GEA RED HEAT PUMPS

High-performance, low-charge ammonia industrial heat pumps

Engineering for a better world.

GEA.com

GOOD FOR YOUR SAVINGS, GOOD FOR THE ENVIRONMENT

The future of industrial heating belongs to eco-friendly technologies such as heat pumps. They use a wide variety of existing heat sources and combine performance and energy efficiency with sustainable advantages 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 designed to be environmentally friendly and efficient. And there is more — accurately configured, high-end components 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 – A SMART SOLUTION

GEA Red heat pumps provide supply temperatures of up to 203 °F (95 °C) with zero Global Warming Potential.

The refrigerant makes all the difference.
Many heat pump options exist, however, the combination of ammonia refrigerant with a wide range of waste heat source options makes GEA Red heat pumps particularly attractive. Offering zero Global Warming Potential (GWP) and high volumetric efficiencies, the natural refrigerant ammonia complements the environmentally friendly and economic properties of a heat pump system. This ensures that GEA Red heat pumps score very high in ecology and very low for your total life cycle costs.

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 and welded plate heat exchangers, provide maximum safety and availability. Thanks to minimal weld seams in the refrigerant circuit, safety is enhanced, even under demanding conditions.

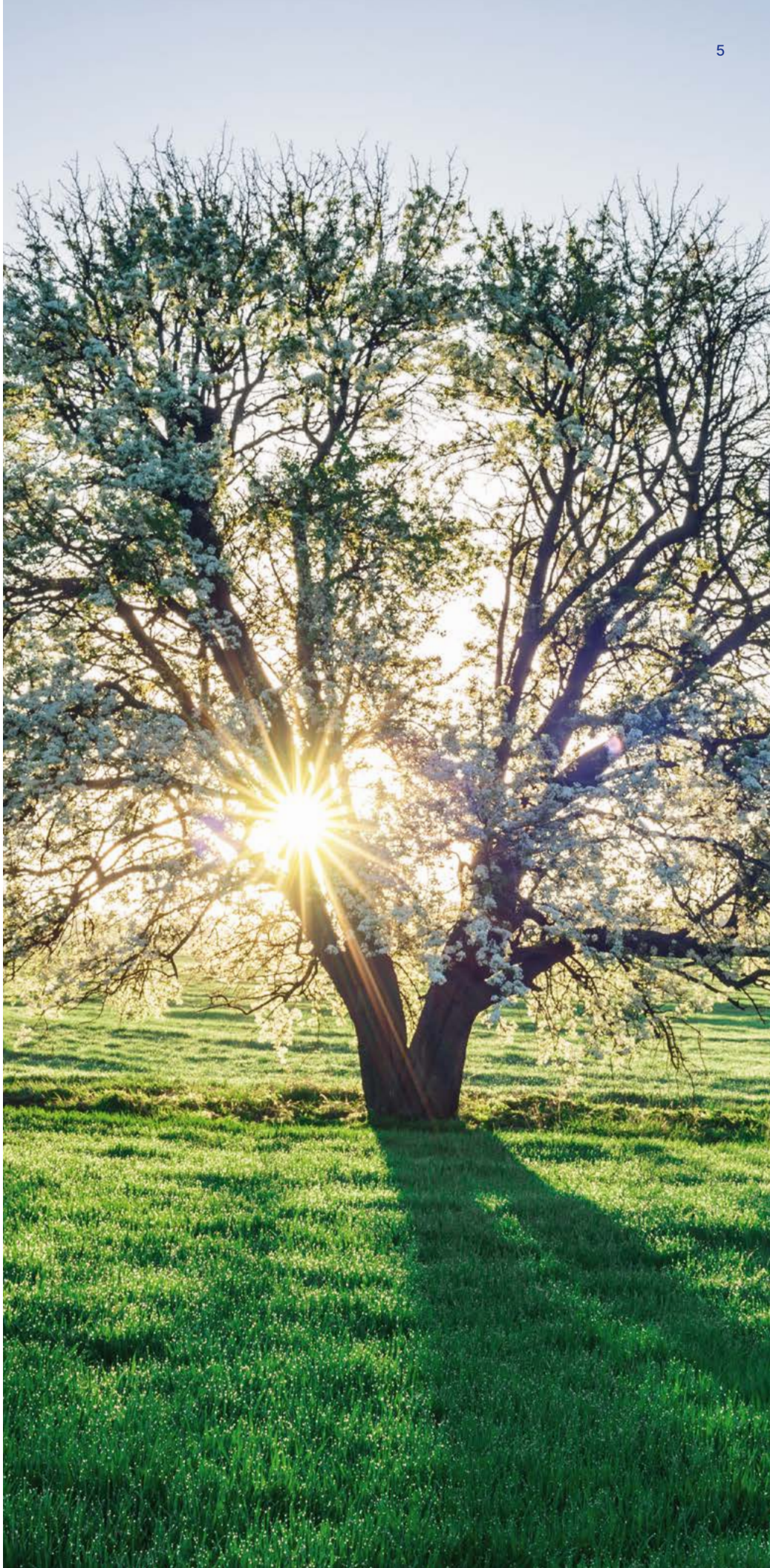
Flexibility is the best argument.
All series models offer an array of choices when it comes to liquid waste heat source options. This makes them suitable for a wide variety of applications. GEA Red heat pumps are particularly effective in combination with a GEA Blu series chiller, the standard liquid chiller from GEA. Using both systems together provides a well-matched solution for cooling and heating.

Significant efficiency increase (up to 20% or more).
GEA Red heat pumps can now be configured with an ammonia cascade evaporator to “add-on” to an existing chiller system. This makes an extra heat exchanger and liquid cycle redundant, hence reducing the equipment complexity while increasing the efficiency thanks to lower approach temperatures — once again making the GEA Red heat pumps more eco-friendly with lower total costs.

