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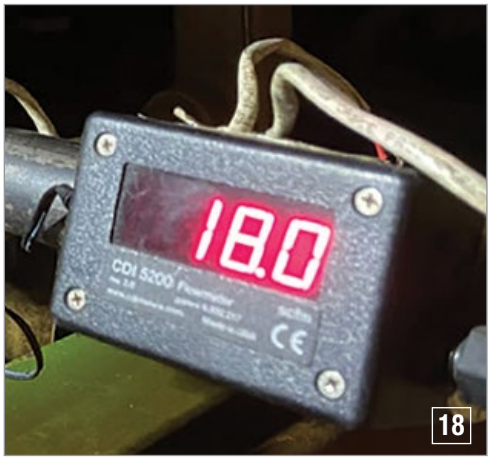

SUSTAINABILITY & ENERGY/WATER CONSERVATION

EVERY ISSUE

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FROM THE EDITOR

Smart pneumatic sensors offer plants simple and convenient ways to monitor compressed air consumption. I personally see this as the future of compressed air. Our lead article covers this topic and is titled, "Achieving Sustainability Targets by Optimizing Compressed Air Use" and was written by Jan Edler and Michael Britzger from Emerson.

Many plants are switching to generating nitrogen from their compressed air system. How proficient are sales engineers and plant engineers at calculating the true costs of their nitrogen bulk liquid storage set-up? Ron Marshall again provides our readers with an excellent training resource with his article titled, "Metal Fabricator Measures Nitrogen Use, Receives a Surprise."

It's not every day I encounter a new technique or technology for compressed air systems. While it's not technically new, the use of sonic nozzles acting as a "flow limiter" to evenly distribute compressed air flow to dryers, is a new concept for me. I had to consult with some highly technical individuals, who blessed it, before going forward with this topic. I hope you enjoy the article titled, "Compressed Air Systems and Rocket Science", provided to us by Mustafa Uslu from Revindus.

The 2022 AICD Conference Show Report, written by our own Bill Smith, reviews the technologies on display and the conference topics discussed. Held in beautiful Savannah, Georgia, we were glad to see another successful AICD event take place.

Please save the date for the Best Practices 2022 EXPO & Conference being held October 4-6, 2022 at the Cobb Galleria in Atlanta. Visit https://cabpexpo.com for more information!

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

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COMPRESSED AIR INDUSTRY NEWS

Atlas Copco Acquires Associated Compressor Engineers

Atlas Copco has acquired Associated Compressor Engineers Ltd (ACE), a UK based company. The company specializes in sales, installations and service of compressed air systems. ACE is a privately owned company and was founded in 1982. It has 12 employees and is located in the city of Stockport, near Manchester. The main customers are industrial and service companies in the Greater Manchester area.

"ACE has a strong market recognition in the region and great expertise," said Vagner Rego, Business Area President Compressor Technique. "The acquisition will enable us to develop our Atlas Copco Brand Portfolio products and further our business in the area."

The purchase price is not disclosed. The company will become part of the Service division within the Compressor Technique Business Area.

About Atlas Copco Group

Our industrial ideas empower our customers to grow and drive society forward. This is how we create a better tomorrow. Atlas Copco is a global industrial group, founded in 1873 in Stockholm. In 2021 we had revenues of BSEK111 (BEUR 11) and at year end about 43 000 employees. For more information: www.atlascopcogroup.com.

VMC-USA Announces New Headquarters

VMC-USA is eager to announce a larger facility will be opened in Statesville, NC. This move will be from its original location in Elryia, Ohio. A decision led by The North American division of VMC SPA Italy, a leading and innovative company in the compressed air industry. This exciting transition will decrease transit times and allow products to be readily available to ship to our partners.

This new location will provide in stock components and spare parts. To better serve the needs of the industry and cut down on the lead times, the KTC brand rotary screw air compressors will be in stock and ready to ship. The new structure will provide our partners with first class sales and service support.

VMC-USA is a company dedicated to innovation and technological evolution of screw compressors, to meet the needs of customers with reliable solutions and products for a wide range of applications. Together with VMC, VMC Engineering and KTC, they build the VMC World, the brand that brings uniqueness, responsiveness, competence, and reliability.

Production and engineering will remain in Italy, VMC-USA will continue to provide superior distribution and service.

About VMC SPA Italy

VMC, one of the most innovative companies in the field of compressed air, was founded in Creazzo, Italy, in the late 1970s. Thanks to its leader and founder, Virgilio Mietto, and his family, it designs and manufactures valves and air-ends for compressors according to the patented principle of component integration. A revolutionary concept that changed the way of conceiving a compressor all over the industrial world.

During a lifespan of almost 40 years, VMC has achieved 13 patents proving its cutting-edge know-how and extensive expertise in the name of an ongoing domestic and international growth, as well as eco-sustainable manufacturing. Today, VMC World is selling in 40 countries and operating through its Italian headquarters and its branches in China and the USA.

VMC takes care of its customers and their projects worldwide, establishing a precious collaboration with each of them. VMC is not only a supplier but also a reliable partner able to analyze and recommend the best solutions as well as a customized project alongside the customer's collaboration, understanding of critical points, and quickness in sorting them out. Moreover, VMC's specialized team is always present during the assembly phase, experimentation, a first use, and it is ready to offer care and technical support both before and after-sale, to guarantee the customer's satisfaction and confidence. For any information related to VMC-USA, please reach out to manager@vmc-usa.com or visit our website at www.vmcitaly.com.

VMC-USA'S larger facility in Statesville, NC.

Tired of downtime and scrap as a result of poor compressed air quality?

Moisture is found in compressed air lines and exhausting from valves and actuators on equipment thereby reducing component life and machine efficiency. Tired of draining water and oil from your compressed air lines every spring? Tired of cleaning or replacing pneumatic components well before their lifespan?

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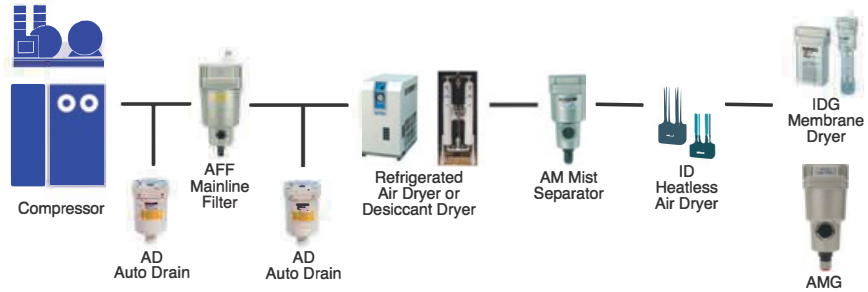

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Compressed Air Industry News

Fluid-Aire Dynamics Opens New Detroit-Area Service Center

Fluid-Aire Dynamics, a leader in industrial compressed air systems in the United States, has opened a new service facility in Wixom, Michigan, on the west side of Detroit. The new office will allow them to better serve customers in greater Detroit, and other surrounding areas. Customers within a 75-mile radius of Detroit can now expect enhanced service, including 24-hour emergency repair service and 4-hour response times enjoyed by customers in the Chicago, Milwaukee, Minneapolis and San Antonio metro areas.

"Geographically expanding into the Detroit area is part of our continued mission to continue our overall growth through expanding our compressed air solutions and services into the largest manufacturing cities within the midwestern region of the country," said Kevin Taylor, General Manager and co-owner of Fluid-Aire Dynamics.

Founded in 1983 in Chicago, Fluid-Aire Dynamics has demonstrated strong growth and built up a loyal customer base throughout the Great Lakes and central U.S. over the last 39 years. They specialize in rotary screw air compressors for industrial applications, servicing compressors from Atlas Copco, Champion, Chicago Pneumatic, Curtis Toledo, Elgi, Gardner-Denver, Hydrovane, Ingersoll-Rand, Kaeser, Kaishan, Mattei, PneuTech, Quincy, Saylor Beall, Sullair and Sullivan Palatek.

"We know that our customers can't afford to have a compressor down for an extended period of time. Our regional service centers allow us to offer 24-hour emergency service and fast response times to some of the greatest manufacturing hubs in the US. Having that physical presence is really critical," said Rob Yahrmarkt, Detroit Area Sales Engineer.

The territory includes the greater Detroit metro area as well as Ann Arbor, Lansing, Flint and Saginaw. They provide both sales and service out of this location. In addition to compressors, the facility will stock dryers, in-line filtration/

media, Unipipe Aluminum Piping along with replacement parts and consumables.

About Fluid-Aire Dynamics

Fluid-Aire Dynamics is a leader in the industrial compressed air industry, specializing in design, sales, installation, maintenance, repair and parts for rotary screw air compressors. Founded in 1983 in Schaumburg, IL, by Garth Taylor, they remain family-owned and operated. They now serve manufacturers and industrial compressed air users in Chicago, Milwaukee, Minneapolis, San Antonio, Detroit and Northern Illinois/Southern Wisconsin. Over the last 30 years, they have built a large and loyal customer base thanks to outstanding customer support backed by their four-hour emergency response guarantee. For more information, visit www.fluidairedynamics.com.

Several members of the Fluid-Aire Dynamics Sales Team celebrated the ribbon cutting in Wixom with a full-day, direct sales introduction blitz all over the Detroit area. They made over 150 cold calls and met directly with over 20 potential new customers. Pictured is Joseph Genualdi, Kody Habeck, Jeremy Gaitsch, Rob Yahrmarkt, Stephan McKinney, Jeffrey Vaughn and Tim Martin (left to right).

Compressed Air Industry News

ABB's New Digital Appraisal Service Reveals Energy Savings

A new digital service from ABB, a global leader in technology, is enabling industrial operators to maximize energy efficiency and boost sustainability by identifying motor-driven equipment in their facilities with the best energy-saving potential. The ABB Ability Digital Powertrain Energy Appraisal service draws on data measured from fleets of digitally connected electric motors and variable frequency drives (VFDs) to show where and how much energy can be saved by upgrading to the latest high-efficiency technologies. Industrial operators can then make data-driven decisions when prioritizing investments.

Upgrading to energy efficient technology is one of the simplest and most cost-effective ways to lower energy consumption and associated greenhouse gas emissions. Across the world's 300 million industrial motor-driven systems, there is potential to reduce global electricity demand by up to 10% by switching to high-efficiency systems.

"The challenge for an industrial operator is knowing where to start in a fleet of hundreds of electrical motors," said Adrian Guggisberg, Division President of ABB Motion Services. "ABB developed the new Digital Powertrain Energy Appraisal service to provide clarity by analyzing motor data and identifying where businesses should focus investment

ABB Ability™ Digital Powertrain Energy Appraisals unlock insights from operational data to help customers achieve energy efficiency gains from motor-driven systems.

to maximize energy efficiency gains that reduce operating costs and CO_2 emissions."

One operator reaping the benefits is Waggeryd Cell, a pulp mill in southern Sweden with industry-leading energy efficiency. In an effort to further improve the efficiency of its energy-intensive process, Waggeryd is building its ABB Ability Condition Monitoring system. This draws data from digitally connected motors in refiners, process pumps, fans and conveyor belts. Under the new Digital Powertrain Energy Appraisal service, ABB's experts used data from the same sources to identify the ten motors with the most potential for improving energy efficiency. Waggeryd has now prioritized replacement of six of these motors to reduce energy consumption, as well as greenhouse gas emissions.

Traditionally, an energy efficiency appraisal requires time-consuming manual collection and evaluation of data and covers only the largest motor-driven systems on a site as these are typically seen as having the most potential for saving energy. However, this could overlook significant energy-saving opportunities for electric powertrains that are smaller, less accessible or where energy-saving potential is not obvious.

