

Compressor valves

Engineered for better efficiency and reliability



Reliable compressor operation for every industry

Reciprocating compressor valves work under demanding conditions. They are crucial to your compressor's availability, efficiency and reliability.

Operators of reciprocating compressors still suffer more shutdowns than they need to. Studies show that valves which are poorly engineered or of outdated design cause breakdowns and unnecessary maintenance.

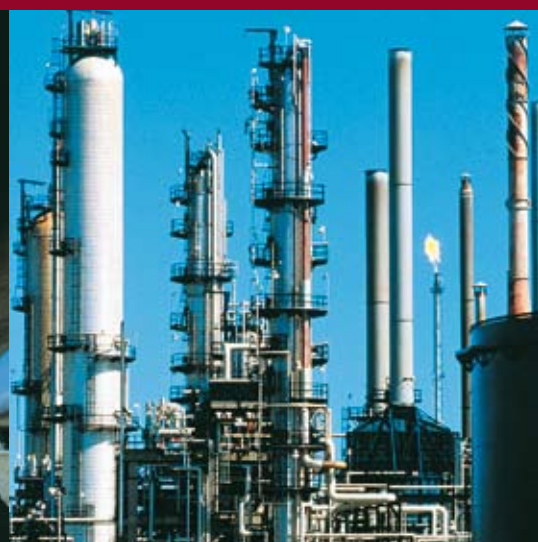
HOERBIGER compressor valves operate completely automatically, with high efficiency, long service life and ideal flow behaviour.

Our wide variety of designs covers:

- High and low pressures
- Lubricated and non-lubricated compressors
- Light gases (hydrogen) and heavy gases (air)
- Humid and bone-dry gases
- Corrosive and contaminated gases

HOERBIGER compressor valves are proven performers in industries including:

- Process industries
 - Refining
 - Petrochemicals
 - Chemicals
- Oil and gas production
 - Gas lift and re-injection
 - Gas gathering
 - Gas transport
 - Gas storage
 - LNG terminals
 - CNG
- Industrial gases
 - Syngas: hydrogen, carbon monoxide
 - Air separation: oxygen, nitrogen
 - Specific gases: argon, helium
- Food industry
 - PET bottle blowing
 - Industrial air
 - Industrial refrigeration
- Utilities
 - Cogeneration (combined heat and power)
 - Biogas
 - Water treatment
- Transport
 - Automotive
 - Railways
 - Shipbuilding



