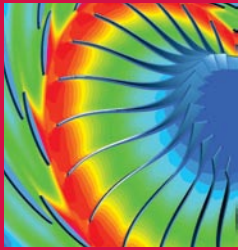


# Engineered Air, Industrial & Process Gas Centrifugal Compressors

MSG® & Turbo Air® series featuring oil-free air





**You have many distinct advantages when you partner with Cameron's Compression Systems for your centrifugal compressor needs.** Compression Systems manufactures centrifu-

gal air and gas compressors and provides aftermarket products and services for a broad customer base around the world. The cutting edge solutions we deliver for air, industrial and process gas requirements are made possible by the unique blend of product quality, engineering talent and dedicated teamwork we bring to every customer.

# CENTRIFUGAL COMPRESSORS

With our main manufacturing facility in Buffalo, NY, USA, located near Niagara Falls, and distribution in more than 80 sales and service locations worldwide, Cameron's Compression Systems is a global company with a singular commitment meeting your needs with superior centrifugal compressor technology while exceeding your expectations with unequaled service and support.



## MSG® and Turbo Air® Series Engineered Compressors

The following pages highlight our Turbo Air® / MSG® (Multi-stage Geared) Engineered Compressor Series which offers outstanding design flexibility.

MSG® compressors are application engineered with a number of available configurations:

- Flows from 2720 m<sup>3</sup>/hr / 1600 CFM to 255,000 m<sup>3</sup>/hr / 150,000 CFM
- Horsepower capacity to over 33,500 kW / 45,000 HP
- Discharge pressures to 83 bar-g / 1200 psig

The Turbo Air® engineered compressors are completely packaged on a common base for easy installation and are available in a number of configurations:

- Flows from 2720 m<sup>3</sup>/hr / 1600 CFM to 59,500 m<sup>3</sup>/hr / 35,000 CFM
- Horsepower capacity up to and over 18,650 kW / 25,000 HP
- Discharge pressures to 83 bar-g / 1200 psig



## COMPRESSION SYSTEMS – A HISTORY OF INNOVATION

- 1955** – Joy Manufacturing Co. established facility in Buffalo, NY USA
- 1960** – First small integral gear centrifugal compressor introduced
- 1965** – Introduced the first packaged centrifugal compressor
- 1971** – First 4-stage, nitrogen recycling machine for liquefaction of industrial gases
- 1980** – Introduced the first microprocessor controlled compressor
- 1987** – Purchased by Cooper Industries, Inc. – major capital investments made
- 1988** – First 7-stage dual service machine with three pinions in each gear box
- 1994** – Introduced the Turbo Air® 2000 incorporating the fourth generation of micro-processor-based control
- 1995** – Cooper Cameron Corporation established
- 1997** – Introduced Turbo Air® 3000 – major capital investments made
- 1999** – introduced Turbo Air® 6000
- 2001** – Introduced Turbo Air® Cooled 2000
  - Entered gas process market
  - Introduced Turbo Air® 11000
  - Introduced Turbo Dry Pak
  - Introduced Vantage Control Panel
- 2004** – Introduced MSG Alpha™ Centrifugal Gas Compressor
- 2004** – Introduced Maestro™ Series of Control Systems
- 2005** – Introduced Turbo Air® 2020
- 2006** – Introduced MSG® 80





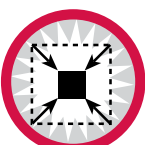



## THE ADVANTAGES OF CENTRIFUGAL COMPRESSOR TECHNOLOGY

Integral gear centrifugal compressors represent the latest technology offering significant advantages over outdated, less-efficient and more costly compressor designs. These advantages are inherent in the centrifugal design and enhanced even further by Compression Systems' more than 50 years of centrifugal expertise.



Compare Compression Systems' innovative centrifugal compressor technology with other machines such as positive displacement compressors and the advantages are clear:

COMPRESSION SYSTEMS CENTRIFUGAL COMPRESSORS		OTHER COMPRESSORS
<b>LOW MAINTENANCE</b> 	<ul style="list-style-type: none"> <li>• No wearing parts requiring regular replacement</li> <li>• Oil filter elements and seal gas filter elements are easily replaced on-line</li> </ul>	<ul style="list-style-type: none"> <li>• Requires regular maintenance such as replacement of piston rings, gland packing and valve plates</li> <li>• Results in high operating expenses and significant machine downtime</li> </ul>
<b>OIL-FREE PROCESS GAS</b> 	<ul style="list-style-type: none"> <li>• 100% oil free</li> <li>• Prevents contamination of system</li> <li>• Meets strict downstream requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Oil filters must be installed at discharge</li> <li>• Potential for oil carryover to foul the process</li> </ul>
<b>NO PULSATION</b> 	<ul style="list-style-type: none"> <li>• Pulsation free and require no dampers</li> </ul>	<ul style="list-style-type: none"> <li>• Require the use of large pulsation dampers to reduce pressure fluctuations</li> </ul>
<b>OPTIMUM CONTROL</b> 	<ul style="list-style-type: none"> <li>• Feature inlet guide vane control plus bypass for consistent gas delivery under all conditions</li> </ul>	<ul style="list-style-type: none"> <li>• The use of cylinder unloading for stepped flow control can result in complicated process control due to sudden changes in capacity</li> </ul>
<b>COMPACT INSTALLATION FOOTPRINT</b> 	<ul style="list-style-type: none"> <li>• Capable of handling substantially higher volumes of gas in one or two small casings for a smaller overall package</li> </ul>	<ul style="list-style-type: none"> <li>• May have 4 or 6 cylinders requiring more space for installation</li> </ul>
<b>NO VIBRATION</b> 	<ul style="list-style-type: none"> <li>• Essentially vibration-free</li> <li>• Require only a pad suitable for supporting the static weight of the package</li> </ul>	<ul style="list-style-type: none"> <li>• Require large and deep foundation to handle heavy weight and unbalanced forces</li> <li>• Precautions must be taken to prevent transmission of vibration to other equipment</li> </ul>

## VARIABLE INLET GUIDE VANES



- Optional variable inlet guide vanes can offer power savings of up to 9%
- Inlet vanes impart a whirling motion to the inlet air flow in the same direction as the impeller operation, reducing the work input
- Net power savings at reduced flow or on days colder than the design temperature
- Inlet vanes are positioned close to the impeller to achieve maximum benefit

## OIL-FREE AIR AND GAS

- Prevents contamination of your system
- Removes the potential for compressed air pipeline fires caused by oil carryover
- Eliminates costly waste disposal problems associated with oil-laden condensate
- Eliminates the expense and maintenance of oil removal filters

## HIGH RELIABILITY

Compression Systems' centrifugal compressors are designed to be extremely reliable with the following features:

- Conservative high quality gear design
- Long life pinion bearing design
- Thrust loads absorbed at low speed
- Stainless steel compression elements

## THE LOWEST COMPRESSOR OPERATING LIFE CYCLE COST

Cameron systems' centrifugal compressors provide better overall operating efficiency than positive displacement or other centrifugal compressors.