Addressing sustainability-related regulations.
GEA takes environmental protection and sustainability seriously.

F-Gas regulation:
To reduce environmental impact, organizations worldwide are focusing on using refrigerants with a low, or zero, Global Warming Potential (GWP) — an internationally accepted environmental benchmark for refrigerants. Based on their CO_2 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 zero and is not affected by any restrictions.

Sustainability labels:
In accordance with leading certification systems such as BREEAM and LEED, GEA heat pumps can increase the performance rating for the sustainability of construction projects, buildings and infrastructure projects.



STRONG SOLUTION FOR A RANGE OF APPLICATIONS

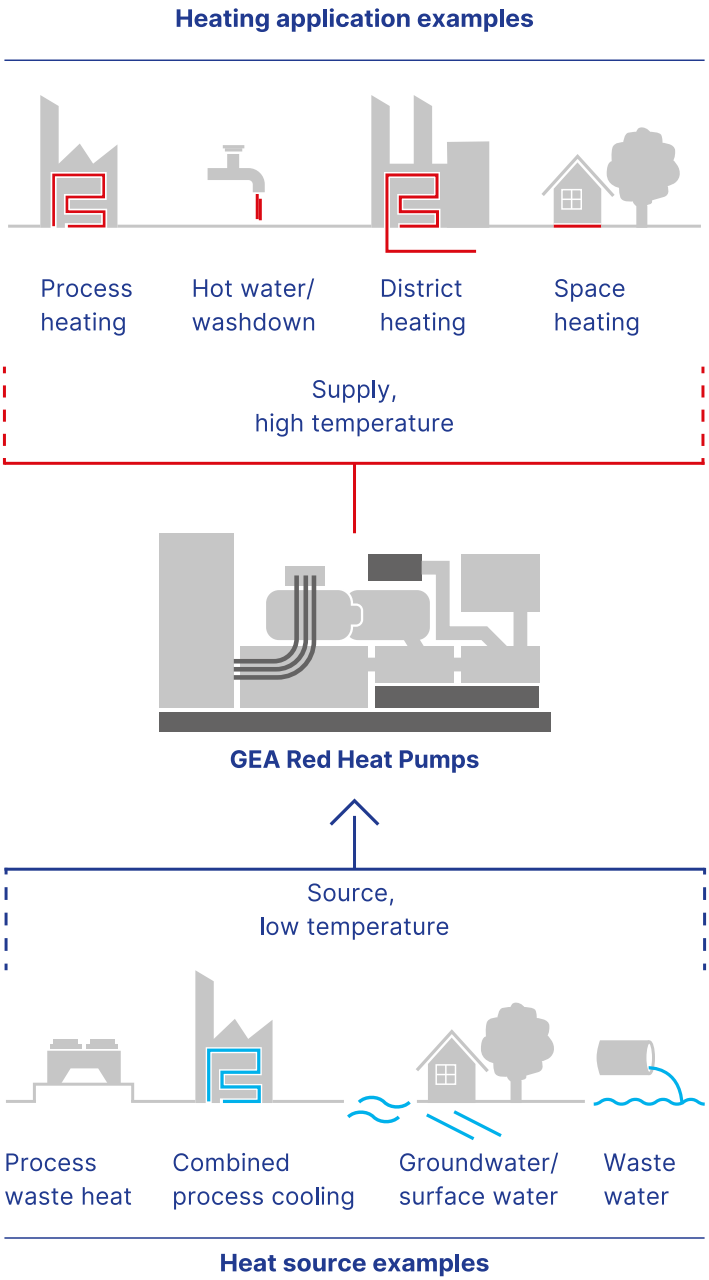
Powerful, compact and designed for low maintenance, GEA Red heat pumps are used worldwide across a wide variety of industries and communities. And there are always new areas of application for which ammonia heat pumps are perfectly suited.

Heat pumps explained.
GEA's heat pump technology relies on our successful screw and piston compressors. Using electrical energy, the process follows the same thermodynamic cycle as refrigeration systems to allow the transmission of heat from a low temperature level (heat source) to a consumer at a high temperature level (heat sink).

Suitable heat sources include:
- Condensation heat from refrigeration plants
- Groundwater and surface water
- Wastewater from processes
- Heat created during industrial processes

In contrast to refrigeration systems, heat pumps typically focus on generating heat at higher temperatures and therefore are engineered at higher design pressures. The heat from the condensation process is transferred to a heat carrier liquid supplying the consumer. Depending on the application and conditions, a smart, high-efficiency heat exchanger set charges the heat carrier with additional heating capacity from external desuperheating, subcooling and oil cooling of the process.

GEA Red heat pumps provide supply temperatures between 122 °F (50 °C) and 203 °F (95 °C) and are suitable for a wide variety of applications.



DECARBONIZE YOUR HEATING SUPPLY

Heat pumps are an integral component to decarbonize thermal energy supply by replacing fossil-fueled heating devices such as boilers. GEA Red heat pumps are used successfully in multiple applications.

Process heat.
GEA Red heat pumps are often used in combination with chillers to provide both heat and cold. Process heat is used in food, beverage and dairy production, and for chemical process engineering or drying, such as wood processing.

Hot water supply.
Hot water is needed for many purposes, including washing and showering, cleaning, washdown and underfloor heating.

District heating.
District heating grids are widespread in many countries. GEA Red heat pumps ensure constant flow temperatures for heating a wide range of buildings, facilities and community heating networks.

SEVEN REASONS TO CHOOSE GEA RED HEAT PUMPS

GEA Red heat pumps are used across a wide range of industries and applications. Designed to be economical and ecological, they are easy to use and require little maintenance. Perfect for the growing demand for reliable, long-lasting and future-proof heat pumps.