The new digital appraisal service uses a plug and play approach to simplify energy efficiency assessments by pulling operational data remotely from across an entire fleet of digitally connected motors. This provides much deeper insight into the business case and carbon footprint benefits of upgrading to high-efficiency motor-driven systems, while being much safer and faster.

About ABB

ABB is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels. With a history of excellence stretching back more than 130 years, ABB's success is driven by about 105,000 talented employees in over 100 countries. www.abb.com.

Aignep Acquires Alpha Technologies

Aignep Spa announces the acquisition of the entirety of Alpha Technologies LLC, a subsidiary company that has been successfully distributing Aignep products in the North American market for years.

The acquisition aims to strengthen its presence in one of the most important markets for the industrial automation sector. Furthermore, the acquisition will make it possible to provide our customers with increasingly complete, innovative and professional solutions.

On the occasion of the recent visit to the American headquarters in Fairview, TN, the CEO of Aignep Spa, Mr. Graziano Bugatti announced important investments aimed at infrastructures and human resources. In the coming months,

Compressed Air Industry News

Aignep awaits the official change of the company name to Aignep USA Inc.

The new CEO of Aignep USA, Mr. David Grabacki, is already working on the new business plan with strong responsibility and professionalism.

With this operation, Aignep continues its internationalization process to consolidate its role as key-supplier in the global manufacturing industry.

About Aignep

Aignep started in 1976 in Bione (Brescia) as a contractor, producing fittings for the heating field, taking advantages from an industrial district specialized in the "taps and fittings" field. Nowadays the company produces a complete range of products, with its own brand in the FluidPower industry. Quality and innovation are the mottos of Aignep: the entire production is realized in Italy and it's distributed worldwide. The only exception are some products dedicated to the North American market, which have to undertake local regulations, there they are perfected in the USA branch. Aignep is part of the Bugatti Group (since 1923), which is made up of four companies of other fields: household products (Casa Bugatti), lighting (Landa), machine tools (Picchi) and FluidPower (Aignep). For more information, visit www.aignepusa.com.

Asahi/America Air-Pro Piping Now Includes 10-Year Warranty

Asahi/America, the leader in thermoplastic fluid flow technology, announces that Air-Pro specially formulated PE compressed air piping system now offers a 10-year warranty.

Air-Pro is certified by NSF to meet California OSHA Impact and Pressure test requirements to conform to the State of California's Unfired Pressure Vessel Safety Order Appendix C requiring sharp and blunt impact testing at 32°F. Air-Pro is available up to 4" (110mm) in blue colored piping for 230 psi applications and black colored piping up to 12" for 150 psi applications at ambient temperature.

Asahi/America Air-Pro specially formulated PE compressed air piping system now offers a 10-year warranty.

Since 1992, the piping system has been made from specially formulated polyethylene (PE) resin, which has antioxidant properties that can withstand the demanding application of compressed air. Air-Pro's thermoplastic material is also resistant to compressor lubricants and atmospheric corrosion from chemicals or marine environments.

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 piping 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. For more information, visit www.asahi-america.com.

Pneumatech Appoints Gas Generation Business Development Manager

Pneumatech North America, the Rock Hill, SC based Compressed Air Treatment & Gas Generation company, has appointed Ben Smith as the Business Development Manager, Gas Generation.

Ben has held numerous positions with Pneumatech during his 9-year tenure and has gained a tremendous amount of product and industry knowledge. In his new role, Ben will focus on the development and growth of Pneumatech's Industrial and Lab Gas product portfolio. He will work with the existing Regional Sales Managers and their distributors on applications specific to Gas Generation.

Ben brings with him a great deal of industry knowledge and experience and is a great addition to the Pneumatech team.

About Pneumatech

Since 1966, Pneumatech has provided industry-leading compressed air treatment and gas generation solutions to customers across the globe. We pioneered external heat regenerative dryers, introduced variable speed technology on refrigerant dryers and pushed the energy efficiency of nitrogen and oxygen generators to the highest level. Our innovative products and solutions provide clean, dry air and gas to general industries as well as automotive, textile, power generation, oil & gas, food & beverage and electronics. For more information, visit www.pneumatech.com.

Ben Smith, Business Development Manager, Pneumatech.

Achieving Sustainability Targets by Optimizing Compressed Air Use

By Jan Edler, IIoT Manufacturing Applications Leader, Emerson, and Michael Britzger, Senior Manager IIoT Engineering & Innovation, Emerson

By monitoring compressed air consumption using smart pneumatic sensors, companies can reliably reduce energy use and emissions.

Sustainability is a top priority for companies around the world. To reduce their environmental impact, many companies are setting decarbonization targets and undergoing digital transformation to reliably achieve them. Digital transformation of equipment, a process or an entire facility can help industrial manufacturers save energy, conserve resources and reach their decarbonization and environmental sustainability goals.

The digital transformation of pneumatic systems is one critical way that companies can improve operational sustainability. Advanced airflow-sensing technology provides compressed air monitoring and valuable insights that allow companies to control and significantly reduce the energy used to produce compressed air as well as related carbon emissions.

The Significance of Compressed Air Monitoring

From production to packaging, pneumatic technologies power processes across operations in nearly every industry. To function, these processes require pneumatic energy, primarily in the form of compressed air. One of a facility's most expensive energy sources, compressed air is produced on-site. Facilities generate the compressed air they need to operate using on-site air compressors, the motors of which usually draw electrical energy.

When installed on a facility's machines, the AVENTICS Series AF2 Flow Sensor empowers operators to monitor air consumption in pneumatic systems according to DIN ISO 50001 for energy management. Image courtesy of Emerson.

Unfortunately, if companies don't have a clear picture of pneumatic systems, the compressed air that is generated is not always used efficiently. It's estimated that, of the compressed air a facility produces, 10% is lost to leaks and some processes use more compressed air than they actually need. However, what makes this a significant loss also makes it a significant opportunity.

Compressed air monitoring can give facilities insight into energy consumption that allows companies to intentionally control usage, save energy and reach their decarbonization targets. Using these insights, facilities can practice predictive maintenance and address leaks early – or even before they happen. Compressed air monitoring also makes it possible for operators to optimize the amount of compressed air a machine uses while maintaining cycle times.

A Greater Understanding of Energy Use

The digital transformation of pneumatic systems has made it possible for companies to make better decisions when it comes to sustainability. Such advanced monitoring makes it possible for operators to confidently know how much energy their processes are using and why, which positions them to make informed decisions that lead to smarter actions.

Intelligent airflow sensors are key technologies that enable the digital transformation of pneumatic systems. Many sensors are simple to install, are scalable and can be retrofitted on existing equipment, from one machine to machines across all a company's facilities. As such, smart sensors can serve as an effective way for a company to begin or continue its digital transformation journey.

The most advanced airflow sensors can measure many different process parameters, including pressure, temperature, mass flow rate, volumetric flow rate, flow velocity, total mass, total volume and energy at the machine level. These sensors may have a configurable display that operators can use to view data and configure various visualizations and flow charts for measurements, process curves and cumulative values.

The data-capture capability and systematic approach of some sensors, including Emerson's AVENTICS™ Series AF2 flow sensor, is so advanced that these sensors enable operators to monitor air consumption in pneumatic systems according to DIN ISO 50001 for

The AF2 Flow Sensor sends compressed air to the pneumatic system and measures the overall airflow. Image courtesy of Emerson.

Achieving Sustainability Targets by Optimizing Compressed Air Use

energy management. This ISO standard was created to help organizations establish, implement, maintain and improve their energy management systems.

Smart sensors can offer operators even greater capability when paired with a gateway and software. At this level of digital transformation, operators can access dashboards, store historical data, create parameter thresholds that trigger alert notifications, complete leakage analysis, correlate data with other sensors, complete site accounting and much more.

Energy Savings in the Real World

The AF2 is one of the primary solutions Emerson uses to support and enable its customers' environmental sustainability efforts. But Emerson recently made it a solution that it uses to improve its own sustainability efforts. It recently installed 19 of these advanced airflow sensors on half of the machines in its Sissach, Switzerland, plant.

The plug-and-play AF2 is easy to install, keeping time and costs to a minimum with little to no training required, and automatically connects to a pre-built dashboard. The compressed air dashboard collects data from all 19 connected AF2 sensors and makes it possible for operators to gain a wider and deeper understanding about the pneumatic systems. With advanced analytics, including temperature, pressure and volume statistics across time, the dashboard gives operators an aggregated, plantwide overview, as well as allows them to dive into a single machine's metrics.

The impact this complete compressed air monitoring system has had in such a short amount of time is remarkable. The company identified that 850 liters per minute of compressed airflow, about 20% of total airflow, is lost to leaks. Using the AF2 sensors to proactively detect and address leaks can save 20% of Emerson's compressed air usage per year. This translates to $58,000 in energy savings and 68,000 kilograms of reduced carbon emissions over 10 years.

What's more, this rate of savings delivers a notable return on investment (ROI), with an estimated payback of 18 to 24 months. Within 5 months, the identified savings opportunities reached 50% of payback.

Perhaps what's most significant is that this compressed air monitoring solution empowers operators to find energy optimization opportunities. Savings can be generated with the available visualizations and input, but the gained insights are the most valuable, and these insights will continue to make an impact over the installation's lifetime.

The AF2 dashboard measures flow rate, speed, volume, temperature and pressure. Image courtesy of Emerson.

This fully developed solution within a company's network can also easily scale across sites, becoming an enterprise-wide solution. In fact, Emerson plans to expand monitoring from 50% of machines to 80% at its Sissach plant and has begun monitoring at other Emerson plants in Singapore, Malaysia and India, too.

Sustainability Success

Companies cannot achieve ambitious decarbonization targets on hope alone. It requires accurate analysis, informed decision-making, smart action and support from an experienced digital transformation provider. Compressed air monitoring is a valuable way for companies to reliably meet targets and improve their sustainability. Monitoring delivers valuable insights that give operators the information they need to make decisions that make a difference – decisions that effectively reduce energy use and a company's carbon footprint, while improving reliability, productivity and safety at the same time. BP

About the Authors

Jan Edler

Jan Edler is IIoT Manufacturing Applications Leader at Emerson. He has vast knowledge of automation technology and IIoT interconnectivity. In his role, he leads Emerson's global IIoT projects. He has established compressed air and energy monitoring in Emerson facilities around the world.

Michael Britzger

Michael Britzger is Senior Manager IIoT Engineering & Innovation Machine Automation at Emerson. In his role with his team, he focuses on data-driven software solutions and IIoT technology development for Emerson's Digital Transformation initiative.

About Emerson

Emerson is a global technology and engineering company providing innovative solutions for customers in industrial, commercial and residential markets. Emerson's Automation Solutions business helps process, hybrid and discrete manufacturers maximize production, protect personnel and the environment while optimizing their energy and operating costs. Emerson's Commercial & 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.

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Metal Fabricator Measures Nitrogen Use, Receives a Surprise

By Ron Marshall, Marshall Compressed Air Consulting

Nitrogen (N_2) is used in many facilities for a variety of purposes. The most common source of N_2 is through the use of bulk liquid storage. A plant owner was recently surprised to learn that a large portion of his N_2 was disappearing, without ever being used by his production process. This article discusses where it went and what we could do about it.

Background

The facility where the study was done is a small metal fabrication shop. The company uses three different lasers to accurately cut various parts out of metal sheets. Nitrogen is used as a shield gas to prevent the steel sheets from becoming discolored by the cutting process due to oxidization when the metal is at high temperatures.

