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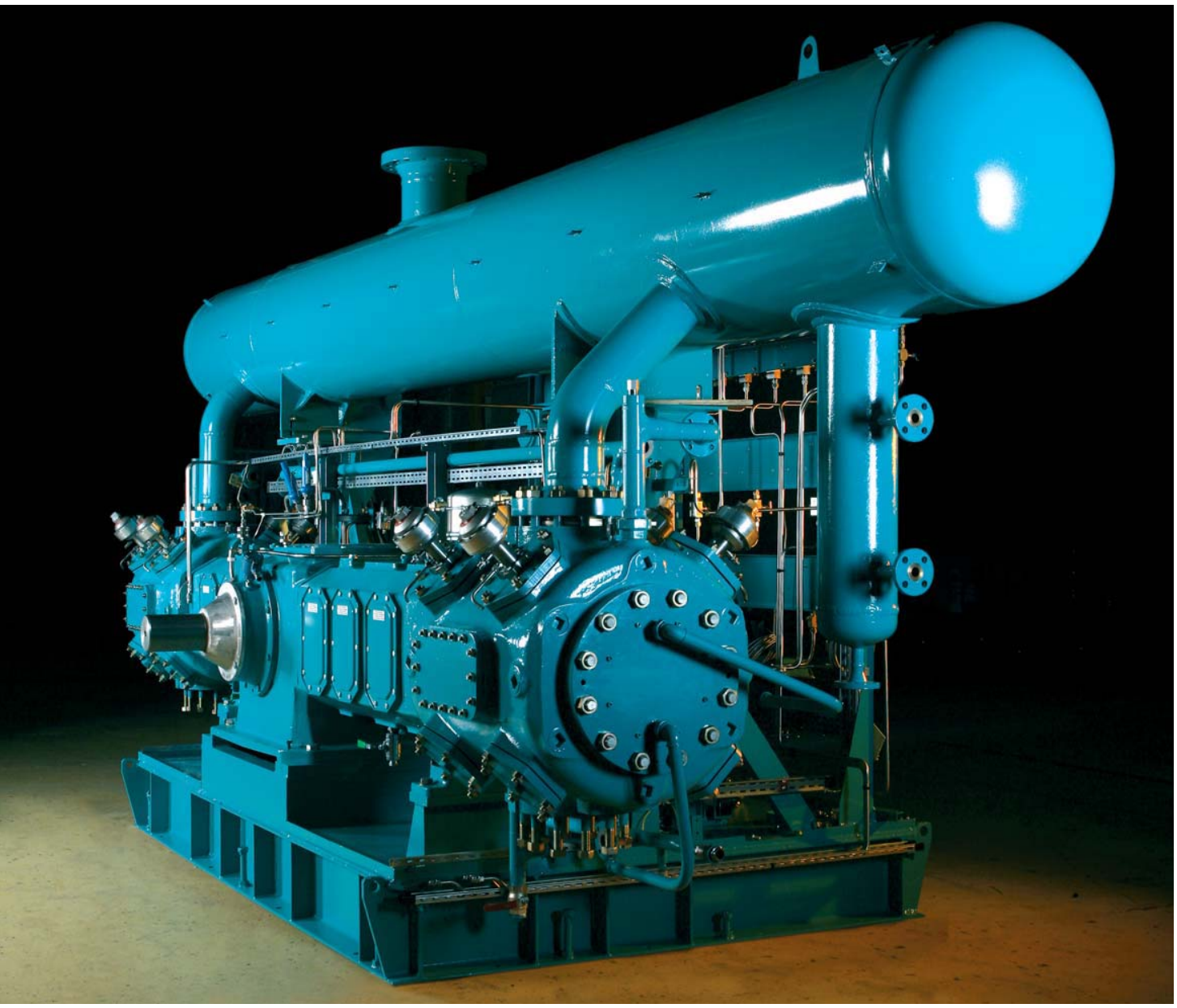
RELIABILITY UNDER PRESSURE

BURTON CORBLIN® RECIPROCATING COMPRESSOR PACKAGES FOR HEAVY DUTY APPLICATIONS



CUSTOM DESIGN, MATCHLESS QUALITY

Part of Howden, the worldwide and world-class force in air and gas handling, Burton Corblin® compressors are designed and manufactured as complete and individually engineered packages to meet the specific demands of unique situations. Our equipment is the preferred choice for applications where safety, reliability and performance have to be beyond question. It can be found in the world's most demanding environments, including the nuclear and petrochemical industries.

Burton Corblin® compressors bring together our exceptional knowledge and understanding of the properties of gases under pressure, our expertise in fluid dynamics, our engineering skills and our worldwide on-site support and technical backup to provide assurance in the most critical situations.

