August-September 2007

CompressorTech Two

Dedicated to Gas Compression **Products** and **Applications**

Targeting Turbomachinery

New Compressor Line from GE

On-Site Nitrogen Generation

www.compressortech2.com

This Caterpillar G3406NA driven Gardner Denver SSQG rotary screw compressor is being fabricated in Dearing Compressor and Pump Co.'s shop in Youngstown, Ohio, U.S.A. Destined for a wellhead compression application in Western Pennsylvania, it is rated at 215 hp (160 kW) at 1800 rpm.

COMPRESSOR PACKAGES FOR THE APPALACHIAN BASIN

Dearing Compressor and Pump Co. Expands to Serve Needs of Regional Market

By Norm Shade

Dearing Compressor and Pump Co. takes pride in being the largest compressor packager in the Appalachian market. "That's where we want to be successful," said Richard (Rick) H. Dearing, Jr., president. "We like to deal with customers on a personal level, and it's been an important factor in our success. We've grown a lot in the past year."

A 10,000 sq.ft. (929 m^2) high-bay expansion, completed in August 2006, helped provide the capacity needed for the Youngstown, Ohio, U.S.A., packager to fabricate the larger compressor units now very much in demand in the Appalachian Basin.

The company was formed in 1945 by Albin P. Dearing III, who sold and serviced Gardner Denver industrial air compressors, and it is the second oldest remaining distributor for Gardner Denver in the U.S.A. The company's introduction to the oil and gas business came in 1960 by working on Gardner Denver oil rig compressors. This later led to an expansion into the natural gas compressor market within Ohio. Today, Dearing's air and gas compressors serve automotive, aluminum, plastic, chemical, food, high-tech, lumber, rubber, steel and mining, as well as oil and gas industries.

Rick Dearing, grandson of the founder, joined the company in 1985 after gaining petroleum engineering and MBA degrees. Rebecca Dearing Wall, a sister and co-owner with Rick, joined the company in 1981 and currently serves as executive vice president and chief financial officer. "The company has grown steadily since we purchased it in 1996, with sales revenue doubling in the last three years alone," said Wall. "Dearing is established as a leader in the engineering, packaging and installation of quality compression equipment," she added.

"The air and gas compressor businesses have historically balanced each other through peaks and valleys in the energy and industrial markets. But in the last few years, both have done well at the same time for the first time ever," explained Dearing. "The company has been able to change and adapt to changing markets and new niche opportunities, allowing us to grow conservatively, but steadily," he said.

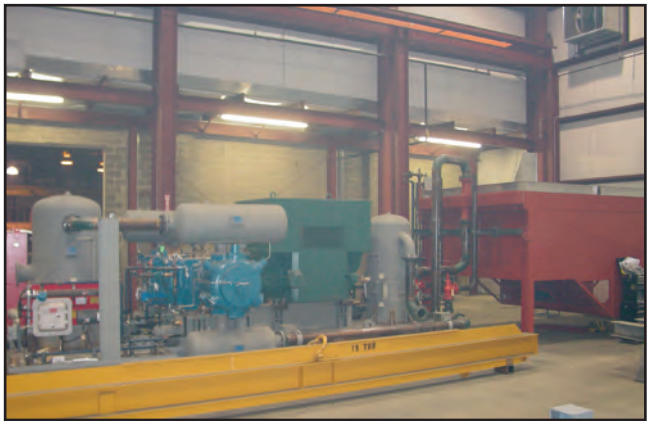
"In 1996, 100 to 300 hp (75 to 224 kW) packages were common for Dearing, and 500 hp (373 kW) was a big unit for us," he said. "But our customers demanded that we be able to do it all or we wouldn't get any of their business, so we have kept expanding to larger and larger units."

Until the recent expansion, Dearing's 26,000 sq.ft. (2416 m^2) facility, with only two 5 ton (4.5 metric ton) cranes having 12 ft. (3.7 m) hook height, made it challenging to package large units. The new 10,000 sq.ft. (929 m^2) bay has two 30 ton (27 metric ton) cranes having 25 ft. (7.6 m) hook height. "This enables us to lift 60 tons (54 metric tons) in a single lift without hiring portable cranes, and that reduces our loading time to 1 hour instead of 4 to 6 hours. We can now load a unit and set the next unit on the same day, which helps us progress toward our goal of building a unit in 1 to 2 weeks' time," said Dearing.