1. Efficiency
- Legendary GEA compressor and GEA Omni control panel technology
- Use of ammonia with high volumetric efficiency
- Modern heat exchangers in an efficient, project-specific set-up
- Optimized components for reduced pressure losses
- Variable-speed operation designed to deliver maximum efficiency in all loads

2. Sustainability and decarbonization
- Replacement and independence from fossil-fueled heating systems
- Future-proof refrigerant ammonia (R717) with zero Global Warming Potential at highest availability
- Designed for reduced energy input and resource consumption

3. Total cost of ownership
- Designed for reduced energy consumption and costs through high efficiencies
- Smart and robust GEA design for low service and maintenance expenses
- Lower usage and costs of operating utilities like ammonia and oil

4. Compact design
- GEA-patented combined evaporator/liquid separator technology
- Modular components with high integration level
- Smart design based on successful GEA Blu chiller series

5. Reliability
- Well-proven, industry-tested components
- Project-specific heat pump configuration and component calculation
- Sophisticated safety chain against excess pressure
- Modular components and smart pipe layout for minimized leakage risks
- Plug-and-play design
- GEA on-site service

6. Flexibility
- Piston as well as screw compressor technology for wide application and capacity range
- Stand-alone units for combined cooling & heating
- Suited for a wide range of heat sources and temperatures
- Suited for cascade applications and “add-on” set-ups (GEA Red heat pump directly charged with ammonia from the refrigeration plant)

7. GEA know-how
- More than 100 years of experience with ammonia
- Pioneer in piston as well as screw compressor technology and development
- Countless heat pump projects and references
- Commissioning and service support on site

Global customers rely on GEA Red heat pumps.

More and more corporations seek to replace expensive and harmful fossil heating with modern heat pumps. Those who already did now reap the benefits of GEA heat pumps. Two examples:

GEA Red heat pumps firing up the food industry.
The food industry traditionally uses boilers to cook or heat up the food which is subsequently transferred to a refrigerator to cool down. In 2016, a major producer of fresh prepared foods and chilled ready meals approached GEA about a solution that could replace both the boiler and the outdated chiller. The customer's objectives together with the analysis of cooling and heating capacity and temperature requirements quickly tipped the scale in favor of GEA Red heat pumps. The first unit was installed in 2017 providing chilled glycol at 21 °F (-6 °C) (133TR cooling capacity) and simultaneously 760 kW heating capacity at a supply temperature of 152 °F (67 °C). The result — boilers were turned off leading to significant cost savings and reduction of CO_2 emissions. The success is also exemplified by several follow-up projects realized during the past several years.

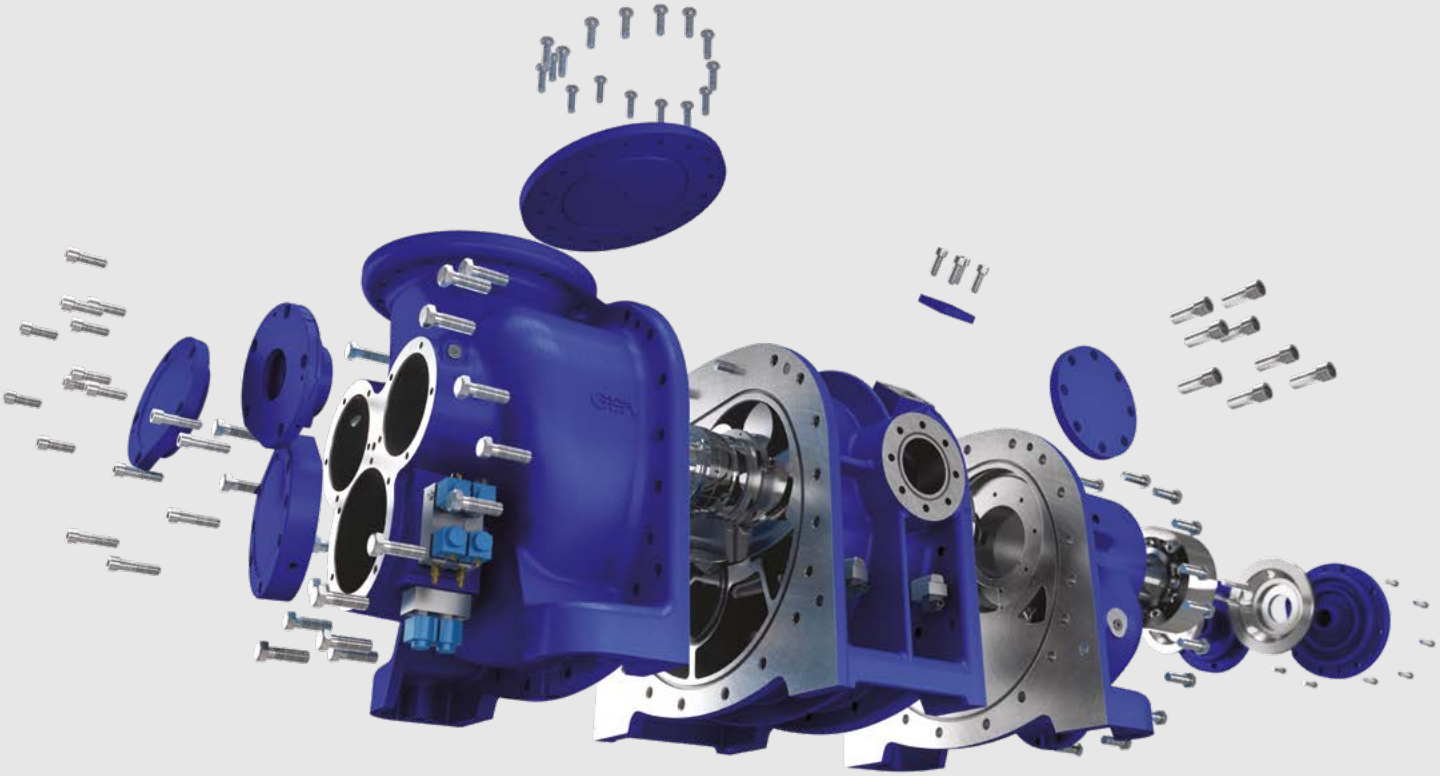
Groundwater cooling & facility heating at an international airport.
Two GEA RedAstrum units are installed at a major hub in Northern Europe. Previously, local authorities were forced to act against rising groundwater temperatures. When the airport operators defined the demand for heating, it became clear that the GEA heat pump would do the perfect job. And now it does — the groundwater is used as the heat source which the GEA RedAstrum cools down from 59 °F (15 °C) to 41 °F (5 °C) (coolant cycle). At the heat sink, the two heat pumps transfer their heat emitted from the condensers, external subcoolers and oil coolers to a glycol heat carrier up to a temperature level of 162 °F (72 °C). Together the two GEA RedAstrum units provide 400 TR cooling and over 2 MW heating capacity.

