AERZEN
PROCESS GAS SOLUTIONS

We know what drives them

AERZEN

AERZEN.
PREMIUM QUALITY FOR EVERY PROCESS.

Discover the difference.
In the chemical, petrochemical, energy, food, and pharmaceutical industries, applications are demanding and compressor technologies must be up to the task. The demands on plant design, engineering, documentation and worldwide service in those industries are often just as high as the safety and environmental guidelines to be followed.Whereever these highly critical processes gases and refrigerants are compressed, you can find AERZEN.

For over 150 years, AERZEN has been developing a unique expertise for these industries. This began when we developed Europe's first rotary lobe blower in 1868. Our history has given rise to a unique knowledge pool of technological advances and know-how, and we have focused it primarily on our PGD center–the AERZEN Process Gas Division.

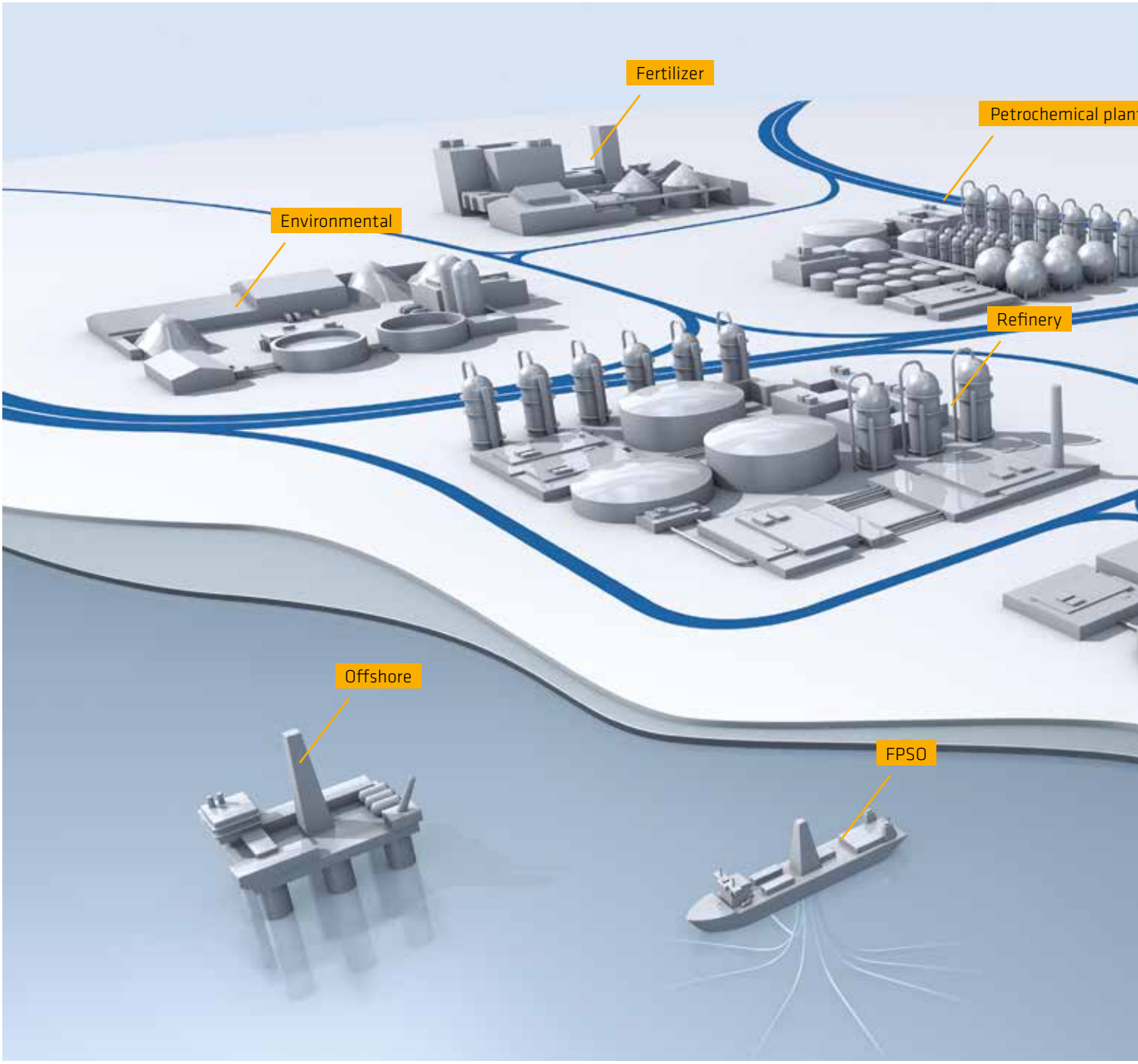
Made by AERZEN, made in Germany.
There is nothing that creates more pressure than our own expectations. At AERZEN, we want to provide our clients with the best possible solutions. Advanced blowers and compressors for the process gas and refrigeration industries. Unbeatable in their quality. Inspiring in their longevity, reliability, and accessibility. Precise in their adaptation to client process requirements–with the result that they are revolutionary in their efficiency.