The owner had contracted with a local welding gas supplier to provide liquid nitrogen, which was stored in a large Dewar bulk storage tank outside directly beside the facility. About every two weeks the supplier would send a truck to fill up the storage tank with the equivalent of about 4,700 m^3 of nitrogen per load.

The plant owner was a bit curious; his nitrogen usage didn't always track his production throughput. He found out that thermal mass flow meters built for compressed air could also measure his N_2 flow, so he fitted each laser with a meter designed for the 400 psi pressures flowing into his machines. Each flow meter had a wireless transmitter, the output of which was continuously captured by his desktop computer. Armed with this data, it wasn't long before the situation started to become a bit clearer.

Some unit calculations would need to be done. The supply company delivered in cubic meters and the flow meters were calibrated in cubic feet, however, the readings showed an interesting fact. During some months the lasers used just slightly over one third of what was delivered, something else was consuming the nitrogen! Over a period of six months the lasers had only used an average of 55 percent of the delivered gas. This almost doubled the effective price of the gas to a cost of $0.98 per cubic meter or about $0.028 per cubic foot.

Low-cost thermal mass flow meters with wireless transmitters were used to track nitrogen consumption of the facility's three laser cutters.

Dewar Storage Losses

A bit of research turned up a bit of a surprise about the characteristics of dewar storage of liquified gasses. The vessel holding the bulk liquid nitrogen is like a large thermos bottle, with an outer and inner shell and an evacuated layer in between. Within the vessel is the liquid, which must be kept at the -320°F (-196°C) it takes to keep the N_2 in liquid form. There is a constant battle within the container, with the heat that leaks in being necessarily counteracted by evaporating Nitrogen. So, for example on a hot windy summer day on the weekend, with the highest head infiltration, when the facility is not in operation, Nitrogen must boil off to maintain the storage temperature. The excess gas must be off-vented to atmosphere or hazardous pressures will cause the vessel to fail. Thus, one of the causes of liquid loss was solved. The plant had a 16-hour x 5 day a week work schedule, during all remaining hours there was significant gas loss, and more in the warmer summer months due to higher ambient temperatures.

There can also be other losses in the storage. Leakages within the plant can also cause the wasted consumption gas. And there are transfer losses in connecting and disconnecting liquid transfer hoses between the delivery truck and the tank.

On-Site N_2 Production

The plant owner looked for a solution and came across some on-site Nitrogen generation systems that were available, but he had heard that the compressed air used for an input to any Nitrogen generator could be expensive and that compressed air is called "the most expensive utility within an industrial plant".

But doing a few simple calculations yielded another surprise. The compressed air system he had within his plant was producing the air at an average power consumption of 20 kW per 100 cfm, a typical compressed air system specific power level for a variable speed drive compressor. His electricity costs were $0.07 per kWh. Converting these units, he found his actual cost of producing compressed air was $0.00023 per cubic feet about 120 times less than his Nitrogen costs. Research told him that the 99.995% purity he needed consumed about 5.3 units of compressed air for every one unit of Nitrogen using PSA (pressure swing adsorption) style generators. Doing the math, he found he could gain a significant annual saving if he generated the gas in-house.

There were some additional energy costs, the pressure he needed was about 400 psi, this required a booster compressor which added a bit to the cost of producing nitrogen. But when all was said and done, he found he only needed one 25 hp air compressor and a 5 hp booster compressor to do the job.

Additional Benefits

Having an additional 30 hp in air compressors generates some waste heat, which would benefit the plant in the winter months, saving natural gas costs. And the plant had some hot dip tanks where metal parts were treated before going to the paint line. These tanks use electric heaters to warm the treatment baths, it was found that the heat of compression could be used to

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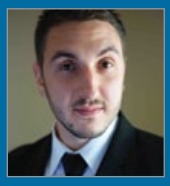

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Francisco Lara
Manager, Airtec Global LLC

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FEB 17
Compressed Air Piping System Sizing & Design
Presenter Tim Dugan, P.E., President and Principal Engineer, Compression Engineering Corporation – *Sponsored by Trace Analytics and Unipipe*
Thursday, February 17, 2022 – 2:00PM EST

MAR 10
On-site Nitrogen Generation Replacing Bulk Liquid Nitrogen
Presenter Antonio Mayne P.E., Utilities Optimization Engineer, Molson Coors Beverage Company – Toronto Brewery – *Sponsored by Atlas Copco*
Thursday, March 10, 2022 – 2:00PM EST

MAR 24
How to Hunt for Vacuum Leaks: Is it Worthwhile?
Presenter Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting – *Sponsored by Best Practices 2022 EXPO & Conference*
Thursday, March 24, 2022 – 2:00PM EST

APR 28
Air Compressor Cooling, Water- or Air-Cooled?
Presenter Tom Taranto, Owner, Data Power Services – *Sponsored by Kaeser Compressors*
Thursday, April 28, 2022 – 2:00PM EST

MAY 12
IIot Solutions for Multiple and Multi-brand Compressors Remote Monitoring
Presenter Tim Dugan, P.E., President and Principal Engineer, Compression Engineering Corporation – *Sponsored by Kaishan*
Thursday, May 12, 2022 – 2:00PM EST

MAY 19
ASME PTC 13 Wire-to-Air Performance Test Code for Blower Systems Part 1
Presenters Julie Gass, Lead Mechanical Process Engineer, Black & Veatch, Fred Constantino, S&C Project Engineering Advisor, ASME and Andrew Balberg, President, Lone Star Blower and Compressor – *Sponsored by Lone Star Blower & Compressor*
Thursday, May 19, 2022 – 2:00PM EST

JUN 09
Sizing and Maintaining Compressed Air Systems
Presenter Loran Circle, Senior Consultant, Circle Training & Consulting – *Sponsored by Kaishan*
Thursday, June 9, 2022 – 2:00PM EST

JUN 23
Compressed Air System Design for Lowest kW/100scfm
Presenter Tom Taranto, Owner, Data Power Services – *Sponsored by VPInstruments and BEKO Technologies*
Thursday, June 23, 2022 – 2:00PM EST

JUL 21
Applications for Adiabatic Cooling Technology
Presenter Bert J. Wesley, Sr. Principal Industrial Plant Engineering Practice Leader, Woodard & Curran – *Sponsored by Evapco*
Thursday, July 21, 2022 – 2:00PM EST

JUL 28
ASME PTC 13 Wire-to-Air Performance Test Code for Blower Systems Part 2
Presenters Hiran de Mel, Senior Project Manager and Principal Technologist, Jacobs and Lloyd Slezak, Consulting Engineer (ret), Brown and Caldwell – *Sponsored by Howden*
Thursday, July 28, 2022 – 2:00PM EST

AUG 18
VFD Vacuum Pumps Do's and Don'ts
Presenter Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting – *Sponsored by Busch Vacuum Solutions*
Thursday, August 18, 2022 – 2:00PM EST

AUG 25
Avoiding Production Downtime: Realtime Compressed Air Quality Monitoring and Audits
Presenter: Francisco Lara, Manager, Airtec Global LLC – *Sponsored by SUTO-iTEC*
Thursday, August 25, 2022 – 2:00PM EST

OCT 20
How to Determine the Ideal Physical Location of a Cooling Tower
Presenter Nick McCall, P.E., Technical Manager, Woodard & Curran – *Sponsored by SPX Cooling Technologies, Inc.*
Thursday, October 20, 2022 – 2:00PM EST

OCT 27
Compressed Air: What You Don't Know Can Hurt You
Presenter Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting – *Sponsored by VPInstruments and Kaeser Compressors*
Thursday, October 27, 2022 – 2:00PM EST

NOV 10
ASME PTC 13 Wire-to-Air Performance Test Code for Blower Systems Part 3
Presenters John Conover, Consultant, Mark Addison, Senior Engineer, Artesian Water Company, and Fred Constantino, S&C Project Engineering Advisor, ASME – *Sponsored by APG-Neuros*
Thursday, November 10, 2022 – 2:00PM EST

DEC 08
Compressed Air: Reliable Source for Nitrogen Generation
Presenter Loran Circle, Senior Consultant, Circle Training & Consulting – *Sponsored by Rogers Machinery and Parker*
Thursday, December 8, 2022 – 2:00PM EST

Hiran de Mel
Senior Project Manager and Principal Technologist, Jacobs

Mark Addison
Senior Engineer, Artesian Water Company

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Metal Fabricator Measures Nitrogen Use, Receives a Surprise

supplement this process and also save electrical energy, all possible if a heat exchanger was fitted onto the new compressor oil cooling circuit.

One of the characteristics of this plant's electrical bill is that the electrical demand cost ($ per kVa) charged by the utility was about 50 percent of the total bill, the remaining cost is the kWh charges. This is typical of facilities that have high peak demands during the day and significant periods of non-production during evenings and weekends. The proposal was to control the nitrogen generation times schedule so it was only running during off-peak times. This required a larger Nitrogen storage vessel, but with proper control the cost of the gas would reduce by about 40%.

The local power utility was very interested in the recovery of waste heat and were prepared to grant some incentive funds to help with the project, expected to gain a simple payback of less than 2 years.

Conclusion

The bulk storage of liquid Nitrogen using a Dewar system has the disadvantage in that some of the gas can be lost due to venting. This effect is more pronounced if there are periods of time where no nitrogen is being drawn from storage, and where higher ambient temperatures are being experienced, such as during warm summer months.

The production of onsite Nitrogen is often a less costly process, even when the energy needed to generate compressed air is factored into the operating costs. Some side benefits like using waste heat that to displace building or process heat can make the project even more attractive. BP

For more information about this article, contact Ron Marshall at Marshall Compressed Air Consulting tel: 204-806-2085.

To read similar ***On-Site Nitrogen System Assessment*** articles, visit https://www.airbestpractices.com/system-assessments/air-treatment-n2

