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## Food Packaging


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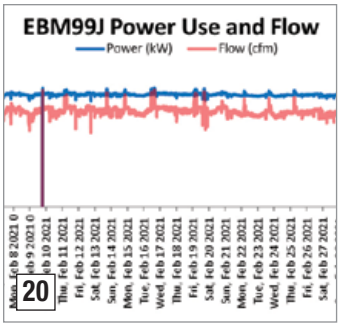



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# FROM THE EDITOR

## Food Packaging

Our own Mike Grennier kicks off this issue with his article titled, "Food Processor Conserves Energy with Compressed Air System Audits." Two of their plants, in Canada, had their systems audited and optimized by CRU AIR + GAS. Thanks go to CRU's President, Shannon de Souza, for sharing this story with our readers.

Downtime, due to a compressed air system failure, is not tolerated in any manufacturing plant. Don Van Ormer, a Senior Auditor with APenergy, shares his experience increasing uptime at a Pennsylvania-based dairy product processor.

Robert Brezni, from EMERSON Discrete Automation, has sent us an excellent article titled, "Smart Pneumatics Play a Big Role in Meeting Industrial Sustainability Goals." Manufacturing plants would do well to start asking their suppliers of production equipment to integrate "smart pneumatics" into their products. This article outlines the pneumatic components, like on-board air flow measurement to detect leaks, which are now available.

Hank Van Ormer, Technical Director with APenergy, did a full supply and demand-side compressed air system assessment at a cheese processing and packaging plant. We have purposely shown several "existing air compressor situation" tables summarizing how much the air compressors are working (load percentage) by shift.

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

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# Compressed Air Industry News

## Atlas Copco Group Celebrates 150th Anniversary

Global industrial solutions leader, the Atlas Copco Group, celebrates its 150th anniversary. Founded on February 21 in Stockholm in 1873, Atlas Copco has spent the last century and a half driving development and delivering breakthrough innovations to international customers in many different industries. The company marked the milestone by ringing the opening bell at NASDAQ in New York City.

Serving over 180 countries, Atlas Copco is a leading producer of industrial productivity solutions. Every day, across the United States and around the world, products are manufactured, facilities are constructed, critical fasteners are secured, processes are pressurized and cleaned, and all types of gasses are compressed and turned into energy. This may seem like a collection of unrelated processes, but one company unites them – Atlas Copco.

Globally, Atlas Copco employs over 49,000 people, comprises around 60 unique brands, and has global revenues in excess of $13 BUSD. In the United States, the Group has 6,000 employees across its greater than 100 locations, including over 300 employees with over 25 years of experience.

The Stockholm, Sweden-founded company initially delivered equipment for construction of the Swedish railroad system. Since then, the Group has evolved to support customers in many different industries through cutting-edge industrial technologies and services that support everything from food production to space travel.

"We are extremely proud of our past, and we continue to shape the future through our technologies and service solutions," said Mats Rahmström, CEO and President of the Atlas Copco Group. "Much has changed since 1873 when we were a small local start-up. But I think our founders would recognize our innovative spirit, the passion shown by our employees, and our dedication to drive development together with our customers."


*Atlas Copco ringing the opening bell at NASDAQ in New York City to mark its 150th anniversary on February 21, 2023.*

As part of the Company's 150 birthday celebration, their employee-led clean drinking water organization, Water for All, will make its largest ever single donation to a project, pledging $150,000 to U.S.-based organization, charity: water, for a project in Ethiopia. Over the last 12 years, Atlas Copco's U.S. Water for All program has supported over 60 projects across 25 countries and helped several hundred-thousand people gain access to clean water – donating over $2.5 million in the process. For every dollar an employee donates, the company adds another two dollars, making a double match.

"As we celebrate this milestone, we plan to make 2023 a year that lives long in the memory of our employees, customers, suppliers, and other key stakeholders," said Aaron Prato, VP Holding for Atlas Copco North America. "This celebration started with our team members joining together for the opening of the NASDAQ stock exchange on our birthday, and will continue with parties at offices across our entire global network."

"I am so proud that our employee-led Water for All organization is able to once again support charity: water and make such a sizable donation. This is just the start – over the coming weeks and months, we will continue the celebration by announcing many

more exciting and impactful initiatives," added Prato.

Read more about Atlas Copco's history here: https://www.atlascopco.com/history

*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 had revenues in excess of 13 BUSD and employs over 49,000 people globally. For more information, visit www.atlascopco.com.*

## Sullair Acquires California Compression and CDA Systems

Sullair, an industry leader in innovative compressed air solutions since 1965, has acquired compressed air distributors California Compression and CDA Systems. California Compression has served as an independent Sullair distributor since 2017 specializing in the sales and service of compressors and related equipment. CDA Systems provides compressor sales and service and preventive maintenance for compressors, air dryers, and filtration systems. The two companies are co-located in Livermore, California.

"Sullair is committed to building a customer-forward company and providing our customers with a total seamless solution to their compressed air needs," said John Randall, Sullair President and CEO. "California Compression and CDA Systems are well known for their customer service, industry expertise and end-to-end capabilities. Adding these two companies to the Sullair owned-distribution network, allows us to better service the evolving needs of both our current and future customers in the strategic Northern and Central California regions."

The acquisition of California Compression LLC and CDA Systems LLC, subsidiaries of Montreal-

## Compressed Air Industry News

based Xebec Adsorption, Inc., is pursuant to a Sale and Investment Solicitation Process established by the Canadian court overseeing Xebec's restructuring proceeding. California Compression, founded in 1975, and CDA Systems, founded in 2009, are co-located at 410 Longfellow Court, Livermore, California and serve a diverse group of customers in northern and central California including Silicon Valley, in general manufacturing, wine production, mining and more.


*California Compression has served as an independent Sullair distributor since 2017.*

All California Compression and CDA Systems employees will remain with their respective companies through the transition and both companies will continue to operate under their original name to help ensure uninterrupted service to customers.

"Our business was founded on putting the customer first which is one of the reasons our distributor partnership with Sullair was so successful," said Scott Gerner, General Manager / Director of Sales at California Compression. "As we become a permanent member of the Sullair family we will have even more tools and capabilities at our fingertips to continue to provide the personalized and expert service our customers have come to expect."

*About Sullair*

*Since 1965, Sullair has developed and manufactured air compressors with proven reliability and wear-free durability. Sullair is globally recognized as a leading manufacturer of air compressors for use in manufacturing, oil and gas operations, food processing, construction and more. Sullair has manufacturing capabilities in Michigan City, Indiana; Suzhou, China; and a JV (IHI-Sullair) based in Suzhou. For more information, visit www.sullair.com. Sullair is a Hitachi Group Company.*

## Air Solutions Canada Celebrates 25 Years

Air Solutions Canada Inc. (ASCI) is celebrating its 25th anniversary in 2023. According to founder Peter Gray, "We're in it for the long haul. We've always considered this a marathon, and not a sprint. That's why we are still leading the race."

This year the company is introducing several service improvements that will benefit its clients, most notably a new software system has been implemented to handle administration, CRM, finance, and inventory. As a result, efficiency and productivity have already improved significantly, in a very short space of time.

"Our clients notice the difference mainly where it comes to service response. The service portion of our business is now managed and electronically integrated. Customers sign directly on the screen to trigger an e-mailed work order and invoice. It's a complete game changer," said Lynne Tate, CCO. "Our customers' experience is now even more exceptional."

Asked what the biggest differentiators between ASCI and others are, company founder Peter Gray lists the following:

- **Rapid emergency service –** With a team of 16 full time factory trained service technicians, we have the largest compressed air team in Southern Ontario. One technician is always dedicated to breakdowns. We guarantee a same day visit if you report a breakdown in the morning.
- **Best pricing in the industry –** We enjoy preferential pricing based on our volume purchases, and we pass these discounts on to our clients. We allow our sales team to be flexible with pricing and payment terms to accommodate clients' needs.

## Compressed Air Industry News

- **Right 1st time repairs –** We have a First Time Fix Rate of almost 90%, which is exceptional in our industry. Our technicians have a crash kit in their vehicles with critical spare parts, so they almost never have to make a return visit.

- **Dedicated Technicians –** We allocate primary and secondary technicians for each customer, and they have all client information and equipment history on their iPad. It means that we know facility details and understand equipment status.

- **Turnkey compressed air solutions –** We truly offer everything from start to finish. One of our solution specialists manages your project from the initial discovery call, through to after sales service. We have all technical skills in-house, including ticketed refrigeration technicians, millwrights and electricians.

- **Extensive inventory –** With $2m of inventory, essential parts and machinery are readily available. With more than 50 compressors and dryers in our warehouse, we can solve any emergency.

As we approach the end of our 3rd financial quarter, ASCI is on course for our best year of growth, sales, and service results. We are looking forward to the next 25 years, with our amazing team servicing exceptional clients in Southern Ontario!

