

Individual and reliable solutions for process gases



AERZEN
EXPECT PERFORMANCE

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Individual and reliable processes

AERZEN – Premium in every process

Where gases are compressed in highly-critical processes, there are few tolerances. Process gas solutions must meet highly specific requirements. Just as strict laws and guidelines. Above all, they must ensure one thing: A reliable, uninterrupted and economic production process. Under any conditions. In all applications, industries, and countries of the world.

AERZEN is one of the pioneers in compressor technology. Discuss machine solutions with our experts and benefit from more than 150 years of know-how and experience. From an unusually broad solution portfolio. From the consistent focus on efficiency criteria. From extremely long service life. And from the international profile of a global player.

The right plant for every application

We develop ground-breaking solutions and overall concepts in more than 100 countries of the world. Process gas compressors and blowers, modifications, accessories and special developments that have proven themselves in more than 10,000 installed plants worldwide. Market-leading solutions

that significantly contribute to your company's success. No matter whether you're looking to optimise, modernise, or construct plants. Benefit from this in every individual application. In every specific process. In each of your questions:

- How do you secure the productivity of your process gas plant and consequently your business success?
- What requirements do modern process gas machines have to meet today?
- What sets compressor solutions from AERZEN apart?

On the following pages, we would like to provide you with our answers to these and other questions.

LET'S TALK

"... about **resource-saving** and **efficient** aeration of your aeration tanks."

Industries and key applications

Sometimes critical, always challenging

AERZEN offers the process gas industries an enormously broad spectrum of blower and compressor technologies – perhaps the broadest of all. The machines work in all industrial key applications on a stand-alone basis, in machines or containers, onshore and offshore.

Industrial gases

- Air separation
- Synthetic gases

Chemical process industry

- Methanol synthesis
- Ammonia synthesis
- Ammonia liquefaction
- Sodium production
- Lime kiln gas compression, combustion gas compression
- Reduction gas catalysts
- Acetylene circular gas

Petrochemicals, refineries

- PSA feed gas, tail gas
- Flare gas compression
- Ethylene, propylene, olefin
- Butadiene
- Styrene off gas

Industrial research and development

- Circular processes
- Helium compression in cryo plants

Energy production

- Turbine charging
- Steam compression
- Biogas block-type thermal power station
- Glass industry
- Oxygen blowers
- Tin bath protective atmosphere

Nuclear

- Vapour recompression
- Boron recycling

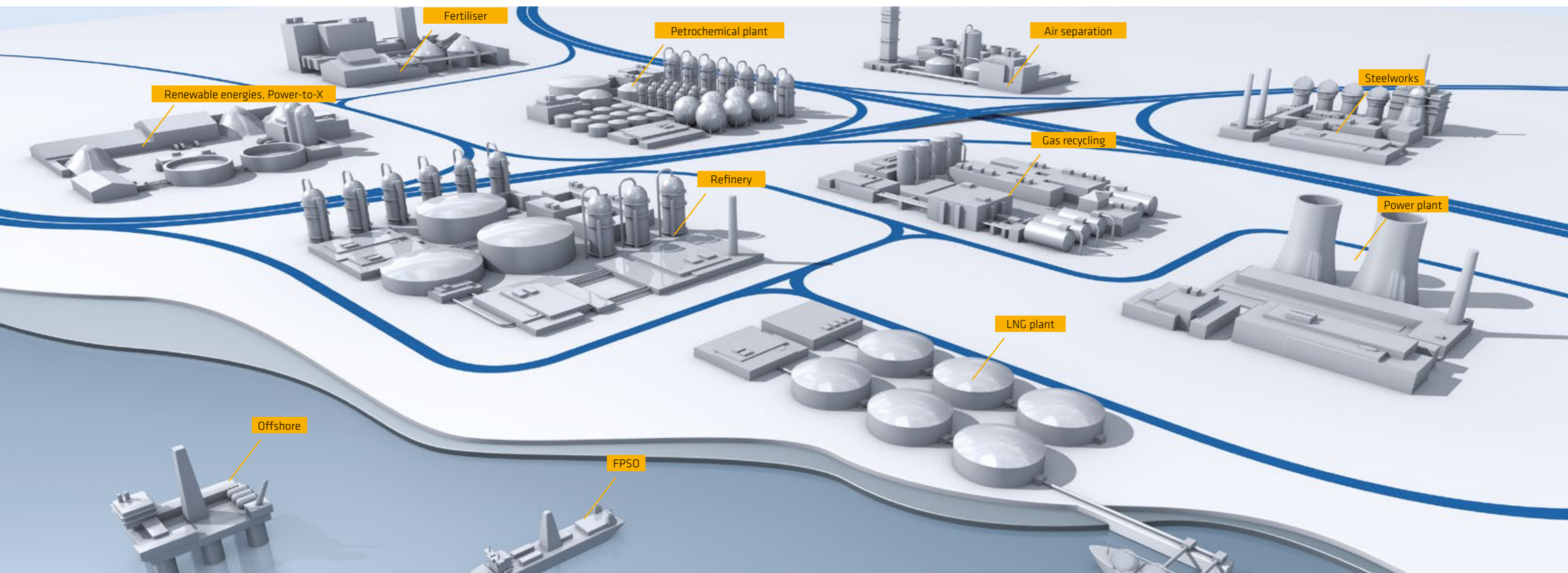
Oil/gas extraction and storage

- Natural gas, crude gas
- Acid gas, hydrogen sulphide, Claus gas
- Pipeline booster, compressor charge
- Gas recovery
- Boil-off gas compression
- VOC compression
- Propane, butane booster
- Helium recovery
- Decarbonisation

- Coal, iron, and steel
- Coke oven gas compression
- (Blast) furnace gas
- Process and cooling gas in iron direct reduction
- Purge gas compression direct reduction kilns

Hydrogen reduction

- Oxygen blowers
- Renewable energies, Power to X
- Hydrogen network feed-in
- Oxygen use
- Synthesis gas compression
- Production of biomethane
- Refrigeration technology
- Compression of organic and inorganic coolants
- Refrigeration circuits



Secure the leading edge

Compression under the best conditions

We want to offer you the best solutions. Highly developed blowers and compressors for the process gas industry. Unbeatable in terms of quality and service life. Impressive reliability and availability. Tailor-made to your respective process conditions – resulting in ground-breaking efficiency.

