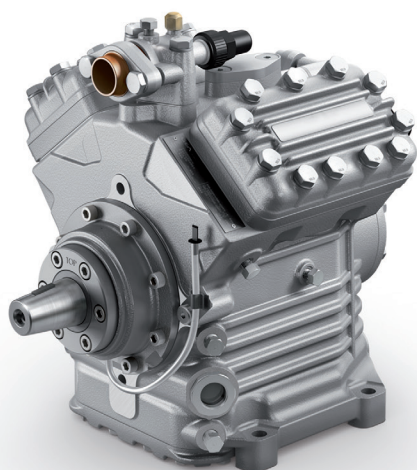




Think **green**,
choose **blue**.



GEA Bock HG, F and FK Compressors

Product overview



engineering for
a better world

gea.com

GEA compressors – best choice for sustainable security

GEA is one of the largest suppliers of process technology for the food industry and for a wide range of other industries. As an international technology group, the company focuses on world-leading process solutions and components for sophisticated production processes.

GEA Group AG

GEA is one of the largest suppliers for the food processing industry and for a wide range of other process industries. As part of our cooling and refrigeration technologies portfolio we offer future-proof and efficient compressors for all fields of commercial, industrial and transport refrigeration as well as rail and bus air-conditioning.

Proven quality combined with high efficiency

The new compressor series GEA Bock HG22e to HG44e were optimized: Compared with their predecessors these compressors offer a better efficiency, larger displacement stages and a more compact engineering design.

The GEA Bock HG56e series are entirely new compressors: They combine state-of-the-art technology with the GEA design features that have been proven for decades. The new 6-cylinder compressors replace the previous 4-cylinder series HG5 and partially HG6. Three sizes cover the range from 73.8 m³/h to 100.4 m³/h displacement (at 50 Hz).

Natural refrigerants are gaining ground

For the use with the refrigerant CO₂ GEA offers compres-

sors that are not only optimized with regard to pressures, but also for the use with CO₂, in many other respects. This includes a robust design for the partially demanding operating conditions with CO₂, a very smooth and quiet operation due to low vibration and pulsation and a very low oil carry over.

In the last years hydrocarbons have established themselves as another natural alternative. The GEA compressors of the hydrocarbon series meet all requirements of the F-gas regulation. Thus, they can be used for the long-term and increase the planning dependability for system manufacturers, users and investors.

Mobile cooling and air-conditioning

For mobile applications we offer proven solutions with the GEA Bock FK and HG series. The compressors ensure optimal climate in buses and trains or other transport vehicles.

Be inspired. By our new products, our established product series and the entire passion that goes into each of our products.

Semi-hermetic compressors HG (HA)

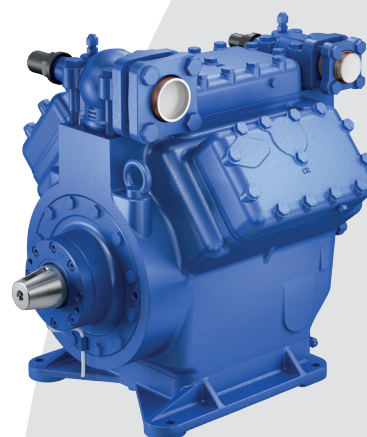
The GEA Bock HG (Hermetic Gas-cooled) range of semi-hermetic compressors offers traditional suction gas-cooled compressor state of the art technology. These compressors of the highest quality standard excel in their running comfort, easy maintenance, efficiency and reliability. Suitable as standard for conventional, chlorine-free HFC, low GWP refrigerants as well as natural refrigerants.

The HA (Hermetic Air-cooled) range, specially engineered by GEA, is available for low temperature applications, in particular for use with the R404A replacement refrigerants R407A, R407F, R448A and R449A.



Open type compressors F

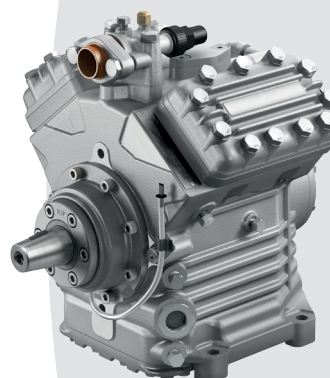
The F model series provides modern open type 2-, 4- and 6-cylinder compressors for separate drive systems (using V belts or direct couplings). Virtually all drive capacity requirements can be met.



Vehicle compressors FK

GEA Bock FK vehicle compressors are the result of many years of experience in the domain of mobile cooling systems and air-conditioning.

The unsurpassed light, compact, robust design and wide r.p.m. range are only some of the outstanding features of this unique product range of 2-, 4- and 6-cylinder compressors. A wide variety of designs can be tailored to suit individual requirements.



Semi-hermetic compressors HG (HA) 1 P. 6

Open type compressors F 2 P. 20

Compressors for mobile applications 3 P. 24

F-gas Regulation – HFC on the way out

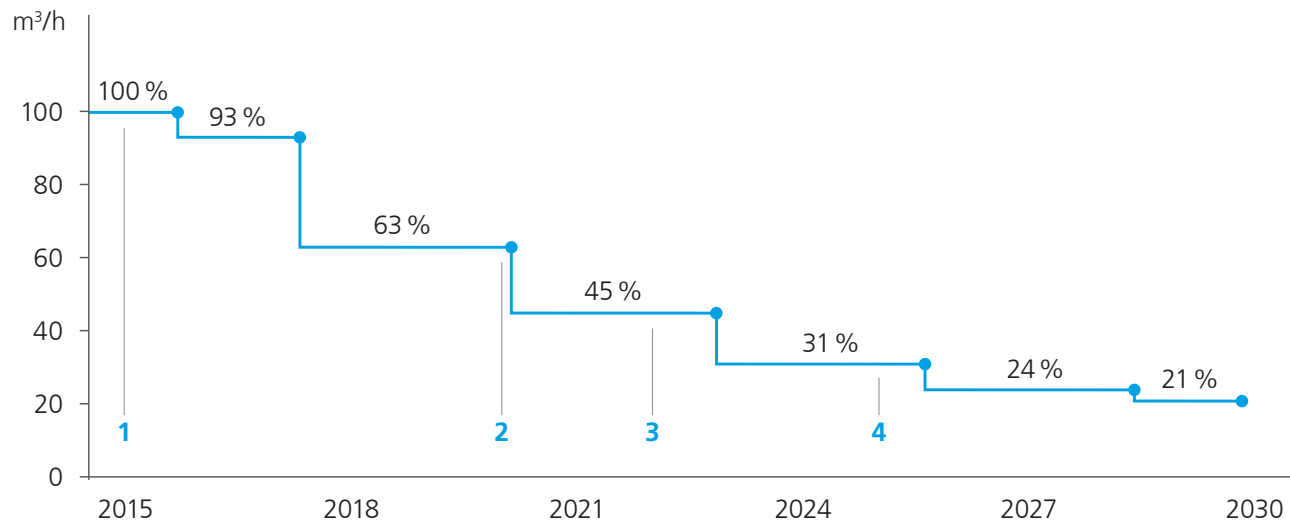
Since 2006 the F-gas Regulation (EC) No 842/2006 has been governing the use of fluorinated hydrocarbons (HFC) in technical refrigeration systems. The reason why emissions into the atmosphere must be kept within limits is that the heat-absorbing properties of HFC represent a cause of the greenhouse effect and global climate warming.

From the beginning of 2015, the new F-gas Regulation EU 517/2014 is effective. Planners, manufacturers, implementers and operators of refrigeration systems must undergo considerable reorientation. The new directive narrows their choice of applicable refrigerants more than ever, marking a fundamental turn away from refrigerants with a high greenhouse effect.

The goal set for the year 2030 is to reduce emissions of partly fluorinated hydrocarbons (HFC) to a fifth of the average output 2009–2012. Already in the near future, equipment for refrigerants with high greenhouse potential will be banned from the market, and refilling of existing systems will be subjected to restrictions.

As a technology partner for refrigeration, air-conditioning and heating applications GEA offers comprehensive advice and support for your switch to the natural refrigerants ammonia (NH₃), carbon dioxide (CO₂), and hydrocarbons (HC/R290). An extensive portfolio of compressors is available for any task.

PLACING ON THE MARKET PROHIBITIONS



1 2015: Household refrigeration appliances (GWP ≥ 150)

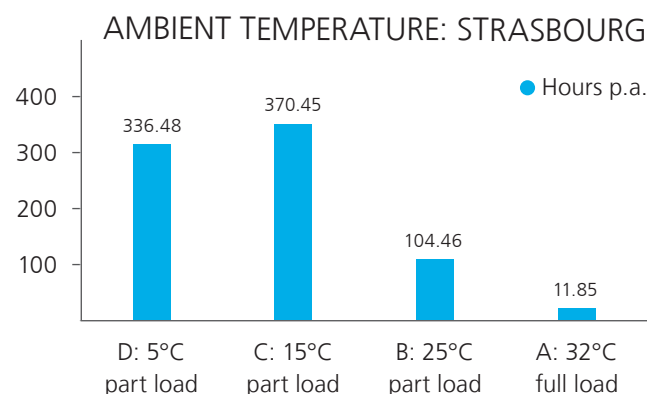
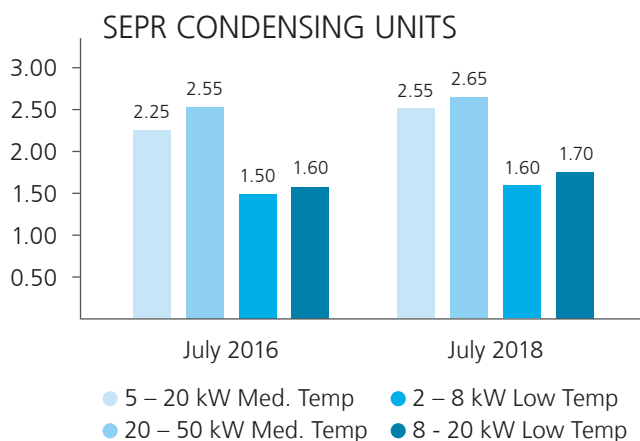
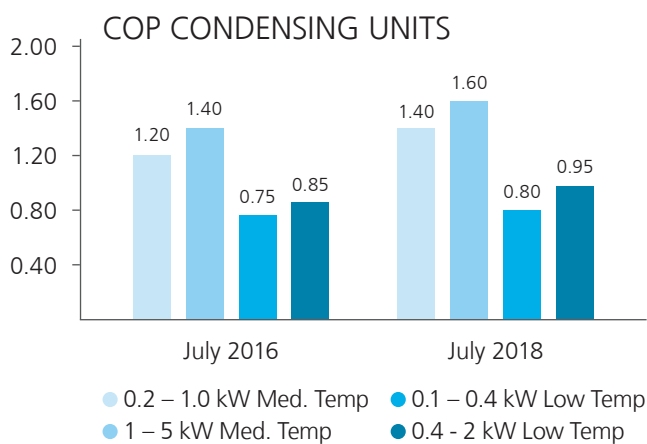
2 2020: Movable room AC systems (hermetically sealed systems) (GWP ≥ 150)
Stationary refrigeration systems (GWP ≥ 2500),
Prohibited: e.g. R404A, R507
Refrigerators and freezers for commercial use (hermetically sealed systems) (GWP ≥ 2500)

