



**DRESSER-RAND**

**BRINGING ENERGY AND THE ENVIRONMENT INTO HARMONY.®**



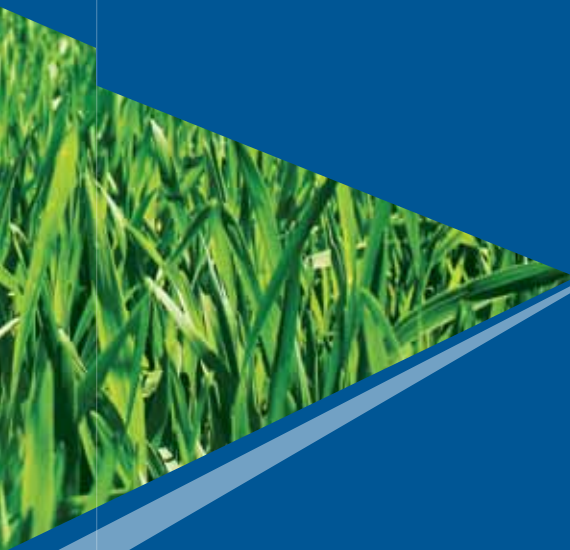
# LEADING THE BUSINESS OF ENERGY WITH THE SPIRIT OF ECOLOGY.

Dresser-Rand is among the largest global suppliers of custom-engineered rotating equipment solutions for long-life, critical applications in the oil, gas, petrochemical, and process industries.

These products—centrifugal and reciprocating gas compressors, gas and steam turbines, gas expanders, and associated control panels—are used in oil and gas production, high-pressure field injection and oil recovery, gas liquefaction, gas transmission, refinery processes, natural gas processing, power generation, petrochemical production, general industry (including paper, steel, sugar, distributed power), and U.S. Navy applications. Our worldwide client base consists of oil and gas producers and distributors, state-owned oil and gas companies, and chemical and industrial companies in more than 140 countries.

## SUSTAINABLE SOLUTIONS

Our clients know us best for our ability to bring equipment solutions and premier service for rotating equipment to the energy infrastructure markets. Beyond oil and gas, our markets increasingly encompass power generation and its associated technologies. We continue to widen our markets by investing in new technologies and companies that offer exceptional environmental benefits and the economic value propositions that allow our clients' facilities to operate more efficiently or help them to be more competitive in their markets.





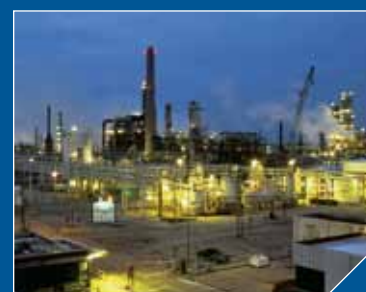
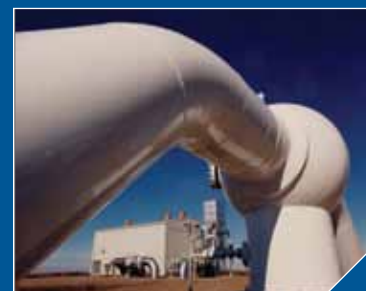
**TECHNOLOGICAL LEADERSHIP**—We are an industry leader in introducing new, value-added technology. We have developed many of the technological and product breakthroughs in our markets, and manufacture some of the most advanced products available in our product lines. For example, our VECTRA® 30G power turbine features a new modular concept to provide maximum serviceability while reducing downtime.

**OUTSTANDING SERVICE**—With roots dating back to 1840, Dresser-Rand has more units in the field than anyone else—more than 94,000 rotating equipment units installed in more than 140 countries. Because of the critical role played by the equipment we sell, clients place a great deal of importance on our ability to provide rapid, comprehensive service. With an extensive global network of approximately 40 service centers around the world, we're prepared to deliver service *anytime, anywhere* and for *any brand*.

**UNIQUE BUSINESS PROCESSES**—With the support of our Corporate Product Configurator, our business processes enable faster cycle times for all phases of projects.

