A WORLD OF ENERGY CONVERSION SOLUTIONS
Dresser-Rand works with you to achieve the lowest total cost of ownership for your compression facilities. We’ll study your requirements and consider a variety of options before selecting the most cost-effective solution for your application. The flexible perspective helps us develop creative, field-proven solutions that include all aspects of a project, from initial concept to equipment installation.

Operational and maintenance of both O & E and other power-conversion equipment. We take full responsibility, including appropriate performance guarantees. Dresser-Rand offers Maintenance Plus™, a comprehensive maintenance program that supports your health care by pairing, valuing, and assessing Dresser-Rand processes and services into a single, typically performance-based agreement. As an add-on D-R representative serves as a single point of contact.

Upgrades and retrofits to install other brands of rotating machinery to fit your operating conditions and requirements. Dresser-Rand Applied Technology capabilities allow you to enjoy the benefits of the latest DATUM® compressor technology in many makes and models of your installed turbomachinery. Options include major assemblies, individual parts, upgrades, retrofits, and many other unique solutions designed to improve compressor operation and performance.

Engineered evaluations that show you how to optimize your equipment’s performance. Dresser-Rand’s comprehensive testing methods using the most advanced and consistent testing methods.

Our global presence allows us to be more responsive. With Dresser-Rand facilities and representative offices throughout the world, we’re ready to help you meet your challenges, no matter where you are.

Bringing energy and the environment into harmony.®
**DATUM® Frame Size Flow/Pressure Coverage Map**

**DATUM® Nomenclature**

**Example: D 1 0 R 9 B**

Where:  
- **D**: Always a “D” for DATUM®  
- **X**: Frame size designation, one or two digits, 2 through 28 in steps of two  
- **Y**: Case split designation as follows:  
  - “R” for radial (barrel type)  
  - “A” for axial (horizontally split)  
  - “P” for pipeline (barrel type)  
  - “C” for compact compressor configuration  
  - “I” for Integrated Compression System  

**N**: Total number of impellers, one or two digits  

**Z**: Casing configuration, is either:  
- “B” for back-to-back  
- “D” for double-flow  
- “S” for straight-thru  
- “CS” for centrifugal separator
WE BUILT IN ENHANCED PERFORMANCE AND CONVENIENCE RIGHT FROM THE START
From initial concept, through consultations with our clients, to design and production, our goal with the DATUM® line was to produce a better centrifugal compressor with an eye toward the environment. This has led to a number of client benefits.

Improved Efficiencies
Depending on application requirements and configuration, DATUM® compressors often operate at efficiencies that are two to five percent greater than competitive turbomachinery, thereby reducing fuel consumption or increasing throughput per installed horsepower. In addition, the improved aerodynamic design and larger shaft diameter enable DATUM® compressors to handle greater flows and pressure ratios than standard designs for a given frame size. In some cases, a single DATUM® compressor can deliver pressure ratios that previously required multiple bodies.

Reduced Emissions
The superior efficiency of the DATUM® compressor reduces driver fuel consumption, which can result in a decrease in harmful CO₂ and NOX emissions—more important than ever as environmental regulations tighten. D-R is committed to addressing critical environmental concerns while continuing to improve operational efficiencies. Incorporating D-R dry gas seals further reduces emissions by eliminating the need for processing sour seal oil.

Reduced Noise
The most significant development in our efforts to design quieter machines has been the introduction of D-R™ duct resonator arrays. This patented feature is internal and can be designed into new equipment and revamps, including non-Dresser-Rand equipment.

Extensive testing on D-R duct resonator arrays was performed at the company’s test facility in Olean, New York. The results demonstrated that the overall noise level of a 60 PDI (axial inlet single-stage overhung pipeline booster) compressor could be reduced by 10 dB with no adverse effect on compressor performance. In some instances, field noise level reductions have been measured in excess of 20 dB for PDI compressors and 10 dB and higher in multi-stage DATUM® compressors. D-R duct resonator arrays have been used in more than 250 DATUM® compressors to date.