- Excellent efficiencies at full load, part load and no load
- Low maintenance cost
- Increased uptime from high reliability design (limits the need for multiple unit installations for basic reliability reasons)
- No sliding or rubbing parts in the compression process causing wear and thereby efficiency loss

## EASY OPERATION/MAINTENANCE

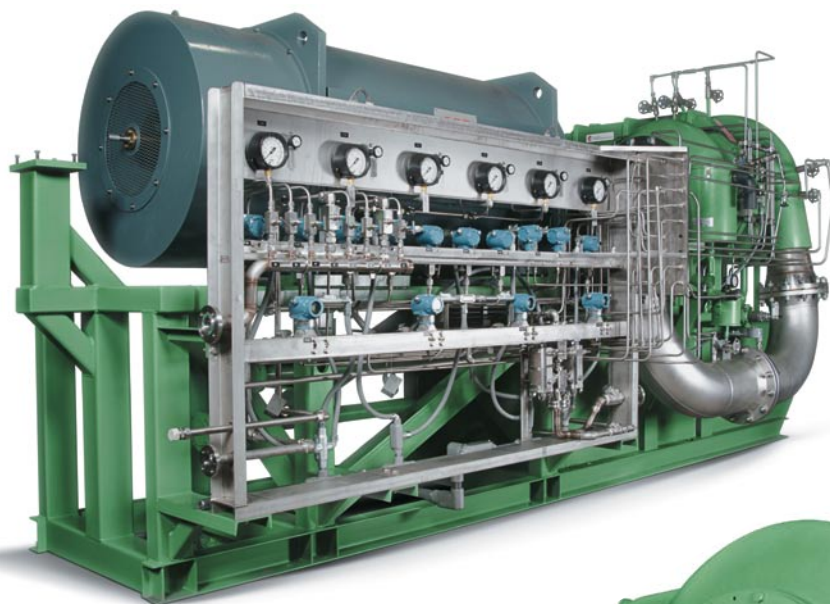
- State-of-the-art controls with a choice of exclusive control systems
- Totally automatic operation for any operating condition
- Self diagnostic
- No wearing parts requiring periodic changes or replacement in the compression elements
- No downstream oil removal filters to clean
- Accessible horizontally split gear box for quick inspection
- Intercooler and aftercooler bundles easily removed for cleaning

## SIMPLE INSTALLATION

- Compressor, lubrication system, intercoolers, shaft coupling, coupling guard, interconnecting piping, etc. all on a common base
- Installation on a slab foundation in the shortest possible time
- Easy component accessibility
- Great flexibility to tailor a machine to your needs
- Minimizes floor space required
- Pulsation free

## THE RIGHT COMPRESSOR FOR YOUR NEEDS

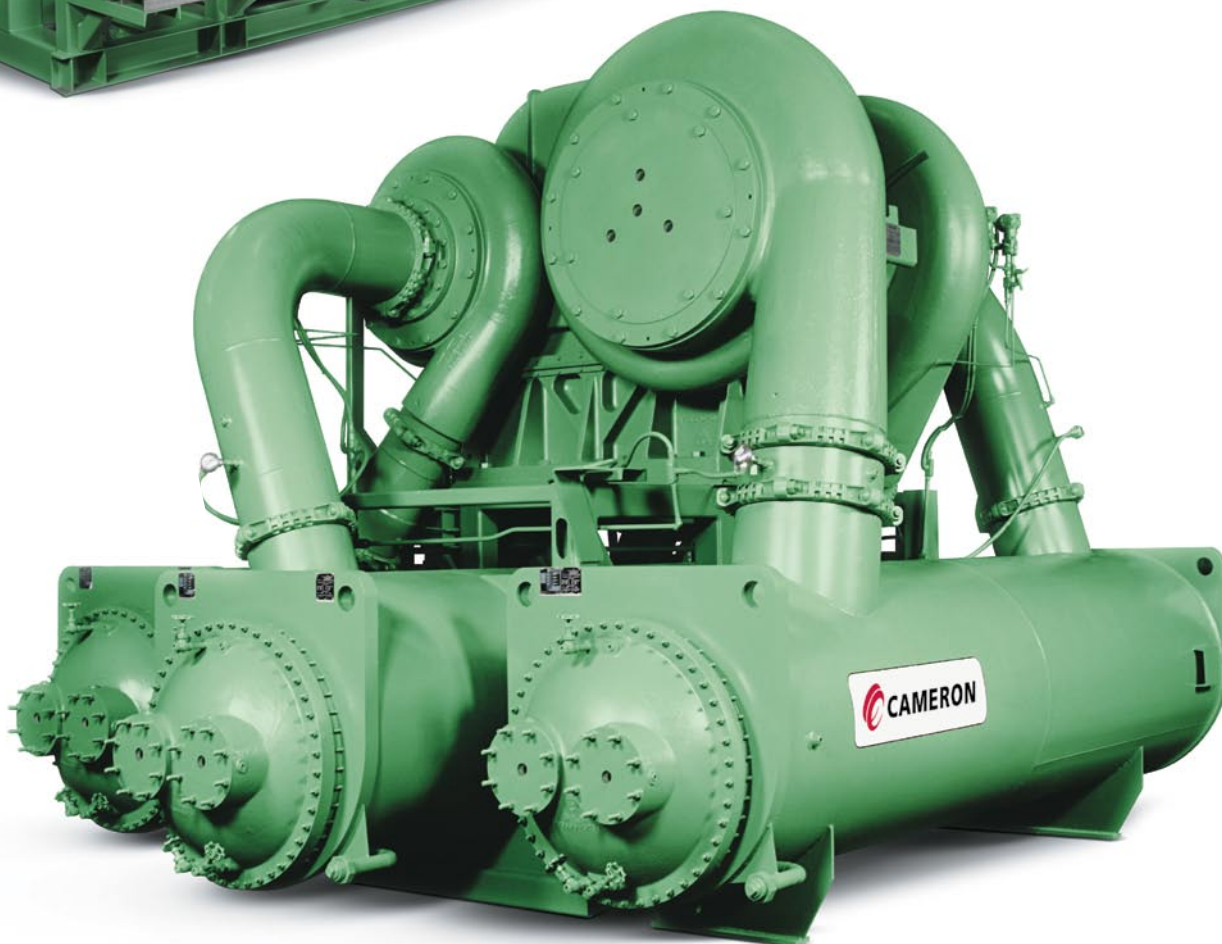
No matter what your application, there is a centrifugal compressor from Compression Systems to meet your exact requirements. With over 10,000 installations worldwide, on nearly every continent, Compression Systems' products are proven in a wide variety of industries.



**3R2MSGPB-5G/30**  
**Gas Compressor** (left)

APPLICATION: Located in Algeria;  
used as a boil-off compressor.

SPECIFICATIONS: Flow = 20,000 kg/hr  
Discharge Pressure = 7.47 kg/cm<sup>2</sup>A

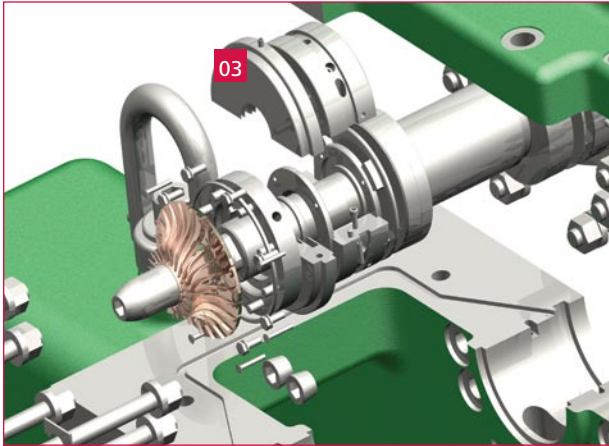


**4MSG-16/15**  
**Air Compressor** (below)

APPLICATION: Located in China; used as a  
main air compressor for an air separation  
plant

SPECIFICATIONS: Flow = 59,000 Nm<sup>3</sup>/hr,  
Discharge Pressure = 1241 kPaA.