Dearing Compressor and Pump Co. engineers, packages and installs compression equipment for gas gathering, process gas and gas transmission. "We have a significant freight cost advantage for Appalachian customers, being closer to the market and also close to Ariel's factory," said Dearing. "Our primary market covers Western Pennsylvania, West Virginia, Ohio, Western New York, Virginia, Kentucky, Tennessee and now Michigan as well."

Dearing gas compressor packages

A 400 hp (298 kW), 1800 GE electric motor-driven Gardner Denver SSYG rotary screw compressor progresses toward completion prior to heading for coalbed methane service in Virginia, U.S.A.



■ **(Left) A 700 hp (522 kW), 900 rpm single-stage compressor package is shown in Dearing Compressor and Pump Co.'s new high-bay fabrication addition. The package includes an Ariel JGH/2 driven by a Reliance electric motor and a separate R&R Engineering cooler. It will be used for a gas processing plant in Virginia for nitrogen removal. (Right) Two Dearing Compressor & Pump Co. three-stage gas gathering and boosting compressor packages are shown being installed at a customer site near Clarksburg, West Virginia, U.S.A. Each package includes a Caterpillar G3516 gas engine driving an Ariel JGE/4 compressor at a rated speed of 1400 rpm.**

utilize Ariel reciprocating compressors or either Ariel or Gardner Denver rotary screw compressors. Most packages use Caterpillar gas engine drivers, but Waukesha, Arrow, Cummins or GM Vortec engines are also used. Dearing has also been building electric motor-driven gas compressor packages since 1997, using Toshiba, Baldor, Reliance or GE motors, some with variable frequency drives. Most packages utilize R&R Engineering or ACE coolers, Miratech exhaust catalysts and Maxim silencers.

The company is flexible enough to package units ranging from 5 to 3000 hp (4 to 2237 kW) with up to Ariel JGC and JGD compressor frame sizes. Dearing completed their first Caterpillar G3608 package and also built two 3000 hp (2237 kW) electric motor-driven units in early 2007. "The Appalachian market has a need for larger electric-driven packages for gas production, gathering and boosting," said Dearing. "This is fed by low-cost electricity from coal plants, run times that are superior to engine drives, fewer air permitting issues and shorter delivery times for motors than gas engines. Most of the units have three or four stages, taking gas from about 5 psig (0.3 bar) and boosting it to 1000 to 1200 psig (69 to 83 bar)."

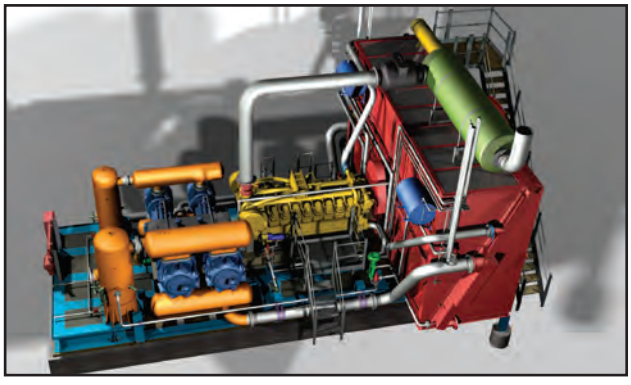
"Our engineering department will match customer needs with the best equipment for the application using the most state-of-the-art components available," said Dearing. "Our years of experience in design and service ensure an efficient system totally suited to the customer's specifications. We provide a superior skid design with a mechanically friendly layout with standard or custom controls," he added.

Designs are engineered in AutoCAD Inventor 3-D. Beta Machinery Analysis provides the torsional, acoustic pulsation and structural analyses. Skids are either fabricated in-house or subcontracted, depending on business volume. However, Dearing indicated that all sub bases are built in-house because of their importance to the design integrity of the package. ASME vessels are currently being fabricated by Northern Design Services in Kalkaska, Michigan, U.S.A., however, Dearing's next expansion planned for 2008 will include an ASME vessel shop for in-house production of scrubbers, pulsation bottles and filters. Dearing personnel perform all assembly, electrical, controls and ANSI B31.8 or B31.3 pipe welding for the packages.