**WORLDWIDE MANUFACTURING**—Our manufacturing capabilities are global, with 12 ISO-certified state-of-the-art facilities located in Olean, Painted Post and Wellsville, New York; Burlington, Iowa; Houston, Texas; Le Havre, France; Peterborough, England; Oberhausen and Bielefeld, Germany; Kongsberg, Norway; Ahmedabad, India; and Shanghai, China.

Dresser-Rand remains committed to building and servicing reliable, energy efficient rotating equipment for use in delivering environmentally friendly energy to every corner of the world.



# RECIPROCATING COMPRESSORS

The result of more than a century of design and manufacturing expertise, our reciprocating compressors have established an outstanding record for performance, efficiency, reliability, and low maintenance in the most demanding upstream, midstream and downstream applications. We have approximately 23,500 operating reciprocating units—including process reciprocating compressors, gas engines and gas field compressors/separable products. Each Dresser-Rand compressor is manufactured to stringent specifications.



## PERFORMING FOR DECADES IN THE TOUGHEST ENVIRONMENTS.

### Process Reciprocating Compressors

- Designed and built to meet API-618 and ISO 13707 specifications
- Power capability up to 45,000 hp (over 33 MW)
- Maximum combined continuous rod load from 10,200 lbs (4,627 kg) to 350,000 lbs (158,700 kg)
- Cylinder diameters from 1.652" (41.96 mm) to 44.5" (1,028.7 mm)
- Cylinder rated discharge pressures to 60,000 psig (4,138 bar)
- Compressor strokes from 5" (152.4 mm) to 16" (406.4 mm)
- Speeds to 720 rpm
- Operate in many types of process applications including severe and corrosive gases
- High-pressure and low-pressure compressor applications on U.S. Navy ships

### Gas Field Compressors/Separable Products

- Designed and built to meet client requirements (including API-11P and ISO 13631)
- Power capability up to 11,250 hp (over 8 MW)
- Maximum rod load ratings from 15,400 lbs (6,985 kg) to 90,000 lbs (40,824 kg)
- Cylinder diameters from 3.5" (88.9 mm) to 32" (812.8 mm)
- Cylinder maximum allowable working pressures from 130 psig (8.96 bar) to 8,800 psig (606.74 bar)
- Compressor strokes from 3.5" (88.9 mm) to 8.5" (215.9 mm)
- Speeds to 1,800 rpm
- Operate in natural gas and process gas applications (including CO<sub>2</sub>)
- Custom pipeline and storage applications





## TURBOMACHINERY

Approximately 9,000 turbomachinery units in operation add up to experience no other company can match, plus innovation that has led to such products as our highly efficient, reduced-emissions DATUM® centrifugal compressors. Dresser-Rand seeks to provide lowest total cost of ownership solutions for your oil and gas production, gas processing, refining, and petrochemical applications.

### TIME TESTED. FIELD PROVEN.

#### Centrifugal Compressors

##### DATUM (Oil, Gas & Process Applications)

- Discharge pressures over 10,500 psig (725 bar)
- Flow rates to 500,000 acfm (850,000 m<sup>3</sup>/hr)
- Power exceeding 120,000 bhp (90 MW)

##### DATUM P (Natural Gas Applications)

- Discharge pressures to 3,000 psig (207 bar)
- Flow rates to 53,000 acfm (96,000 m<sup>3</sup>/hr)
- Power over 40,000 bhp (greater than 30 MW)
- One to six stages

##### DATUM C (Compact Compressor)

- Integrated high-speed electric induction motor
- Magnetic bearings
- Hermetically sealed
- Emission-free design

##### DATUM ICS (Integrated Compression System)

- Integrated high-speed electric motor
- Integrated liquid separator
- Integrated process gas intercoolers
- Compact footprint

##### PDI (Natural Gas Applications)

- Discharge pressures to 1,500 psig (104 bar)
- Flow rates to 60,000 acfm (102,000 m<sup>3</sup>/hr)
- Power over 40,000 bhp (greater than 30 MW)
- Demonstrated efficiency over 90%

#### M-LINE, B-LINE, CBF, CVM

##### Axial Compressors (Air)

- Inlet flow up to 350,000 acfm (600,000 m<sup>3</sup>/hr)
- Discharge pressure up to 80 psig (5.5 bar)
- Carbon steel casing construction
- Continuously adjustable stator vanes