Reliability. Premium quality made in Germany

AERZEN stands for premium technologies. And with it for an extraordinarily high quality level with global standardisation. Global quality standards were set up and certified in an integrated management system to guarantee this. Consisting of components such as DIN EN ISO 9001 (quality management), 14001 (environmental management), and 50001 (energy management), ISO 45001 (occupational health and safety management), as well as ISO 22000 (food safety).

Just like certified design processes and a wide range of special certifications. The headquarters in Germany is responsible for worldwide quality control of the company group. What do you have from it? High reliability in plant operation. Extremely long availability. And the certainty of being able to rely on the quality promise “Made in Germany – Made by AERZEN”. Regardless of where our machines are in use all over the world.

Safety. That you rely on

Regardless of type of construction, sizes, and special designs, our highly developed machines are configured to comply with all relevant international requirements, building regulations,

or specifications of the most diverse industries or inspection companies. From A to Z. In all countries. This includes ASME, API, TEMA, ANSI, Ex, and DIN. Or the European Pressure Equipment Directive (PED). And, of course, the relevant safety directives for electrical plants such as DIN, EN, NEMA, IEC and ATEX. Certifications that put your mind at ease: Wherever our machines work – with AERZEN, you are on the safe side.

Efficiency. Right-sized for your process

Energy efficiency is one of the main requirements for modern compressor technology. No wonder, seeing as how the energy share of the total life cycle costs of such plants is about 80%. This is why energy consumption reduction is a core objective of AERZEN. To your benefit. For example, with blower and compressor types precisely designed for optimum flow. With high efficiency, innovative component developments, and the extraordinarily wide portfolio of gearbox variants. The decisive factor in minimising energy consumption still remains: Each AERZEN compressor and blower package is tailor-made. Individually tailored to your specific process. Right-sized – and uniquely efficient.

„Every solution by **AERZEN** is individual. Bespoke for the specific requirements of our customers.“

References

International projects



VRa 7365

Butadiene Recycle Gas Compressor

Volume flow: 13,590 m³/h
Pressure range: 0,6 to 4,0 bar g

GQ 22.23xz

Process gas booster in MIDREX processes

Volume flow: 300,000 m³/h
Pressure range: 0.1 to 2.2 bar g
(3 + 2 stage configuration)



VRa 7365

Coke oven gas compressor in integrated steel mill

Volume flow: 10,100 m³/h
Pressure range: 0.0 to 3.0 bar g

GRa 20.f20x

Handling of coke oven and blast furnace gas in steelworks

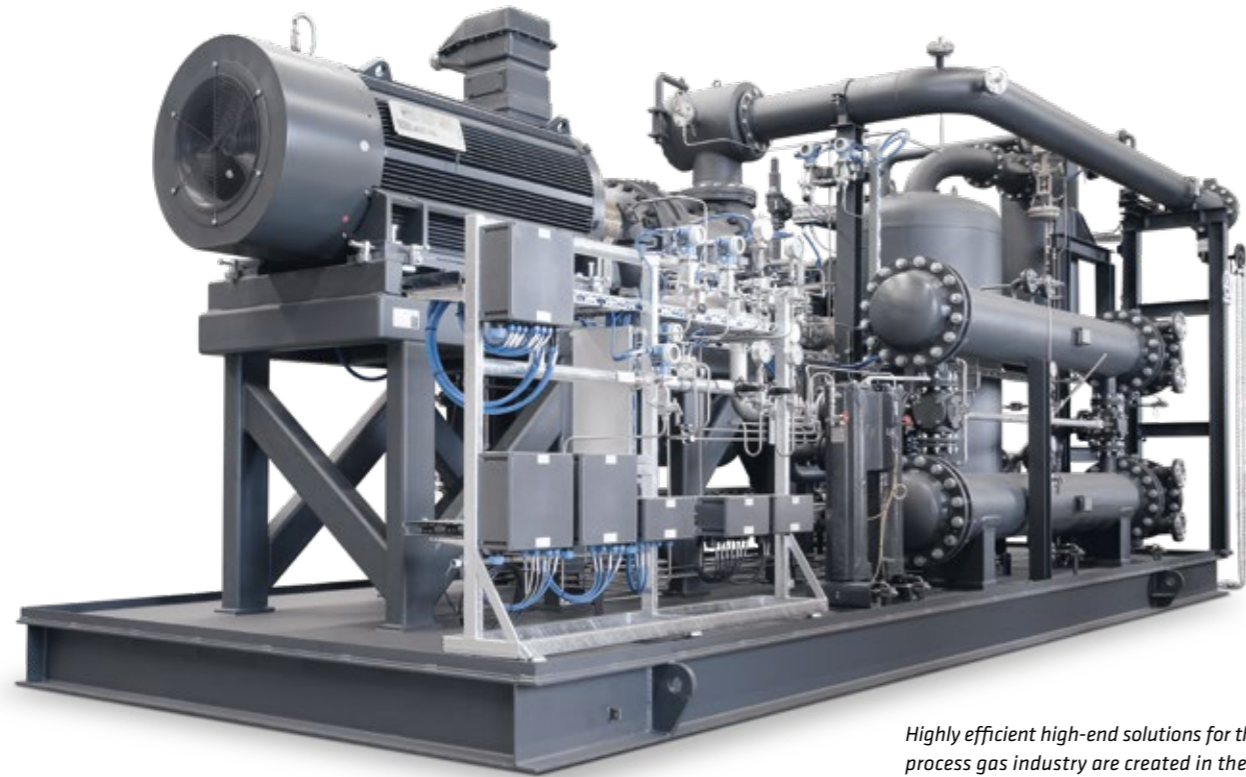
Volume flow: 22,500 m³/h
Pressure range: 0.1 to 1.1 bar g
(3 stage parallel)



Engineering

From application to your high-end solution

It's not the machine that determines the process – it's the process that determines the machine. This is our philosophy. Reflecting on application the AERZEN way means investing a lot of effort in preparations to understand the business of its customers. At our Engineering Center, we use this to create high-performance solutions. State-of-the-art technologies for the most demanding process gas applications in a wide range of industries.