3 2022: Multipack centralised commercial refrigeration systems > 40 kW (GWP ≥ 150) – except primary circuit of cascaded systems (GWP ≥ 1500)
Refrigerators and freezers for commercial use (hermetically sealed systems) (GWP ≥ 150)

4 2025: Single-Split AC systems < 3 kg charge (GWP ≥ 750)

EU ecodesign regulation for condensing units

The ecodesign directive aims to improve the energy efficiency of certain energy-related products placed on the EU market. As a consequence, the regulation for condensing units requires Minimum Efficiency Performance Standards (MEPS) for new products being introduced into the EU market as of July 2016. These requirements entail a series of challenges for the manufacturers, assemblers and importers, just as they do for the EU member states that are legally obligated to ensure that new products placed on the market comply with the new MEPS.



REQUIREMENTS OF ECODESIGN REGULATION

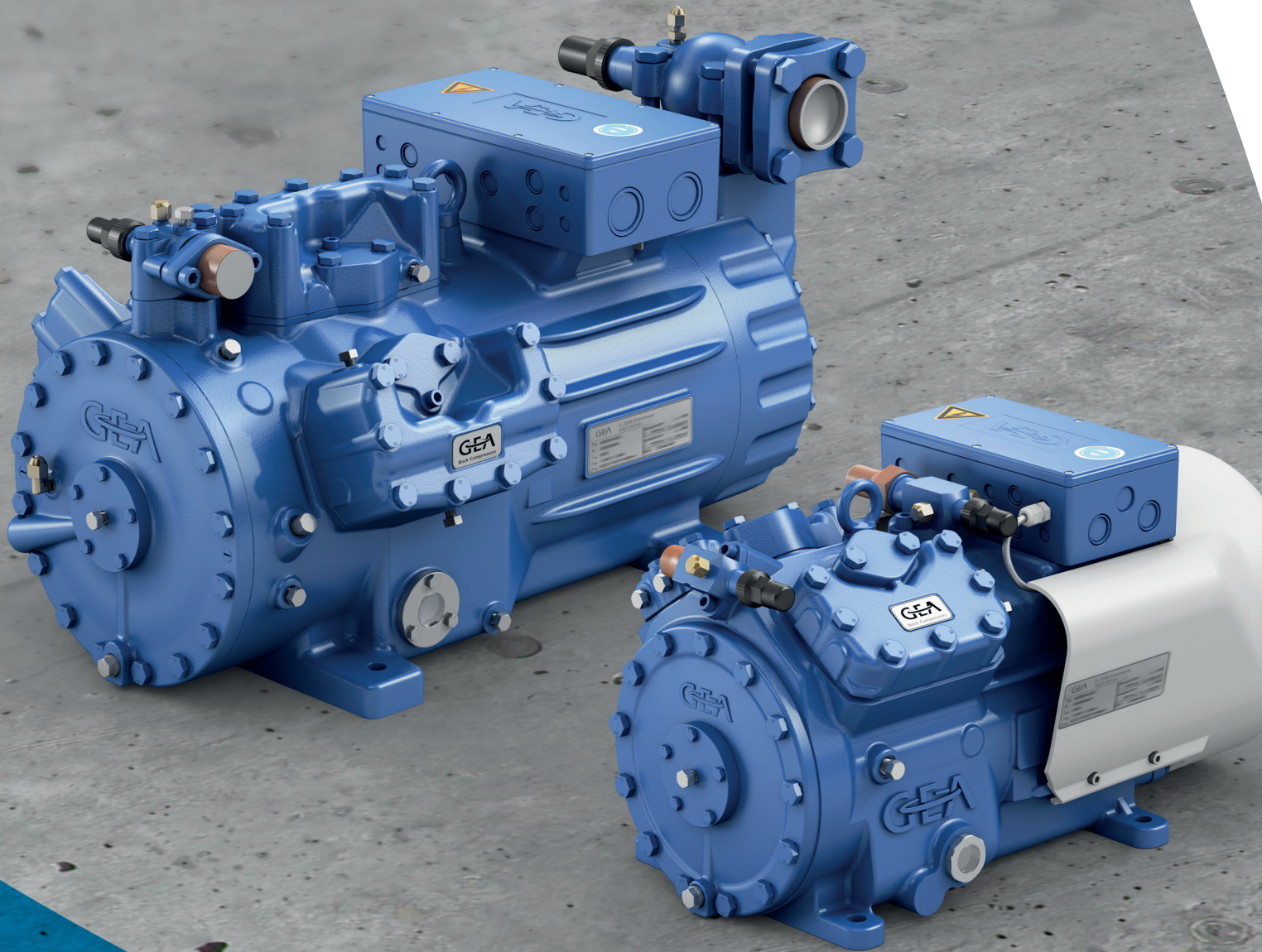
Rating considers COP value for condensing units with lower cooling capacities at medium and low temperature. Equipment using refrigerants with a GWP < 150 obtain a 15 % reduction of MEPS in all ranges for July 2016 and 10 % as of July 2018.

Rating considers Seasonal Efficiency Performance Ratio (SEPR) for condensing units with higher cooling capacities at medium and low temperature. Those larger size products with fixed or staged capacity are degraded at part-load.

Rating considers the temperature profile of Strasbourg.

Advantage for customers:

- Allows customers to select product with certified performance
- Declaration of performances for condensing units according to latest EN13215 standard
- Harmonized test procedure (certification process is well defined and supervised by a certain notified body)
- Product passport for market surveillance authorities on performances declaration process



Semi-hermetic compressors

The semi-hermetic compressors of the highest quality standard excel in their running comfort, easy maintenance, efficiency and reliability. Suitable as standard for conventional, chlorine-free HFC as well as low GWP refrigerants.

- At a glance
- Special features
- Compressors for natural refrigerants
- ATEX compressors
- Condensing units

Product overview

Semi-hermetic compressors



Semi-hermetic compressors			
HG compressors (gas-cooled)	HA compressors (air-cooled)	Compressors for natural refrigerants	ATEX compressors
SHG condensing units	SHA condensing units	CO ₂ compressors transcritical	ATEX compressors for zone 1
SHG Plusbox		CO ₂ compressors subcritical	ATEX compressors for zone 2
		HC compressors for hydrocarbons	



Building air-conditioning



Commercial refrigeration



Supermarket refrigeration



Fruit cooling



Ice rinks



Maritime applications



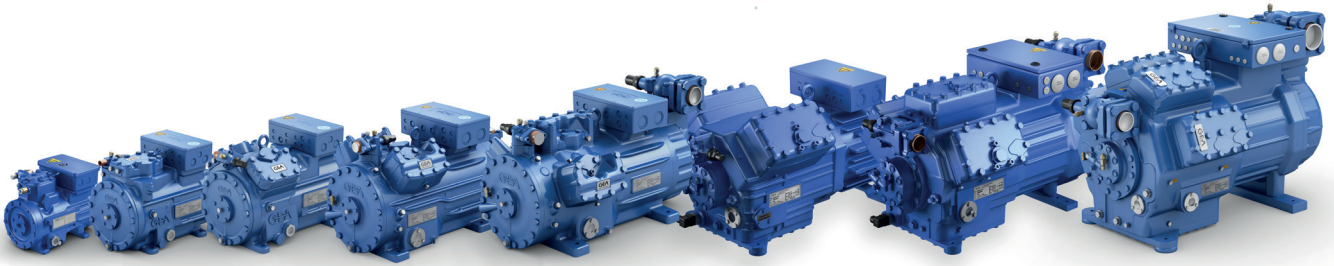
Bus air-conditioning



Rail air-conditioning

Further information can be found online at vap.gea.com





The best arguments for semi-hermetic GEA compressors

The GEA Bock HG (Hermetic Gas-cooled) range of semi-hermetic compressors offers traditional suction gas-cooled compressor state of the art technology. These compressors of the highest quality standard excel in their running comfort, easy maintenance, efficiency and reliability. Suitable as standard for conventional or chlorine-free HFC refrigerants.

