



GEA Red Heat Pumps

High-performance low-charge ammonia industrial heat pumps



THE GEA GROUP

is headquartered in Dusseldorf, Germany. As the technology leader for ammonia-based cooling and heating applications, we offer our chillers, heat pumps and compressors to customers worldwide. Discover more at www.gea.com/en.

Good for the environment, good for your savings

The future of industrial heating belongs to environmentally friendly technologies such as heat pumps. They use a wide variety of existing heat sources and combine performance and energy efficiency with sustainability and low costs.

GEA Red Heat Pumps combine the potential of heat pump technology with the natural refrigerant ammonia. The result? Industrial heat pumps that are extremely environmentally friendly and efficient. And there is more: high-end components, carefully configured, offer high availability, reliability and longevity. This makes them a future-proof investment, especially in the face of ever-stricter guidelines on energy consumption, environmental compatibility and greenhouse gases.

GEA Red Heat Pumps: one solution, twice the efficiency

GEA Red Heat Pumps have a GWP of 0 and, depending on the heat source, achieve water temperatures up to 80 °C – making them a sustainable solution capable of meeting all your future heating needs.

The refrigerant makes all the difference

There are lots of heat pumps out there. But the combination of the refrigerant ammonia with a wide range of waste heat source options makes GEA Red Heat Pumps particularly attractive. With a GWP (Global Warming Potential) of 0, the natural refrigerant ammonia complements the environmentally friendly properties of a heat pump system – ensuring that GEA Red Heat Pumps score very high for ecology.

Convenience meets safety

Thanks to their extremely compact design, GEA Red Heat Pumps are very easy to install and maintain. Carefully selected components, such as efficient compressors, welded plate heat exchangers

or 3-D-bent tubes, provide maximum safety and availability. Thanks to minimal weld seams in the refrigerant circuit, maximum safety is guaranteed even under demanding conditions.

Flexibility is the best argument

All series models offer maximum choice when it comes to liquid waste heat source options. This makes them suitable for a wide variety of applications and ensures they always provide the right heating performance. GEA Red Heat Pumps are particularly effective in combination with a Blu Chiller, the standard liquid chiller from GEA. Using both systems together provides a perfectly matched solution for cooling and heating.

F-Gas Regulation, BREEAM and other sustainability labels

GEA takes environmental protection and sustainability seriously.

- **F-Gas Regulation:** Key to the European regulation adopted in 2014 is Global Warming Potential (GWP). This represents an internationally accepted environmental benchmark for the use of refrigerants. Based on their CO₂ equivalent, the use of various refrigerants will be severely restricted around the world in the coming years. Ammonia, a natural refrigerant, has a GWP of 0 and is not affected by any restrictions.
- **Sustainability labels:** In accordance with leading certification systems such as BREEAM, DGNB and LEED, GEA heat pumps can increase the performance rating for the sustainability of construction projects, buildings and infrastructure projects.



Strong solutions for a range of industries

Powerful, compact and low-maintenance, GEA Red Heat Pumps are used worldwide across a wide variety of industries. And there are always new areas of application for which ammonia-cooled heat pumps are perfectly suited.

