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November 2023



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FROM THE EDITOR



Metal Fabrication

As we enter late Fall, we are pleased to announce Atlanta as the site of our Best Practices 2024 EXPO & Conference. Please reserve October 29-31, 2024 to come visit what has become “North America’s Largest Compressed Air Expo” as we return to the Cobb Galleria Centre!

Air compressor manufacturers FS-Elliott and FS-Curtis gave us the opportunity to profile them this month. Mike Grennier and I had the chance to visit with FS-Elliott CEO Paul Brown and FS-Curtis President Robert Lee to learn more about these firms and their parent company, Fusheng Group. We hope you enjoy Mike’s article.

In-plant oxygen and nitrogen generation continues to grow as manufacturing plants decide to reduce the costs and sustainability impact related to providing these gases to their production processes. Metal fabrication, stamping and welding processes are a big example. Our thanks go to Jatinder Tiwana, the CEO at Specialty Gas Canada, for sending us the article titled, “Boost Performance with On-Site Oxygen and Nitrogen Generation.”

A porcelain factory was deploying too many maintenance resources to keep the vacuum system going in support of extruder degassing applications. Busch Vacuum Solutions has sent us a case study on how a new vacuum system helped this firm reduce their maintenance costs.

I was pleased to be invited by Kaeser Compressors, in Fredericksburg, Virginia, to join their celebration of “forty years of growth and expansion.” Their new office building, featuring a Rooftop Café, was one of the highlights I hope you can also enjoy by reading my trip report.

Fabtech 2023 is a leading event for metal forming, fabricating, welding and finishing. It was held in Chicago’s McCormick Place from September 11-14, 2023. None of these processes can function without compressed air, nitrogen generation and chiller systems! I put on my roving reporter hat and the enclosed show report attempts to provide a glimpse of the technologies and firms displaying these products at the show.

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

RODERICK M. SMITH

Editor

tel: 412-980-9901

rod@airbestpractices.com



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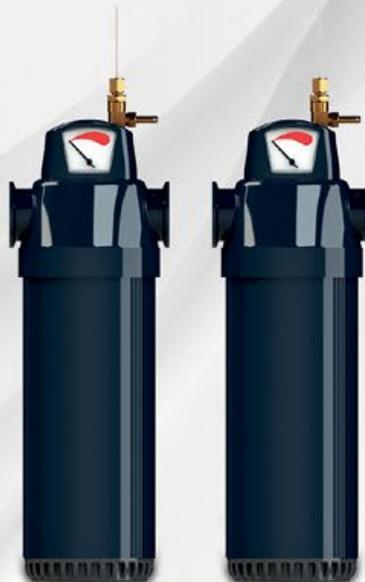
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Compressed Air Industry News

Thomas Kaeser Awarded the Bavarian Order of Merit

Thomas Kaeser, President and CEO of Germany's Kaeser Kompressoren, has been awarded the Bavarian Order of Merit by Markus Söder, Minister-President of Bavaria. Kaeser is a highly successful economic leader and active member of the business community. In an Upper Franconian economy that has undergone extensive change, he has used structural transformation to help the economy locally and to grow Kaeser Kompressoren globally.

When presenting this prestigious honor, Söder said, "He is a steadfast advocate for the Upper Franconian economy. He always has excellent ideas and suggestions for what can be done to benefit society." Additionally, Söder emphasized that to receive the Bavarian Order of Merit one must accomplish something exceptional. "It cannot be bought or inherited; it must be earned," he said.

In accepting this honor, Thomas Kaeser promised to continue applying his skills for the benefit of society as a whole as well as his company. He expressed his gratitude to the many people who have accompanied and shaped him throughout his life: his grandparents and parents, his six siblings, his friends and colleagues, the entire Kaeser Kompressoren staff of 7,500 employees, and most especially his wife Tina-Maria and his sons Jan and Philipp. "I want to share a part of the Order with those who have supported and influenced me throughout my life," he said.

About Thomas Kaeser

Thomas Kaeser is a native of Coburg, Germany. He is the grandson of Carl Kaeser, Sr., who founded Kaeser Kompressoren in 1919, and the son of Carl Kaeser, Jr., who led the company until 2009. Today Thomas Kaeser and his wife Tina-Maria Vlantoussi-Kaeser lead the family business with offices in over 140 countries. Mr. Kaeser

is Chairman of the vbw-District Group of Upper Franconia, Chairman of the Western Region of the VBM and BayME, and CEO of the Association of the Metal and Electrical Industry in Thuringia. In addition, he is involved in the Board of the VDMA (Mechanical Engineering Industry Association), the Exhibitor and Trade Fair Advisory Board of the Hannover Messe, as well as the PNEUROPE Council and the Exhibition and Trade Fair Committee of the German Economy (AUMA). In 2012, he was awarded the State Medal for Special Services to the Bavarian Economy.

About the Bavarian Order of Merit

The Bavarian Order of Merit has been awarded annually since 1957 as a symbol of honorable and grateful recognition for outstanding services to the Free State of Bavaria and the Bavarian people by the Minister-President. It symbolizes the extraordinary commitment and outstanding contributions of the citizens of the Free State to the community.

About Kaeser Compressors

Kaeser Compressors is a leader in reliable, energy efficient compressed air equipment and system design. We offer a complete line of superior quality industrial air compressors as well as dryers, filters, SmartPipe™, master controls, and other system accessories. Kaeser also offers blowers, vacuum pumps, and portable gasoline and diesel screw compressors. Our national service network provides installation, rentals, maintenance, repair, and system audits. Kaeser is an ENERGY STAR Partner. For more information, visit <https://us.kaeser.com/>. For more information or to be connected with your local authorized Kaeser representative, please call (877) 417-3527.



Markus Söder, Minister-President of Bavaria, honored Thomas Kaeser with the Bavarian Order of Merit.

Atlas Copco Expands Manufacturing in India with Pune Factory

Atlas Copco Group has begun construction of a new manufacturing facility in Talegaon, Pune, India. Atlas Copco's new factory in Talegaon will manufacture air and gas compressor systems for the local market, and for export. It encompasses a manufacturing plant and office building of approximately 25,000 m². Atlas Copco is investing around MINR 1400 (approximately 180 MSEK). The new facility is planned to be completed by Q2, 2024. It will generate additional employment for over 200 people and add production capacity.

"We invest further in capacity in India to cater to the growing demand of the Indian and export markets," said Vagner Rego, Business Area President, Compressor Technique. "This expansion project is part of our strategy to remain first in mind, first in choice for our customers. It will enable us to reach new customers and markets and improve lead times."

At the Talegaon facility, around 80% of the energy will come from solar panels and 75% of the water consumed will be derived from rainwater harvesting.

The construction will be in line with the LEED (Leadership in Energy and Environmental Design) concept.

About Atlas Copco Group

Great ideas accelerate innovation. At Atlas Copco we have been turning industrial ideas into business-critical benefits since 1873. By listening to our customers and knowing their needs, we deliver value and innovate with the future in mind. In 2022, Atlas Copco Group had revenues of BSEK 141 and at year end about 49,000 employees. For more information, visit: www.atlascopcogroup.com.



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Compressed Air Industry News

60 Years of Busch Vacuum Solutions

60 years ago, Busch Vacuum Solutions was founded by Ayhan and Dr Karl Busch. Today, 8,000 people work for the family-owned company in 110 subsidiaries worldwide. The company has been world market leader in the vacuum packaging market segment for decades.

Ayhan and Dr Karl Busch met in Munich, where she studied medicine and he mechanical engineering. In 1960, Dr Karl Busch received his doctorate on the subject of “Friction and wear in water-lubricated rotary compressors.” He then went on

to work as a design manager in the machine factory owned by his grandfather, Karl Wittig, in Schopfheim in the Black Forest in Germany. In 1963, he and his wife founded “Dr.-Ing. Karl Busch GmbH” there. The company relocated to Maulburg, the neighboring village, in 1972, where it remains today.

When self-service supermarkets appeared in Germany in the early 1960s, Dr Karl Busch developed the first vacuum pump specifically for packaging food: the HUCKEPACK, a particularly compact and robust vacuum pump with pump stages arranged one above the other. This stacked

design explains its name, which is the German word for piggyback.

It was thanks to Ayhan Busch’s entrepreneurial foresight that the young company grew so quickly. She recognized early on the importance of international expansion. In 1971, Busch founded its first foreign branch in the United Kingdom. In just 15 years, another 18 subsidiaries and four production facilities followed all over the world. The Busch couple never relied on banks while building up their company. Instead, they used the capital they had generated themselves. In 1981, Busch was the first German industrial company to sign a cooperation agreement for production in China. With HUCKEPACK’s successor, the R5, an oil-lubricated rotary vane vacuum pump, the company set a new industry standard and became a world market leader in the vacuum packaging sector.

Today, Busch offers vacuum solutions for a wide range of applications for various industries. The company is represented by 110 subsidiaries all over the world, including production facilities in China, the Czech Republic, France, Germany, India, Korea, Romania, Switzerland, the United Kingdom, the USA and Vietnam. The international Busch Group also includes Pfeiffer Vacuum AG, a vacuum pump manufacturer based in northern Hesse, Germany.

Busch Vacuum Solutions is jointly managed by Ayhan and Dr Karl Busch, as well as their

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three children Ayla, Sami, and Kaya Busch. The Busch family still makes all major decisions together. This principle, which Ayhan Busch established, remains the recipe for success on which the company is based today. In 2022, the Busch family received the most prestigious honor for family businesses in Germany, the award “Family Entrepreneur of the Year”, in recognition of its diversity between generations, genders and cultures.

Additionally, Ayhan Busch and Dr Karl Busch were jointly named as citizens of honor by the municipality of Maulburg in 2015. In 2019, the Technical University of Munich named Dr. Karl Busch an honorary senator. In the same year, he and his wife received the Business Medal from the state of Baden-Württemberg for their outstanding entrepreneurial achievements, and in 2022, they were presented the Gold Medal of Honor from the district of Lörrach for their social and cultural commitment.

About Busch Vacuum Solutions

Busch Vacuum Solutions offers vacuum and pressure solutions from individual vacuum pumps, blowers, and compressors to tailor-made vacuum systems. In addition to vacuum equipment, Busch is also a global service provider. Busch USA headquarters is in Virginia Beach, VA, and part of the global Busch family-owned company with over 3,800 employees in 45 countries. For more information, please contact Busch at info@buschusa.com or visit the Busch US website at www.buschusa.com.



Ayla, Dr. Karl, Sami, Ayhan and Kaya Busch (left to right).



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Compressed Air Industry News

Ingersoll Rand Publishes 2022 Sustainability Report

Ingersoll Rand Inc. published its 2022 Sustainability Report, “Progress Powered by Sustainable Performance,” detailing how the company’s sustainability strategy drives two clear and compelling growth paths: advancing customers’ sustainability goals with innovative products and services, as well as supporting customers in high-growth, sustainable end markets through existing products and new product innovation. The report also focuses on the significant sustainability improvements within its own operations.

In addition, this report highlights the seamless integration of Ingersoll Rand’s Lead Sustainably strategic imperative, one of its five core imperatives alongside Deploy Talent, Accelerate Growth, Expand Margins, and Allocate Capital Effectively, into all its other strategies.

Highlights from the Sustainability Report include the company’s successes in:

- Providing innovative products and services that offer efficiency, circularity and safety to help customers meet their sustainability goals, and also

catering to high-growth, sustainable markets such as renewable energy, water and wastewater management, food and beverage as well as the life sciences sector.

- Leveraging the rigorous and disciplined approach of Ingersoll Rand Execution Excellence (IRX) to successfully achieve substantial energy and greenhouse gas (GHG) reductions within its own operations and continue the company’s steady progress toward achieving its 2030 climate, water and waste management targets.