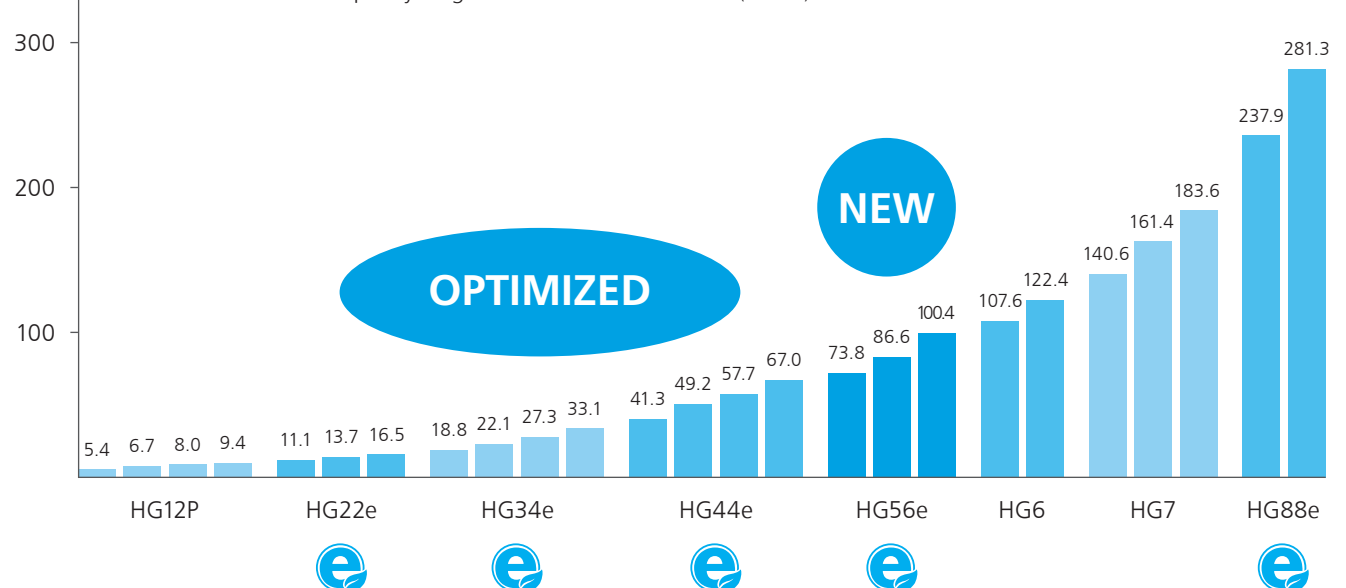
The HA (Hermetic Air-cooled) range, specially engineered by GEA, is available for low temperature applications, in particular for use with the R404A replacement refrigerants R407A, R407F, R448A and R449A.

All HG and HA compressors are characterised by the following features:

- High refrigeration capacity combined with minimum power requirement
- Outstanding running comfort
- Wide range of applications without additional cooling
- Stable valve plate design
- Replaceable motors
- Economic capacity control
- Minimum space requirement
- Quiet and low vibration
- Oil pump lubrication independent of direction of rotation

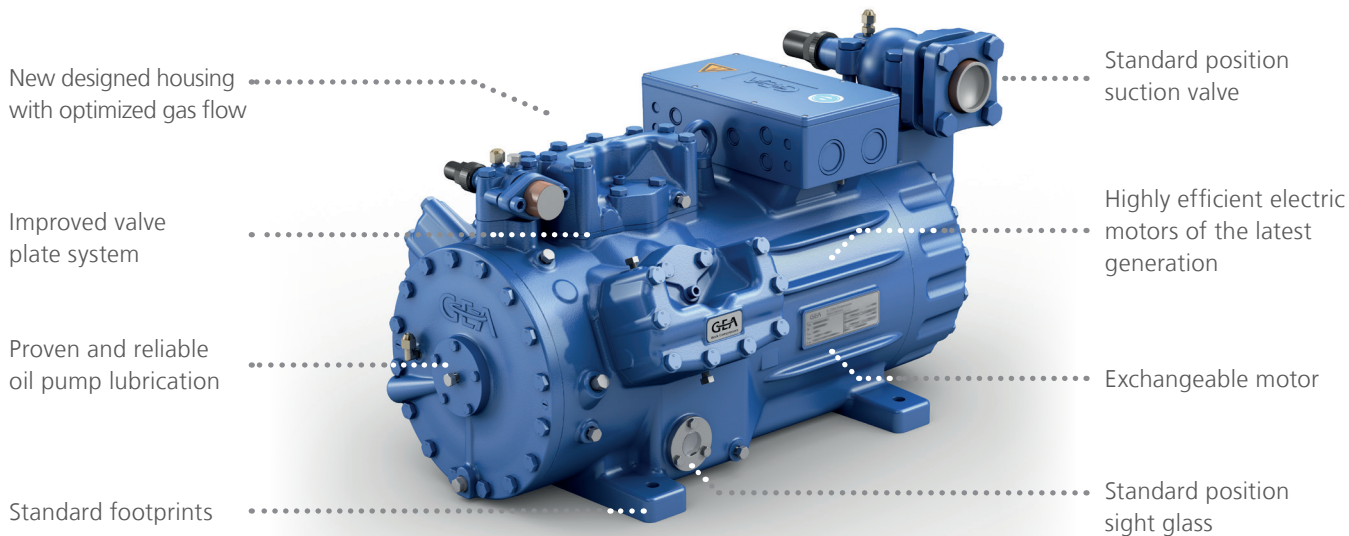
THE CURRENT PROGRAM

m³/h 8 model sizes with 25 capacity stages from 5.4 to 281.3 m³/h (50 Hz)



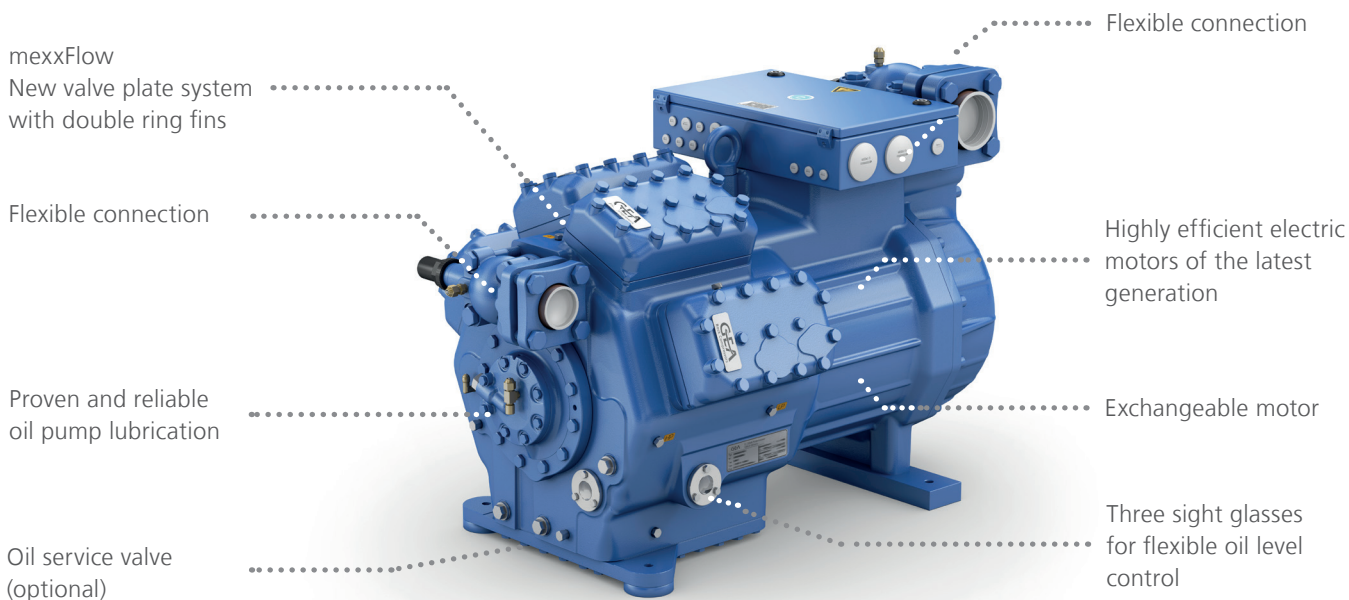
HG56e

The new 6-cylinder compressor with a high level of efficiency and quiet operation



HG88e

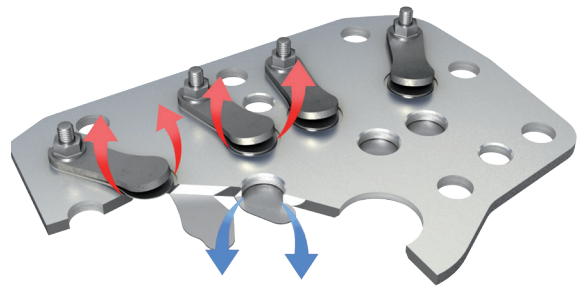
The biggest reciprocating compressor for commercial refrigeration



GEA Valve plate systems

Standard valve plate construction

GEA compressors, for smaller and medium-sized capacities, are equipped with a standard valve plate design. This world-wide proven valve design is equipped with finger reed valves on suction and discharge side. The fins are made of high-quality, impact-resistant spring steel. The valve in- and outlets are flow-optimized for smaller and medium-sized capacities in order to reach an efficient compression.



HG12P-HG56e

mexxFlow valve plate innovation

More refrigerating capacity and lower power consumption – this is the motto of the mexxFlow valve plate, which forms the heart of the new GEA compressor generations for higher capacities. In order to increase the energy efficiency of reciprocating compressors, manufacturers have always been focused on the valve plate system. At higher capacities the standard valve plates reach their limits in terms of efficiency. With the mexxFlow, GEA was successful in increasing the efficiency of its compressors by up to 20 %. This success was achieved through a flow-optimized double ring fin construction of the valve plate in combination with a specially adapted cylinder head.

With the knowledge gained from practical experience over the past decade, we have consistently improved and further developed the mexx Flow plate system.

The result: mexxFlow 2.0.

The second generation shows even greater resistance with a consistent high efficiency. This makes it suitable for the even toughest requirements of various applications.