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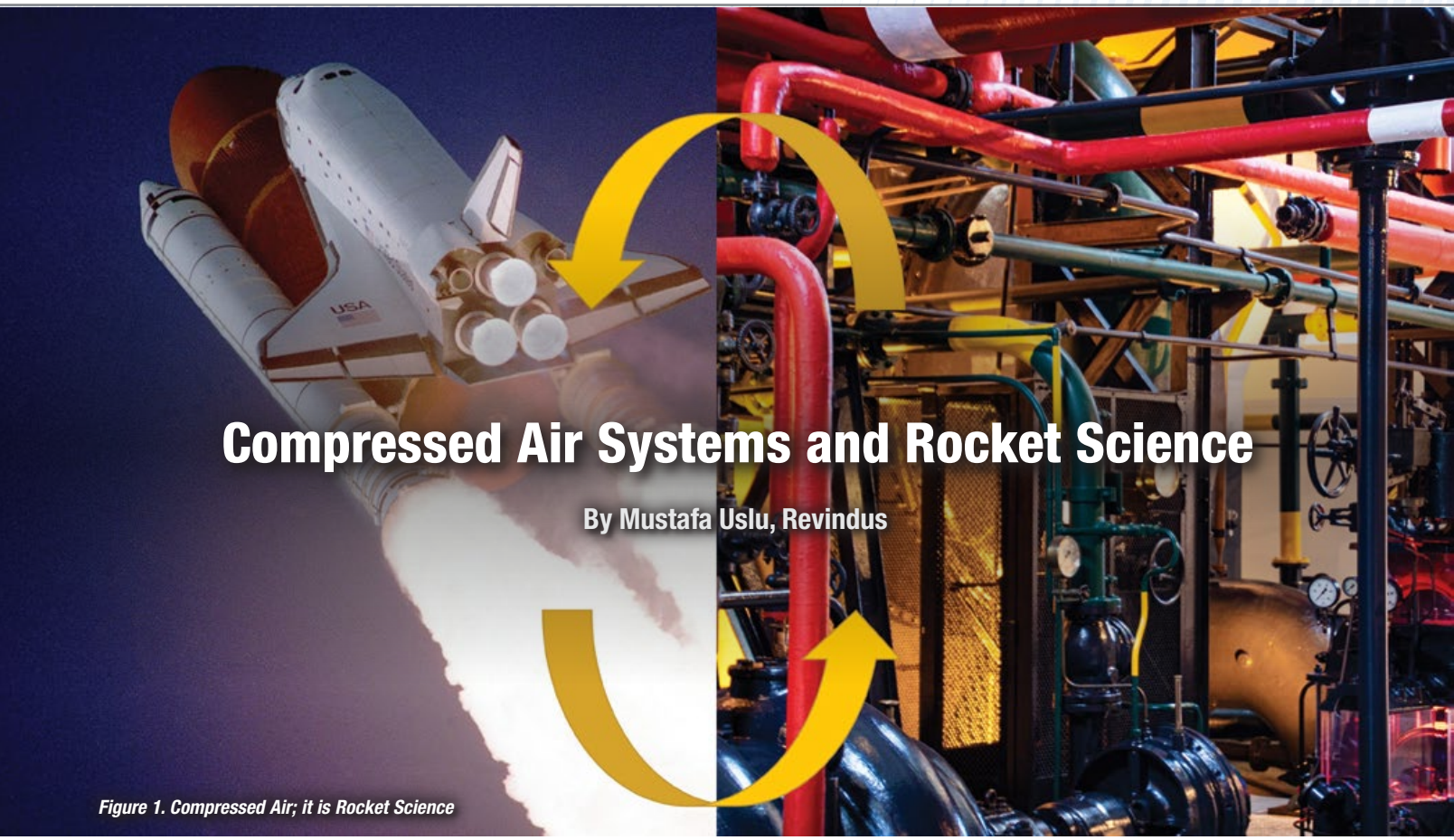
Large Dewar style storage vessels, constructed like a large thermos bottle, have the disadvantage in that a portion of the gas must be vented to atmosphere to control the pressure during periods of plant inactivity.



Compressed Air Systems and Rocket Science

By Mustafa Uslu, Revindus

Figure 1. Compressed Air; it is Rocket Science

➤ Would you believe the same technology used in the launching and controlling of a space rocket is also used in your compressed air system? Yes, in some cases, "rocket science" helps to solve problems in compressed air systems and ensures the performance of the installed units. In this article, we are going to explain the technology called the **"Sonic Nozzle",** that combines a space rocket thruster and your compressed air system. Additionally, we are going to walk through a case study, step by step, to show how it works.

A Little Bit of History

The concept of the venturi geometry was discovered and used in the 19th century and known as the (Converging-Diverging) de Laval Nozzle. It was invented to experiment with the effect of pressure reduction through throats and to use the kinetic energy of the gas for the impulse steam turbines. However, *sonic nozzles* (are known also as Critical Flow Venturis-CFVs) were first used in rocket engines in the 1940s and excelled in the 1960s during space

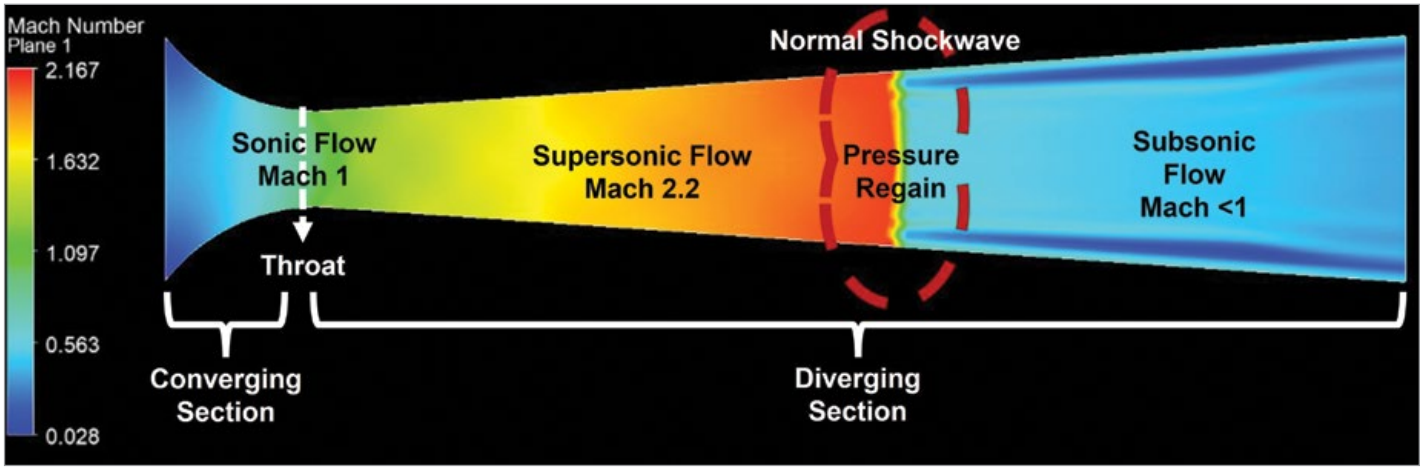


Figure 2. Sections of the Sonic Nozzle

activities by NASA. The detailed studies were carried out to cover the real gas behavior and obtaining the optimal shape of the nozzle for given conditions. Besides rocket engines, today the nozzle and the calculation theory are used for measuring and limiting compressed gas flow rates accurately and repeatedly.

A Little Bit of Theory: What Makes the Sonic Nozzle so Precise?

The sonic nozzle is tailored for each application; pressure, mass flow rate and gas content. The surface roughness, roundness and the dimensions are playing a very important role in defining the flow characteristics and accuracy of a nozzle. There is a niche theory behind the topic but since it might sound too scientific, we will try to keep it as simple as possible for this article. If you are really interested in the details, we will be glad to explain further.

The theory goes like this: Upstream of the nozzle, the gas is directed to the converging section of the nozzle to increase the velocity. Then at the throat section, where the cross-sectional area of the flow is minimum, the gas velocity reaches the speed of sound (sonic velocity, Mach 1) and now the flow is choked. The choked flow means the flow reaches its terminal rate; no further flowrate can pass through. That helps to use this device to limit the flow precisely. If the geometry and the thermophysical properties of the gas upstream are known, the flowrate can be calculated accurately. When the flow is choked, downstream pressure or piping has no effect on the flow at all. Even though the diverging section has no effect on the flow rate, it is playing an important role for having an acceptable pressure drop across the nozzle.

Figure 3. Precisely Machined Sonic Nozzles

When the flow becomes supersonic (Mach >1) in this section, the pressure regain occurs where the normal shock is observed. After the shockwave, flow returns to acceptable speeds (subsonic) and the pressure is increased further by reducing the velocity by increasing the flow cross-section. Therefore, unlike the stereotypes about sonic nozzles, it is possible to have less than 0.3 psi of pressure drop if the nozzle is well designed.

Compressed Air Systems and Rocket Science

Typical Applications in Compressed Air Industry

Sonic nozzles are very popular in flow meter calibration and precision flow rate measurements, thanks to the record-breaking accuracy and repeatability. Additionally, they are used for limiting the flow, securing the operation for equipment, and flow balancing.

Here are some of the typical applications of sonic nozzles in the compressed air industry:

1. Compressed Air Flow Meter Calibration: As a transfer device, this can calibrate any gas flow meter precisely.
2. Air Compressor and Dryer Performance Acceptance Test: CAGI's 3rd party lab

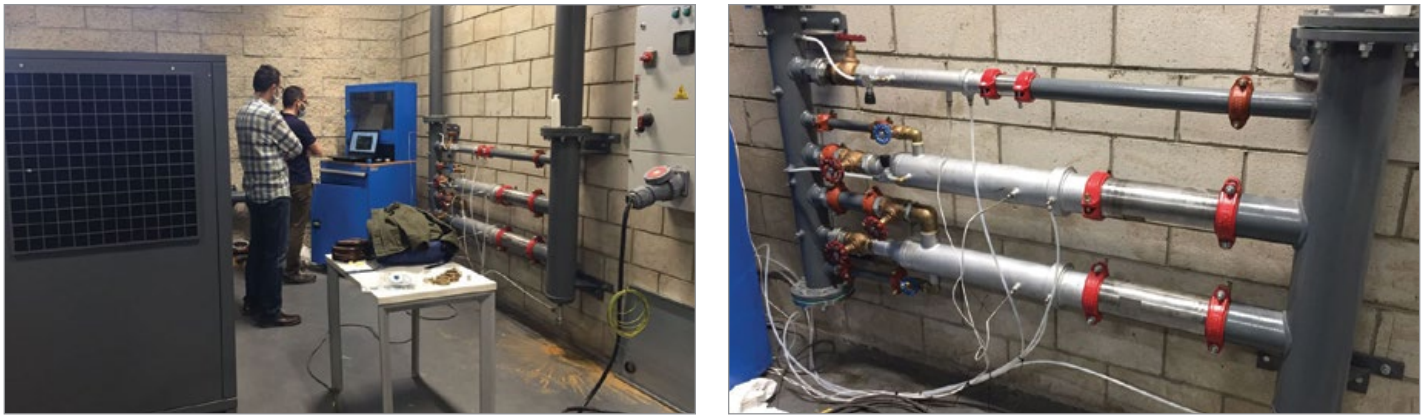


Figure 4. Sonic Nozzle Flow Measurement Application at an Air Compressor Manufacturer QA and R&D Lab (Courtesy of Hertz)

uses this technology to validate air compressor and dryer performance.

3. Precise Flow Limiter for Branches Having Distribution Issues: The case study of this article covers this application.

4. Precise Flow Limiter for Parallel Dryers Having Different Capacities: Due to pressure drop vs flow rate relation, the higher flow rate of compressed air tends to flow through the larger units or units having less pressure drop.

5. Assures Safe Operation for Desiccant Dryer and Activated Carbon Tower: Repressurizing the compressed air system, or immediate drop in pressure, can cause a desiccant dryer or activated carbon tower to fail. This could be eliminated by a sonic nozzle placed just after the units.

6. Intermittent Demand Solutions: Like jet pulse cleaning of filter bags

As mentioned, in this article, we will be focusing on the flow distribution across the branches. We will keep the details of other topics for our next articles.

Case Study: Flow Distribution Across Parallel Dryers with Same Flow and Pressure Drop Characteristics

A large-scale cookie production plant was in trouble with a constantly faulty dryer for a long time and searching for a rugged solution. There were two 250 kW variable speed (one for back up) and three 250kW constant speed rotary screw air compressors installed in parallel to feed the main header line. By the nameplate figures, the maximum capacity was around 7000 CFM with backup. Three 2000 SCFM water cooled refrigerated dryers were installed in parallel. The simple block diagram of the compressed air supply side can be seen in Figure 5.