Easier, Faster Maintenance
Even a single lost day of production can translate into losses of hundreds of thousands of dollars, so we made easy maintenance a priority throughout the design process. One way we dramatically reduced maintenance time was by combining the rotor, diaphragms and other stationary flowpath components, bearings, seals, and instruments—almost everything but the casing—into a module. This module can be completely pre-assembled outside of the casing (in the controlled environmental conditions of a shop, for example), then installed as a complete assembly. Critical dimensions, fits and clearances can be checked much more easily. By storing a spare module on site, turnaround times can be reduced to a few hours.

The modular design of the DATUM® unit also yields additional advantages:

- The DATUM® modular bundle has horizontally split stationary carrier housings that enable the rotor-to-stator alignment to be verified with the rotor in its true axial position and with the thrust bearing fully assembled. This allows direct determination of correct rotor positioning in the axial direction, as well as measurement of the radial clearance between the rotor and all labyrinths at the impeller eye and shaft interstage locations.

- Because the bearing housings, journal bearings, and thrust bearing assemblies are horizontally split, the coupling does not have to be removed to replace a bearing assembly on the driven end of the machine, and the thrust disc does not have to be removed to replace a bearing on the free end of the machine.

- For larger frame sizes, the radial vibration probes are externally adjustable and removable, as are the axial position probes on non-thru-drive units.

Standardization
To improve reliability and reduce cost, we standardized DATUM® compressor components wherever possible, maximizing the use of proven designs. The DATUM® line consists of 15 standard frame sizes that are scaled from the median size frame. The impellers, diaphragms, inlets, volutes, and shafts are all directly scaled; the bearings and seals are not directly scaled, in order to take advantage of outside vendors’ standard sizes. Further standardization was achieved by using the same internal components in both the radially split and axially split versions.
DATUM® centrifugal compressors are available in 15 sizes with discharge pressures ranging up to more than 15,000 psig (1,000 bar), maximum flow rates from 5,400 cfm (9,200 m³/h) to 700,000 cfm (1,200,000 m³/h), and power ratings to more than 120,000 bhp (90 MW). Cases can be split axially (900 psig max.) or radially (15,000 psig max.).

PAYING CAREFUL ATTENTION TO THE DETAILS
When we designed the DATUM® compressor, we made sure its components supported our goals of higher efficiency, lower cost and easier maintenance.

Impeller Design
To improve performance, we used the latest aerodynamic design and analysis technology to develop a new family of impellers and matched stationary flowpath components. The new impeller designs were tested in single- or multi-stage test rigs to simulate a complete compressor stage. Accuracy and quality of the impeller manufacturing process were substantially improved. Impellers are two-piece, milled from solid forgings, with welded or brazed construction. The majority of our new impeller designs are five-axis milled bladed discs, providing the sophisticated aeromechanical design required for strength and high performance. All diaphragms and other stationary flowpath components are fully machined from steel or alloy for compliance with aerodynamic design requirements. For special applications, single-piece, integral-machined or single-piece powdered metal impellers are available.

EBraze Welding
Created specifically for the DATUM® product family, EBraze welding combines two proven methods—electron beam welding and vacuum furnace brazing—to create a weld joint with superior strength. To fuse the impeller cover and blades, an electron beam weld is directed through the cover and a braze alloy foil is applied to each blade. Fusion occurs across the complete cover-to-blade interface, creating an impeller with greater reliability, longer life and more accurate performance.

Vacuum Furnace Brazing and One-Piece Integral Machining
Depending on the application, impellers can also be fabricated using vacuum furnace brazing and one-piece integral machining or one-piece HIP powder metal super alloy impellers.

Bearings
Tilt Pad Journal Bearings—Pad length, offset factor, pad orientation, clearance, preload, and other geometric parameters are selected for optimum dynamic rotor performance. The pads possess axial and radial aligning capability to uniformly distribute the load over the pad surfaces. Directed oil lubrication reduces oil consumption and power loss, lowers operating temperatures and allows higher operating speeds.