##### Gas Turbine Products (Onshore and Offshore Applications)

- Gas turbine generator packages (1.53 MW to 2.25 MW) include Dresser-Rand's proprietary KG2 gas turbine
- Larger gas turbine packages from 18 MW to 52 MW
- Large packages incorporating Dresser-Rand's proprietary VECTRA modular power turbine
- VECTRA models
  - 30G (LM2500 gas generator, also available for retrofits)
  - 40G (LM2500+ gas generator)
  - 40G4 (LM2500+G4 gas generator)
- Generator, compressor and pump drive

##### Expanders (Power Recovery)

- More than 130 units in operation
- Inlet temperatures up to 1,400°F (760°C)
- Inlet pressure up to 160 psig (11 bar)
- Inlet flow up to 1,600,000 lbs/hr (730,000 kg/hr)
- Power up to 60,000 bhp (45 MW)

# STEAM TURBINES

With a century of experience and approximately 62,000 steam turbines in operation in more than 140 countries, our turbine knowledge is unrivaled. Our heritage, along with our constantly evolving approach to turbine design, meticulous attention to detail and world-class manufacturing, allows us to deliver custom-engineered steam turbines for electric and mechanical drives with unparalleled reliability. We have one of the most comprehensive steam turbine selections in the industry and provide solutions for paper mills, steel, sugar, district energy, marine, FPSO, palm oil, and U.S. Navy for simple cycle, combined cycle and cogeneration projects as well as solar, biomass and waste-to-energy applications.

## BUILDING ON A HERITAGE OF INNOVATION.

### Single-Stage Turbines

- From 1 HP (0.746 kW) to 4,000 hp (3 MW)
- Pressures to 2,000 psig (138 bar)
- Temperatures to 1,000°F (524°C)
- Drive pumps, fans, mills, compressors, and generators

### Multi-Stage Mechanical Drive Turbines

- Wide range of models from 670 hp (500 kW) to 94,000 hp (70 MW)
- Pressures to 2,000 psig (138 bar)
- Temperatures to 1,050°F (551°C)
- Condensing and noncondensing to 800 psig (55 bar)
- Drive compressors, chillers, pumps, fans, generators, and mills

### Turbine Generator Sets

- Single-stage and custom-engineered to suit exact client conditions from 0.5 MW to 100 MW
- Pressures to 2,000 psig (138 bar)
- Temperatures to 1,050°F (551°C)
- Geared and direct connected, 60/50 Hz
- Condensing, noncondensing, single and double automatic extraction
- Up, down, side, and axial exhaust capabilities





## SERVICES

With the largest installed base of any OEM in the industry, Dresser-Rand is ready to deliver service quickly, efficiently and safely. Our comprehensive range of services and solutions, along with our service personnel are available to help maximize the reliability, production revenue and profitability of your rotating equipment. We welcome the opportunity to show you how our service and solutions can satisfy your particular requirements.

### RESPONSIVE SUPPORT, WHENEVER AND WHEREVER IT'S NEEDED.

#### Parts

- OEM design integrity for optimum performance, reliability and safety
- Advanced manufacturing, inspection processes and technology

#### Upgrades

- Improve reliability, availability and efficiency
- Reduce maintenance costs
- Latest design and manufacturing improvements

#### Revamps, Reapplications, Rerates and Remanufactured Equipment

- Meet new or changing compression requirements with existing equipment
- Provides cost-effective alternative to new equipment
- Increases reliability and availability by incorporating latest material and design technology
- Extends equipment life

#### Arrow Services

- Foundation services
- Portable machining/casting repair
- Mechanical services

#### Supersonic Ejector

- Emissions footprint reduction
- Easy to retrofit to hydrocarbon centrifugal compressors with gas seals
- Easy to maintain with no moving parts
- Captures vent gases and returns them to a useful supply

#### Service Centers

- Strategically located throughout the world
- Repair and overhaul services
- Two dedicated U.S. Navy repair centers
- Enhanced repair standards that are flexible and available to support client expectations/needs
- Comprehensive machining and testing capabilities
- Rotor storage at select locations