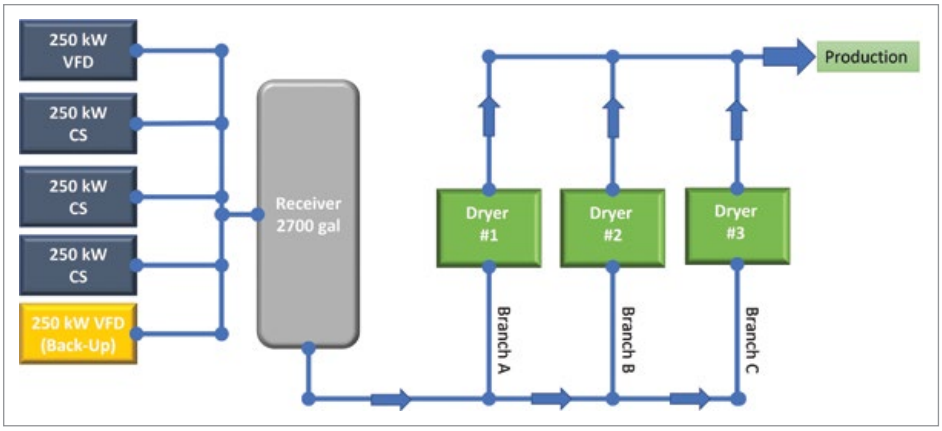
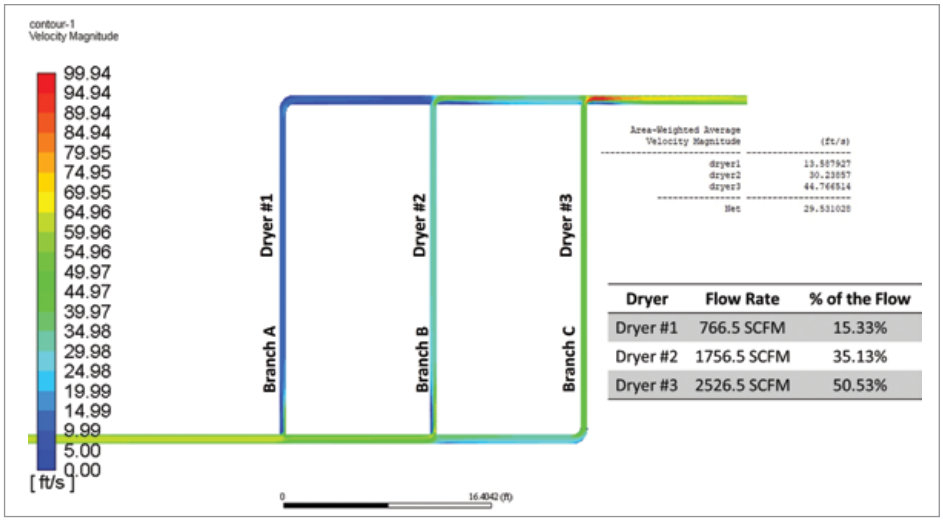


Figure 5. Compressed Air System Block Diagram

After installation of the flow meters and energy analyzers, it was found that the demand peak flow rate was 5000 SCFM, while the average flow rate in one shift was 3800 SCFM and during the holiday season it was averaged

Compressed Air Systems and Rocket Science

1400 SCFM. The plant manager said the dryers were selected 20% oversized after an audit due to hot and humid ambient conditions while consideration was taken not for installed compressed air flow but for the actual demand of the production at that moment. The pressure of the plant was set to 100 psig, the main header pipe was selected 6" and branch pipes were 4". The main header split into 3 branches, and 2000 SCFM refrigerated type dryers were operating at the end of them. There were many problematic points of the whole system but for this article, we will stick to our topic.



Dryer	Flow Rate	% of the Flow
Dryer #1	766.5 SCFM	15.33%
Dryer #2	1756.5 SCFM	35.13%
Dryer #3	2526.5 SCFM	50.53%

Figure 6. Flow Distribution Across Branches

Service History

After some time passed on commissioning, Dryer #3 in Branch C failed due to overload. During servicing, it was found the refrigerant compressor tripped a couple of times and eventually the coil was burnt out. This incident occurred two more times in a row. The third time, the service engineer decided to switch Dryer #2 and Dryer #3, just to

make sure if Dryer #3 had a chronic issue. Interestingly, this time Dryer #2 in branch C failed. Therefore, the problem was not the unit but the flow distribution. The customer, however, wasn't willing to make a costly investment to correct the piping to a proper diameter and distribution.

The flow needed to be balanced for each unit. A service technician installed three valves, after the units, to limit the flow with a temporary flow meter to adjust the flows to stay in the safe zone. It was observed that for different flow rates, the distribution drifted slightly. After fine adjustment of the flows, the service technician removed the flow meters and left the plant.

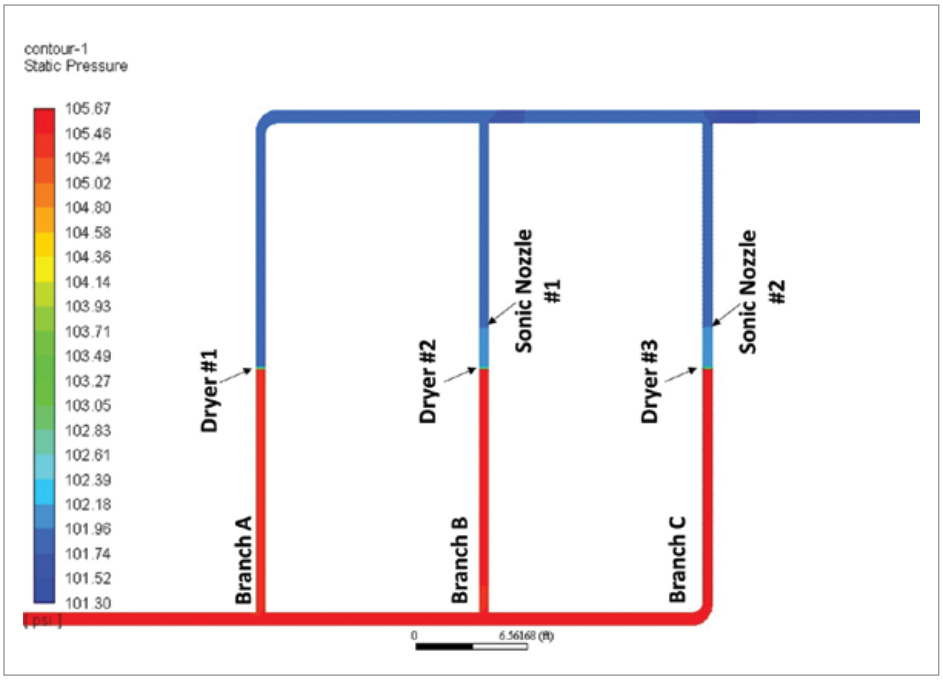
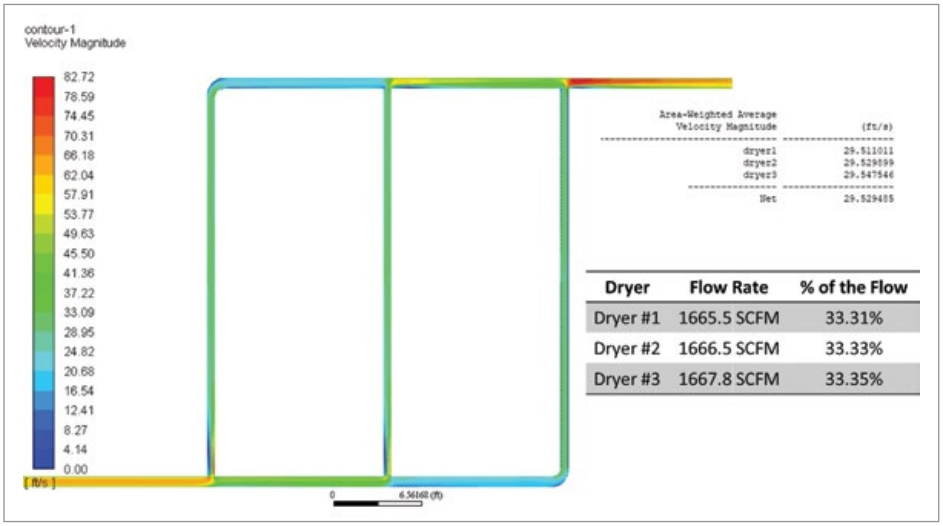


Figure 7. Pressure Distribution After Sonic Nozzle Installation



Dryer	Flow Rate	% of the Flow
Dryer #1	1665.5 SCFM	33.31%
Dryer #2	1666.5 SCFM	33.33%
Dryer #3	1667.8 SCFM	33.35%

Figure 8. Flow Distribution After Sonic Nozzle Installation

Compressed Air Systems and Rocket Science

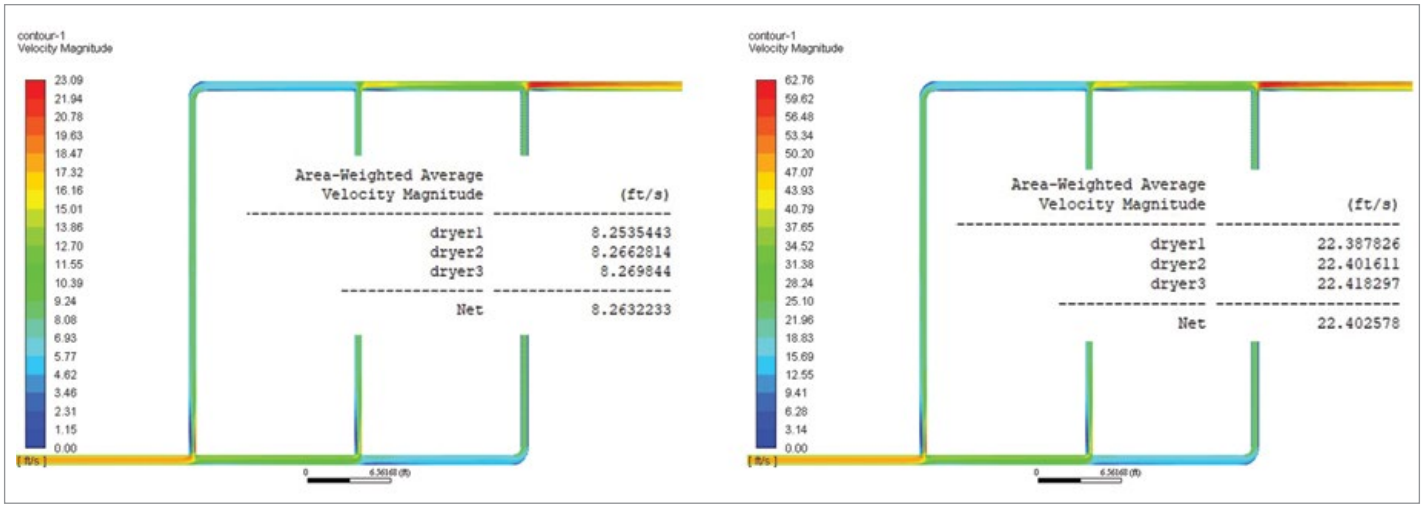


Figure 9. Flow Distribution of 1400 SCFM and 3800 SCFM Operation Respectively

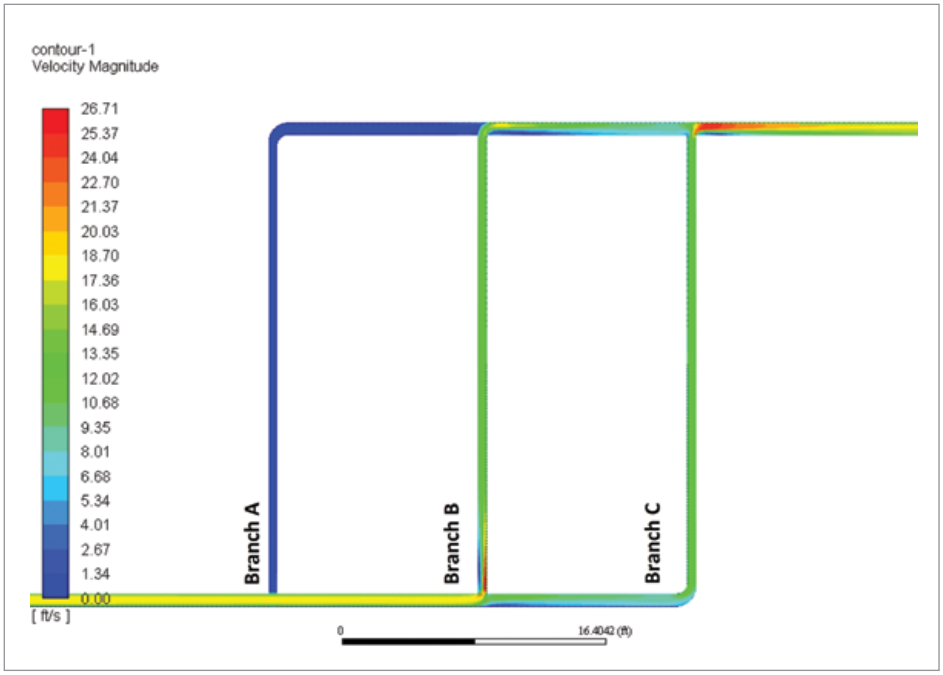


Figure 10. Flow Distribution at 1400 SCFM While Branch A was Shut Down

The plant manager thought even though this worked out quite well, it was not safe since it was adjustable, and anyone can play around and asked us to find a solution that doesn't rely on adjustment. Plus, during low load conditions (like 1400 SCFM), the customer was asking to shut down the dryer placed in Branch A to save energy. However, switching to the normal operations will be tricky since it again might require flow meters and fine adjustment to stay in the safe zone.

