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Food Processing

November 2018

- 12 **Safety: Food-Compliant Pneumatics**
- 18 **Profile: Hertz Kompressoren USA**
- 24 **Nitrogen Gas in the Food Process**

34 SHOW REPORT: BEST PRACTICES EXPO



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SUSTAINABLE MANUFACTURING FEATURES

12 Safety Feature

Food-Compliant Pneumatics Ensure Uptime of Fully Aseptic Juice Filling Machine

By Xavier van Aelst, Aventics

18 Profile: Hertz Kompressoren USA

By Rod Smith, Compressed Air Best Practices[®] Magazine

24 Nitrogen Gas in the Food Process

By Jenny Palkowitsh, Trace Analytics

28 Common System Issues Part 1

Oil-Free Air Compressors Paired with Heatless Desiccant Dryers

By Tim Dugan, P.E., Compression Engineering Corporation

34 Show Report

The Inaugural BEST PRACTICES EXPO & Conference

By Mike Grennier, Compressed Air Best Practices[®] Magazine



COLUMNS

4 From the Editor

6 Industry News

42 Resources for Energy Engineers Technology Picks

45 Advertiser Index

49 The Marketplace Jobs and Technology





FROM THE EDITOR

Food Processing



Elopak manufactures hygienic filling machines for ultra-sensitive drinks, dairy products and liquid foods. Food safety and reliability are the top priorities for their clients. Aventics has provided us with an article about how their food-compliant pneumatics help Elopak meet customer safety requirements while reliably providing outputs of up to 12,000 cartons per hour.

In food industry compressed air installations, oil-free air compressors are sometimes paired with heatless desiccant dryers. Starting a new series of articles about “Common System Issues”, Tim Dugan explains why this pairing can often be less than optimal.

Hertz Kompressoren has recently expanded their business operations into the United States. We hope you enjoy our profile article based upon an interview with Bob Groendyke, the Vice President and General Manager of their U.S. subsidiary based in Charlotte.

Nitrogen has long played a key role in the food processing and packaging industry. Ensuring reliable and high quality nitrogen is the objective of Trace Analytics. Pure gas testing is the main topic of their article. I believe the more testing we do, the more we can push the envelope on more efficient supply strategies.

I hope you enjoy our Show Report from the inaugural BEST PRACTICES EXPO & Conference, which took place September 17-19, 2018 in Chicago. Thanks again to everybody who participated. We've announced the 2019 Best Practices EXPO & Conference taking place October 13-16, 2019 at the Music City Center in Nashville, TN! For more information visit www.cabpexpo.com.



Thank you for investing your time and efforts into **Compressed Air Best Practices®**.

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INDUSTRY NEWS

Gardner Denver Adds New Distributor in Central Pennsylvania

Gardner Denver recently added Cleveland Brothers Equipment Co. Inc. as a new authorized distributor in Pennsylvania for its industry-leading compressed air products and solutions. Cleveland Brothers will offer expert guidance on compressed air and aftermarket product configuration, advising customers on single source solutions, service, rentals and warranty support in 29 counties in Central Pennsylvania.

With their strong technical background, Cleveland Brothers has the experience and knowledge required to ensure their recommended solutions optimize technology choice, energy usage, reliability, and flow to match the customer's application needs now and with an eye on future growth. To better serve their customers, Cleveland Brothers – Industrial Air Compressors division is headquartered in Harrisburg, Pa. with additional branches in the Williamsport, Milesburg/State College and Wilkes-Barre/Scranton areas.

From its beginnings, Cleveland Brothers has strived to provide exceptional service at a maximum value to every customer. This philosophy has guided the company for over 70 years, and placing the customer first will continue to be its main focus.

About Cleveland Brothers Equipment Co., Inc.

Founded in 1948, Cleveland Brothers Equipment Co., Inc., is the exclusive Cat® dealer of Pennsylvania, northern West Virginia and western Maryland, providing new, used and rental equipment and machinery, parts and service.

Cleveland Brothers supplies a vast variety of solutions and products, including industrial diesel and gas engines and generators, oil and gas machinery, construction equipment and much more. With 25 locations, customers have access to all of the parts and equipment needed to get the job done, backed by industry-leading technicians and staff. For more information or, to request a quote or service, please contact Cleveland Brothers via



phone 1-717-526-2121, email at info@clevelandbrothers.com or online at www.clevelandbrothers.com.

About the Gardner Denver Industrials Segment

The Gardner Denver Industrials Segment delivers the broadest range of compressors and vacuum products, in a wide array of technologies, to end-user and OEM customers worldwide in the industries it serves. The Segment provides reliable and energy-efficient equipment that is put to work in a multitude of manufacturing and process applications. Products ranging from versatile low- to high-pressure compressors to customized blowers and vacuum pumps serve industries including general manufacturing, automotive, and wastewater treatment, as well as food & beverage, plastics, and power generation. The Segment's global offering also includes a comprehensive suite of aftermarket services to complement its products.

Gardner Denver Industrials Segment, part of Gardner Denver, Inc., is headquartered in Milwaukee, Wisconsin, USA. Gardner Denver was founded in 1859 and today has approximately 6,700 employees in more than 30 countries. For more information about Gardner Denver Industrials products and services, please visit www.gardnerdenver.com/industrials

About Gardner Denver

Headquartered in Milwaukee, WI USA, Gardner Denver (NYSE: GDI) is a leading global provider of mission-critical flow control and compression equipment and associated aftermarket parts, consumables and, services, which it sells across multiple attractive end-markets within the industrial, energy and medical industries. Its broad and complete range of compressor, pump, vacuum and blower products and services, along with its application expertise and over 155 years of engineering heritage, allows Gardner Denver to provide differentiated product and service offerings for its customers' specific uses. Gardner Denver supports its customers through its global geographic footprint of 40 key manufacturing facilities, more than 30 complementary service and repair centers across six continents, and approximately 6,700 employees worldwide. www.gardnerdenver.com.



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INDUSTRY NEWS

Sauer Compressors USA Celebrates 20th Anniversary

Sauer Compressors USA is celebrating its 20th anniversary this year. Sauer USA was founded in August 1998 as the United States Headquarters for the Sauer Group by JP Sauer and Sohn out of Kiel, Germany. When the USA operation first opened, the main market focus was on the CVN Aircraft Carrier program and the United States Navy. After successfully landing the Carrier Contract and working their way onto most major U.S. Navy and Coast Guard surface vessel programs, by providing the highest quality, low maintenance solutions, with world-class support, Sauer Compressors USA expanded into countless commercial applications for high and medium pressure air and gas. These markets include CNG, Shipping, Research & Development, Aviation, Metallurgy, Processing, Mining, Power Generation, Power Distribution, Petro, & General Industry.

The North American Headquarters based in Stevensville, Maryland, maintains fully staffed sales, engineering, production and service teams ready and able to produce the best possible compressor package solution. After several facility expansions, Sauer Compressors USA moved into their current home in 2015. Today's manufacturing facility is 10 times larger than it was in their humble beginnings.

Sauer Compressors USA has grown from a company with less than 10 employees, to an international network throughout the United States, Canada, Mexico, and Central America. This anniversary marks twenty years of providing the highest standards of quality and dependability for medium and high-pressure compressors. Sauer Compressors USA provides customers with custom solutions for any requirement. Each package can be specifically designed from a basic compressor block to a complete weather-resistant / sound-dampening containerized system,



Sauer Compressors USA Headquarters in Stevensville, Maryland

including options like gas boosters, storage receivers, dryers, filtration packages, custom programed controls, and much, much more.

Sauer Compressors USA has developed a rental program, which offers a diverse fleet of air & gas compressors ranging from 150 – 6,000 PSIG. With turnkey start up and immediate availability, the rental program allows customers to experience the ease of an operating Sauer compressor prior to purchase. Sauer Compressors USA has also expanded their product line by adding HAUG Oil-Free Compressors. HAUG compressors are 100% oil-free, dry running and hermetically gas-tight. Coming soon, Sauer Compressors USA will launch the highly anticipated “next generation” of medium and high-pressure compressors for North America.

Kent Island resident and CEO of Sauer Compressors USA, Don Eaton, says he is “looking forward to creating more local jobs and impacting the economy of Maryland’s Eastern Shore for the next 20 years”.

About Sauer Compressors USA

Sauer Compressors USA Inc. specializes in the manufacturing of medium and high-pressure air and gas compressors for naval, commercial maritime, offshore, research & development, and demanding industrial applications. In addition to air, Sauer Compressors is saturated in the CNG, N₂, He, and inert gas markets. Sauer USA, located in Stevensville, MD is an affiliate of J.P. Sauer & Sohn, headquartered in Kiel, Germany. Rated for continuous duty, all compressors have been field tested in the most demanding applications and extensively refined to provide true 24/7 reliability supported by the Sauer Lifetime Warranty. With a reputation for reliability and life cycle product support, Sauer Compressors is the global leader in the medium and high-pressure compressor markets.

For more information please go to www.sauerusa.com or reach out to sales@sauerusa.com



Sauer Compressors USA – Executive Management: George Emery, Johnny Moore, Stuart Steele, Harald Schulz, Don Eaton, Hendrik Murmann (left to right)

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INDUSTRY NEWS

ISO 50001 for Energy Management Gets a Boost

The International Organization for Standardization (ISO) recently revised the ISO 50001 standard, making it even more effective in helping to tackle the world's energy challenges.

Roland Risser, Chair of the ISO Technical Committee that developed the standard, said the new version features updated terms and definitions and greater clarification of certain energy performance concepts.

"There is a stronger emphasis on the role of top management as it is important to instilling an organizational culture change," Risser said. "It is also now aligned with ISO's requirements for management system standards, making it easier to integrate into an organization's existing management systems."

Risser said ISO 50001:2018, Energy Management Systems – Requirements with Guidance for Use – transformed the energy performance of organizations worldwide when it was first published in 2011 because it provided a strategic tool for using energy more

efficiently and effectively. It also provides a framework for managing energy performance and addressing energy costs, while helping companies reduce their environmental impact to meet emissions reduction targets, he said.

Risser added that ISO 50001 has become increasingly important since its release seven years ago. By the end of 2016, ISO issued a 20,216 certificates to ISO 50001. An ISO Survey showed certifications to the standard increased 69% during the same year.

ISO 50001:2018 was developed by ISO Technical Committee ISO/TC 301, Energy Management and Energy Savings whose secretariat is held jointly by American National Standards Institute (ANSI), which is ISO's member for the United States, and Standardization Administration of China (SAC), which is ISO's member for China. The standard is available to ISO members and can be purchased online at the ISO Store.

Visit <https://www.iso.org/standards.html>.