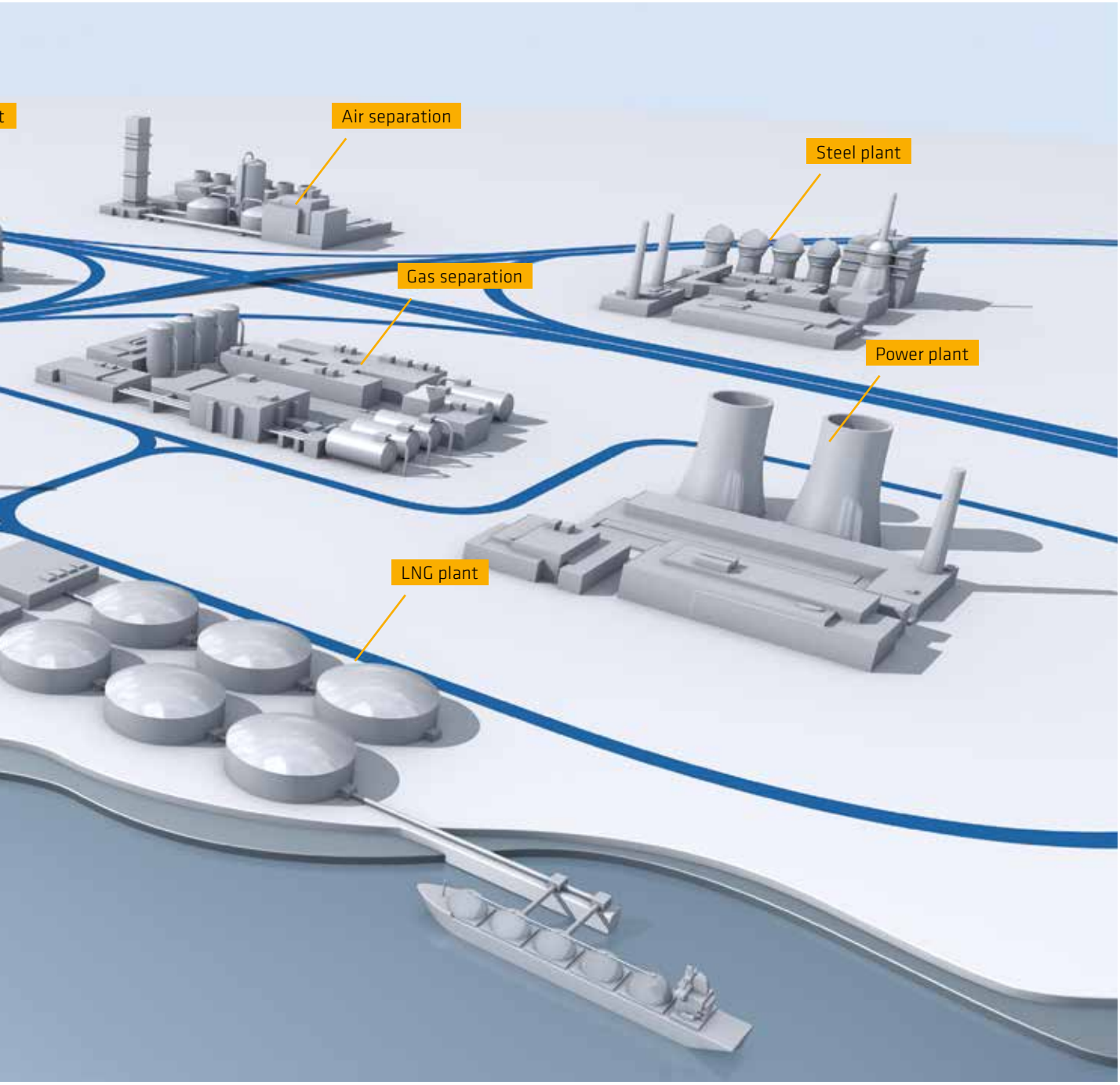
This is why we are on hand for you in over 100 countries around the world–because proximity to our clients is important to us. This is why we work hard to understand all the unique features of your applications until we understand them in every detail. This is the reason why our blowers and our oil-free and oilinjected compressors are among the market leaders. And, this is why the name AERZEN has become synonymous for premium technology "made in Germany."

CONTENTS

INDUSTRIES AND SECTORS.
COMPRESSION UNDER ALL CONDITIONS.

AERZEN offers the process gas and refrigeration industries an incredibly broad spectrum of rotary lobe blower and screw compression technologies—perhaps the broadest of any manufacturer, onshore and offshore, and in every single key industrial application.




Air separation
Steel plant
Gas separation
Power plant
LNG plant

KEY APPLICATIONS.
SOMETIMES CRITICAL. ALWAYS DEMANDING.

Chemical and Petrochemical Industries
- H2 and CH mixtures
- Acetylene
- Ethylenes
- Lime kiln gas
- Rich gas
- Synthesis raw gas
- Butadiene
- Vinyl chloride
- Hydrogen sulfide
- Hydrogen
- Styrene off gas

Refineries
- Hydrocracking
- Hydrosulfurization
- Fractionating
- Reforming
- Catalytic cracking
- PSA
- Flare gas and vent gas
- H_2 and CH mixtures

Energy Production
- Gas turbine fuel gas supply
- Steam

Oil & Gas Conveyance and Storage
- VOC recovery
- Natural gas compression
- Pipeline booster
- Underground gas storage
- CO_2
- Liquefaction

Industrial Gases
- Hydrogen generation
- Air separation
- Argon
- Syngas
- Flue gas
- Oxygen

Refrigeration industry
- Refrigerants (R1270, R290, etc.)

Helium Refrigeration and Liquefaction
- Helium

Offshore & FPSO
- Natural gas compression
- Vapor recovery
- Special refrigeration
- PSA

Breweries
- Steam (wort boiling)

Pharmaceuticals

Steel Mills and Coking Plants
- Coke oven gas
- Fuel gas
- Vacuum degassing
- Cooling and seal gas
- Syngas

Gas supply

Chemical industry

Power station technology

Two-stage AERZEN VRa 336 S + VRa 136 S
Oil-free srew compressor for
Flare gas in a refinery

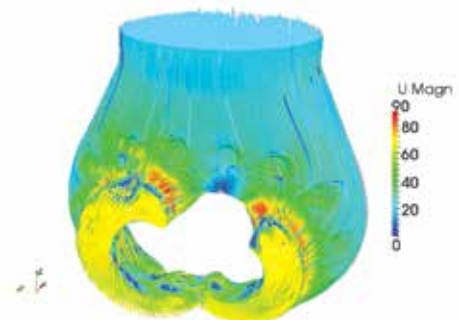
"PROCESS GAS COMPRESSORS AND BLOWERS FROM AERZEN FUNCTION SAFELY AND RELIABLY IN ALL APPLICATIONS."

ENGINEERING.
FROM APPLICATIONS TO HIGH-END SOLUTIONS.

It is not the machine that determines the process—it is the process that determines the machine. This is our philosophy. Anyone as application-oriented as AERZEN invests heavily in groundwork: the kind that results in a solid understanding of the client's business, the kind that forms the basis for the high-performance solutions that come from our design traditions, and state-of-the-art technologies for the most demanding process gas and refrigeration applications.

Understanding the process.
The philosophy and technical design underlying process gas and refrigeration facilities demand a high level of intelligence. After all, they are expected to work in the world's most demanding industries. Often in highly critical applications. That is why AERZEN has gathered together its best minds in the Process Gas Division. A team of excellently trained specialists from construction, instrumentation, control, and project management. With international experience in all areas of process gas compression and transport. They operate in Germany, Hungary, and the USA. For markets and industries the world over.

Design tradition AERZEN.
Our process gas and refrigerant compressors are designed, constructed, and tested according to certified design processes and DIN ISO 9001. In Germany, in the town of Aerzen to be precise, AERZEN's entire technical expertise is focused on our engineering and production center. This is where our R&D work happens- all the engineering from construction to measurement, control and electronic technologies. And, that's where we ensure that the high quality of our solutions can go into serial production—even if they're way beyond the standard.



The engineering process at AERZEN is supported by modern software tools such as ANSYS CFX.