- Demonstrating its commitment to employee investment through the implementation of its “Ownership Works” program, providing new employees with a one-time equity grant after one year of service with the company.

- Signaling its commitment to the Science Based Targets initiative (SBTi) by signing the Commitment Letter, which demonstrates its steadfast dedication to defining a path to net-zero emissions by 2050.

- Continuing its unwavering commitment to the safety of our employees and contractors as well as its diversity, equity and inclusion (DE&I) goals in the areas of representation, advancement and experience.

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“Lead Sustainably is a key strategic imperative integrated throughout the company to help make life better for our employees, customers, shareholders, and our planet,” said Vicente Reynal, chairman, president and chief executive officer of Ingersoll Rand. “We continue to make great progress against our ambitious operational sustainability goals while offering products and services that deliver significant value to our customers through energy efficiency and water reduction. We’re also relentlessly seeking opportunities to support customers in high-growth, sustainable end markets with new innovations and existing products.”

Ingersoll Rand’s 2022 Sustainability Report has been prepared in accordance with the Global Reporting Initiative (GRI) Sustainability Reporting Standards and is aligned with the Sustainable Accounting Standards Board (SASB) requirements, Task Force for Climate Related Financial Disclosures (TCFD) and the U.N. Global Compact framework.

About Ingersoll Rand

Ingersoll Rand Inc., driven by an entrepreneurial spirit and ownership mindset, is dedicated to helping make life better for our employees, customers and communities. Customers lean on us for our technology-driven excellence in mission-critical flow creation and industrial solutions across 40+ respected brands where our products and services excel in the most complex and harsh conditions. Our employees develop customers for life through their daily commitment to expertise, productivity and efficiency. For more information, visit www.IRCO.com.

Sauer Compressors USA Seeks Acquisitions in North America

Sauer Compressors USA, an affiliate of J.P. Sauer & Sohn GmbH, takes great pride in announcing its plans to expand capabilities and actively pursue strategic acquisitions in North America. As a rapidly growing organization in the compressed air and gas industry, Sauer Compressors USA remains committed to meeting the evolving needs of its valued customers and solidifying its position as a leading provider of high-quality compressor systems.

The decision to expand capabilities and seek acquisitions reflects Sauer’s dedication to further strengthening its market presence and broadening the scope of its offerings. With over 25 years of expertise and an unyielding commitment to excellence, Sauer Compressors USA has earned a notable reputation for delivering innovative, reliable, and efficient



Sauer Compressors USA expands capabilities and seeks acquisitions to propel growth in North America.

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Compressed Air Industry News

medium and high-pressure air and gas compressors to customers across diverse industries.

Expanding capabilities is an essential step in achieving Sauer's long-term vision. This includes investing in cutting-edge technologies, bolstering research and development efforts, and enhancing manufacturing processes to stay at the forefront of the industry. By expanding the facilities and workforce, Sauer aims to increase production capacity to meet the rising demands of customers and expedite delivery times.

In addition to strengthening in-house capabilities, Sauer Compressors USA is actively seeking strategic acquisitions in North America. Through these endeavors, the company plans to collaborate with like-minded organizations with the same commitment to innovation, customer satisfaction, and unwavering quality. Sauer Compressors USA believes that growth through acquisitions is a mutually beneficial strategy that will drive success for the organization, partners, and the industries served. Sauer is confident that the combined strengths of acquired companies and their expertise will create a formidable force poised to meet the dynamic challenges of the compressed air and gas industry.

"We are excited about the possibilities that lie ahead as we expand our capabilities and explore acquisitions in North America," said Don Eaton, CEO and President of Sauer Compressors USA. "This strategic move is a testament to our commitment to delivering the most reliable and advanced solutions to our customers while fortifying our market position. We are confident that this growth trajectory will lead us to new heights and enable us to serve our valued customers better."

Sauer Compressors USA looks forward to an exciting and prosperous future as it continues its journey of expansion and growth through acquisitions. For more information about potential partnership opportunities, please contact Cara Godack, Business/Acquisition Strategy & Integration Specialist, at cgodack@sauerusa.com.

About Sauer Compressors USA

Sauer Compressors USA, an affiliate of JP Sauer & Sohn GmbH and located in Stevensville, Maryland, specializes in the manufacturing of medium and high-pressure air and gas compressors and compressor systems for naval, commercial maritime, offshore, research & development, and industrial applications.

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FS-Elliott and FS-Curtis' Synergies Ensure Compressed Air Success

By Mike Grennier, Compressed Air® Best Practices Magazine

Storied histories; FS-Elliott has manufactured centrifugal air compressors in Export, PA since 1962. FS-Curtis began manufacturing Masterline heavy-duty reciprocating air compressors in St. Louis, MO in 1897.

► There's a lot to be said about compressed air companies FS-Elliott and FS-Curtis, which together bring a host of solutions to the marketplace. What rises to the top, however, is their ability to meet a wide range of customers' needs, thanks to synergies offered on a global scale – in addition to ongoing investments in facilities and resources.

FS-Elliott and FS-Curtis are a combined force, yet each comes to the table with well-established and highly reliable brands of compressed air products. This means they're fully prepared to tackle customers' goals individually or by working together seamlessly and all with the backing of Fusheng Industrial and parent company Fusheng Group, a Taiwanese-based corporation with annual sales in excess of \$2 billion and 20,000-plus employees.

Leaders of FS-Elliott and FS-Curtis say they have it covered when it comes to helping customers meet their compressed air goals, whether the technology centers on centrifugal, reciprocating, rotary screw, scroll, or hybrid solutions.

"We're one of the few companies that can offer the whole range of products," said Paul

Brown, Chief Executive Officer of FS-Elliott.

"But we're not trying to push the customer down a particular route; we're looking to figure out, 'What's the best answer with the available technologies?' That's a huge benefit we can bring, and we encourage that investigation from the customers' side."

"It's a benefit that's delivered, in a streamlined fashion since no corporate procedures or policies stand in the way of getting it done," said FS-Curtis President Robert Lee

"We truly do have the ability without restriction to look at the needs of the customer and propose the best solution," Lee said.

Long and Rich Compressed Air Histories

FS-Elliott and FS-Curtis each have long and rich histories, both of which are complemented by Fusheng Industrial with its own well-established reputation in the global compressed air industry.

FS-Curtis dates to 1854, when it began producing industrial equipment at its headquarters in Saint Louis, Missouri. In 1897, it began producing its Masterline Compressors line of heavy-duty reciprocating air compressors, which is still available and in demand today. Fusheng Industrial acquired FS-Curtis in 2005, and since then, FS-Curtis has thrived.



Paul Brown, Chief Executive Officer, FS-Elliott



Robert Lee, President, FS-Curtis

In 1962, FS-Elliott entered the industry with the first oil-free, integrally geared, multi-stage centrifugal air compressor. The innovative machine ultimately led to the PAP Plus line of centrifugal air compressors that remain popular today. In the late 1990s, Elliott Company and Fusheng Industrial formed a joint venture to build a packaging facility in Shanghai, China, which later resulted in the packaging and selling of the PAP Plus centrifugal air compressor line in the Asia market. In 2003, Fusheng Industrial acquired the same product line to create FS-Elliott Co., LLC.

Established in 1953, Fusheng Group began operations in Taiwan as a small company that overhauled all types of air compressors. It expanded its reach in the compressed air industry through acquisitions, such as those with FS-Elliott and FS-Curtis under the umbrella of Fusheng Industrial, in addition to various mergers. Fusheng Group is also the largest golf club head manufacturer in the world, with decades of experience in casting, forging, and carbon fiber forming. It also has a significant presence in the semiconductor industry.

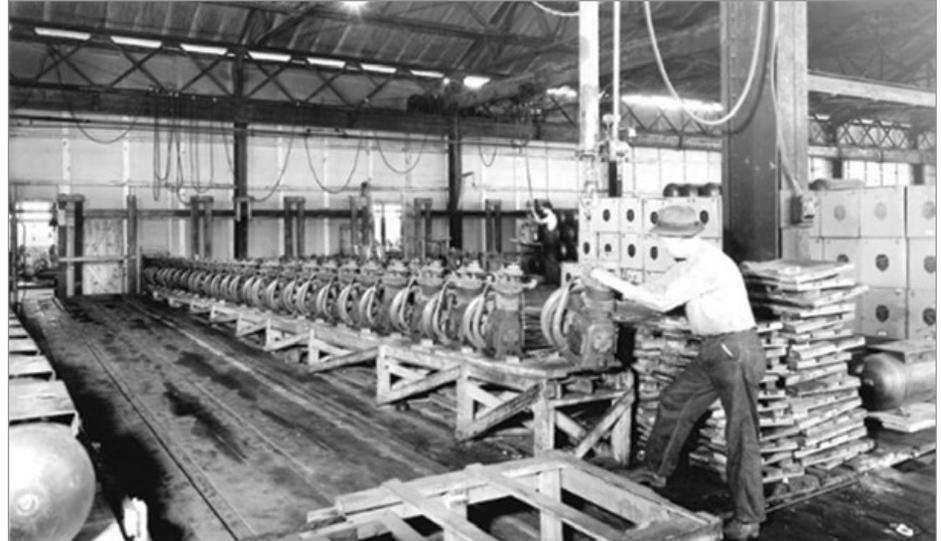
FS-Elliott Rises to a New Level

Like Fusheng Industrial, FS-Elliott began as a small operation, but decision-makers knew the future was ripe with opportunity, said Brown.

“When FS-Elliott formed in 2003, the acquisition was essentially a lot of air compressor drawings and about 48 people,” he said, noting that manufacturing for



The FS-Elliott manufacturing floor for oil-free, integrally geared, multi-stage centrifugal air compressors in Export, Pennsylvania.



FS-Curtis Masterline pumps being prepared for tank assembly in 1897.

the company at that time was managed by the former parent, Elliott Company. “The reputation of the brand was really one of a highly efficient, robust machine. It was fortunate that we retained the Elliott name, so people understand who we are still.”

Plans in 2003 called for taking the air compressor brand to a new level with investments in facilities and resources, Brown said. That included a new manufacturing plant in Export, Pennsylvania, as well as a new plant in China. Brown pointed to recent

FS-Elliott and FS-Curtis' Synergies Ensure Compressed Air Success



Fusheng Industrial is investing in FS-Elliott and FS-Curtis. Pictured is one of two new Mazak Integrex five-axis machining centers installed as part of a recent manufacturing and warehousing expansion at FS-Elliott's Export, PA facility.

upgrades at the Export plant as an example of Fusheng's commitment to manufacturing capabilities that contribute to quality products and services.

"We have recently expanded the floor space and added machine tools, including two beautiful Mazak Integrex five-axis machining centers," he said. In all, the company expanded the manufacturing and warehouse space to 180,000 square feet. "We've also added a service training center here so our channel partners and our direct-service team can tear down, rebuild, and start air compressors in reality rather than operating them in theory. It's added a lot of quality to our service teams around the world."

FS-Elliott's main products manufactured at the Export facility include industrial centrifugal air compressors with models ranging from 250 horsepower (hp) to 3,000 hp in two and three-stage configurations that deliver up to 250 psig discharge pressure. Its engineered PAP Plus centrifugal air compressors, with models ranging from 250 to 5,000 hp in one-, two-, three-, and four-stage configurations, deliver up to 450 psig discharge pressure. The company additionally specializes in designing, manufacturing, and rigorous testing of airends utilized in air compressor production at various facilities worldwide. The Export facility has experienced substantial growth, now employing a workforce of over 200 skilled professionals.