Special features of the mexxFlow valve plate:

- Valve plate with highly efficient double ring fins
- Flow optimized system of valve plate and cylinder head

mexxFlow 2.0



HG88e

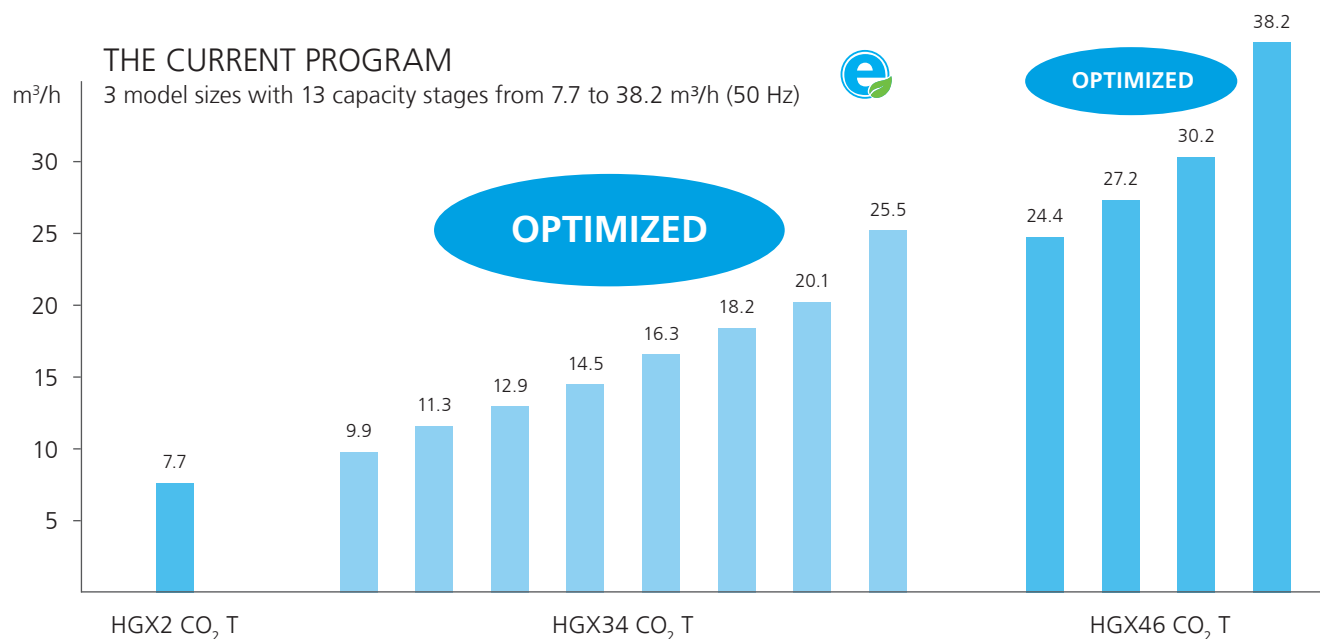
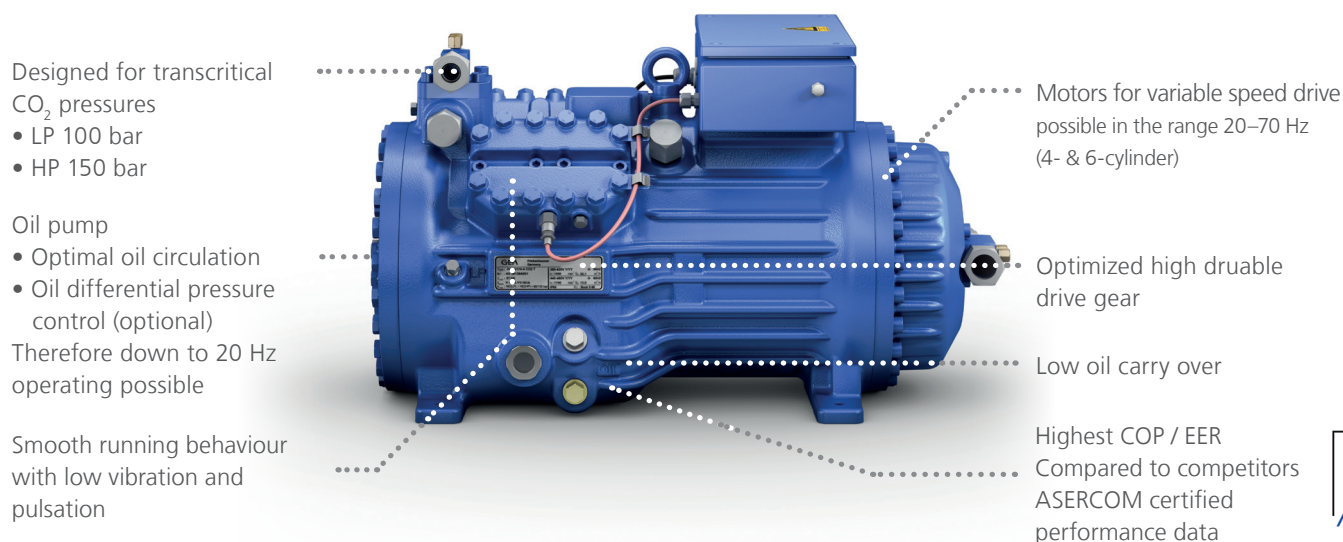
CO₂ compressors for the refrigerant R744

CO₂ compressors transcritical

Since the beginning of the 90's, GEA has been engaged in the development of compressors for transcritical CO₂ systems. The series now covers displacement from 7.7 to 38.2 m³/h (50 Hz) with 2, 4- and 6-cylinder reciprocating compressors. The compressors are distinguished by high reliability, excellent operating performance, wide frequency band for minimum part-load needs and previously unachievable efficiency standards in the market. The collected outstanding

performance data has also been confirmed officially through ASERCOM (Association of European Refrigeration Component Manufacturers). Therefore the compressors contribute to lowest life-cycle costs and comply with long-term legal requirements such as the F-gas regulation in Europe.

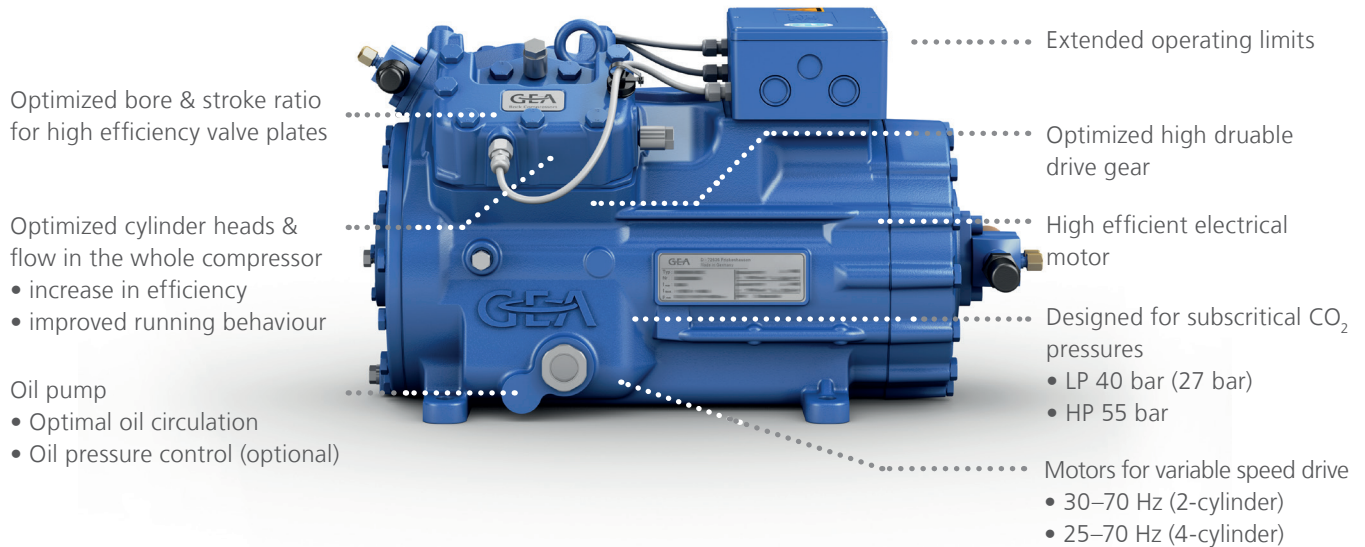
The compressors are used in transcritical and subcritical applications for supermarkets, industrial refrigeration and heat pumps.



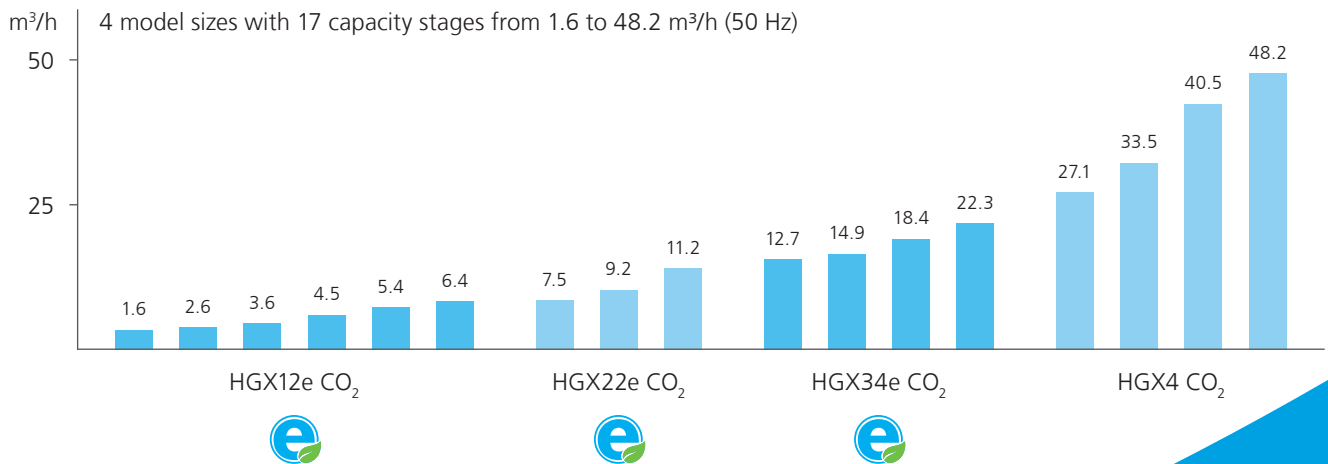
CO₂ compressors subcritical

For low temperature applications a series with displacements from 1.6 to 48.2 m³/h (50 Hz) is available. This series combines the advantages of a time-tested compressor series, which

have been optimally adapted to the demands of CO₂. The compressors are used in cascade- and booster-systems in supermarket and industrial cooling applications.



THE CURRENT PROGRAM



With technical optimizations we continuously improve the energy consumption of our compressors. The compressors of the e-series set a new standard when it comes to motor-efficiency, gas flow and efficiency of the valve system. All this results in a higher refrigerating capacity of the compressor at a lower drive power.