The engineering teams in Germany, Hungary and the USA are closely networked

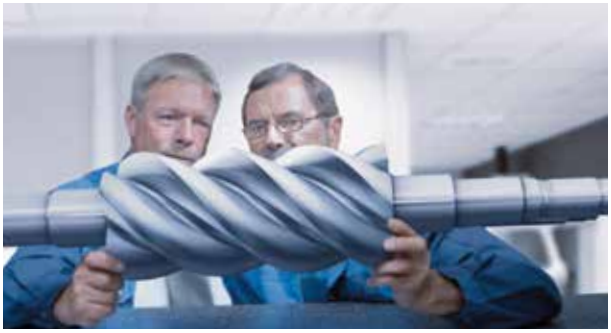
VRa 337 L for FPSO compressing flare gas nace compliant with self acting tandem dry gas seals

AERZEN'S EXPERIENCE ALLOWS US TO OFFER SOLUTIONS RATHER THAN JUST EQUIPMENT

Premium. In every phase of the project.
Our PGD is developing and constructing compressor and blower stages for process gas applications, as well as tailor-made packages. Our strength is satisfying clients individual requirements via demanding technologies. Underlying that strength is AERZEN's unwavering technical competence as a producer of blowers and oil-free and oil-injected screw compressors, along with an extraordinary breadth and depth of knowhow and performance. Our engineering teams stay with the project through all phases of facilities development–from the first on-site inspection to well after final commissioning. They assume responsibility for the project in all areas of system design–from project management and coordination to quality control and system integration, documentation and certification, packaging and shipping, maintenance and service. This is how we ensure that our turnkey solutions also meet the demand for the highest possible quality–a demand that comes from AERZEN itself.

Smart minds. Intelligent technologies.
The engineering process at AERZEN is based on over 150 years of experience and on modern software tools. These include state-of-the-art development and design technologies such as AutoCAD Mechanical or Inventor which ensure accurate plans for facilities designs, ANSYS CFX for flow simulations, rotor profile analysis with TWIN MESH, flow charts, lists and tables are created in Engineering Base, process calculations with UNISIM, and special programs are used for the raw performance data and FEM calculations. All these tools help ensure clear 3D visualization, precise materials lists, and transparent coordination with the client. By the way: all AERZEN machines are tested in Aerzen–in our own testing facilities and we have helped develop national and international testing protocols.

Engineering services from AERZEN.
- Process data calculations (drive performance, refrigeration requirements)
- Preparation of drive dimensioning start-up curves
- Acoustic calculations
- Torsion and critical bending calculations
- Pipeline calculations (including earthquake calculations)
- Consultation for all client safety concerns (e.g. HAZOP studies)
- Re-engineering (constructive, electrotechnical)



At AERZEN, experience and the inventive spirit go hand in hand

Up-to-date computer programs in the service of our design engineers

Fully API compliant VMY 536 M oil-flooded screw compressor, gearbox and motor.

"EVERY SOLUTION FROM AERZEN IS INDIVIDUALIZED. TAILORED TO OUR CLIENTS' SPECIFIC REQUIREMENTS. THAT'S OUR STRENGTH."

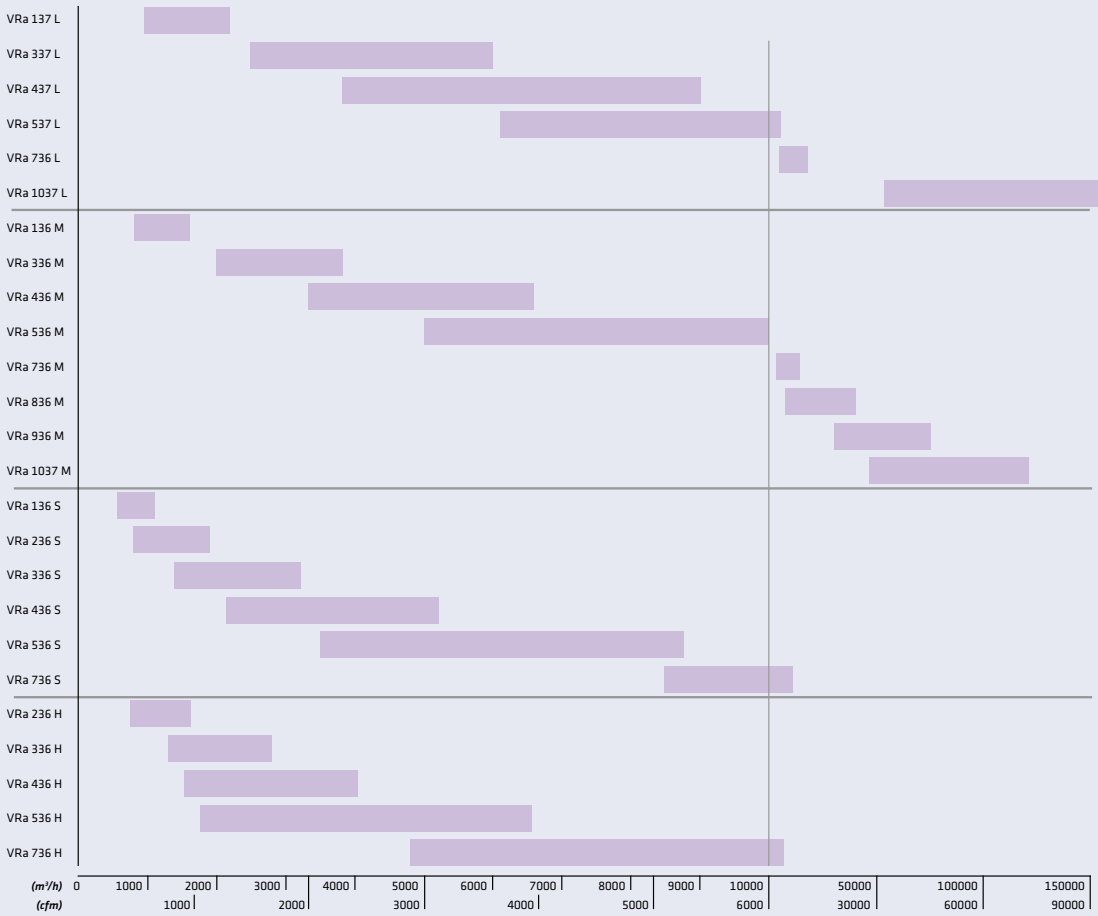
VR PROCESS GAS COMPRESSORS.
ALL PROCESSES. ALMOST NO LIMITATIONS.