Highly efficient high-end solutions for the process gas industry are created in the AERZEN Engineering and Production Center. This is a single-stage assembly of the VMY series.

Connecting skills. The Engineering Center

Process gas plants must operate in the most demanding industries. The requirements places on performance and technical design are correspondingly high. To meet these requirements, we bundle all of our technical expertise at the AERZEN Engineering Center Germany, home to a team of excellently trained specialists. Experts with international experience in all fields of process gas compression and

handling. Our research and development activities and all engineering expertise is bundled here as well – from design to measurement, regulation, and electrical engineering. For good reason. This is to ensure that our solutions meet the high quality standards you associate with the demands made on AERZEN.

Engineering services from AERZEN:

- ✓ Calculations of process data (drive power, cooling consumption, etc.)
- ✓ Preparation of starting curves for drive design
- ✓ Acoustic calculations
- ✓ Torsion and bending-critical calculations
- ✓ Piping calculations included Earth-quake calculations
- ✓ Advising on all safety issues of the customer (e.g. HAZOP studies)
- ✓ Re-engineering, constructive and electrotechnical

Understanding your process

More than 150 years of know-how in the development of compressor technologies, more than 10,000 successfully implemented process gas plants in nearly all industries and applications worldwide – there is virtually no application that AERZEN has not found a solution for. Why does AERZEN invest so much in your task? Each and every time? Because the performance of the machine determines the performance

of the production process. Because your markets and production processes make the small but crucial difference. Because professionalism, experience, and an eye for detail determine success. And because we see your trust as a mandate to support you with the best machine solution that can currently be built.



One partner. In all phases of the project

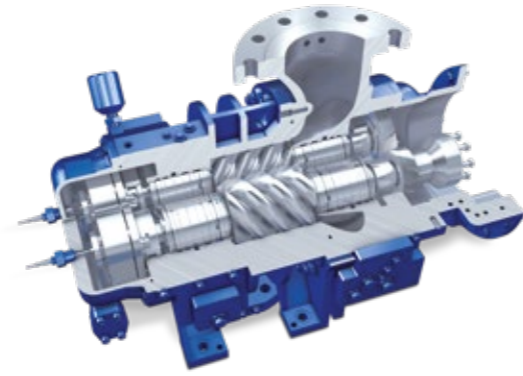
Our engineering teams accompany your plant development through all phases of the project. From the first site inspection until long after commissioning. As your point of contact, they take over responsibility for your project. In all areas of system design. Comprehensive – from project management and coordination up to quality control and

system integration, documentation, and certification, packing and shipment, maintenance and service. Your project from a single source – we want to make sure that our turnkey products not only meet your requirements: We want to inspire you along the line.