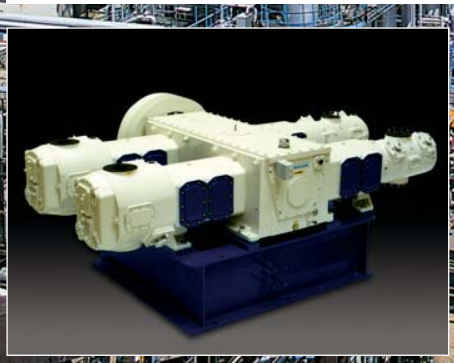
BURTON CORBLIN: A BRIEF HISTORY

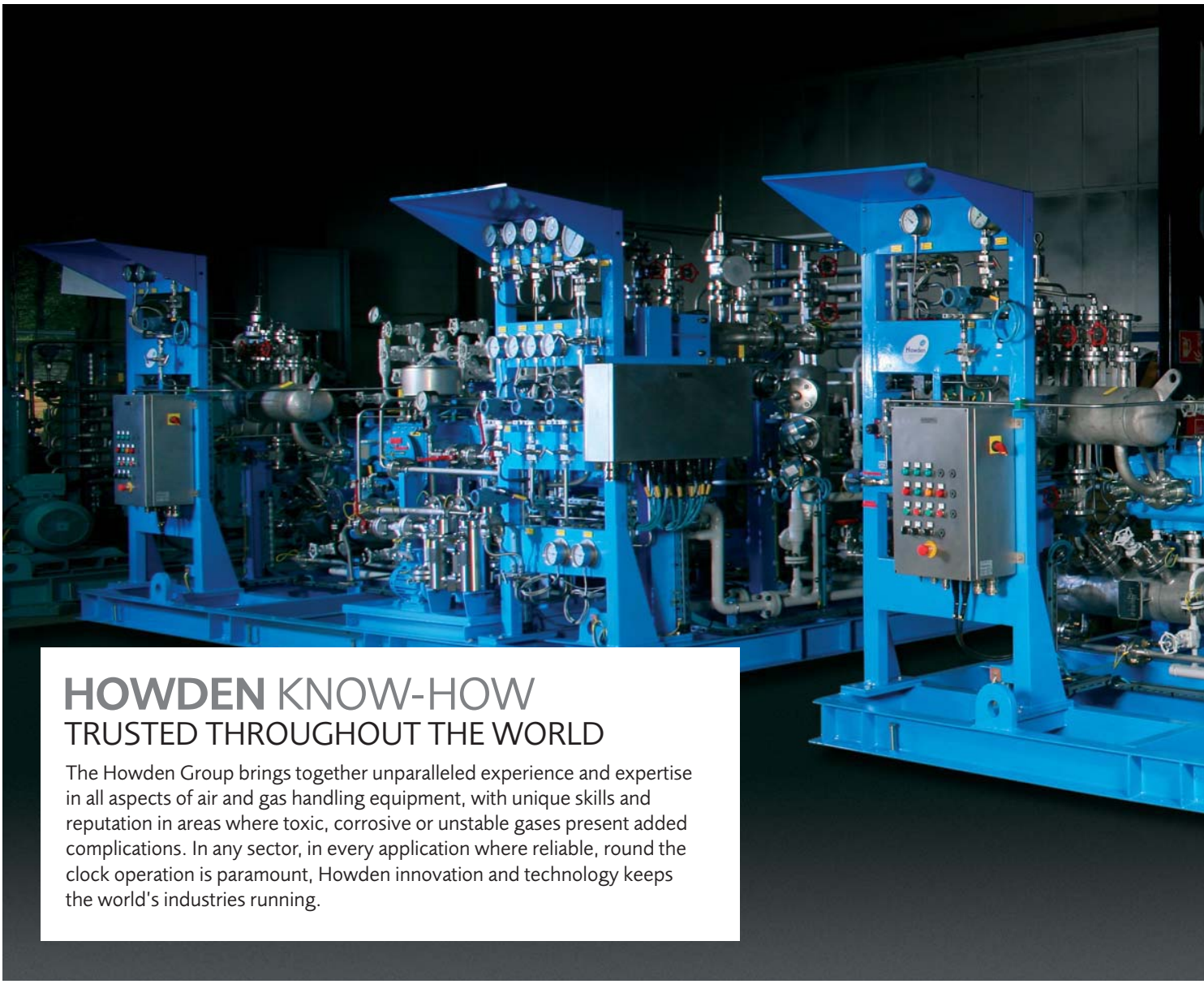
Over 120 years ago, William Burton started a workshop building pumps and air compressors at Nogent-sur-Oise, 60kM north of Paris.

Around thirty years later, Henri Corblin invented the metal diaphragm compressor which found a growing market in the industrial gas and petrochemical sectors. With enviable reputations for their separate specialities, the two companies came together in 1960 to build hybrid machinery combining piston technology with a diaphragm compressor head, delivering the high pressures and large capacities demanded by deep sea exploration and industrial gas applications.

Burton and Corblin merged into a single company in 1971, focusing on custom designed and built units. In 1995, the firm found its natural home within the Howden Group, a world leader in air and gas handling engineering.

THE NATURAL CHOICE WHERE UNINTERRUPTED HEAVY DUTY PERFORMANCE IS VITAL.





HOWDEN KNOW-HOW
TRUSTED THROUGHOUT THE WORLD

The Howden Group brings together unparalleled experience and expertise in all aspects of air and gas handling equipment, with unique skills and reputation in areas where toxic, corrosive or unstable gases present added complications. In any sector, in every application where reliable, round the clock operation is paramount, Howden innovation and technology keeps the world's industries running.

CHEMICAL AND PETROCHEMICAL

In the chemical and petrochemical sectors, Burton Corblin® compressors operate safely at extreme pressures and temperatures, handling a wide range of light and heavy gases, many with corrosive, flammable, toxic or bio-hazardous components.

- Sinopec
- Arkema
- BASF
- Solvay
- Total Petrochemicals
- National Petrochemical Company

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OIL AND GAS

The oil and gas industries extract and transport fluids in exceptionally challenging environments involving extreme highs and lows of temperature, high humidity and salinity and remote locations both on and offshore. Burton Corblin® robustness and reliability is a vital part of the supply chain.