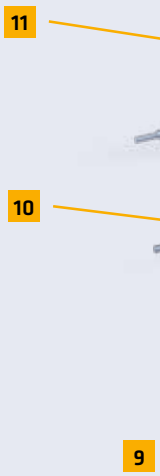
They were developed for the dry compression of almost all gases. From ammonia and argon to styrene, vinyl chloride or hydrogen. The only limitations are pressure and temperature ranges and allowable rotational speeds. The VR series has an enormous application range. For final pressures up to 750 psig.

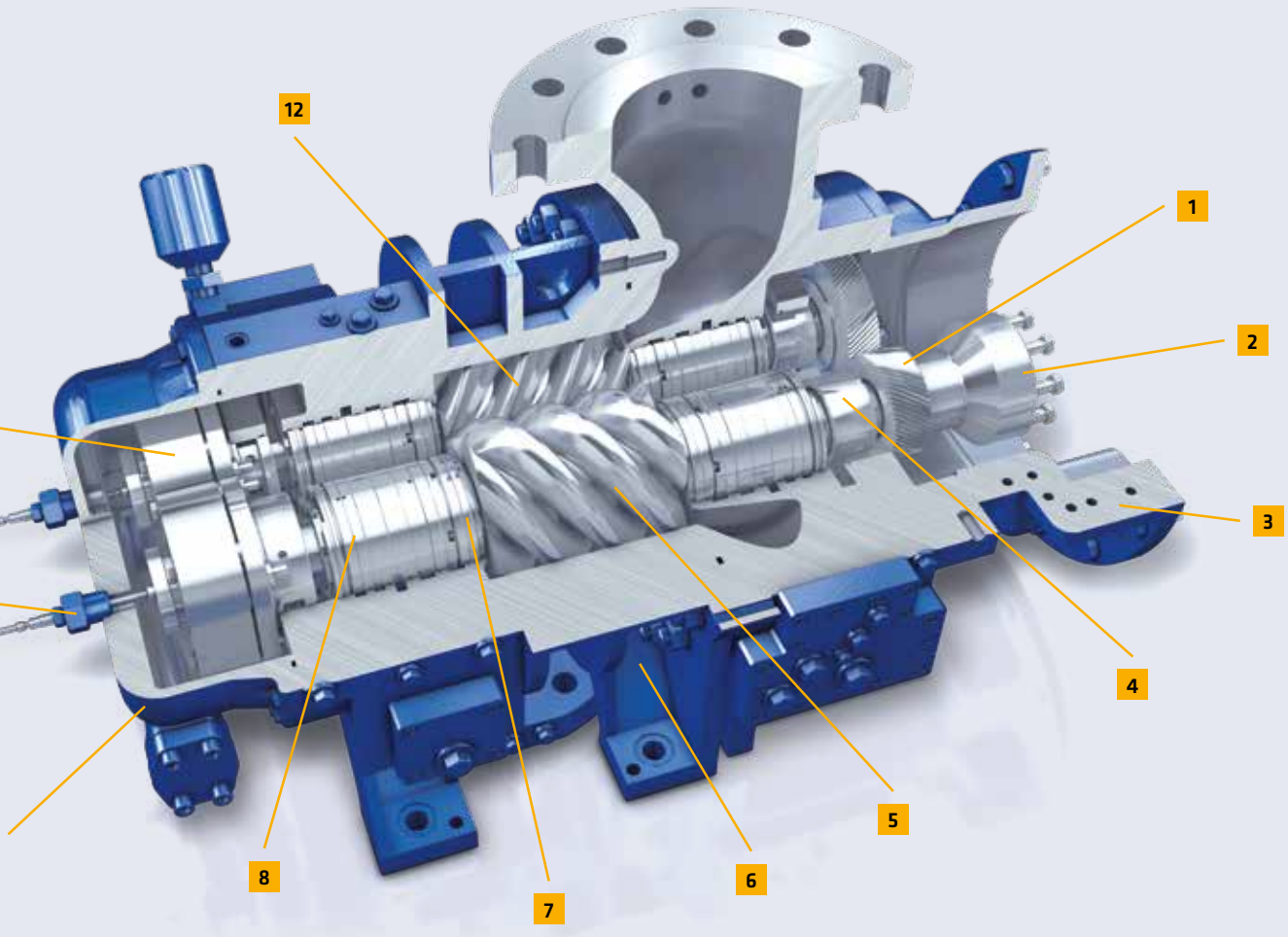
The hallmarks of efficiency.
Large pressure differentials, combined with volumetric efficiency rates: that is what differentiates AERZEN VR compressors from other rotary lobe machines that also operate according to the positive displacement principle with internal compression. A special 4+6 rotary profile brings this plus efficiency to process gas applications. The highly available VR compressors can be designed as either single stage or multistage. With variable drive types such as direct drive or helical gearing. Flanged or mounted separately. And in principle designed with the conveying direction from top to bottom–an important prerequisite for fluid injection, which is often necessary in cases of highly contaminated or polymerizing gases.

Performance and characteristics.
- Technology: oil-free positive-pressure and negative-pressure compressor units and stages
- Volume flow: 380 to 100,000 cfm (645 to 160,000 m3/h)
- Negative pressure: -13 psig (-900 mbarg)
- Positive pressure 750 psig (52 barg)
- Rotors: 4+6 profile
- Media: toxic, flammable, or corrosive gases or gas mixtures, as well as air and nuetral gases

Intake volume flow Q_1 (m^3/h and cfm)







VR process gas compressor.

1 Timing gears	4 Radial bearing	7 Labyrinth seal	10 Axial displacement sensors
2 Coupling hub	5 Main rotor	8 Mechanical seal	11 Axial thrust bearings
3 Intermediate cover	6 Housing	9 Housing cover	12 Secondary rotor

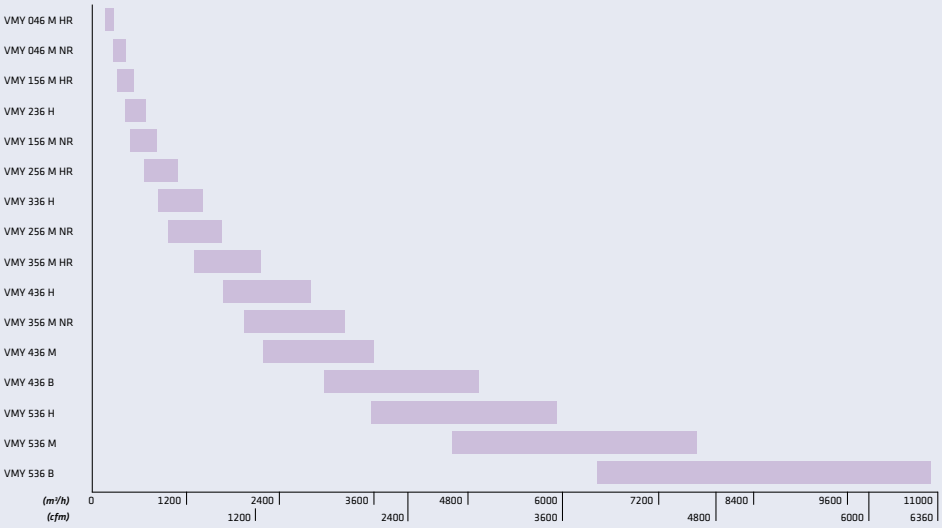
VMY PROCESS GAS COMPRESSOR.
THE BEST SOLUTION FOR VARIABLE VOLUME STREAMS.