Innovation: a HOERBIGER tradition

Proven and unique designs

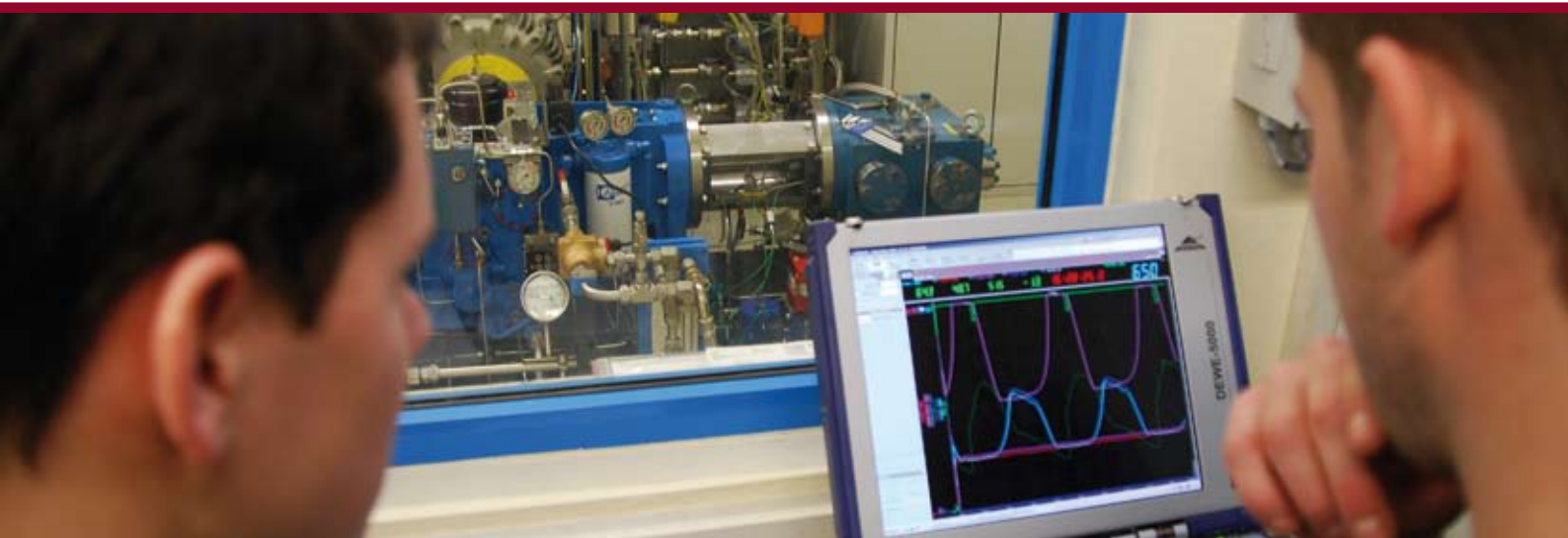
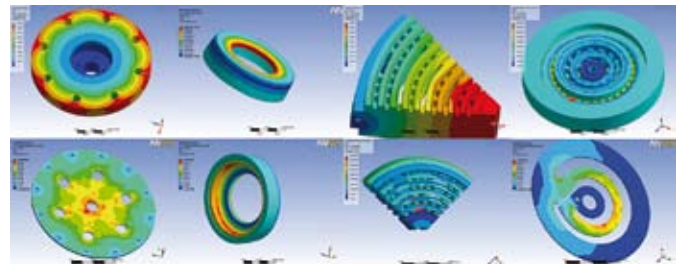
For more than a century HOERBIGER has developed designs and materials to improve the efficiency and reliability of compressors. From standard applications to the most challenging “specials”, every HOERBIGER solution encapsulates all our expertise in the complex relationships within the compressor, as well as on external benchmarks and standards.

This experience allows us to provide what our customers need. We support compressor manufacturers in the early stages of developing new models, and we create spare parts to squeeze the last drop of performance out of old machines.

HOERBIGER product development standards

To create the best products for our customers we follow a development process that is imaginative and flexible, yet tightly structured:

- Systematically examine fundamental chemical and physical relationships
- Use these findings to develop better materials and products
- Run thorough tests in our laboratories and on our own test compressors
- Work with selected customers on an intensive reference phase



The right valve at the right time in the right place

Customised for every application

Scarcely any two of our compressor valves work under exactly the same conditions. A wide variety of processes requires an equally wide variety of valve designs, materials, sizes and configurations. Process operators trust us to tailor valves to their highly specific demands. Compressor manufacturers rely on our expertise to optimise their designs, helping them to provide reliable and efficient performance for decades to come.

Long before computers, we used index cards to capture every detail of our technical knowledge of valve design and operation. Now, HOERBIGER application engineers can draw on customised design software and on-line databases that are always available, consistent, accurate and up-to-date.

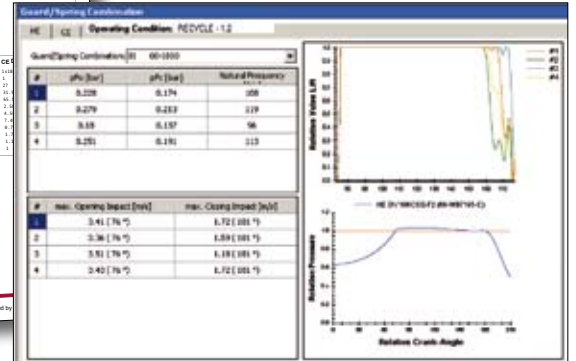
ITKK Print Out - Performance

Customer	Count	Tag	PT
0000000133		PT-103	CE

Material	Manufacturer	Model	Serial	Specs
0000000133	HOERBIGER	0000000133	0000000133	0000000133