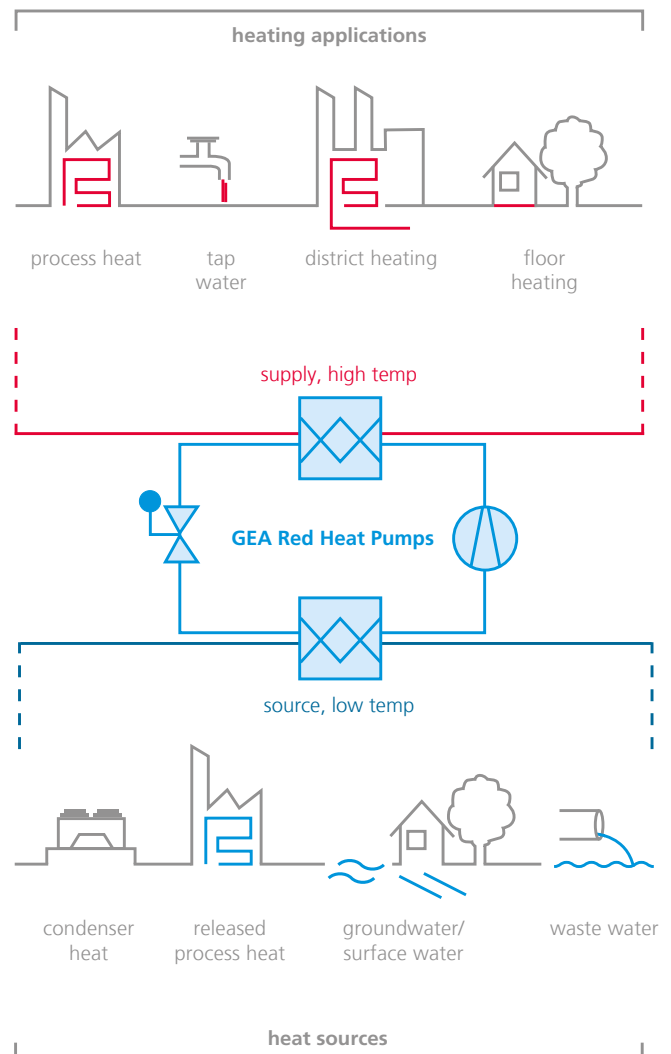
Heat pumps in a nutshell

GEA's heat pump technology uses electrical energy to raise waste heat from different sources to higher temperatures.

Suitable heat sources include

- condensation heat from refrigeration plants
- groundwater and surface water
- wastewater from processes
- heat created during industrial processes

The core is usually a compressor. As with refrigeration systems, the compressor comprises a thermodynamic circuit consisting of compression, condensation, pressure reduction and evaporation. However, heat pumps focus on the warm side, which produces higher temperatures than a refrigeration system. Capable of generating a range of temperatures between 55°C and 80°C, GEA Red Heat Pumps are suitable for a wide variety of applications.



GEA Red Heat Pumps are used successfully in multiple applications, such as:

- **providing process heat (production processes)**
GEA Red Heat Pumps are often used in combination with chillers to provide both heat and cold. Process heat is used in production processes such as food production, chemical process engineering or drying processes such as wood processing.
- **hot water supply** for washing, showering, cleaning and underfloor heating etc.
- **district heating**
District heating is already widespread in many countries. GEA Red Heat Pumps ensure constant flow temperatures for heating a wide range of buildings. Usage temperatures range between approx. +55°C and +80°C.



GEA RedAstrum – high performance in a small footprint

GEA's RedAstrum is a new range of compact, highly standardized ammonia heat pumps featuring carefully selected components and a sophisticated design. The benefit? Maximum efficiency and reliability in an exceptionally small footprint.

A new generation of screw heat pumps provides four models based on the newly developed GEA Grasso M series 52-bar screw compressors.

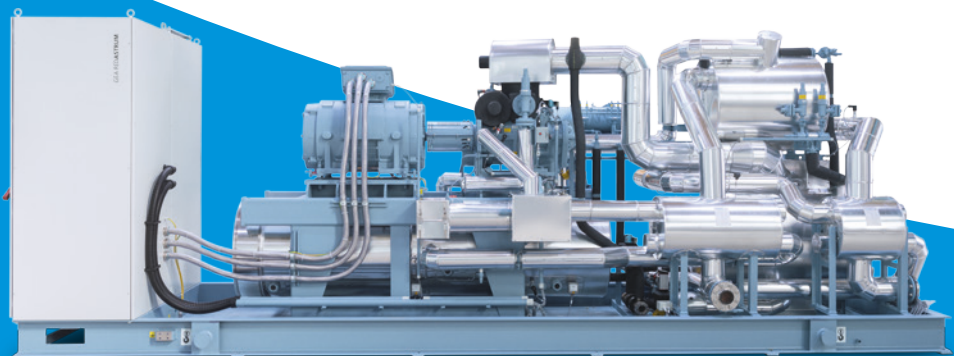
GEA RedAstrum heats water or similar suited fluids to temperature levels between 55 and 80°C and can be utilized in industrial processes or for local and district heating networks.