- Petrobras
- IFP Institut Français du Pétrole
- Snamprogetti
- Técnicas Reunidas
- Hangzhou oil refinery
- National Iranian Oil Company

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INDUSTRIAL GASES

Many situations, including high presssure filling of gas cylinders and tubes, pressurising gas cartridges for airbags, and the manufacture and processing of ultra-high purity, rare gas and electronic gases, require that the gases must be hermetically isolated from the atmosphere to prevent fire hazard, contamination or pollution. Burton Corblin® diaphragm compressors are the optimum choice for such applications.

- Air Liquide Gaz industriel Services
- Air Products
- Messer
- Linde
- Craft Engineering

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ENERGY

Power generation demands the highest levels of reliability and performance. For many decades, power industries, both fossil fuel and nuclear based, have depended on Burton Corblin® equipment for critical applications such as waste gas recovery, gas feeds, process air supply, electrolyser packages and high pressure storage of hydrogen for alternator cooling and hydrogen fuel cells.

- AREVA
- EDF
- China Nuclear power engineering
- Cogen & nuclear power stations in Spain, South Africa and various other countries

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AEROSPACE AND DEFENCE

Aerospace and military users operate at the leading edge of technology and engineering and demand the highest specification and robustness. Burton Corblin® are the chosen compressors in stringently demanding applications from high-pressure helium leakage testing to bench trials of rocket booster equipment and front-line naval vessels.

- Cnes
- Ministries of defence
- Navies
- Air Forces
- Tecnico Corp. for US Navy

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INDUSTRIES & HIGH TECH

Burton Corblin® compressors reliability provides high availability levels on continuous manufacturing lines requiring high pressure or purity.

- Autoliv Livbag
- Michelin
- Drinks & spring water bottling process
- Specialty gases for electronic industry
- China Steel Corp

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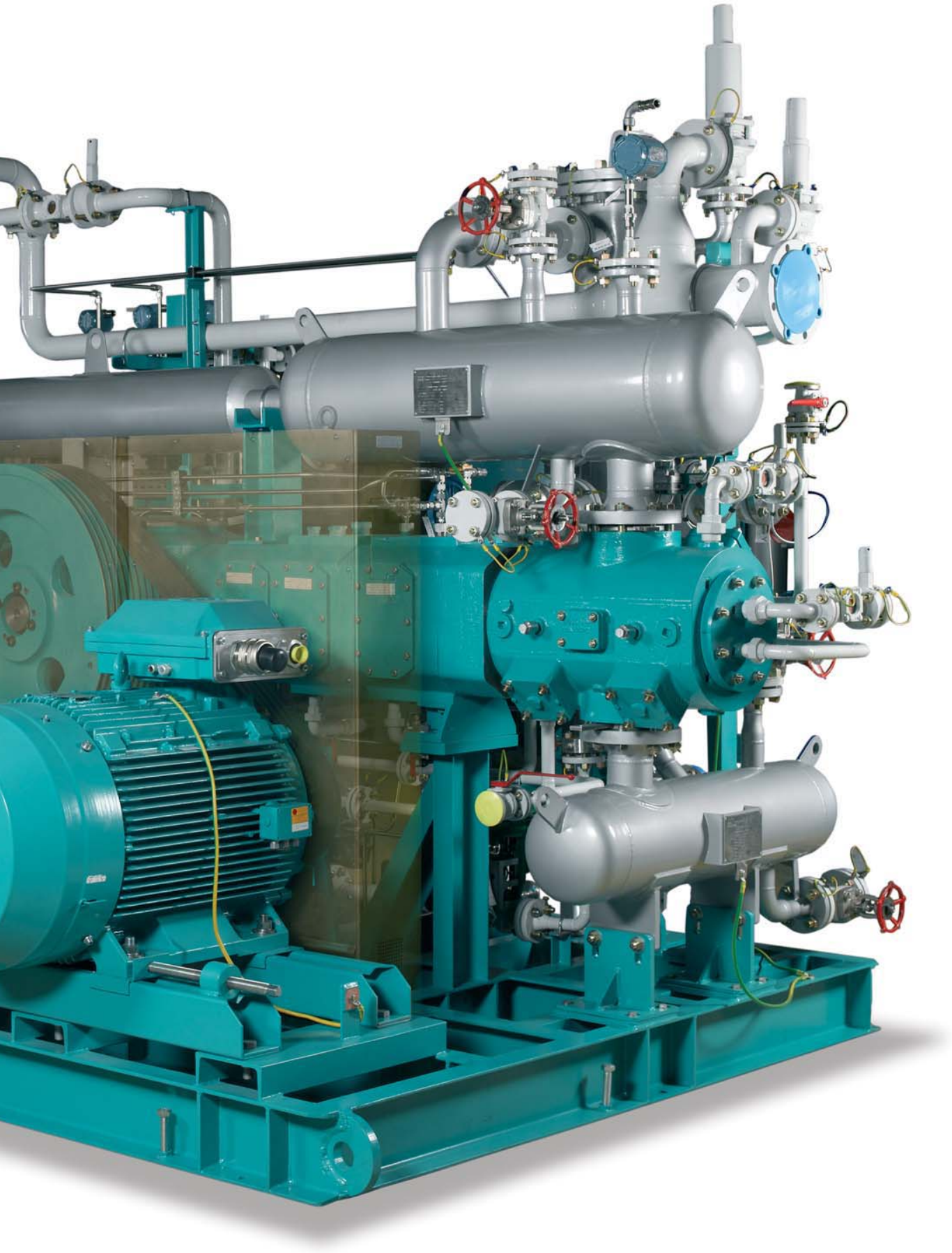
BURTON CORBLIN® PISTON COMPRESSOR PACKAGES

BURTON CORBLIN® HEAVY DUTY COMPRESSOR PACKAGES ARE CUSTOM DESIGNED FOR EACH INDIVIDUAL INSTALLATION.