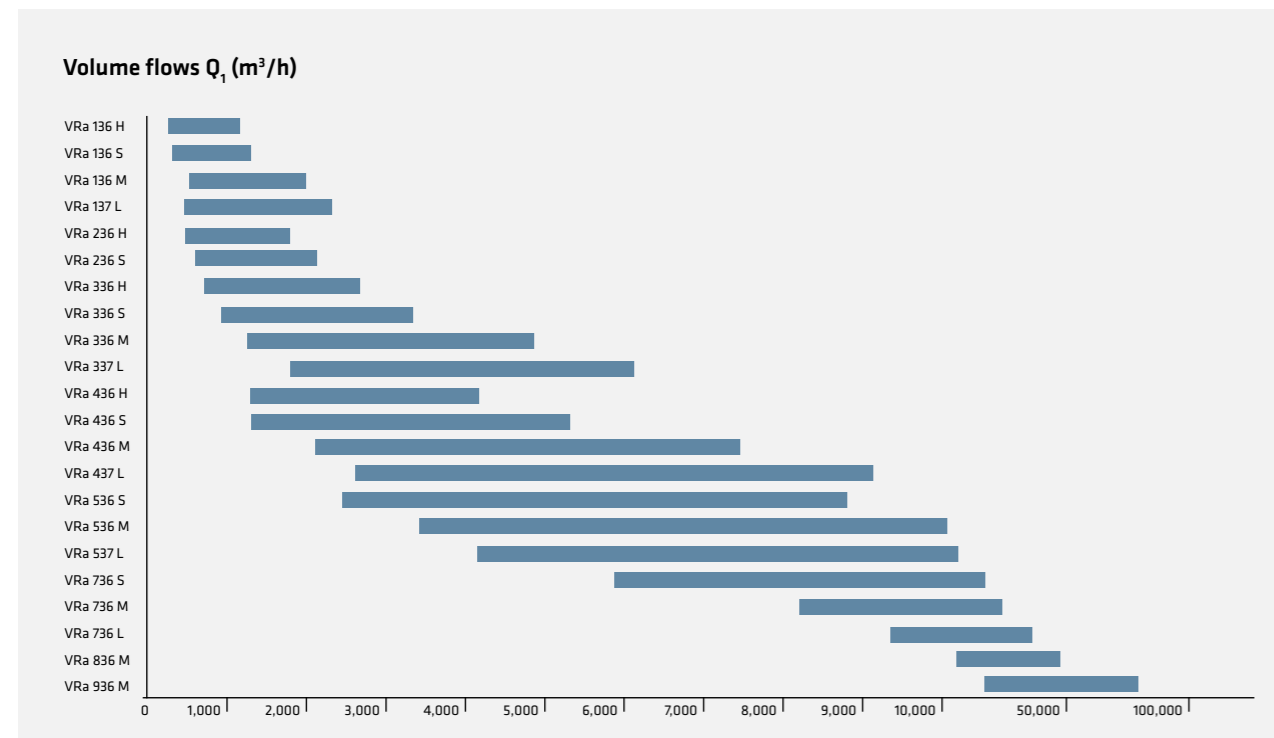
VR Process gas compressor

Maximal volume, oil-free compression

Oil-free compression for small and large volume flows, for nearly all gases: The dry screw compressors from AERZEN are extremely versatile. Gear ratios and speed controls maximise the already large field of applications. A multitude of proven seal concepts and the completely separated oil chambers guarantee smooth continuous operation – even with contaminated or polymerising gases. With vertical direction of flow for high water injection quantities. Applications include cooling, cleaning, and increasing volumetric or isentropic efficiency. VR compressors from AERZEN are the ideal choice for fluctuating operating states and oil-incompatible gases.



- Compressor oil-free
- Volume flows from 300 to 75,000 m³/h
- Neg. pressure: -900 mbar g
Pos. pressure: 52 bar g
Diff. pressure: 25 bar
(Depends on suction pressure)
- Conveying media:
Neutral, toxic,
flammable, corrosive gases,
or mixed gases



L long, M medium, S short, H high pressure

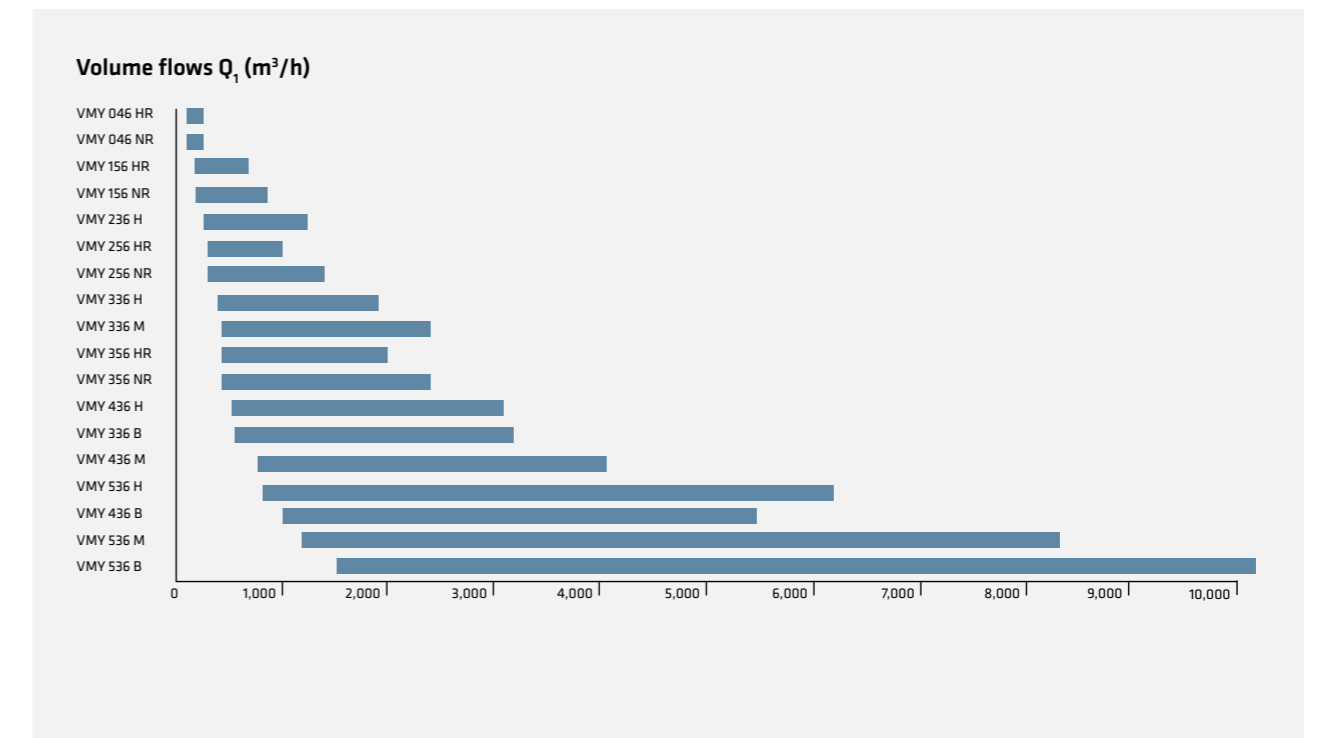
VMY Process gas compressor

Highest pressures, full flexibility

They supply the highest differential pressures or pressure ratios in the AERZEN product portfolio – the oil flooded compressor series VMY. The flow rate can be continuously controlled via the control slider and can also be used as a start unloading device. The rotor drive is not effected by means of timing gears (as with oil-free compressors), but by means of direct power transmission of the driven rotor. The oil injection quantity regulates the outlet temperature and, in case of humid gases, it is ensured that the oil is always compressed above the specific dew point temperatures. This reliably prevents water from escaping into the oil/gaseous mixture. Designed for years of continuous operation, VMY compressors are the ideal solution for low molar weights, for coolants, and generally for fluctuating operation conditions under high pressure ratios.