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Edgetech Instruments Inc. is pleased to announce signing-on two new Manufacturers Representatives, **JMI Instrument Company**, covering Illinois, Indiana, Wisconsin and Iowa and **Statesville Process Instruments**, covering North and South Carolina. These representatives now provide Edgetech Instruments' dew/frost point, humidity and oxygen analyzers as well as their 17025:2005 accredited calibration services.

Established in 1997, JMI Instrument Company is a technical sales firm representing top tier manufacturers in the field of process instrumentation. With a corporate office located in the Chicagoland area, JMI's primary territory covers Illinois, Indiana, Wisconsin and Iowa. Key areas of expertise include process instrumentation and controls, gas and flame detection for safety, process analyzers and sampling systems, heat trace systems, and wireless I/O systems. Primary industries covered include refining and specialty chemicals, power, natural gas/LPG storage and distribution, steel, pharmaceutical, ethanol/biofuels, OEM and manufacturing.

Statesville Process Instruments, founded in 1985, is an employee owned manufacturer's representative and distributor firm that offers

a full line of process controls including temperature, pressure and flow instrumentation. Statesville stocks sensors, transmitters, controls, recorders and final control elements and has access to products for large OEM's and one-of-kind specials.

Edgetech Instruments Inc. designs and manufactures accurate and reliable absolute humidity hygrometers, relative humidity transmitters, humidity probes, moisture and dew/frost point analyzers, relative humidity calibrators, dew/frost point generators and oxygen measurement instrumentation. Edgetech Instruments products are manufactured, calibrated and serviced to the highest industry standards in a modern, ISO/IEC 17025:2005 accredited, ISO 9001:2015 registered facility located in Hudson, Massachusetts. All certifications and calibrations are traceable to NIST.

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THE CONDENSATE MANAGEMENT SPECIALIST

Safety: Food-Compliant Pneumatics for FULLY ASEPTIC JUICE FILLING MACHINE

By Xavier van Aelst, Aventics



The AS Series Maintenance unit ensures high compressed air quality.

► Machines for filling milk or juice must often work around the clock. Given the critical importance of uptime, Elopak opted for Aventics food-compliant pneumatics when developing its E-PS120A - the first fully aseptic filling machine for gable top packaging.

With an output of up to 12,000 cartons per hour, disruptions and downtime are not welcome with the aseptic filling machine said Wolfgang Buchkremer, Senior Manager Research & Engineering at Elopak EQS GmbH in Mönchengladbach. Rather, high reliability is of the upmost importance, he adds.



The Elopak E-PS120A fully aseptic filling machine.

“The latest technical features are not our main concern when selecting components,” Buchkremer, said. “We need components that play their part without standing out – we want to be able to install and then forget them. And that isn’t possible with just any component.”

The Goal: Meet Customer Expectations, Industry Requirements

In developing its E-PS120A machine, Elopak leveraged its Pure-Pak[®] Advanced filling concept. It meets both increasing expectations of consumers regarding product design, functionality and quality, and industry requirements regarding maximum efficiency and machine availability.

The E-PS120A machine offers advanced automation technology and is divided into six modules. The inserted packaging material is recorded, set upright, and pre-folded. The sealing cap is then applied via ultrasound welding and the bottom is heated and pressed to seal the carton. In a separate chamber, the packaging is sterilized with hydrogen peroxide, and the product is then filled with a single shot. Finally, the packaging is induction-welded and transported out of the machine.

With this system, users can choose from three packaging sizes of 500 ml, 750 ml, and 1 L. Since all machine processes are geared to the packaging height, the only adjustment required to switch between them is the height of the bottom of the carton. Performed by a cylinder, this movement takes just a few minutes and provides a major advantage.

Machine Addresses Complex Tasks

The design and construction of the filling machine involves the need for the unit to address complex tasks. A sterile environment and aseptic packaging are vital to maintain



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UD-Series, 40-60 HP shown above

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SAFETY: FOOD-COMPLIANT PNEUMATICS FOR FULLY ASEPTIC JUICE FILLING MACHINE



Aventics' CCI compact cylinder facilitates adjustments for packaging heights.

product quality for the long term at room temperature without cooling the products, or using other methods. This means the ultra-sensitive drinks, dairy products, and liquid foods have to be filled hygienically and securely while the machine components are subjected to extreme environmental conditions such as cold, humidity and splashes.

"Frequently, permanent reliability comes down to the details," said Buchkremer. Referring to the close collaboration with Aventics, he said: "Even though the pneumatic components installed at first appear insignificant, they are crucial to machine availability and asepsis. In addition to reliable components, we also need close contact and collaboration with suppliers based on partnership to detect optimization potentials in good time and drive improvements forward together."

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Cylinder Operation Based on Precision

On the E-PS120A machine, an Aventics SSI series compact cylinder isolates sealing caps by moving them from one side to another. It sounds like a simple task, but it has to function precisely, around one million times a week in day-to-day operations.

Using concrete application data supplied by Elopak, Aventics reinforced the piston package, extending the cylinder's service life, which in turn has a positive effect on machine availability. Other cylinders move packaging forward up to the next processing step. Pressure varies depending on the position and amount of packaging on a rail. Here, the Aventics ED02 electropneumatic pressure regulator ensures precise, dynamically controlled pressure, enabling an optimized, energy-efficient process.

Throttles Key to Sterilization Process

Hydrogen peroxide (H₂O₂) is used to sterilize the packaging, but has an effect on all reactive components, including sealing materials and grease, which are standard for throttles. Here, choosing the wrong material poses a risk to the entire sterilization process in the long run.

“We worked with Aventics to find a suitable solution, and now use a throttle that has been cleaned on the inside, with a special sealing ring on the sterilization system’s vaporizer. These design details allow us to achieve higher stability,” said Johannes Platen, responsible for Engineering and Mechanical Design at Elopak EQS.

Valves Optimized for Reliability and Safety

The use of HO-impregnated air also resulted in an application-specific development. To extend the valves’ service life, Aventics combined a standard valve system with an aluminum corner strip including an all-round seal. Now, the valve pilots engage directly in the closed cable conduit within the machine, while the outlets exit the machine. This effectively prevents problematic contact between valves and hydrogen peroxide, contributing to optimized reliability.

Aventics’ quick exhaust and soft start valves are a special unit consisting of three Aventics components, mainly for machine safety to meet the required performance level. Combined with a soft-start and a blocking valve, an AS series maintenance unit offers an array of functions. After a safety cut-out and when the system is depressurized, for example by opening the doors, the valve systems should not be subjected to the full 6 bars of pressure



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A corner strip with an all-round seal prevents the valves from coming into direct contact with H_2O_2 -impregnated air in a standard valve system.

immediately upon restart. The application-specific design now ensures the valve systems are slowly filled with compressed air.

Hygienic Safety a Top Priority

Aventics leveraged its experience in designing hygienic components for the machine. This is reflected in numerous properties of components customized specifically for utmost food safety. This means no recesses or sharp edges, easy cleaning and disinfection, as well as the use of food-compliant materials and lubricants, and resistance to chemicals.

“Aventics provided Elopak EQS with support right from the start and knows what it means to monitor a near-series machine in development. The pneumatic components made a major contribution in the reliability and low-maintenance requirements of our innovative aseptic filling machine, not least for these reasons. This all boosts machine availability,” said Buchkremer. “Furthermore, Aventics and Elopak support the VDMA initiative to standardize consumption measurement so we are on the same level when it comes to determining energy efficiency, able to implement this together to the user’s advantage.”

Elopak will also use the Aventics Advanced Valve series, which is optimized for future requirements for continuous data exchange from the control to the lowest field level. “This meets our desire to continue driving fieldbus technology forward, also in pneumatics,” said Platen, adding: “This development, too, will be realized in close collaboration with Aventics.” **BP**



nano

nitrogen generation: beverage packaging

“We eliminated our high pressure nitrogen bottles that were a safety hazard and made our environment a safer place to work.”

Owner -Chris' Coffee, Albany, New York

When the owner of Chris' Coffee needed to expand his growing coffee roasting process, he looked for ways to save money and maximize production time. One item on his list was the addition of a nitrogen generation system. He researched several manufacturers and recognized the benefits of the nano GEN2 nitrogen generator.

With a nano GEN2 system, the company saves money by producing its own supply of nitrogen and they save valuable production time by removing the need to interrupt their packaging process to replace empty nitrogen cylinders.



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About Elopak

If your milk carton doesn't spill or make a mess when you open it, the packaging is very likely from the Elopak Pure-Pak series. The leading global supplier of paper-based packaging solutions for liquid food products is headquartered in Norway and belongs to the Ferd Group. Elopak develops, produces, sells, and maintains complete systems for packaging non-carbonated liquid products, such as milk and dairies, juices, wine, water, and soups. Elopak is the best-known supplier of gable top cartons with its Pure-Pak[®] brand.

Since 2011, Elopak EQS GmbH has been headquartered in Mönchengladbach, now employing around 130 staff. EQS stands for equipment supply and includes everything from machine construction to the development and production of pourer sealing systems.

About Aventics

Aventics is one of the world's leading manufacturers of pneumatic components, systems, and customer-specific applications. The pneumatic engineering company provides products and services for industrial automation, additionally focusing on the sectors of commercial vehicles, food and beverage, railway technology, life sciences, energy, and marine technology. By integrating electronics, the use of innovative materials and prioritizing trends such as machine safety and the Internet of Things, Aventics is a pioneer in intelligent and easy-to-use solutions.

With over 150 years of expertise in pneumatics, Aventics employs around 2,000 associates worldwide. In addition to production sites in Germany (Laatzten), France (Bonneville), Hungary (Eger), USA (Lexington), and China (Changzhou), Aventics is represented in more than 90 countries through direct sales and dealers. The Aventics Group has received multiple certifications, including ISO 9001 and ISO/TS 16949 for quality, ISO 50001 for energy management, and ISO 14001 for environmental management. Further information is available at www.aventics.com/us.

All photos courtesy of Aventics.

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Profile: Hertz Kompressoren USA

By Rod Smith, Compressed Air Best Practices® Magazine

► Compressed Air Best Practices® Magazine interviewed Bob Groendyke, Vice President and General Manager, of Hertz Kompressoren USA.

Good afternoon! Hertz Kompressoren recently expanded into the United States. Please describe the company.

Hertz Kompressoren USA is headquartered in Charlotte, N.C. We're a premium brand of the Dalgakiran Group Company, a leading international compressed air sales and service producer with a well-established worldwide network. Our parent company was founded in Turkey more than 50 years ago and currently sells and services machines in 130 countries. Hertz Kompressoren has built a solid reputation by creating and manufacturing high-quality products offered at reasonable prices to satisfy our worldwide customer base.