They are a proven problem-free route to optimum performance and continuous operation in applications as diverse as food processing and hazardous petrochemicals.

- Pressures up to 250 bar (3,600 psi) • Power up to 2,500kW (3,400 hp) • Inlet volume up to 20,000m³/h (11,7500cfm)
- Built to meet or exceed API 618 or industry standards



ENGINEERED FOR HEAVY DUTY CONTINUOUS OPERATION

Burton Corblin® piston compressors are the pinnacle of over 100 years of experience. Our expertise has been developed over the design, manufacture and installation of more than 2,500 piston compressor packages throughout the world. Our mastery of reciprocating compressor design using non-lubricated cylinders, operating to the highest specification, is unrivalled and undisputed.

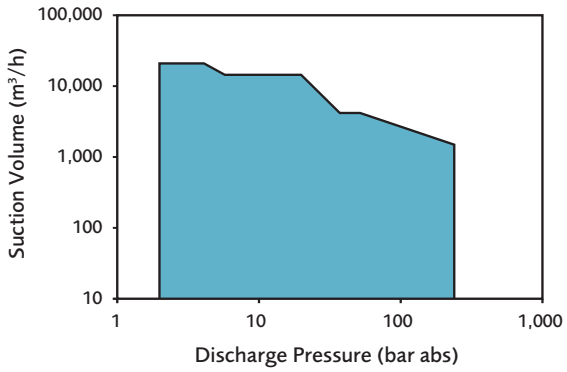
DESIGNED AND BUILT TO YOUR INDIVIDUAL REQUIREMENTS

Each compressor package we build is created, from concept to construction, specifically to meet individual circumstances.

From the most basic installation to the most complex and complicated, we evaluate every aspect of the system and take account of the factors that will affect compressor performance, to ensure that the package will operate continuously within its specification and meet the demands placed upon it. Our work is designed to anticipate the unexpected and allow for it.

DELIVERED READY FOR INSTALLATION AND START-UP

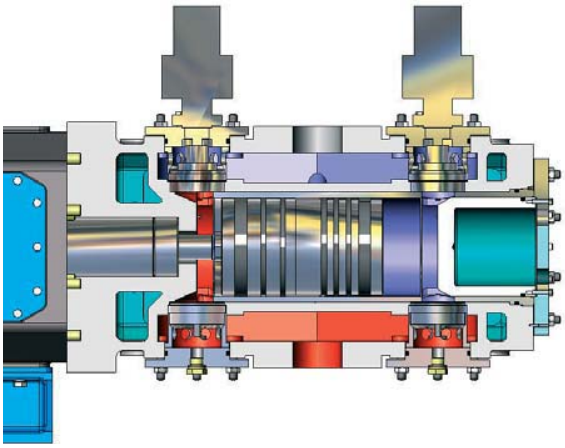
The fully integrated package we supply can incorporate control systems, regulation equipment, gas treatment plant and any other additional modules and utility packages required by the circumstances. Mechanically tested as an integrated package as well as discrete components, the installation undergoes final testing on-site by our highly skilled engineers, with full evaluation of noise levels, vibration, pulsation, temperatures, mechanical loadings, pressures and speed.



API 618 PROCESS COMPRESSORS

- Conservative operating speed to reduce fatigue
- Water cooling of cylinder ends using open-circuit, closed loop, thermo siphon, static fill or other methods as appropriate
- Single or dual compartment distance pieces allow for internal pressurisation or gas recovery, or both, if required
- Horizontally aligned cylinders with removable liners

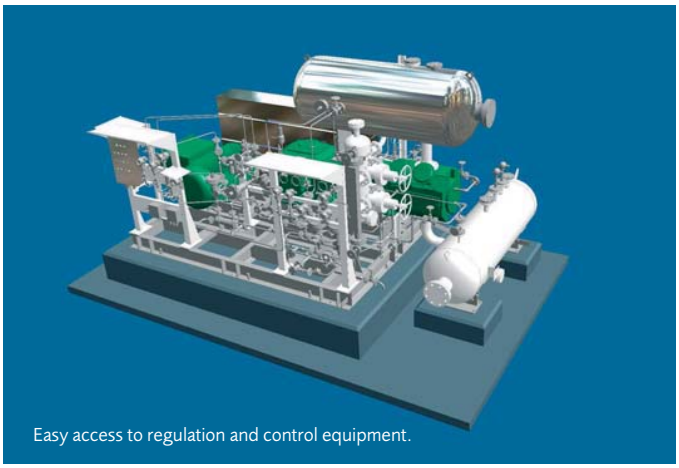
Howden offers a range of capacity control systems designed to precisely govern and optimise flow rate while reducing energy consumption.



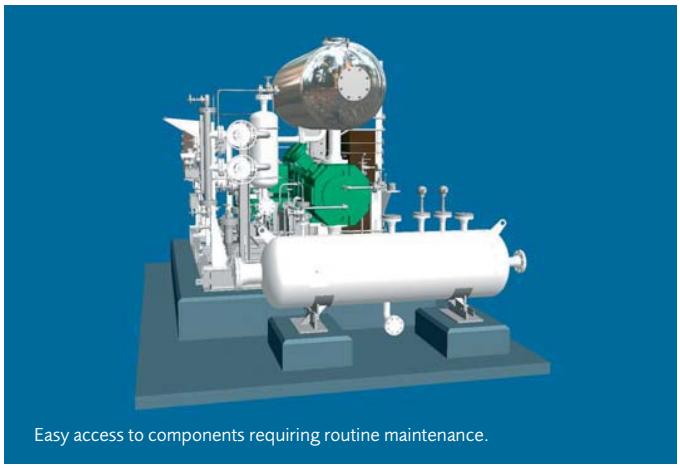
Matching a series of elements and components to optimise the performance of a compressor package within its critical operating parameters is a complex and highly skilled procedure. It demands profound knowledge of the behaviour of the gas as temperatures and pressures change during the compression cycle, as well as comprehensive understanding of the mechanical engineering involved, the customer's precise requirements and the local regulatory framework.