### *About Air Solutions Canada*

*ASCI is a compressed air specialist that works with maintenance and engineering teams in GTA manufacturing facilities. They need a compressed air system that works reliably with the least amount of downtime, and a partner who responds, and strives to reduce their cost of operation and downtime. We help them with consultation, installation, and maintenance services, offering rental equipment, and emergency support, so they can be confident with radically improved solutions that serve their needs better. For more information, visit www.airsolcan.com.*

*Air Solutions Canada is headquartered in Dundas, Ontario.*

### New Distributor for Gardner Denver in Florida

Gardner Denver, Inc. has a new distributor for Florida – Performance Air Compressor Solutions, headquartered in Tampa and located at 523 US-301 South, Tampa, FL 33619.

Performance Air Compressor Solutions (PACS) offers a wide range of industrial equipment and solutions to meet the needs of various industries. PACS provides expert new equipment advice, technical support, and after-sales services to ensure its customers get the most out of their equipment. As the Gardner Denver Distributor, PACS offers products such as air compressors, dryers, filters, blowers, vacuum systems and a wide range of parts and services.

PACS has a comprehensive local inventory of equipment and parts to help keep customers' operations running smoothly. The owners have decades of experience and expertise in the industrial compressor field. The vision is to help businesses increase productivity, reduce downtime, and improve its bottom line.


*Performance Air Compressor Solutions has four branch locations in the state of Florida.*

Performance Air Compressor Solutions will have a strict hiring process to ensure recruitment of individuals with the right qualifications including high integrity, a positive team attitude, excellent skills with an eagerness to learn. In turn, the company treats employees like family, and with a competitive compensation plan, all coupled together to yield a focus on customer success.

### *About Performance Air Compressor Solutions*

*PACS has multiple locations across Florida and is committed to delivering exceptional service and support to customers all throughout the entire state. For more information, visit www.performanceaircompressorsolutions.com or call 800-642-4499.*

## Altec AIR Acquires Engineered Air Products

Altec AIR has acquired assets of Engineered Air Products (EAP) located in Lancaster, NY near Buffalo. EAP has been designing and manufacturing large desiccant air dryers since 2009 and has a legacy in the compressed air treatment market of over 40 years. This acquisition further expands Altec AIR's product offerings, while combining the capabilities and experience of both Altec AIR and EAP. The EAP Manufacturing and Operations Teams will remain in New York and will begin operating under the Altec AIR brand. The facility in New York increases Altec AIR's footprint and will continue to manufacture and service air dryers, allowing Altec AIR to continue supporting EAP's current and legacy Customers and their products.

## Compressed Air Industry News

"This is an exciting time for our Associates and the Compressed Air Industry. Our focus on strategic growth in Refrigerated and Desiccant Dryers has brought together two long standing family businesses that have always focused on quality and innovation. We are thrilled to welcome the new team from Lancaster to the Altec AIR Family," said Chris Foster, Managing Director, Altec AIR.

*About Altec AIR*

*Altec AIR is a market leader in air pressurization and compressed air treatment systems, committed to providing the most cost-effective system and support options, with an emphasis on the needs of our customers. Every day, the Altec AIR Team aims to help Customers improve process quality, reduce downtime, and lower operating costs. We look forward to providing the same high-quality products and excellent service that Altec AIR and EAP Customers have come to expect. For more information on our products and services, please visit our website at www.AltecAIR.com, or contact a member of the Altec AIR Team at 1-800-521-5351 (Broomfield,CO) or 1-800-943-7924 (Lancaster, NY).*

### HAUG Sauer Kompressoren Appoints Bruno Garcia as CEO

Swiss manufacturer HAUG Sauer Kompressoren AG appointed Bruno Garcia as its new CEO. Garcia has already been a member of management, that was led for many years by the past CEO Beat Frefel. The Company, part of the Sauer Compressors Group, also presented Emanuel Scheffknecht as the new Sales Director.

New Chief Executive Officer (CEO) Bruno Garcia brings experience in international management and an excellent know-how of the compressor industry. The engineer worked in HAUG Sauer Kompressoren management roles, most recently as Chief Operating Officer (COO) with responsibility for product development, order processing, production, customer service, finance, and IT. Beat Frefel, who managed the compressor manufacturing operations for 22 years, leaves the Company due to personal reasons.

Emanuel Scheffknecht will take over the position of Sales Director at HAUG Sauer


*Altec AIR has acquired assets of Engineered Air Products (EAP) located in Lancaster, NY near Buffalo.*

Kompressoren. The economist, who holds a doctoral degree, worked in leading positions for internationally operating manufacturers of medical devices and was the managing director of a trading company.

*About Sauer Compressors and HAUG Sauer Kompressoren*

*HAUG Sauer Kompressoren AG, based in St. Gallen, is a long-established company, that was founded in 1896. As part of the Sauer Compressors Group, it forms the global center for oil-free compressor technology. Core competencies are the development and the production of process gas compressors of the HAUG product line. Sauer Compressors is a medium-sized German group of companies with 14 international subsidiaries. The company looks back on more than 135 years of history and over 85 years of experience in compressed air and gas technology. These days, the focus is on the development, manufacture and sale of oil-lubricated, and oil-free medium- and high-pressure compressors for applications in commercial shipping, industry and navy. In addition to standard products, customized solutions are offered for every type of application for individual customers, OEMs and globally active companies. With a worldwide network of representatives and partners, Sauer is always close to its customers. By supplementing the compressor range with high-quality accessories, engineering services, assembly, and service concepts, Sauer provides complete system solutions right up to complete turnkey installations. For further information please visit: https://www.sauercompressors.com and https://www.haug.ch/de/index.html*

*Bruno Garcia is the new CEO of HAUG Sauer Kompressoren.*

# Food Processor Conserves Energy with Compressed Air System Audits

By Mike Grennier, Compressed Air Best Practices® Magazine


*The compressed air audit led to the installation of an energy-saving rotary screw VSD air compressor.*

➤ There is no such thing as an invisible compressed air system that can efficiently deliver air without fail. But it's nice to think of it that way if one can, especially if the system helps save energy and reduce cost.

So says the director of engineering at a food processing company located in Canada.

"A compressed air system is something you want to be invisible because that means you never have a problem with it," said the director of engineering. "But the day you have to think about it that means something didn't work out."

Out of mind is exactly the status of the compressed air systems at the firm today, thanks to major overhauls at its two large production operations. For all intents and purposes, the company's upgraded compressed air systems are now cloaked in reliability – all the while helping the company keep pace with growth and conserving energy in the bargain.

*Components of the updated compressed air system at the food processing plant are housed in a BOGE in a BOX container outside the facility.*

## Sustainability a Driving Force

Sustainability is a driving force for this food processor.. The company could not be more dedicated to sustainability, said the director of engineering. "It's out duty to society to provide people with sustainable solutions that reduces their environmental impact, while still being able to enjoy products they like to consume," he said. "Then the other end of it is how can we produce product more sustainably? Reducing our energy is, of course, a big one."

## Growth Sparks Compressed Air Audit at Facility #1

A focus on sustainable products and packaging, in combination with a passion for quality, has resulted in considerable growth for the firm. Plans to add production lines at facility #1, in turn, drove the need to address the plant's faltering compressed air system.

# Food Processor Conserves Energy with Compressed Air System Audits

The original compressed air system consisted of two fixed-speed, rotary screw, air compressors in addition to a refrigerated dryer and a receiver tank. The system was incapable of meeting increased demand for air. Additionally, spikes in demand resulted in pressure drops at production machines. The air compressor airends also began failing and needed to be replaced.

The food processor brought in CRU AIR + GAS – headquartered in Mississauga, Ontario, Canada – to recommend the best solution to address immediate and future needs. A detailed compressed air audit conducted by CRU AIR + GAS showed the existing system was unable to efficiently supply compressed air to meet the load profile due in large part to minimal supply side storage, as well as two-inch piping and a two-inch header octopus configuration that combined to restrict


*CRU AIR + GAS' team of trained and highly skilled technicians supports customer operations around the clock.*

## CRU AIR + GAS

Headquartered in Mississauga, Ontario, Canada, with an office in Carrollton, Georgia, CRU AIR + GAS focuses on a holistic approach to serving manufacturers in virtually every industry sector.

The company's diverse product portfolio includes oil-flooded and oil-free rotary screw air compressors, centrifugal air compressors, oil-free reciprocating air compressors, single stage and two stage PET Blow Molders and a robust offering of auxiliary compressed air system technologies and components. Its product line also boasts onsite nitrogen generators, as well as a portfolio of chillers.

CRU AIR + GAS' in-house team of trained and highly skilled technicians is equipped to support customer operations around the clock. The company is also well suited to helping companies strengthen their sustainability initiatives with its in-house auditing team consisting of two professional engineers, a certified energy manager, and a certified energy auditor.

For more information, visit www.cruairgas.com.

airflow. The audit also pointed to considerable air leaks and the potential for substantial energy savings.