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0000000133	HOERBIGER	0000000133	0000000133	0000000133

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Every HOERBIGER valve is precisely tailored in design, dimensions and materials to the process and the machine in which it operates. First we pre-select one or more valve types to provide high efficiency and long service life based on features such as suction and discharge valve motion, pressure drop and gas velocity. Next, our application engineers use HOERBIGER's proprietary simulation tools to carry out a comprehensive dynamic study under actual operating conditions. Valve seats and guards are designed using state-of-the-art finite element methods.



The ideal material for every application

A complete selection of materials to meet every requirement

Our valve materials must meet special requirements including stability at very high or low temperatures, resistance to corrosive gases, extremely high impact resistance, and reliability under a wide range of operating conditions.

All the following materials have been specifically developed by HOERBIGER for valves and are manufactured in our own plants.

Standard materials

PK is the standard HOERBIGER material based on the polymer PEEK. It is often used as a benchmark against which to measure other materials. PK remains in our extensive material portfolio for its temperature tolerance.

MC is a material developed for light gas applications and for ring valves. MC is impact-tolerant and has optimum sealing behaviour.

PC is a specific carbon-filled PEEK that provides reliable service in high-temperature environments.

Impact-resistant materials – 3X

MTX sets a new standard for the working life of valve plates. It is especially suitable for high-stress conditions.

HTCX performs well for medium to heavy gases at medium and high temperatures. Carbon reinforcement and excellent sealing properties make HTCX ideal for ring valves.



For corrosive, cryogenic and other challenging applications

HP is a truly unique material for both plate and ring valves. This compression-moulded polymer reinforced with long carbon fibres resists chemical attack over an exceptionally wide temperature range (-200°C to $+230^{\circ}\text{C}$). HP is particularly suited to corrosive gases like ammonia and chlorine, to cryogenic applications such as LNG boil-off gas and ethylene, and to pure oxygen.

Proper material selection for gas compression equipment can only be made by qualified technical personnel. Please consult an authorised HOERBIGER representative to ensure that you receive the correct material for your compressor's operating conditions.



CE valve

Highly efficient ring valve for all process applications

- Ideal for heavy duty
- Low energy consumption
- Covers wide ranges of pressure and other operating conditions
- Reliable operation in difficult applications like humid or contaminated gases
- Easy to repair

Characteristics

- Profiled guard stops oil sticking
- Wide flow openings for high efficiency
- Carbon-fibre-reinforced HTCX and HP rings withstand the most violent impacts
- Spring saver technology
- 10 mm ring width
- Maximum speed 1200 rpm
- Size range 48–314 mm
- Suitable for HydroCOM control

Typical applications

- Hydrocracking
- LDPE



CX valve

Robust valve for hydrogen and light gases

- Very robust design
- Extremely long life
- Easy to repair

Characteristics

- Profiled guard prevents oil sticking
- Carbon-fibre-reinforced HTCX rings withstand the most violent impacts
- 16 mm ring width
- Maximum speed 1200 rpm
- Size range 60–310 mm
- Suitable for HydroCOM control

Typical application

- Hydrodesulphurisation



CM valve

Reliable, efficient ring valve for high pressures

- Higher power and compression density
- Reliable operation at extreme pressures
- The standard for high-pressure and high-speed compressors

Characteristics

- Profiled guard prevents oil sticking
- Drilled seat is stable at high pressure
- Wide flow openings for high efficiency
- Carbon-fibre-reinforced HTCX rings withstand the most violent impacts
- Synchronising plate ensures uniform movement of rings
- 7 mm ring width
- Maximum speed 1400 rpm
- Size range 72–192 mm
- Suitable for HydroCOM control

Typical application

- Natural gas storage



CP valve

Greater efficiency and reliability for both standard and extreme conditions

- Ideal for high compression density and high speed
- Cuts valve energy losses by up to 40%
- Longer mean time between repairs
- Better availability due to fewer unscheduled shutdowns