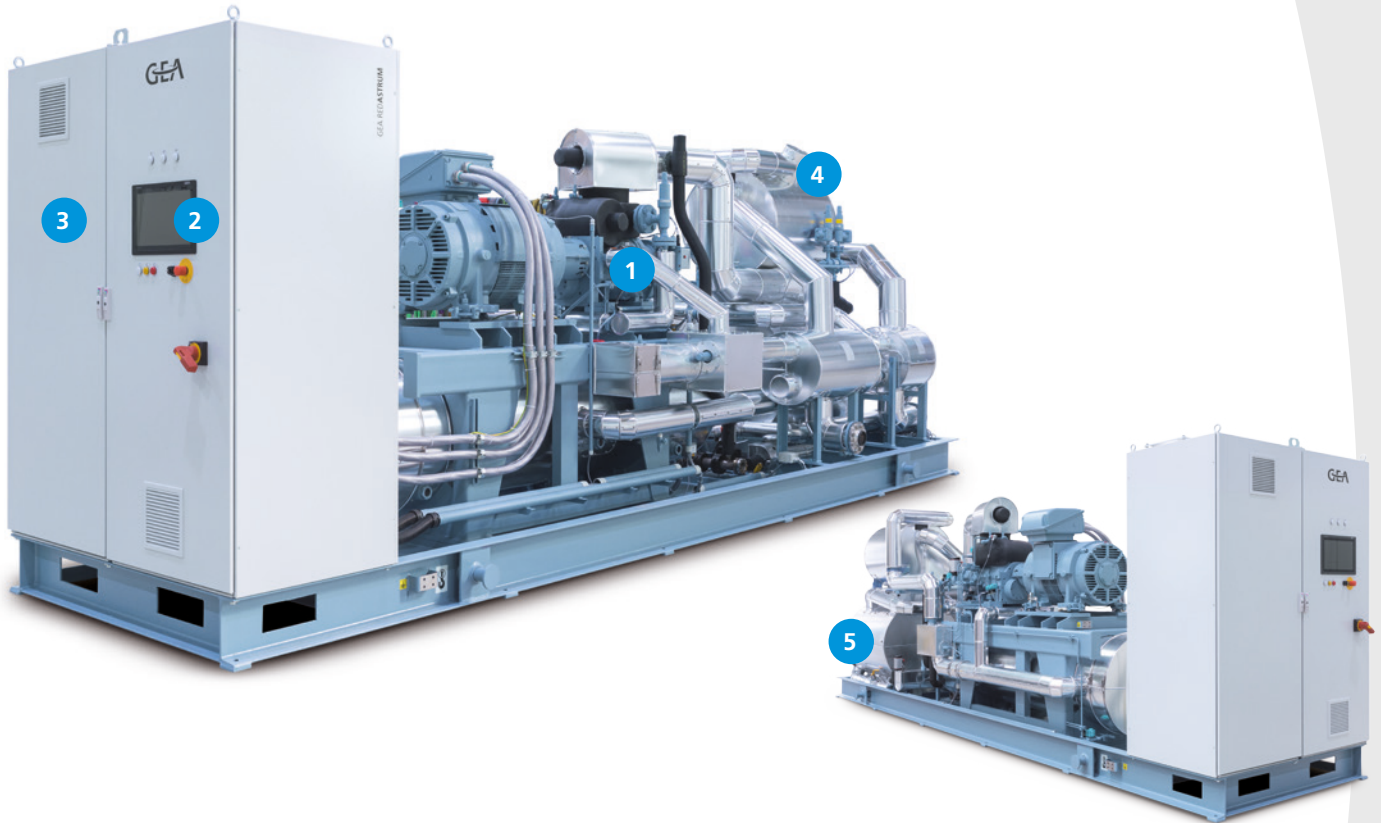
Thanks to its innovative compact design, GEA RedAstrum can also be installed where space is in short supply. Adapted from the highly successful GEA BluAstrum chillers series, the

GEA RedAstrum range provides identical advantages: industry-leading efficiency and heat exchanger approach temperatures, low oil and ammonia charges, high reliability and an exceptionally small footprint.