We operate in a highly competitive market in which purchasing decisions directly impact the bottom line. Customers expect machines that do what they're supposed to do throughout their lifecycle. Hertz Kompressoren uses proven components with features that are valued by customers. Our systems are designed to minimize installation time, with easy connections that get customers up and running quickly. Because our reputation depends on word-of-mouth and social media recommendations, Hertz Kompressoren strives to minimize the number of customer complaints and product returns.

Hertz Kompressoren keeps a comprehensive range of commercial-grade components in stock and ready for immediate shipment. We have a full line of compressed air products, with rotary screw fixed and variable speed drives ranging from 5 to 450 horsepower (HP). Reciprocating air compressors, booster and high-pressure (580 psig), along with



“Our value-added formula is 1+1=3 or, as Aristotle said, ‘The whole is greater than the sum of its parts.’ By backing up our partner distributors from sales through service, we all do better.”

— Bob Groendyke, Vice President and General Manager, Hertz Kompressoren USA

matching air treatment products, provide any level of air quality purity.

Early in 2019, we'll be releasing our oil-free product line, an oil-free compressor meeting ISO 8573-1 Class ZERO standards that's been tested and approved by TUV Rhineland.

What is your unique value proposition?

At Hertz Kompressoren, we concentrate on our core competence: providing customers with the highest standard of equipment and services. Our corporate culture is based on helping meet the needs of customers and suppliers by always asking, "How can Hertz Kompressoren help you?"

Our value-added formula is $1+1=3$ or, as Aristotle said, "The whole is greater than the sum of its parts." By backing up our partner distributors from sales through service, we all do better. In this industry, trust is everything. We stake our reputation on three operating principles:

- Responsiveness
- Reliability
- Collaboration

What do you mean by responsiveness?

At Hertz Kompressoren, customer service has been and always will be the focus. Our key market advantage is our high-quality staff. Our team of professionals has more than 100 years of combined industry experience. All of them are experts in their fields of engineering, field service, customer applications, and product development.

Our policy is to answer all emails, texts and phone calls within the same day whenever possible, and no later than 24 hours. We provide personalized, effective support by: listening to customers' problems, identifying solutions tailored to each situation, and executing solutions. In short, we honor our commitments and follow through with what we say we'll do.



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PROFILE: HERTZ KOMPRESSOREN USA

How does Hertz Kompressoren demonstrate reliability?

The last thing we need is callbacks. We assure long-lasting, dependable equipment backed by a comprehensive warranty plan that's among the best in the industry. Our Smart+ Extended Warranty covers all oil-flooded rotary screw air compressors shipped from Hertz Kompressoren USA. This comprehensive warranty covers parts and labor for five years on the motor, VSD, air/fluid receiver, oil cooler and after-cooler; and 10 years on the airend.

The Smart+ Warranty is free for registered customers. By following recommended maintenance schedules and participating in the oil sampling program, registered customers are eligible to receive genuine Hertz Kompressoren replacement parts and lubricants. Smart Parts are made of high-quality materials for reliable performance and durability.

Describe Hertz Kompressoren's approach to collaboration with independent distributors.

Hertz Kompressoren USA has a distributorship network with a very high capability of sales and aftersales services. We are dedicated to meeting the needs of our network of independent distributors as we expand across the United States.

Our distributors are valued business partners who are treated as teammates and solution providers. Each partner is responsible for a territory and doesn't have to share it with fellow associates in the same territory with the same product.

Independent distributors benefit by sharing ideas with and receiving support from other channel partners in our network. Hertz Kompressoren has a distributor advisory

council that generates trust, commitment and communication with partner distributors. The advisory council is a valuable tool for collecting and sharing information about emerging issues, such as:

- Industry conditions
- Competitive strategies
- Changing customer needs
- Training issues
- Performance feedback
- Actions of competitors

Hertz Kompressoren offers ongoing technical and commercial training. We train distributors' staffs on matters such as product features and benefits, product positioning, and competitiveness. Our comprehensive Hertz Factory Certified Training program provides specific technical training that covers machine maintenance and repair. This ensures technicians have accurate product knowledge and diagnostic testing experience.

Our partners have access to a distributor portal containing detailed product information, engineering data sheets, manuals and drawings.

What feedback have you received from partner distributors?

To build long-term, healthy relationships with distributors, we encourage two-way communication so that ideas and feedback flow back and forth. Our distributors have told us they appreciate this open, honest approach.

Scott Harper, Western Regional Manager for Applied Air Systems in Lakeville, Minn., has a five-person independent distributorship that depends on manufacturer reliability, responsiveness and ability to collaborate. He says it's easier to deal with Hertz Kompressoren



The Hertz Kompressoren HBD Series unit mounted on a 120-gallon tank with a refrigerated dryer.



Bob Groendyke, VP & General Manager,
Hertz Kompressoren USA

than larger companies that take a less personalized approach, have layers of personnel, and longer wait times to fill orders. He knows Hertz Kompressoren will supply quality, dependable equipment and do whatever it takes to resolve any problems.

Morty Hodge, President of Atlanta Compressor LLC, serves about 1,800 customers in the Atlanta and Nashville area, including Fortune 500 companies, universities, hospital systems and federal government agencies. As an independent distributor, Hodge says Hertz Kompressoren consistently delivers reliable products that are readily available and generally don't have warranty issues. When equipment fails, a customer's entire operation shuts down and they lose money by the minute. Atlanta Compressor gives its customers peace of mind by relying on Hertz Kompressoren staff to work around the clock if necessary to get products out as soon as possible.

Hertz Kompressoren's network of independent distributors knows our company isn't interested in taking over the customer base they work so hard to build. Our goal is to work in partnership with distributors to sell its products and help them grow.

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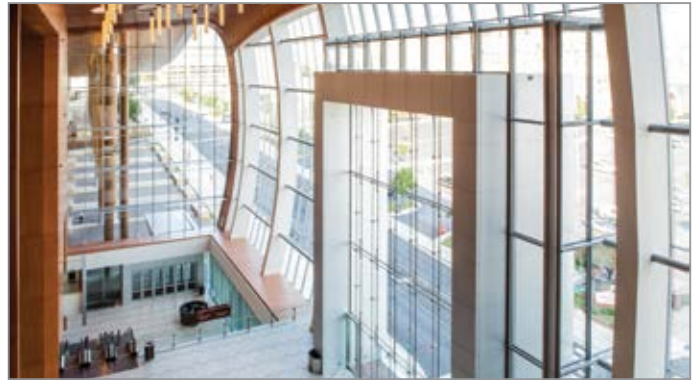
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PROFILE: HERTZ KOMPRESSOREN USA



Hertz Kompressoren offers compressed air treatment dryers and filters rated from three to 10,000 cfm.

What goals does Hertz Kompressoren have moving forward?

Our goal is to be an industry leader in environmental sustainability. Protection of the environment is one of our top priorities. Hertz Kompressoren is committed to working toward continual improvement of its environmental performance. We believe it's important for our products and our operations to have the lowest possible adverse impact on the environment. To that end, we're striving to further improve energy efficiency and reduce emissions in all aspects of our business. Hertz Kompressoren's policy is to operate in a more efficient manner, to avoid waste and, wherever possible, conserve energy.

Thank you Hertz Kompressoren USA for your insights. BP

For more information, please contact Bob Groendyke, VP & General Manager, Hertz Kompressoren USA Inc., Charlotte, N.C., email: robertgroendyke@hertz-kompressoren.us; tel: 844-354-3789, or visit www.hertz-kompressoren.com.

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Nitrogen Gas in the Food Process

By Jenny Palkowitsh, Trace Analytics

► Gaseous nitrogen is used in a variety of systems and processes in the food manufacturing and packaging industries. Often regarded as the industry standard for non-chemical preservation, nitrogen is an inexpensive, readily available option. Suited for a variety of uses, Nitrogen needs to be monitored for purity and potential contaminants. Depending on the type of use, the distribution channel, and the required purity levels, different testing plans should be implemented to ensure safety.

Uses For Nitrogen in Food Process

Because foods are comprised of reactive chemicals, it is the job of packaging specialists and food manufacturers to find ways to protect nutrients and ensure the quality of their product. Oxygen can be harmful to packaged foods as this gas causes the food to oxidize and can encourage the growth of microorganisms (Welt and Connaughton, 2017). Foods that are particularly susceptible to these risks include fatty meats, fish, veggies and ready-to-eat products. In fact, a third of fresh food does not reach consumers due to transport spoilage (Sengupta, 2017). Modifying the atmosphere of the packaging can be an effective way to ensure that products remain safe for consumers.

To increase the shelf life of fresh products, many manufacturers choose to modify the atmosphere of the packaging to include higher levels of nitrogen (American Chemistry, 2010). Because it is a safe, inert gas, nitrogen is an excellent replacement for oxygen or supplemental gas in food packaging and manufacturing. Increased nitrogen preserves freshness, protects the nutrients, and prevents aerobic microbial growth.

The main challenge with modifying the atmosphere of packaging is that some food products do require a small amount of oxygen to maintain their coloring and texture (Welt and

Connaughton, 2017). Red meats, for example, will turn an unappetizing color when deprived of oxygen. Food manufacturers sometimes choose a lower nitrogen purity to make their product more palatable to consumers.

In addition to meats and vegetables, nitrogen is used with increasing frequency in the coffee and beer industries. Guinness, for example, is known for its signature foam produced by nitrogen gas (Welt and Connaughton, 2017). Additionally, coffee brewed with nitrogen has become quite popular. Beverage manufacturers who introduce nitrogen into their product must



meet certain purity levels and ensure that the gas is free from contamination.

The Importance of Pure Gas Testing

Because Nitrogen is a critical component in the preservation, transportation, and quality control of fresh food products and beverages, it must be tested regularly. It is susceptible to decreases in purity levels and contaminants like gas, particles, water, oil, and microorganisms. Individual systems call for different testing protocols. Variables to take into consideration include nitrogen cylinders verses nitrogen generators, system age and build, distribution piping and the type of contact the gas has with the product. Complete a risk assessment to ensure an in-depth understanding of your system and its unique needs.





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NITROGEN GAS IN THE FOOD PROCESS

Nitrogen Cylinders and Generators

Food manufacturers and packaging plants that choose to work with nitrogen cylinders or generators can expect to have clean and dry nitrogen at the source. However, according to Nikki Smith, Quality Manager at Trace Analytics, LLC, it is important to account for the distribution line. Smith explains that testing for gas purity at the point of use is a reliable way to ensure that the piping is not contaminating the pure gas.

Unhealthy systems with ineffective filters or leaks can reduce the purity of gas and introduce contaminants like volatile hydrocarbons, water, oil, or particles. Leaks can lead to lower purity levels or contamination because they create a vacuum which brings in atmospheric air containing oxygen, moisture, and hydrocarbons (Kandl, 2005). Ineffective filters or materials can introduce particulate contamination. Whether your system works with cylinders or a generator, testing at multiple points ensures that the quality of gas does not deteriorate down the line. A third-party, accredited

laboratory can provide thorough analysis for pure gas systems to ensure that the gas at the end of the distribution line is as pure as when it flowed directly out of the cylinder or generator.