THE HEART OF THE SYSTEM – GEA COMPRESSORS

Reflecting more than 160 years of technological leadership and innovation, GEA's compressors are a preferred choice of leading producers, contractors, municipalities and institutions across the globe.

GEA offers a large and extensive compressor portfolio. Utilizing natural refrigerants and well suited for myriad applications, GEA's proven screw and piston compressors are designed to deliver what customers value most — energy efficiency, reliability, safety and ease of maintenance.

GEA's RedAstrum heat pump series utilizes GEA screw compressors, whereas piston compressors drive the RedGenium series. By offering a wide range of model capacities for each compressor type, customers are able to select the optimal GEA heat pump system for their application.

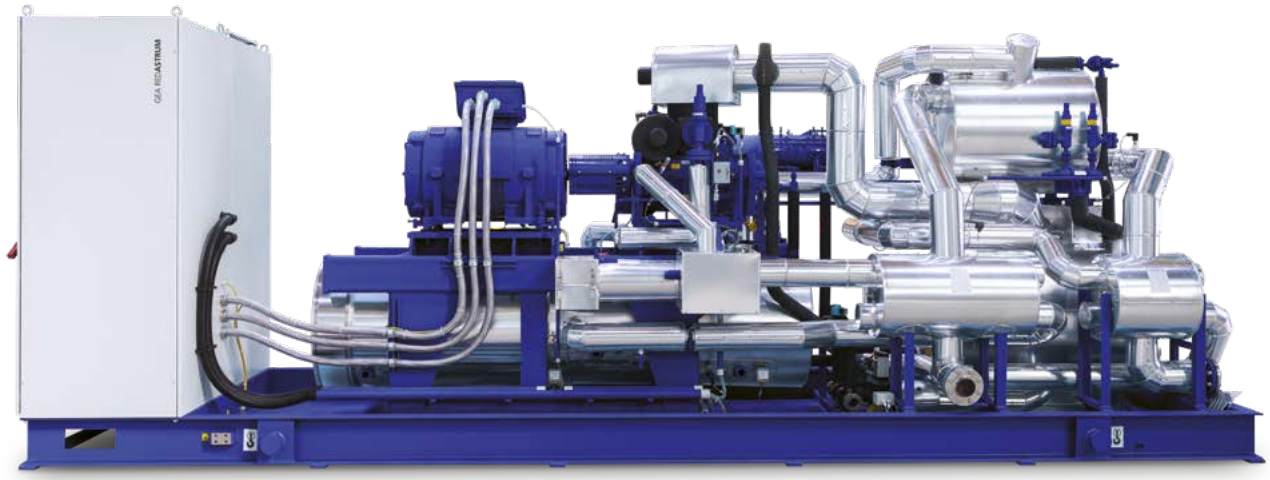


GEA's robust lineup of screw compressors drive GEA RedAstrum heat pumps that deliver temperatures up to 185 °F (85 °C).

GEA's RedGenium heat pumps utilize GEA piston compressors, which can achieve temperatures up to 203 °F (95 °C).

GEA REDASTRUM – HIGH PERFORMANCE WITH A SMALL FOOTPRINT

GEA's RedAstrum is the standard screw compressor ammonia heat pump featuring high-end components and a sophisticated design. The benefits — maximum design efficiency, flexibility and reliability with an exceptionally small footprint.