HC compressors for hydrocarbons

For various applications, such as the field of supermarket refrigeration, hydrocarbons have established themselves as another natural alternative besides CO₂. The GEA compressors of the hydrocarbon range meet the requirements of the F-gas regulation. They can be used for the long-term and therefore increase the planning dependability for system manufacturers,

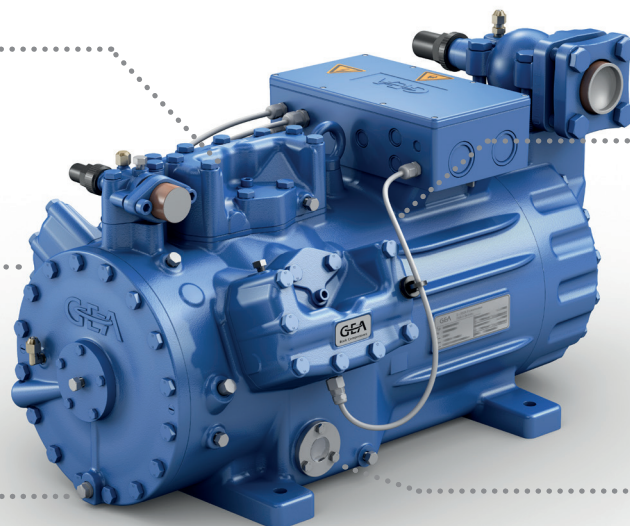
users and investors. Due to the flammability of hydrocarbons the compressor has some safety related modifications and corresponding adjustments in the system design.

The compressor series HC with displacement from 5.4 to 279.8 m³/h is available for the use with hydrocarbons.

Optimized valve plate system
for maximum efficiency

Durable engine
for demanding applications
with hydrocarbons

Oil sump heater (required)
due to high solubility
of refrigerant in oil



Thermal protection thermostat
Recommended for operating
conditions with high hot gas
temperatures

Specific oil filling
High wear protection even
for extreme requirements



Electronic motor protection INT69 G
enclosed for installation in the switchboard

The new HG44e HC and HG56e HC

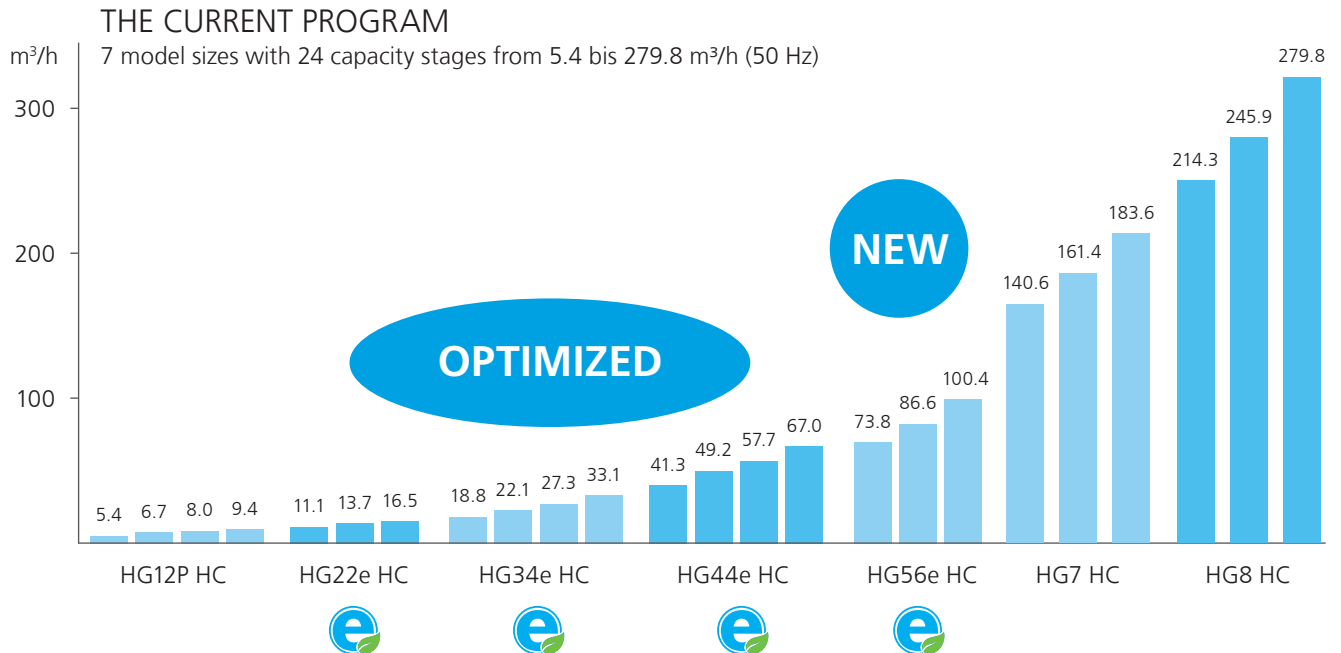
The advantages of the proven HG44e range have now been transferred to the compressors for hydrocarbons. The new, more efficient HG44e HC compressors was launched in February 2016 and will replace the HG4 HC range.

Since April 2014 the HG44e is successfully on the market and offers key advantages over the previous series. It combines the time-tested reliability and running smoothness of the preceding model HG4 with new and enhanced efficiency.

The HG44e HC series, in comparison to its predecessors, now offers four instead of three model sizes and covers the range of maximum displacements from 41.3 to 67.0 m³/h. In addition, the largest version, the HG44e/770-4 HC compressor, offers almost 20% more displacement with its 67 m³/h than the largest HG4 HC model and replaces the smallest model size of the former HG5 HC range with 62.9 m³/h.

In addition to the already optimized and well-established model HG44e HC, GEA presents now the new 6-cylinder compressors for hydrocarbons: the GEA Bock HG56e HC series, with three models, covers the range with displacements from 73.8 to 100.4 m³/h.

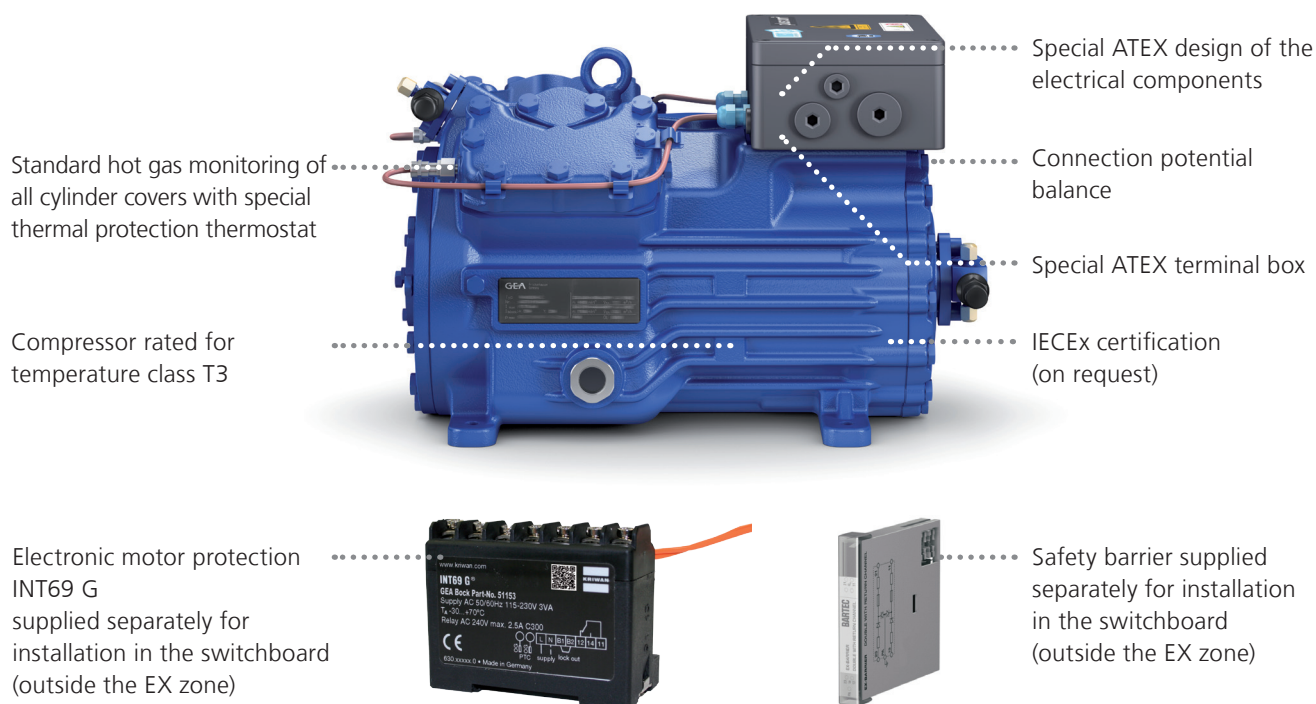
As a result, the GEA Bock HC series guarantee the most extensive performance coverage of any brand in the industry. The new compressor versions for hydrocarbons combine high efficiency, running smoothness, compactness and a long life cycle. Due to optimized drive gear components and an adjusted specific oil filling, both models offer highest performance, even under very demanding conditions of hydrocarbons. The GEA compressors of the hydrocarbon range meet the requirements of the F-gas regulation. This provides planning assurance to system manufacturers, users and investors.



Additionally, ATEX compressors are available that can be operated with hydrocarbons as well. You can find more information about these compressors in our ATEX brochure.

ATEX compressors

Differences (zone 1) to a standard compressor



Now the entire program is also available as hydrocarbon (HC) version.

ATEX compressors for zone 1

Within the European Union, electrical and mechanical machinery operated in explosive atmospheres must comply with the ATEX (ATmospheres EXplosibles) conditions. The system designer must use correspondingly marked and certified components for these applications.

GEA is the first European manufacturer who offers compressors which are conform to ATEX machine category 2.

Information on the compressors:

The 2-, 4-, 6- and 8-cylinder models of the HG Series are the basic compressors for ATEX versions.