- Oil-injected compressor
- Volume flows from 70 to 11,000 m³/h
- Neg. pressure: -900 mbar g
Pos. pressure: 25 bar g
Diff. pressure: 20 bar
(Depends on suction pressure)
- Conveying media:
Neutral and flammable gases,
oil-compatible mixed and
process gases, as well as all
common coolants

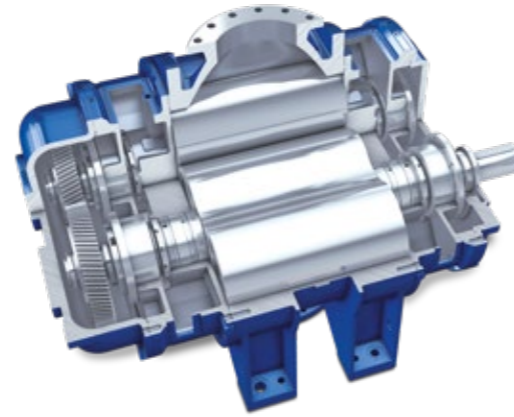


M medium, H high pressure, B booster, HR main rotor driven, NR secondary rotor driven

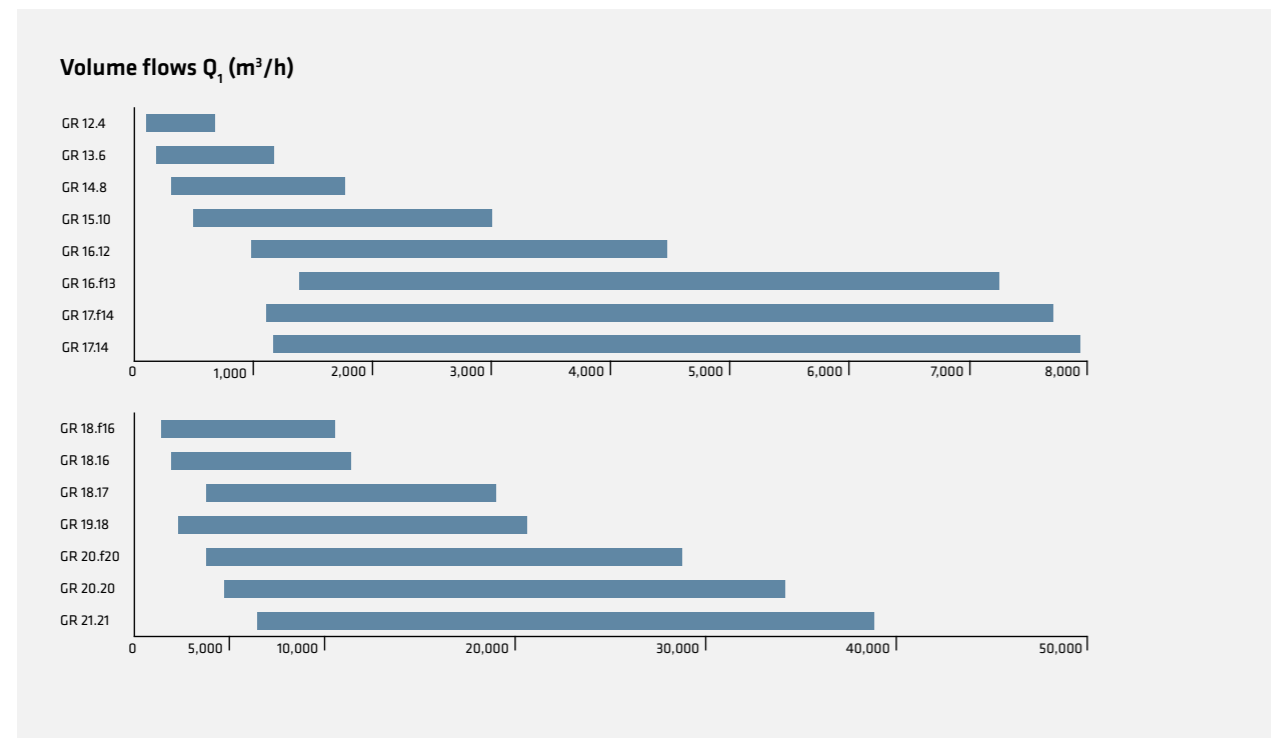
Process gas blower GR

Maximal safety, oil-free handling

The GR series is the flexible all-rounder among the Roots blowers. This series is suitable for the oil-free handling of almost all gases for small and large volume flows. The vertical direction of flow allows continuous water injection for cooling and cleaning, for efficient conveying of even highly contaminated or polymerising gases over the long term. Depending on local conditions, different sealing concepts can be selected to keep the life cycle costs to a minimum. The optimal solution, especially for oil-incompatible gases.