Benefits at a glance:

- Heating capacity between approx. 600 kW and 2000 kW
- Hot water temperature up to +80°C
- Heat source between -10 and +40°C
- Compact footprint, one-piece design, indoor installation





1 High-efficiency screw compressor

- High-pressure version – 52 bar
- Proprietary 5/6 rotor profile – industry-leading COP
- Reduced complexity, no oil pump required
- Pressure-activated suction check valve for smooth operation

2 Sophisticated GEA Omni™ control

- User-friendly industrial PC
- 15.6" high-definition touch screen
- All common communication protocols
- Remote access via web browser
- Maintenance logs and full data history

3 Stepless capacity control

- Capacity control via frequency converter and capacity slide for infinitely variable capacity
- Sequence control for several units

4 Optimized hot water cycle

- Optimized temperature approach and lowest system pressure loss
- Individual and optimal set-up of condenser, oil cooler and optional subcooler
- Completely pre-piped, only one inlet/one outlet connection required
- All common fluids supported

5 Combined evaporator/liquid separator

- Fully welded vessel suitable for all common fluids
- Minimized ammonia charge
- Electronic Condensate Drain (ECD) system for optimized capacity adjustment

Enhanced plant safety

- Multi-stage safety chain for over-pressure protection
- Double safety valve, PED-approved
- Reduced welding seams and leakage risks
- Insulated hot and optionally cold side, touch protection and minimized heat losses

Minimized service and maintenance

- Continuous vibration surveillance of the bearings
- Easy access to wear parts when service is indicated

GEA RedGenium – the compact solution for temperatures up to 70°C

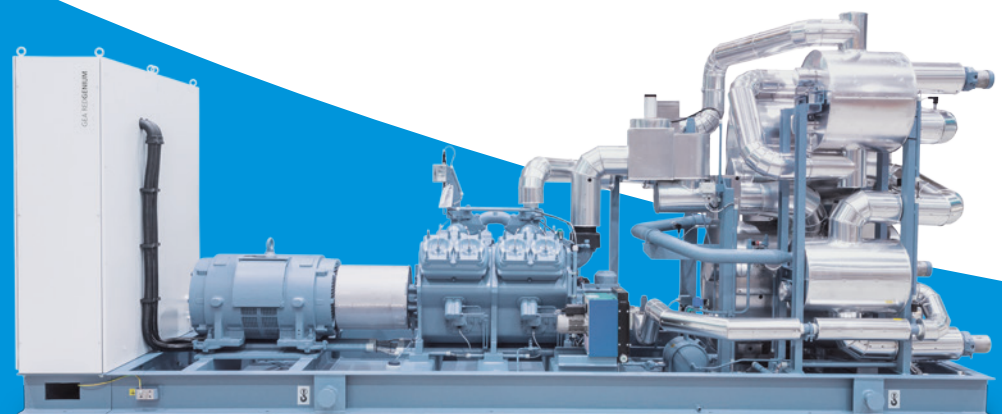
Compact design, efficient piston compressors and the lowest refrigerant charges characterize the RedGenium series. The first choice when it comes to maximum efficiency.