IECEx IDENTIFICATION

Ex	d	e	ia	mb	IIB/IIC	T3	Gb
International explosion protection					Increased safety		
Intrinsically safe equipment					Encapsulation, magnetic coil (option), only EX-HG34e to EX-HG6		
					Explosion sub-group IIB = Offshore coating, IIC = ESD coating		
					Equipment protection level Temperature class T3 (max. 200 °C)		

ATEX compressors for zone 2

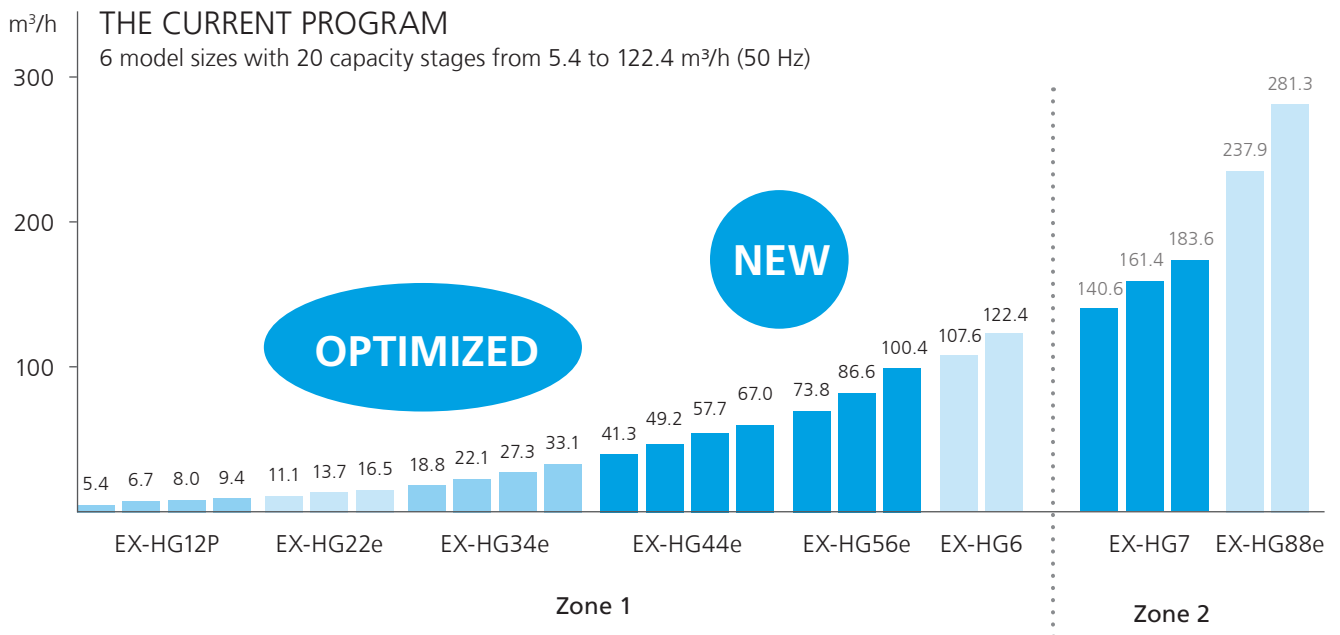
Beside to the well-known zone 1 compressors, GEA also offers compressors which are compliant with the ATEX category 3 (zone 2). Upon request, these compressors are available with an offshore coating, e.g. for the use on oil rigs.

Start-up for the new zone 2 compressors are the 6- and 8-cylinder compressors. Further types will follow.

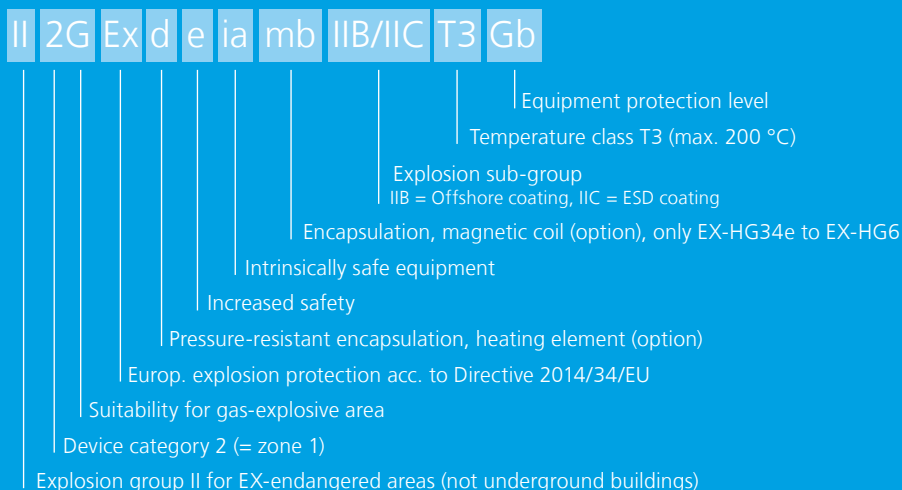
GEA is the only manufacturer who offers semi-hermetic compressors for zone 1 and 2 ATEX- and recently also IECEx-certified. Therefore the compressors have worldwide accepted Certificates of Conformity.

Characteristics:

- Confirmation of conformity by a notified body
- Permissible ambient temperature range -20 °C to 60 °C
- Wide range of accessories available
- Explosion sub-group IIC
- Optional available offshore package with:
 - Corrosion resistant multilayered coating, polyurethane free (Explosion sub-group IIB)
 - Corrosion resistant terminal box



ATEX IDENTIFICATION



Condensing units



Condensing units air-cooled

With the current series of units, GEA offers you a comprehensive range from 5.4 to 122.4 m³/h displacement. In the lower and medium capacity range, the compressors of the Pluscom generation come into use. All GEA Bock units are constructed following a continuous “module” principle.

Special features

Universal

Wide range of uses (R134a, R407C, R 404A, R507, R22) for air-conditioning, medium and low temperature refrigeration applications

Two compressor variants

- HG design with suction gas-cooling
- HA design with air-cooling, particularly advantageous for low temperature applications (R407F, R404A, R22)

Reliable and safe oil supply

All compressors are fitted with classic lubrication oil circulation and an oil pump which is independent of the direction of rotation

High refrigeration capacity with reduced energy consumption

Generously proportioned condensers with optimized tube circulations and heat transmission linked to high-performance fans

Efficient fans

Fans with highly efficient shovel fluting, motor in compact external rotor design, single-phase (230V -1- 50/60Hz) with winding protection. Motor suitable for electronic speed regulation for optimal condensation pressure setting



ASERCOM certification

Based on the EU Ecodesign Directive and its related regulation

ASERCOM, the Association of European Component Manufacturers, is the platform for addressing scientific and technical challenges, promoting standards for performance and safety, encouraging better environment protection and serving the refrigeration and airconditioning industry and its customers.

The new ASERCOM certification programme for condensing units makes it possible to objectively compare the performance of the wide variety of products available on the market.

Following GEA Bock Condensing Units are „Certified Performance“ products:

Plusbox

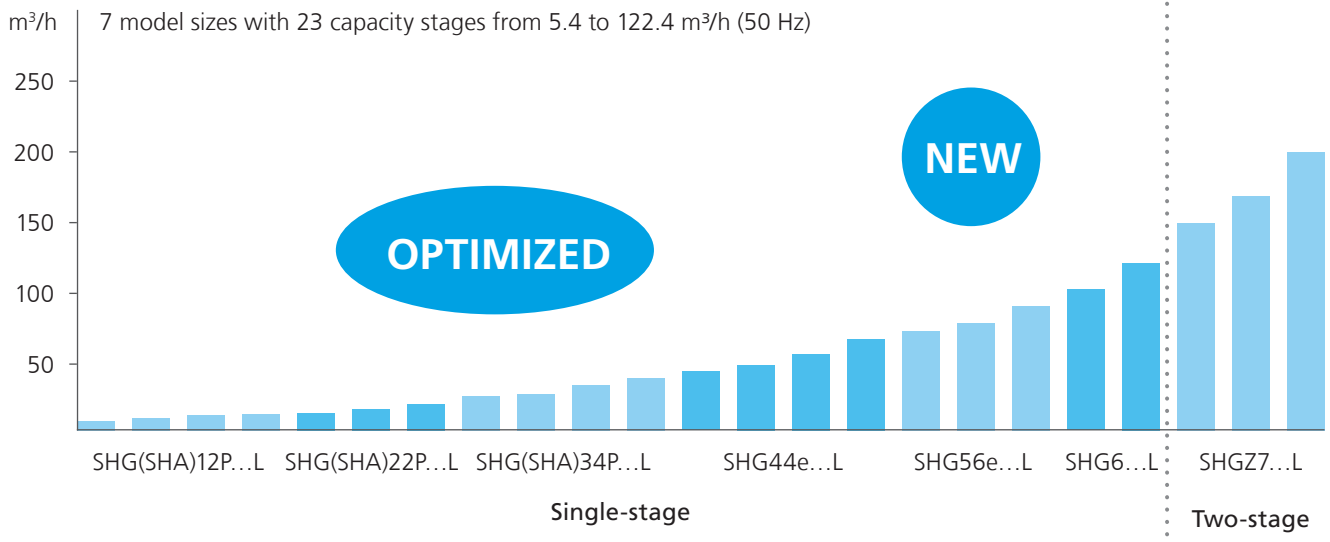
- SHGX34e/215-4 PB
- SHGX34e/255-4 PB
- SHGX34e/315-4 PB
- SHGX34e/380-4 PB

Air-cooled Condensing Units

- SHGX12P/60-4 SL
- SHGX12P/75-4 L
- SHGX12P/90-4 L
- SHGX12P/110-4 L
- SHGX22e/125-4 L
- SHGX22e/160-4 L
- SHGX22e/190-4 L
- SHGX34e/215-4 L
- SHGX34e/255-4 L
- SHGX34e/315-4 L
- SHGX34e/380-4 L
- SHGX44e/475-4 L
- SHGX44e/565-4 L
- SHGX44e/665-4 L
- SHGX44e/770-4 L

THE CURRENT PROGRAM

7 model sizes with 23 capacity stages from 5.4 to 122.4 m³/h (50 Hz)





Open type compressors

The F model series provides modern open type 2-, 4- and 6-cylinder compressors for separate drive systems (using V belts or direct couplings). Virtually all drive capacity requirements can be met.

- At a glance
- Special features
- Compressor units for directive drive

Product overview

Open type compressors



Open type compressors

F compressor

FDK compressor units for direct drive

F NH₃ compressor

FDK NH₃ compressor units



Maritime applications



Fishing industry



Ice machines



Cold stores



Fruit cooling



Process refrigeration

Further information can be found online at vap.gea.com



Open type compressors

The F model series provides modern open type compressors for separate drive systems (using V belts or direct couplings).

Virtually all drive capacity requirements can be met.