 Blower oil-free	 Volume flows from 90 to 38,000 m ³ /h	 Neg. pressure: -500 mbar g Pos. pressure: 6 bar g Diff. pressure: 1,500 mbar	 Conveying media: Oxygen as well as neutral, toxic, combustible, corrosive gases or mixed gases
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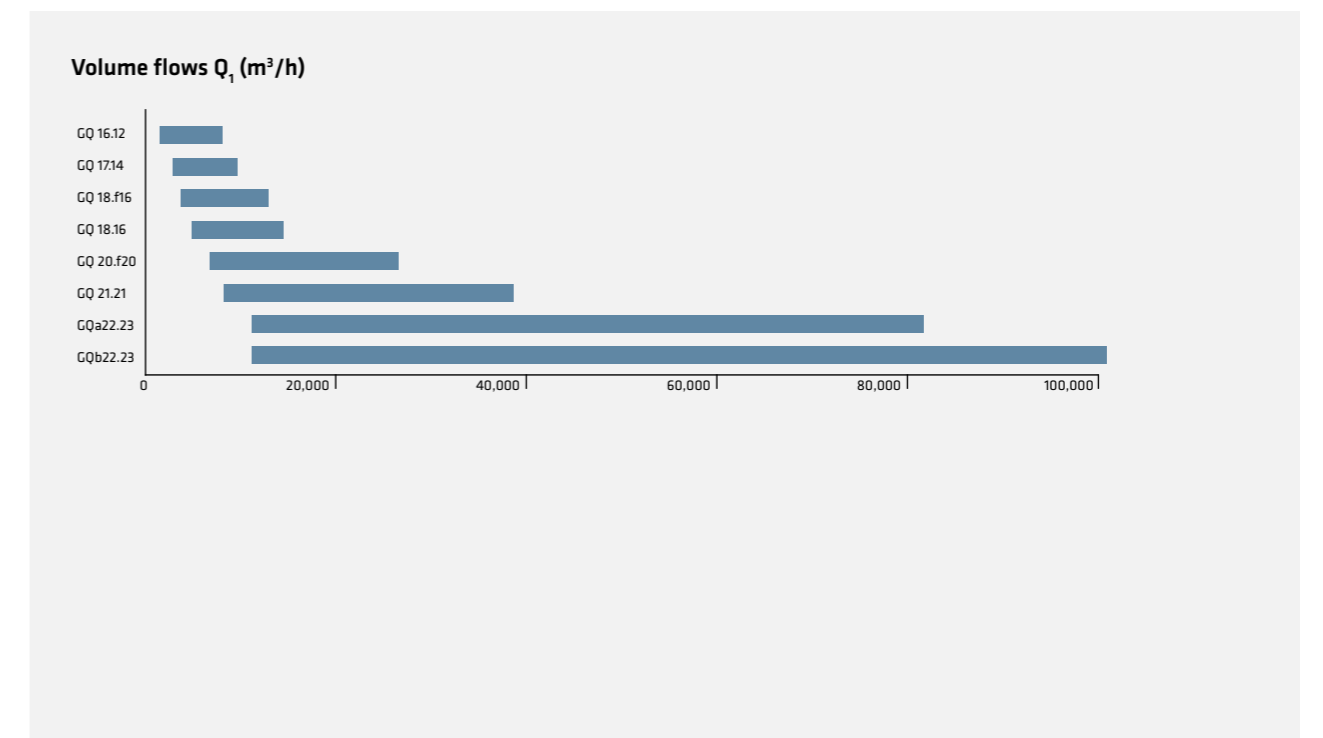
GQ Process gas blower

A tough endurance runner

The robust high-performance machines of the GQ series have been developed for continuous operation. Adhesive or abrasive gas components are washed continuously without damaging parts in contact with the medium. The combination of oil-purged mechanical seal with an upstream, flushable labyrinth permanently separates the oil and conveying chamber – safely and effectively. Designed for multi-year continuous operation, GQ blowers are the preferred solution for process and cooling gas applications in iron direct reduction plants.



 Blower oil-free	 Volume flows from 910 to 104,000 m ³ /h	 Neg. pressure: -500 mbar g Pos. pressure: 6 bar g Diff. pressure: 1,500 mbar	 Conveying media: Inert, toxic, combustible, corrosive gases or mixed gases
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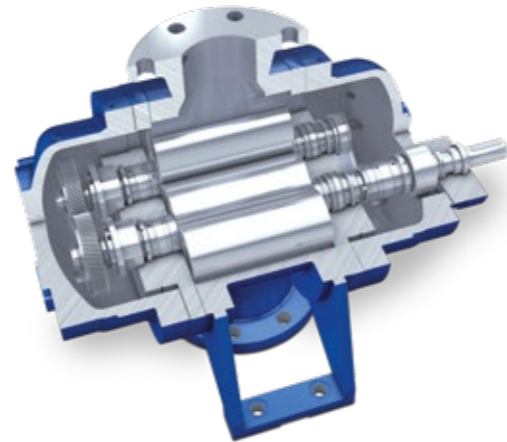


b Stainless version

GM HP high-pressure blower

Gas booster at the high-pressure level

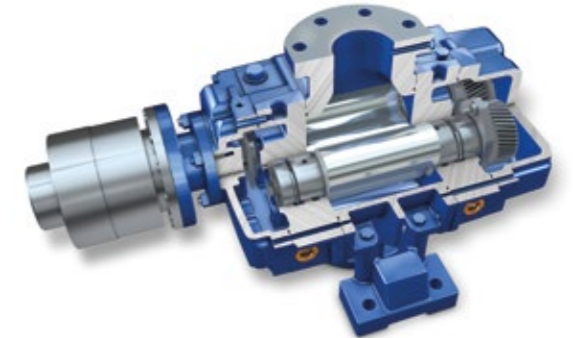
The high-pressure series GM HP was developed for gas booster applications in closed circuits with increased inlet pressures. For explosive gases, the design pressure of 25 bar g offers the corresponding pressure shock resistance (internal Ex zone). GM HP supplies up to 2,000 mbar differential pressure. The drive shaft is sealed using single or double-acting mechanical seals.