FS-Curtis Leverages Strategy for Growth

FS-Curtis continues to design and manufacture air compressors at its plant in Saint Louis as it did nearly 160 years ago, although the manufacturing operation has grown and evolved technically since then to employ approximately 200 people.

Lee said Fusheng Industrial's decision to bring FS-Curtis in the fold, as with FS-Elliott, speaks to the company's strategy for growth, which relies in part on making and servicing products in the regions of the world where customers are located.

"We know in order to succeed in any country, you need more than just a distributor," Lee said. "You really need that presence, whether it's manufacturing or warehousing, as well as sales and marketing."

In addition to channel partners throughout North America and Latin America, FS-Curtis operates company distributorships. They include California Air Compressor Company with locations in Los Angeles and San Diego, California; FS-Compression Houston, Missouri City, Texas; Comp Air-Service with locations in Miami, Tampa Bay, Orlando, Florida, and Valdosta, Georgia; FS-Compression Pittsburgh, Export, Pennsylvania; and FS-Compression Mid-Atlantic, Greensboro, North Carolina.

FS-Curtis is well-known for its reciprocating air compressors ranging from .75 to 300 hp and



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FS-Elliott and FS-Curtis' Synergies Ensure Compressed Air Success

are available in lubricated-, oil-free-, and gas-driven models. Its rotary screw air compressors are available from 5 to 500 hp models in fixed or variable-speed options, as well as single- and two-stage options. It also offers oil-less scroll air compressors, as well as a line of air- and water-cooled centrifugal air compressors from 250 to 350 hp.

“While we’ve continued to offer the dependable reciprocating air compressors we’ve been manufacturing for more than a century, FS-Curtis has undergone a significant transformation in the last eight years. This transformation stems from Fusheng’s unwavering commitment to designing a top-tier global rotary product line.” Lee said,

emphasizing the success of its Nx Series of rotary screw air compressors.

Customers' Needs Drive Success

Lee and Brown are upbeat about the future for FS-Curtis and FS-Elliott, given strong distributor representation in key geographies, new product strategies, and the continued infusion of investments and resources from a financially strong parent company.

The primary focus for FS-Curtis, said Lee, is to continue to grow its channel partners while continuing to develop and introduce new products, including oil-free air compressors. The long view, he said, is to introduce air compressors that complement centrifugal machines.

“We want to offer up that full complementary line,” he said, with an eye toward addressing market demand. “Where are gaps in the market? Let’s go after it.”

Brown said demand for centrifugal air compressors is growing, which FS-Elliott is well-prepared to satisfy. He cites the desire of manufacturers in North America for larger machines as an example.

“Typically, we’ve seen that 500 to 1,000 horsepower (size machines) is common. Now we’re seeing that grow into 1,200, 1,500, 2,000, and 2,500 horsepower. More of the plants we’re seeing are larger scale manufacturing plants,” he said.



The assembly area for CT Series reciprocating air compressors at the FS-Curtis plant in Saint Louis, Missouri.

Air compressor sizes aside, the customer's situation drives the decision when it comes to solutions, said Brown.

"It's important you've got the right detailed analyses of the load demand for the customer, because it's constantly varying," Brown said, adding that a highly efficient centrifugal air compressor isn't always the right answer. That, he said, reinforces the value of synergies offered by FS-Elliott and FS-Curtis.

"Everybody's going to try to sell you and say, 'This thing has 60% turndown, and

it's very efficient across a whole range,'" he said of a centrifugal air compressor as an example.

"But you can potentially optimize the efficiency of a centrifugal system by running it at its base load and then supplement it with a trim machine, such as a rotary air

compressor, to accommodate fluctuations in system demand. That's a good example of a solution I could see." **BP**

For more information on FS-Elliott and FS-Curtis, visit www.fs-elliott.com and <https://us.fscurtis.com>.

Images courtesy of FS-Elliott and FS-Curtis.

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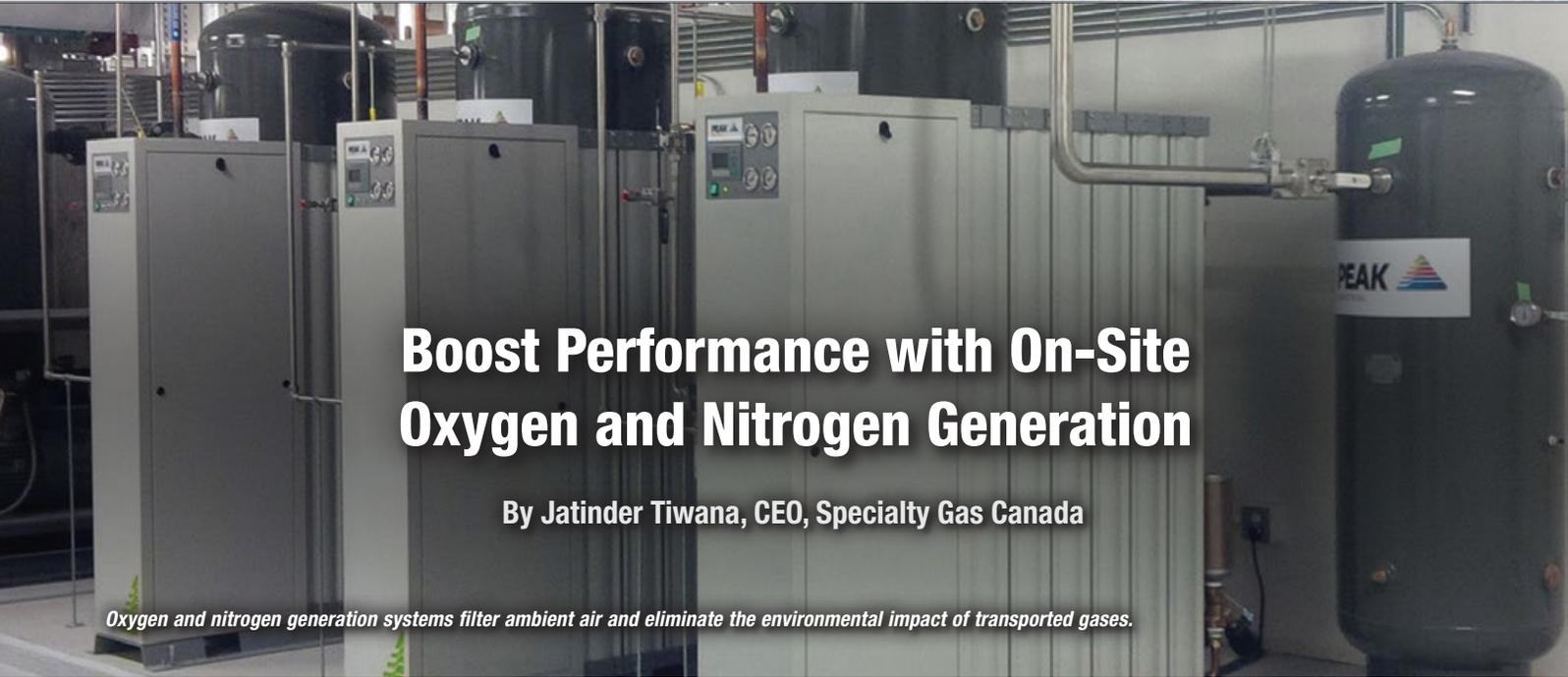
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Boost Performance with On-Site Oxygen and Nitrogen Generation

By Jatinder Tiwana, CEO, Specialty Gas Canada

Oxygen and nitrogen generation systems filter ambient air and eliminate the environmental impact of transported gases.

► Introduction

The impact of compressed air on industries globally is undeniable, spanning from small tire shops to vast oil and gas sectors, as well as specialized domains like laboratories and pharmaceuticals. Amid this industrial transformation, many have taken control by employing in-house air compressors, air dryers, and related equipment to autonomously generate compressed air. In-house compressed air generation eliminates the need for relying on external sources, whether through cylinder bulk packs, Dewars, or tankers delivering compressed air.

However, when the demand arises for specialized gases such as Nitrogen and Oxygen, a dependency on gas companies

often prevails. In an era where humanity is achieving feats like landing spacecraft on the moon's South Pole, it's imperative to question the conventional and inefficient practice of sourcing Nitrogen and Oxygen through external gas suppliers. Remarkably, our atmosphere contains an abundant supply of two pivotal gases: Nitrogen, constituting 78.09%, and Oxygen, comprising 20.95%.

When an air compressor is in operation, it draws air from the surrounding atmosphere, compresses it, and then delivers it under pressure to meet specific needs. This compressed air is a mixture of various gases, including Nitrogen (N₂), Oxygen (O₂), and other components. To put it simply, if a customer requires Nitrogen, an Oxygen filter is necessary. Conversely, if the

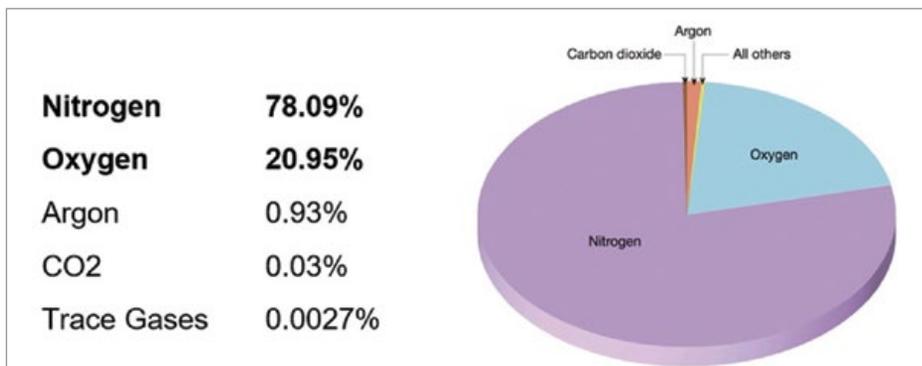
process demands Oxygen, a Nitrogen filter should be added to the line. This adaptation ensures the fulfillment of both Nitrogen and Oxygen requirements. These filters are commonly referred to as Nitrogen Generators and Oxygen Generators.

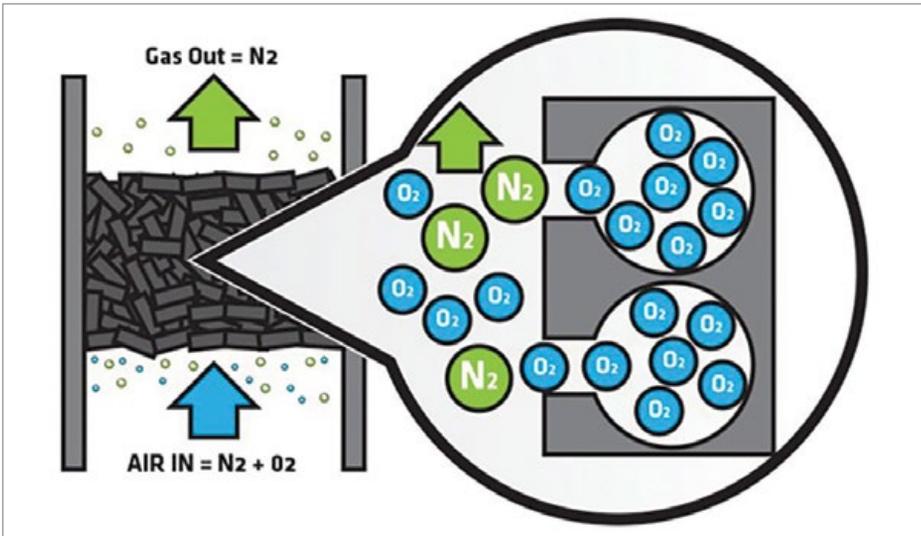
Types of Oxygen and Nitrogen On-Site Generators and the Delivered Gas Systems Being Replaced

There are two primary types of on-site nitrogen generators. They are pressure swing adsorption (PSA) and membrane nitrogen generators. There are also two primary types of on-site oxygen generators. They are pressure swing adsorption (PSA) and vacuum pressure swing adsorption (VPSA).