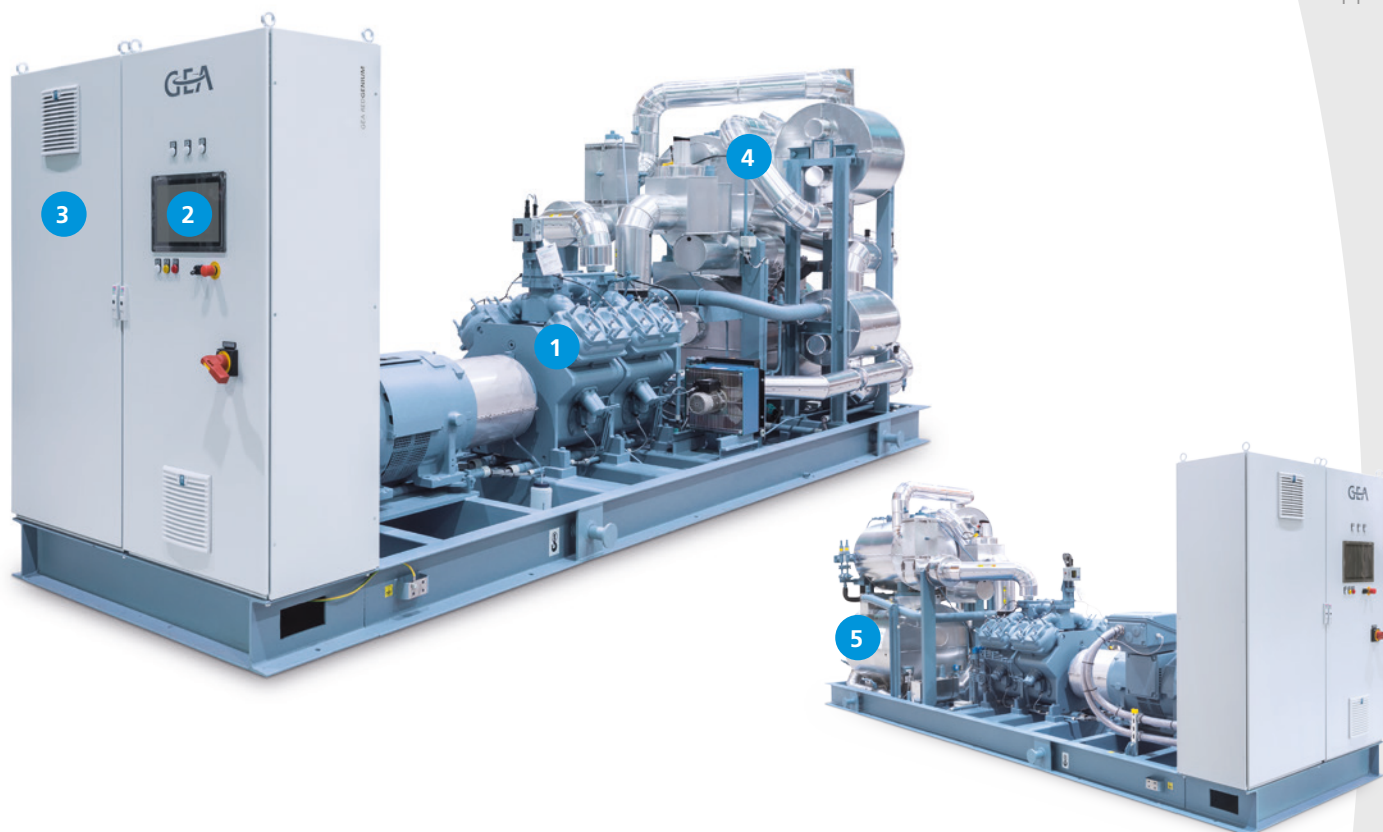
GEA RedGenium is a compact heat pump for small to medium heat loads. Flexibly selected modules, depending on the output size, combine to form a space-saving and efficient system concept. Perfect for temperatures up to 70°C, they are ideally suited to a wide range of heat pump applications.

The heart of the GEA RedGenium series is the extremely reliable and efficient GEA Grasso V HP reciprocating compressor. Specially developed for the smaller capacity range offering heat transfer temperatures up to 70°C, all three compressors are pressure resistant to 39 bar. Combined with efficient heat exchangers, they are key to providing the extra performance that RedGenium stands for.

Benefits at a glance

- Heating capacity between 500 kW and 1100 kW
- Hot water temperature up to +70°C
- Compact footprint, one-piece design, indoor installation





1 High pressure reciprocating compressor

- GEA Grasso V HP 39 bar(a) version
- GEA reciprocating technology for highest volumetric efficiency
- Simplified design without oil separator and cylinder head cooling
- Motor valve for safe shut-off on the suction side at standstill
- External oil pump for safe oil supply in all operating states
- Integrated air-cooled oil cooler

2 GEA Omni™ control panel

- User-friendly touch panel
- 15.6" high-resolution display
- All common communication protocols
- Remote access via Ethernet/web browser
- Storage of maintenance logs and data history