GMd Process gas blower

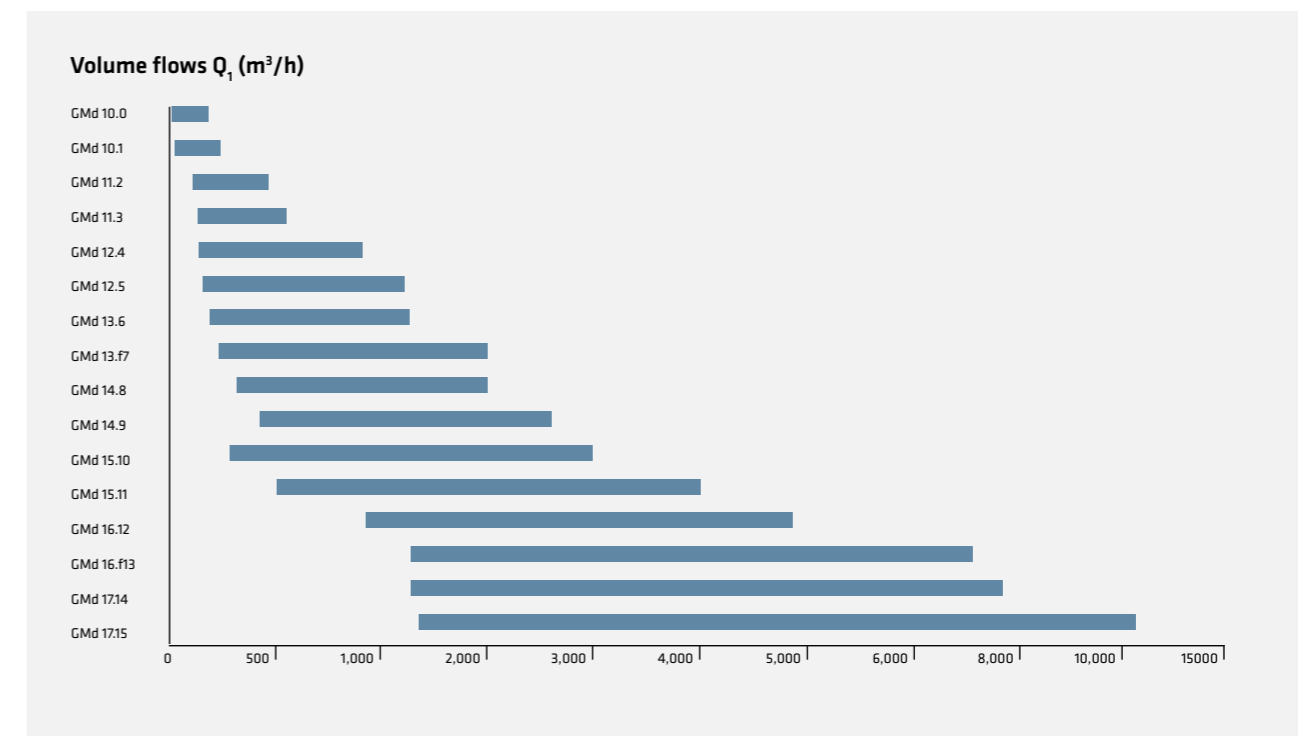
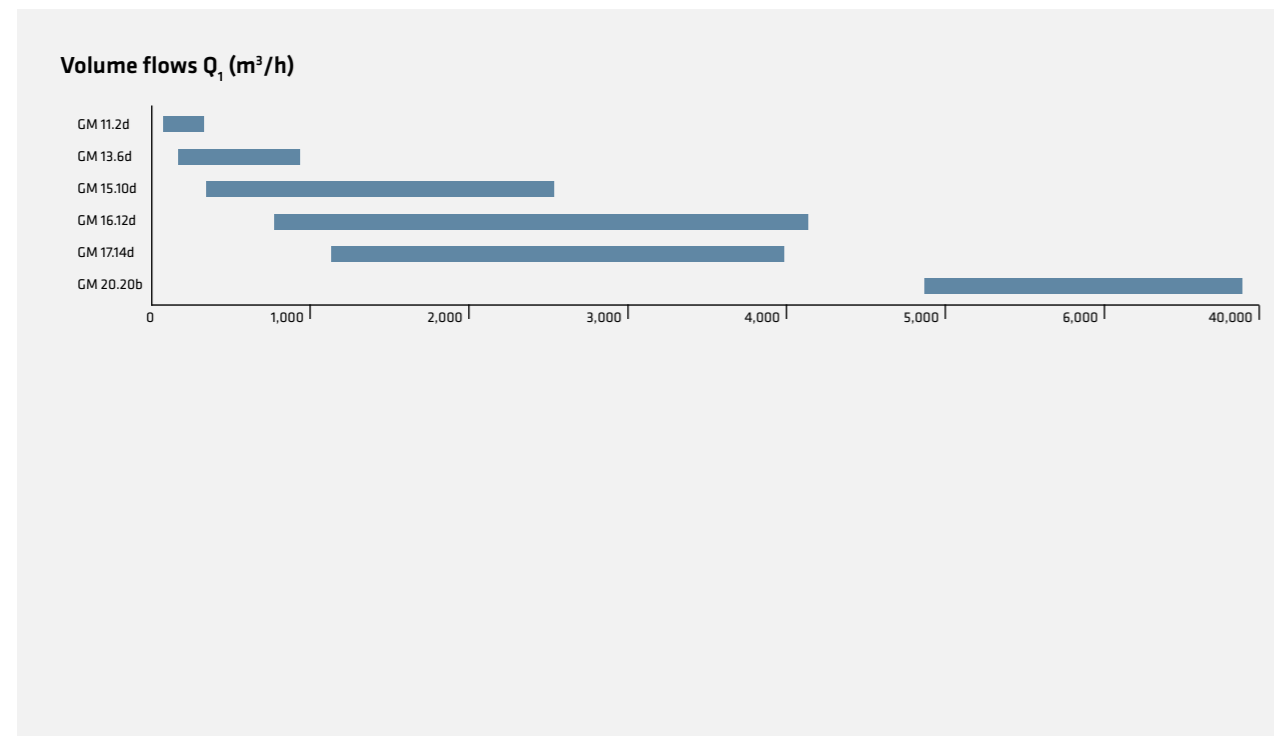
Gas booster for low pressure applications

The GMd series from AERZEN is the universal gastight booster solution for the low-pressure range. Equipped with a magnetic coupling, it guarantees a virtually maintenance-free sealing concept. There is no need for a sealing system for the drive shaft seal, for a low-maintenance machine concept. The separation between the oil and process side is effected by a special ring seal. The robust two-lobe compressors allow a design pressure of 7.0 bar g following AD2000/DIN EN 13445. 16 sizes ensure optimal efficiency and operation conditions for each design case.



