free and wide cross section with a significant thermal performance. The cooling fluid is passing through the wavelike channels with high turbulence. This leads to excellent heat transfer coefficients in the condensing media as well as on the service side.

The GEAFlex vacuum condenser fulfills the requirements for minimum space and weight. A special design for a fully welded and compact housing has been developed. This allows the installation under the most difficult conditions and on top levels, where size and weight are an important issue.

Large diameters for the steam inlet connection according to process requirements can be provided. All connections are adjusted to client's requirements. Non-condensable gases will be removed through appropriate devices.

Application examples

- Vacuum steam condensation in incineration plants to provide low temperature heat for greenhouses and district heating networks
- Condensers in vacuum crystallization
- Condensation of process media from vacuum distillation columns

Your advantages at a glance

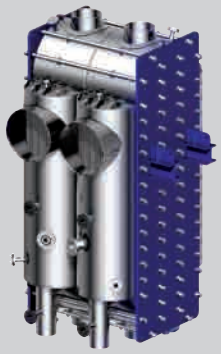
- Compact design with small footprint and low weight
- Minimum pressure loss at high volume flow rates
- Connection sizes up to DN3000
- Excellent heat transfer under vacuum conditions



GEAFlex - condenser for pressures up to 25 bar

First class in power generation and district heating

GEAFlex condensers have been working successfully in the water-steam-cycle of power plants since 1992. They withstand severe operating conditions due to enhanced pressure resistance of the GEAFlex plates. The unique three dimensional and solid design of the plate pack corners ensures a strong connection between plate pack and housing. Both plate pack and housing are based on a modular configuration. A combination with a condensate collector (hotwell) is possible. In typical installations the GEAFlex condenser supplies the required energy to district heating systems. Although the best efficiency is reached with condensation of saturated steam it is also possible to use superheated steam. After total condensation the condensate can be led through several passes within the plate pack which provides further subcooling of the condensate.



Modular design of a GEAFlex overpressure condenser.
In two parallel modules steam will be condensed and the condensate subcooled further.
Total heat load: 170 MW.

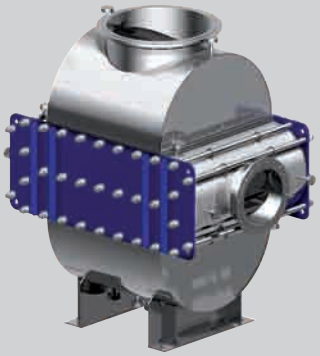
Your advantages at a glance

- More than 20 years of experience in the turbine cycles of power plants
- Unique three dimensional and solid design of the plate pack corners
- Integrated condensate subcooling zone



GEAFlex - evaporator

Efficient phase change in an asymmetrical plate design



GEAFlex as evaporator.

Your advantages at a glance

- Low pressure drops in the tube channels allow for extreme volume changes and improve the evaporation process
- Modular design of Flex plates and housing with add-ons allow "Natural Circulation" and "Plate Falling Film Evaporation"
- Connections up to DN 4000 can be welded to the housing
- Operation under high differential pressure is possible

The special corrugation of GEAFlex plates with open tubes on one side and the compact wave on the other side makes this plate most suitable for evaporation applications. Liquids can pass the tube channels of the plate pack either from bottom to top as rising film or with natural or forced circulation or in reverse direction following the principle of falling-film evaporation. Liquids, steam, vapor or two phase mixtures (evaporative condenser) can be used as heating medium. Add-ons are required to adjust the GEAFlex evaporator to natural or falling-film Evaporation.

Natural Circulation Evaporator:

- Liquid circulation through internal or external channels.
- The distributor on top of the plate pack can be equipped with a demister

Plate falling-film evaporator:

- Installation of plate packs in a round shell
- Our patented liquid distribution unit ensures even distribution of the evaporating liquid in the vertical tubes.
- Internal or external droplet separators achieve the required grades of vapor purity.
- Liquids can be evaporated in the open and short tube channels of the GEAFlex evaporator under severe vacuum conditions.