3 Stepless capacity control

- Speed control via a frequency converter and cylinder switch-off
- Continuous capacity adjustment between 500 and 1500 rpm

4 Optimized hot water circuit

- Optimized degree of heat transfer and minimal pressure loss
- Individual, optimal construction of desuperheater, condenser and subcooler connected in series
- Completely pre-piped, only connection required at heating medium inlet and outlet
- Suitable for all common heating media

Simple service and minimal maintenance cost

- Maintenance monitor (via GEA Omni™)
- Good accessibility for servicing

5 Evaporator-liquid-separation unit

- Flooded evaporation
- Fully welded plate heat exchanger
- Low ammonia content
- Electronic Condensate Drain (ECD)
- Optimized power control system

High plant safety

- Multi-stage safety chain against excess pressure
- Double safety valve with shuttle valve and PED approval
- Minimal number of welded seams; reduced risk of leakage
- Isolation of the hot and (optional) cold side, minimal heat loss

TECHNICAL DATA

Series	Type	Secondary refrigerant temperature (°C)	Heat carrier (°C)	Heating capacity (kW)	COP ³⁾	Dimensions ⁴⁾ (mm)			Weight (kg)
		in/out	in/out			line	L	W	H
GEA RedAstrum	HE	40 / 35	40 / 70 70 / 80	1,120 ¹⁾ 1,000 ¹⁾	5.7 3.8	6,000	1,600	2,250	8,200 10,275
	HG	40 / 35	40 / 70 70 / 80	1,320 ¹⁾ 1,185 ¹⁾	5.9 3.9	6,000	1,600	2,250	8,375 10,825
	MH	40 / 35	40 / 70 70 / 80	1,740 ¹⁾ 1,545 ¹⁾	6.0 4.1	7,000	1,800	2,350	10,850 12,800
	ML	40 / 35	40 / 70 70 / 80	2,000 ¹⁾ 1,700 ¹⁾	6.1 3.9	7,000	1,800	2,350	11,150 13,225
	HH	12 / 6	40 / 65	770 ¹⁾	5.7	6,000	1,600	2,250	7,950
	LL	12 / 6	40 / 65	890 ¹⁾	5.8	6,000	1,600	2,350	8,400
	MM	12 / 6	40 / 65	1,160 ¹⁾	5.9	6,000	1,600	2,350	9,575
	NN	12 / 6	40 / 65	1,430 ¹⁾	6.0	7,000	1,800	2,350	11,500
GEA RedGenium	500	27 / 22	50 / 70	553 ²⁾	5.4	4,900	1,600	2,200	4,980
	800	27 / 22	50 / 70	829 ²⁾	5.5	5,300	1,600	2,300	5,950
	1100	27 / 22	50 / 70	1,105 ²⁾	5.5	5,700	1,600	2,400	6,960

¹⁾ 3,600 rpm

²⁾ 1,500 rpm

³⁾ COP (coefficient of performance) = heating capacity/power consumption at net, GEA RedAstrum types HH/LL/MM/NN COP combined = cooling and heating capacity/power consumption at net

⁴⁾ Dimensions and weights are based on standard exemplary applications. Values can differ depending on the specific operating conditions!



Six reasons to choose GEA Red Heat Pumps

GEA Red Heat Pumps are used across a wide range of industries and applications. As well as being economical, they are easy to use, do not require much maintenance and are very safe. They meet the growing demand for reliable, long-lasting heat pumps.

1. Compact ammonia heat pumps

- Highly effective solutions that save space

2. High efficiency

- Frequency converters for infinitely variable speed control
- Low operating and maintenance costs
- Does not require much refrigerant