Characteristics

- Extremely efficient profiled plate design
- HP material with low thermal expansion is suitable for temperatures from -200°C to 200°C and corrosive environments
- Integrated anti-rotation device ensures reliable operation when unloaded
- Special springs provide maximum dynamic reliability
- Maximum speed 1800 rpm
- Size range 79–212 mm
- Suitable for HydroCOM control

Typical applications

- PET bottle blowing
- Air separation (oxygen)
- LNG boil-off
- HYCO processes



CT valve

High-performance valve for high-speed compressors

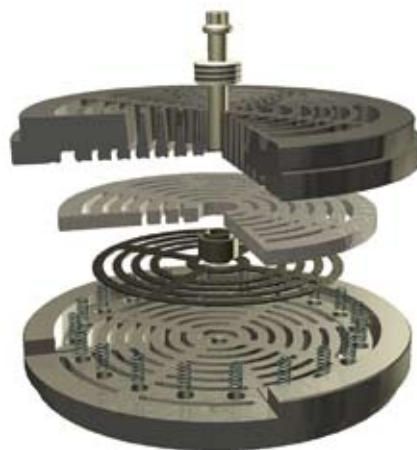
- Suitable for high-speed compressors
- Better availability due to fewer unscheduled shutdowns
- Easy to repair

Characteristics

- Non-metallic plate valve
- Circumferential springs stabilise plate motion
- Good efficiency
- Suitable for both lubricated and non-lubricated compressors
- Patented design helps eliminate oil sticking
- Maximum speed 1800 rpm
- Size range 64–220 mm
- Suitable for HydroCOM control

Typical application

- Gas lift



CS valve

Proven performance at low and medium pressures

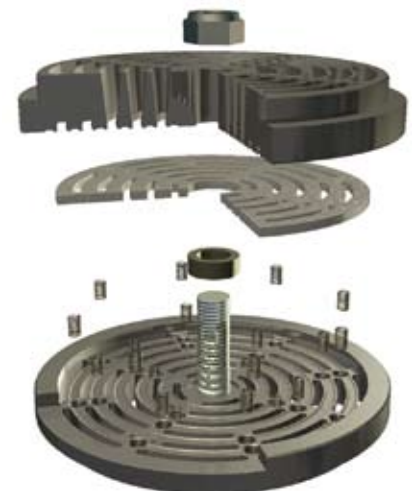
- Standard design
- Easy to repair

Characteristics

- Non-metallic valve plate
- Profiled guard reduces oil sticking
- Suitable for both lubricated and non-lubricated compressors
- Size range 90–320 mm

Typical application

- Industrial air



R valve

The senior valve for industrial air compressors

R valves have a worldwide reputation for reliability under the most severe operating conditions in small short-stroke industrial air compressors. In lubricated service, the robust design gives long and trouble-free operation with minimum maintenance. These valves and HOER-BIGER reed valves are still an economical solution for small serial compressors.

Characteristics

- Available for both lubricated and non-lubricated compressors
- Low to medium pressures
- High flow
- Low clearance volume
- Strong seat
- Coil springs, spring plates or guided ring design
- Metallic or non-metallic valve plate

Typical applications

- Industrial air compressors
- Brake compressors
- Starter compressors



Concentric

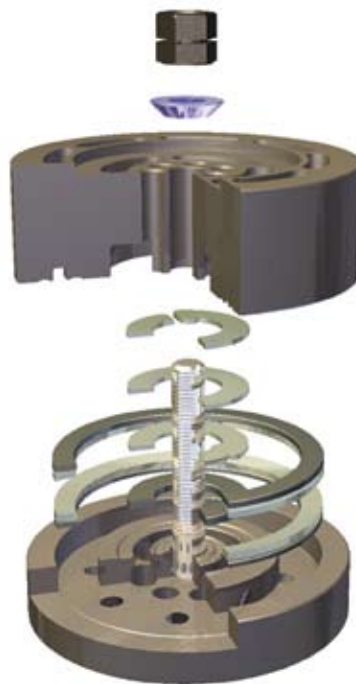
For lube and non-lube compressors

A concentric valve integrates the suction and discharge valves in a single valve body. In single-acting compressor cylinders, this makes ideal use of the available space. Concentric valves are customised for each application to achieve optimal integration with the cylinder head. Features include:

- Low clearance volume
- Low flow resistance
- Long service life
- Compact, space-saving design
- Available in metallic and non-metallic versions

Typical applications

- Refrigeration
- Industrial air
- CNG (compressed natural gas)



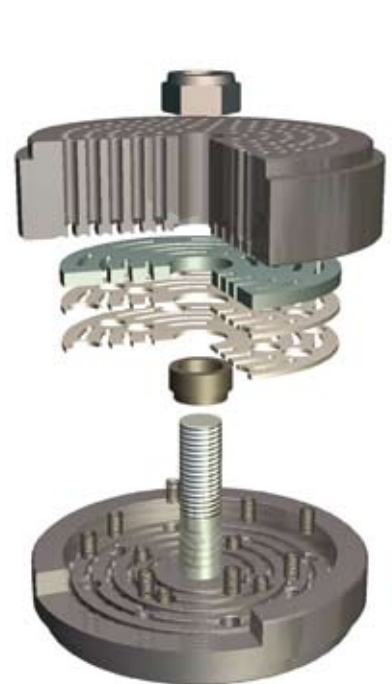
HDS valve

Traditional design for heavy gases

HDS valves were previously used for heavy gases and high-pressure application. Most of these valves have now been converted to non-metallic designs, which are more reliable and reduce the risk of secondary damage caused by broken metal valve plates.

Characteristics

- Reliable and long-lived
- Double-damping design reduces opening and closing impacts
- Drilled seat to withstand high pressures



The best valve service now on your doorstep

State-of-the art compressors equipped with HOERBIGER valves require only a minimum of valve maintenance. Nevertheless, compressor reliability and safety depend on carrying out this limited maintenance thoroughly.

Visual checking

First of all, our specialists examine each valve carefully to spot any problems – and their possible causes – for the final repair report. They decide whether the valve can be repaired economically, and if so, they give it a preliminary clean in preparation for dismantling.

Dismantling

For dismantling, the valve is first sprayed with solvent. It is then clamped in a special jig which stops it rotating and prevents damage when the screw is removed.

Washing and shot-peening

All the valve components are cleaned with the help of a shot-peening machine, which removes even the most persistent layers of contamination.

Crack checking

Next, each component is inspected for signs of fatigue, cracks and breakage. Small cracks can be repaired, but deep tears or breaks in the seat or guard require the valve to be replaced. On the whole, the valve will need replacing if more than 10% of the thickness of the sealing elements has been lost.

Seat machining

Seat surface quality is critical to valve tightness. We use high-precision machine tools to turn and grind valve seats to agreed standards.

Assembly

Due to the highly specific and individual nature of each compressor valve, assembly requires as much care and accuracy as dismantling. Our specialists use only HOERBIGER spare parts when they replace plates, rings and springs. They take care to tighten the central nut to the exact torque required, whilst ensuring that the valve plates have free movement and the correct lift.

Leak testing and conditioning

Finally, the valve is checked thoroughly on a dedicated test rig. We insist on the same stringent tightness standards for reconditioned valves as for new valves. All valves are documented on a certificate that is included with the analysis report. The valve is wrapped in special paper for long-term storage.



Solutions to get the best from your valves

To back up its proven valve designs HOERBIGER offers a safe, leak-free mounting system and a simple yet effective method of capacity control

Valve retaining system stops leaks

On older compressors, the seal around each valve cover can be a significant source of gas leakage. HOERBIGER's **Eliminator** valve retaining system virtually eliminates leaks, and can be retrofitted to any compressor that uses valve cover gaskets.