Anaerobes

Using nitrogen to modify the atmosphere of packaged foods does prevent against aerobic bacteria growth, but does not stop the growth of anaerobes. Anaerobes are microorganisms that can grow without oxygen. These microorganisms can be particularly dangerous and need to be carefully guarded against as they lead to recalls and consumer illnesses.

Because anaerobes do not need oxygen to grow, poorly maintained Nitrogen systems can be at risk for this type of contamination. Obligate anaerobes only grow with a complete lack of oxygen, while Facultative anaerobes can use oxygen but do not require it to grow (USDA, 2012). Facultative bacteria include *Listeria*, *E. coli* and *Botulism*.

This year alone, over 20 food manufacturers issued recalls due to *Listeria* (FDA, 2018).



Recalls can be costly at best, and devastating at worst, causing entire shut downs. Since *Listeria* can survive in the atmosphere, it can pass through the system and impact food if proper precautions are not administered. Other dangerous anaerobes to test for include *E. coli*, *C. botulinum*, and *C. perfringens* (USDA, 2012).

How Pure Gas Testing Works

Trace Analytics, LLC, uses a Gas Chromatograph-Mass Spectrometer-Flame Ionization Detector (GC-MS-FID) to test for gas purity and gas contamination. The three different pieces of equipment function together to provide precise and thorough results. The Flame Ionization Detector recognizes gas contaminants like TVHC, CO, CH₄ and CO₂, while the Mass Spectrometer detects ions by mass and can separate out Oxygen, Nitrogen, Argon, and water.

To determine purity, the gas sample is compared to controls using NIST traceable gas standards. Smith explains that manufacturers base their purity goals on their usage. For example, some manufacturers might require 99.0% nitrogen purity, while others could allow for a lower purity.

Optical microscopy is used to test for particulate contamination. This determines particle size and count. This method allows for the evaluation of point-of-use filtration and can identify problems



due to add-ons after the filter that create contamination like rust, metal shavings, o-ring materials, solder, and Teflon tape.

To properly test for anaerobic contamination, users take samples using the Pinocchio Super II Impaction Sampler along with blood agar contact plate media. A GasPak is opened in a sterile bag which removes the oxygen from the bag and ensures only anaerobic microbes can grow. An accredited microbiology lab can then incubate the media and use Gram Staining to determine whether the gas is contaminated. If a company suspects *Listeria* or *E. coli* contamination, specialty plates can be used which will reveal a positive or negative result.

Requirements and Regulations

The release of SQF Code Edition 8 has brought some clarity to the testing process and further protects end-users from contaminated products. This new edition states that compressed air and other gases must be clean and regularly monitored.

“11.5.5.1 Compressed air or other gases (e.g. nitrogen, carbon dioxide) that contacts food or food contact surfaces shall be clean and present no risk to food safety.”

“11.5.5.2 Compressed air systems, and systems used to store or dispense other gases used in the manufacturing process that come into contact with food or food contact surfaces shall be maintained and regularly monitored for quality and applicable food safety hazards.”

With the addition of the words “or other gases”, nitrogen, mixed gases and pure gases are now included and must be monitored regularly. Individual manufacturers should assess their risks and work with an ISO 17025 accredited laboratory to determine the appropriate tests.

Trace Analytics, LLC offers testing for pure gas, particles, water, oil, and microorganisms.

CONCLUSION:

Nitrogen has critical application in the food manufacturing and packaging industries. Its quality and purity have direct impact on both food and beverage products. Because of this, it is important to test for purity and contaminants regularly with a third-party, accredited laboratory. Perform a risk assessment to gain a thorough understanding of your system and risks. Then implement a monitoring plan with regular testing for your nitrogen system to ensure the safety of your end-product. Contact us to receive a personalized Pure Gas testing quote. **BP**

For more information on pure gas testing, contact Trace Analytics, LLC at sales@airchecklab.com or visit: <http://learn.airchecklab.com/pure-gas>

Resources:

FDA. “2018 Recalls, Market Withdrawals & Safety Alerts.” U.S. Food and Drug Administration Home Page, Center for Drug Evaluation and Research, 2018, www.fda.gov/Safety/Recalls/ArchiveRecalls/2018/default.htm.

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“The Benefits of Nitrogen for Food Processing.” American Chemistry Magazine, 2010. <http://www.airproducts.com/~media/downloads/article/b/en-benefits-of-nitrogen-american-chemistry-reprint-332-10-040.pdf>

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Common System Issues Part 1 OIL-FREE AIR COMPRESSORS PAIRED WITH HEATLESS DESICCANT DRYERS

By Tim Dugan, P.E. President, Compression Engineering Corporation

► Many food processing plants are already using – or are being driven to use – oil-free compressed air at a low-pressure dewpoint. This has required the use of two-stage oil-free screw air compressors, centrifugal air compressors and other technologies, as well as regenerative dryers of one type or another.

The most common oil-free air compressor in industry is the two-stage “dry screw” machine and the most common regenerative dryer type is the heatless type. These are combined in many food processing, pharmaceutical, and high-tech plants. But they weren’t actually designed to be a “pair” and there is a “fatal attraction” that brings them together in ways that can defeat reliability and efficiency, unless systems issues are addressed.

This article discusses “systems issues” that improve reliability and reduce costs. I define systems issues as how the pieces are controlled and fit together, not their fundamental design as components. Also provided are pointers about optimizing your system with piping and/or controls modifications, not new air compressors and dryers.

The Goal: Lower Energy and Maintenance Costs

Plants can increase reliability by reducing the number of air compressors running – creating standby. In some cases, system optimization can create drying redundancy. They can also realize costs savings by reducing energy consumption and maintenance costs, primarily of the air compressors.

Certainly, the oil free screw/heatless dryer combination might be criticized for being an overkill in some plants, because you can often filter lubricated screw air compressors to a level needed by most food processing processes. In addition, a -40 °F pressure dewpoint might be lower than needed for many processes. And there certainly are oil-free air compressor/dryer combinations designed by

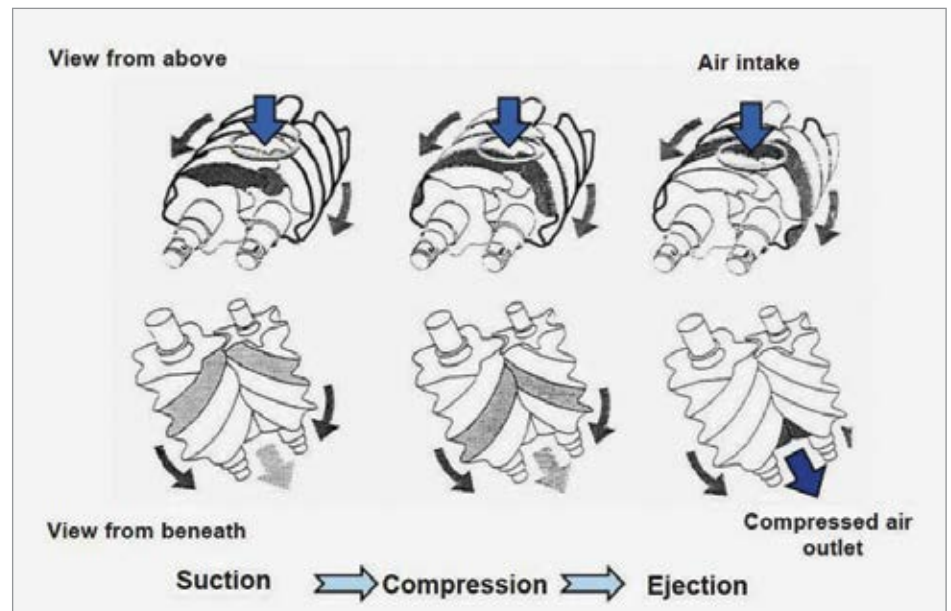


Figure 1: Typical screw compression.

the OEM to work together very seamlessly. However, this article won't go into the controversies associated with the competing technologies that can serve food processing. There are valid arguments to use different types of air compressors and dryers based on the specifics of the plant. But oil-free screw air compressors and heatless dryers are common enough, and the components easy enough to understand, that it makes for a good discussion about system issues.

Oil-Free Screw Air Compressor Basics

Oil-free screw air compressors are positive-displacement, 2-stage air compressors. Positive displacement air compressors compress a fixed amount of air per cycle. It operates like a set of spiral pistons, one per space between the female rotor lobes. The "cylinder" is the space between the female rotor and the casing. The "piston" is the male rotor squeezing the length of that cylinder as the rotors rotate, and it reduces that volume, by pushing from the discharge end back to the inlet.

At the inlet of the air compressor stage, this cylinder is open to the intake, and its volume is filled. At "cut-off," the rotation of the female rotor away from the center moves the cylinder so that it no longer is open to the intake plenum, isolating that volume of air. From that point on, rotor rotation causes the male lobe to compress that cylinder, until it is open to the discharge plenum. The length of the cylinder is about 1/3 now, and the pressure is about 3 X what it was at the inlet. See Figures 1 and 2.

Temperature goes up significantly during compression in an oil-free air compressor, so there is a limit to the compression ratio. In a 3:1 compression ratio, which is typical, temperatures can rise by as much as 300 °F. Also, 3:1 compression only provides about 30 psig so a second stage is required to get to typical plant pressure of +/- 100 psig.

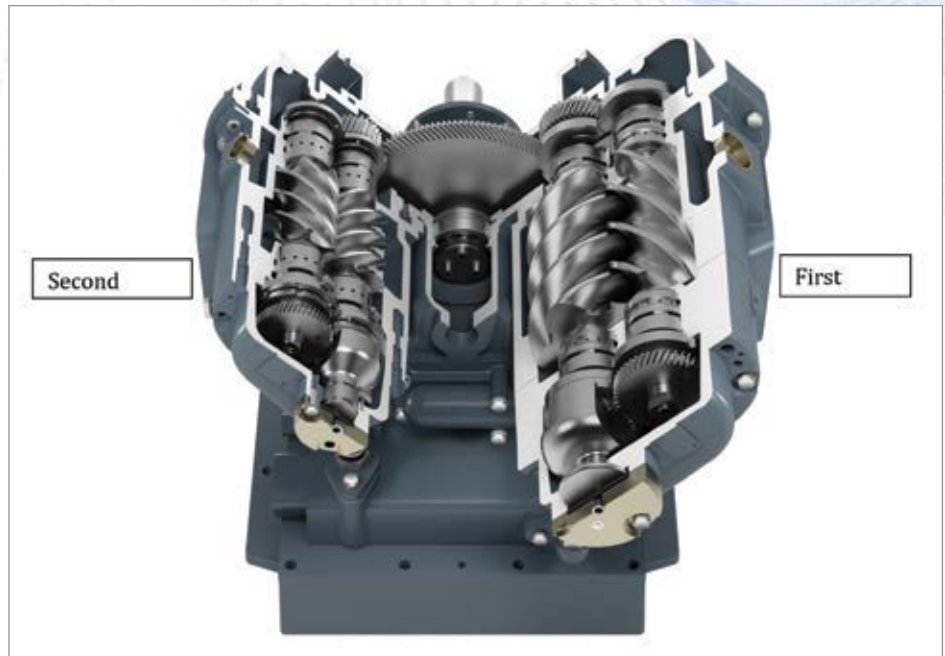


Figure 2: A cutaway of a typical oil free rotary screw air compressor.