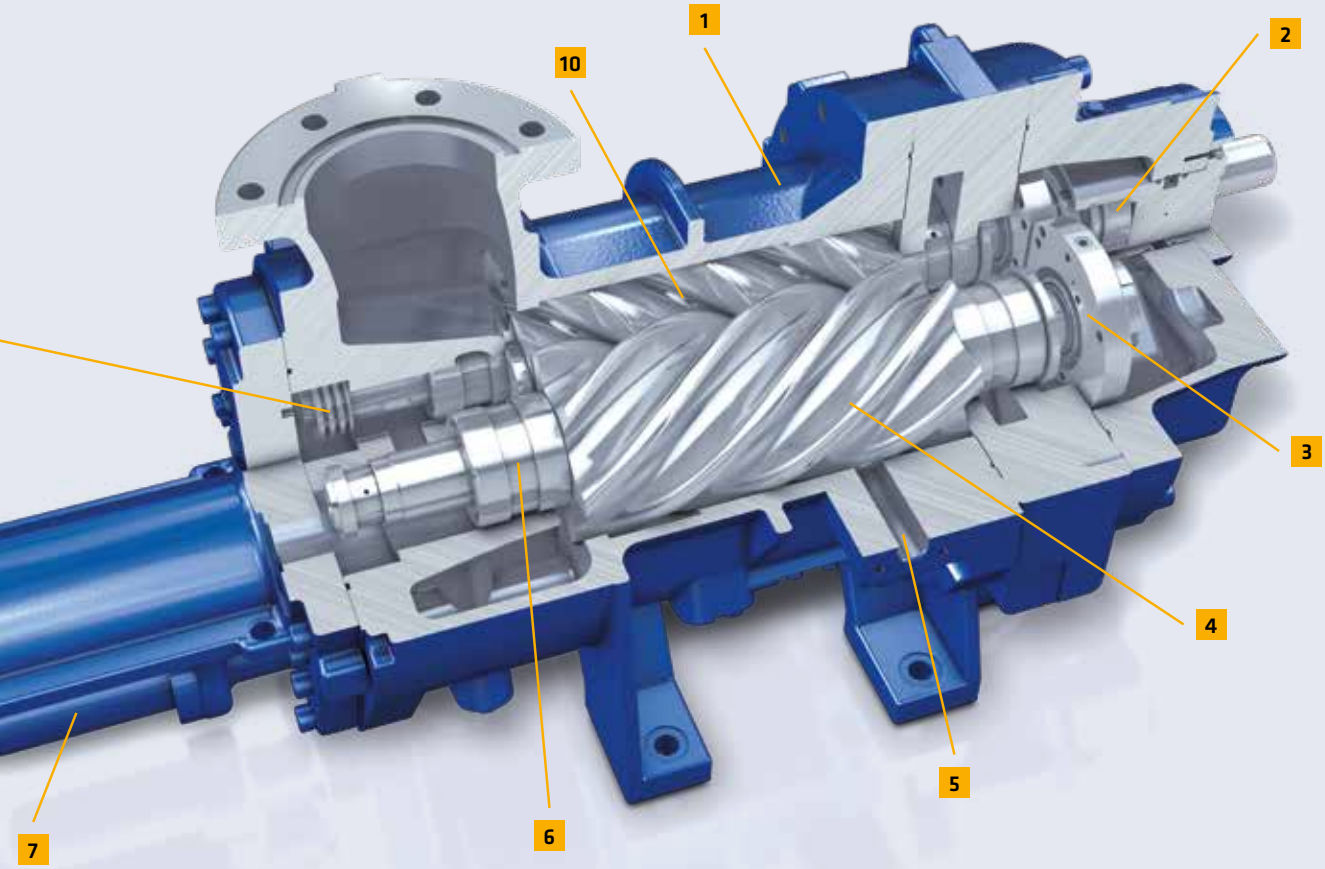
Compressors in the VMY series have built their reputation in closed refrigeration circuits, demonstrated their high efficiency in open process systems (chemical, petrochemical, energy production), and proven themselves in refineries and other process gas systems. They are the ideal machines for gases with low molecular weights, high compression ratios, and variable configurations.

Continuous reliability.
They are unaffected by variations in volume, temperature, or pressure–which makes the oil-injected VMY screw compressors from AERZEN ideal for use in variable operation. All compressors in this series are equipped with a slide valve for flow control. A continuous change in volume flow between 100% and 20% means an optimal customization to the operation at hand. These machines are reliable over a vast range of requirements and operating conditions. Low operating costs and reliability are their hallmarks. There are a total of 16 different models available.

Performance and characteristics.
- Technology: units and stages with oil injection
- Volume flow: 135 to 6,600 cfm (233 to 11,200 m3/h)
- Negative pressure: -14.5 psig (-999 mbar)
- Positive pressure: 360 psig (25 barg). Higher pressures available on request.
- Rotors: energy-saving 4+6 profile
- Vi modification based on operating data
- Media: neutral and flammable gases, oil-compatible gas mixtures and process gases, as well as all standard refrigerants

Intake volume flow Q_1 (m^3/h and cfm)





VMY process gas compressors.

1 Housing	4 Secondary rotor	7 Vi setting	10 Main rotor
2 Mechanical seal	5 Economizer connection	8 Slide valve position sensor	
3 Thrust bearing	6 Radial bearing	9 Thrust balance piston	

GR/GQ PROCESS GAS BLOWERS.
BLOWER POWER FOR SPECIAL REQUIREMENTS.

All AERZEN oil-free process gas blowers have one thing in common: they are robust, high-performance machines. They are unaffected by gas contaminants or moisture, suitable for continuous liquid injection for gas cooling or cleansing, and they can be designed to include a wide range of special materials and seals.

GR process gas blowers.
The 1 or 2 stage blowers can be used for almost all technical gases and gas mixtures. In all branches of industry. They are also ideal for gases with negative intake temperatures down to -35°F (-30°C).