### ENGINEERED AIR APPLICATIONS

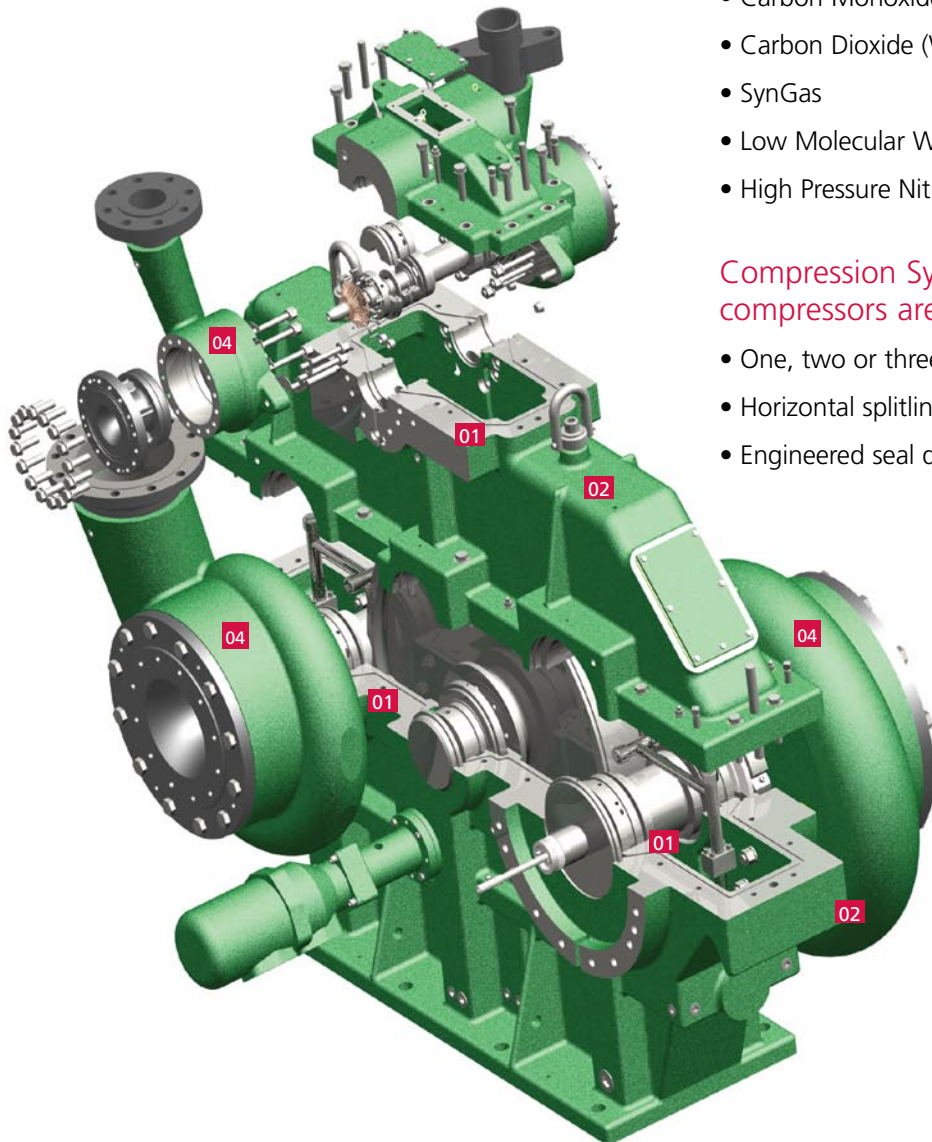
- Industrial Gases
- Instrument Air
- American Petroleum Institute (API) Standards
- Soot Blowers
- Large Plant Air
- Power Industry Related

### GAS COMPRESSOR APPLICATIONS

- Fuel Gas Boosters
- Natural Gas Gathering
- Hydrocarbon Refrigeration Gas
- Carbon Monoxide
- Carbon Dioxide (Wet or Dry)
- SynGas
- Low Molecular Weight Recycle Gas
- High Pressure Nitrogen

### Compression Systems' centrifugal compressors are superior by design

- One, two or three rotors, up to 6-stages per gear box
- Horizontal splitline(s) for easy access to parts
- Engineered seal designs



#### Cross Sectional View of a Typical 3-rotor Process Gas Compressor

- 01:** One, two or three rotors up to 6-stages per gear box
- 02:** Horizontal splitline(s) for easy access to parts
- 03:** Engineered seal designs
- 04:** NACE compliant scrolls and inlets may be manufactured from steel or stainless steel



### HORIZONTALLY SPLIT GEARBOX FOR EASY MAINTENANCE

- Allows inspection or replacement of gears, bearings and oil seals by simply lifting a cover
- No disassembly of piping or heat exchangers is necessary
- Periodic inspections and maintenance are made easy
- Minimal maintenance, maximum uptime

### BULL GEARS FOR OPTIMUM SPEED AND EFFICIENCY

- Allows each pinion to operate at optimum speed as determined by the flow and efficiency characteristics of the impeller
- Connected directly to the compressor by a low speed coupling
- Gears are high speed, precision helical-type designed to meet or exceed AGMA standards quality



5 Pad Tilting Pad Bearing Assembly

### TILTING PAD PINION BEARINGS FOR HIGH RELIABILITY

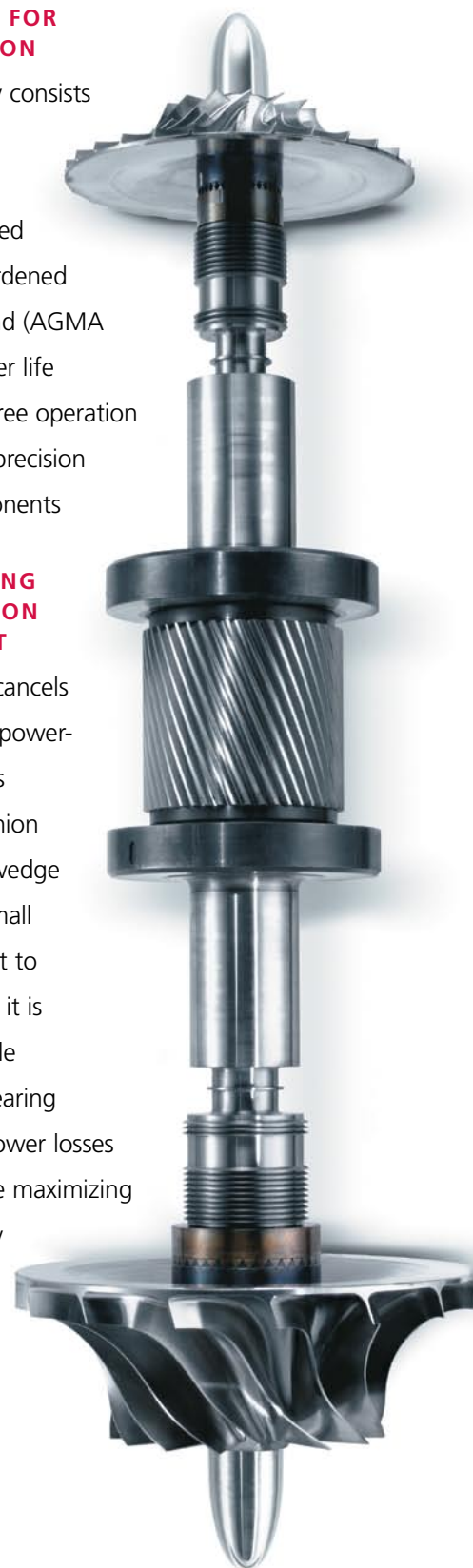
- 5-pad journal bearings have the highest stability and lowest vibration level for high speed shafts, which are subjected to variable loading over a wide range
- High reliability over the entire operating range, from full load to no load
- Pressure lubricated and steel backed for maximum reliability

### ROTOR ASSEMBLY FOR SMOOTH OPERATION

- Each rotor assembly consists of a pinion shaft to which one or two impellers are attached
- Pinion gears are hardened and precision ground (AGMA 13 quality) for longer life
- Smooth, vibration free operation is assured through precision balancing of components

### TAPERED RIDER RING THRUST COLLARS ON THE PINION SHAFT

- Centrifugal design cancels out the majority of power-robbing thrust loads
- Thrust collars on pinion shaft create an oil wedge which carries the small remaining net thrust to the bull gear where it is absorbed by a simple low-speed thrust bearing
- Reduces gearbox power losses to a minimum while maximizing mechanical integrity



## Seal Design Options

Compression Systems offers a complete range of seal arrangements to meet the specific needs of your application.