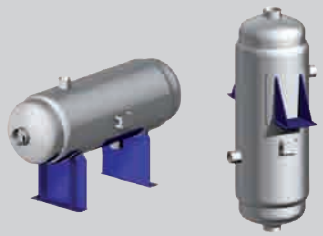
GEAFlex HP - high pressure

Free flow channels with a pressure resistance of up to 100 bar

The GEAFlex plates are further improved to match pressures levels of up to 100 bar on the wave side. The tube side as the service side is designed for 16 bar. A newly developed and unique three dimensional stabilization is welded to all plate edges and builds a strong connection between plate pack and housing. The plate packs are installed in a round vessel. The GEAFlex plates and housing are extremely robust and durable. They withstand the full differential pressure. Plate packs and vessels can be manufactured from different materials. GEAFlex heat exchangers comply with international safety standards.

- More than 1000 m² of heat transfer area in one vessel.
- Very good thermal performance for single phase and two phase applications.
- High flow rates with minimum pressure drops.

The result is a compact design with low weight and space required. This makes the unit appropriate for all kinds of offshore applications, e.g. LNG liquefaction and regasification.



GEAFlex HP - high pressure

Your advantages at a glance

- Operating pressure of up to 100 bar
- Lowest pressure drops even with high flow rates
- Fluids with particles can be handled
- Unique three dimensional stabilization of plate pack edges





Fully automatic pressing lines ensure consistent product quality



Highest manufacturing know-how leads to tight weld seams

Heat Exchange is our passion

Comprehensive engineering and production knowledge

GEA plate heat exchangers (PHEs) are designed with efficiency as the top priority. In figures: our PHEs are capable of recovering more than 90 % of the input energy. The extremely high operational reliability is an additional benefit; guaranteed by the combined plate engineering expertise and plate production know-how of the GEA engineers, by the high quality of the materials and their processing, coupled with comprehensive project management.The plate shapes developed for the various applications and the wide range of materials constitute the basis for the extremely high heat transfer coefficients of our plate heat exchangers. Fully automatic pressing lines ensure consistent product quality.

We ensure perfect connections

Whether roller seam welding, spot welding or laser welding, either manual or partially mechanised GTAW, manual FCAW or microplasma: the art of welding is very diverse at GEA. Performed by highly qualified employees with an extraordinary level of expertise, skills and experience in every area – for example in the welding of housings, vessels and pressure parts. And this know-how is continuously expanded by further training and experience. This is also guaranteed by a consistent quality management system to ensure that both our expertise and our products continue to reliably achieve the highest quality level.

Quality for ultimate process reliability

GEA quality gets your projects on the path to success

State-of-the-art production facilities ensure that the production sites achieve high productivity. But quantity is nothing without quality. High-precision plate heat exchangers are produced here that have proved their worth thousands of times over, particularly with regard to their excellent quality features. This quality standard begins in the careful selection of the raw materials used in manufacturing the plate heat exchangers. The pronounced awareness of the materials used is a central factor in the extremely high service life of our products.

Our service close-by

Good products need good service to fully satisfy customers. With GEA you can rely on a comprehensive service network staffed by highly trained technicians – throughout the world! You always have the full spectrum from a single source – servicing, repair, spare parts, etc. at short notice, on time and with technical expertise, even for products or components made by other manufacturers. We use only high-quality original spare parts to guarantee a perfect fit, efficient functioning and a long service life.



Accurate service quality is the result of precise workmanship



We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global mechanical engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX Europe 600 Index.

GEA Heat Exchangers

GEA Ecoflex GmbH

Schifferstrasse 20-22, 47059 Duisburg, Germany
Karl-Schiller-Str. 1-3, 31157 Sarstedt, Germany
info.phe-systems.de@gea.com

Contact

Phone: +49 203 98420 112, Fax: +49 203 98420 198
www.gea-phe.com

© GEA Heat Exchangers. Subject to modification. K0-03/2014 - PE-2014-0001-GB