Two Primary Types (each) of On-site Nitrogen and Oxygen Generators

1. Pressure Swing Adsorption (PSA) Nitrogen Plant / Generator
2. Membrane Nitrogen Generator
3. Pressure Swing Adsorption (PSA) Oxygen Plant / Generator
4. Vacuum Pressure Swing Adsorption (VPSA) Oxygen Plant / Generator





A depiction of an oxygen filtration system.

Three Traditional Delivered Gas Systems Being Replaced

There are three prevalent, traditional methods for delivering Nitrogen and Oxygen: Gas Cylinders, Dewars, and Bulk Liquid Tanks. These systems are being replaced with on-site nitrogen and oxygen generation systems.

1. Gas Cylinder: Delivered at high pressure (200 – 300 BarG).
2. Dewar: Delivered in a liquid state.
3. Bulk Liquid: Transported as cryogenic Nitrogen or Oxygen in liquid form.

Benefits of On-site Nitrogen and Oxygen Generation

Environmental Advantage

The foremost advantage of producing Nitrogen and Oxygen in-house lies in its environmental significance. The elimination of truck deliveries stands as a pivotal benefit. While this may not immediately



translate into direct monetary gains for users, its larger positive impact on the environment is undeniable. The cessation of truck deliveries translates to a reduction in carbon emissions – an imperative step towards combating global warming.

An enlightening study conducted on behalf of one of our esteemed clients in Brampton, Ontario, revealed a startling truth. The Nitrogen delivered via tankers contributes to a staggering annual CO₂ emission of 6,979.5 KG. To offset this carbon footprint as part of their Corporate Social Responsibility, they are required to plant 300 trees every year. This serves as a striking reminder that every user of Nitrogen and Oxygen sourced from external suppliers possesses the power to make a substantial contribution to carbon footprint reduction. The elimination of truck and transport deliveries becomes an embodiment of the “Go Green” initiative.

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Boost Performance with On-Site Oxygen and Nitrogen Generation

Cost Savings

Another significant advantage of on-site Nitrogen and Oxygen Generation lies in the realm of cost efficiency. This advantage is magnified through the production of Nitrogen and Oxygen gases within your own premises, obviating the reliance on external suppliers. This strategic transformation has the potential to yield substantial savings for your organization. Transitioning towards in-house production of Nitrogen and Oxygen can trigger a noteworthy reduction in costs.

To provide a tangible perspective, let's consider the pricing dynamics. A Nitrogen gas supplier typically charges around 50 cents per cubic meter (m³), and this doesn't even encompass ancillary expenses like tank rentals and duties.

In sharp contrast, producing Nitrogen in-house can be achieved at approximately 6 cents per m³, leading to remarkable savings. While the cost of producing on-site Oxygen slightly exceeds that of Nitrogen, around 18 cents per m³, it still presents a significant reduction compared to purchasing from external suppliers. This substantial cost differential underscores the compelling financial rationale behind on-site gas generation.

Price Stability

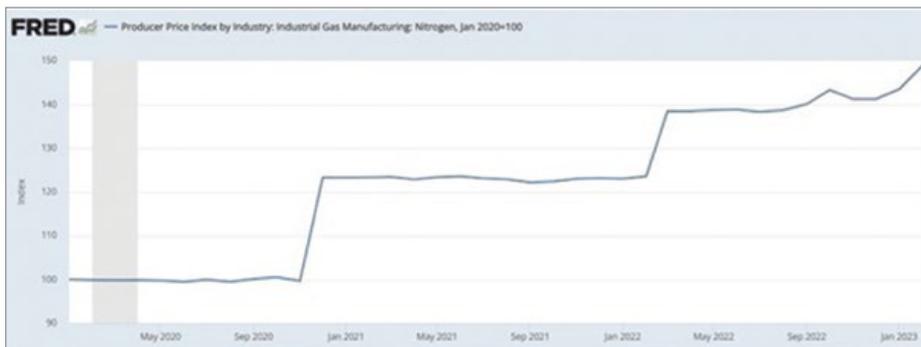
Shield yourself from fluctuating prices. Moreover, by embracing this approach, users can shield themselves from the risks associated with price escalations. The recent trajectory, as indicated by the U.S. Bureau of Labor Statistics, has been rather unsettling. Over the past three

years, the Producer Price Index of Industrial Nitrogen Gas has surged by nearly 50% starting from January 2020.

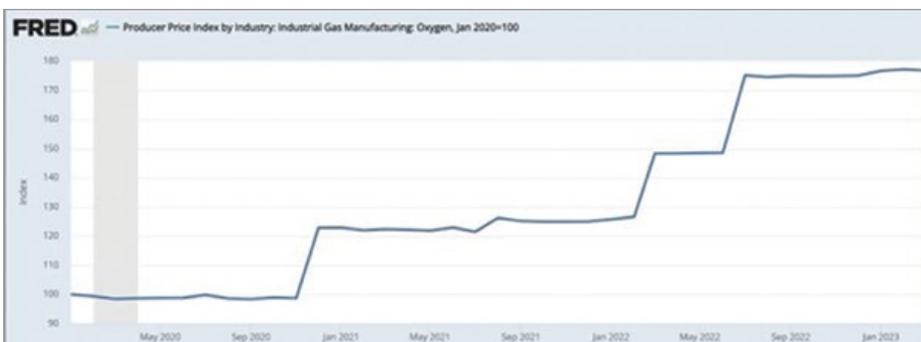
Remarkably, the situation is even more concerning in the realm of industrial Oxygen gas pricing. Over the same three-year span, the Producer Price Index recorded an astonishing 80% increase. These steep and consistent price hikes underscore the volatility and uncertainty inherent in relying on external suppliers. On the contrary, on-site generation empowers businesses to escape this price rollercoaster and establish more predictable and favorable cost structures.

On-Demand Generation

Onsite generation eliminates the Supply Chain challenges. The world suffered catastrophic losses during the Covid 19 pandemic and companies struggled to fulfill the soaring



The Producer Price Index for Industrial Nitrogen Gas shows a 50% increase from January 2020 to January 2023 (U.S. Bureau of Labor Statistics).



The Producer Price Index for Industrial Oxygen Gas shows a 80% increase from January 2020 to January 2023 (U.S. Bureau of Labor Statistics).



A simple installation of a nitrogen generator with storage in Ontario, Canada.

demand for Oxygen across various regions. It was during these trying times that in-house Oxygen generators emerged as saviors, bridging the gap for countless users. Unlike those reliant on external suppliers and waiting for gas deliveries, generator users experienced uninterrupted access.

Whether your gas (N₂ and O₂) demands are constant or intermittent, an in-house generation system tailors itself to your needs. The system adapts, ensuring that a continuous supply of gas is readily available whenever required. This flexibility not only bolsters operational resilience but also underscores the autonomy and reliability that on-site generation brings to your business.

Say No To Contracts (Flexibility and Freedom)

The majority of customers find themselves obligated to sign intricate legal contracts when procuring gas from external suppliers. These contracts often contain complex clauses, making it challenging for users to grasp the potential consequences of non-compliance. The beauty of on-site generators lies in the unfettered flexibility they offer. They eliminate the need for binding contracts, enabling users to seamlessly initiate the in-house production of Nitrogen and Oxygen without the constraints of legal agreements. This liberation empowers businesses with the autonomy to shape their gas production strategy as needed, unburdened by contractual intricacies.

Conclusion

It's time to harness the abundance of Nitrogen and Oxygen that nature provides. By embracing on-site generation of these gases, industries can not only enhance their operational efficiency but also contribute to a greener planet. The opportunities are vast, from cost savings and environmental preservation to seamless accessibility and enhanced safety. The time has

come to harness the resources around us and take charge of our own Nitrogen and Oxygen needs, transcending the limitations of traditional supply chains. Start producing in-house and unlock a new era of performance and savings. **BP**

For more information or any questions, please call Specialty Gas Canada Inc. at 905-971-5304 or visit our page at <https://www.specialtygas.ca/>

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Advanced Vacuum Generation Reduces Maintenance

By Dr. Fabian Fahlbusch, Head of Content
Marketing, Busch Vacuum Solutions



*The porcelain honeycomb bodies are given their fine holes and thin walls by a template behind the screw press.
Photo: Busch Vacuum Solutions.*

► Higher quality, less maintenance and lower costs – two standard vacuum systems from Busch Vacuum Solutions prove that everything is possible at the Hermsdorf porcelain factory in Thuringia. There, they are used for extruder degassing.

Industrial ceramics have been produced in Hermsdorf, near Jena, since 1890. In the past, high-voltage insulators; now, ceramic honeycomb bodies for heat exchangers, ventilation and emission control systems. They have always kept up with the times, developing innovative materials, products and state-of-the-art production processes to do so.

Just like the two new SIMPLEX vacuum systems from Busch that are used to degas the ceramic mass. In 2021, these replaced four oil-lubricated rotary vane vacuum pumps and have been providing four extrusion lines with the required vacuum ever since. More than 100 employees currently work in the historic halls of the porcelain factory.

1600 Holes, No Air Bubbles

The strand of square-shaped ceramic, still damp, slides smoothly out of the screw press. But after 1.50 meters, the race is over. Clever hands then cut off the front piece and place it on a large rack to dry. They do this

continuously in three shifts. After around nine days, when the mass only contains one percent residual moisture, the honeycombs are fired in an oven at 1,200 degrees. 1,600 small holes run through them lengthwise like honeycomb cells, separated only by fine walls, all precise and symmetrical.

To ensure that this remains the case after the combustion process, the mass must not contain any air pockets. These would expand with the heat in the oven and cause the entire honeycomb body to burst. For this reason, the mass must be degassed beforehand with SIMPLEX vacuum systems from Busch. At the

heart of each control cabinet and vacuum vessel is a MINK MV Synchro dry claw vacuum pump. What other vacuum pumps see as a challenge, namely handling very moist, paste-like masses, they can master with ease. This is precisely why they have been developed for extruder degassing.

No Muddy Matter

The previously used oil-lubricated rotary vane vacuum did not cope as well with the process conditions. “The oil quickly became an emulsion with the condensed water vapor. They were noisy, they stank, and the filters were permanently clogged. This resulted in excessive wear and pump failure. Once a month we had to change the filters and oil, which was a lovely muddy job,” says Christian Ferber, Managing Director of Porzellanfabrik Hermsdorf GmbH.

The new SIMPLEX VO vacuum systems from Busch are completely different. They do not require oil in the compression chamber and are virtually maintenance-free, quiet and frequency controlled. While the previous pumps were constantly running and had to be manually controlled by means of false air valves, the new vacuum systems from Busch automatically adapt to the required vacuum level and switch off when no vacuum is required. “We initially used a Busch loaner system for testing purposes and were immediately impressed. We are still completely satisfied with our own SIMPLEX systems today. In terms of maintenance, the new systems really make things much easier,” says Christian Ferber.



The intelligent vacuum system SIMPLEX VO from Busch degasses the mass in the extruder.
Photo: Busch Vacuum Solutions.