### Standard Labyrinth Style Air/Gas and Oil Seals

- Used with atmospheric air and low pressure gases
- Effectively confine air in the stage casings and prevent contamination of the gas stream from lubricating oil
- Seal is non-contacting and not subject to critical shaft wear
- Does not require periodic replacement
- Does not require inspection for 5-6 years under normal use



Babbitted Air Seal

### Babbitted Style Air/Gas Seals

- Used with high pressure and nitrogen applications
- When used with educting, these seals have an excellent recovery rate
- Knife edges on pinion cut into the babbitt material on seal for closer fit and very low leakage
- Babbitt material has a high tin content for lubricity
- Seal maintenance is not required for 5-6 years under normal use
- Ports can be machined in the seal to recover process gas or buffer the seal during periods of non-use

Labyrinth Air Seal

Labyrinth Oil Seal



### Carbon Ring Seals

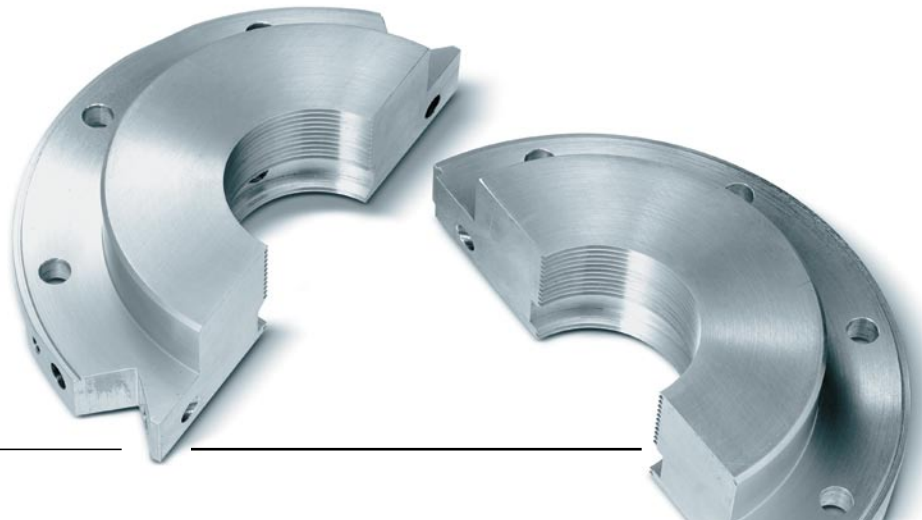
- Compression Systems' design has two solid, floating carbon rings with close shaft clearance
- Still a non-contacting seal, so periodic maintenance is not required
- Complete assembly bolts inside the scroll and is accessed by removing the impeller
- Leakage control is significantly better than the babbitt seal for the same pressure

### Single Dry Face Seal

- Used on hydrocarbon and process gases where leakage is not allowed or high pressure applications where labyrinth seals cannot provide enough leakage protection
- Seal system is completely oil-free
- Buffer gas pressure can be set so that no buffer gas enters the process but a small amount of process gas vents out of the system

### Other Types of Seals

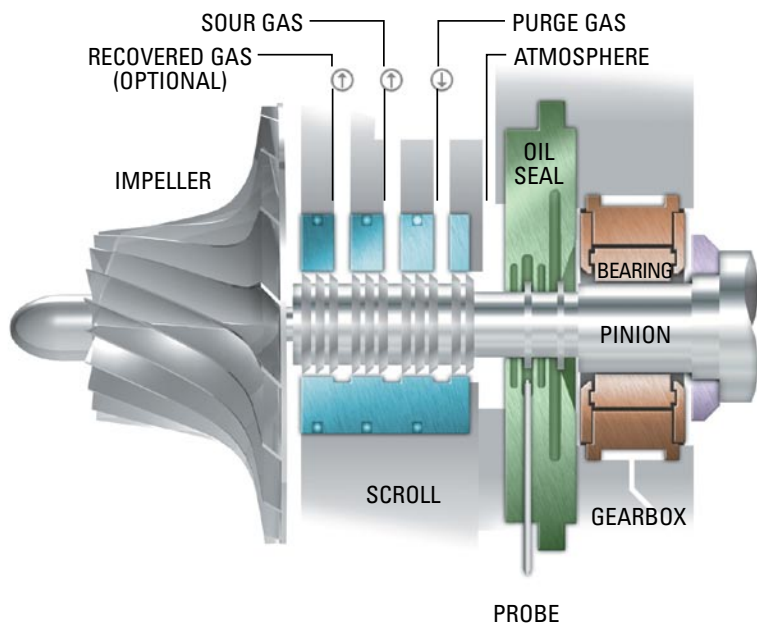
- Tandem Seal with Buffered Back-up Seal
- Oil Bushing Seal with Separate Seal Oil System



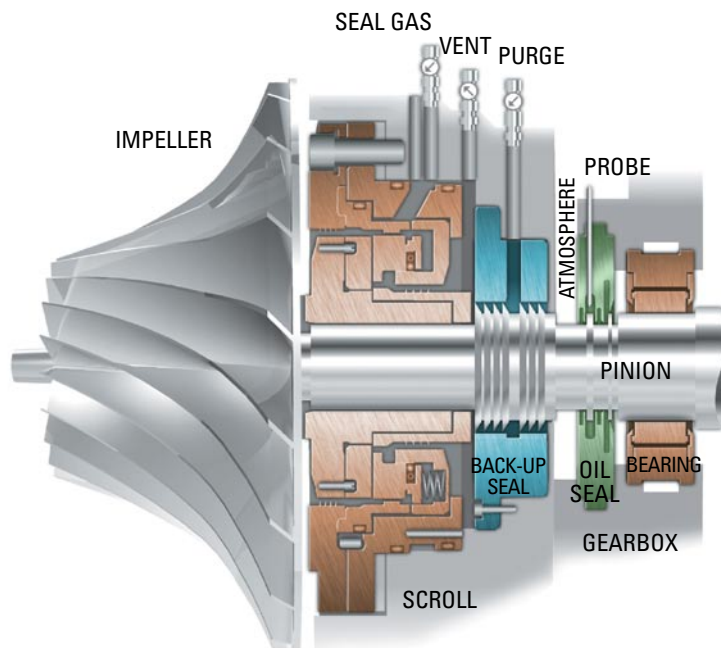
## Gas Seal Options for All Your Process Applications

Multiple gas seal designs are available for a wide range of process gases and leakage requirements. Compression Systems can suggest a seal type based on your process, or design the seal of your choice into the package. Additional seal designs are available – all major seal suppliers can be used.

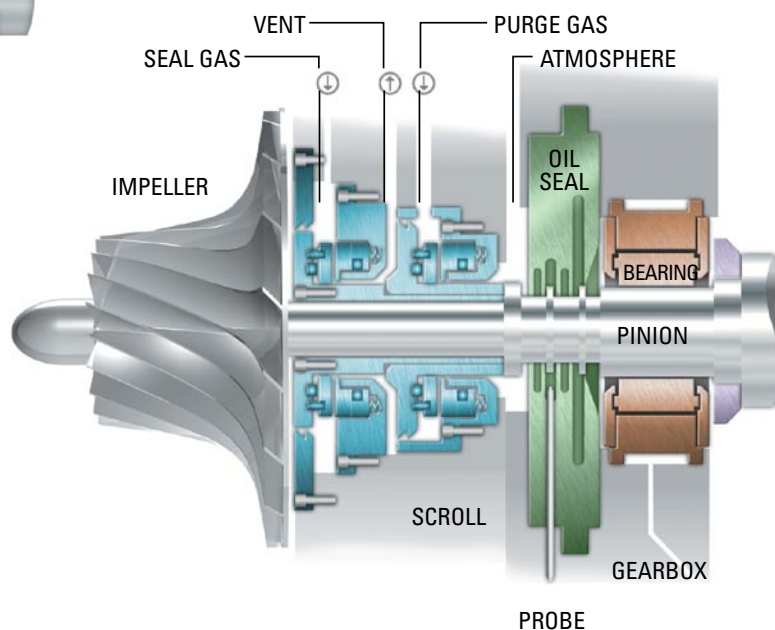
The standard Compression Systems' dry face seal uses a floating self-centering rider. The clearance fit allows the seal to be easily removed and installed without puller tools. The seal comes as a complete assembly with an installation plate. The drawing shows some of the mechanical details.