- Volume flow: 60 to 30,000 cfm (100 to 50,000 m3/h)
- Negative pressure: -7 psig (-500 mbar);
  positive pressure: 70 psig (5 barg)
  Differential pressure up to 22 psi (1.5 bar)
- Conveying direction: vertical
- Media: toxic, flammable, or corrosive gases or gas mixtures, as well as oxygen, air, and neutral gases

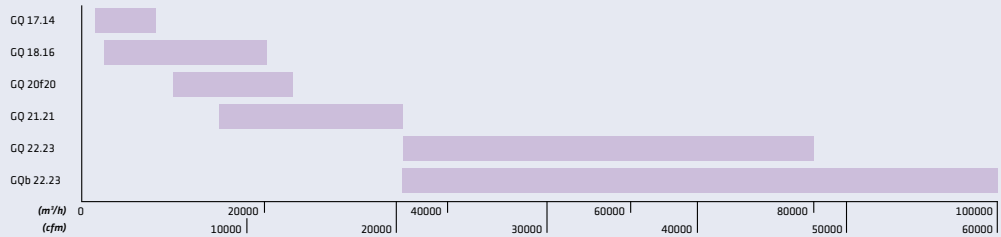
GQ process gas blowers.
Ideal for use in steel plants for the compression of process, cooling, and seal gas. These blowers are often used as 2-stage units and are up to the most extreme challenges.

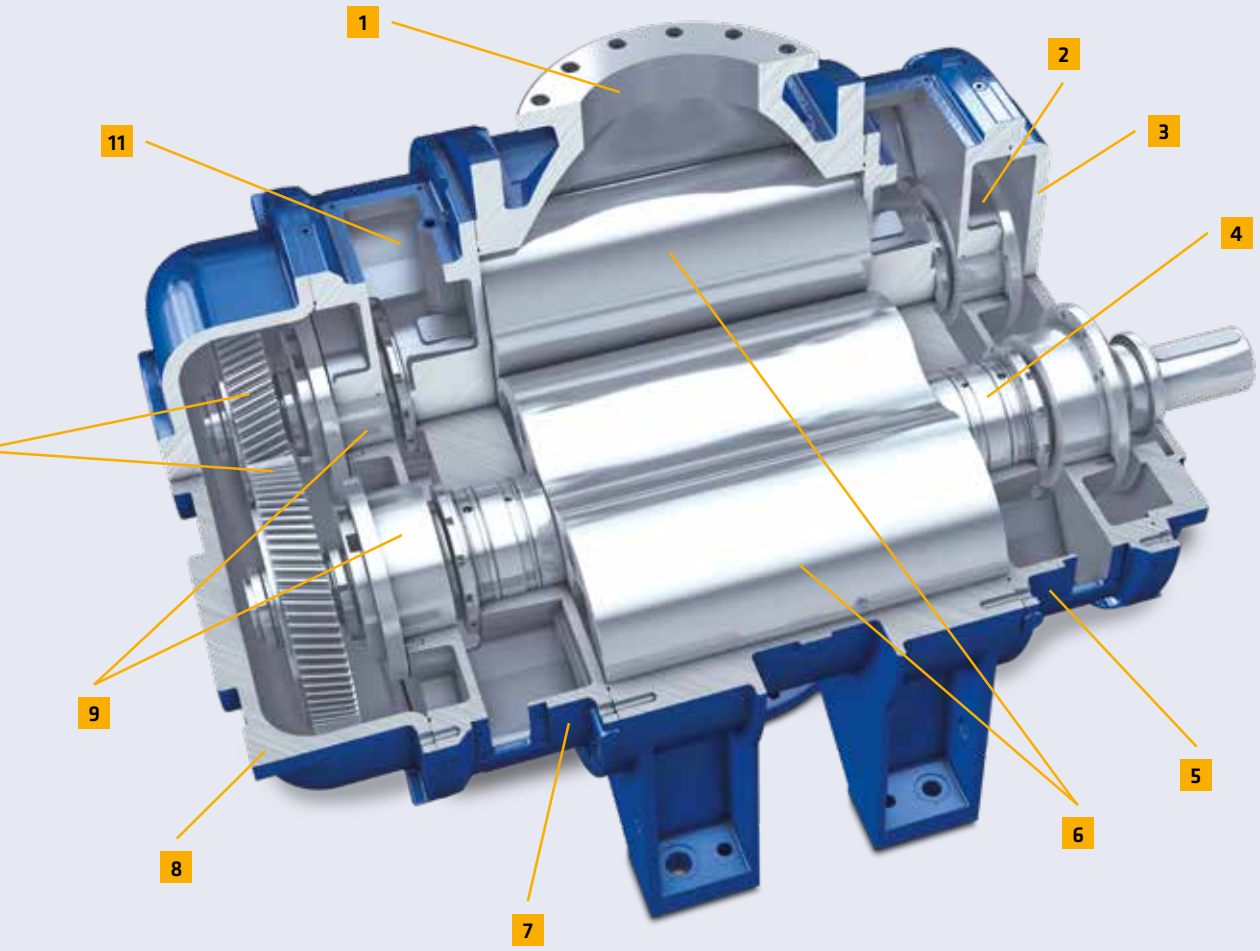
- Volume flow: 9,000 to 60,000 cfm (15,000 to 100,000 m3/h)
- Negative pressure: -7 psig (-500 mbar)
- Positive pressure: 70 psig (5 barg)
- Differential pressure: up to 22 psi (1.5 bar)
- Conveying direction: horizontal
- Media: toxic, flammable, or corrosive gases or gas mixtures, as well as oxygen, air, and neutral gases

Intake volume flow Q_1 (m^3/h and cfm)

10

GQ intake volume flow Q_1 (m^3/h and cfm)





GR process gas blowers.

1 Housing	4 Rotor chamber seal	7 Side plate gear side	10 Timing gears
2 Radial bearings	5 Side plate drive side	8 Gear case	11 Atmospheric chamber
3 Housing cover	6 Rotors with driveshaft	9 Radial bearings	

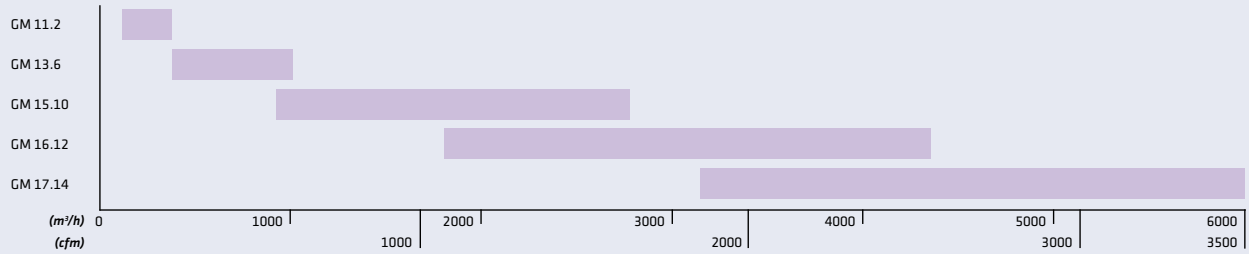
GM...CZ HIGH PRESSURE BLOWERS. FOR SAFETY IN DEMANDING SITUATIONS.