Seals
Shaft seals, located between the bearing chambers and the gas stream, minimize gas leakage outward and prevent lubricating oil leakage into the gas stream. D-R offers a variety of seal assemblies to handle various compressor applications:

- Labyrinth seals
- Contact seals
- Dry gas seals
- Oil film seals
- Tilt pad seals

Additional stability is provided by the D-R damper seal, a significant recent development that has resulted in an inherently stable centrifugal compressor. With the D-R damper seal, the rotor’s dynamic stability (log-decrement) actually increases with increasing discharge pressure.

Rotor Stability
The DATUM® shaft diameter is 30 percent larger than our earlier turbocompressor models. This enables higher power density with improved rotor stability, both of which are increasingly vital as pressure ratios and gas densities increase.

Large ebraze welding machine located at the Dresser-Rand facility in Olean, NY.
COMMITTED TO WORLD-CLASS MANUFACTURING

Proper execution of a good design is vital, so we’ve invested both human and financial resources at an unprecedented level to upgrade our facilities. As a result, our ISO-certified, state-of-the-art facilities are among the world’s most advanced for turbocompressor design, production and testing.

The NX CAD/CAM system further enhances our ability to design and manufacture custom engineered products. It allows our engineers to work simultaneously with each other on all aspects of design, analysis and manufacturing. This leads to better coordination of the various stages of a project and reduced cycle times.

TO MAKE SURE IT PERFORMS FOR YOU, WE MAKE SURE IT PERFORMS FOR US

With test facilities in Olean, New York, USA, and Le Havre, France, Dresser-Rand has some of the most comprehensive test capabilities in the world. That allows us to check all aspects of equipment operation, including full-load testing in Olean. ASME PTC 10 Type 1 hydrocarbon tests can be conducted up to 80 MW with gas turbine drives and 50 MW with electric drives. Twenty test stands allow maximum flexibility in meeting client requirements. Comprehensive data acquisition and analysis systems assure that everything meets strict API and other standards.

In early 2009, Dresser-Rand completed construction of its large compressor full load test facility in Le Havre, increasing its worldwide testing capacity with natural gas up to 150 MW (gas turbine drive) or 100 MW (electrical drive). This facility includes a high capacity quay with direct sea access, enabling compressor train delivery and shipment from and to any location around the world.

Development single- and multi-stage test vehicles are used to confirm the mechanical and performance characteristics of various components. This gives us the hard data to predict the performance of the completed compressors more accurately than by relying solely on theoretical calculations.
Chevron’s decision to enter a worldwide preferred supplier agreement with Dresser-Rand was based in part on the technology of DATUM® compressors.

— Vincent R. Volpe Jr., president and CEO of Dresser-Rand

The DATUM® C hermetically sealed, integral high-speed motor-driven compact compressor with magnetic bearings. Shown right: Synchrony® magnetic bearings and NovaGlide™ bearing control system.

CONTROL SYSTEMS AS ADVANCED AS OUR COMPRESSORS
Our PLC-based control systems can be configured to control, monitor and protect DATUM® compressors and a wide variety of other rotating machinery. Decades of machinery design and manufacturing experience are built into our electronic control products for gas turbine fuel systems, steam turbine governors, compressor surge, compressor capacity and performance, machine vibration and temperature monitoring, train sequencing, and overall machinery protection. We can help you maximize the performance of your DATUM® compressor with our compressor performance monitoring software and vibration condition monitoring products. User-friendly operator interfaces feature real-time and historical trending, report generation, system alarms, shutdown, and event logging capabilities.
The DATUM® model D6R6B compressor is a radially split, barrel-type compressor with a back-to-back design within the existing DATUM® product line. This centrifugal compressor has a discharge pressure that exceeds 550 bar (7,975 psi) while compressing gases that are almost 65% heavier than typical natural gas blends.

BUILDING ON A HERITAGE OF FIELD-PROVEN ENGINEERING AND SUPERIOR SERVICE

For more than 100 years, Dresser-Rand has been a world leader in energy conversion technology, designing, manufacturing, and servicing a wide range of field-proven centrifugal and reciprocating compressors, gas and steam turbines, expanders, and control systems. Since the mid-1900s, we have built centrifugal compressors for applications as diverse and challenging as LNG, ethylene, refining, ammonia, gas production, and gas reinjection for enhanced oil recovery.