Multi-port babbitted seal with purge



Single dry face seal with a babbitted back-up



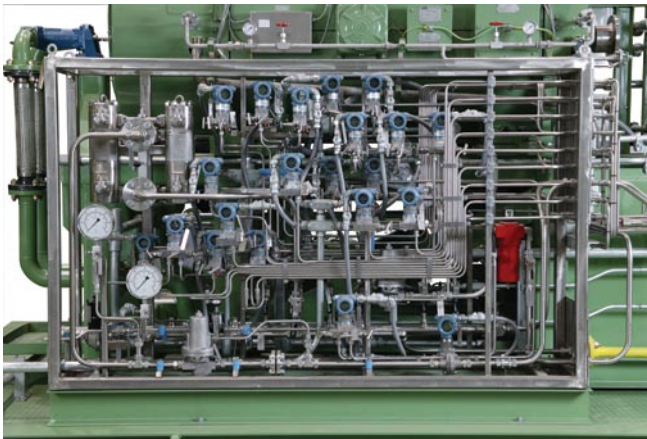
Tandem dry face seal with integral labyrinth



## Process Gas Seal Support

Gas seal support systems are designed, built and tested per API-614. System designs can be based on Differential Pressure Control, Flow Control or other methods. The Scope of supply is virtually unlimited; fully automatic, manual or customer specified systems can be engineered for any gas seal type.

Systems are designed with instrumentation to monitor seal condition. Filters and accessories are supplied with sufficient instruments to plan maintenance and minimize down time. The goal is to save you time and money by providing worry-free operation of your equipment and simple maintenance when required.



Gas seal transmitter rack with 2-of-3 voting, seal gas filtering and purge gas filtering

## Superior Aerodynamic Performance

### UNIQUE IMPELLER DESIGNS

Impellers, diffusers and scrolls are uniquely designed to meet your specific needs. Examples of our impellers include:

#### Sigma Radial Impeller

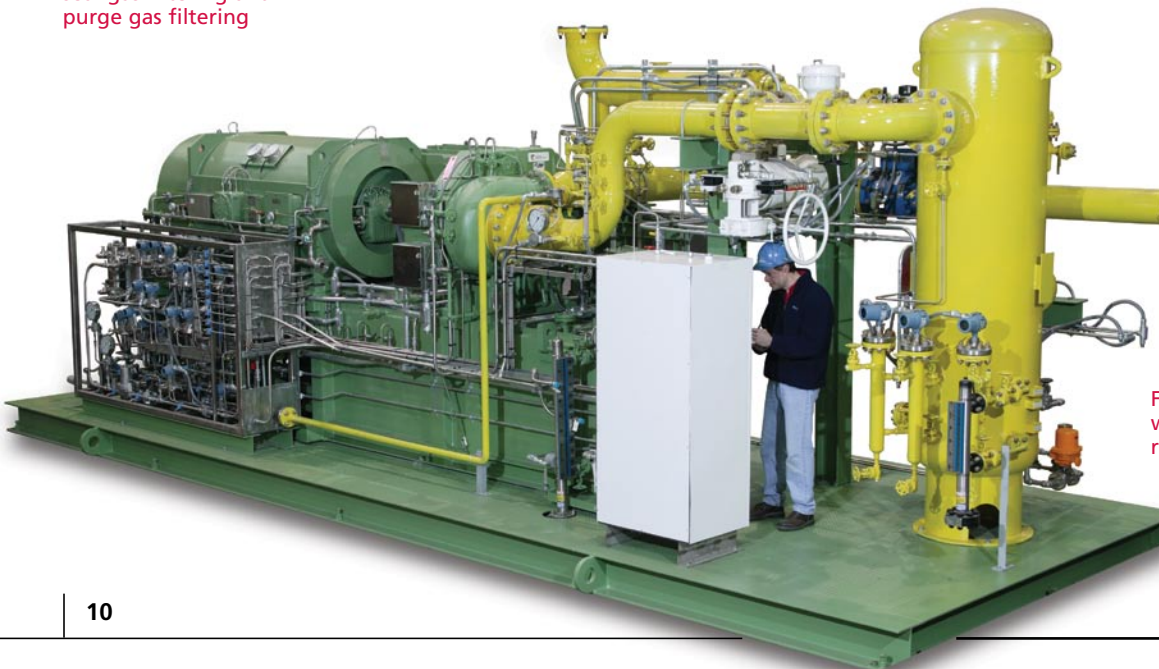
- Combines the best features of straight, radial-bladed and backward leaning impeller designs

#### Custom Engineered/Milled

- Custom designed impellers utilize Computational Flow Dynamics (CFD) design tools for aerodynamic design and Finite Element Analysis (FEA) for mechanical design integrity
- Produces impeller design that is optimum for its application
- Overall savings can be as great as 5% increase in efficiency

#### Radial Sigma Radial

- RSR available for added flexibility
- Provide more compression ratio



Fuel gas booster skid with scrubber, bypass and recirculation piping

## Control Systems

Compression Systems can provide the right control system engineered for your applications.

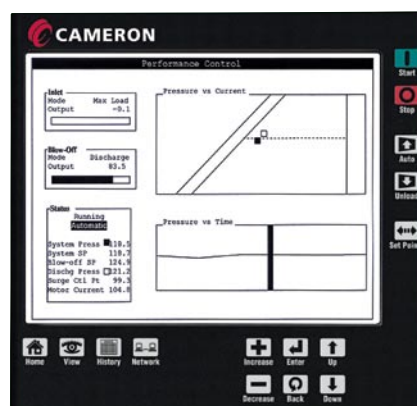
### MAESTRO™ SUITE OF CONTROLS

Maestro™ is the new suite of control systems from Compression Systems. The Maestro™ suite contains a model that is sure to be in tune with your needs.



### MAESTRO™ LEGEND

- Provides comprehensive control of your centrifugal compressor and can be configured to coordinate the operation of multiple compressors
- Maintain plant pressure to within 0.17-0.14 bar/1-2 PSI, which allows overall pressure reduction to improve efficiency and reduce air leakage losses saving energy dollars



### MAESTRO™ PLC

- Utilizes an open architecture Allen Bradley PLC which enables you to use off-the-shelf components that match other panels in your plant
- Available in three control methods: Constant Pressure, Auto/Dual, and Mass Flow



### MAESTRO™ EZ

- An economical control system for basic compressor operation
- A standardized PLC solution with broad built-in capability designed for easy use





Allen Bradley PLC based control center with PanelView interface

## MAESTRO™ PLC BASED CONTROLS – ALLEN BRADLEY

### Customer Defined PLC Controls

PLC based systems are used for packages with high I/O counts, multiple gas circuit control loops and multiple processes. PLC's by all major industrial suppliers are available. We can design, program, and supply your specified PLC system mounted and wired to your compressor package.

- PLC system is fully tested by our Control Engineering department before shipping
- Logic diagrams and programming software are standard
- Control systems can be locally mounted on the skid, designed with local I/O and remote processors, or any buyer-defined arrangement
- Control system enclosures and wiring are available for US and IEC applications, Class 2 / Zone 2 and non-hazardous installations



Siemens S7-400 series PLC. IP-54 enclosure with profibus fiber optic connecting modules.