COMBINED COMPRESSOR TECHNOLOGY

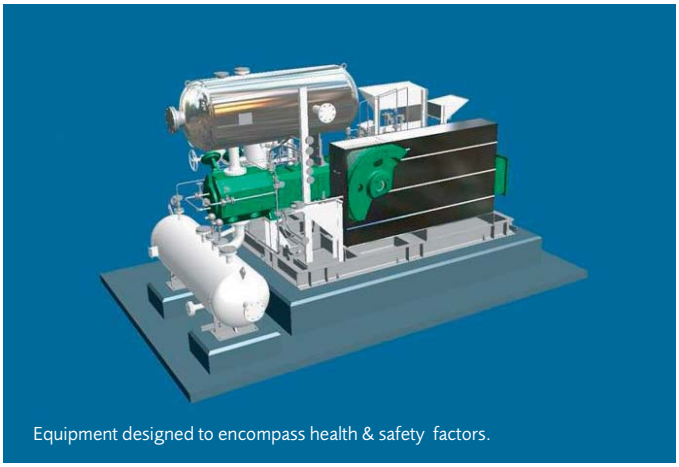
Where greater pressures are required, the advantages of piston compressor technology can be combined with an additional diaphragm compression head at the final stage to deliver the high capacities of piston compressors at higher pressure levels. Using Combined Compressor technology, an innovation developed and perfected by Howden, gas volumes of 225m³/h (140cfm) at pressures up to 410 bar (6,000psi) can be reached.



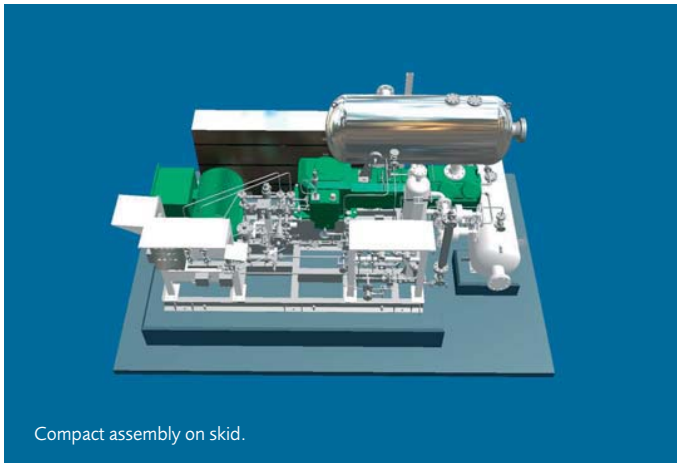
Easy access to regulation and control equipment.



Easy access to components requiring routine maintenance.