Over its long history, Dearing has survived many industry downturns by adapting to serve diverse niche market opportunities. "We've always had an ability to innovate and adapt by identifying a niche and going after it," explained Dearing. For example, they once had an active business building gas engine-powered air compressors during the electricity crisis a few years ago, selling more than 100 units on both coasts, Texas and eastern Canada. They still build a few, although that market has softened in recent years. So, Dearing redirected their focus to the natural gas market, which has

■ **(Left) This Dearing Compressor and Pump Co. two-stage package includes a Caterpillar G3608 gas engine driving an Ariel JGC/4 compressor at a rated speed of 1000 rpm. (Right) Two three-stage Dearing 2250 hp (1678 kW), 900 rpm synchronous motor-driven Ariel JGC/4 compressors are shown being readied for commissioning at an Appalachian Basin customer site.**

■ **(Above) A Dearing three-stage 1250 hp (932 kW) electric motor-driven Ariel JGK/4 compressor package shown in an Appalachian Basin gas gathering application. (Below) Dearing Compressor & Pump Co. package designs are engineered using AutoCAD Inventor 3-D modeling software. Shown here is a two-stage Caterpillar G3516 engine with an Ariel JGE/4 compressor.**



more than filled their capacity. They also serve the landfill and digester gas compression markets, providing gas turbine fuel gas compression systems with built-in chillers to remove water. Gardner Denver screw compressors and blowers and Dekker liquid ring compressors are also packaged for the coalbed methane and vapor recovery markets.

More examples of Dearing niche compression applications abound. They package diesel engine-driven Gardner Denver primary and Ariel booster compressors for air drilling services. A five-stage Ariel JG/4 air compressor, powered by a 150 hp (112 kW), 1200 rpm Toshiba electric motor with VFD, was recently packaged to boost atmospheric air to 900 psig (62.05 bar) for a GM stamping plant process. They repackage, repower and recylinder existing packages. Dearing also indicated that they were bidding a project to replace Caterpillar G3608 engines with 2500 hp (1864 kW) electric motors to reduce an existing site's emissions and operating costs, a developing new market; and they were building their first Ariel nonlube unit for an LNG facility.

The company's Gardner Denver air compression system and industrial pump business is based in Cleveland, Ohio, U.S.A. Air compressors and drying systems are available for sale or rental; and rotary screw compressors are repaired, rebuilt and reconditioned for both air and gas services. A full line of air compressors, rotary screws from 5 to 500 hp (4 to 373 kW), reciprocating from 3 to 1500 hp (2 to 1119 kW), and centrifugal from 300 to 1500 hp (224 to 1119 kW), is offered, as well as ancillary equipment such as air dryers, filters, drains, air receivers, oil-water condensate separator systems and cooling water systems. Dearing can assist with

■ **This recently completed 125 hp (93 kW) motor-driven two-stage nonlube Ariel JGJ/2 compressor is ready for shipment from Dearing Compressor and Pump Co.'s Youngstown, Ohio, U.S.A., plant for service in an LNG gas boil-off application.**

the design of the entire system or with the addition of a single component to the system.

Dearing also represents the complete family of Gardner Denver and OPI high-pressure plunger pumps, which are used in the petroleum industry and in major industrial markets. The pumps range in frame size from 25 to 200 hp (19 to 149 kW), with pressures from 300 to 20,000 psig (21 to 1379 bar).

Additional family members, including Robin Wall and Albin Dearing, handle distribution, industrial sales and environmental products for the company. In addition to compressors and pumps, Dearing products for those sectors include trailer-mounted systems sold to environmental consultants for environmental ground water remediation. Partnering with Guild Associates, they sell processing equipment for CO_2 and N_2 extraction.

Dearing Compressor and Pump Co. can provide installation, start-up and commissioning services with factory-trained technicians, most having 15 to 20 years of experience. Parts are available for Gardner Denver, Ariel, FW Murphy, ASCO, Kimray, Altronic controls and ignition, and other products required to support compressor packages.

"Even though we've expanded, we're still a relatively small, fast-acting, family-owned operation where service is the key to the sale. Three of four children from the third generation are involved in the business, and we're proud to be training the fourth generation," said Dearing. "We remain flexible enough to handle small, big and anything in between, and we will continue to satisfy our base customers in the Appalachian basin." ■

■ **This Dearing package is ready for service in a New Jersey, U.S.A., wastewater treatment plant, compressing digester gas for use as gas turbine fuel. In addition to an electric motor-driven rotary screw compressor, the system includes a built-in chiller to remove water.**