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JAN 11 **How to Boost the Energy Efficiency of Rotary Screw Air Compressors**
Presenter Andrew Smith, P.E., Co-Founder, SMARTCAir
Thursday, January 11, 2024 – 2:00PM EST

JAN 25 **Using ASME PTC 13 to Evaluate the Energy Efficiency and Performance of Different Blower Technologies**
Presenter Julie Gass, Lead Mechanical Process Engineer, Black & Veatch and Hiran de Mel, Senior Project Manager and Principal Technologist, Jacobs
Thursday, Jan 25, 2024 – 2:00PM EST

FEB 08 **Centrifugal vs Rotary Screw Air Compressor Performance: Full Load and Part Load Efficiency**
Presenter Mike Lenti, Senior Auditor, Compressed Air Consultants
Thursday, February 8, 2024 – 2:00PM EST

FEB 22 **Storage Tank and Pipe Sizing for Large Plants: How to Meet CFM Needs**
Presenter Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting
Thursday, February 22, 2024 – 2:00PM EST

MAR 07 **Sizing Vacuum Pumps and Piping for Various Applications**
Presenter Andy Smiltneek, President, Growth Solutions Consultants
Thursday, March 7, 2024 – 2:00PM EST

MAR 21 **Control of Distributed Systems with Multiple Air Compressor Rooms**
Presenter Tim Dugan, P.E., President, Compression Engineering Corporation
Thursday, March 21, 2024 – 2:00PM EST

APR 04 **Refrigerated vs Desiccant Dryers and Choosing the Right One**
Presenter Don Van Ormer, Auditor, APEnergy
Thursday, April 4, 2024 – 2:00PM EST

APR 18 **CTI STD-201RS Thermal Certification for Cooling System Heat Rejection Equipment Part 2**
Presenter Mike Womack, Thermal Certification Administrator, Cooling Technology Institute
Thursday, April 18, 2024 – 2:00PM EST

MAY 09 **How to Identify and Eliminate Artificial Demands**
Presenter Tom Taranto, Owner, Data Power Services
Thursday, May 9, 2024 – 2:00PM EST

MAY 23 **Sensors for Compressed Air Systems: Data Management and Analysis**
Presenter Andrew Smith, P.E., Co-Founder, SMARTCAir
Thursday, May 23, 2024 – 2:00PM EST

JUN 13 **Advanced Aeration Control for Blowers**
Presenter Tom Jenkins P.E., President, JenTech Inc.
Thursday, June 13, 2024 – 2:00PM EST

JUN 27 **Heat Recovery from Chillers: How to Capture and Use Waste Heat**
Presenter TBD
Thursday, June 27, 2024 – 2:00PM EST

JUL 18 **How to Determine the Optimal Size of a Nitrogen Generator**
Presenter Mike Flowe, President, Flowe Nitrogen Systems
Thursday, July 18, 2024 – 2:00PM EST

JUL 25 **Instrumentation and Monitoring for Vacuum Systems**
Presenter TBD
Thursday, July 25, 2024 – 2:00PM EST

AUG 08 **How to Diagnose and Fix Common Issues in Rotary Screw Air Compressors**
Presenter TBD
Thursday, August 8, 2024 – 2:00PM EST

AUG 22 **Thermal Performance of Evaporative and Dry Cooling Systems**
Presenter Clayton Penhallegon, Jr., P.E., Integrated Services Group
Thursday, August 22, 2024 – 2:00PM EST

SEP 12 **Aeration Blower Sizing and Selection**
Presenter Tom Jenkins P.E., President, JenTech Inc.
Thursday, September 12, 2024 – 2:00PM EST

SEP 26 **Heat Recovery from Compressed Air Systems**
Presenter Don Van Ormer, Auditor, APEnergy
Thursday, September 26, 2024 – 2:00PM EST

OCT 10 **How to Interpret Audit Data and Improve Your Compressed Air System**
Presenter Mauricio Uribe, Auditor, Compressed Air Consultants
Thursday, October 10, 2024 – 2:00PM EST

NOV 21 **Power Consumption Curves for Vacuum Pumps: Fixed-Speed vs Variable-Speed**
Presenter Andy Smiltneek, President, Growth Solutions Consultants
Thursday, November 21, 2024 – 2:00PM EST

DEC 12 **Compressed Air Leak Detection: Techniques, Methods, Tips, and Tools**
Presenter Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting
Thursday, December 12, 2024 – 2:00PM EST

DEC 19 **Selection Criteria for Oil-Free Air Compressors**
Presenter TBD
Thursday, December 19, 2024 – 2:00PM EST



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Advanced Vacuum Generation Reduces Maintenance



The dried honeycomb bodies waiting to be fired. They do not contain air pockets that could burst in the oven.
Photo: Busch Vacuum Solutions.

From Hermsdorf to the World

Two energy-saving, extremely low-maintenance dry standard systems that replace four old, energy- and maintenance-intensive oil-lubricated pumps: “Thanks to the good advice we received from Busch, we have saved 10,000 kWh per year. Since installation, the two vacuum systems have been running absolutely trouble-free. There’s no comparison with the predecessor pumps at all,” says Christian Ferber.

And thanks to the new vacuum solution from Busch, 80,000 to 90,000 high-quality honeycomb bodies in various shapes and sizes leave the traditional plant in Hermsdorf every

month. They ensure efficient heat recovery and clean air in ventilation systems of passive houses or afterburning plants on large container ships and cruise ships worldwide. **BP**

About Busch Vacuum Pumps and Systems

Busch Vacuum Pumps and Systems is one of the largest manufacturers of vacuum pumps, blowers and compressors in the world. Our products are at the forefront of vacuum and low-pressure technology. For more information, visit www.buschvacuum.com.

All images courtesy of Busch Vacuum Pumps and Systems.

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Kaeser Compressors Celebrates Growth

By Roderick M. Smith, Editor,
Compressed Air Best Practices Magazine

Facility tours included stops at the product training center and the automated parts fulfillment system at the headquarters for Kaeser Compressors in Fredericksburg, Virginia.

► Over the two days of September 17-18, 2023, hundreds of Kaeser Compressors, Inc. employees, friends and business partners gathered in Fredericksburg, Virginia to celebrate “forty (40) years of growth and expansion” at their headquarters’ campus.

Kaeser Compressors’ President Frank Mueller held a ribbon cutting ceremony, with local and regional dignitaries attending, and in his address to the gathering said, “This 50% increase in office space, the new Rooftop Café, and the warehouse expansion are all dedicated to the well-being, health and productivity of our employees who continue to fuel our growth.”

Office Space Expansion and the Rooftop Café

This fourth expansion to the headquarters in Fredericksburg accommodates current and anticipates future growth. As functional departments grow in headcount, the space is now in place. “Functional departments are growing and it’s critical these teams have the space to stay together in order to maintain high levels of communication and efficiency,” said Mueller.

The big hit of the day was located on the top floor of the new building. The Rooftop Café looked to me like a very nice restaurant, featuring indoor and outdoor dining areas. Featuring glass walls, nice views of the countryside

were to be had no matter where you sat. Capable of feeding 400 people, the Rooftop Café features a Deli station, grill, salad bar and “action area” with rotating specialty foods being served. “We will serve breakfast, lunch and try-out providing one take-home dinner per week, said Mueller. “With subsidized pricing and very healthy and fresh food served, we anticipate the Rooftop Café becoming an employee hub and another reason why people enjoy long careers with Kaeser Compressors.”



Kaeser Compressor President Frank Mueller (left) celebrates with a local official after the ribbon cutting ceremony.

Warehouse Expansion and Technology Investments

Tours of the entire facility were provided. You could feel the pride coming from employees acting as tour guides, many of whom have personally invested 20 to even 35 years contributing to the growth of Kaeser in the U.S. over these past 40 years. We visited the hands-on product training area, where all products are on display and prepared for service and sales training courses. A special feature was a pink AIRTOWER 5c, which for the second straight year, Kaeser is auctioning off to support their “Compressor for a Cure” campaign.

We were then off to the warehouse where we saw the investments made in an automated Kardex VLM Vertical Lift Module system. The shelf-based system has increased the capacity of the warehouse by using vertical space and order fulfillment is now performed by a shuttle which automatically retrieved the parts. This increases accuracy, speed and greatly reduces the amount of walking and lifting personnel in this department used to do. In

recent years, the number of VLM bays has grown from two to seventeen.

The warehouse also featured a testing laboratory and an area dedicated to product modifications. One example of this is the addition of food grade lubricants to air compressors going to food industry clients.

A big driver for the warehouse expansion has been the growth in demand for Kaeser Air System Enclosures (KASE). These standard 40 to 300 horsepower compressed air systems are packaged into highly engineered enclosures. It was explained to me that making standard KASE systems allows high value features to be present at a good value. An emphasis is made on ambient air temperature control in the enclosure with thermostatically controlled intake louvers, insulated walls and recirculating air ducting (for winter and summer). The systems are built on skids and then the heavy-duty cranes cover them with the 12-foot high enclosures. This area also builds Custom Engineered Solutions on skids, with or without enclosures, which are built to the specification of the customer.

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Kaeser Compressors Celebrates Growth

Attendees Voice Their Opinions on Growth Drivers

I was curious to know the opinions of attendees, who had come from all over the U.S., as to why this business continues to grow. Ralph Klug, the owner of H.G. Klug Sons – a Kaeser distributor in Nebraska since 1988 offered, “As a privately held company, they prioritize product quality, training and parts availability. This earns loyalty from both employees and business partners.”

Keith Carley, the owner of Air Compressor Works – a Kaeser distributor in Florida since 1979 said, “Kaeser consistently develops reliable,

quality products which are easy to service. Service technicians always want to work on Kaeser products.”

Significant growth also appears to be occurring in California. Keith Baker has worked for the firm for many years and told me they are opening an expanded West Coast warehouse in Los Angeles in the fourth quarter of 2023. His opinion was, “While other firms in our industry often change direction, Kaeser has consistent leadership strategies and quality products – this makes a big difference over time.”



Attendees enjoyed the outdoor dining area at the Rooftop Café.

The warehouse tour stopped at the assembly area for Kaeser Air System Enclosures (KASE).



Ralph Klug and Frank Mueller (left to right).



Harald Wagenknecht, Werner Rauer and Tilo Fruth (left to right).

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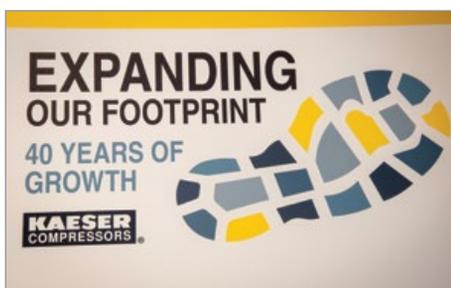


Kaeser Compressors Celebrates Growth



Neil Mehlretter, Joe D'Orazio, Stephen Horne and Matt McCorkle (left to right).

Matt McCorkle has been with the firm since 2008 and manages Kaeser-owned sales and service companies located around the country. He said, "As a veteran I made a conscious decision to leave the military sector. At Kaeser I found a corporation with a mix of a family feel, where people invest their energies into building a career, combined with a very process-driven culture which is comfortable for people with military backgrounds." McCorkle added the firm actively recruits veterans and has found great success with them.



Conclusion

Accompanied by beautiful fall weather, the celebration was clearly enjoyed by all the employees, friends and business partners attending. I appreciated the invitation to participate and hope our readers are able to do the same, in a small way, with this report. **BP**

For more information on Kaeser Compressors visit <https://us.kaeser.com/>

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CAGI: The Voice of the Compressed Air Industry

CAGI (The Compressed Air and Gas Institute) has been running performance verification on products for years, but did you know they now also have a testing program for the people who serve you?