Proposed Solution

Thanks to the advanced technology in Computer Aided Engineering (CAE) tools and thermofluid science, we can simulate the case and analyze it. A Computational Fluid Dynamics (CFD) tool was used for the case. CFD helped us to have a better understanding of the flow distribution across the piping and the system behavior under various conditions. Using the CFD, we were able to provide more precise solutions for this system. In our case, we have modeled the piping configuration and dryers.

As seen clearly in Figure 6, the flow distribution across the branches is far from being balanced. The dark blue color indicates a low velocity, so low flowrate while green to red color indicates high velocity, so higher flowrates. In this very case, while Branch A was having 15% of the total flow, Branch C was having 50% of the total flow while the total flowrate is 5000 CFM. Therefore, the dryer in Branch C is 25% overloaded to its design values. With operating condition corrections, however, it rose to 50% overloading which explains the reason for the failure in Branch C.

After consecutive simulations were carried out, the proposed solution was to install sonic nozzles in Branch B and Branch C to balance the flow. Due to the nature of the sonic nozzle operation, when excessive flow occurs, the flow will be choked and re-directed to the other branch until it reaches equilibrium. The color

change in the contour represents a pressure drop in Figure 7, so the dryers and installed sonic nozzle can be recognized easily.

A spectacular flow distribution was observed after the sonic nozzle installation on each branch as expected. The velocity distribution and the flow distribution can be seen in Figure 8. Even though this result looks perfect, further simulations were carried out to observe the system under various conditions, even shutting down one branch.

When the flow dropped to 1400 SCFM and 3800 SCFM, the flow distribution was also equal due to the choked flow phenomenon balancing the flow across the piping. The solution was rock solid. These cases were also simulated in CFD software and results can be seen in Figure 9. In this case, if the problem was solved through orifice or valves, since it creates artificial pressure drop, it might not be possible to have equal distribution under various conditions.

Even when the Branch A and Dryer #1 is shut due to energy concerns, the flow is distributed to Branch B and Branch C equally thanks to the nature of the nozzle again. That's why in Figure 10, the velocity contour in Branch A was dark blue (0) and Branch B and C had similar colors (flow rates).

Table 1 summarizes the whole study in terms of flow distribution for each case and for each branch.

	Initial Case	5000 CFM w/ SN	3800 CFM w/ SN	1400 CFM w/ SN	1400 CFM w/ SN and A Closed
Branch A	15.33%	33.31%	33.30%	33.29%	0.00%
Branch B	35.13%	33.33%	33.33%	33.34%	50.20%
Branch C	50.53%	33.35%	33.35%	33.35%	49.80%

Table 1. Complete Table of Flow Distribution of Each Application

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Compressed Air Systems and Rocket Science

Conclusion

Applying a sonic nozzle technology in a compressed air system was very exciting for this case study. Combining this with another cutting-edge technology, computational fluid dynamics/CFD, helped us speed up the process, have a better understanding of the whole system, and simulate different scenarios instead of a costly trial and error process. Lastly, the system was installed three years ago and is still functioning flawlessly. BP

For more information contact Mustafa Uslu, Mechanical Engineer (M.Sc.), Revindus, email: mustafa@revindus.com, http://revindus.com/

About the Author

Mustafa Uslu is a Mechanical Engineer (M.Sc.) at Revindus – Revolutionary Industries. He has over 12 years of experience in designing, developing, and manufacturing high tech compressed air equipment, and special refrigeration units by using cutting edge technology to meet the unique requirements. Mustafa holds a master's degree about theoretical and experimental analysis of a refrigerant compressed air dryer on Mechanical Engineering.

About Revindus – Revolutionary Industries

Revindus was founded in 2018 with a vision of offering the high technology products in the industry. The company consist of precise refrigeration and compressed air engineering divisions. Our product offering includes precise gas flow meters, flow computers, lab automation, sonic nozzles, data loggers, compressed air engineering, as well as precisely temperature-controlled refrigeration units, ultra-low temperature chillers (-100°F), freezers, freeze dryers and climate cabinets. The units are built in house including software development, automation, manufacturing, and final testing. Revindus serves multiple industries including gas flow meter manufacturers, medical laboratories, manufacturing, food and beverage, pharmaceuticals, and infrastructure. For more information visit www.revindus.com

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The 2022 AICD Show Report

By Bill Smith, Compressed Air Best Practices® Magazine

The AICD Board: Jimmy Ford, Rob Grizzle, Phil Kruger, Dave Nosal, Kasey Gould, Michael McCulley, Jeff Brennan, Bart Frush and Brent Pifer (left to right).

The Association of Independent Compressor Distributors (AICD) held its annual show at the Westin Savannah Harbor Golf Resort & Spa in Savannah, GA in May of 2022. Participating distributor members and guest enjoyed a few days of networking events, trade show, speakers, the AICD Golf Tournament and more.

"The AICD is continuing to grow despite the challenges of the last two years," said Jeff Brennan, President, AICD. "We're now bigger than ever and membership is really supporting the Association."

Matt Nolte, Austin Wilkins, Bruce McFee, Grant Hebert and Joanna Hebert at the Sullivan-Palatek booth (left to right).

This report will recap a sampling of exhibitors – not all exhibitors present at the show could be featured due to article space limitations.

Air Compressors

Sullivan-Palatek displayed rotary screw and reciprocating air compressors through the Sullivan-Palatek and Saylor-Beall brands. The industrial electric rotary screw portfolio ranges from 7.5–450 hp with variable frequency drive capability, reaching pressures up to 125 psig. The SP32 range (300–450 hp) achieves capacities from 1,490–1,730 cfm with motor speeds of 1,800 rpm.

Hertz Kompressoren USA introduced a Maintenance Kit Program and the HS Series oil-free scroll air compressor series, available in 14 models from 2–40 hp, 115–145 psi, 6–121 cfm. Hertz displayed a HS5.5-S tank-mounted unit with a cycling refrigerated dryer in its booth, along with other air compressors models. The new Maintenance Kit Program offers Basic and Plus Kits sorted appropriately per unit type, and service intervals for every few thousand run hours. Kits are stocked with necessary oil filters, separators, Hertz Smart Oil, free oil analysis kit, air treatment filters, valves, cabinet panel filters, and more.

Sauer Compressors USA specializes in the manufacturing of medium and high-pressure air and gas piston compressors up to 7,250 psi. The Sauer team was present discussing its diverse rental fleet of skid-mounted packages, basic units and full containerized solutions from 150–5,800 psig. "When capital expenditures aren't an option, yet operating demand persists, we're able to help customers with our rental fleet and maintenance services, keeping their operations running

James Anthony, Clark Beal, David Carpenter, Bob Groendyke, Hugh Smith and Stephanie Brockman at the hertz Kompressoren USA booth (left to right).

Jim Riley and Joshua Peter at the Sauer Compressors USA booth (left to right).

Matt Piedmonte and Scott Werner at the Aerzen Rental booth (left to right).

The 2022 AICD Show Report

Brian Speed, Steve Vogel, Rusty Welch, Adrian Fernandez and Russ Jones at the BEKO Technologies booth (left to right).

Ken Scheifer, Dan Harrison (Air Compressor Services), Jeff Crutchfield, Jon Carnes (AIM of Louisiana), Allan Hoerner, Mike Kinnucane, Nitin Shanbhag and Aydin Dereci (Alkin Compressors) at the Mikropor booth (left to right).

Jim Tomczyk, Todd Allison, Matt McQuillin, Nick Herrig, Jane Sexton and Jim McFadden at the nano-purification solutions booth (left to right).

and providing peace of mind," said Jim Riley, Rental Sales Manager.

Aerzen Rental presented electrically-driven (optional diesel powered generator sets) low-pressure solutions below 50 psi. Their positive displacement blowers (up to 14.5 psi) and TVS-Series single stage, air-cooled, oil-free rotary screw units up to 50 psi with integrated VFD are commonly used for wastewater basin aeration, bulk material pneumatic conveying and any low-pressure industrial application.

Compressed Air Dryers and Air Purification

BEKO Technologies displayed refrigerated and desiccant compressed air dryers, coalescing and particulate filters, zero air loss condensate drains, and oil water separators. BEKO also displayed fixed and portable sensors for dew point, flow, pressure, oil vapor and leaks. During my booth visit we reviewed BEKO's new 2022 product brochures for general facts and figures about compressed air, installation diagrams to achieve desired air quality classes in accordance with ISO 8573-1:2010, and features and benefits of the BEKO Technologies product portfolio.

The full Mikropor America sales team was at the AICD. "This show has been instrumental for us," said Nitin Shanbhag, President, Mikropor America. "It's all about the people, whether we're enhancing relationships with existing customers or developing new ones." Mikropor has been a leading manufacturer of compressed air treatment systems, atmospheric air filtration solutions, nitrogen generators and process chillers since 1987.

Nano-purification solutions showcased the new DHM Range membrane dryers. The DHM range consists of seven models rated[1] from 6.4–74.2 scfm inlet conditions achieving 57.6°F dew point suppression – producing an outlet air dew point of 40°F – then seven more models rated from 3.2–55.1 scfm achieving 99°F dew point suppression – producing sub-freezing outlet air dew points at the reference conditions. Advanced hollow fiber technology with a unique inner coating increases separation efficiency between the water vapor and air.

Jon Brom, Charles Algiene, Jim DiMaiolo, Joe Rodenbucher, Chris Foster and Bob Mackay at the Altec AIR booth (left to right).

Altec AIR introduced its new RAD Series non-cycling refrigerated compressed air dryer (25–300 scfm). "Our engineering team did a fantastic job implementing customer feedback into the new design," said Jim DiMaiolo, Market Segment Manager. New features and benefits to the RAD Series include locking easy-access cabinet design, top mounted inlet and outlet connections, compact all aluminum heat exchanges modules, International Safe Transit Association (ISTA) testing for withstanding vibrations during transport, UL certification pending and less than 2 psi pressure drop.

Raymond Batkay, Maggie Rogers, Hal Burke, Kate Turner and Ben Smith at the Pneumatech booth (left to right).