## Supply- and Demand-side Issues Tackled

Based on CRU AIR + GAS' recommendation, the food processor opted to replace the existing air compressors at plant #1 with an oil-flooded, variable speed drive (VSD) air compressor. The system also included a variable capacity refrigerated dryer, along with an oil mist eliminator and zero loss drains. Due to space limitation in the plant, the air compressors and air treatment components are housed in a steel and insulated container located outside the facility. Air is routed into the facility situated approximately 10 feet from the containerized system.

A highlight of the installation included two new receiver tanks and four-inch header piping in place of the two-inch piping on both the supply and demand side of the system.

"They had a deadhead at the plant where the air just ended," said CRU AIR + GAS President Shannon de Souza. "So, we installed one of the large receiver tanks in the middle of the plant and connected it to both ends to create a ring main."

## Increased Production Planned at Facility #2

At facility #2, planned production increases prompted the food processor to retrofit the compressed air system to meet more demand for air. As with facility #1, increased reliability and overall system efficiency was essential to the investment. The company subsequently hired CRU AIR + GAS for the project based in part on the success at facility #1.

The original air compressors included three larger fixed-speed, rotary screw, air compressors and one small air compressor. It also included two refrigerated dryers. As with facility #1, an air audit demonstrated the inability of the existing system to efficiently supply air to meet the facility's load profile given inadequate air storage, as well as two-inch piping and a partial ring main that together caused significant pressure drop at some production machines.

"The plant had a huge pressure drop of 12 psig to the air treatment components because air was being choked at the supply side of the system," de Souza said, noting the refrigerated dryers also operated in parallel, creating inefficiencies. Additionally, an idle load test of the air compressors revealed an average daily loss of air of 43% due to air leaks, demonstrating more potential energy savings.

# Food Processor Conserves Energy with Compressed Air System Audits

*A holistic compressed air audit led the food processor to overhaul the compressed air systems at its operations, including the one shown at facility #2.*

## Solution Mimics First Project

Following the audit and internal planning for future needs, the firm decided to overhaul the compressed air system at facility #2 based on CRU AIR + GAS' recommendation. The solution, in some ways, mimicked the project at facility #1.

The project included the replacement of the original air compressors with a new VSD rotary screw air compressor as well as a fixed-speed, direct drive, rotary screw air compressor. CRU AIR + GAS also installed a wet receiver tank and a heatless regenerative

desiccant dryer providing a pressure dewpoint of -40°F (-40°C), along with a purge economizer.

The system is equipped with an oil mist eliminator to treat air before the dryer and a second one to treat it after the dryer. The installation also included the addition of a dry storage tank and low pressure-drop filters, as well as zero loss drains on all receiver tanks. As with facility #1, CRU AIR + GAS replaced the two-inch piping header with a four-inch header. A final component of the upgraded system was the addition of a master controller to monitor and manage the compressed air system.

The food processor also contracted with CRU AIR + GAS to repair and manage compressed air leaks at both production facilities.

## Positioned for Ongoing Success

The end result at both plants is the efficient and reliable delivery of compressed air today and well into the future. The projects also achieved energy and cost savings. At facility #1, the system saves the company 580,6544 kilowatt hours (kWh) per year for a total of $79,171 per year in cost savings. Facility #2 saves 445,707 kWh per year, shaving $66,856 off its annual electric bill. Thanks to the Canadian Save on Energy program, the payback on the investment for facility #1 is 1.9 years, while the payback for facility #2 is 2.5 years.

For the director of engineering, there is no longer any need to ponder the effectiveness and reliability of their compressed air systems. The focus, instead, is on continuing to deliver high-quality, sustainable products to the marketplace for many years to come.

"Our energy consumption has been reduced and the systems are invisible as they should be," he said. "It puts us in a position where we can increase production without having to worry. And our overall goal is to be more sustainable. We've done that on our materials side and now we're making even more progress on the energy side." BP

*All photos courtesy of CRU AIR + GAS.*

To read similar ***Food Industry Compressed Air Audit*** articles, visit https://www.airbestpractices.com/industries/food

Visit our Webinar Archives to listen to expert presentations on ***Air Compressor Technology*** at https://www.airbestpractices.com/webinars

# Growing Dairy Product Processor Improves Uptime with Compressed Air Audit

By Don Van Ormer, Senior Auditor, APenergy

A growing dairy product processing plant operates 24 hours per day, 7 days per week, 365 days per year in the upper Midwest of the U.S. The primary products manufactured and packaged are milk, butter and powdered milk products. Product demand is strong and projected to grow.

Our firm was asked to conduct a supply-side compressed air system assessment due to uptime issues related to the compressed air system. There were two situations brought to our attention. The first was that production at times was having to slow down, or even stop, due to compressed air system pressure falling below the required levels. The second reason was due to reports, from plant personnel, of compressed air moisture problems negatively affecting the bag life of the dryer baghouses.

## Characteristics of the Existing Compressed Air System

At the time of our system assessment, their average energy cost at the plant was $0.087 per kWh. The firm spends $186,000 per year on energy to pressurize their compressed air system. The compressed air system operates 8,760 hours per year. The air demand profile of the compressed air system ranges from 855 scfm to 1,234 scfm from average to peak flow periods. This is relatively stable when compared to other air systems in a similar industry. The system pressure varies 3-4 psig in the header during production. This is normal considering the capacity controls of the compressed air system.

There are two separate air compressor areas located next to each other but separated by a wall. All air compressors tie into the same collection 2 ½" piping header and the air in this header can travel in either direction depending on the system demand.

## The Existing Air Compressors

The compressed air supply consists of six well-maintained, single-stage, lubricated, water-cooled, rotary screw air compressors. Air compressors #1 and #3 are very old, but like the others, have been well maintained. Air compressor #6 was added in recent years to help keep up with compressed air demand and to provide some backup. Plant personnel states, however, that if either air compressor #4 or air compressor #5 is down for repairs or maintenance, the system cannot maintain adequate pressure and production must slow down or stop. All the air compressors use modulation controls with no blowdown. There is no central control system for all the air compressors.

- #1 Model TA190 110 psig rated 40hp unit
- #2 Model EBM99J 125 psig rated 75hp unit
- #3 Model TA175 115 psig rated 40hp unit
- #4 Model EBMSKC 125 psig rated 60hp unit
- #5 Model EMQ9995 100 psig rated 125hp unit
- #6 Model EBH 125 psig rated 50hp unit

**TABLE 1. EXISTING COMPRESSED AIR SYSTEM CHARACTERISTICS**

| Measure | Annual Operation |
|---|---|
| Average system flow | 876 scfm |
| Sustained peak flow | 1,25 scfm |
| Average compressor discharge pressure | 89 psig |
| Average system pressure | 86 psig |
| Input electric power | 243.7 kW |
| Operating hours of air system | 8,760 hours |
| Annual electric use | 2,135,174 kWh/year |
| Average specific power | 3.59 scfm/kW |
| Electric cost for air /unit of flow | $212.10 $/scfm/year |
| Electric cost for air /incremental psig | $1,038.6 $/psig/year |
| Annual electric cost of compressed air | $185,760 $/year |