3. Simple plug-and-play solution

- Delivered in a single unit
- Small footprint
- Easy to install

4. Reliability

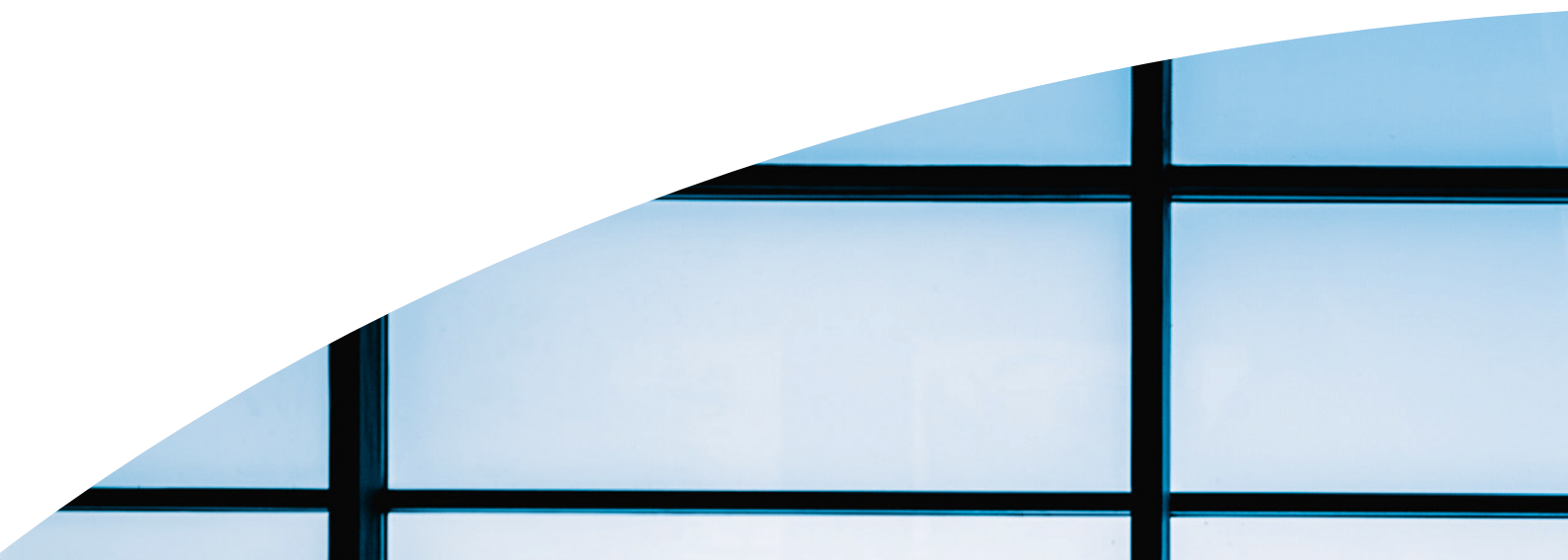
- High availability and long product lifetime
- Industry-tested components
- GEA on-site service

5. Functional design

- Well-matched model range
- Stiff construction for low noise emissions
- Optimized pipe layout for minimal pressure losses

6. Sustainability

- The refrigerant ammonia (R717) is climate friendly and has a GWP of 0, future-proof and provides exceptionally high volumetric efficiency
- High-efficiency values and durable components that minimize the use of resources
- GEA know-how: more than 100 years of experience with ammonia



International airport relies on GEA RedAstrum Heat Pumps

Worldwide, heating is mostly provided using fossil fuels. This is not only expensive, but also harms the environment. The alternative is GEA Red Heat Pumps. These have been proven at a large international airport where two GEA RedAstrum units provide warm water heating while protecting the climate and lowering operating costs at the same time.

Fossil fuels damage the earth's climate. Consequently, some governments are already restricting their use for heat generation. The installation of environmentally friendly heat pumps offers the perfect alternative. Not only do they make a significant contribution to reducing the greenhouse effect, but also offer financial benefits.

Two GEA RedAstrum heat pumps installed at an international airport heat water and feed the local district heating network. Using the groundwater heated to approx. 20°C (which is first used to cool the building, then re-cooled by the GEA RedAstrum before returned to the nature) as the source of the heat pump, the two units generate 2 MW and temperatures up to 72°C to heat the building.

The system's efficient screw compressors and the configuration of the heat exchangers offer numerous advantages and make the system particularly energy efficient. Thanks to its modern design, integrated safety components and small footprint, the RedAstrum range is very reliable and universally installable. To implement this sustainable and future-proof heating system, the airport operator found exactly the right partner in GEA.





We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global 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.

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