 Blower oil-free	 Volume flows from 50 to 38,000 m ³ /h	 Neg. pressure: -700 mbar g Pos. pressure: 25 bar g Diff. pressure: 2,000 mbar	 Conveying media: Inert, toxic, combustible gases or mixed gases
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 Blower oil-free	 Volume flows from 30 to 11,000 m ³ /h	 Neg. pressure: -700 mbar g Pos. pressure: 7 bar g Diff. pressure: 1,000 mbar	 Conveying media: Inert, toxic, combustible gases, or mixed gases
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At a glance

Variety for every application

		Compressor oil-free type VR	Compressor oil-injected type VMY	Blower oil-free type GR	Blower oil-free type GQ	Gas booster, high pres- sure, type GM dz	Gas booster, low pressure, type GMd
Industrial gases	Air separation		✓			✓	✓
	Oxygen			✓		✓	
Coke, iron, and steel	Coke oven gas compression (COG)	✓		✓			
	(Blast) furnace gas (BFG)	✓		✓	✓		
	Process and cooling gas in iron (DRI)				✓		
	Sealing gas compression, direct reduction kilns (DRI)	✓					
	Hydrogen reduction (hydrogen route)	✓	✓				
	Oxygen blowers (from AEL, PEM electrolysis)			✓		✓	
Oil and gas extraction and storage	Natural gas compression (onshore, offshore)	✓	✓				
	Pipeline Booster, compressor charge	✓	✓				
	Gas recovery (VRU)	✓	✓	✓			✓
	Boil-off gas compression (BOG)		✓			✓	✓
	Propane, butane booster (LNG)		✓	✓		✓	
	Helium recovery		✓				
	Decarbonisation/tertiary oil production	✓	✓	✓		✓	✓
Chemical process industry	Ammonia synthesis (recycle gas compression)		✓				
	Sodium production (rich gas, lean gas, humid CO2)	✓					
	Lime kiln gas compression, combustion gas compression	✓		✓			
	Acetylene circular gas		✓	✓		✓	✓
Petrochemicals, refineries	PSA feed gas, tail gas	✓	✓				
	Flare gas compression	✓	✓				
	Ethylene, propylene, olefin (feed-gas compression)	✓				✓	✓
	Butadiene (extractive distillation)	✓		✓			
	Styrene off-gas	✓					
	Desulphurisation	✓	✓	✓		✓	
	VOC compression		✓				
Industrial research and development	Circular processes (inert gases, flushing gases)			✓		✓	✓
	Helium compression in cryo plants		✓				
Energy production	Turbine charging	✓					
Renewable energies, Power to X	Hydrogen power supply (AEL, PEM electrolysis)	✓	✓				
	Oxygen use (saturated from AEL, PEM electrolysis)			✓		✓	
	Synthetic gas compression (hydrogen, carbon dioxide, methane)	✓	✓				
Glass industry	Oxygen blowers (melting furnace)			✓		✓	✓
	Tin bath protective atmosphere (hydrogen, nitrogen)			✓		✓	✓
Nuclear	Vapour recompression			✓			
	Boron recycling			✓			
Refrigeration technology	Compression of organic and inorganic coolants		✓				
	Refrigeration circuits		✓				

Matured to perfection in 150 years: The service world of AERZEN

The best kind of service is the kind you don't need. But every technology involves wear and tear. Our machines are designed to do their job for as long and efficiently as possible. If necessary, for decades. The goal of AERZEN Services is to extend service life and availability – simple added value for your investment!



With your OEM's best recommendations

We have been manufacturing quality products for over 150 years. At the same time, we also developed a corresponding service world. With tailor-made offers for every phase of your machine's lifespan. With OEM original parts, reliable logistics and excellent service at its core. And with decentralised service centres in your vicinity, which guarantee fast provision of spare parts and competent service - worldwide.

AERZEN on-site service

Our service teams work where our machines are. All over the world. Onshore or offshore. Often under extreme conditions. How do we do it? With short distances. AERZEN has a dense network of service centres and decentralised parts warehouses around the globe. More than 200 excellently trained service technicians can come to your aid from there. Any time and anywhere you need us.



Contact worldwide

2,500 employees work for AERZEN. On every continent. With six sales offices in Germany alone, we're there for you. And with 50 subsidiaries in over 100 countries around the world. Hence we're never far away – should you ever need us. Give us a call:
+49 5154 81 0

Service-Infoline

Our German Service Centre is available for customers and operators. We are happy to help you. We look forward to your call:
+49 700 49318551

Customer Net

Where you can learn more about the company and the leading compressor technologies from Aerzen? It's simple: In our Customer Net on our website, where we have stored everything that is worth knowing for you:
www.aerzen.com



LET'S TALK

Find your local contact

www.aerzen.com/worldwide

AERZEN Compression is the key to success

AERZEN was founded in 1864 as Aerezener Maschinenfabrik. In 1868, we built Europe's first positive displacement blower. The first turbo blowers followed in 1911, the first screw compressors in 1943, and in 2010 the world's first rotary lobe compressor package. Innovations made by AERZEN keep driving forward the development of compressor technology. Today, AERZEN is among the world's longest established and most significant manufacturers of positive displacement blowers, rotary lobe compressors, screw compressors and turbo blowers.

AERZEN is among the undisputed market leaders in many areas of application. At our 50 subsidiaries around the world, more than 2,500 experienced employees are working hard to shape the future of compressor technology. Their technological expertise, our international network of experts, and the constant feedback we get from our customers provide the basis for our success. AERZEN products and services set the standard in terms of reliability, value and efficiency. Challenge us.



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