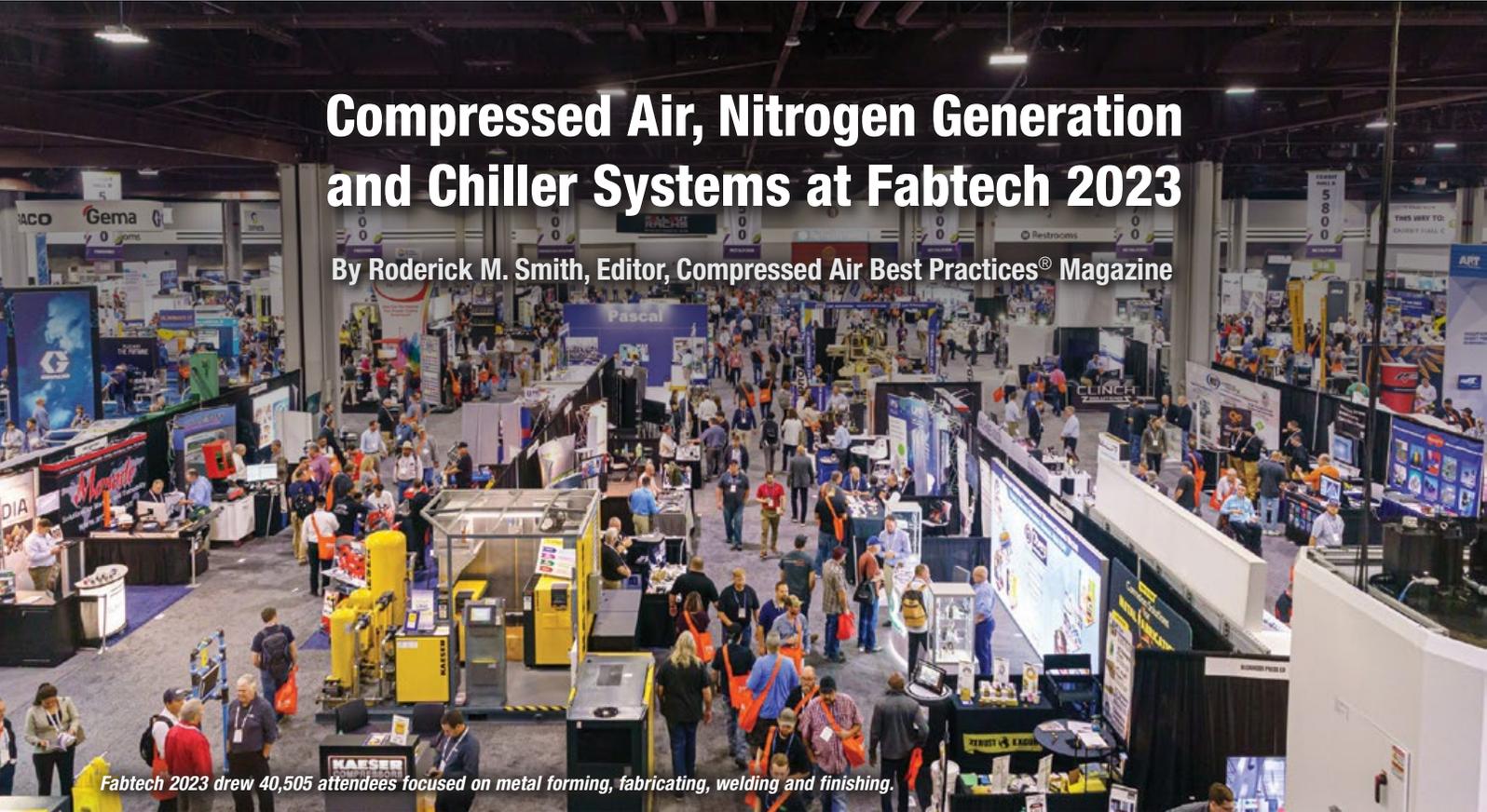
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Compressed Air, Nitrogen Generation and Chiller Systems at Fabtech 2023

By Roderick M. Smith, Editor, Compressed Air Best Practices® Magazine



Fabtech 2023 drew 40,505 attendees focused on metal forming, fabricating, welding and finishing.

► FABTECH 2023, a leading event for metal forming, fabricating, welding, and finishing, successfully wrapped up its four-day run at Chicago's McCormick Place, achieving significant milestones for attendance, exhibitors, and show floor size. From September 11-14, FABTECH 2023 welcomed 40,505 attendees from across the globe – a 26% year-over-year gain in attendance compared to the 2022 event in Atlanta and a 40% increase compared to the 2021 event in Chicago. The 2023 show floor, spanning an impressive 825,325 square feet across three exhibit halls, featured an extensive showcase of over 1,500 world-class suppliers.

“We extend our sincere gratitude to the attendees, exhibitors, speakers, members, and everyone who joined us for FABTECH 2023 in Chicago,” expressed Tracy Garcia, CEM, FABTECH Group Director at SME. “This year's event was an exceptional gathering, offering the industry a one-stop-shop for solutions with an expansive show floor that truly showcased the future of manufacturing.

FABTECH is North America's largest metal forming, fabricating, welding, and finishing event. The event provides a convenient venue where you can meet with world-class suppliers, see the latest industry products and developments, and find the solutions to improve productivity and increase

profits. FABTECH is made possible by its five event partners, all of whom represent the varied and diverse makeup of the manufacturing industry. They include the American Welding Society, the Chemical Coaters Association International, the Fabricators & Manufacturers Association International, the Precision Metalforming Association and SME.

The objective of this article is to provide readers with a sampling of compressed air, nitrogen generation and chiller system technologies on display at the show. We regret not being able to include all exhibitors or visits made due to article length considerations.

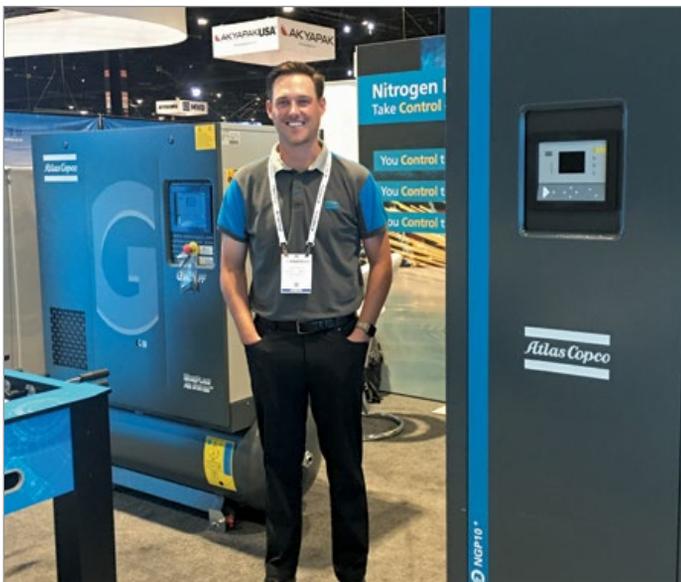
Compressed Air System and Nitrogen Generation Technology

The Atlas Copco booth featured their compressed air system products, nitrogen generators, oxygen generators and AirNet aluminum piping for both compressed air and nitrogen. Cody Triscik was manning the booth and said, “We are unique in that we manufacture every component of a nitrogen generation system starting with the air compressors, dryers, filters and including PSA or membrane type nitrogen generators.” He said clients with carbon reduction goals really like the idea of eliminating deliveries from their gas suppliers and that the design of the NGP+ nitrogen generator has a leading air to gas efficiency ratio.

Kaeser Compressors' booth featured their Kaeser Air System Enclosure (KASE) with standard products from 40 to 300 horsepower. Michael Camber said that depending upon the size of the metal fabricator, they might purchase anywhere from a 2 x 20 hp system to a 3 x 100 hp system. He said this market also purchases their skid systems for laser cutting using compressed air. These are low to high-pressure systems including boosters to 350 to 500 psig. Lastly, I was impressed to see,

integrated into the KASE, the new KM Series line of instrumentation products measuring ambient air temperature/pressure, pressure, dew point and flow.

Anest Iwata is a major player in the metal coating industry with their comprehensive line-up of industrial spray equipment. This includes spray guns, pressure pots and double diaphragm pumps. The Anest Iwata oil-



Cody Triscik next to a G Series rotary screw air compressor and a NGP10+ nitrogen generator at the Atlas Copco booth.



Michael Camber, Mike Lanoie, Eva Johnson and Travis Taylor in front of a Kaeser Air System Enclosure (KASE) at the Kaeser Compressors booth (left to right).



Tom Fermann next to an oil-less piston compressor at the Anest Iwata booth.



Adrian Fernandez, Jason Brister, Randy Kinsey and Brian Speed in front of the DRYPOINT X heatless desiccant dryer at the BEKO Technologies booth (left to right).

Compressed Air, Nitrogen Generation and Chiller Systems at Fabtech 2023

less scroll and piston air compressors were on display. Tom Fermann told me their oil-less piston has a MWP of 200 psi and pump sizes up to 15 hp. Their Cincinnati area facility is UL 508 approved and assembles tank-mounted oil-less piston packages to 30 hp. He said their oil-less scroll pump has a MWP of 145 psig with 2 to 10 hp pump models which they can turn into 2 to 60 hp packages.



Jeff Crutchfield, Mike Kinnucane, Chris Wells and Allan Hoerner in front of their MNG Series nitrogen generator at the Mikropor booth (left to right).

BEKO Technologies had a surprise for me at their booth when they showed me their FDR Filter Dryer Regulator. Made for point of use machine protection it features a membrane dryer manufactured by BEKO in Atlanta. Apparently, this FDR was receiving a lot of attention from visitors to the booth. They were also displaying the Drypoint X desiccant dryer also manufactured in Atlanta.



Zach Stewart, Kyle Harasimowicz, Jason Lizzo, Derrick Taylor, Brad Taylor, Jeremy Gaitsch, Michael Heine and Ed Diener at the Fluid-Aire Dynamics booth.



Steve Ciesin, John Gallo and Bruce Graham next to the NG Series nitrogen generator at the Generon booth (left to right).



Jim DiMaiolo and Robert Ruskaup at the Altec AIR booth.

Mikropor was displaying their new MTD Series Turbo Air Dryer designed for flow ranges of 5,850 to 17,500 cfm (10,000 to 30,000 Nm³/h) at 100 psig (7 bar). The thermal mass design provides energy savings at partial loads and feature TEFC motors. Vice President of Sales Chris Wells said that depending upon the size, the units feature R-410a scroll and R-407c screw refrigeration compressors. The experienced team of regional

managers also raved about the growth in sales of their PSA (pressure swing adsorption) nitrogen generation product line.

One of the busier booths at Fabtech was the Fluid-Aire Dynamics booth. National Sales Director Jeremy Gaitsch said, "Our sales team did a tremendous job of bringing customers to our booth." The booth



Jim McFadden and Matt McGuillin next to the NANO ecoGen2 nitrogen generator.



Farren Choudry, Emre Tüjümet, Nitin Shanbhag and Gerardo Aburto Salas at the ALKIN booth (left to right).



Paul Cairney presented nitrogen generation systems at the South-Tek Systems booth.



Tara Eckhart, Mike Kreklau and Keisha Hernandez at the Tsunami Compressed Air Solutions booth (left to right).

Compressed Air, Nitrogen Generation and Chiller Systems at Fabtech 2023



Justin Marion and Brett Rogers next to the Nitrocenter at the Purity Gas booth (left to right).

was busy presenting the PneuTech air compressor and dryer product lines and their UniPipe aluminum piping system. The higher (than normal) maximum working pressure ratings of the UniPipe system was generating many inquires for the 580 psi nitrogen applications in metal fabrication plants.