Benefits

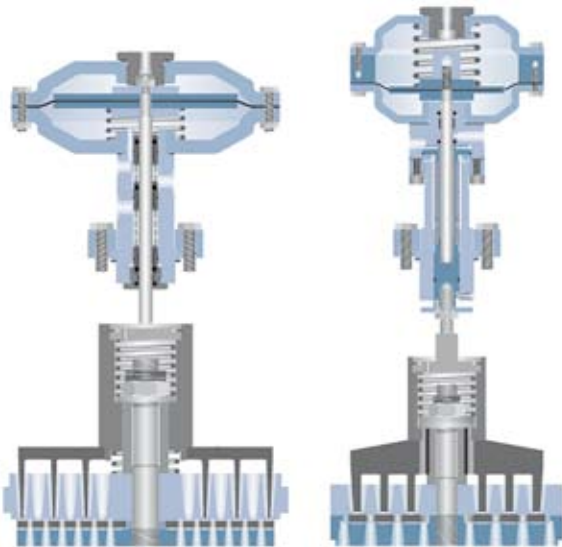
- Even load distribution through multiple jackbolts
- Eliminates misalignment problems
- Unique captive jackbolt design
- Tubular valve chair
- Eliminates leakage



Diaphragm cylinders for stepwise control

HOERBIGER diaphragm cylinders act in conjunction with valve unloaders to provide stepwise control of compressors. Their advantages compared to other unloader systems are:

- Applicable to any compressor
- Exact matching of the valve, unloader and diaphragm cylinder creates a "system solution"
- Suitable for almost any gas, thanks to the use of corrosion-proof materials
- Direct- or reverse-acting
- Rapid response, with no stick-slip effect
- Optional bellows version guarantees zero leakage for critical applications
- Serial inert gas connection for purging, if required
- Low consumption of compressed air or other control media
- Service-friendly
- Safe and environmentally friendly
- Lower life-cycle costs



HydroCOM capacity control systems

HOERBIGER control systems for higher efficiency, better process control and lower operating costs

Many reciprocating compressor applications require a finer degree of capacity control than is possible through simple stepwise unloading. Unfortunately, most of the available capacity control systems are slow, inaccurate, and wasteful of energy. HOERBIGER's HydroCOM system is different.

HydroCOM is the most efficient continuous control system available for reciprocating compressors.

- HydroCOM's stepless control stabilises compressors that are subject to fluctuating loads
- Reducing or eliminating the need to recycle or vent gas allows maximum energy savings
- Can be fully integrated into distributed control systems (DCSs) and other plant automation systems
- Shares a common platform with HOERBIGER's RecipCOM continuous compressor monitoring and protection system

How HydroCOM works

When the compressor is required to operate at less than full load, during part of each compression stroke the HydroCOM controller sends a signal to an actuator connected to a valve unloader. The unloader holds the suction valve open until the required volume of gas has been pushed back into the suction chamber again. At that point the suction valve closes and the gas remaining in the cylinder is compressed.