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COMMON SYSTEM ISSUES PART 1

Thus, intercooling is added to drop the air temperature down before re-compressing, and after-cooling is required before delivery to the dryer.

Rotors don't touch in an oil-free screw air compressor. They are kept at a very close

distance via timing gears, and coated with a factory-designed temperature and wear tolerant coating to seal the rotor gap as best as possible. Some leakage back between the rotors occurs, reducing capacity and increasing temperature as it wears but that's another technical subject all on its own.

Capacity control is done typically via load-unload. Variable speed is becoming more accepted, but most air compressors installed are load-unload, so we will assume that mode for this discussion. Oil-free screw air compressors can't be "inlet modulated" because first-stage temperatures would go too high. To unload, the capacity control valve (CCV) is fully closed, and the discharge is vented. To load, the reverse occurs. Oil-free air compressors are capable of loading and unloading far quicker than lubricated type unit, because there is no oil sump to blow down. However, there are maintenance issues associated with cycling. The CCV needs to be rebuilt more often if the air compressor cycles more frequently.

Automatic condensate drains are at the intercooler and after-cooler outlet, and are usually bleeding intermittently whenever the air compressor runs. Water can't be allowed to enter the second stage, or the air compressor will be destroyed. When the after-cooler outlet drain bleeds, it takes air with it. Keep that in mind for the discussion later about the "fatal interaction" of oil-free air compressors and heatless dryers.

Multiple oil-free screw air compressors are not hard to control with a PLC. The simplest method is "cascade control." Typical settings are shown in Figure 3.

Smart sequencers can use a variety of other algorithms, but cascade is the most common and easiest to understand. Keep in mind that all air compressors local controls operate from their own discharge pressure sensor so any pressure variances at that point are interpreted as a demand for air.

Heatless Regenerative Dryer Basics

Regenerative dryers are completely different than refrigerated dryers. Refrigerated-type dryers drop moisture by merely cooling the air as much as possible, and condensing

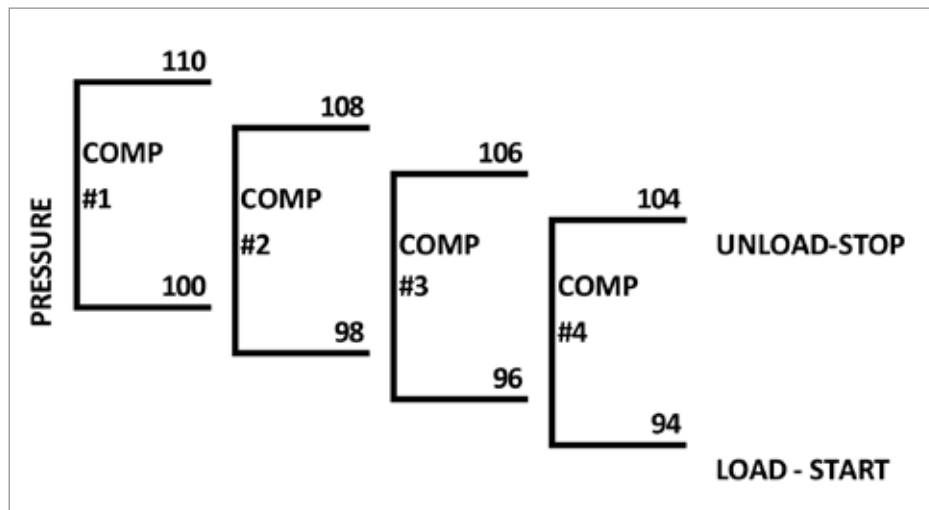


Figure 3. Shown is an example of typical cascade pressure settings.

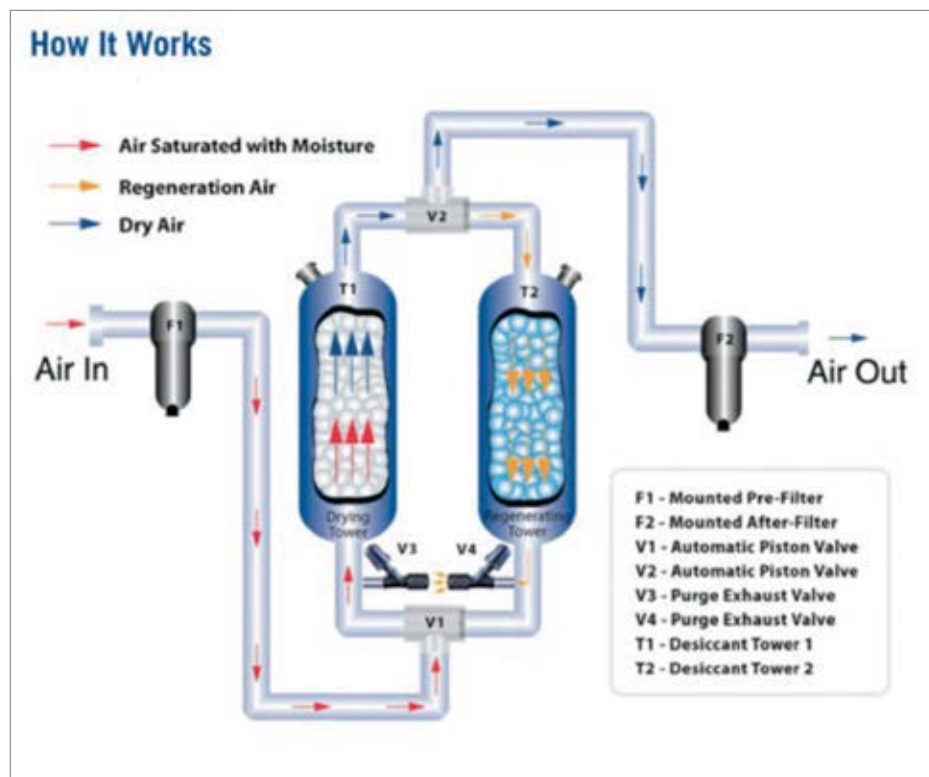


Figure 4. A typical heatless dryer.

the water vapor. It takes a small amount of energy to “pump” the heat from the compressed air out, about 5% of the energy that it took to compress the air. A vapor-compression refrigeration cycle draws the heat out of the air.

Regenerative dryers don’t use a thermodynamic cycle like refrigerated dryers. They use a process called “adsorption,” which is a molecular process of a gas adhesion to a solid. In a crude sense, it’s like a magnetic process. A water vapor molecule is attracted to the surface of the tiny beads of desiccant like a particle of iron to a magnet, at normal temperature and pressure. And it is rejected like a reverse-polarity magnet at a lower pressure (or higher temperature).

So a desiccant dryer has two pressure vessels full of desiccant (Figure 4). In one, the water vapor is adhering to the desiccant, drying the incoming air. In the other, the water vapor is being driven off the desiccant, “regenerating” the desiccant. The two vessels, or “towers,” are switched back and forth, trading roles, over and over. Note the check valves in Figure 4. Purge is usually drawn from before the check valves.

To regenerate the off-line tower, the pressure has to be dropped and a motive fluid added to carry away the moist air, and with it all the moisture that has been loaded up in the last cycle. In a heatless regenerative compressed air dryer, that fluid is a portion of the dried air. About 15% of the dried air is needed to regenerate a -40 °F dryer, and about 25% for a -100 °F dryer. This is called “purge.” Purge air had to be compressed, and is costly. Not just in terms of the energy, but the reserve air compressor capacity that it robs from the plant.

Controls consist of a timer and valves that switch back and forth, and control de-pressurization, re-pressurization, and other

necessary functions. Typical heatless dryers have a 5-minute cycle time per tower.

Additional controls called “dewpoint demand” (or something similar) use a dewpoint transmitter after the dryer to determine if the dryer can extend drying on a tower, and not start to regenerate. It is NOT a variable purge flow, however, but a variable time that it is purging. It certainly saves a lot of energy on lightly loaded dryers. However, keep in mind that the peak purge is still the same. This comes into play in the “fatal attraction” discussion also.

“Fatal Attraction” of Oil-free Screw Compressors and Heatless Dryers

Now for the fun part where things are not nice and tidy! Like in a typical plant, such as your own. Let’s talk about air compressor

controls, and what happens when your system is a set of individual air compressors, each with their own dryer. You might have had the plant built originally with one and a backup. The plant has grown, and you have another air compressor room that has one or more, all isolated to their own dryer. I realize this isn’t an ideal arrangement, but it makes this next section easier to explain.

Recall that any drop in pressure at the air compressor sensing location (P1) will be interpreted by the air compressor as a demand for air. In addition, know the air compressor will start and load. And any rise in pressure will be interpreted as a reduction in demand, and the air compressor will unload and stop after an idle timer, purely based on pressure. The pressure at the air compressor discharge is influenced by many

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9:00AM–6:00PM	Exhibitor Move-In
3:00PM–6:00PM	Conference Registration Open
6:00PM–8:00PM	Welcome Reception

MONDAY, OCTOBER 14, 2019

7:00AM–11:00AM	Exhibitor Registration and Move-in
8:30AM–10:00AM	Opening Session
10:15AM–12:15PM	Conference Session #1
12:00PM–6:00PM	EXPO FLOOR OPEN
1:30PM–2:30PM	Energy Treasure Hunt Workshop #1
2:45PM–4:45PM	Conference Session #2
TBD	Networking Event!!