Nano has been a leader in factory-generated nitrogen and oxygen generation products. Industry veterans Jim McFadden and Matt McGuillin said they introduced the first modular in the market and that the new technologies are excited including the new NANO ecoGen2 and Gen2 Mini nitrogen generators. They confirmed demand has been strong and said the strength of their products has always been their simplicity and reliability.



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Generon was displaying their NG Series modular nitrogen generator which is field expandable up to 5 columns. Bruce Graham explained their carbon molecular sieve (CMS) towers use a high-end 400 mesh carbon, unlike some other products in the industry. Their units also feature a PLC able to provide trending reports and key performance indicators like inlet dew point and temperature. Generon also supplies oxygen generators using zeolite in the columns and said they are seeing growing demand for both product lines.

ALKIN was founded in 1971 and is a manufacturer of high-pressure compressed air and breathing air compressors and nitrogen boosters with pressures up to 6000 psi. At Fabtech they were displaying their 530 Series booster for compressed air which goes up to 580 psi at very low rpms of 700-1000 which they say is 50-80% slower than many piston boosters on the market. They were also displaying their W32 nitrogen booster for pressures up to 6000 psi while extremely quiet at 60 dba.

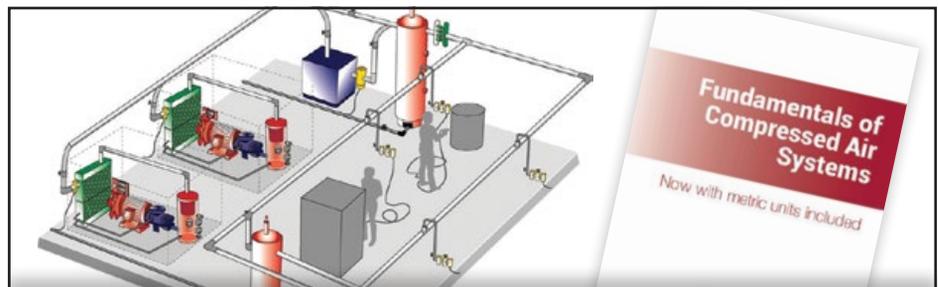
Altec AIR continues their methodical march into standard industrial compressed air purification products. At Fabtech, they were presenting their HRL Series heatless desiccant dryer product line. They also have a very interesting “mini” heatless desiccant dryer for extremely low flow rates.

Tsunami Compressed Air Solutions displayed their point of use desiccant compressed air dryers and filters. They said their 15 cfm dryer is used in front of spray booths and plasma cutting tables in metal fabrication facilities. In addition their new Core Series cartridge style desiccant dryer has a maximum flow rating of 25 cfm.

Paul Cairney from South-Tek Systems is focused on the metal fabrication, stamping

and welding market. He was discussing their LS Series nitrogen generators for lasers which provides an inlet nitrogen pressure to the laser of 400-500 psig. He was also presenting the HPF high pressure nitrogen booster package, rated for up to 4500 psi, and explained that laser cutting is an intermittent application for nitrogen and that users like to use nitrogen storage tanks.

Purity Gas was displaying their Nitrocenter nitrogen generator. Sales Manager Brett Rogers told me they place a large emphasis on conducting free nitrogen assessments for their clients. He said it's very important to help clients double-check and verify key system requirements like nitrogen pressure, purity, flow, hours of operation. Continuing he said it's also important to help clients understand the carbon impact and operational costs of the their current delivered gas systems.



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Compressed Air, Nitrogen Generation and Chiller Systems at Fabtech 2023



Phil Shaver next to the new QBE laser chiller at the Chase Cooling Systems booth.



Aruelle Fearn and Billy Pospisil at the Orion Chiller booth (left to right).



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Chiller Systems for Laser Cutting and Welding

Chase Cooling Systems was displaying their new QBE Series Chase Chiller designed for laser applications. The dual channel product line comes in 11 to 63 kW models for lasers up to 30 kW. Phil Shaver said the units have a new PLC controller. I liked the easy to see visual displays of the two chilled water temperature set-points for laser and optics.

At every trade show I go to, I always discover at least one new company. This years' discovery was Orion Chillers. Their U.S. operations are in Austin, Texas and they are a major OEM chiller supplier to most of the major metal stamping and fabrication manufacturers. After visiting their booth, I started noticing their chiller in the other booths. They said they were the first chiller manufacturer to introduce dual channel chillers for fiber laser applications. They have now introduced inverter technology to the pumps, fans and compressors in their chillers using 407c refrigerants.

FABTECH 2024

Exclusively dedicated to advancing the metal forming, fabricating, welding, and finishing industries worldwide, FABTECH delivered an unparalleled trade show experience in 2023. The excitement and success of this year's event paves the way for a promising future. FABTECH 2024, which marks a shift in location, is scheduled for October 15-17, 2024, in Orlando, Florida, at the Orange County Convention Center. For more information, visit fabtechexpo.com 

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Compressed Air Technology News

Kaeser's Compressor for a Cure is Back for 2023

Kaeser Compressors brought back its "Compressor for a Cure" for 2023. The auction for its pink AIRTOWER 5c began on National Mammography Day, October 20th and concluded on October 30th. The popular AIRTOWER is a complete compressed air system with a Sigma rotary screw compressor, refrigerated air dryer, and drain – all compactly mounted with a receiver tank.

The AIRTOWER 5C is a 5 hp unit providing up to 21 cfm and available in pressures from 125-217 psig. The AIRTOWER is useful for a wide variety of applications and the Compressor for a Cure campaign will be a great way to purchase a fully operational compressed air system and fund breast cancer research at the same time.

Last year the pink M59PE raised over \$20,000 for the Breast Cancer Research Foundation. Kaeser will again donate 100% of proceeds from our equipment auction to help fund critically needed research efforts. For more information on how you can participate and support breast cancer research, please visit us.kaeser.com/compressor4acure.

About Kaeser Compressors

Kaeser Compressors is a leader in reliable, energy efficient compressed air equipment and system design. We offer a complete line of superior quality industrial air compressors as well as dryers, filters, SmartPipe, master controls, and other system accessories. Kaeser also offers blowers, vacuum pumps, and portable gasoline and diesel screw compressors. Our national service network provides installation, rentals, maintenance, repair, and system



Kaeser's pink AIRTOWER 5C was auctioned off to raise funds for Breast Cancer Research Foundation.

audits. Kaeser is an ENERGY STAR Partner. For more information, visit us.kaeser.com.

PEAK Gas Launches i-Flow Prime & i-Flow Mini

PEAK Gas Generation, parent brand of PEAK Scientific and global leader in on-site gas generation for manufacturing and processing industries, has unveiled its latest innovation, the i-Flow Prime and i-Flow Mini. Building upon over 25 years of experience as industry leading gas generation specialists, the i-Flow Prime & Mini generators are the culmination of PEAK Gas Generation's innovation and technological expertise. The newest in the i-Flow series harnesses the latest in gas purification technologies, providing the most cost effective, energy efficient nitrogen generation system available on the market.

Designed and engineered in the UK, the new range utilizes the latest Pressure Swing Adsorption (PSA) technologies, optimized for maximum energy efficiency, with over 100 preconfigured flow rate and purity

specifications. With flow rates of up to 268.32 M3/hour and purity up to 99.9995%, the i-Flow Prime and Mini are suitable for use in numerous industries, including food & beverages, pharmaceuticals & biotechnology, chemicals, electronics, metal fabrication, plastics, rubbers and many more.

Francois Blain, PEAK's Global Business Development Manager, said, "We are delighted



The i-Flow Prime & Mini gas generators can be scaled with additional CMS banks or modular units.

to launch the new i-Flow Prime & Mini Systems, allowing us to offer a convenient and reliable high-flow gas solution for industrial applications and affording businesses the possibility of expanding as business requirements dictate. It's fantastic to be continually expanding the number of distribution partners installing i-Flow Prime and Mini generators to industry."

To accommodate future growth and expanding business needs, the i-Flow Prime & Mini gas generators can be scaled with additional CMS banks or modular units. This scalability offers companies the flexibility to incorporate a solution that can continually adapt infrastructure in line with growth, rather than being constrained by an increasingly expensive or fixed capacity nitrogen gas solution.

For more information on the i-Flow Prime and Mini, visit <https://www.peakgas.com/i-flowprime> and for information on distribution opportunities, visit <https://www.peakgas.com/contact>.

About Peak Gas Generation

PEAK Gas Generation is a leading innovator in the design, manufacture and support of high performance gas generators for a diverse range of markets and applications, with direct operations in every continent around the world. What differentiates us is our world-class technical support and ongoing service care throughout the generator's lifespan, wherever you may be in the world. For more information, visit www.peakgas.com.

Festo Introduces CPX-AP-A Distributed I/O Solution

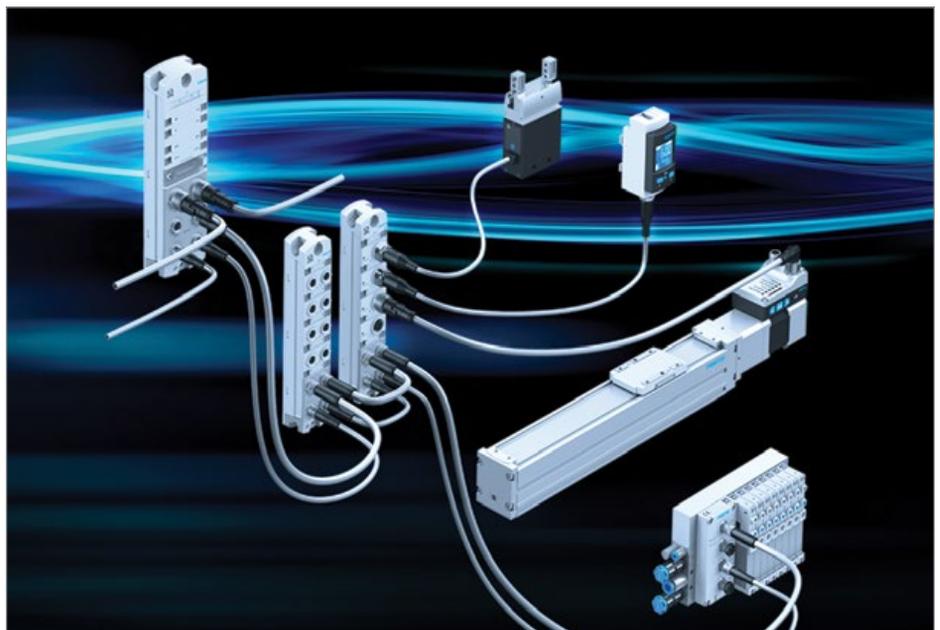
With the recent introduction of its distributed I/O solution CPX-AP-A, along with its established CPX-AP-I decentralized I/O, Festo now offers a range of electric and pneumatic automation solutions that is unmatched in North America in terms of performance, flexibility, cost savings, and engineering productivity. AP stands for Automation Platform and this backplane-based remote I/O system has been in development for a decade.

"The Festo AP backplane communications platform, that provides a central communication and data transfer I/O interface, is a combination of everything that we've learned over the past 25 years of doing electric and pneumatic linear automation solutions," said Tim Sharkey, Director of Electric Automation, Festo North America. "AP backplane communications brings together enormous functionality and creates a

higher level of integration among our devices than we've ever had. AP continues the tradition of Festo product development and manufacturing excellence. It leverages our strengths."

CPX-AP-A is the new line of distributed I/O where modules are attached within a terminal. CPX-AP-I is Festo's decentralized I/O where modules are connected via cable at distances of up to 50 meters (164 feet) between modules. AP modules, whether on-terminal or individual, are IP65/67 rated and can be located in cabinets, in clusters around the cell, individually placed, and separated at great distances. Every AP module features a high-performance real-time backplane transmission rate of 200 Mbps full duplex.