## Air Flow Arrangement

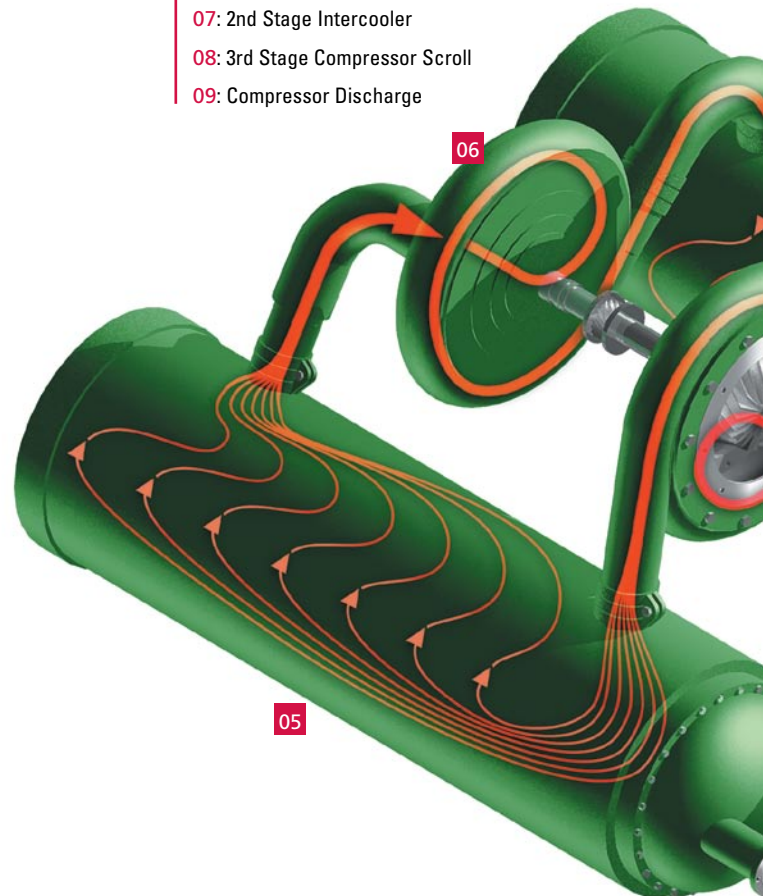
Compression Systems' centrifugal compressors feature a superior arrangement of air flow components.

Advantages of this arrangement include:

- Air movement is directed so turbulence-induced friction is reduced
- Air is cooled after every stage to assure a high isothermal efficiency

### Air Flow Diagram

- 01: Compressor Inlet
- 02: 1st Stage Compressor Scroll
- 03: Water In
- 04: Water Out
- 05: 1st Stage Intercooler
- 06: 2nd Stage Compressor Scroll
- 07: 2nd Stage Intercooler
- 08: 3rd Stage Compressor Scroll
- 09: Compressor Discharge



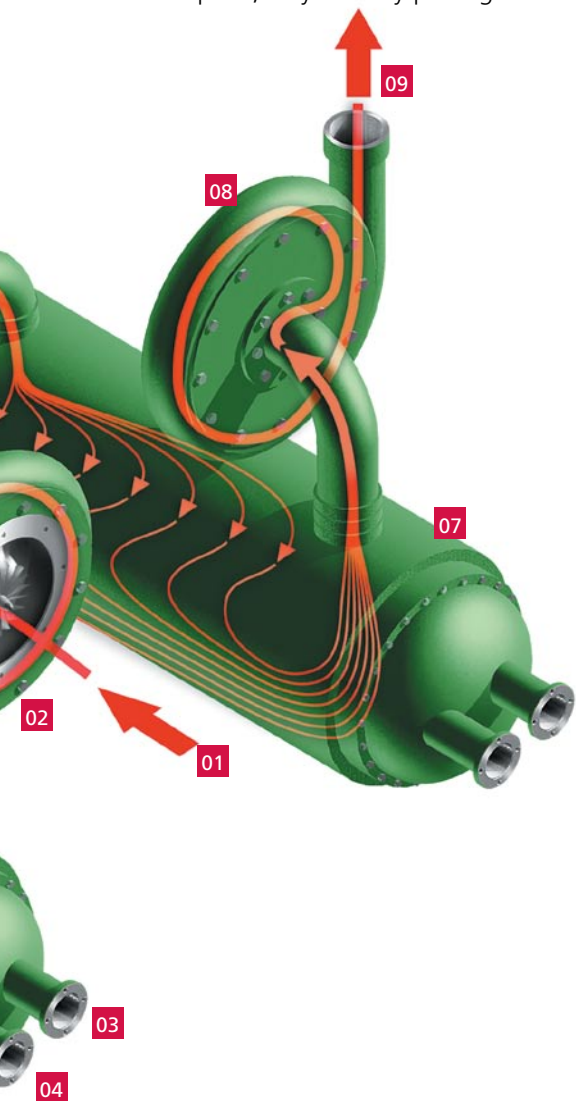


### A Better Packaging Concept

Compression Systems' cutting edge packaging concept gives you great flexibility to tailor a centrifugal compressor to your needs while simplifying installation and maintenance. Our TA and MSG packages include:

- A lubrication system
- Intercoolers
- Shaft coupling
- Interstage piping
- Driver
- Control panel

We can build standard compressor packages or specialized API-672/API-617 packages, all on a common baseplate, very sensibly packaged.



### Advanced Lubrication System

Compression Systems' standard self-contained, low pressure lubrication system:

- Includes an oil reservoir, mechanical oil pump, electric full-flow auxiliary oil pump, fixed bundle oil cooler, single full-flow oil filter, safety devices and instrumentation for safe compressor operations
- Is assembled and is packaged on a compressor base frame when compressor and intercooler(s) layout permits
- Can be sized to serve the main driver
- Can be designed to meet:
  - Customer specifications
  - API-672 (Packaged Centrifugal)
  - API-617
  - API-614
  - Process Industry Procedures (PIP)
- Includes interconnecting piping between the lubrication system and compressor when compressor, intercooler(s) and main oil pump arrangement permits

### Intercoolers Guarantee Maximum Heat Transfer

Our ASME-coded intercoolers (PED, China Code, as required) provide efficient cooling between stages and are designed to be accessible for inspection and cleaning.