Compact construction

- Robust and easy to handle
- Suitable for v-belt or coupling drive
- Large number of applications with a wide r.p.m. range
- Naturally with oil pump lubrication

Quiet with low vibrations

- Large-dimensioned crankshaft area
- Dynamic mass balance
- High volume pressure area to dampen pulsations

Universal

- e.g. R134a, R404A, R507, R407C, R22, R407A, R407F, R448A, R449A
- One compressor design for all conventional refrigerants
- For air conditioning, medium or low temperature applications
- Maximum permissible operating pressure: 28 bar
- Compressor designs for NH₃

Compressor units for directive drive

FDK compressor units

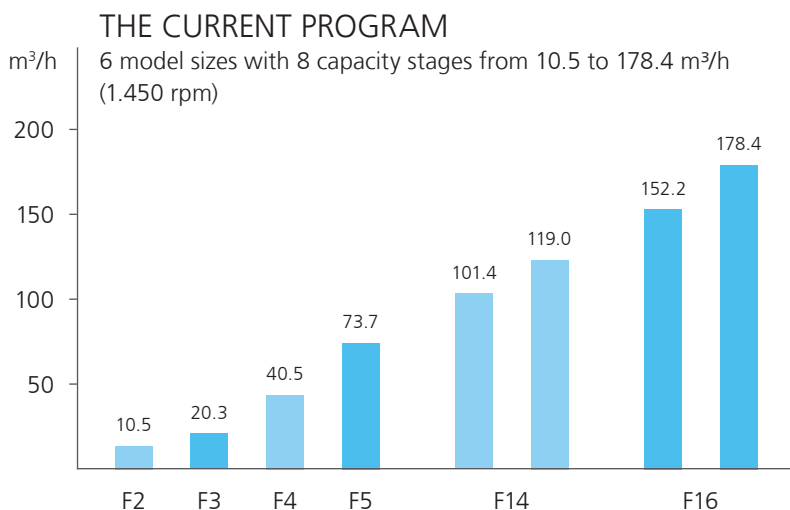
Based on the F compressor series with its many designs and application options, a selection of compressor units with compact construction is available for use with direct drive.

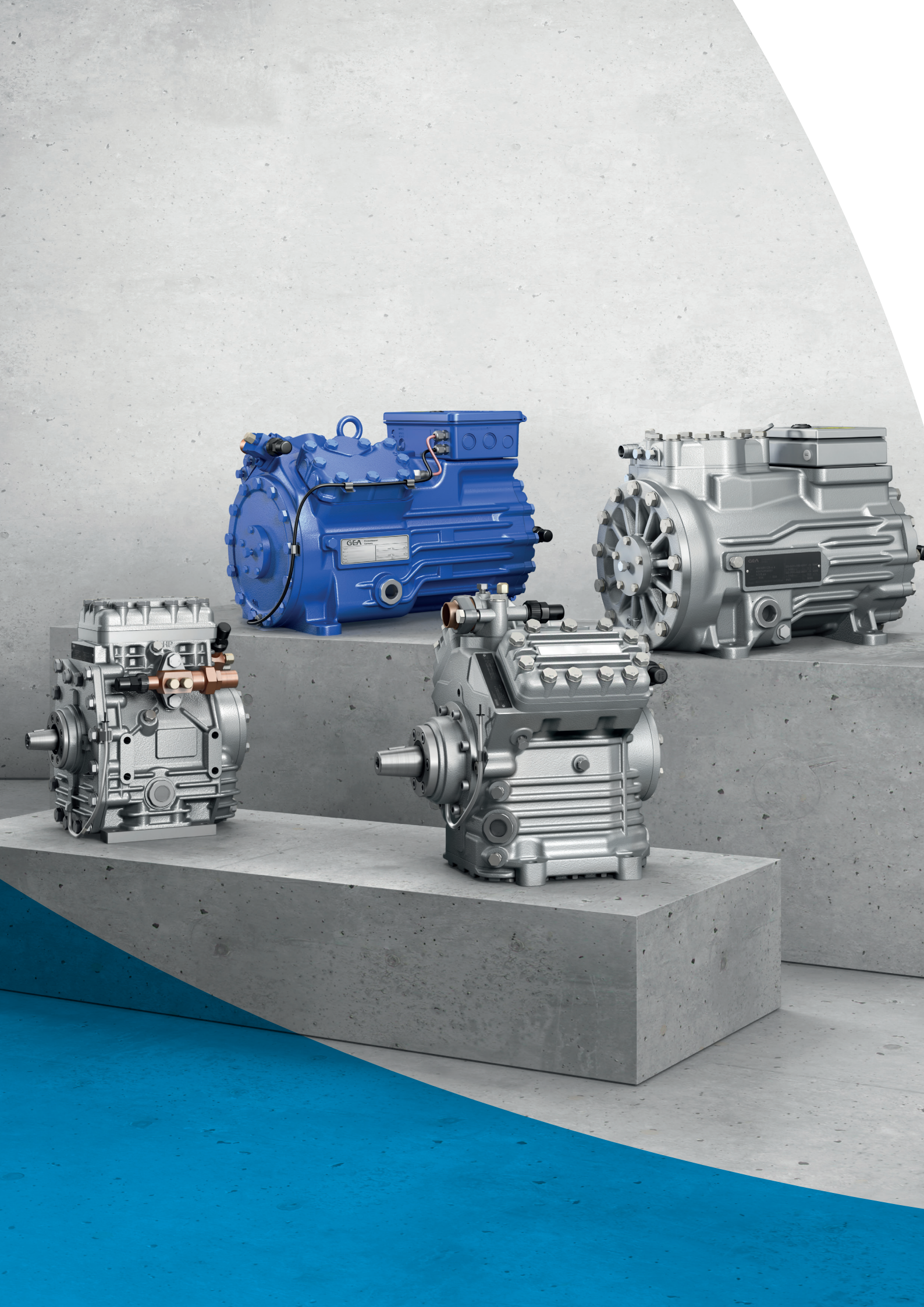
Compressor with flexible shaft coupling for direct drive

mounted on a profile base frame. The power transmission

from motor to compressor occurs via an elastic flexible shaft

coupling. ICE standard motors of type IM B₃ are used as drive motors (option).





Compressors for mobile applications

GEA Bock FK vehicle compressors are the result of many years of experience in the domain of mobile cooling systems and air-conditioning.

- At a glance
- Special features
- FK compressors
- HG compressors
- HG aluminium compressors

Product overview

Compressors for mobile applications



Compressors for mobile applications

FK vehicle compressors

K-valve plate (air-conditioning)

N-valve plate (air-conditioning or medium temperature)

TK-version (low temperature)

HG semi-hermetic compressors

Cast iron version

Aluminium version

2- and 4-pole motor version

R407C version (HP 35 bar)



Bus air-conditioning



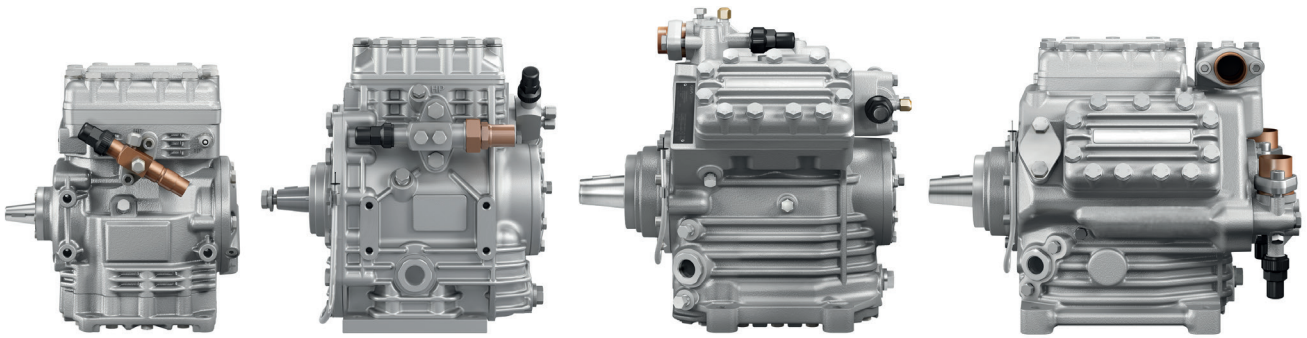
Transport refrigeration



Rail air-conditioning

Further information can be found online at vap.gea.com





Vehicle compressors FK

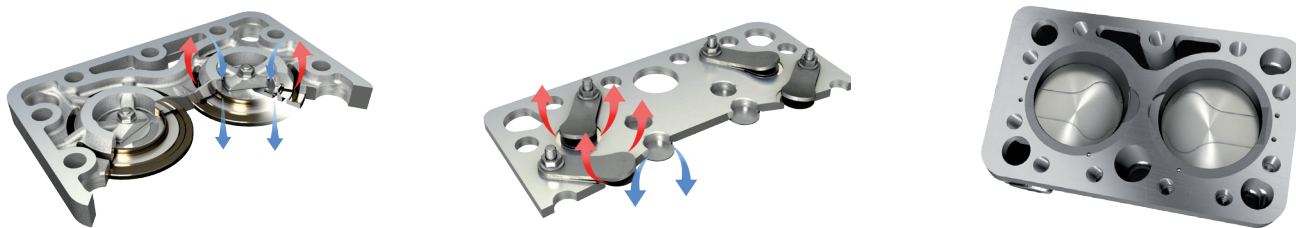
Vehicle compressors of the GEA Bock FK range are the result of many years of experience in the area of mobile refrigeration systems. The unsurpassed light, compact, robust design and wide r.p.m. range are only some of the outstanding features of this unique product range of 2-, 4- and 6-cylinder compressors. A wide variety of designs can be tailored to suit individual requirements.

The so-called K version is a special innovation with a unique valve plate system for maximum requirements in bus and coach air-conditioning systems.

- Compressors for bus and train air-conditioning
- Compressors for transport cooling and other applications of mobile cooling

GEA Bock FK compressors are specialists around the world.