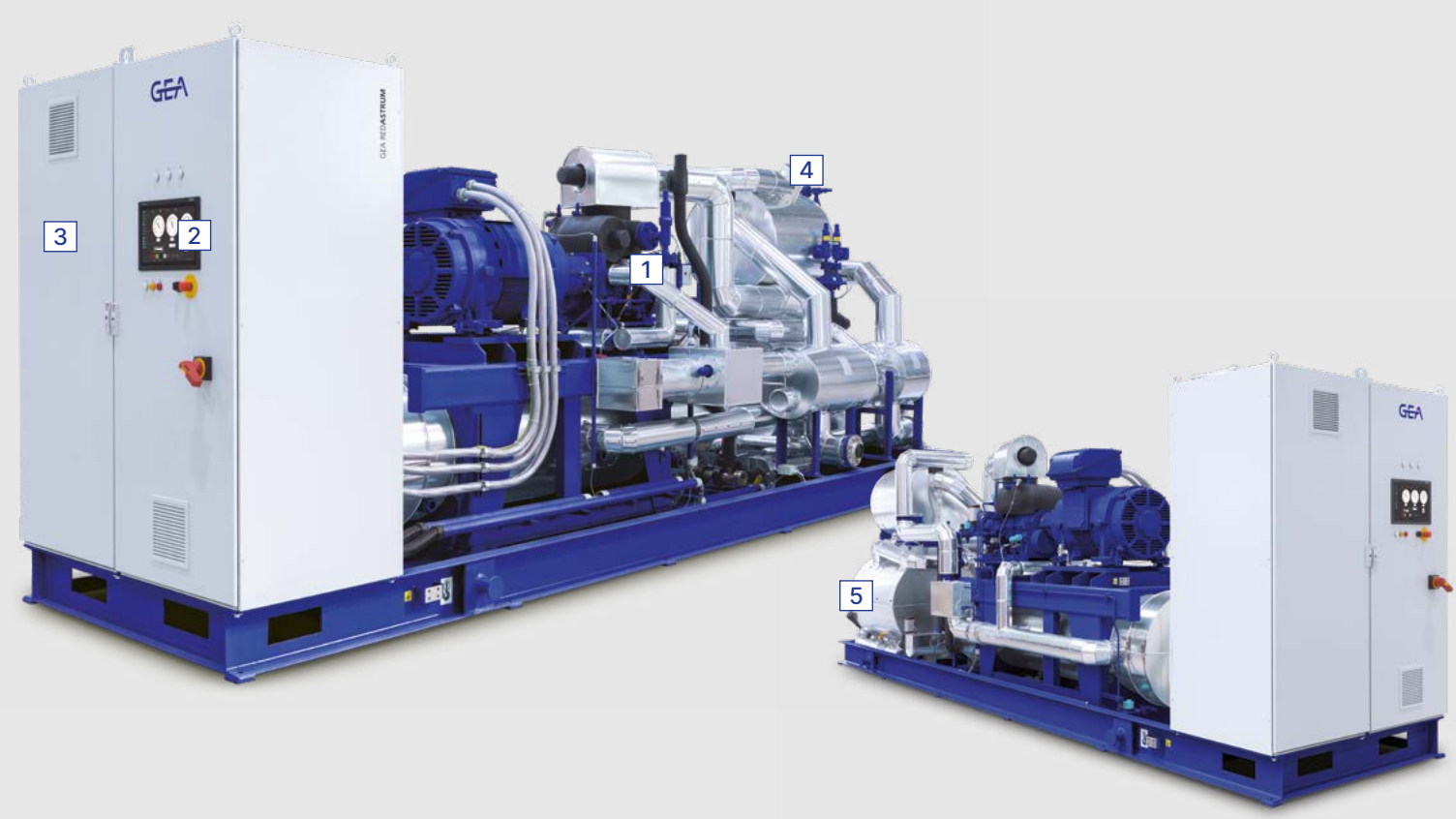
GEA RedAstrum revised — the second generation of screw compressor heat pumps offers a further optimized design, an ammonia cascade evaporator option and an extended model range. GEA RedAstrum now provides seven screw compressor types based on the successful GEA FES GMX and GLX series in a specific high-pressure design execution.

GEA RedAstrum heats water or similar suited fluids to temperature levels between 131 °F (55 °C) and 185 °F (85 °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 — high efficiency and heat exchanger approach temperatures, low oil and ammonia charges, GEA reliability and an exceptionally small footprint.

Highlights at a glance.

- Heating capacity between approx. 600 kW and 2,900 kW
- Hot water temperature up to 185 °F (85 °C)
- Liquid heat source between 14 °F (-10 °C) and 122 °F (50 °C)
- Ammonia cascade evaporator (option) for evaporation temperatures up to 113 °F (45 °C)
- Compact footprint, one-piece design, indoor installation



1. Highly efficient screw compressor
- High-pressure version – 52 bar(g)
- Proprietary 5/6 rotor profile – industry-leading COP
- Specific heat pump design
- Pressure-activated suction check valve for smooth operation

2. GEA Omni control panel
- Intuitive, user-friendly industrial PC
- Advanced control and protection of equipment
- 15.6” high-definition, multi-touch screen
- Supports common communication protocols
- Remote access via OmniLink using VNC technology
- Maintenance logs and full data history
- Deep-dive data analysis via OmniHistorian

3. Stepless capacity control
- Capacity control via frequency converter and capacity slide for infinitely variable capacity
- Smart sequence control for several units

4. Optimized hot water circuit
- Optimized degree of heat transfer and minimal temperature approach and 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 unit
- Fully welded vessel suitable for all common fluids
- Ammonia cascade heat exchangeroption for efficient “add-on” implementation to an existing refrigeration plant
- Minimized ammonia charge
- Electronic Condensate Drain (ECD) system for optimized capacity adjustment

Enhanced plant safety
- Multi-stage safety chain against excess pressure
- Double safety valve with shuttle valve
- Reduced welding seams and leakage risks
- Insulated hot and optionally cold side, touch protection and minimized heat losses

Service and maintenance advantages
- Continuous vibration surveillance of the bearings
- Easy access to serviceable parts

GEA REDGENIUM – AN EFFICIENT SOLUTION FOR TEMPERATURES UP TO 203 °F (95 °C)

The GEA V XHP piston compressor is the latest in GEA's long and legendary history of compression innovation.

GEA RedGenium is an efficient industrial heat pump for a wide range of heat loads. It includes high-end components and modules which are project-specifically configured to meet your unique requirements.

GEA RedGenium transfers heat to a liquid heat carrier providing temperatures between 122 °F (50 °C) and 203 °F (95 °C) for any heat consumer in industrial processes or for heating networks.