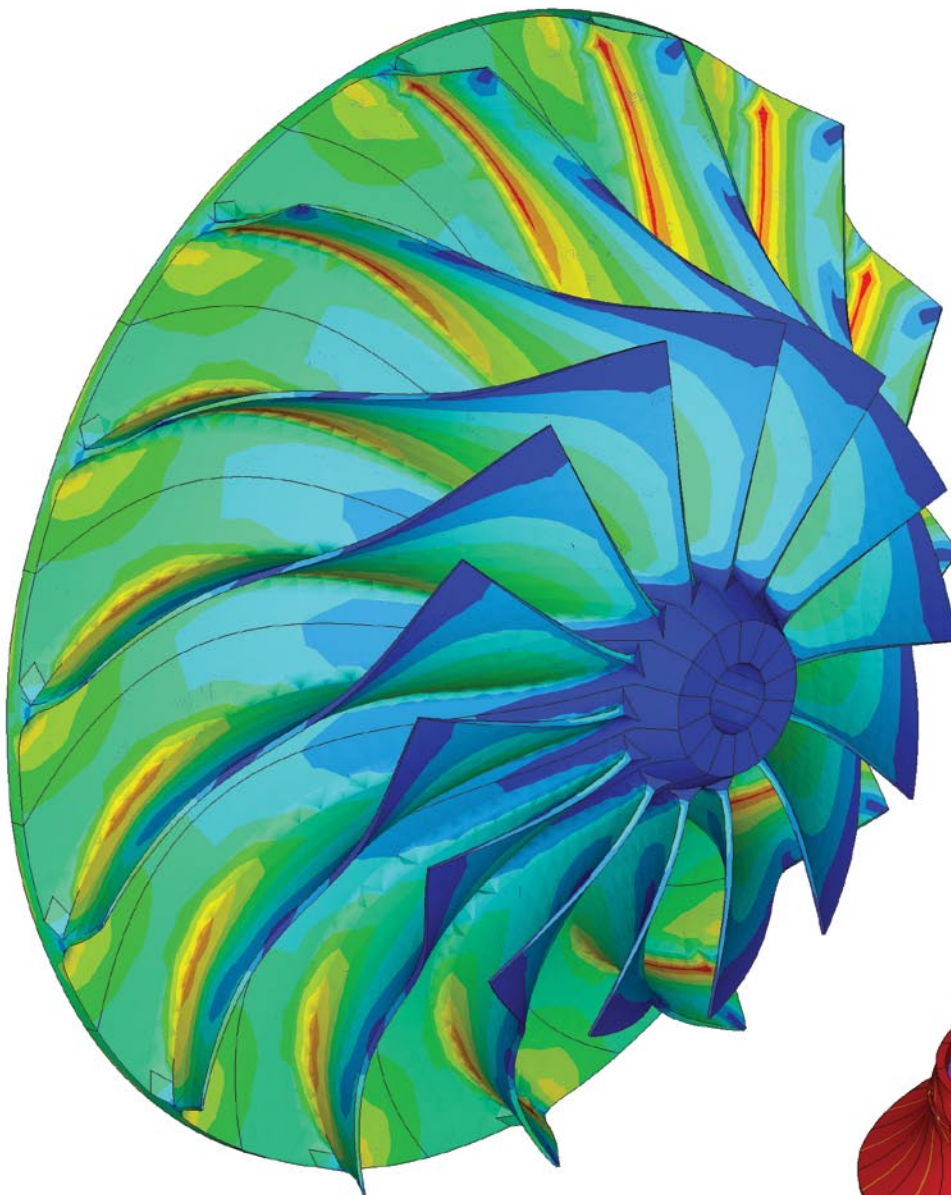
- Air-in-shell, water-in-tube design puts water where the cleaning is easy, an important consideration in areas with poor water conditions
- Extended surface, plate-fin design provides maximum heat transfer with minimum space requirements
- Accessible, smooth bore tubes are easily rodded with bundles in place
- No disassembly of any other part of the compressor is necessary to perform maintenance



## EXCELLENCE IN ENGINEERING

From air separation to large plant air requirements to a variety of process gas applications, Compression Systems' engineers have a broad range of experience in designing systems for customers around the globe.

Our team of engineers and technicians are continually adding to our experience base in a wide variety of applications. These professionals love a challenge in air and process gas applications and are driven to deliver the best solution every time.



### Impeller Stress Analysis (left)

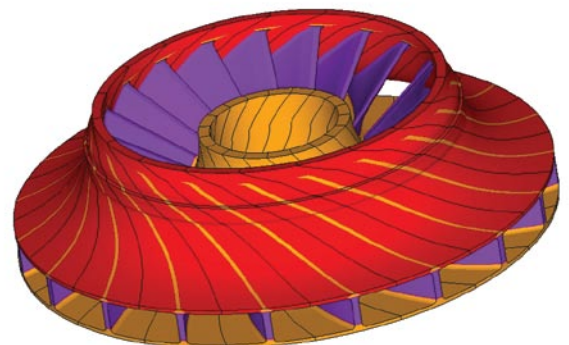
FEA of an impeller at operation speed. All 5 axis impellers are analyzed with FEA to ensure robust designs.

### Closed Impeller (below)

A finite element model of a shrouded impeller.

### MSG® Cutaway (right)

CAD rendering of a compressor gear box showing internal bullgear and rotor assemblies.



### THE LATEST TECHNOLOGY IN DESIGN ENGINEERING

#### 1D, 2D and 3D CFD software

- Preliminary design – sizing and performance prediction
- Detailed design – design of blade shape
- Analysis – 3D Unsteady Navier-Stokes Flow Analysis

#### Mechanical Analysis

- Finite Element Analysis – stress and resonance calculations
- Rotordynamics – bearing and vibration analysis
- Mechanical Design – solid modeling

### COMPREHENSIVE TESTING AND R&D

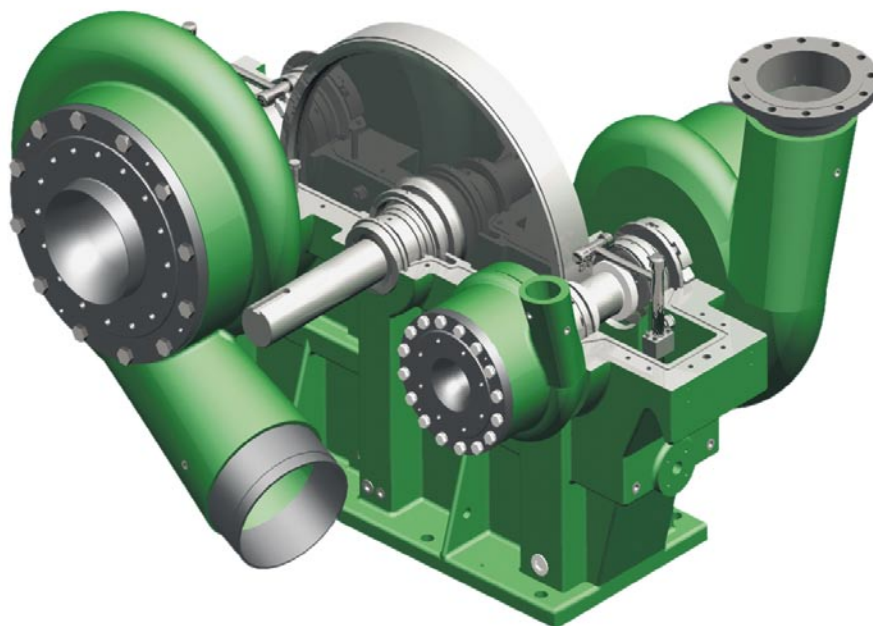
Cameron engineers have access to the resources of our dedicated lab facilities and extensive research and development programs to ensure your compressor delivers the optimum design for your requirements.

### Dedicated Manufacturing Capabilities

Compression Systems' manufacturing facilities are among the most advanced in the industry, utilizing leading technology, operated by an experienced and skilled workforce. Everything we do at our ISO-9001:2000 facilities is aimed at improving quality and shortening delivery times.

### MANUFACTURING TECHNOLOGY HIGHLIGHTS

- CAD/CAM systems
- Vertical turning centers
- Impeller milling centers – 5-axis
- Horizontal boring centers
- Cell manufacturing and work team techniques
- State-of-the-art testing facilities





## COMPREHENSIVE QUALITY

From start to finish, from the factory to the field, in every area, for every employee, quality is the rule. You would expect that from a world class manufacturer such as Compression Systems. Our objective is to exceed your expectations.



## Our Quality Policy

The key elements of Compression Systems' quality policy are:

- Fully meeting customer expectations and requirements
- Providing products that equal or exceed industry and government standards
- Providing our customers with the best value delivered
- Focusing on long-term customer satisfaction
- Striving for continuous improvement
- Understanding quality is everyone's job

## Our Quality Program

### ISO-9001:2000 CERTIFIED QUALITY MANAGEMENT SYSTEM

- Systematic approach to continuous improvement
- 15 Trained ISO Internal Auditors

### ISO-14001:1996 CERTIFIED ENVIRONMENTAL MANAGEMENT SYSTEM

- Dedication to reducing and eliminating waste
- Providing a healthy and safe work environment for all employees
- Meeting or exceeding all environmental, health, and safety regulatory requirements

### SIX SIGMA TRAINING

- Addressing customer critical to quality issues
- Process and product improvements most beneficial to our customers
- Training in sophisticated problem-solving tools



## SUPPLIER QUALITY MANAGEMENT

- Maintain an approved vendors List
- New suppliers reviewed and evaluated prior to being added
- Supplier quality performance tracked through the non-conforming product database within our business system
- Periodic supplier performance evaluations

## CE MARK CERTIFICATION

- TAC2000 family of compressors was first to be certified
- Other plant air units and some engineered compressors have been certified

## PRESSURE EQUIPMENT DIRECTIVE – PED

- Equipment meets the PED requirements for the design and manufacture of pressure equipment and assemblies

## CHINA PRESSURE VESSEL CODE CERTIFICATION

- Key suppliers have been certified to meet the China Pressure Vessel Code
- Multiple units have been shipped meeting these requirements



## Added Quality Assurance from Advanced Testing Facilities

To guarantee performance to both customer and manufacturer specifications, every Compression Systems' design is fully tested for aerodynamic and mechanical performance by highly skilled technicians before it leaves the factory.