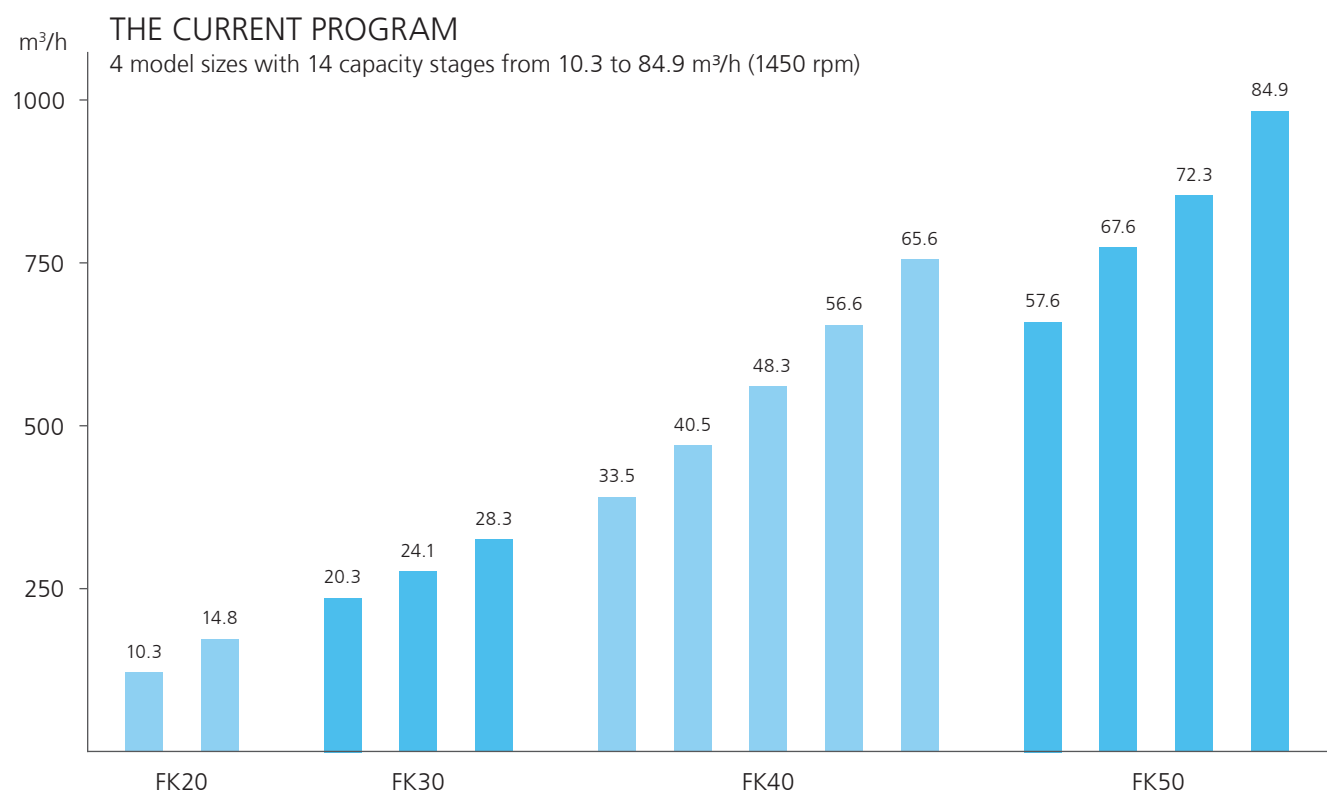
- Unsurpassed light and compact design
- Highly robust design
- Wide speed range
- Efficient operating performance
- Universal application
- Easy to service



Three design variations are available for different areas of application:

- For air-conditioning – the K design
- For air-conditioning or medium temperature – the N design
- For low temperature – the TK design

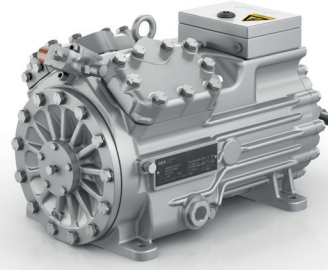
The differences are essentially associated with the valve plate, which is adapted to each application range in terms of operational safety and efficiency. Additionally we have different solutions for the flexible adaptation of the compressors for your individual requirements.





HG 2- and 4-pole compressors

Especially for power-intensive applications, such as mobile air-conditioning, GEA also offers the Pluscom model HG34P in 2- and 4-pole design.

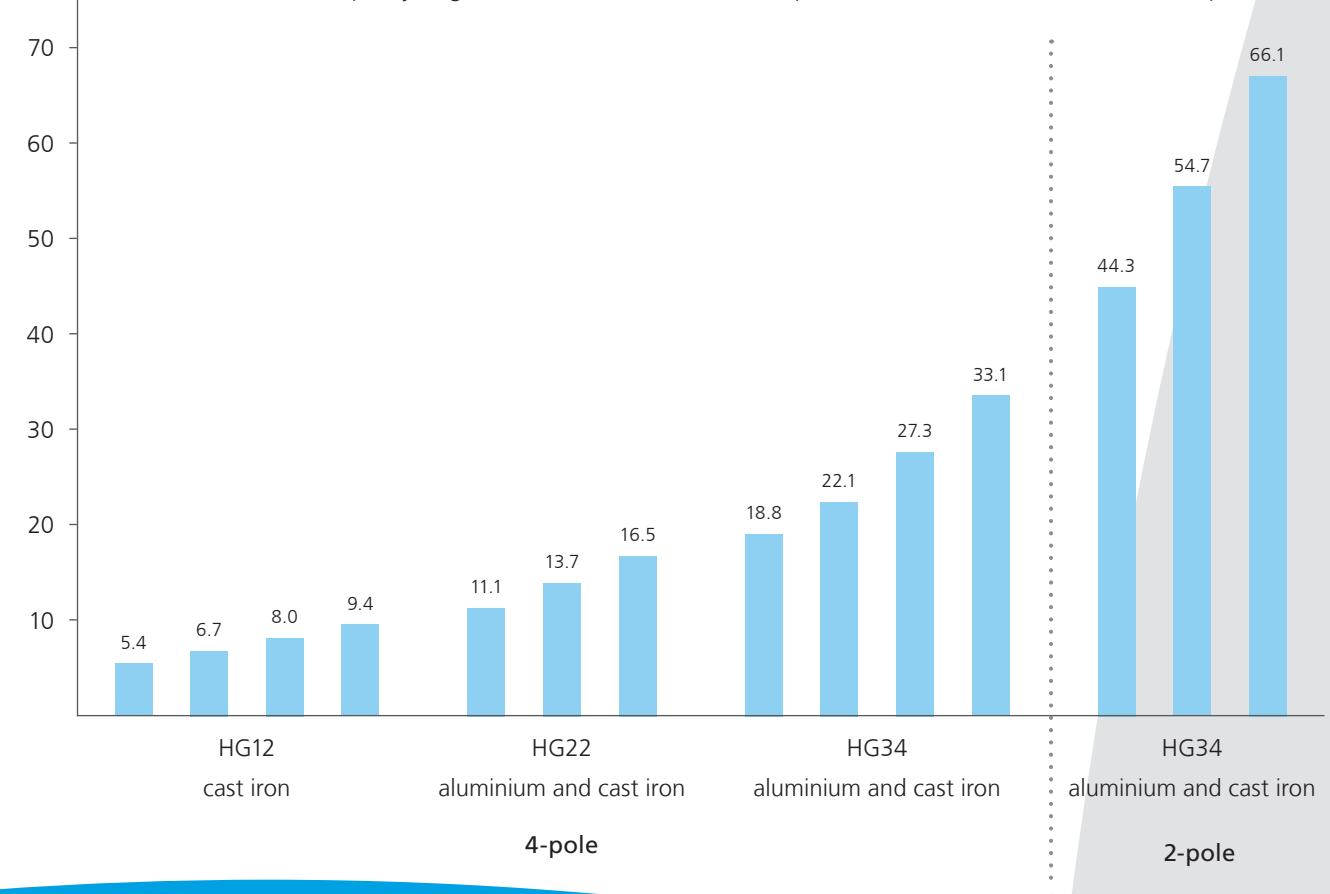


HG aluminium compressors

With the two models HG22 and HG34 in full-aluminium, lightweight construction, GEA offers the perfect solution for all application areas in which the weight of the compressor is important.

THE CURRENT PROGRAM

3 model sizes with 14 capacity stages from 5.4 to 33.1 m³/h (1450 rpm) and from 44.3 to 66.1 m³/h (2900 rpm)



Learn more about GEA Compressors

Because you're never done learning –
GEA training and workshops on compressors

Many years ago, GEA intensified its commitment in the area of customer training. Therefore, we offer an extensive range of attractive training events, from two-day practitioners' workshops in Frickenhausen to afterwork workshops throughout Germany – regardless of the type of training you are interested in.

These things are characteristic of all GEA training:

- The captivating way that the training director carries out the events
- The strong practice orientation of the training events

For additional questions or advice, please contact our training center:

Telephone +49 7022 9454-0

Email: info@gea.com

You can find the current dates on our homepage:



GEA Bock HG, F and FK Compressors Online

VAP Compressor selection program

The GEA Bock compressor selection software supports you in searching the suitable compressor or rather condensing unit for your application. On the basis of the searched refrigerating capacity and operating condition (refrigerant, evaporation and condensing temperature) suitable compressors will be found. Furthermore the software provides additional information on the chosen compressor:

- Operating limits
- Technical data
- Performance data
- Scope of supply and accessories
- Dimensions and connections
- Product photo
- Spare part list, drawings, 3D model etc.

The compressor selection program is available as webbased online-version as well as offline-version for installation on the computer.

- Find suitable compressors quickly
- Software-date on a daily basis
- For stationary and mobile applications
- All compressors in one version

Here's the direct way to the online-version:

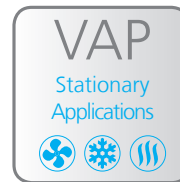
- GEA Bock HG compressors



- GEA Bock F compressors



- GEA Bock FK compressors



SOCIAL MEDIA

GEA is represented in the following social media networks:

LinkedIn

International exchange and land get connected on LinkedIn.

www.linkedin.com/groups/GEA-Food-4225307



Facebook

Please contact us and stay updated with all the latest news in the transportation industry.
www.facebook.com/GEAtransportation



YouTube

You can find product videos and animations of GEA on YouTube.
www.youtube.com/user/theGEAgroup



Twitter

Follow us on Twitter and be always up-to-date.
www.twitter.com/GEA_Events



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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