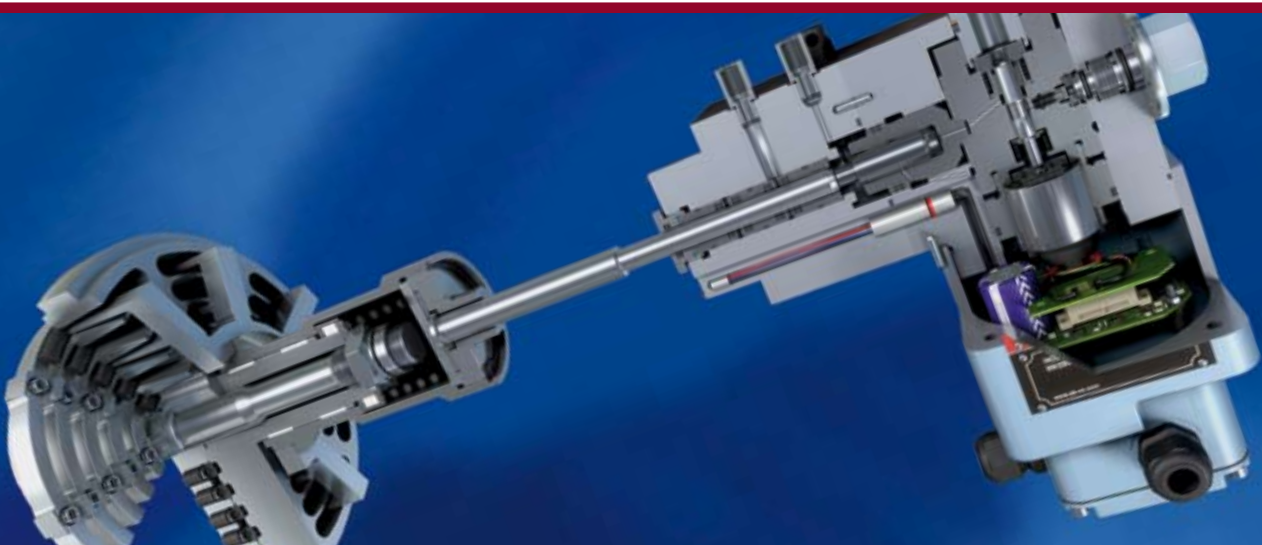
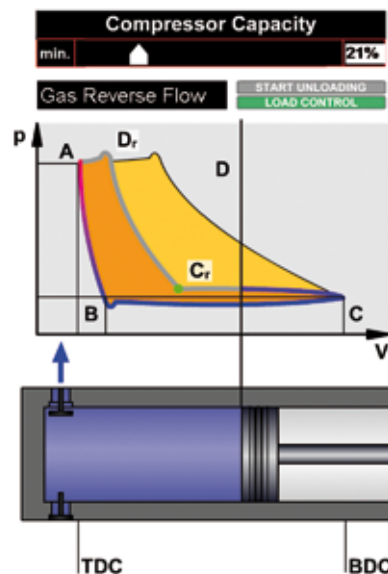


Why invest in HydroCOM?

Continuous control via HydroCOM provides large energy savings, since the compressor handles only the volume of gas that is actually required. HydroCOM's ability to adapt smoothly to load changes helps to optimise the performance of the whole plant, and simplifies process start-up and shutdown.

HydroCOM supports complete system integration

Clear interfaces permit simple integration of HydroCOM into both new and existing compressor plants.



The advantages of HOERBIGER valves for your compressor

Benefits

- Energy savings and higher efficiency
- Problem-solving know-how to achieve outstanding runtime
- Easy and professional repairs thanks to our more than 60 service companies in close proximity to you
- In-house or outsource
- Reduction of unscheduled shutdowns, especially in combination with HOERBIGER's RecipCOM monitoring and protection system
- Excellent controllability with the HydroCOM control system
- Customised functionality covers both standard and exceptionally demanding operating conditions

Main features

- Well-proven and robust ring design
- Innovative and extremely efficient profiled plate design
- Broad product line of carefully designed valves
- Backed by intensive research and development
- Comprehensive competence in material selection and design
- Proven material quality, with complete quality control at every process stage

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HOERBIGER
because performance counts

HOERBIGER Compression Technology is a business unit of HOERBIGER Holding AG, Zug / Switzerland. HOERBIGER is active throughout the world as a leading player in the fields of compression technology, automation technology and drive technology. In 2009, its 6,500 employees achieved sales of 772 million Euro. The focal points of its business activities include key components and services for compressors, gas engines and turbomachines, hydraulic systems and piezo technology for vehicles and machine tools, as well as components and systems for shift and clutch operations in vehicle drive trains of all kinds. Through innovations in attractive technological niche markets, the HOERBIGER Group sets standards and delivers cutting-edge solutions for the benefit of its customers.

This product brochure contains product specifications based on research and development on the one hand and on manufacturing on the other hand. Dependent on place of installation, operating conditions and specifications, several parameters of the described product may change. Thus, Hoerbiger assumes no liability or warranty for the accuracy and completeness of information covered in this brochure.