### NINE TEST STANDS

Our test facility in Buffalo, New York includes nine test stands.

- Variable speed drives to simulate actual operating speed and meet the speed requirements of the ASME PTC-10 type 2 test
- Package testing of machines up to 11,000 HP (8,200 KW) is possible
- The test stands are separated into three separate bays allowing one machine to be set-up while another is tested
- Computer controlled cooling towers are used to simulate actual coolant conditions
- A test stand lubrication system supplies machines with required oil pressure regardless of the test speed, and monitors oil conditions for mechanical loss verification
- Recirculation coolers are available for closed-loop testing

### TESTING FOR PROCESS GAS COMPRESSORS

Closed loop testing with a simulated mole weight gas mixture is standard for process gas compressors. Nitrogen/Helium mixtures are used for fuel and lower mole weight gas compressors, Carbon Dioxide/Nitrogen mixtures for higher mole weight compressors.

### TEST CENTER COMPUTERIZED CONTROL ROOM

Compression Systems' test center control room provides computer control of cooling water, input speed and lubricating oil supply.

- Aerodynamic testing through use of finely calibrated pressure and temperature instruments
- Vibration monitoring
- Vibration frequency analysis
- 110% overspeed

### TESTING OBSERVATION AND DOCUMENTATION

Upon request, you are welcome to observe testing of your compressor, and complete test documentation is available

- Documentation can be provided for full operating tests to identify capacity, pressure, temperature and horsepower
- Vibration data for both steady state and coast down operation is recorded to verify rotor critical speed and response



Compression Systems' test center control room provides computer control of cooling water, input speed and lubricating oil supply.



Multi-stage carbon monoxide compressor being prepared for closed-loop testing



## AFTERMARKET SERVICES AND SUPPORT



How else can we prove our commitment to your total satisfaction? By providing the industry's most comprehensive resource for top-notch aftermarket products, engineering solutions and field service: CAMSERV™. If you ever have a question or problem, CAMSERV™ is at your service.





### WORLDWIDE CUSTOMER SUPPORT ORGANIZATION

Compression Systems has representatives and distributors worldwide to service your needs wherever your application is located. We keep life-cycle records on every unit we manufacture, enabling us to be a partner with you, now and in the future.

### EXCEPTIONAL PARTS

- Genuine parts produced in the same facility for more than 50 years
- Extensive inventory in strategic locations around the world backed by our written warranty
- Cross-checked against unit maintenance records to ensure correctness

### ELITE TECHNICAL SUPPORT

- Our goal, like yours, is to keep your unit running
- Our Technical Support is geared to do just that

### INSTALLATION AND START UP

- Concierge preventive maintenance programs
- Diagnostic and troubleshooting services
- Vibration analysis and trending
- Remote monitoring

### REPAIR EXPERTISE

- State-of-the-art-equipment for turnkey repairs
- Complete documentation package
- Strategic locations to serve a broad customer base including Houston, TX; Los Angeles (Garden Grove), CA; Buffalo, NY; and Milan, Italy

### FACTORY TRAINING

- Comprehensive, on-site training seminars for you and your personnel
- Instruction on a variety of topics including Level II courses offering hands-on training
- Courses can be tailored to your needs at our Buffalo, NY training center



### SMART PRODUCT UPGRADES

Compression Systems is constantly striving to improve efficiency and enhance performance. We incorporate these advances into retrofit kits that enable you to keep your equipment up to date.

### CONTROLS RETROFITS

- Re-aero kits to improve efficiency or match changing conditions
- Oil and cooling water system enhancements
- Motor upgrades

# COMPRESSION SYSTEMS OFFERS MORE

In addition to our custom engineered products, Compression Systems' manufactures a full line of centrifugal compressors in a wide range of capacities and power ranges.



## Turbo Air® Series of Centrifugal Compressors

Compression Sysytems' revolutionary Turbo Air® centrifugal compressor offers an advanced, state-of-the-art source of oil-free air for plant air and other applications. Models include:



**TURBO AIR® 2000**



**TURBO AIR® 2020**



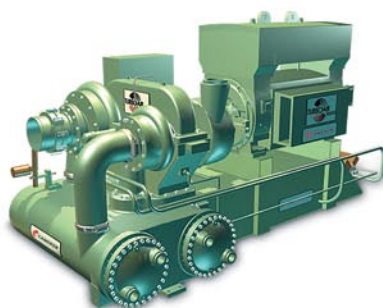
**TURBO AIR COOLED™ 2000**



**TURBO AIR® 3000**



**TURBO AIR® 6000**



**TURBO AIR® 9000**



**TURBO DRYPAK™ AND TWINTURBO**

**TURBO AIR® 2000** - 93-260 kW / 125 to 350 HP and 14.3-48.1 m<sup>3</sup>/min / 505 to 1700 CFM

**TURBO AIR® 2020** - Two-stage 187-298 kW / 250 to 400 HP and 28-57 m<sup>3</sup>/min / 1000-2000 CFM offering best specific power of any two-stage compressor

**TURBO AIR COOLED™ 2000** - 93-260 kW / 125 to 350 HP and 14.3-48.1 m<sup>3</sup>/min / 505 to 1700 CFM range.

**TURBO AIR® 3000** - 298-597 kW / 400 to 800 HP and 57-113 m<sup>3</sup>/min / 2000 to 4000 CFM

**TURBO AIR® 6000** - 670-1120 kW / 900 to 1500 HP and 113-226 m<sup>3</sup>/min / 4000 to 8000 CFM

**TURBO AIR® 9000** - 1120-1680 kW / 1500 to 2250 HP and 184-334 m<sup>3</sup>/min / 6500 to 11800 CFM

**TURBO DRYPAK™** - Patented dryer and compressor package featuring adjustable dew point performance

**TWINTURBO** - Combined service compressor for dual process air and booster applications

## Locations to Serve You Worldwide

### HEADQUARTERS

16250 Port Northwest Drive  
Houston, TX 77041 USA  
Tel 713.354.1900  
Fax 713.354.1923

### MANUFACTURING & ENGINEERING

#### CENTER OF EXCELLENCE

3101 Broadway  
P.O. Box 209  
Buffalo, New York  
14225-0209 USA  
Toll free: 877.805.7911  
Tel 716.896.6600  
Fax 716.896.1233  
[www.c-a-m.com](http://www.c-a-m.com)

### SALES OFFICES

#### North America

3070 Bristol Pike Suite 106  
Bensalem, PA 19020 USA  
Tel 215.245.9150  
Fax 215.245.9170

#### Europe/Middle East/Africa

Via Cantu' 8/10  
20092, Cinisello Balsamo (MI), Italy  
Tel 39.02.6129.2010  
Fax 39.02.6129.4240

#### Asia Pacific

No. 2 Gul Circle  
Jurong Industrial Town  
Singapore 629560  
Tel 656.863.3631  
Fax 656.862.1662

Tower A, Room 1701-1703  
Chengjian Plaza  
No. 18 Beitaipingzhuang  
Haidian District  
Beijing 100088, China  
Tel 86.10.82255700  
Fax 86.10.82255711

#### South America

Alameda Santos, 455  
Conj. 212 – Paraiso  
CEP 01419-0000  
Sao Paulo, Brazil  
Tel 55.11.3284.1164  
Fax 55.11.3284.3872

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