The heart of each GEA RedGenium is the extremely reliable and efficient GEA Grasso piston compressor. Three different compressor lines are available within the RedGenium scope:

- GEA Grasso 5 HP at 50 bar(g) design pressure for small heating capacities and temperatures up to 176 °F (80 °C)
- GEA Grasso V HP at 38 bar(g) design pressure for medium heating capacities and temperatures up to 158 °F (70 °C)
- GEA Grasso V XHP at 63 bar(g) design pressure for medium heating capacities and temperatures up to 203 °F (95 °C)

Combined with efficient heat exchangers in the well-proven concept and the powerful GEA Omni control panel, these GEA compressors are key to providing the extra performance that RedGenium stands for.

Highlights at a glance.

- Heating capacity between approx. 200 kW and 2,000 kW
- Hot water temperature up to 203 °F (95 °C)
- Liquid heat source between approx. 14 °F (-10 °C) and 122 °F (50 °C)
- Ammonia cascade evaporator (option) for refrigeration plant condensing temperatures up to 140 °F (60 °C)
- Compact footprint, one-piece design, indoor installation

1. High-pressure piston compressor
- Legendary GEA piston compressor technology
- Three different high-pressure lines, 38 to 63 bar(g)
- Simplified design without oil separator and cylinder-head cooling
- Motor valve for safe shut off on suction side at standstill
- External oil pump for safe oil supply in all operating states

2. GEA Omni control panel
- Intuitive, user-friendly industrial PC
- Advanced control and protection of equipment
- 15.6” high-definition, multi-touch screen
- Supports common communication protocols
- Remote access via OmniLink using VNC technology
- Maintenance logs and full data history
- Deep-dive data analysis via OmniHistorian

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

4. Optimized hot water circuit
- Optimized degree of heat transfer and minimal temperature approach and pressure loss
- Individual and optimal set up of desuperheater, condenser and optional subcooler
- Completely pre-piped, only one inlet/ one outlet connection required
- All common fluids supported

5. Combined evaporator/liquid separator unit
- Fully welded vessel suitable for all common fluids
- Ammonia cascade heat exchanger option for efficient “add-on” implementation to an existing refrigeration plant
- Minimized ammonia charge
- Electronic Condensate Drain (ECD) system for optimized capacity adjustment

Enhanced plant safety
- Multi-stage safety chain against excess pressure
- Double safety valve with shuttle valve
- Reduced welding seams and leakage risks
- Insulated hot and optionally cold side, touch protection and minimized heat losses

Simple service and minimal maintenance cost
- Maintenance monitor (via GEA Omni)
- Easy access to serviceable parts

Technical Data* – evaporator charged with liquid coolant

Series	Type	Liquid Coolant (°F)	Heat carrier (°F)	Heating capacity[1] (kW)	COP[2]	Dimensions[3] (inch)			Weight (lb)
		in/out	in/out		line	L	W	H	incl. motor
GEA RedAstrum (water)	EC	104/95	104/158 158/176	745 650	5.36 3.64	236	63	89	15,874 18,740
	ED	104/95	104/158 158/176	875 780	5.64 3.70	276	71	93	16,535 19,180
	HE	104/95	104/158 158/176	1,095 980	5.51 3.71	276	71	93	16,976 20,063
	HG	104/95	104/158 158/176	1,295 1,155	5.78 3.84	276	71	93	18,078 20,944
	MH	104/95	104/158 158/176	1,690 1,510	5.72 3.89	288	71	89	19,621 24,692
	ML	104/95	104/158 158/176	1,935 1,730	5.95 3.94	299	71	93	21,826 26,235
	RM	104/95	104/158 158/176	2,365 2,170	5.89 4.10	311	79	97	24,692 27,337
	RN	104/95	104/158 158/176	2,900 2,645	5.83 4.12	311	79	97	27,558 30,203
	EE	129/109	104/149	510	5.47	236	63	89	14,991
	GG	54/43	104/149	590	5.73	236	63	89	15,874
	HH	54/43	104/149	760	5.72	236	63	89	16,535
	LL	54/43	104/149	870	5.95	236	63	93	16,976
	MM	54/43	104/149	1,140	5.84	288	71	93	18,740
	NN	54/43	104/149	1,405	5.86	288	71	93	21,385
	RR	54/43	104/149	1,580	6.10	311	79	97	24,251
GEA RedGenium (water)	35	81/72 99/90	122/158 158/176	190 240	4.84 4.70	177	63	89	11,023 11,685
	45	81/72 99/90	122/158 158/176	255 325	4.92 4.76	177	63	89	11,244 12,015
	55	81/72 99/90	122/158 158/176	320 400	4.94 4.82	185	63	89	11,685 12,566
	65	81/72 99/90	122/158 158/176	385 480	4.97 4.79	185	63	89	11,905 12,897
	300	81/72	122/158	555	5.13	193	63	87	12,346
	350	81/72 99/90 117/108	122/158 158/194 158/203	730 905 1,195	5.06 4.33 5.05	232	63	89	15,212 16,535 16,976
	450	81/72	122/158	835	5.12	209	63	91	14,551
	550	81/72 99/90 117/108	122/158 158/194 158/203	1,090 1,350 1,775	5.09 4.33 5.07	240	71	97	15,873 17,306 17,857
	600	81/72	122/158	1,120	5.15	225	63	95	16,094
	750	81/72 99/90 117/108	122/158 158/194 158/203	1,440 1,795 2,385	5.04 4.34 5.10	272	71	97	17,417 19,621 20,944
	950	81/72 99/90 117/108	122/158 158/194 158/203	1,800 2,200 2,995	5.08 4.27 5.17	284	71	97	19,621 22,487 24,251

* Some figures approximated.