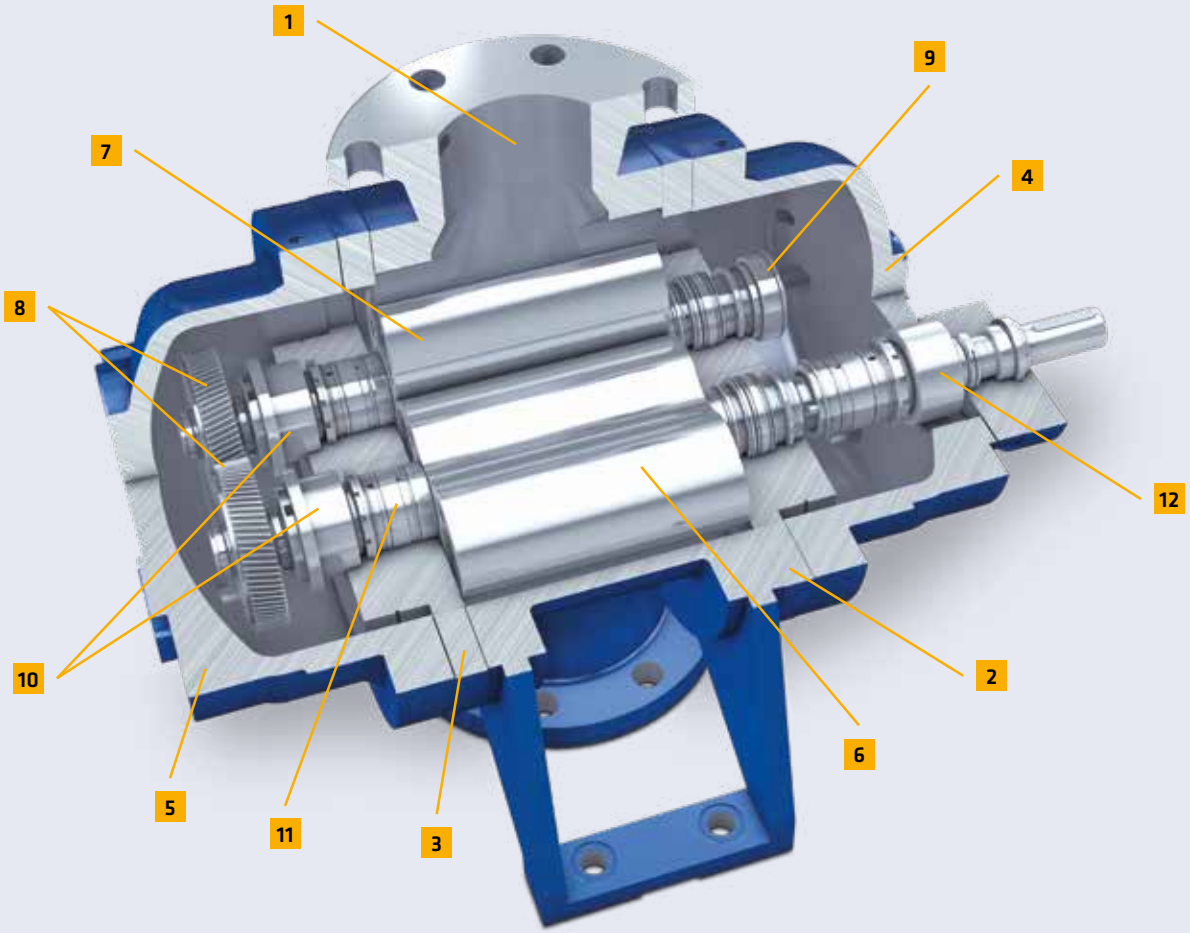
Special solutions for special applications. For cases with high inlet pressures and when pressure differentials of up to 30 psi (2 bar) are required. This is what the high-pressure blowers from AERZEN were designed to handle. For oil-free conveyance in chemical and many other industries.

Pressure-stable up to 925 psig (64 barg).
The direct-drive GM...cz (and dz, ez, fz) blowers from AERZEN are high-performance machines. They can be configured in single or multi-stage design, with separate pressurized oil lubrication for the oil-free transport and compression of gas mixtures, air, and neutral gases. These highly advanced and extremely robust rotary lobe products are available in a wide range of special materials and seals, such as stainless steel for oxygen service according to BAM regulations, or as acetylene boosters according to TRAC norms.

Performance and characteristics.
- Volume flow: 35 to 3,500 cfm (60 to 6,000 m3/h)
- Positive pressure:
  cz models up to 230 psig (16 barg)
  dz models up to 360 psig (25 barg)
  ez models up to 580 psig (40 barg)
  fz models up to 925 psig (64 barg)
- Differential pressure: 30 psi (2 bar) per stage
- Conveying direction: vertical
- Media: Oxygen, acetylene, gas mixtures, air, and neutral gases

Intake volume flow Q_1 (m^3/h and cfm)





GM...dz process gas blowers.

1 Housing	4 Double mechanical seal	7 Side plate gear side	10 Radial bearings
2 Radial bearing	5 Side plate drive side	8 Piston ring labyrinth seal	11 Timing gears
3 Housing cover	6 Rotor with driveshaft	9 Gear case	12 Non-drive rotor

PRODUCTS.
A WIDE VARIETY FOR INDIVIDUALIZED APPLICATIONS.