## Growing Dairy Product Processor Improves Uptime with Compressed Air Audit

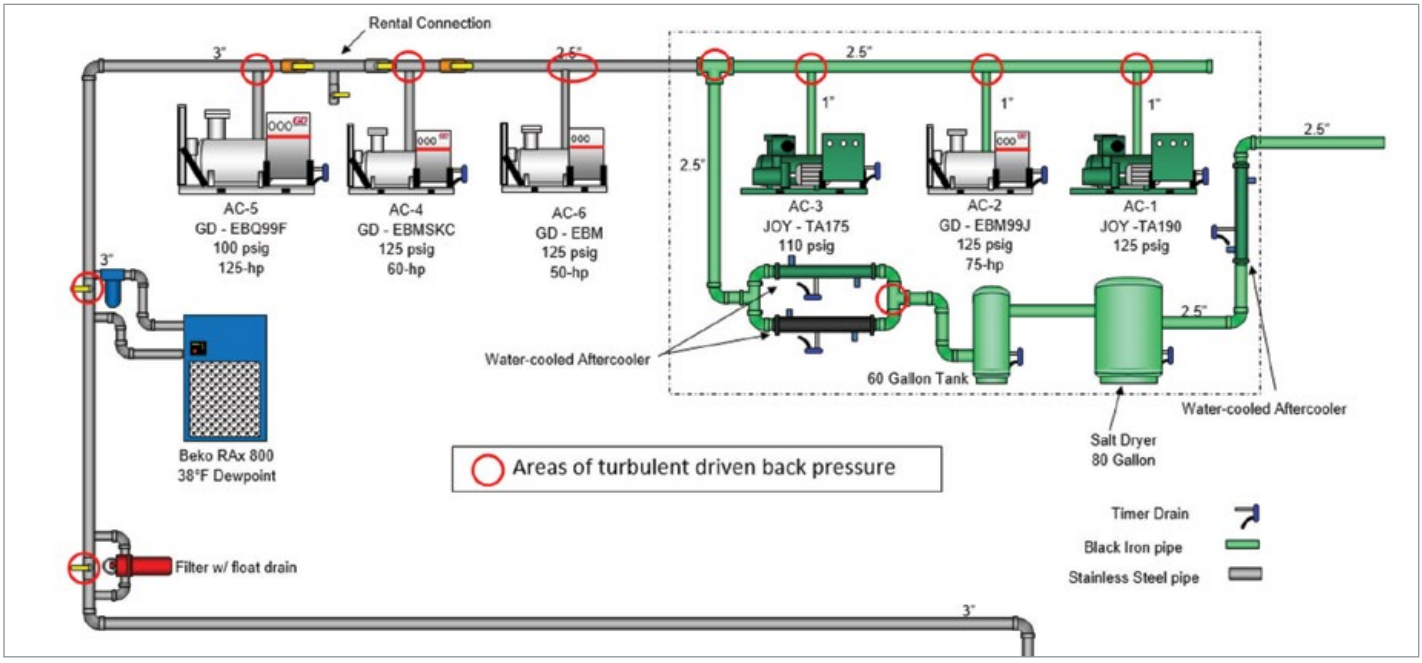


*Figure 1. Existing Compressed Air System Schematic*

**TABLE 2. ANNUAL LOAD PROFILES OF EXISTING AIR COMPRESSORS**

| Unit # | Air Compressor Model | Full load | | Electric demand | | Baseline air flow | |
|---|---|---|---|---|---|---|---|
| | | Demand (kW) | Air flow (scfm) | % of Full kW | Actual kW | % of Full flow | Estimated flow |
| 1 | TA190 | 37.4 | 173 | 49% | 18.2 | 42% | 73 |
| 2 | EBM99J | 58.7 | 291 | 92% | 54.0 | 79% | 229 |
| 3 | TA175 | 36.3 | 155 | 19% | 6.9 | 12% | 19 |
| 4 | EBMSKC | 47.4 | 215 | 79% | 37.5 | 50% | 108 |
| 5 | EMQ995 | 108.3 | 566 | 85% | 92.4 | 59% | 332 |
| 6 | EBH | 40.7 | 193 | 85% | 34.8 | 59% | 115 |
| **Total** | | | | | **243.7 kW** | | **876 cfm** |

**TABLE 3. ANNUAL AIR COMPRESSOR OPERATION/USE PROFILE**

| Air Compressor | Operating hours | % of power | % of flow |
|---|---|---|---|
| #1 TA190 | 4,510 | 94% | 81% |
| #2 EBM99J | 8,563 | 94% | 81% |
| #3 TA175 | 1,903 | 87% | 57% |
| #4 EBMSKC | 8,009 | 86% | 55% |
| #5 EMQ995 | 8,484 | 88% | 61% |
| #6 EBH | 8,471 | 88% | 61% |

## The Existing Compressed Air Dryers

The only compressed air dryer in the system is a RAx 800 water-cooled, non-cycling, refrigerated dryer (see Figure 1). It is sized for 800 scfm, at design specifications, and is providing a reliable 38°F (3°C) pressure dew point. This dried compressed air supplies most of the facility.

There is a separate compressed air line, which supplies the Dryer baghouses, which is cooled by chilled water heat exchangers with no reheater (labeled as water-cooled aftercooler in Figure 1). This air is still saturated at the discharge temperature of the heat exchangers. If the ambient temperature falls below this temperature, liquid water will form in the compressed air lines.

Water (condensate) and oil carryover problems in the current compressed air system are not an issue on the refrigerated dryer

## Growing Dairy Product Processor Improves Uptime with Compressed Air Audit

side of the system. They can be significant on the chilled water-cooling side, using the aftercooler, during hot summer months. Plant personal stated they are having, at time, water problems in the #1 and #2 Dryer baghouse. The problems increase in magnitude during more humid months.

The correct way to eliminate water and oil in the compressed air system is to clean and dry the air immediately after it is produced in the air compressor room. Then clean dry air can be stored in a separate air receiver and can flow to the system, as required. Some guidelines include:

- Generally, it is best to eliminate water and oil at the compressed air source before they enter the air system.
- Water vapor, when condensed to liquid in the drying process, must be removed immediately or it can re-contaminate compressed air by evaporation and overflow.
- Every 20°F increase in temperature will almost double the moisture load that air will hold. Refrigerated compressed air dryers are usually capacity rated at 100°F (38°C) and 100 psig (7 bar) inlet air conditions. At 120°F (49°C) and 100 psig, the dryer's capacity rating is reduced by 50%.
- Putting dry/oil-free air into the system 90% of the time and then allowing wet/oily air to enter sporadically 10% of the time will make the system wet or oily all the time. The water and/or oil will fall out within the piping system and continue to re-entrain and contaminate and/or collect in the low spots of the system. This will

cause recontamination as liquid is pulled into the flowing compressed air system. Bypassing the dryer with part of the air (controlled by the bypass valve) will almost always end up with wet air. A wet/oily system could take many months of continued flow of clean dry air to "clean up."

**TABLE 4. EXISTING COMPRESSED AIR CONDENSATE DRAINS**

| Location | Type | Qty | Size (scfm) | Use (%) | Total Flow | Project |
|---|---|---|---|---|---|---|
| Heat Exchangers Old Room | Timer | 3 | 27 | 30 | 9 | Install new zero-loss, level-activated type condensate drains. |
| #1 Compressor Moisture Separator | Timer | 1 | 9 | 30 | 3 | |
| #2 Compressor Moisture Separator | Timer | 1 | 9 | 30 | 3 | |
| Old Room Tall Tank | Timer | 1 | 9 | 30 | 3 | |
| Old Room Short Tank | Timer | 1 | 9 | 30 | 3 | |
| **Totals** | | **7** | | | **21** | |

## Existing Compressed Air Condensate Drains

There are a total of seven (7) compressed air condensate drains. They are timed electric drains actuating solenoid valves to open and close. It's estimated they are using 21 scfm of compressed air. They should be replaced with electric or pneumatic-operated zero-loss condensate drains which will not consume compressed air.

## Compressed Air System Assessment Recommendations

The proposed system has many changes. The focus of the changes is to eliminate downtime relating to the compressed air system. While the project will provide energy savings of $56,000 per year, the benefits are focused on increasing production uptime.

In order to stabilize compressed air system pressure and allow for future growth, the recommendation is to install two new 125 hp rotary screw air compressors. These are to be placed where the #4 and #6 air compressors are now. These units are to be moved to replace the aging #1 and #3 air compressors in their current locations (see Figure 2).

Along with the new air compressors, a central air compressor control system, able to turn on and off compressors depending on demand, should be installed and all compressors tied into it. This will keep the system running at the most efficient level and still maintain adequate supply. This system should be more than just a sequencer switching compressors based on time. It should be able to keep all necessary compressors at full load with only one trimming. This should be the smallest horsepower unit to effectively perform the job with all others off.