1) GEA RedAstrum speed 3,600 rpm (RM, RN, RR types limited to 3,300 rpm), GEA RedGenium speed 1,500 rpm.
2) COP (coefficient of performance) = heating capacity / power consumption at net, GEA RedAstrum types EE / GG / HH / LL / MM / NN / RR
   COP combined = cooling and heating capacity / power consumption at net.
3) Dimensions and weights are based on standard applications. Values can differ depending on the specific operating conditions.
   Motor sizes above 600 HP capacity require an extra panel for the frequency inverter (L x W x H approximately 79 × 24 × 87 inches)

Technical Data* – evaporator charged with liquid coolant (METRIC)

Series	Type	Liquid Coolant (°C)	Heat carrier (°C)	Heating capacity[1] (kW)	COP[2]	Dimensions[3] (mm)			Weight (kg)
		in/out	in/out		line	L	W	H	incl. motor
GEA RedAstrum (water)	EC	40/35	40/70 70/80	745 650	5.36 3.64	6,000	1,600	2,250	7,200 8,500
	ED	40/35	40/70 70/80	875 780	5.64 3.70	7,000	1,800	2,350	7,500 8,700
	HE	40/35	40/70 70/80	1,095 980	5.51 3.71	7,000	1,800	2,350	7,700 9,100
	HG	40/35	40/70 70/80	1,295 1,155	5.78 3.84	7,000	1,800	2,350	8,200 9,500
	MH	40/35	40/70 70/80	1,690 1,510	5.72 3.89	7,300	1,800	2,250	8,900 11,200
	ML	40/35	40/70 70/80	1,935 1,730	5.95 3.94	7,600	1,800	2,350	9,900 11,900
	RM	40/35	40/70 70/80	2,365 2,170	5.89 4.10	7,900	2,000	2,450	11,200 12,400
	RN	40/35	40/70 70/80	2,900 2,645	5.83 4.12	7,900	2,000	2,450	12,500 13,700
	EE	12/6	40/65	510	5.47	6,000	1,600	2,250	6,800
	GG	12/6	40/65	590	5.73	6,000	1,600	2,250	7,200
	HH	12/6	40/65	760	5.72	6,000	1,600	2,250	7,500
	LL	12/6	40/65	870	5.95	6,000	1,600	2,350	7,700
	MM	12/6	40/65	1,140	5.84	7,300	1,800	2,350	8,500
	NN	12/6	40/65	1,405	5.86	7,300	1,800	2,350	9,700
	RR	12/6	40/65	1,580	6.10	7,900	2,000	2,450	11,000
GEA RedGenium (water)	35	27/22 37/32	50/70 70/80	190 240	4.84 4.70	4,500	1,600	2,250	5,000 5,300
	45	27/22 37/32	50/70 70/80	255 325	4.92 4.76	4,500	1,600	2,250	5,100 5,450
	55	27/22 37/32	50/70 70/80	320 400	4.94 4.82	4,700	1,600	2,250	5,300 5,700
	65	27/22 37/32	50/70 70/80	385 480	4.97 4.79	4,700	1,600	2,250	5,400 5,850
	300	27/22	50/70	555	5.13	4,900	1,600	2,200	5,600
	350	27/22 37/32 47/42	50/70 70/90 70/95	730 905 1,195	5.06 4.33 5.05	5,900	1,600	2,250	6,900 7,500 7,700
	450	27/22	50/70	835	5.12	5,300	1,600	2,300	6,600
	550	27/22 37/32 47/42	50/70 70/90 70/95	1,090 1,350 1,775	5.09 4.33 5.07	6,100	1,800	2,450	7,200 7,850 8,100
	600	27/22	50/70	1,120	5.15	5,700	1,600	2,400	7,300
	750	27/22 37/32 47/42	50/70 70/90 70/95	1,440 1,795 2,385	5.04 4.34 5.10	6,900	1,800	2,450	7,900 8,900 9,500
	950	27/22 37/32 47/42	50/70 70/90 70/95	1,800 2,200 2,995	5.08 4.27 5.17	7,200	1,800	2,450	8,900 10,200 11,000

* Some figures approximated.

1) GEA RedAstrum speed 3,600 rpm (RM, RN, RR types limited to 3,300 rpm), GEA RedGenium speed 1,500 rpm.
2) COP (coefficient of performance) = heating capacity / power consumption at net, GEA RedAstrum types EE / GG / HH / LL / MM / NN / RR
   COP combined = cooling and heating capacity / power consumption at net.
3) Dimensions and weights are based on standard applications. Values can differ depending on the specific operating conditions.
   Motor sizes above 450 kw capacity require an extra panel for the frequency inverter (L x W x H 2,000 × 600 × 2,200 mm).