Our DATUM® centrifugal compressors are the latest in this illustrious line. Introduced in 1995, they have gone on to demonstrate their superior efficiency, reduced emissions, and numerous other benefits in hundreds of applications worldwide.

COMMITTED TO DELIVERING VALUE

D-R provides reliable, efficient energy conversion solutions that deliver the highest value to our clients. Our engineers constantly seek improvements in design, production and testing to make our equipment even more efficient and reliable. This R&D focus is reflected in every product and service we offer, from new equipment to upgrades, that extend the life of your installed equipment.

Our emphasis on maximizing the value you receive also extends to the way we work with you. Our Corporate Product Configurator (CPC) coordinates all elements of the bidding, engineering, design, and manufacturing process. It improves communication and results by fostering closer collaboration with our clients and within D-R. Best of all, it has dramatically cut our cycle times for all project phases, so your equipment can be on-line and producing sooner.

Our leading-edge technology, some of the shortest cycle times in the industry, advanced business processes, and global presence help our clients reduce unit operation costs, which are 70 to 80 percent of the total cost of compression assets. That helps our clients to be more competitive.

One of three identical 7,000 psi DATUM® gas reinjection compressor trains driven by a Dresser-Rand VECTRA® power turbine offshore West Africa.
DATUM® compressors are bringing new efficiency and availability levels to FPSO vessels.

“We can reduce the time offshore to replace the rotor bundle by about a day and a half to two days compared to conventional designs. If you equate that to availability, that’s about a half percent a year improvement — just for that feature alone.”

— Senior Consultant, ConocoPhillips

DATUM® COMPRESSORS ARE PROVING THEMSELVES AROUND THE WORLD

The DATUM® line of centrifugal compressors was designed for maximum performance in all pressure and flow applications. Their unmatched efficiency, reliability and ease of maintenance make them the most advanced turbocompressors available for the oil, gas, and process industries. Typical applications include:

- **Oil and gas production**—gas gathering, liquid recovery, gas lift, gas injection, pipeline boosters, gas storage, recompression, and reinjection
- **Refining**—wet gas, hydrogen, coker, and other hydrocarbon and utility gases
- **Ethylene**—charge gas, ethylene and propane/propylene refrigeration
- **Methanol**—feed gas and syngas
- **LNG**—mixed refrigerant, propane, methane, nitrogen, and feed gas compression
- **Ammonia**—feed gas, syngas, refrigeration, and air compression
- **Urea**—CO₂ compression
- **Air separation**—nitrogen feed, recycle and air services
DATUM® family of products

*Designed for maximum performance in all pressure and flow applications.*

DATUM® ICS INTEGRATED COMPRESSION SYSTEM (ICS)

The DATUM® ICS is a complete motor-driven compression system that can be applied to all markets—upstream, midstream and downstream—with a small footprint, reduced weight and at the lowest total cost. It provides a compact and highly efficient means for removing liquid from a gas-liquid stream while increasing the pressure of the dehydrated outlet gas.

Features of the DATUM® ICS system include high-efficiency DATUM® centrifugal compressor technology; Dresser-Rand proprietary centrifugal separation technology; a high-speed, close-coupled, gas-cooled motor; magnetic bearing rotor system; dedicated unit controls; process coolers, valves, instrumentation, and interconnecting piping—all packaged in a compact module design. Our approach to compact compression could typically result in as much as a 45% reduced footprint and a 35% reduction in weight when compared to traditional compression modules.

DATUM® P COMPRESSOR

Dresser-Rand has offered pipeline booster equipment for the gas transmission industry for more than 50 years. The DATUM® P compressor uses components—impellers, bearings, seals, stationary flow-path components, etc.—from the DATUM® multi-stage compressor product line. As such, it benefits from the proven experience and flexibility of the DATUM® design product line, including its many innovative features. One of those features is the modular bundle assembly that enables rapid change-out of rotating elements—together with bearings, seals and stationary components—in one cartridge-style assembly.