TUESDAY, OCTOBER 15, 2019

7:00AM–8:00AM	Continental Breakfast*
8:00AM–9:30AM	Plenary Session
9:45AM–11:45AM	Conference Session #3
12:00PM–6:00PM	EXPO FLOOR OPEN
1:30PM–2:30PM	Energy Treasure Hunt Workshop #2
2:45PM–4:45PM	Conference Session #4
5:00PM	Energy Treasure Hunt Raffle Winners Announced!!*

WEDNESDAY, OCTOBER 16, 2019

7:00AM–12:00PM	Exhibitor Move-out
7:00AM–8:00AM	Continental Breakfast*
8:00AM–10:00AM	Conference Session #5
10:15AM–12:15PM	Conference Session #6



4 TRACKS PER CONFERENCE SESSION

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<ul style="list-style-type: none"> October 14 Workshops, Lunch, Opening Session, Expo Hall & Evening Reception October 15-16 Breakfasts, Lunch, Conference Sessions, Expo Hall & Evening Reception 		

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COMMON SYSTEM ISSUES PART 1

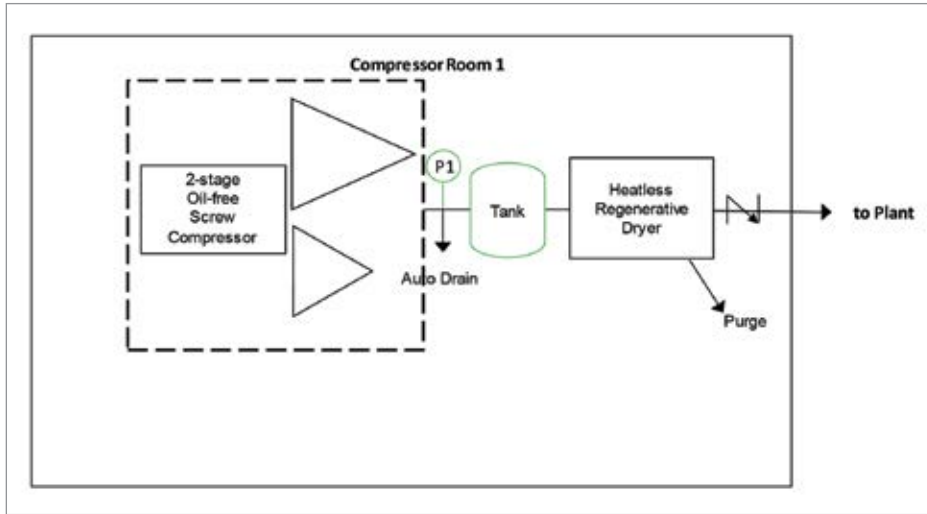


Figure 5. A simplified oil-free compressor/heatless dryer system.

things, including real demand after the dryer, dryer purge and auto drains.

The latter two are isolated from the system by the check valve, and will cause draw-downs in pressure far faster than a system drop (if the air compressor is unloaded or off). The purge and auto drains are coming off a smaller, “mini-system” storage size, smaller than storage that buffers the demands out in the plant. And the purge and drains are “sudden,” or “binary” demands, on, then off. The dryer purge can be a big one, even if reduced in frequency by the dew-point demand controls, sometimes as much as 1/3 of the air compressor size if the dryer is oversized.

Making the problem worse are pressure drops in filters and the dryer, which bump up pressure at the air compressor the moment the air compressor loads, effectively robbing operating pressure differential.

So, what demand will “talk” to the air compressor faster, creating a pressure signal to start/load, the dryer, the auto drain, or the system? It turns out it’s in that order most of the time, dryer purge, then drain, then system.

The net result is that the air compressor in Figure 5 will cycle to meet false demands.

If the plant had two air compressor rooms like this, and one was in “lag,” it could be starting/stopping, loading and unloading purely based on a false demand. In a future article, I will describe a case study of a real system that ran and cycled a 300 HP air compressor merely due to dryer purge.

Conclusions

Heatless dryers and oil-free screw air compressors, though they are reliable and provide great performance in many situations, can have a fatal attraction if one air compressor is isolated to one heatless dryer. The problem is compounded when the dryer is larger than the air compressor. The dryer will become a false demand for that air compressor, cause it to load and load rapidly, just to meet purge. My next article will discuss some system changes that can reduce that effect, and maybe help them get along better. **BP**

For more information, contact Tim Dugan, tel: (503) 520-0700, email: Tim.Dugan@comp-eng.com, or visit www.compression-engineering.com.

To read more **Air Compressor Technology** articles, please visit www.airbestpractices.com/technology/air-compressors.

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Conference Images from the Opening Session and from a Track Session

SHOW REPORT: The Inaugural BEST PRACTICES EXPO & Conference

By Mike Grennier, Compressed Air Best Practices[®] Magazine

► The inaugural BEST PRACTICES EXPO & Conference is officially in the books and show organizers and attendees alike have given it a big thumbs-up!

Held September 16-19, 2018 at the Chicago O'Hare Crowne Plaza and Conference Center, the first-ever event drew 750 attendees who came together to learn and share ideas about the countless ways to achieve

efficiencies with compressed air, blower, vacuum and cooling systems – and in the process – save energy and improve profitability.

The publishers of Compressed Air Best Practices[®] Magazine, Blower & Vacuum Best Practices and Chiller & Cooling Best Practices produced the event, co-sponsored by Chicago's utility provider ComEd and by the Compressed Air & Gas Institute. Show Producer Rod Smith reported



Bruce McFee, Patrick Britton, Chad Larrabee and Rob Haseley at the CAGI booth (left to right).



Eric Iversen, Nicole Glick, Chris Brucher, Cristina Curca, Jeri Ketzner, Shonda Biddle and Tom Johanson at the ComEd booth (left to right).

an overwhelmingly positive response to the event. “It exceeded our hopes for a first-time event in terms of attendance and content.” Smith said. “We felt we took a positive first step with the Corporate Energy Managers discussing how these three utilities are interdependent. I was encouraged to hear sales channel personnel say they are considering expanding their scope of auditing services to help plants better manage these utilities.”

Derrick Taylor, PneuTech Director USA, is one of many attendees and exhibitors who gave the BEST PRACTICES EXPO & Conference high marks. “It’s been awesome,” Taylor said on the show floor. “I believe the North American market needed a show like this for many years.”

The Educational Conference

The conference consisted of the following four tracks running simultaneously for 2 ½ days featuring almost 100 speakers. Our thanks go to the amazing collection of experts who came with the spirit of sharing knowledge so we can improve our manufacturing plants.

1. Compressed Air Supply Strategies
2. Compressed Air Demand Reduction
3. Blower & Vacuum System Optimization
4. Cooling Systems & Energy Management

Speakers included leading system assessment experts from the U.S. and Canada, as well as representatives speaking from the Compressed Air &

Gas Institute, ComEd, Compressed Air Challenge®, Association of Energy Engineers, Department of Energy Better Plants Program, and the U.S. Environmental Protection Agency’s ENERGY STAR® for Industry program.

Leading Energy Managers from General Mills, Ball Beverage Packaging, Fiat Chrysler, NTN Bearings (to name a few) gave very insightful speeches explaining their success and challenges with optimization projects. Chicago-region firms like Harris Equipment, Air Services Company, Fluid-Aire and Brabazon both exhibited and lent their expertise as speakers and session chairs.

And while a lot of business got done, there was also opportunity for networking and fun. Social events included a packed opening reception, along with a second gathering at a popular bar-restaurant where attendees got the opportunity to sample some of Chicago area’s great food and watch the Chicago Bears win their home opener.

The BEST PRACTICES EXPO

The EXPO portion of the event sold out the exhibit space and featured 65+ exhibitors of compressed air, blower, vacuum and cooling system technologies. Attendance was free-of-charge for qualified industry personnel.

Compressed air technologies on display included all types of air compressors, controllers, compressed air dryers, nitrogen generators, piping and lubricants. At least ten booths featured blowers, rotary screw and rotary vane vacuum pumps, lubricants, piping and controls. There



Brit Thielemann, Greg Fenwick, Rebecca Borodzick, Ken Kittasz, Stephanie Roberts, Lexi Lubber, Brian Pratka, Kent Van Sickel, Gordana Stefoski and Nick Rhode at the Sullair booth (left to right).



Greg Marciniak, Jack Gusciora, Brian Blum, Sara Nagib and Lindsay (Yontz) Moss at the Atlas Copco booth (left to right).

THE INAUGURAL BEST PRACTICES EXPO & CONFERENCE



Eric Koolenga (Air Components & Engineering) Chris Erickson, Tom Pischl, Mark Olson, Fred Bergsma (Air Components & Engineering), Tony Witter, Michael Camber, Steve Ekkens (Air Components & Engineering) and Vince Hardy (Air Components & Engineering) at the Kaeser booth (left to right).



Tilo Fruth at the BEKO Technologies booth.



Biren Bhalla, Kevin Ray, Bogdan Markiel and Garth Greenough at the DV Systems booth (left to right).

were also five cooling system technology booths exhibiting chillers, heat exchangers and custom cooling systems.

Here's a sampling of booths the editorial team got the chance to visit in the allotted hours, starting with the co-sponsors of the entire event. Our apologies to all exhibitors/booths not mentioned or photographed here.

Co-Sponsored by the Compressed Air and Gas Institute and by the ComEd Energy Efficiency Program

The Compressed Air and Gas Institute (CAGI) continues to add more and more value to members. During a visit to CAGI's booth, Chad Larrabee pointed to several examples, including ongoing work with educational resources. Specifically, the 7th edition of the Compressed Air & Gas Handbook is being updated with new chapters and made available as downloadable files. There is also CAGI's e-Learning program. The online program is highly recommended given invaluable information concerning safe and efficient operation of compressed air systems. Members can also visit the "Industry Hot Topics" area of CAGI's website to get answers to questions about efficiency, sustainability, heat recovery, and more. Visit www.cagi.org to learn more.

It's an understatement to say ComEd stands out as a utility dedicated to helping customers save energy. At the booth, Tom Johanson shared insights into ComEd's Energy Efficiency program, offering three types of no-cost studies to industrial customers. ComEd will conduct a free compressed air study when a customer commits to repairing 50% of the identified leak volume. It will also cover the cost of an industrial refrigeration study when a customer commits to implementing at least \$15,000 of recommended energy efficiency projects. It will do the same for a process-cooling study. ComEd also announced its Fix-it-Now program, incentivizing customers to fix compressed air leaks. The program pays \$100 per leak repair to customers who qualify for the incentive. More details are available at www.comed.com.

The EXPO – Compressed Air Technology

At the Sullair booth, Senior Product Manager – Stationary Air Compressors Brit Thielemann, showed the editorial team the LS Series oil-flooded rotary screw air compressors using Electronic Spiral Valve technology to reduce operational costs. The variable capacity control method efficiently manages changes in compressor demand. Doing so reduces the amount of air compressed, which in turn, reduces energy

usage. Sullair also provided insights into its AirSuite compressed air system auditing software allowing users to identify true system costs and opportunities for energy, equipment and maintenance costs.