Technical Data* – evaporator as ammonia cascade heat exchanger

Series	Type	Condensation heat source[1] (°F)	Heat carrier (°F)	Heating capacity[2] (kW)	COP[3]	Dimensions[4] (inch)			Weight (lb)
		in/out	in/out		line	L	W	H	incl. motor
GEA RedAstrum (cascade)	EC	95.0 95.0	104/158 158/176	705 620	5.02 3.47	236	63	89	16,535 20,062
	ED	95.0 95.0	104/158 158/176	830 735	5.25 3.55	276	71	93	18,519 20,503
	HE	95.0 95.0	104/158 158/176	1,045 935	5.22 3.49	276	71	93	19,621 20,944
	HG	95.0 95.0	104/158 158/176	1,225 1,095	5.54 3.69	276	71	93	21,164 22,708
	MH	95.0 95.0	104/158 158/176	1,620 1,450	5.40 3.70	276	71	93	22,487 27,337
	ML	95.0 95.0	104/158 158/176	1,850 1,650	5.57 3.78	287	71	93	24,471 28,660
	RM	95.0 95.0	104/158 158/176	2,255 2,065	5.54 3.88	311	79	97	26,896 31,526
	RN	95.0 95.0	104/158 158/176	2,705 2,520	5.56 3.89	311	79	97	29,101 33,731
GEA RedGenium (cascade)	35	86.0 95.0	122/158 158/176	235 250	5.67 4.84	177	63	89	11,464 12,125
	45	86.0 95.0	122/158 158/176	315 335	5.78 4.89	177	63	89	11,685 12,456
	55	86.0 95.0	122/158 158/176	395 420	5.81 4.95	185	63	89	12,125 13,007
	65	86.0 95.0	122/158 158/176	465 495	5.70 4.89	185	63	89	12,456 13,448
	300	86.0	122/158	665	5.90	197	63	87	14,330
	350	86.0 86.0 118.4	122/158 158/194 158/203	875 805 1,345	5.84 3.99 5.60	240	63	89	15,873 17,196 17,637
	450	86.0	122/158	1,000	5.96	209	63	91	17,637
	550	86.0 86.0 118.4	122/158 158/194 158/203	1,300 1,200 2,000	5.87 4.01 5.62	248	71	97	16,535 17,968 18,519
	600	86.0	122/158	1,330	5.93	224	63	95	21,605
	750	86.0 86.0 118.4	122/158 158/194 158/203	1,740 1,585 2,635	5.89 4.03 5.56	280	71	97	18,188 20,723 23,149
	950	86.0 86.0 118.4	122/158 158/194 158/203	2,170 1,975 3,230	6.02 4.00 5.50	295	71	97	20,944 24,251 26,455

* Some figures approximated.
1) Condensing temperature of an existing refrigeration plant (relates to the Red heat pump evaporation temperature levels of approx. 2 Kelvin below the chiller condensing).
2) GEA RedAstrum speed 3,600 rpm (RM, RN types limited to 3,300 rpm), GEA RedGenium speed 1,500 rpm.
3) COP (coefficient of performance) = heating capacity / power consumption at net.
4) Dimensions and weights are based on standard applications. Values can differ depending on the specific operating conditions.
Motor sizes above 600 HP capacity require an extra panel for the frequency inverter (L x W x H approximately 79 × 24 × 87 inches).

Technical Data* – evaporator as ammonia cascade heat exchanger (METRIC)

Series	Type	Condensation heat source[1] (°C)	Heat carrier (°C)	Heating capacity[2] (kW)	COP[3]	Dimensions[4] (mm)			Weight (kg)
		in/out	in/out		line	L	W	H	incl. motor
GEA RedAstrum (cascade)	EC	35.0 35.0	40/70 70/80	705 620	5.02 3.47	6,000	1,600	2,250	7,500 9,100
	ED	35.0 35.0	40/70 70/80	830 735	5.25 3.55	7,000	1,800	2,350	8,400 9,300
	HE	35.0 35.0	40/70 70/80	1,045 935	5.22 3.49	7,000	1,800	2,350	8,900 9,500
	HG	35.0 35.0	40/70 70/80	1,225 1,095	5.54 3.69	7,000	1,800	2,350	9,600 10,300
	MH	35.0 35.0	40/70 70/80	1,620 1,450	5.40 3.70	7,000	1,800	2,350	10,200 12,400
	ML	35.0 35.0	40/70 70/80	1,850 1,650	5.57 3.78	7,300	1,800	2,350	11,100 13,000
	RM	35.0 35.0	40/70 70/80	2,255 2,065	5.54 3.88	7,900	2,000	2,450	12,200 14,300
	RN	35.0 35.0	40/70 70/80	2,705 2,520	5.56 3.89	7,900	2,000	2,450	13,200 15,300
GEA RedGenium (cascade)	35	30.0 35.0	50/70 70/80	235 250	5.67 4.84	4,500	1,600	2,250	5,200 5,500
	45	30.0 35.0	50/70 70/80	315 335	5.78 4.89	4,500	1,600	2,250	5,300 5,650
	55	30.0 35.0	50/70 70/80	395 420	5.81 4.95	4,700	1,600	2,250	5,500 5,900
	65	30.0 35.0	50/70 70/80	465 495	5.70 4.89	4,700	1,600	2,250	5,650 6,100
	300	30.0	50/70	665	5.90	5,000	1,600	2,200	6,500
	350	30.0 30.0 48.0	50/70 70/90 70/95	875 805 1,345	5.84 3.99 5.60	6,100	1,600	2,250	7,200 7,800 8,000
	450	30.0	50/70	1,000	5.96	5,300	1,600	2,300	8,000
	550	30.0 30.0 48.0	50/70 70/90 70/95	1,300 1,200 2,000	5.87 4.01 5.62	6,300	1,800	2,450	7,500 8,150 8,400
	600	30.0	50/70	1,330	5.93	5,700	1,600	2,400	9,800
	750	30.0 30.0 48.0	50/70 70/90 70/95	1,740 1,585 2,635	5.89 4.03 5.56	7,100	1,800	2,450	8,250 9,400 10,500
	950	30.0 30.0 48.0	50/70 70/90 70/95	2,170 1,975 3,230	6.02 4.00 5.50	7,500	1,800	2,450	9,500 11,000 12,000

* Some figures approximated.
1) Condensing temperature of an existing refrigeration plant (relates to the Red heat pump evaporation temperature levels of approx. 2 Kelvin below the chiller condensing).
2) GEA RedAstrum speed 3,600 rpm (RM, RN types limited to 3,300 rpm), GEA RedGenium speed 1,500 rpm.
3) COP (coefficient of performance) = heating capacity / power consumption at net.
4) Dimensions and weights are based on standard applications. Values can differ depending on the specific operating conditions.
Motor sizes above 450 kW capacity require an extra panel for the frequency inverter (L x W x H 2,000 × 600 × 2,200 mm).

Engineering for a better world.

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