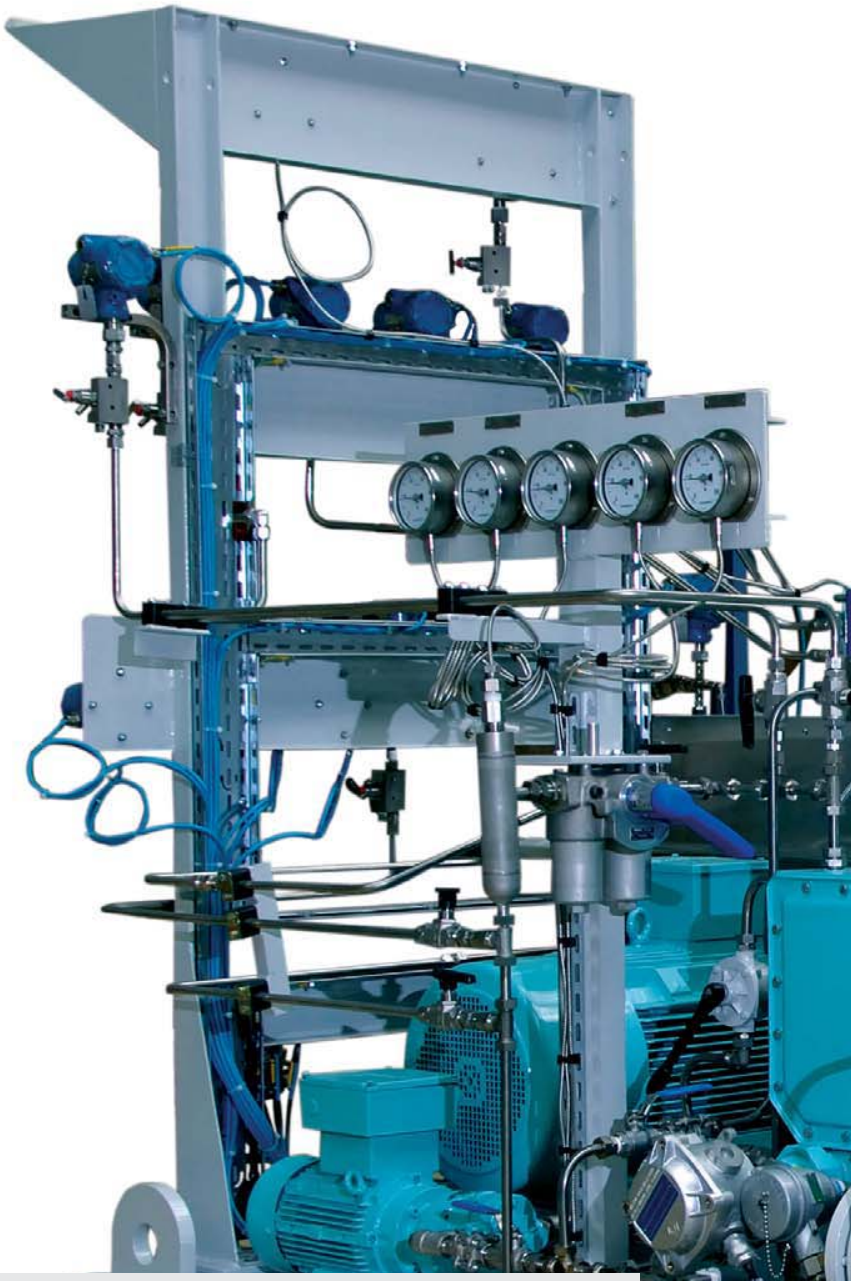


Equipment designed to encompass health & safety factors.



Compact assembly on skid.

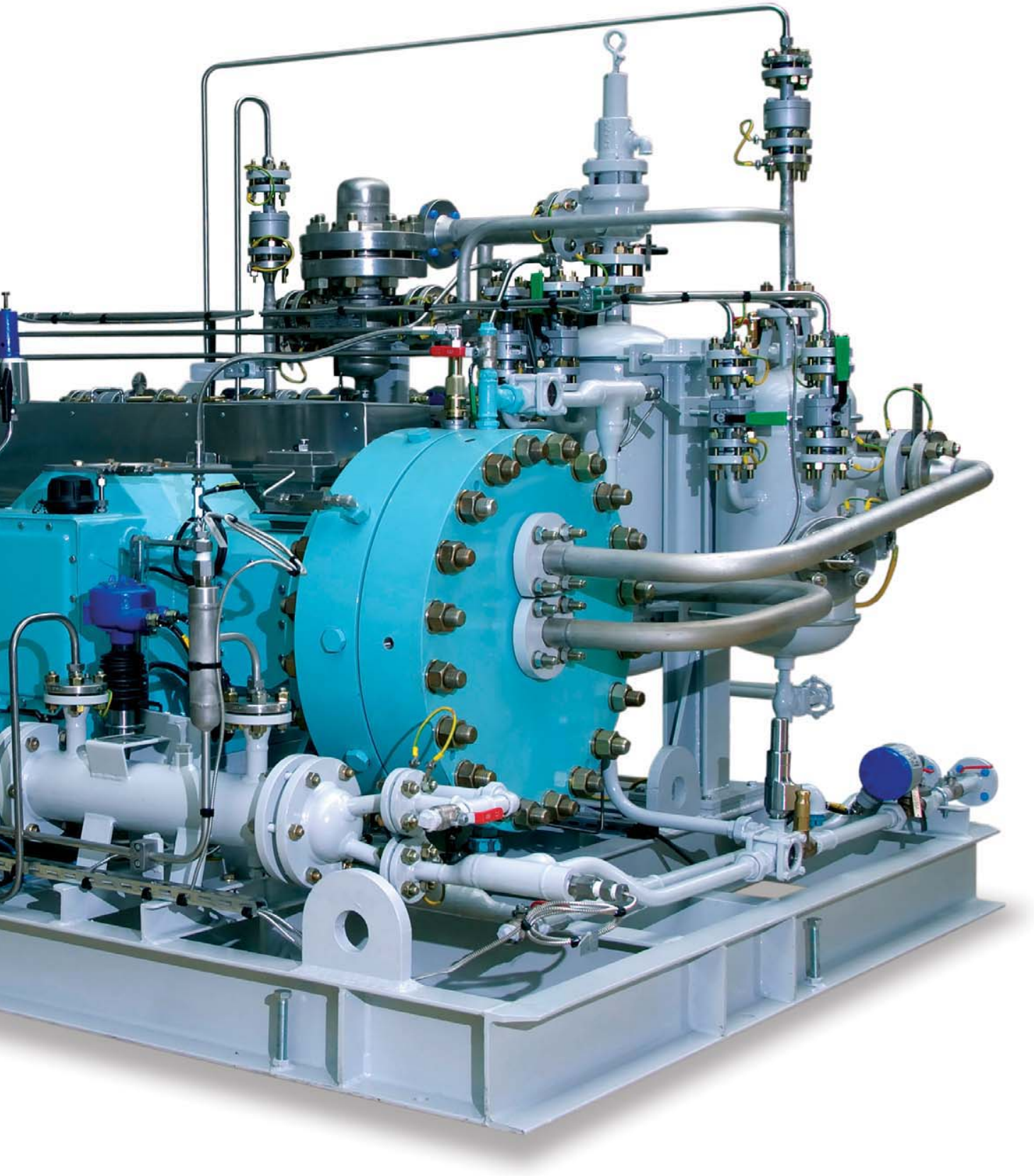
BURTON CORBLIN®
DIAPHRAGM COMPRESSOR PACKAGES