ROTARY LOBE BLOWERS

Model GR

Model GQ

Model GM ... dz

Applications

- VOC Recovery
- Gas boost
- Reforming
- Steam
- Gas boosting
- Chemical processes
- Regeneration processes
- Gas boost for lime kilns, steel, coking plants
- Coke oven gas (COG)
- Blast furnace gas (BFG)
- Natural gas (NG)
- Product conveyance

- VOC Recovery
- Hydrocraking
- PSA
- Acetylene
- Ethylene
- Gas boosting for COG, BFG, CG
- Coke oven gas
- Blast furnace gas
- Cooling gas

- Nitrogen boosting
- Acetylene boosting (TRAC)
- Oxygen (BAM)
- Closed loop recycle/boosting
- Refrigeration loops
- Kiln pressure test bed
- Ammonia boosting

Performance data

- Volume flow approx. 60 – 30,000 cfm (100 to 50,000 m3/h)
- Negative pressure -7 psig (-500 mbar) Positive pressure 70 psig (5 barg)
- Delta P max 22 psi (1.5 bar)

- Volume flow approx. 9,000 – 60,000 cfm (15,000 to 100,000 m3/h)
- Negative pressure -7 psig (-500 mbar) Positive pressure 70 psig (5 barg)
- Delta P max 22 psi (1.5 bar)

- Volume flow approx. 35 – 3,500 cfm (60 to 6,000 m3/h)
- Positive pressure 925 psig (64 barg) if the medium is prepressurized
- Delta P max 30 psi (2 bar)

OIL-FREE SCREW COMPRESSORS

Model VRa

- Associated gas
- FPSO
- Fuel gas boosting (gas turbine)
- Pipeline boosting
- H_2 and CH gas mixtures, flare/tail gas, butane and propane recovery
- CH gas mixture boosting
- LNG/CNG
- Butadiene, lime kiln gas boosting, styrene, ammonia boosting
- Methyl cloride boosting
- Coke oven gast boosting

- Volume flow approx. 380 - 100,000 cfm (650 to 160,000 m3/h)
- Negative pressure -13 psig (-900 mbar)
  Positive pressure 750 psig (52 barg) (multistage)

OIL-INJECTED SCREW COMPRESSORS

Model VMY .36

- Gas gathering onshore, offshore
- Natural gas compression
- Fuel gas boosting (gas turbine)
- H_2 and CH gas mixtures, flare/tail gas, butane and propane recovery
- BOG
- Turbine fuel gas
- LNG, LPG, cryogenic, ammonia boosting

- Volume flow approx. 400 – 6,600 cfm (700 to 11,200 m3/h)
- Negative pressure -14.5 psig (-999 mbar)
  Positive pressure 360 psig (25 barg)

Model VMY .56/046

- Gas gathering onshore, offshore
- Natural gas compression
- Fuel gas boosting (gas turbine)
- H_2 and CH gas mixtures, flare/tail gas, butane and propane recovery
- BOG
- Turbine fuel gas
- LNG, LPG, cryogenic, ammonia boosting

- Volume flow approx. 135 – 1,600 cfm (233 to 2,700 m3/h)
- Positive pressure 360 psig (25 barg)

SERVICE AROUND THE WORLD.
SERVICES FOR GLOBAL INDUSTRIES.

The best kind of process gas and refrigeration installations are the kind you do not notice, because they run for 20, 25, 30 years. This is what we provide, with highly specialized service teams in Germany, in Europe, in over 100 countries all over the world. This is how we can secure your investment, productivity, and decisive advantage in global competition.

AERZEN OEM expertise is available to its customers anytime, anywhere in the world.

Getting in touch the world over
There are 2,000 people working for AERZEN, including six continents. With six sales offices in Germany alone, and 50 affiliates in over 100 countries, we shorten the distance to you our customers–so we can be there when you need us. Give us a call:
+1-610-380-0244

Service Hotline
We are there for you–even outside of office hours. Use the direct line to AERZEN via our regional service hotlines:
800-444-1692

CustomerNet
Where can you learn more about our company and the leading compressor technologies coming out of Aerzen? Simple: the CustomerNet link on our homepage. We've put everything there that you need to know.
www.aerzenusa.com

AERZEN on-site service.
Wherever AERZEN machines are, the service teams from our Process Gas Division are available the world over. How can we do that? By shortening the distance to our customers. The PGD has three regional service centers in Germany, Hungary, and the USA. Their experts work in all global AERZEN branch offices so they can be there whenever and wherever you need them.

As multifaceted as our customers.
The extraordinarily customer-oriented PGD service philosophy? It begins with the friendliness of our colleagues, but certainly does not end with on-site training. Included in the portfolio: exchange stages, tailor-made service kits, machine diagnosis, process modifications, energy-savings studies, technological enhancements, acoustic optimization, replacement parts, and a large selection of rental machines.
Packaging and shipment are also an important part of our service. The process gas and refrigeration compressors can be configured and packaged in Germany, Hungary, or the USA, tailored precisely to the needs of our customers. In this way, we can combine AERZEN's immense experience and engineering resources with the flexibility of the Process Gas Division in project management and on-site packaging.

AERZEN process gas compressors and blowers have proven themselves in over 10,000 units installed the world over. What are the decisive factors? Extremely long service life, sharp focus on efficiency cri - teria, and also this: the unusually broad portfolio of solutions, including modifications, accessories and special developments to ensure they meet every possible process requirement.

The engineering and production center at AERZEN, where high-performance, high-end solutions for the process gas and refrigeration industries are born.

Focus on special requirements.

AERZEN is a pioneer in compressor technology. In many areas we are the market leader. With unique technological advantages. With superior quality and high efficiency, our product portfolio for the process gas and refrigeration industries includes a broad spectrum of specialized blowers and compressors. Highend machines with a wide variety of designs, sizes, and special features, configured so they meet all relevant international regulations, building codes, and specifications in a wide variety of industrial branches and certification bodies. This includes ASME, API, TEMA, ANSI, Ex, DIN, PED, GOST, and CRN, as well as safety regulations for electrical installations such as DIN, EN, NEMA, UL, CSA, NFPA, NEC, IEC und ATEX.

Rightsized for the process.

Energy efficiency is one of the main demands on today's compressor technology. This is not surprising when you consider that it can make up as much as 80% of the lifecycle costs of compressor installations. Reducing energy consumption is one of the main goals of AERZEN's R&D department. All our blowers and compressors are radically flow optimized. Carefully selected transmission variants are just as important to increasing efficiency as innovative component developments. But the decisive factor in reducing energy consumption is this: every compressor and blower unit from AERZEN is tailored to the individual requirements of our customers and

AERZEN. Compression as a success principle.
AERZEN began life in 1864 as Aerzener Maschinenfabrik. In 1868 we built Europe's first rotary lobe blower. The first turbo compressors followed in 1911, the first screw compressor in 1943, and in 2010 the world's first rotary lobe compressor unit. Innovations "made by AERZEN" keep driving the development of compressor technology forward. Today, AERZEN is among the world's oldest and most significant manufacturers of rotary lobe blowers, rotary lobe compressors, screw compressors, and turbo blowers, and is among the undisputed market leaders in many areas of application.

More than 2,000 experienced employees in 50 affiliates the world over are working at full speed to advance compressor technology. Their technological expertise, our international network of experts, and constant feedback from our clients form the basis for our success. Products and services from AERZEN are setting standards when it comes to reliability, lasting value, and efficiency. Go ahead: challenge us!

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AERZEN
EXPECT PERFORMANCE