The ZEKS Compressed Air Solutions team was on site presenting their ZMA Series modular desiccant dryers (heatless regeneration) with 11 models from 3–177 scfm. The ZMA Series features an advanced controller, proprietary flow valve, high strength desiccant for enhanced dryer performance and afterfilter life, purge mufflers (<75dBA), stainless steel angle seat purge valves, internal/external anodized towers within powder coated external enclosure and more.

Jesse Yates and Ben Laiweneek at the Walker Filtration booth (left to right).

1. Rated flow capacity: compressed air dryer inlet: 101.5 psig and 95°F; ambient air temperature: 77°F; 100% RH

The 2022 AICD Show Report

Molly Powers, Scott Scheuerlein, Bill Peters, David Schluckebier and Chad Timmer at the Clean Resources booth (left to right).

Mike Zacharko, Abbey Hopkins and Sean van Auken at the Air System Products booth (left to right).

Bill Duffel and Bill Kirkpatrick at the Applied System Technologies booth (left to right).

Pneumatech displayed the PMNG Series membrane N_2 gas generator (90.0–99.5% purity), PPNG Series pressure swing adsorption (PSA) N_2 gas generator (99.5–99.999% purity), desiccant and refrigerated compressed air dryers, filtration and condensate management. The PPNG PSA units range from 324–39,521 scfh (5.4–658.68 scfm) at 99.5% purity. The Purelogic controller has full monitoring capabilities, measuring flow rate, oxygen percentage, inlet, outlet and buffer tank pressures and inlet/outlet dew points. "We have the lowest air factor on the market, which means Pneumatech N_2 generators require the lowest amount of compressed air to produce a set amount of N_2, reducing energy costs and total cost of ownership," said Ben Smith, Business Development Manager, Gas Generation.

Featured products at the Walker Filtration booth were the new line of CondenSmart Zero-loss Drains (6 models, 2.9–232 psig working pressure), plus coalescing and particulate oxygen filters (19 pipe sizes, 5.7–1,425 scfm). The CondenSmart electronic drain solenoid valve automatically opens and closes to release accumulated fluid, and should be serviced every 12 months or every 8,000 hours.

Clean Resources appointed Scott Scheuerlein as its new Vice President of Business Development. Scheuerlein has extensive experience in the compressed air industry having worked in business development roles for air compressor and dryer OEMs and distributors. Clean Resources showcased its Smart-Pak, IDC, Super Pak, Micro 50 & 100 Series high performance oil-water separators for compressed air systems from 50–10,000 cfm.

Lance Frederick, Derrick Taylor, John Vicat and Joe Burke at the Unipipe booth.

Adam Schmitz and Brad Wilbanks at the Prevost booth (left to right).

Air System Products displayed their portfolio of compressed air condensate management solutions. The Posi-Zorb pump driven oil/water separator is design to handle system-upset conditions and a variety of oils, requires no electricity and is capable of 24 hour continuous operation. The Posi-Zorb ranges from 250–1,000 scfm (90°F/90% RH). The unit enables easy disposal, simple replacement and there are no messy bags to handle. Readers may also recognize the Robo-Drain and several other zero air loss and timer drain technology manufactured by Air System Products.

Piping and Storage

Applied System Technologies displayed their Quick-fit (1/2"), Infinity [3/4"–2.5" (20mm–63mm)] and Elevation [2.5"–10" (73mm–273mm)] aluminum piping systems for compressed air, vacuum and inert gases. The Infinity and Elevations lines are backed by an exclusive lifetime warranty.

The 2022 AICD Show Report

Chad Hills, Jon Schwartzman and Scott Kramer at the AIRpipe USA booth (left to right).

Raul Holguin and Stefano Gaggero at the Aircom USA booth (left to right).

Theresa Hinkler, Madison Lester, Andy Freyer and Les Taylor at the Kingston Valves booth (left to right). *Editor's note: Shortly after the event, the Kingston Valves team shared news of the sudden passing of Les Taylor. The Best Practices team shares its sincerest condolences to the family, friends and colleagues of Les Taylor.*

PneuTech-Unipipe discussed upcoming additions to their piping portfolio. "In the second half of this year we're bringing in a new 8" and 10" product with rolled ends so pipe lengths can connect to each other with a simple grip ring, rather than using a standard coupling," said Derrick Taylor, General Manager, Unipipe. "This will cut installation time and costs significantly." Unipipe will also introduce a 3-way ball valve, eliminating extra piping tees for air dryer bypass. Unipipe is also introducing high pressure brown pipe with increased wall thickness for oil and fluid systems. Unipipe compressed air piping is available in 13 sizes from ¾"–10" (20mm–250mm) and comes in options for compressed air, nitrogen, vacuum and high-pressure applications.

Parker was present showcasing Transair aluminum pipe [nine sizes, 1/2"–8" (16.5mm–220mm) and Transair stainless steel pipe [six sizes, 3/4"–4" (22mm–101mm)] for compressed air, vacuum and inert gas applications. The Transair aluminum line has recently expanded up to 8" diameter. Parker Transair aluminum pipe maximum working pressure for ½"–4" sizes is 232 psi (from -4°F to 113°F), while maximum working pressure for 6"–8" sizes is 188 psi (from -4°F to 140°F). Transair stainless steel maximum working pressure is 145 psi (from -4°F to 194°F). "Customers frequently ask for a stainless steel option. Stainless steel is also appropriate for our customers with process water and chemical transfer applications," said Tim McDonald, Business Unit Manager, Transair.

Prevost has been manufacturing patented compressed air and fluid distribution products since 1978. "We're introducing our new color

concept for 2"–4" aluminum piping, allowing installers to directly mount components together. Now instead of having a small section of piping from a tee to an elbow (or ball valve), you can directly connect a ball valve to a tee, or an elbow to four-port manifold, saving install time, preventing air leak points and overall size required to mount the system," said Adam Schmitz, National Sales Manager. The Prevost Piping System (PPS) aluminum blue pipe for compressed air is available in nine diameter sizes from ½"–4" operating up to 232 psi, in -4°F to 176°F temperatures.

AIRpipe USA displayed its Blue Rigid Aluminum Pipe, available in nine diameter sizes from ¾"–8" with maximum working pressures from -4°F to 176°F. Its wide range of connectors include standard connectors, 45° elbows, 90° elbows, male and female threaded elbows, equal lateral and lateral reducing wyes, equal and reducing tees and more, offering endless installation configurations backed by a 10-year quality guarantee.

Aircom USA was on-site displaying its Quick Line Aluminum system of pipes and fittings for compressed air, available in 11 diameter sizes from ½"–8" (16mm–220mm). The Quick Line system offers the same connection principle through ½"–4" sizes, requires no special tools and is designed for deep insertion of pipe for effective alignment and sturdiness. Raul Holguin was recently appointed as a regional sales manager.

Kingston Valves introduced its Stainless Steel, Soft Seat Safety Valves, ASME Section XIII / National Board Certified for high-capacity flow rates. Its team introduced the stainless steel models to withstand harsh and corrosive environments, ensuring reliable operation in operating temperatures from -20°F to 400°F and set pressure ranges from 20 to 450 psig.

Manchester Tank was present discussing its standard design and custom, built-to-order air receivers. Manchester tank is capable of producing pressure vessels and compressed air

Joe Luthman and Mike Amstutz at the Manchester Tank booth (left to right).

The 2022 AICD Show Report

Mike King, Andrew Bardsley, Meredith Smith, Tim Watson, Chris Gibson and Janelle King at the Edmac booth (left to right).

Dan Parker, Dave Brockett and Donnie Hendrickson at the ISEL booth (left to right).

Kevin Kovanda, Abra Zawacki and Mac Samples at the SA Performance booth (left to right).

tanks as small as 2" in diameter at 3,000 psi to as large as 96" in diameter at 300 psi.

Intake Filtration, Lubrication and Components

Edmac Compressor Parts displayed a selection of its aftermarket OEM compressor and vacuum parts. Its product range includes lubricants, filters, service kits, consumables, air ends, separators, desiccant and more. Edmac provides support and aftermarket parts for all brands across the globe.

ISEL Lubricants, a subsidiary of DuBois Chemicals, displayed not only its line of air compressor lubricants, but also raised awareness on the rest of its product line. Apart from lubricants, ISEL distributors provide end users with metal working fluids, water treatment solutions, industrial cleaners, rust preventatives, pretreatment & paint line solutions and more. The ISEL brand carries dedicated lubricants for rotary screw, reciprocating, centrifugal and rotary vane air and gas compressors, not to mention blower lubricants, food grade lubricants and more.

SA Performance provides compressor lubricants designed to reach 100% fluid life at 200°F for use in rotary screw, centrifugal and reciprocating compressors as well as vacuum pumps and blowers. Its new Dura-Life FG product is rated for 12,000+ hours at 200°F, uses an optimized blend of antiwear agents, rust inhibitors and antioxidants. This lubricant is designed to withstand harsh environments and protects food-grade lubricant from microbial contamination.

Solberg displayed its filtration solutions designed to protect critical machines such as

vacuum pumps, blowers, fans, engines and compressors. Its primary product lines include vacuum process filters. liquid separators, inlet air filtration, industrial silencers, air/oil separation and more.

ProCura IoT displayed its asset management software providing real time readings for all of your equipment. Its multi-level dashboards feature customizable notifications, real time graphing, customizable reports, document storage, and all things related to equipment monitoring.

Andy Spicer and Kevin Dumont at the Solberg booth (left to right).

Conference

The AICD conference format has an engaging agenda, aimed at helping senior management at air compressor sales and service companies better manage their businesses today and tomorrow.

- Economic Check-Up – Professor J.R. Gillette, Ph.D.
- Supply Chain Update – Professor Tom Goldsby, Ph.D.
- Equipment Rental 101, Success in Compressors – Bill Kiker
- Celebrity Speakers – Javier Pena & Steve Murphy (A Morning with the NARCOS guys) – How They Took Down Pablo Escobar

Dalton Joy and Ben Taylor at the ProCura IoT booth (left to right).

Conclusion

Throughout the duration of the event, attendees testified to the impact this association has had on their careers. Here, members connect with peers to share ideas, discuss business methods develop solutions to industry problems, see the latest technology on the market and enjoy a world class event produced by the AICD team. Mark your calendars for May 21-23, 2023 in Dallas, Texas to be a part of next year's show. BP

For more information, please contact Kasey Gould, AICD Administrator, email: admin@aicd.org, or visit www.aicd.org.

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COMPRESSED AIR TECHNOLOGY NEWS

BOGE Expands S-4 Series

With their extreme efficiency and quiet running, the S-4 series really set a before and after in the world of compressed air technology when they were launched. Their innovative design concept has now been expanded to include additional power ranges, and the oil-lubricated screw compressor with the large housing is also now available where 90 kW power is required. BOGE continues to fulfill its customers' demands for powerful yet simultaneously efficient, low-noise compressors. The optimized airend with direct drive similarly ensures reliable running.

The S 91-4 model with an output of 90 kW is the most efficient screw compressor in its class.

Best in class – the new BOGE compressor shares the outstanding characteristics of its elder siblings in the S-4 series. The latest model – the S 91-4 with an output of 90 kW – is, of course, also the most efficient screw compressor in its class, able to produce excellent free air delivery at low specific power consumption when compared with its competitors. These efficiency benefits are achieved thanks to the model's revolutionary construction concept – the generously sized components reduce internal pressure losses. On top of that, BOGE's own internally developed airend can achieve high efficiencies.

The great advantage of the S-4 series is its direct drive on the airend. With its highly robust design, the airend is hermetically enclosed and offers considerable advantages when compared with standard belt-driven models which can suffer from high levels of wear in certain areas of application. "Generally, V-belts need to be replaced two or three times a year," said Frank Hilbrink, Product Manager at BOGE. "This, of course, has a certain cost impact, and is quite a disadvantage when compared to our direct drive-based system." When combined with a frequency converter, the speed of the new BOGE compressor can be varied, making it ideal for adapting to the exact compressed air requirements for the task.