LEAK TIGHT, CONTAMINATION FREE COMPRESSION OF ALL GASES

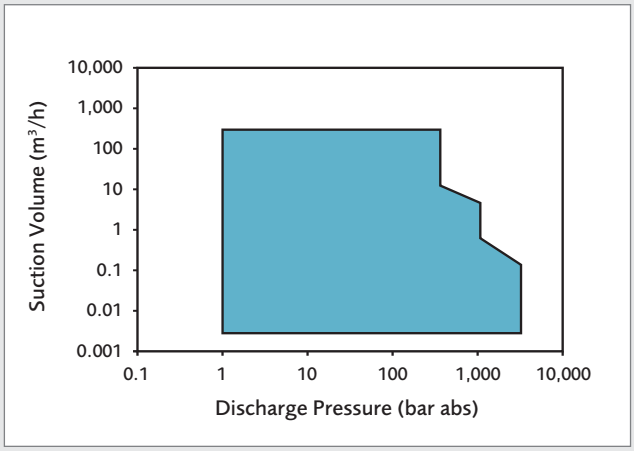
Burton Corblin® diaphragm compressors take the principles created by Henri Corblin in 1916 to leading edge levels of effectiveness, providing high compression ratios and high pressures while isolating the process gas completely from the external atmosphere.

• Pressures up to 3,000 bar (43,500 psi) • Power up to 400kW (540hp) • Inlet volume up to 200m³/h (117cfm)



HERMETICALLY SEALED, LEAK-FREE CONTINUOUS OPERATION

Burton Corblin® diaphragm compressor packages have been installed in many hundreds of situations where complete isolation of gas is vital, including production sites and laboratories handling high purity, rare, toxic, flammable, corrosive, explosive or radioactive gases. Today's designs are built on decades of experience and success.



COMPRESSION RATIOS

Extraordinary compression ratio up to 15:1 in a single stage can be achieved. Raising pressure from normal atmospheric pressure up to 600 bar in industrial applications only requires 3 compression stages. Compressor heads and crankcases are meticulously selected to ensure optimum operation at the specified pressures and temperatures.

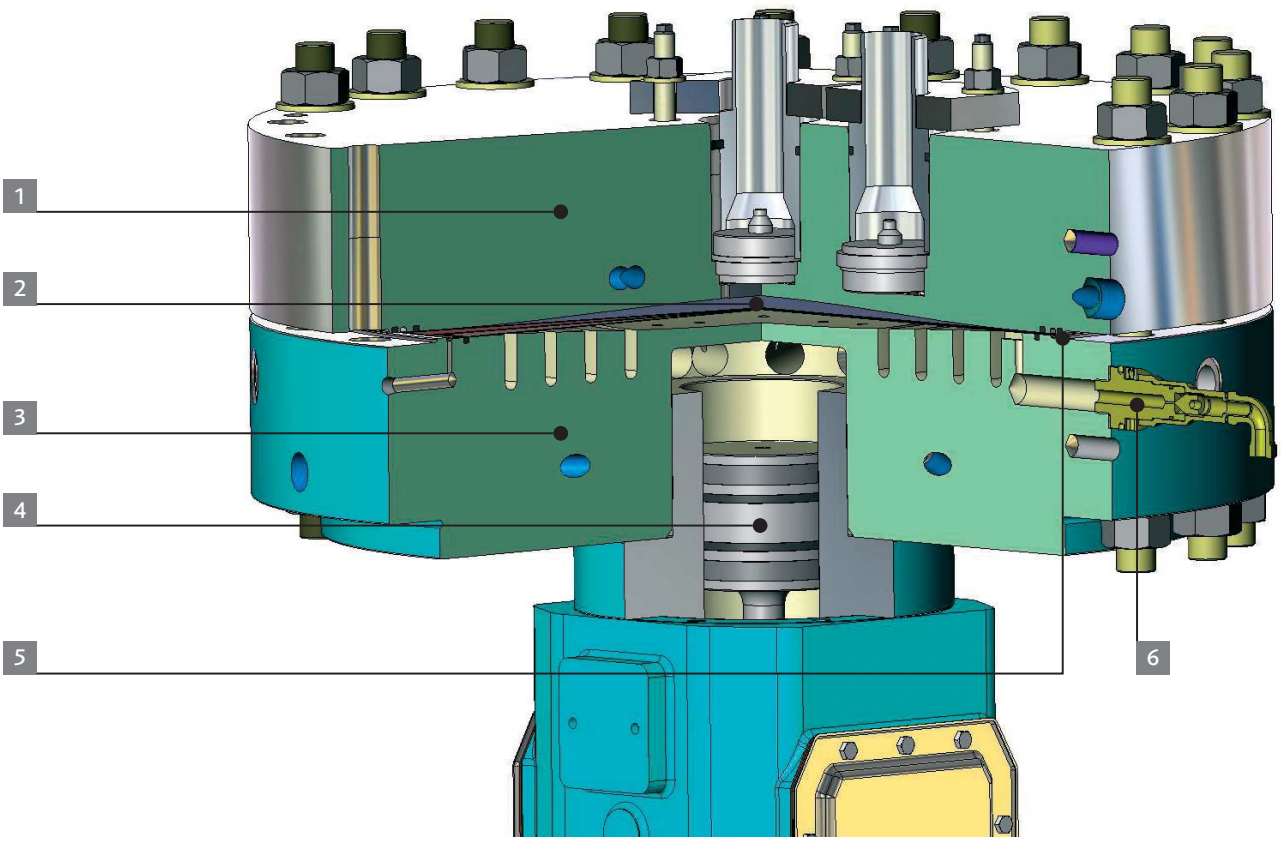
A thorough understanding of the properties and behaviour of the gas being processed is vital to the design and selection of components.