# Growing Dairy Product Processor Improves Uptime with Compressed Air Audit

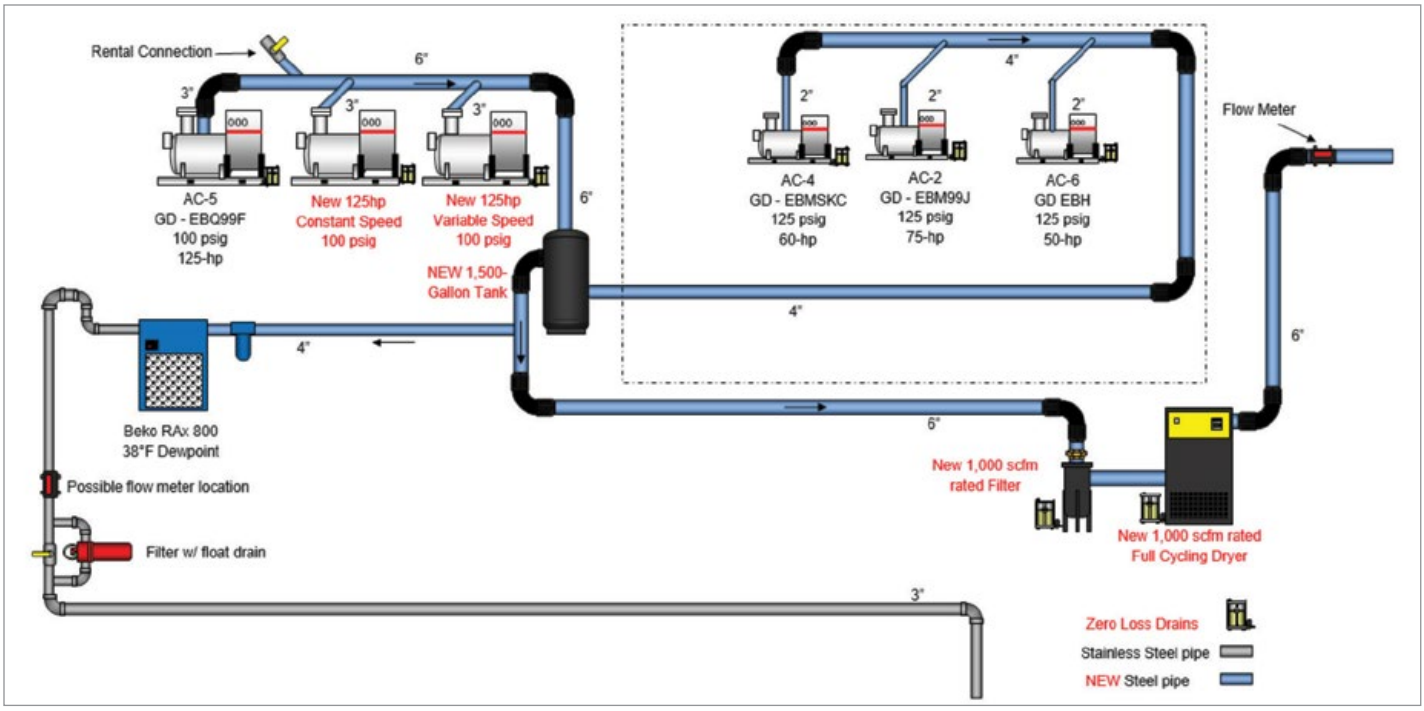


*Figure 2. Proposed Compressed Air System Schematic*

**TABLE 5. ANNUAL LOAD PROFILES OF PROPOSED AIR COMPRESSORS**

| Unit # | New Configuration of Air Compressors | Full load | | Electric demand | | Proposed air flow | |
|---|---|---|---|---|---|---|---|
| | | Demand (kW) | Air flow (scfm) | % of Full kW | Estimated kW | % of Full flow | Estimated flow |
| 1 | EBM99J | 57.0 | 291 | 0% | 0.0 | 0% | 0 |
| 2 | EBMSKC | 46.1 | 215 | 0% | 0.0 | 0% | 0 |
| 3 | EMQ995 | 105.2 | 566 | 0% | 0.0 | 0% | 0 |
| 4 | EBH | 39.6 | 193 | 0% | 0.0 | 0% | 0 |
| **5** | **New R90i constant speed** | **104.0** | **558** | **99%** | **103.3** | **98%** | **546** |
| **6** | **New R90N variable speed** | **114.1** | **597** | **56%** | **63.5** | **52%** | **309** |
| **Total** | | | | | **166.9 kW** | | **855 cfm** |

**TABLE 6. PROPOSED ANNUAL AIR COMPRESSOR OPERATION/USE PROFILE**

| Compressor | Operating hours | % of power | % of flow |
|---|---|---|---|
| EBM99J | 23 | 41% | 2% |
| EBMSKC | 0 | 0% | 0% |
| EMQ995 | 0 | 0% | 0% |
| EBH | 0 | 0% | 0% |
| **New R90i constant speed** | **8,759** | **99%** | **98%** |
| **New R90N variable speed** | **8,330** | **58%** | **54%** |

The interconnecting piping needs to be replaced with a properly sized collection header. A new 1500 gallon storage tank should be installed.

A new refrigerated dryer and a mist eliminator should replace the water-cooled aftercoolers for the air leaving the old compressor room. This new dryer and filter will provide clean dried air to the Dryer Baghouses and eliminate the issues there. Lastly, zero-loss, level-activated condensate drains should replace the existing timer drains. BP

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# Smart Pneumatics Play Big Role in Meeting Industrial Sustainability Goals

By Robert Brezni, Key Account Manager, EMERSON Discrete Automation

➤ Industrial manufacturers of all sizes are turning to smart technologies to optimize efficiency and reach their most challenging goals. But when it comes to reaching sustainability and decarbonization targets, there is one area of opportunity that many facilities overlook in their digital transformation journeys.

Pneumatics and the generation of compressed air accounts for about 10% of a typical facility's energy consumption. That number could be much lower, but because of leaks and poor air pressure regulation, a surprising amount of energy is wasted in the process. Yet, most manufacturers are not taking full advantage of smart pneumatic technologies or data analytics to improve energy efficiency. By installing connected pneumatic solutions in their plants, manufacturers can continuously collect critical data to understand where energy is being wasted and make informed decisions to optimize energy consumption.

## A Smart Way to Save Energy

Wasted energy in pneumatic systems can be staggering. To put a number on it, manufacturing plants typically lose 30% of compressed air just due to leakage alone. This wasted energy leads to machine downtime and, of course, increased energy use.

Compressed air is used throughout industrial facilities, and its prevalence makes it pivotal to lowering year-over-year energy costs.

Improvements in the compressed airflow of a plant's machinery of as little as a few percentage points can mean tens of thousands of dollars saved in energy costs each month, depending on the size and nature of the equipment. That can translate to hundreds of thousands of pounds of carbon dioxide ($CO_2$) emissions saved. By using smart pneumatics like software monitoring and notification solutions to detect leakages, manufacturers can often reduce their compressed air energy spend by 10 to 20% and reduce their $CO_2$ footprint by 10%.

Achieving these energy savings is a goal for many manufacturers, but turning aspirations into a practical plan for success is another story. More than 70% of manufacturers lack a data analytics plan or a clear blueprint for making pneumatic operations more efficient.


*The AVENTICS AF2 Series air flow sensor monitors air consumption, detects leaks and provides alerts to give operators a clear view into the efficiency of their pneumatic systems. (Image courtesy of Emerson)*

But that doesn't have to be the case. Manufacturers can invest in plug-and-play smart pneumatic solutions that keep installation time and costs to a minimum. Manufacturers can take the first step toward digital transformation by taking a closer look at how smart pneumatics can be applied to save energy in two critical ways.

## Continuous Monitoring for Leaks and Near Real-Time Detection

The most obvious way manufacturing plants lose energy in pneumatic systems is through leakage. Leaks cause the average manufacturing plant to lose about 35% of compressed air annually. Some can lose more than $50,000 worth per machine, per year!

A compressed air leak can also cause system pressure in machinery to fluctuate, affecting equipment efficiency and even production. As a result, a machine may have to work harder to compensate. This unnecessary cycling and increased run time can raise energy costs, decrease equipment service life and increase maintenance.

To detect and locate compressed air leaks, many operations rely on scheduled inspections at regular intervals. This method of detection usually relies on specialized technicians and ultrasonic equipment to effectively detect leaks. However, leaks can

## Smart Pneumatics Play Big Role in Meeting Industrial Sustainability Goals

appear at any time between inspection intervals, and they can grow over time to cause greater losses in productivity and energy efficiency.

In comparison, smart pneumatics continuously monitor airflow. Some sensors can collect and provide real-time insights on flow while also capturing pressure and temperature data in the feed line, enabling advanced diagnoses of the operating parameters. These solutions can often easily retrofit to existing machines with the use of edge gateways. Around-the-clock software monitoring can detect leaks in near-real time. The software identifies the machine in question and sends notification alerts directly to maintenance staff so they can further investigate.

### Driving More Efficient Production with Smart Pneumatic Technology

A global producer serving the automotive industry partnered with automation solutions provider Emerson to monitor and measure the amount of energy an existing production line lost through compressed air leakage.

The production line included various legacy equipment from different suppliers and a limited number of Ethernet access points. To meet the needs of this complex setup, Emerson recommended the AVENTICS™ Series AF2 Sensor, an easy-to-use airflow sensor that measures flow, pressure and temperature and monitors air consumption in pneumatic systems.

The compact AF2 is easy to assemble and install on existing machines and pneumatic systems and provides clear notifications and alerts to users when it detects a leak. This flexible sensor allowed the company to invest in energy savings while keeping installation time and costs to a minimum.

In addition to the AF2, the company chose PACSystems™ RXi2-BP Edge Computing Device from Emerson, which digitizes then translates incoming AF2 sensor data into straightforward, user-friendly information that's displayed on a live, web-based dashboard and gives users even more energy insights without additional software.

The all-in-one, energy-saving, sensing and edge computing solution Emerson provided monitors pneumatic air consumption and analyzes machine data, giving the automotive producer actionable insights and a more complete picture of what's happening in its plant. As a result, the company has been able to identify critical areas for improvement, reduce peak power consumption, optimize maintenance costs and avoid downtime. Now, they have an action plan to continue optimizing energy usage in their machines.

In this way, smart pneumatics can significantly lower energy spend and emissions. Addressing compressed air leaks earlier also reduces both planned and unplanned downtime and improves overall equipment efficiency (OEE).


*The PACSystems RXi2-BP Edge Computing Device translates and analyzes air flow data to provide easy-to-understand insights into pneumatic efficiency. (Image courtesy of Emerson)*

## Optimizing Air Pressure and Flow for More Efficient Production

Some manufacturers may not know the optimal consumption point of compressed air for their manufacturing process, and the air pressure in their industrial machines may be higher than it needs to be. Smart sensors, plus an edge computing device, can collect data about air pressure and airflow. By analyzing the edge analytics of the pneumatic system, plants can get a clearer picture of the relationship between air pressure and flow. By lowering the overall pressure of their pneumatic system, they can reduce the airflow to a certain point while maintaining the same cylinder cycle time.