AP provides the utmost in topology flexibility. It gives machine builders the freedom to optimize the machine or cell by adding I/O where they need it, and in ways that will best boost



The Festo Automation Platform (AP) provides the utmost in topology flexibility. All the distributed and decentralized I/O are under a single IP address.

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Compressed Air Technology News

performance and diagnostics capabilities. The AP ecosystem makes it efficient for end-user customers to add functionality as needs arise.

Physically attached on-terminal or connected via cable, all components such as PLCs, valves, motors, drives, and I/O appear to the programmer to be incorporated within one smart terminal under a single IP address. Having the entire distributed and decentralized I/O topology under a single IP address significantly reduces hardware and installation costs while lowering system complexity. Since many PLCs come with a limited number of IP addresses, the Festo solution means more capabilities are possible per PLC.

With all the components appearing to the programmer as resident in a single smart terminal, addressing becomes straightforward, programming time shrinks, and engineering productivity rises. As the functionality and capabilities of the system climb with the addition of modules, the overall distributed and decentralized I/O system becomes simpler to create and maintain.

Festo's multi-year product roadmap calls for the continued rollout of AP-based PLCs, valves, linear actuators, motors, and drives. For those OEMs and end-user customers wanting extended AP capabilities today, Festo support teams can make much of that happen.

“There are many companies with distributed I/O,” said Eric Rice, Product Market Manager, Festo North America. “On the other side there are suppliers for electric or pneumatic linear motion. Not one North American supplier on either side

of that line comes close to offering the same level of performance, capabilities, and support that stems from the integration of the AP platform with the breadth of Festo motion solutions.”

About Festo U.S.

Festo is a leading manufacturer of pneumatic and electromechanical systems, components, and controls for process and industrial automation. Celebrating more than 50 years in the U.S., Festo Corporation has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Through advanced technical and industrial education, Festo Didactic Learning Systems and its partners prepare workers for current and future manufacturing technologies. For more information, visit www.festo.com.

Emerson Introduces IO-Link Master for Pneumatic Valve Systems

Emerson has introduced a new Class A, IO-Link master that provides customers with a cost-effective solution for smart and analog sensor connectivity on the AVENTICS Series G3 Fieldbus platform. The G3 IO-Link Master is suitable for machine architectures with many sensors and pneumatic valves, and where it's important to have reliable digital data communication between field devices, such as sensors and the machine controller. Application areas include automotive, tire manufacturing, food and beverage, packaging and metalworking.

IO-Link is an internationally standardized I/O technology (IEC 61131-9) for communication at the sensor/actuator level in machine

control. During replacement, IO-Link devices can identify and configure themselves automatically, saving maintenance time. The IO-Link master provides pneumatic valve control through direct digital data communication with the machine controller. It offers event-based and I/O mapped diagnostics – both important predictive maintenance requirements for Industry 4.0 and Industrial Internet of Things (IIoT) applications.

By adding the IO-Link capabilities to its valve systems, customers can include multiple IO-Link masters on only one G3 Fieldbus platform, saving hardware costs, thus enabling customers to be future-proof and positioned for Industry 4.0/IIoT application requirements.

Customers can cut costs by reducing the number of communication nodes. G3 IO-Link master is optimized for sensor-rich applications with eight Class A ports per module to support multiple IO-Link smart and standard analog sensors. The IO-Link master can be distributed up to 30 meters away from G3. Together with the 20-meter IO-Link cable length maximum, the sensors can be located up to 50 total meters in total from the G3 Fieldbus platform. As a result, material cost is reduced, and machines are more streamlined because fewer cables are required.

The IO-Link Master offers a complete Emerson solution. Customers can experience the benefits of integrating IIoT into their systems by connecting to the IO-Link-capable Series AV03/AV05 and 500 valve systems, Series EV12 and EV18 electropneumatic pressure



The new G3 IO-Link master reduces hardware costs, and future-proofs pneumatic valve systems with IIoT integration.

regulators, Series 617 Sentronic LP and Series 614 Sentronic PLUS proportional valves, Series ECD-IV and ECD-LV intelligent compact vacuum ejectors, Series SM6-AL distance measuring sensors, Series ST4-2P magnetic proximity sensors, Series PE5 and PE7 pressure sensors, and Series AF2 flow sensors. In addition, Class B IO-Link solutions can be supported with an optional T-adapter.

The G3 is the only fieldbus electronics platform for pneumatic valve systems that contains a graphical display used for configuration, commissioning, and diagnostics. It offers improvements in performance and reduces maintenance for original equipment manufacturers (OEMs) and end users alike. The G3 IO-Link Master can also be configurable with the G3 web server. With easy access to connections, the electronic platform is simple to assemble, install, commission, and maintain. G3's functionality allows programmable logic controllers to efficiently turn valves on and off, and to channel I/O data from sensors, lights, relays, individual valves, or other I/O devices via various industrial networks.

Further benefits include compatibility with the full G3 range of valve interfaces, including Series 501, 502, 503 (ISO15407-2), 2035, 2002, 2005, 2012 and 511, 512, 513 (ISO 5599-2). The G3 IO-Link Master supports the widely used protocols EtherNet/IP DLR and PROFINET. Additional protocols are available upon request.

About Emerson

Emerson, headquartered in St. Louis, Missouri (USA), is a global technology and engineering company providing innovative solutions for customers in industrial, commercial, and residential markets. Our Automation Solutions business helps process, hybrid, and discrete manufacturers maximize production, protect personnel and the environment while optimizing their energy and operating costs. Our Commercial and Residential Solutions business helps ensure human comfort and health, protect food quality and safety, advance energy efficiency, and create sustainable infrastructure. For more information visit www.emerson.com.

Compressed Air Technology News

E+E Elektronik Launches New Humidity and Temperature Sensor

The new HTS801 sees E+E Elektronik launch its most powerful humidity and temperature sensor for industrial applications on the market. This versatile, high-end measuring device combines the Austrian sensor specialist's decades of experience in the field of humidity measurement with the high quality demands of industrial metrology. The sensing probes of the HTS801 incorporate a premium, heatable sensing element for accurate measurements, guaranteeing long-term stability even under the most challenging conditions. Additional options such as a large color display or plug-and-play probe replacement using rapidX technology ensure user-friendly operation and easy maintenance.

The HTS801 is particularly well suited to use in applications with high humidity and chemical exposure. It is based on the E+E sensing

element with monolithic structure. An integrated heater enables targeted heating of the sensing element to prevent condensation and its negative impacts on the measurement results. Depending on the requirements, two type-specific operating modes are available for selection including "Condensation Guard" in case of a short-term risk of condensation and "High Humidity Guard" for permanent exposure to high humidity and condensing conditions.

In addition to this, all HTS801 models have an Automatic ReCoverY (ARC) function. ARC removes chemical impurities and eliminates possible drift effects through short-term intensive heating of the sensing element.

Furthermore, the tried and trusted E+E sensor coating protects the sensing element and its leads against corrosion or deposits. This special coating extends the sensor's service life, ensuring accurate measurement results and improved long-term stability in harsh or corrosive environments.

Thanks to its wide operating range from -80°C to 180°C (-112°F to 356°F) and 300 bar (4,351 psi), the HTS801 is suitable for a variety of applications; for example, for monitoring drying processes, humidity and temperature monitoring in fuel cell test benches, climate chambers or high-humidity storage rooms to demanding measurement tasks in meteorology and much more.

The rugged polycarbonate or stainless-steel enclosure, featuring IP65 / NEMA 4X protection, supports easy mounting and maintenance of the HTS801.

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HTS801 humidity and temperature sensor for demanding industrial applications.

The HTS801 offers the option of smart, pluggable sensing probes. Every HTS801 rapidX smart probe can be exchanged without configuration, adjustment or calibration following the plug-and-play principle. The specific parameters are stored directly in the probe and are transmitted to the sensor when the probe is plugged in. This avoids downtime and costs if a probe needs to be replaced due to damage or for recalibration.

The HTS801 is optionally available with a 3.5" TFT color display. This allows up to four physical quantities to be displayed simultaneously and monitored locally. The integrated data logging function stores up to 20,000 measured values per measurand. The values can be visualized on the display or downloaded using the USB service interface. Thanks to the on-board diagnostics function, the operating status of the HTS801 can be checked directly on the device.

The measured data is available at two freely scalable analogue outputs, RS485 (Modbus RTU) or Ethernet PoE (Modbus TCP) interface, and at two alarm (relay) outputs. This enables flexible integration of the sensor into the customer's own data acquisition systems.

The HTS801 can be configured via the USB port using the free PCS10 configuration software or directly on the device using the display and push-buttons.

About E+E Elektronik

E+E Elektronik develops and produces sensing elements, modules and sensors for air velocity, CO₂, dew point, flow, humidity, moisture in oil, pressure and temperature. Hand-held meters, humidity calibration systems and calibration services complete the comprehensive product portfolio of the Austrian sensor specialist. The main applications for E+E products lie in industrial process control as well as HVAC and building automation. A certified quality management system according to ISO 9001 and IATF 16949 ensures

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Asahi/America Expands Series 19 Actuation Line

Asahi/America, Inc., the leader in thermoplastic fluid flow technology, has recently expanded its Series 19 electric actuation line to include a multiturn unit capable of operating on diaphragm and gate valves up to 4". The Series 19 MAV MultiPack® multiturn actuator features accelerated cycle times ranging from 13 to 100 seconds and a smart feature that tracks the number of completed cycles. Like all Series 19 actuators, the Series 19 MAV MultiPack® comes standard with multi-voltage capability, a visual position indicator, an LED light to indicate valve position or fault, and auxiliary contacts.

Controlled by firmware, the Series 19 MAV MultiPack® is available in two packages as on/off or modulating unit. The MAV MultiPack® mounts on Asahi/America Type-14 diaphragm valves and gate valves up to 4". It includes a heater, one set of dry contacts for PLC confirmation and one for alarm reporting, an OLED screen with push buttons, local controls and a QR code for easy and instant access to user manuals.



The Series 19 MAV MultiPack® multiturn actuator features accelerated cycle times ranging from 13 to 100 seconds and a smart feature that tracks the number of completed cycles.

All Asahi/America Series 19 electric actuators have a corrosion resistant NEMA 4X engineered resin enclosure with stainless steel trim to protect the unit's reversing, brushless DC motor and permanently lubricated steel gear train. The multi-voltage unit operates at a 70 percent duty cycle for more frequent cycling of the valve. Compatible with most PLCs, the Series 19 is an ideal choice for OEMs and skid manufacturers where space is at a premium, but power cannot be sacrificed. All Series 19 actuators are CE labeled and compliant, and factory mounted and tested to ensure dependable operation.

About Asahi

Asahi/America is the premier manufacturer and supplier of thermoplastic fluid flow and air handling solutions for industrial, environmental, high purity and commercial applications. Asahi's

pipng systems, valves and actuators have been installed with confidence for over 40 years in a variety of industries including water and wastewater treatment, oil and gas, water parks and aquariums, landfills, semiconductor and pharmaceutical manufacturing, and chemical processing. The company maintains fabrication, machine and assembly shops in its Massachusetts headquarters, as well as an extensive custom fabrication department in Louisiana. The Asahi/America staff is hereto support you through every step of your project, offering engineering support, on-site consultation, supervision and training. From concept to completion, we're Your Experts in Plastics™. For more information about Asahi/America products and services, please contact us: 655 Andover St. Lawrence, MA 01843; 800-343-3618; asahi@asahi-america.com; www.asahi-america.com.

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