DIAPHRAGM COMPRESSION: THE WORKING PRINCIPLES

1. The **gas plate** contains the inlet and outlet check valves which control the flow and the pressure of the gas, as well as a system of channels through which coolant water is circulated. The inner surface of the gas compression plate is profiled to create the compression chamber in which the diaphragms oscillate.
2. The diaphragm assembly consists of 3 flexible layers of metal disks, one of which is in continual contact with the gas and one with the oil that drives the oscillation. Between the two is a slotted plate which operates the HIDS system (see the panel below).
3. The **oil plate** (or **hydraulic plate**) incorporates a system of grooves and holes designed to distribute the pressure of the oil evenly across the surface of the diaphragm. It also includes an oil pressure limiter which allows fine control of the pressure of the oil in the hydraulic system.
4. The piston alternately forces oil in and draws it out of the chamber to drive the oscillation. A compensating pump works in harmony with the oil pressure limiter to control the oil volume and provides maximum operating efficiency.
5. The two solid plates are sealed by a triple arrangement 'O' ring to prevent leakage.
6. Oil pressure limiter spring loaded or automatic gas pressure actuated.

CUSTOM DESIGNED AND FULLY TESTED PACKAGES

Each diaphragm compressor package we create is custom manufactured for its destination. The design of the compressor unit follows a complete technical analysis of the demands that will be placed upon it and the environmental and other factors which may influence the specification. Control systems, gas treatment, regulation components and other modules are then added. A performance test is carried out and the unit is delivered on-site ready for installation and final testing.



ZERO LEAKAGE, ZERO CONTAMINATION –

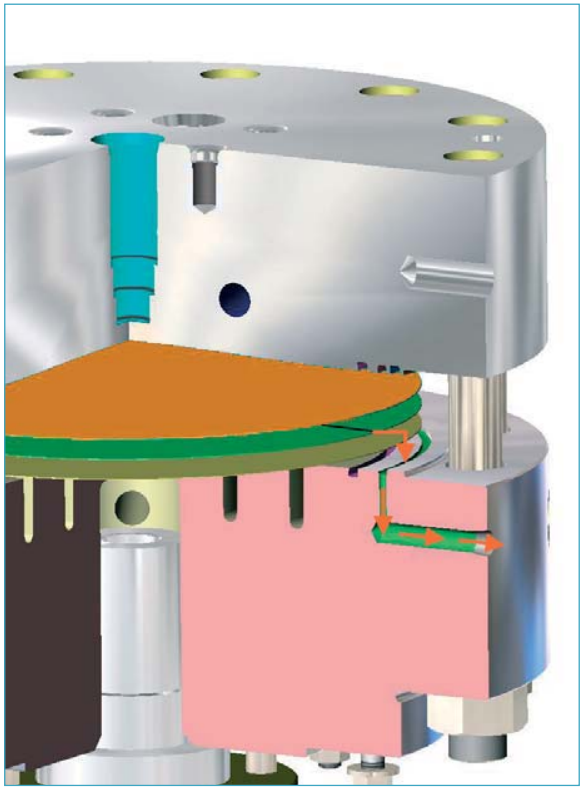
THE HIDS PRINCIPLE

The gas under compression is fully confined in a hermetic, leak-tight chamber sealed by static contact, and integrity is continuously monitored by our unique Head Integrity Detection System. The HIDS safety mechanism has made Burton Corblin® diaphragm compressors the ideal choice in critical areas such as high purity gas handling, nuclear installations or toxic gas processing.

THE HEAD INTEGRITY DETECTION SYSTEM:

TOTAL ASSURANCE FOR THE USER, COMPLETE PROTECTION FOR THE ENVIRONMENT

In Burton Corblin® diaphragm compressors, the diaphragm assembly consists of 3 layers of metal disks, with the middle diaphragm incorporating a pattern of channels. Any gas or oil which comes into contact with this layer is instantly directed to a detector which immediately shuts down the operation. If the integrity of the diaphragm is compromised, the compressor is thus stopped before any leakage or contamination can occur.



LIFETIME COMMITMENT

TOTAL GLOBAL SUPPORT

Every Burton Corblin® compressor package comes with a commitment to maintenance and upgrading that will extend the life of the equipment and improve performance whenever possible. Burton Corblin® technology never stands still, and we are dedicated to giving existing installations the benefits of our most up-to-date developments wherever possible.

MAINTENANCE CONTRACTS

We can arrange regular on-site inspections by experts to keep your compressor packages running at full efficiency and avoid unplanned, unexpected and expensive downtime. The frequency of inspection and scope of the contract will be designed to offer you the greatest possible security, cost effectiveness and peace of mind.

OEM SPARE PARTS AND SUBASSEMBLY REPAIRS

The use of Burton Corblin® parts that exactly match the specifications and parameters of the originals can avoid a host of problems. We keep details of your installation on file so that we can check, before they leave us, that the spares we send are the ones you need. Similarly, when we repair or replace a subassembly or design an upgrade, we can optimise it precisely to your requirements. From the smallest component to the replacement of control and monitoring systems with state-of-the-art versions, we believe that a complete understanding of the original installation is vital to success.

TROUBLESHOOTING

Howden engineers and our colleagues throughout the Howden Group offer worldwide access to world class expertise. Howden is a world leader in the science and engineering of air and gas handling.

BURTON CORBLIN®: THE LEADING COMPRESSOR ENGINEERING BACKED BY TOTAL AFTERMARKET COMMITMENT

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Focusing on its global expertise in fans, heat exchangers and compressors, Howden delivers first class technology, project management and customer support. Wherever our customers are located, a Howden office is close at hand. With engineering, manufacturing and sales offices throughout the world, we understand and satisfy local market needs.

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