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Presenter Loran Circle, Senior Consultant, Circle Training & Consulting – *Sponsored by BEKO Technologies*
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**Loran Circle**
*Senior Consultant, Circle Training & Consulting*

**Frank Melch**
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# Smart Pneumatics Play Big Role in Meeting Industrial Sustainability Goals

Finding the optimal ratio between pressure and flow can lead to a 10 to 20% reduction of compressed air consumption and energy costs, as well as a 10% reduction in $CO_2$ footprint, without affecting production. This allows manufacturers to maintain current cycle times in production but with lower energy consumption, costs and $CO_2$ emissions.

## Smart Energy Savings, Better Sustainability

Industrial manufacturers today are setting ambitious targets to reduce energy use and greenhouse gas emissions to improve their impact on the planet and their overall business. Compressed air monitoring with smart pneumatic technology is another tool in the toolbox to help reach those goals. With this approach, manufacturers can get a clear view of their energy efficiency and take action to reduce wasted energy quickly.

With the scalability and flexibility offered by today's smart pneumatic technology, getting started on the journey toward digital transformation and energy efficiency doesn't take a large upfront investment. Manufacturers can choose to digitally transform their facilities at their own pace. And by partnering with an automation and digital transformation expert, manufacturers can receive the guidance they need to find the best solution for their unique sustainability goals and facility needs. BP

*About the Author*

*Robert Brezni serves as a key account manager, Discrete Automation at Emerson. Prior to his current role, Robert has held account manager positions in several global manufacturing companies. He earned his engineering degree from the Frankfurt University of Applied Sciences, where he studied energy and automation technology.*

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# Compressed Air System Optimized at Cheese Packaging Plant

By Hank Van Ormer, Technical Director, APenergy

A cheese processing and packaging plant is located in the upper Midwest of the U.S. The primary activities are Grade B cheese processing as well as cutting, wrapping, grinding, shredding and packaging of a variety of cheese products. The company expects manufacturing to expand and is looking at how the compressed air system must evolve to accommodate this.

Our firm was asked to conduct a supply-side and demand-side compressed air system assessment, with a focus on getting a few more years life out of the existing air compressors. The demand-side assessment provides recommendations on how to reduce the flow and pressure requirements of the system in order to generate energy savings.

This assessment identifies a path to reduce the energy consumption from $85,000 to $51,000 per year. This can be done with little capital by fixing poppet-valve control problems on the air compressors and reducing flow and pressure requirements. Due to article space limitations, this article does not provide detail on the flow reduction projects. It focuses

only on the impact these projects have on the air compressors and provides readers with a template on the information they should have on their units, by shift.

## Characteristics of the Existing Compressed Air System

The compressed air system is supplied by four (4) 100 horsepower, single-stage, lubricant-cooled, rotary screw air compressors and one (1) 150 horsepower, single-stage, lubricant-cooled, rotary screw air compressor. All of the units are water-cooled.

The compressed air is dried by a 2000 scfm rated blower purge regenerative desiccant dryer providing a -40°F (-40°C) pressure dew point.

All energy calculations in this study use the current blended electric rate at the plant of an average $0.05/kWh.

According to plant personnel, most of the plant can run on 80-85 psig (5.4-5.8 bar) plant pressure. The exception is one special production area requiring a minimum of 95 psig (6.5 bar). Currently the average compressor discharge pressure is 108 psig.

To establish the observed and perceived base load we interviewed plant personnel and measured the input kW to each unit with a Fluke Model 41B motor analyzer. Specific pressure readings were taken with a Helcoid DPG 200 Digital test gauge.

The plant runs three shifts, 24 hours a day, six days a week. The first and second shift are about the same and are usually served

**TABLE 1. EXISTING COMPRESSED AIR SYSTEM CHARACTERISTICS**

| Measure | 1st Shift | 2nd Shift | 3rd Shift | Holidays | Total |
|---|---|---|---|---|---|
| Average System Flow (cfm) | 1500 cfm | 1500 cfm | 750 cfm | 335 cfm | NA |
| Average Compressor Discharge Pressure (psig) | 108 psig | 108 psig | 108 psig | 105 psig | psig |
| Average System Pressure (psig) | 95 psig | 95 psig | 95 psig | 95 psig | NA |
| Input Electric Demand (kW) | 276 kW | 276 kW | 123 kW | 71.4 kW | NA |
| Operating Hours of Air System (hrs) | 2344 hrs | 2344 hrs | 2344 hrs | 1728 hrs | hrs |
| Specific Power | 5.43 cfm/kW | 5.43 cfm/kW | 6.09 cfm/kW | 4.69 cfm/kW | NA |
| Electric Cost for Air – per unit of flow ($/cfm/year) | $21.56 | $21.56 | $19.22 | $18.41 | $80.75 |
| Electric Cost for Air – per unit of pressure ($/psig/yr) | $161.74 | $161.56 | $72.08 | $30.84 | $426.40 |
| Annual Electric Cost for Air ($/yr) | $32,347 / yr. | $32,347 / yr. | $14,416 / yr. | $6169 / yr. | $85,279 / yr. |

*Current electric rates at the plant average $0.05/kWh.