#### Field Services

- Skills-based, hands-on training—factory or client site; and Web-based training courses
- Technical services (field service representatives, field consultants, field crews)
- Project services
- Equipment reliability improvement programs
- Engineering, procurement and construction projects
- Integrated maintenance programs

#### Applied Technology

- D-R experience and technology applied to most brands of similar class rotating equipment
- Complete units, major assemblies and individual parts
- Unique solutions for equipment operation and performance include:
  - Upgrades
  - Revamps
  - Repairs and repair technologies
  - Field service



## ADDITIONAL PRODUCTS

### **SMARTCAES™ Systems**

- Dresser-Rand's compressed air energy storage (CAES) system—**SMARTCAES**—offers the flexibility to manage total demand and power generation
- Grid and load management applications (energy arbitrage; regulation; reserve; black start; VAR support)
- Start to full load as quickly as 10 minutes; start to full load compression in 5 minutes
- Adapts to salt or hard rock caverns, aquifers and depleted natural gas fields (land or sea)

### **Control Systems (Equipment & Plant)**

- Advanced control system solutions for all rotating equipment needs
- Control panels, field instrumentation and control buildings
- Lower cost of ownership through OEM-leveraged knowledge base

### **Condition Monitoring**

- Comprehensive equipment health assessment
- Dresser-Rand's Envision™ software integrates online performance and condition monitoring capabilities
- Fast, expert OEM analysis increases availability
- Mechanical and performance optimization of plant assets
- Applicable to many rotating assets
- Helps reduce maintenance costs

### **Enginuity**

- Advanced technologies for emissions reduction and reliable performance of natural gas fueled reciprocating engine/compressors
- Regulatory consulting and equipment evaluation to assure compliance and uptime
- Catalyst and air-fuel management, aftermarket services, training, and 24/7 support



## ADDITIONAL PRODUCTS

### Gas Seals—D-R Proprietary Design

- Patented pusher ring design to avoid “hang-up” for wide range of applications
- Pressures to more than 2,900 psig (200 bar)
- Continuous speed up to 32,700 RPM



### Gimpel® Valves

- Trip, trip throttle and non-return valves for protection of steam turbines, and API 611 and 612 steam turbine drives
- Hydraulic-operated valves; mechanical, latch-type valve trip cylinders; optional servo-valve and LVDT designs are available for precise flow control

### D-R Bearings

- Designed for centrifugal compressors; tilting pads
- Direct lubricated

### Rotating Separator Technology

- IRIS inline rotary separator separates liquids from gas streams
- IRIS units available in 3" (76.2 mm) and 6" (152.4 mm) sizes
- Bi-phase and tri-phase separator technology



### COPPUS® Portable Ventilators

- Industrial air movers to meet virtually any portable ventilation or cooling needs: confined space environmental control, heat stress control, air curing, and drying
- Electric, pneumatic or steam-drive options; explosion-proof models



### Ingersoll-Rand® Energy Systems Microturbines

- 250 kW power generation units with high-efficiency CHP provides free energy for thermal loads and heat and hot water to on-site processes
- Replace high maintenance, low efficiency, low-load turbines, gas engines, or diesel generators
- Convert flare gas to power; meet stringent emissions regulations



### CHP Solutions

- Bespoke engineered CHP solutions for a wide range of industrial and commercial clients
- Includes Aircogen™, a uniquely efficient system for large air conditioning and process heating applications
- Design and manufacturing operations in Europe and USA
- 24/7 remotely monitored O&M services for Dresser-Rand and third-party systems

### HydroAir™

- A patented bi-directional air turbine used in oscillating water column (OWC) devices that generate electricity from sea waves
- The HydroAir package includes the air turbine, a generator and power electronics to provide a complete power take-off (PTO) solution
- Suitable for shoreline, near shore and offshore applications



For a complete list of products and services, visit [www.dresser-rand.com](http://www.dresser-rand.com) or contact the following:

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**DRESSER-RAND**<sup>®</sup>

Bringing energy and the environment into harmony.<sup>®</sup>