Using vibration isolation for individual components and the flow of cooling air, BOGE has been able to reduce noise considerably, meaning the compressor is ideal for use even in the most demanding of sensitive environments. To make the best use of the energy supplied to the device, heat recovery can also be added to it. This then uses the heat created by the running of the device to warm service water or for other processes.

For intelligent compressed air management, the modular focus control 2.0 control system and airtelligence provis 3 interlocking control are available to BOGE customers. In combination with BOGE connect, they both result in even greater efficiencies, as all the compressors installed throughout the entire system are controlled and monitored optimally. Maintenance tasks can be planned to reduce downtimes to a minimum. Users are also able to access the system remotely, allowing them to react directly at the first signs of any issues with the device. As a result, BOGE connect ensures increased operating safety, reduced operating costs and prepares the path for Industry 4.0 via its digital interconnectivity options.

Just like BOGE's other efficient components, the oil-lubricated S 91-4 screw compressor is eligible for German Federal Office for Economic Affairs and Export Control (BAFA) subsidies. With the help of one of these grants, savings of up to 40% of the investment costs can be reached.

About BOGE Compressors

BOGE America is the USA based America's subsidiary of BOGE KOMPRESSOREN Otto Boge GmbH & Co. KG based in Bielefeld, Germany. Whether for centrifugal compressors, screw compressors, high-pressure piston compressors, scroll compressors, controls, air treatment equipment, complete systems or individual devices, BOGE meets the most diverse requirements and highest standards – in a precise and customer oriented manner. BOGE solutions are used by all sectors of industry to supply compressed air for a wide range of manufacturing processes. The USA Operations of BOGE America stocks the various technologies of high-quality compressors and spares for immediate support to needs. Compressed air systems are designed, sold and serviced through a dedicated network of over 50 distributors in North, Central, and South America. The USA Operations is also the "Center of Excellence" for Technical Trainings for our partners to ensure Top Level Support for the consumer. For more information, visit www.boge.com/en.

Siemens Announces SINAMICS G120XE Enclosed Drive Series

Siemens announces the immediate availability of a new enclosed drive system, the SINAMICS G120XE, designed specifically for the demands of industrial pump, fan and compressor applications in a wide variety of markets. Built around the popular SINAMICS G120X infrastructure drive, this new enclosed system is ideal for fast design and commissioning in industries such as oil-and-gas/petrochemical, water/wastewater, power plants, industrial climate control, refrigeration and chillers in harsh environments. A NEMA 1 enclosure is standard, with a NEMA 12 version optional, featuring appropriate ventilation and air filters. The base enclosure is suitable for wall-mounting to 75 hp applications, while the free-standing floor module accommodates uses to 200 hp.

Standard electrical characteristics of this new enclosed drive system also include a UL508A listing, SCCR rating to 65kA, circuit breaker disconnect with flange-mounted operator handle and mechanical door interlock, plus control power transformer for internal power control and power module with PWM IGBT inverter. Overload ratings allow operation in either light or high overload duty conditions.

The enclosure ventilation fans on the SINAMICS G120XE are controlled via a relay and run only as needed, a significant energy saver and noise reduction feature. Optional features on the enclosure include output filters and reduced voltage soft start (RVSS) bypass.

A key feature of the G120XE is the intelligent operator panel, IOP-2. As Siemens Enclosed Drive Product Manager Chuck Fernandez said, "One of the really exciting aspects of this new enclosed drive system is the intuitive simplicity in setup and commissioning. There's no need for extensive parameter knowledge and the unit literally self-guides the operator with on-screen instructions on a keypad-guided menu." Fernandez also said, every rating of the G120XE is fully tested during the development stage for shock, vibration and electro-magnetic interference (EMI) in addition to many other tests.

In addition to the door-mounted IOP-2 keypad / display, the drive can also be commissioned, setup or modified using any Wi-Fi-enabled laptop, tablet or smartphone by installing the Smart Access Module. Another option for commissioning, setup or drive modification is to use the Siemens Totally Integrated Automation (TIA) Portal via a GSD file.

Siemens offers wall-mounted or free-standing versions of its new SINAMICS G120XE enclosed drive system for use on fans, pumps and compressors used in harsh environments.

Compressed Air Technology News

The popular Siemens SIZER configuration software tool can also be provided to help with selecting and matching the G120X drive system with a Siemens motor and other system components.

Communications with higher level SCADA and PLC systems is possible via PROFINET or EtherNet/IP™ with additional communication options available like PROFIBUS, MODBUS RTU and BacNet MS/TP.

SINAMICS G120XE is ready for digitalization and remote monitoring with a built-in web-server and the ability to connect to the SINAMICS Connect 300 allowing operators and maintenance personnel to access real-time status and cloud-based analytics from anywhere using the Analyze MyDrive app installed on their mobile device.

About Siemens

Siemens Corporation is a U.S. subsidiary of Siemens AG, a global powerhouse focusing on the areas of power generation and distribution, intelligent infrastructure for buildings and distributed energy systems, and automation and digitalization in the process and manufacturing industries. Through the separately managed company Siemens Mobility, a leading supplier of smart mobility solutions for rail and road transport, Siemens is shaping the world market for passenger and freight services. Due to its majority stakes in the publicly listed companies Siemens Healthineers AG and Siemens Gamesa Renewable Energy, Siemens is also a world-leading supplier of medical technology and digital healthcare services as well as environmentally friendly solutions for onshore and offshore wind power generation. For more than 160 years, the company has innovated and invented technologies to support American industry spanning manufacturing, energy, healthcare and infrastructure. In fiscal 2018, Siemens USA reported revenue of $23.7 billion, including $5.0 billion in exports, and employs approximately 50,000 people throughout all 50 states and Puerto Rico. For more information, visit www.siemens.com.

Festo Introduces SDBT-MSX Proximity Switch

Festo introduces the SDBT-MSX – the first programmable proximity switch with automatic switching point setting. With an initial detection range of 20 mm, the SDBT-MSX is easy and reliable to install and commission, especially in applications where mounting is difficult. The switch is ideal for all standard applications, including factory automation and the electronics industry/small parts handling.

Only two steps are required for installing an SDBT-MSX. The user simply fits the switch in the approximate end stop position within the 20 mm detection range (which is marked on the sensor) and connects the cable to the controller (PLC). No power supply is needed during installation. During first operation, the proximity switch detects the end position of the piston stroke and automatically learns and remembers the switching point. This is an industry first for a solid-state positioning switch.

Alternatively, the switching point of the SDBT-MSX can be taught manually using the capacitive control button. This button also allows the user to select PNP, NPN/ NO, or NC, and the switching window can be set from 2 to 15 mm. This flexibility can also reduce the variety of sensor types needed to be kept in inventory.

SDBT-MSX fits in all drives with a T-slot. It pairs best with drives from Festo, such as the DSBC ISO cylinder, DFM guided drive, DSNU round cylinder, ADN and ADN-S compact cylinders, and DGST mini-slide. Such pairings enable users to access the full capabilities of the switch.

Festo's new SDBT-MSX is the first programmable proximity switch with auto teach-in for fast, easy commissioning.

About Festo

Festo is a leading manufacturer of pneumatic and electromechanical systems, components, and controls for process and industrial automation. Celebrating 50 years in the US, 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 todays and tomorrow's manufacturing technologies. Visit www.festo.com/us for insights into the full range of Festo products and services.

Dollinger Series GP-146 Filters from Celeros Flow Technology

Dollinger series GP-146 high efficiency filters from Celeros Flow Technology are designed to remove dirt, pipe scale and other contaminants from process air and other gases.

Dollinger series GP-146 high efficiency filters from Celeros Flow Technology are designed to remove dirt, pipe scale and other contaminants from process air and other gases.

Acting as the last line of defense against particulates that could contaminate the end product or damage expensive equipment, the Dollinger GP-146 is equipped to deliver reliable filtration over extended periods while lowering total cost of ownership.

At the heart of the GP-146 unit is an efficient radial fin filter element that provides the largest filtration area for a given element size. It offers operational integrity up to a differential pressure of 50 psid as standard, with special designs available for applications which demand higher differential capabilities.

Dollinger GP-146 filters come in an extensive range of synthetic and natural fiber filter media suitable for use with most process fluids. Interchangeability of the filter elements makes it simple to vary the degree of filtration within the unit. The filter elements can be cleaned and re-used many times with no loss of performance, which makes the Dollinger GP-146 an excellent choice in applications with high levels of contamination. It also reduces operating costs compared to purchase and replacement of entire filter units.

The filter housing is generally constructed of carbon steel or stainless steel. Special housings to accommodate low temperature applications can also be accommodated.

Dollinger GP-146 high efficiency particulate filters are designed and constructed in accordance with the ASME VIII, Division I Pressure Vessel construction code. Compliance with other international codes – including Korean, SELO, PED, TV, and GOST – is available on request.

About Celeros Flow Technology

Celeros Flow Technology has, through its group companies, a long-standing history of serving worldwide businesses, spanning many decades. As valued Life Cycle partners, our highly focused brands aid in the correct specification, design and manufacture of mission critical equipment, while our after sales services ensure that assets operating within a plant are properly maintained and perform effectively throughout their operating life. Whatever the challenge – the discovery of new energy resources, making distribution more efficient, improving the intelligence from our customer's processes or boosting renewable energy generation – our total partnership approach can help to secure a more reliable and sustainable global supply chain. www.celerosft.com.

Compressed Air Technology News

Emerson Introduces Smart Valve Positioner

Emerson, a global leader in fluid control and pneumatics technology, has released the TopWorx™ PD Series Smart Valve Positioner. The PD Series expands on Emerson's current portfolio of TopWorx sensing and control products, providing intelligence, reliability, and versatility to valve control.

The PD Series enhances the current TopWorx portfolio of discrete valve controllers, providing 100% control over valve position and integrating communication via a 4-20 mA loop signal and HART protocols. Customers can extract valuable feedback through this intelligent communication and can monitor for trends that offer predictive maintenance insights to help prevent costly downtime.

To maximize reliability, the PD Series uses Hall effect contactless position detection. Two PNP alarms that can be configured throughout the full displacement range help improve plant productivity and safety in any process application. The construction of the PD series product line is also designed to withstand a variety of environmental conditions. The PD Series will launch initially with two models: The PD100 for general purpose applications and the PD200 for use in explosive atmospheres.

"Every facility, no matter its environment, needs to be sure it's operating as safely and efficiently as possible," said Paul Bristow, Global Product Manager at Emerson. "That's why the PD Series was designed for trusted performance in demanding conditions in many different applications and industries."

The compact and lightweight design of the PD Series delivers a high degree of versatility, allowing for quick and simple installation

Designed for demanding applications, Emerson's TopWorx™ PD Series uses Hall effect technology to reliably detect and control valve position.

on rotary and linear actuators in many applications. The same solution can provide precision control on both single- and double-acting actuators. An LCD screen allows operators access to device status and optional magnetic key technology allows operators to set all functions of the device without removing the cover in the field. Low air consumption and fast response deliver efficient operations, providing a single solution for both standard and heavy-duty conditions.

The TopWorx PD Series is built to the same industry-leading standards as other proven TopWorx products, to deliver exceptional value and trusted performance for demanding applications. The PD Series is suitable for use in oil and gas, chemical, industrial energy, on-site utilities, power generation, pulp and paper, waste and wastewater and food and beverage applications.

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.

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