# Compressed Air System Optimized at Cheese Packaging Plant

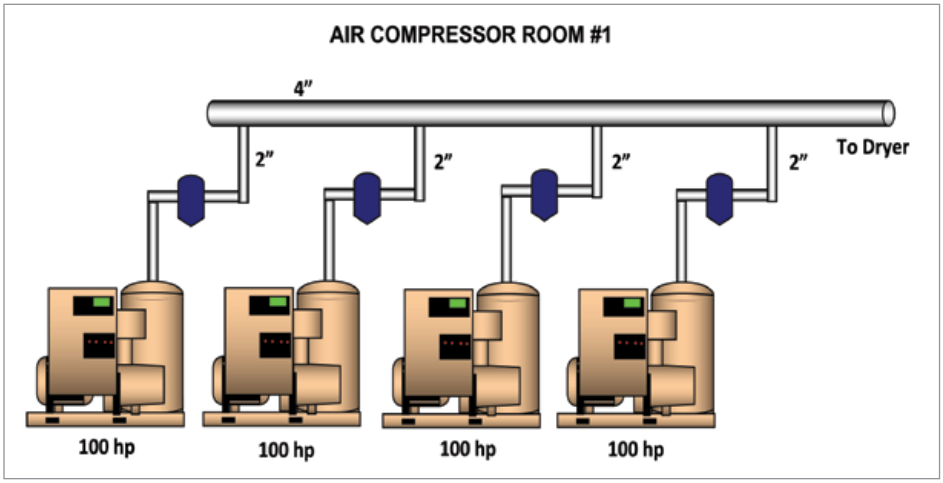


*Figure 1. Existing Compressed Air System Schematic*

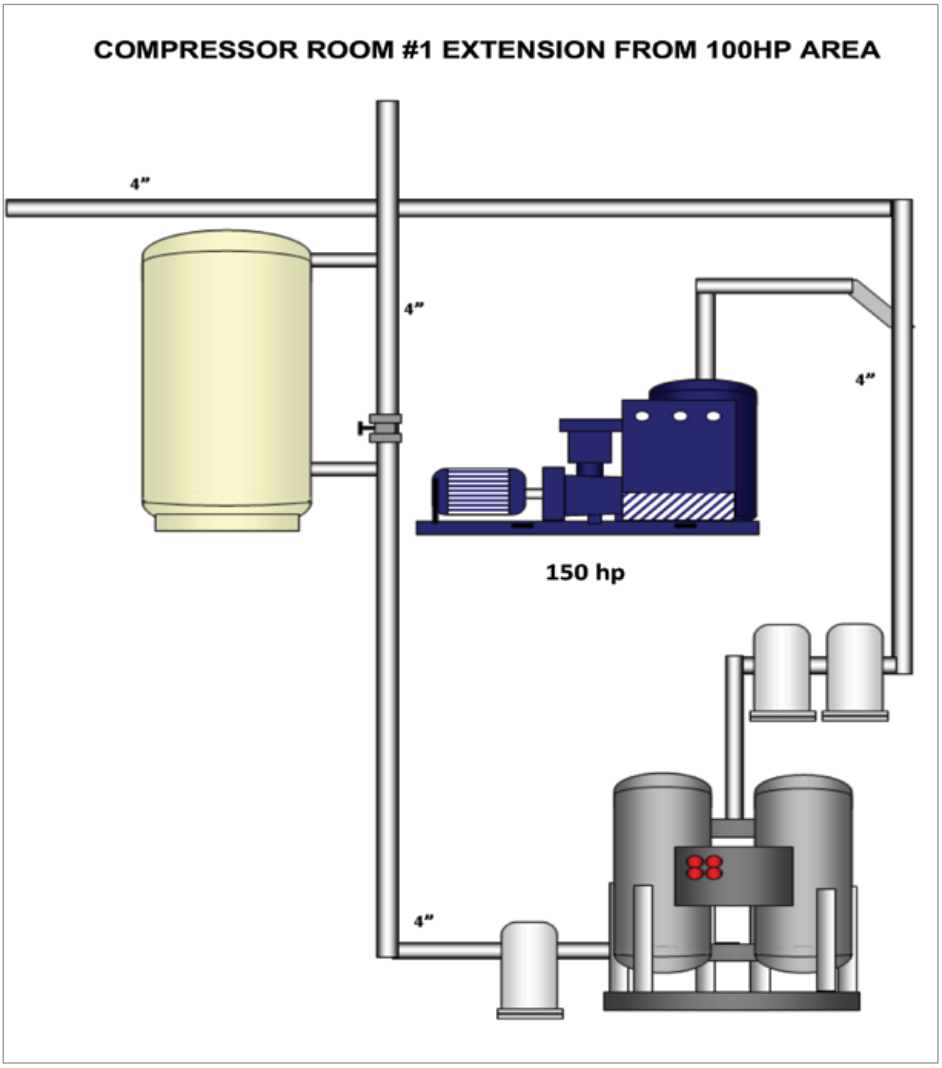


*Figure 2. Existing Compressed Air System Schematic (continued from Figure 1)*

by the 150 HP air compressor (750 cfm) and by two or three of the 100 hp air compressors at various loads.

The third shift includes a sanitation phase, with reduced compressed air demand. This uses the 150 HP air compressor (750 cfm) and two or three of the 100 hp air compressors at various loads. On Sundays and Holidays all production is off, but they run a 100 horsepower air compressor to handle the HVAC and Fire system controls. This unit feeds the complete system and runs about 50-60% loaded, using 42-43 kW.

## The Existing Compressed Air Dryer

The blower purge desiccant dryer is rated to handle 2,000 scfm at standard CAGI rated inlet conditions. These dryers can consistently provide a -40°F (-40°C) pressure dew point, which removes more water vapor than conventional refrigeration units. To regenerate the wet tower while the other tower is drying requires the use of heat in some form and some dry air to "sweep" or "purge" the exchanged moisture out. The unit has a 10 kW blower and 41 kW heater whose use can be minimized by operating the dryer in "demand control mode". Currently the dryer is operating on fixed timer-driven cycles, regardless of the demand on the dryer. Switching to demand control mode will reduce the energy cost from $21,550 to $6,500 per year at current load profile levels.

## The Existing Air Compressors

Current electric rates at the plant average 0.05/kWh. The actual plant electric cost for air production, as running today, is probably in excess of $85,279 per year.

The load profile or demand of this system is relatively stable during all shifts. The full load operating range is 293 days a year, 24 hours a day, 7032 hours a year. There is one flow meter in the system.

The system pressure appears to run from 95 to 105 psig in the headers during production. System cost on a per unit of pressure basis run $426.40/psig.

The 100 horsepower air compressors are aging but well maintained. They are, however, experiencing down-time with increasing frequency and should be replaced in the future. They use poppet valve control systems. The low input kW combined with the lower operating temperatures indicate that units (3) and (4) probably have poppet valves stuck open not allowing them to get to full load but keeping them at part load. Maintenance needs to keep a close eye on this.

**Typical Operating Band of Poppet Valve Control**

| | |
|---|---|
| 100% | 100% power |
| 87.5% | 90% power |
| 75% | 84% power |
| 62.5% | 75% power |
| 50% | 68% power |

## Compressed Air System Assessment Recommendations

Summarized below are the key characteristics describing the performance and economics of the proposed compressed air system. Tables 3 and 4 are modifications of similar tables displayed previously that described the current system. The tables were modified to reflect the system performance and operating cost changes resulting from implementing the set of projects recommended in this report.

**TABLE 2. ANNUAL LOAD PROFILES OF EXISTING AIR COMPRESSORS**

| Unit # | Air Compressor – Horsepower | Percent of Load | Percent of Power | Full Load kW X Percent of Power | Net Demand (kW) | Actual Flow (cfm) |
|---|---|---|---|---|---|---|
| First & Second Shift: Operating at 1500 cfm and 108 psig | | | | | | |
| 1 | 150 HP | 100 | 100 | 123 x 1 | 123 kW | 750 acfm |
| 2 | 100 HP | 100 | 100 | 85 x 1 | 85 kW | 450 acfm |
| 3 | 100 HP | 67 | 80 | 85 x .80 | 68 kW | 300 acfm |
| | | | | **Total** | **276 kW** | **1500 acfm** |
| Third Shift: Operating at 750 cfm and 108 psig | | | | | | |
| 1 | 150 HP | 100 | 100 | 123 x 1 | 123 kW | 750 acfm |
| | | | | **Total** | **123 kW** | **750 acfm** |
| Holiday Shift: Operating at 335 cfm and 108 psig | | | | | | |
| 1 | 100 HP | 74 | 84 | 85 x .84 | 71.4 kW | 335 acfm |
| | | | | **Total** | **71.4 kW** | **335 acfm** |

## Compressed Air System Optimized at Cheese Packaging Plant

All the compressors in the current system have poppet valve capacity controls, which should work very well from 50% load to 100%. The piping system, however, is creating a great deal of back pressure fluctuations in the header causing some significant control instability.

Often multiple units are running at part loads rather than having a unit shut off. This is the way the air compressors were operating when we arrived. When we left, we had momentarily eliminated the problem through machine selection and operating band adjustment. With the inherent instability with the 4" header we would expect the condition to continue to appear. Currently, the system is wasting about 45 to 50 kW depending on the conditions.

This has an annualized energy cost of $15,000 or more if undetected and not readjusted. These potential savings are not in our proposed system modifications and payback since it can be adjusted out.

We recommend the piping header be corrected to eliminate this back pressure (5 psig) and instability. The project is to correct capacity control operation by replacing the 4" header with an 8" header and make all connections a 30° to 45° directional angle entry. This will stabilize the central sensing pressure, increase storage, and eliminate 5 psig of lost pressure at high loads.

We also recommend installing a small 5 HP tank-mounted (120 gallon) industrial air compressor with a refrigerated air dryer to run the HVAC controls and Fire Systems controls on Holidays and Sundays. Set it up dedicated to run HVAC controls only and not through the main compressed air system.

### Pressure Reduction

- Reduce pressure to 90 % of plant to 85 psig (95 psig to Packaging Process)
- Replace 4" header with 8" header – 5 psig

**TABLE 3. PROPOSED COMPRESSED AIR SYSTEM CHARACTERISTICS**

| Measure | 1st Shift | 2nd Shift | 3rd Shift | Holidays | Total |
|---|---|---|---|---|---|
| Average System Flow (cfm) | 1044 cfm | 1044 cfm | 294 cfm | 20 cfm | NA |
| Average Compressor Discharge Pressure (psig) | 100 psig | 100 psig | 100 psig | 150 psig | NA |
| Average System Pressure (psig) | 95 psig | 95 psig | 95 psig | 60 psig | NA |
| Input Electric Demand (kW) | 184.29kW | 184.29kW | 65.75 kW | 5 kW | NA |
| Operating Hours of Air System (hrs) | 2344 hrs | 2344 hrs | 2344 hrs | 100 hrs | hrs |
| Specific Power | 5.66 cfm/kW | 5.66 cfm/kW | 4.47 cfm/kW | 4.00 cfm/kW | NA |
| Electric Cost for Air – per unit of flow ($/cfm/year) | $20.69 | $20.69 | $26.21 | $1.35 | $68.84 |
| Electric Cost for Air – per unit of pressure ($/psig/yr) | $107.99 | $107.99 | $38.53 | $.13 | $254.64 |
| Annual Electric Cost for Air ($/yr) | $21,598 /yr | $21,598 /yr | $7706 /yr | $25 /yr | $50,927 /yr |

**Flow Reduction – 456 cfm total flow reduction**

- Leak Repairs – 300 cfm
- Replace 10 timer drains – 31 cfm
- 90% of flow has 15 psig reduction in pressure – 75 cfm
- Install 5 air amplifiers on blow–offs – 50 cfm
- Run 5 HP tank mounted air compressor on holidays to handle the HVAC and Fire system controls

**Other projects or savings not reflected in the tables include:**

- Eliminate cooling water cost
- Repairs to water coolers due to untreated water
- Run the blower purge in demand control mode

## A Note on the Current Air Compressor Control System

All the air compressors have poppet valve operated variable displacement controls. These have an electronic indicator when the valve solenoid or activator is told to close the valve. These do not necessarily mean the valve is actually closed and seated. If the valves leak, they will reduce capacity (12.8% per valve) and power (5 to 8% per valve).