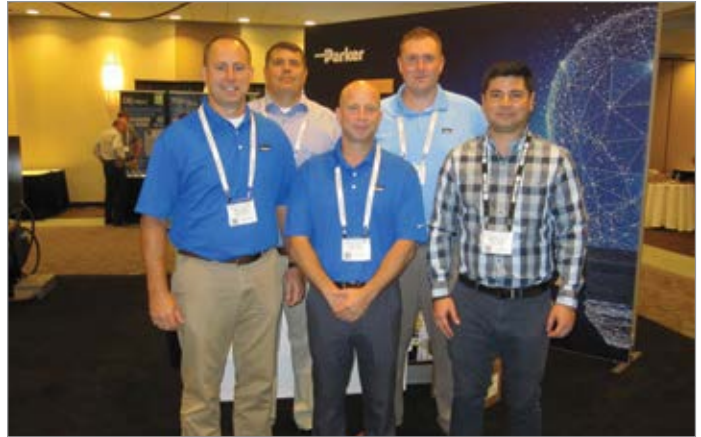
Atlas Copco showcased its new Optimizer 4.0 central controller, which optimizes the airflow of the compressor room, saving energy – while helping to prevent unequal air compressor wear and more. The controller links all compressors and dryers and lowers the overall pressure band. It also selects the best machine combination to efficiently deliver the required compressed air output. The company also displayed its oil-injected GA30 VSD+ rotary screw, variable speed drive compressor equipped with an integrated dryer in one compact package.

Kaeser Compressors talked about its Custom Engineered Solutions – including compressed air, vacuum, and blower systems built to customer specifications. Complete systems, which can be built in custom enclosures or modified ISO shipping containers, help users eliminate constraints with space, weather and accessibility. Kaeser Marketing Services Manager Michael Camber said the packaged systems also go a long way toward helping users reduce construction, installation and operating costs. Kaeser also showcased its SIGMA Air Manager[®] 4.0 multi-unit controller.

BEKO Technologies displayed its family of DRYPOINT XC heatless desiccant dryers. Designed and manufactured in the United States, the dryers are offered in models rated from 60 psig, all the way to the high-pressure model rated to perform at 7,250 psig. The dryers offer standard outlet pressure dewpoints of -40 °F and optional outlet pressure dew point of -100 °F.

DV Systems President Garth Greenough took time away from a busy booth to emphasize how DV Systems' product design philosophy revolves around energy efficiency. He talked about a number of products, including the company's Huron B10 Airsystem, a 10 hp variable speed, direct drive rotary screw air compressor. In addition to providing three-phase electrical power, it features a unique single-phase design that enables enabling the machine's installation in locations where it was previously economical or impossible to do so. The unit, which has a low maximum 55-amp draw, efficiently delivers 37 scfm at 145 psi.

Gardner Denver displayed its Ultima oil-free, two-stage variable speed drive rotary screw air compressor, which is one of numerous models offered in its PureAir oil-free air compressor line. The



Keith Harger, Tim McDonald, Jody Panzer, Jim Tuma and Guillermo Hiyane at the Parker Transair booth (left to right).



Milton Boyce, Sergio Lopez and Bob Groendyke at the Hertz Kompressoren booth (left to right).



Darren and Jan de Bie at the JORC booth (left to right).

THE INAUGURAL BEST PRACTICES EXPO & CONFERENCE



Kevin Taylor, Jason Jones, Jeffrey Vaughn, Dave Cruse, James Brevoort, Natasha Taylor, Tom Chellberg, Anina Diener, Mike Heine and Derrick Taylor at the PneuTech booth (left to right).



Gray Biggins, Jeff Bremer and Frank Brookshire at the ELGi Compressors booth (left to right).



Steve Van Loan, Jerry Rodriguez (Saylor Beall Manufacturing Company), Michael Gonder, Brian Stober, Mike Kropp and Matt Nolte at the Sullivan-Palatek booth (left to right).

Ultima is offered as standard from 75kW to 160kW, with each unit fully upgradeable between this kilowatt-range. Patrick Kraemer, Oil Free Business Development Manager, West Region, said the air compressor is attracting significant interest in applications such as those in the food and beverage industry given the importance of oil-free compressed air systems. He called out numerous features of the machine, such as permanent magnet synchronous motors providing 97% efficiency, as well as a host of water-cooled components including the intercooler, after-cooler, airends, main motors, and inverters that result in improved performance and longevity. The quiet-running and compact machine also has a 37% smaller footprint, allowing it to conserve precious floor space. Additionally, the machine lends itself easily to heat recovery.

There was a lot to take in at Parker Hannifin's booth, starting with its OFAS (Oil-Free Air System) desiccant dryer recently launched to the North American market. The dryer is third party-validated to ISO 8573-1 Class O Quality Classes and designed for use with any air compressor type. Advanced controls automatically adapt dryer operation to ambient and inlet conditions and compressed air load profiles. The result is reduced energy consumption and lower running costs. It's suitable for instrumentation, electronics, robotics, plant automation and industrial compressed air treatment environments. Next, the Parker Transair team shared insights into the Transair Condition Monitoring (TCM) sensors and cloud-based software that allows users to easily monitor their compressed air systems from anywhere in real time. The TCM line of pressure/vacuum, humidity, temperature, power and flow sensors can be integrated into existing steel or copper piping systems, as well as into the Transair aluminum pipe system.

At the Hertz Kompressoren booth, VP General Manager Bob Groendyke talked about the importance of manufacturing quality equipment and customer service. He pointed to the company's HVD Series direct drive and variable speed air compressors. Available in models from 7.5 to 400 hp, the air compressor is engineered to save up to 35% energy. He also said the company's expansion into the United States continues its upward trend based not only on efficient and reliable products, but also on the company's passion for customer service. "We pride ourselves on literally having someone pick up the phone every time the phone rings," Groendyke said.

JORC continues to demonstrate a singular focus on condensate management products. They manufacture a full range of oil-water separators and condensate drains ranging from zero air loss to timed electric solenoid with valves. Jan de Bie explained they are now helping clients visualize condensate drain performance and reliability with some Internet-of-Things solutions.

The team at ELGi Compressors was excited to share insights into its expanded single- and two-stage, oil-free rotary screw air compressors now available from 60 to 500 hp and designed to consistently meet ISO 8573-1 Class 0 Oil Quality Classes. It also touted the capabilities of its Premium EG electric lubricated screw compressors available from 125 to 200 hp, which are specially designed for ensuring lower energy consumption and higher efficiencies.

PneuTech displayed its RK Series 10 hp variable speed drive combo air compressor. The rotary screw compressor incorporates two, 5 hp air compressors, a refrigerated air dryer, inline filtration, storage tank, oil/water separator, and timer drain in a single compact package. The air compressors operate together when needed to efficiently meet air demand, while also providing redundancy. PneuTech also discussed its remote monitoring system. Named, “monitor,” it can be adapted to any brand of compressor, helping users make proactive decisions about usage and maintenance.

Sullivan-Palatek talked about the technical know-how it puts into its products, including the SP Series low pressure rotary air compressors with capacities upwards of 2,200 cfm at pressures as low as 45 psi. President Steve Van Loan said technical expertise is evident in the low pressure air compressors’ ability to run cool and deliver long life. He also pointed out the SP Series’ quiet operation. With an enclosure, for example, the SP-16 Series operates at 66-72 dBA.

Mattei Compressors Sales & Product Manager Bill Kennedy proudly discussed the continued success of the company’s belt-driven BLADE Series, including the BLADE 22i model built with variable frequency drive technology. The rotary vane BLADE Series air compressors are rated to efficiently deliver 14.8 through 65 scfm at speeds as low as 1,050 rpm. The machines also operate very quietly, keeping noise as low as 61 dBA.

Bay Controls discussed how it helps energy managers and plant operators make informed, data-driven decisions and improve their



Bill Kennedy at the Mattei booth.



Thomas Tressler, Roger Blanton and Becky Gibson at the Howden Roots booth (left to right).



Patrick Kraemer and Shawn Boynton at the Gardner Denver booth (left to right).

THE INAUGURAL BEST PRACTICES EXPO & CONFERENCE



James Hupp and Alex Kun at the Leybold booth (left to right).



Adrien Perez, Don Joyce, David Peters and Todd Allison at the Nano Purification Solutions booth (left to right).



Bruce Williams and Mike Wlodarski at the HydroThrift booth (left to right).

compressed air systems. Whether it's the company's cloud-based plant controls and monitoring system, its localized system that connects to the plant's intranet, its controls for one or multiple air compressors – or its customized solutions – Bay Controls works with customers to improve compressed air system reliability, improve uptime, and save energy. In addition to compressed air systems, Bay Controls has grown to service the HVAC market.

The EXPO – Blowers and Vacuum

Howden Roots talked about its RAM-DVJ WHISPAIR Exhauster, a dry exhauster that features a unique discharge plenum that allows cool, atmospheric air to flow into the cylinder. As such, it permits continuous operation at vacuum levels to blank-off with a single stage unit. It also displayed its 412 HPT blower for the dry bulk transportation market. The high-pressure tri-lobe blower delivers more flow than the competitive blowers in its class and is designed to minimize maintenance, said Sales Manager Roger Blanton, P.E.

Atlas Copco showcased its GHS VSD+ Series of oil-sealed rotary screw vacuum pumps, available in models from 230 to 2,245 acfm. The pumps incorporate VSD technology, along with set point control, allowing the vacuum pump to only deliver what's needed to meet required demand. The unit cuts energy costs by an average of 50%, and is found in a wide range of applications, including plastics, glass, bottling, canning, wood, packaging, printing and paper and meat packaging.

Solberg's US Director of Sales Jamie Stebbins walked through the TKO Series Multistage Liquid/Particulate separator, which is designed for use with most vacuum pump liquid removal applications in the marketplace. The TKO Series uses multi-stage filtration and separation technology to protect pumps against harmful liquids that destroy lubricating/seal oil. Additionally, it guards against emulsification in oil-lubricated systems. It can be equipped with Solberg's automatic drain system, which allows the unit to drain without stopping the process and breaking the vacuum.

Gardner Denver displayed its CycloBlower VHX, which utilizes a unique 3 X 5 variable helix rotor design to achieve energy cost savings of up to 35%. Touted as an industry first, the rotor design incorporates faster internal compression and a significantly larger discharge port to eliminate losses, while also improving efficiencies

and a higher turndown capability. “Our customers are looking for energy savings and the investments we make in our products to improve their processes,” said North America Sales Manager Shawn Boynton.

Leybold talked about its DRYVAC Energy Saver device that reduces the power consumption of various DRYVAC dry compressing vacuum pumps by as much as 50%. The proprietary technology primarily conserves energy by managing the inlet and exhaust pressures of the pump, in turn, placing lower power demand on the motor. Energy Saver can be installed on new DRYVAC pumps, or retrofitted to pumps in the field.

The EXPO – Chillers and Custom Cooling Systems

Innovation was on tap at nano purifications solutions booth where Don Joyce talked about the latest NCS multi-scroll air-cooled chiller. The unit automatically alternates between traditional cooling and free cooling. To provide free cooling, a modulating valve (with the help of ambient sensors) changes the flow from the refrigeration circuit to the free cooling coil allowing for a reduction in refrigeration kW. When ambient temperature falls to 4 °F below the return temperature, the chiller starts to partially free cool. The valve then begins to route the process-cooling water to a separate radiator-type chiller housed on the opposite side of the unit, allowing the chiller’s compressor to cycle to match the lower load. When ambient temperature reaches 9 °F below setpoint, the chiller is in 100% free-cooling mode. The only electric power needed is to operate fans.

HydroThrift talked about its engineered cooling systems, including the closed-loop

PCX cooling system. It features a plate and frame, or a shell and tube type heat exchanger, to cool equipment via a closed-loop that uses using an external water source, such as plant process water, tower water, or a pond or river. The closed-loop can also be filled with a water-glycol mixture, deionized water, city water, or other clean heat transfer fluid. The system ensures no entrained air, contaminants, air-borne dirt or chemicals from treated or untreated water are evident in liquid-cooled equipment.

Conclusion

Judging by the success of the first BEST PRACTICES EXPO & Conference, the next event scheduled for October 13-16, 2019 at the Music City Convention Center in Nashville, Tenn., promises to be yet another exciting opportunity for knowledge sharing, viewing technology and networking fun. We look forward to seeing you there! **BP**

For more information please visit www.cabpexpo.com. For the 2019 Exhibitor Prospectus or to propose a Presentation Abstract please contact Rod Smith at email: rod@airbestpractices.com.

To read more about **Compressed Air Technology**, visit www.airbestpractices.com; for **Blower & Vacuum Technology**, visit www.blowervacuumbestpractices.com; and for **Cooling Systems** visit www.coolingbestpractices.com.



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RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

Gardner Denver Ultima Oil-free Air Compressor Enhances Operational Efficiencies

Gardner Denver's Ultima oil-free compressor sets a benchmark for performance and operational efficiencies and for meeting the highest possible air quality standards.

When considering the available technologies, a major drawback to traditional two-stage oil-free compressors is the reliance on a gearbox. Not only do these consume large amounts of energy, but they also require increased oil volume to lubricate the gears.



The Gardner Denver Ultima Oil-free Air Compressor

In contrast, Gardner Denver's Ultima compressor has been engineered with two highly-efficient, permanent magnetic motors that replace the traditional gearbox design. These two, variable-speed motors are capable of achieving speeds of up to 22,000 RPM and efficiencies greater than 98%. The motors directly drive the airends without the need for a gearbox, thereby increasing efficiency.

Furthermore, while conventional models still use oil to lubricate and cool the airends, Ultima uses water in a closed-loop circuit to cool these components. This allows greater heat-transfer and cooling efficiencies and significantly reduces the amount of oil required for airend lubrication. Water-cooling also places less stress on these components, limiting the opportunity for any maintenance issues that might otherwise arise during the compressor's lifetime thereby reducing service costs.

Ultima is offered as standard from 75kW to 160kW, with each unit fully upgradeable between this kilowatt-range. This means that if a site's compressed air demand increases in the future, customers can purchase an upgrade to a larger Ultima model based on the increased demand. There is no need to purchase a completely new compressor, eliminating the associated downtime and reducing the expense that comes with upgrading the plant air system.

Achieving the quietest noise level in its class (69 db(A)) and the smallest footprint, Ultima can be installed easily at the point of use, rather than in a separate compressor room. Ultima's highly-efficient internal cooling also means adjacent compressors can be located close to one another, optimizing the available space.

Bob Shade, Product Manager for Industrial Compressors at Gardner Denver, explains: "Launched in 2017, our Ultima compressor has been installed at sites around the world, quickly establishing itself as a proven and trusted Gardner Denver oil-free technology. There is no question

TECHNOLOGY PICKS

that Ultima continues to deliver high levels of efficiency, due to its highly innovative design and the fact that so many conventional models still rely on the traditional gearbox and single motor set-up.

“For those operating in production sensitive environments, such as the food and beverage industry, electronics manufacturing or pharmaceuticals sector, you want confidence that you are investing in a system that provides the highest air-quality and purity. Ultima meets this need and continues to drive the oil-free compressed air market forward.”

For more information on Gardner Denver's Ultima compressor, please visit <https://www.gardnerdenver.com/en/gdproducts/products/compressors/oil-less-oil-free-compressors/ultima-series-u75-u160>.

About the Gardner Denver Industrials Segment

The Gardner Denver Industrials Segment delivers the broadest range of compressors and vacuum products, in a wide array of technologies, to end-user and OEM customers worldwide in the industries it serves. The Segment provides reliable and energy-efficient equipment that is put to work in a multitude of manufacturing and process applications. Products ranging from versatile low- to high-pressure compressors to customized blowers and vacuum pumps serve industries including general manufacturing, automotive, and wastewater treatment, as well as food & beverage, plastics, and power generation. The Segment's global offering also includes a comprehensive suite of aftermarket services to complement its products.

Gardner Denver Industrials Segment, part of Gardner Denver, Inc., is headquartered in Milwaukee, Wisconsin, USA. Gardner Denver was founded in 1859 and today has approximately 6,700 employees in more than 30 countries. For further information, please visit www.gardnerdenver.com/industrials.

New VPInstruments 3 Phase Power Meter

VPInstruments introduces a highly accurate 3 Phase Power Meter. The newest addition to the company's portfolio measures true power, since it measures the voltage and current of all three phases. The 3 Phase Power Meter, which is recommended for permanent measurements, provides power, voltage, current, cos (phi) and many more electrical parameters. All are communicated via the RS485 (Modbus RTU) interface.

The 3 Phase Power Meter comes in different voltage ranges to fit users' specific measurement applications. Models are available for single- and three phase configurations. The 0.333 VAC CT inputs enables connection to universal current transformers. Or, users can use VPInstruments' current transformers to complete the power measurement solution.

Applications of the 3 Phase Power Meter include power consumption of air compressors, general purpose power measurement, electricity sub metering, as well as pumps, ventilators, and more. By combining it with



The new VPInstruments 3 Phase Power Meter

RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

VPInstruments' VPFlowScope DP flow meter, which has been installed at the discharge of the air compressor, users can monitor air compressor performance and efficiency. In most production plants, the compressed air system consumes between 10 and 25% of all electricity. Monitoring the efficiency of your compressed air equipment is key to realizing energy savings.

About VPInstruments

VPInstruments offers industrial customers easy insight into energy flows. We believe that industrial energy monitoring should be easy and effortless, to enable insight, savings and optimization. VPInstruments products are recommended by leading energy professionals worldwide and offer the most complete measurement solution for compressed air flow, gas flow and electric energy consumption. Our monitoring software VPPVision can be used for all utilities, and enables you to see where, when and how much you can save. Our products can be found all over

the world. We serve all industrial markets, for example; automotive, glass manufacturing, metal processing, food and beverage and consumer goods. We can also help your industry. Let us open your eyes and start saving energy.

For more information please contact Joyce van Eijk, email: joyce.van.eijk@vpinstruments.com, tel: +31 (0) 15 213 1580, or visit www.vpinstruments.com

PREVOST Announces prevoS1 Coupler

PREVOST Corp. announced its prevoS1 one-push button, quick safety coupler. Used in , pneumatic and hydraulic power applications, the patented technology eliminates risk to operators and equipment attributed to decompression and disconnection with one single step. The one-button action also significantly reduced injuries and damage associated with dangerous "hose whip."

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c. Total Requested Copy Circulation (Line 15c) + Requested/Paid Electronic Copies (Line 16a)		14,802	15,195
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PS Form 3526-R, July 2014

TECHNOLOGY PICKS

The prevoS1 coupler meets all industry safety and Occupational Safety and Health Administration (OSHA) compliance regulations. In addition it complies with ISO 4414 regulations, ATEX 2 certification and requirements for zones classified as 2 (gas) and 20 (dust).

About PREVOST

Innovation and quality have always been the two central pillars of the company's development and are the reasons why PREVOST offers numerous patented products with optimized performance. In addition to couplers, PREVOST offers an extensive line of compressed air related products ranging from blow guns, hose reels, piping and flex hoses to outfit an entire facility.

For more information, visit www.prevastusa.com, or call 800-845-7220.

ELGi Launches EG-Premium Series Air Compressors

ELGi has launched a new series of air compressors, called the EG-Premium at a time when there is a worldwide demand for energy conservation and low carbon emission products. These compressors best reflect the current market mood and are specially designed for ensuring lower energy consumption and higher efficiencies.

The EG-Premium is available in the 125 hp to 200 hp range. There is a significant reduction in the noise level as well, along with improvements in aesthetics and overall efficiency. These compressors are fitted with the

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The ELGi EG-Premium Air Compressor

RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

eta-V profile airends from ELGi, which have a unique screw profile with high volumetric efficiency and low specific power consumption.

These machines are compact with optional, integrated variable frequency drives and integrated refrigerated dryers (in some markets). Thanks to the in-house expertise in the design of pressure vessels, the air-oil separator tanks in these compressors are designed to keep oil carry-over in the compressed air to a maximum of just 1 ppm. This exceeds the industry average and shows Elgi's commitment to preserve our environment by reducing oil consumption.

These compressors come with a custom-designed bulk water separator, which removes 99 percent of the moisture from the compressed air by impact and centrifugal action, thereby resulting in a reduced pressure drop and reduced load on the dryer and downstream equipment. The coolers are designed to handle large flows and pressure to deliver the best performance even at higher ambient temperatures. These

compressors are also equipped with the ELGi's Neuron III controller, which has modbus read/write capabilities standard for integration into building SCADA and IOT systems.

About ELGi

ELGi Equipments Limited is a leading air compressor manufacturer with a broad line of innovative and technologically superior compressed air systems. ELGi has earned worldwide distinction for designing sustainable solutions that help companies achieve their productivity goals and keep the cost of ownership low. ELGi offers a complete range of compressed air solutions from oil-lubricated and oil-free rotary screw compressors, oil-lubricated and oil-free reciprocating compressors and centrifugal compressors, to dryers, filters and downstream accessories. The company's portfolio of over 400 products has found wide application across industries.

To learn more about ELGi visit <http://www.elgi.us>

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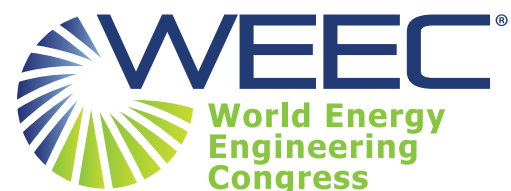
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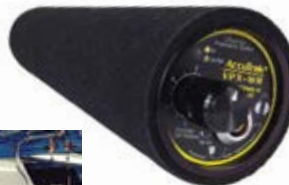
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