When we arrived at the plant, the system was running (and had been running for some time) with the 150 hp unit and 2 of the 3 of the 100 HP units for a total energy consumption of approximately 290 kW. When we reviewed the units, we found that No. 3 & 4 100 hp air compressors apparently have leaking poppet valves. By running the 150 hp unit as the base load unit and the No.1 100 hp unit as the first follow-unit, we ran the plant with one 100 hp unit turned off. This represents a significant savings.

The potential for leaking poppet valves should be constantly monitored as part of your daily maintenance. We recommend installing kW monitors on each control box to compare flow vs kW.

Down the road, new air compressors will need to be purchased to replace the 100 hp units. At this time, a centralized controller, able to manage all the air compressors, should be purchased.

**TABLE 4. PROPOSED ANNUAL AIR COMPRESSOR OPERATION/USE PROFILE**

| | Air Compressor – Horsepower | Percent of Load | Percent of Power | Full Load kW X Percent of Power | Net Demand (kW) | Actual Flow (cfm) |
|---|---|---|---|---|---|---|
| First Shift: Operating at 1044 cfm and 100 psig | | | | | | |
| 1 | 150 hp | 100 | 100 | 123 x .98 | 120.54 kW | 750 acfm |
| 2 | 100 hp | 65 | 77 | 85 x 77 | 63.75 kW | 294 acfm |
| | | | | **Total** | **184.29 kW** | **1044 acfm** |
| Second Shift: Operating at 1044 cfm and 100 psig | | | | | | |
| 1 | 150 hp | 100 | 100 | 123 x .98 | 120.54 kW | 750 acfm |
| 2 | 100 hp | 65 | 77 | 85 x 77 | 63.75 kW | 294 acfm |
| | | | | **Total** | **184.29 kW** | **1044 acfm** |
| Third Shift: Operating at 294 cfm and 100 psig | | | | | | |
| 1 | 100 hp | 65 | 77 | 85 x 77 | 63.75 kW | 294 acfm |

This assessment recommends reducing compressed air demand and system pressure. The existing air compressors still have some years of life left in them if maintenance keeps an eye on the poppet valve control system and the dryer control system. This will provide the firm with energy cost savings of $34,000, with little capital deployed, and an optimized demand-side system ready for new air compressors when that day comes. BP

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# Compressed Air Technology News

## UCA Partners with Envirosep to Build Compressed Air Station

Universal Compressed Air (UCA) is pleased to announce that it has partnered with Envirosep to build a compressed air station for an Electric Vehicle (EV) battery manufacturer in Michigan. This will be the first of three compressed air stations that UCA will design and commission in 2023 within the EV battery world. UCA and Envirosep worked together on the final engineering design for the 27,000 scfm compressed air plant. UCA is responsible for the final equipment design, build, testing and delivery of the system.

*UCA and Envirosep worked together on the final engineering design for the 27,000 scfm compressed air plant.*

### *About UCA*

*Universal Compressed Air provides compressed air as a utility. It is a privately-owned and thriving high-technology business in Pennsylvania's Lehigh Valley focused on compressed air systems for industry. UCA brings decades of Industrial Gas expertise to Compressed Air Supply Systems. The systems are optimized to deliver compressed air as a utility and, in every case, an efficient and reliable solution will be designed and built to maximize savings. As a compressed air supplier, the systems are proven, trusted, and designed to optimize the end user's success. For more information, visit https://universalcompressedair.com/.*

## Sullair Releases E1035H Electric Portable Compressor

Sullair, an industry leader in innovative compressed air solutions since 1965, announced the next step in its commitment to a carbon neutral value chain with the introduction of the E1035H electric portable compressor. This new product development aligns with Hitachi, Ltd.'s long-term environmental targets, titled "Hitachi Environmental Innovation 2050." The Hitachi Group has set a target of becoming carbon neutral in all its global factories and offices by fiscal 2030 and achieving carbon neutrality throughout its entire value chain by fiscal 2050.

The E1035H is a next generation air compressor that provides the same reliability, durability, and performance as its diesel counterparts. It was designed by Sullair engineers based on customer insights and contains the Company's legendary air end and solid state starter for superior efficiency. It also touts quiet operation, added safety features and a lower total cost of ownership as compared to diesel compressors. The E1035H was designed for an evolving marketplace and serves as the beginning of a long line of green initiatives and product innovations planned.

"The development of the E1035H is the beginning of a new era for Sullair in driving industry-leading solutions that bring enormous value to our customers while promoting environmentally responsible innovations," said John Randall, president and CEO of Sullair. "The future of our industry – and our planet – depends on all of our commitment to investments in green technology. Our customers are expecting that commitment, and we are proud to play our part in the fight against climate change."

Demand for greener compressed air solutions has been growing and the E1035H is a direct response to that demand. The initial

development of the E1035H was driven by hands-on input and involvement from Sullair customer, Ring Power Corporation.

"To stay competitive, it is important for manufacturers to listen to customer feedback, adapt and innovate," said Roger Adkins, vice president and compressed air business manager at Ring Power Corporation. "Ring Power was excited to work closely with Sullair in the development of this new electric rental compressor that meets our customers' needs. The Sullair E1035H is a promising addition to their product lineup with versatility and functionality that customers will appreciate. It's wonderful to see Sullair investing in new technology and products that will transform the compressed air industry."

The Sullair E1035H features a number of proprietary and patent-pending features which focus on environmental responsibility and user-friendliness. The E1035H is the first to feature swing-out coolers, a patent-pending design which allows users complete access to the coolers – both front and back – enabling more thorough cleaning which helps keep the compressor running optimally. Additionally, the E1035H features unique condensate management technology which helps eliminate the need for additional equipment to dispose of condensate.

Delivering equivalent power capacity and efficiency as similar-sized diesel-powered compressors, the E1035H produces 1035cfm at 150 psi, and the revolutionary, Sullair proprietary Electronic Spiral Valve (ESV) provides industry-leading efficiency. The E1035H also boasts added flexibility with its emission-less design allowing it to be used indoors and wherever a 60Hz power source is available. Finally, the E1035H runs exclusively on Sullube®, a biodegradable,


*Sullair releases E1035H electric portable compressor as part of long-term climate action strategy.*

## Compressed Air Technology News

varnish-removing lubricant expertly engineered by Sullair for optimized performance and maximum efficiency.

*About Sullair*

*Since 1965, Sullair has developed and manufactured air compressors with proven reliability and wear-free durability. Sullair is globally recognized as a leading manufacturer of air compressors for use in manufacturing, oil and gas operations, food processing, construction and more. Sullair has manufacturing capabilities in Michigan City, Indiana; Suzhou, China; and a JV (IHI-Sullair) based in Suzhou. For more information, visit www.sullair.com. Sullair is a Hitachi Group Company.*

### Doosan Rebrands Three Product Lines as Bobcat

Doosan Bobcat, Inc., a company within Doosan Group, has announced its global branding strategy to create business and growth opportunities for the Doosan Bobcat product portfolio. Doosan Portable Power (DPP), an industry-leading global manufacturer of air compressors, mobile generators and light towers; Doosan Industrial Air (DIA), one of the most comprehensive rotary air compressor lines on the market; and Doosan Industrial Vehicle (DIV), a supplier of quality material handling equipment, including forklifts, will rebrand under the Bobcat trade dress in North America and applicable markets worldwide.

"Bobcat is an iconic brand that changed the world with the invention of the compact equipment industry, and we are excited to unleash the brand in bold, new ways," said Scott Park, Doosan Bobcat CEO and vice chairman. "Doosan Portable Power, Doosan Industrial Air and Doosan Industrial Vehicle have long legacies of developing high-quality products. Bringing these strong Doosan brands into the Bobcat portfolio allows us to further expand these business lines, while also growing our overall Doosan Bobcat business and providing even more solutions to help our customers accomplish more."

This branding approach to the organization's portable power, industrial air and industrial vehicle equipment offerings aims to strengthen overall brand equity, market recognition and consumer recall of all product offerings. The transition will create a cohesive customer experience and grow the organization's footprint, thus making the brand accessible to more customers and in more places.

Bobcat has broadened its product portfolio significantly within the past five years, launching more machines during this period than previously in its entire history. The brand has successfully expanded its offerings with new technologies and innovations and expanded product lines, such as grounds maintenance equipment, which includes compact tractors, small articulated loaders and zero-turn mowers.

"The Bobcat brand empowers ambitious and passionate groundbreakers to accomplish more. Across the globe, big challenges get smaller because of our equipment; from breaking down walls to building up communities, we're proud to provide people what they need to be successful in their endeavors," said Laura Ness Owens, Doosan Bobcat vice president of global brand and North American marketing. "By expanding the Bobcat brand to the portable power, industrial air and industrial vehicle industries, Bobcat can help even more customers, in more ways than ever."

With this refreshed identity, the DPP, DIA and DIV product suites will, respectively, undergo design and aesthetic changes in alignment with current Bobcat branding.


*Doosan Portable Power, Doosan Industrial Air and Doosan Industrial Vehicle will rebrand under the Bobcat trade dress in North America and applicable markets worldwide.*

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## Compressed Air Technology News

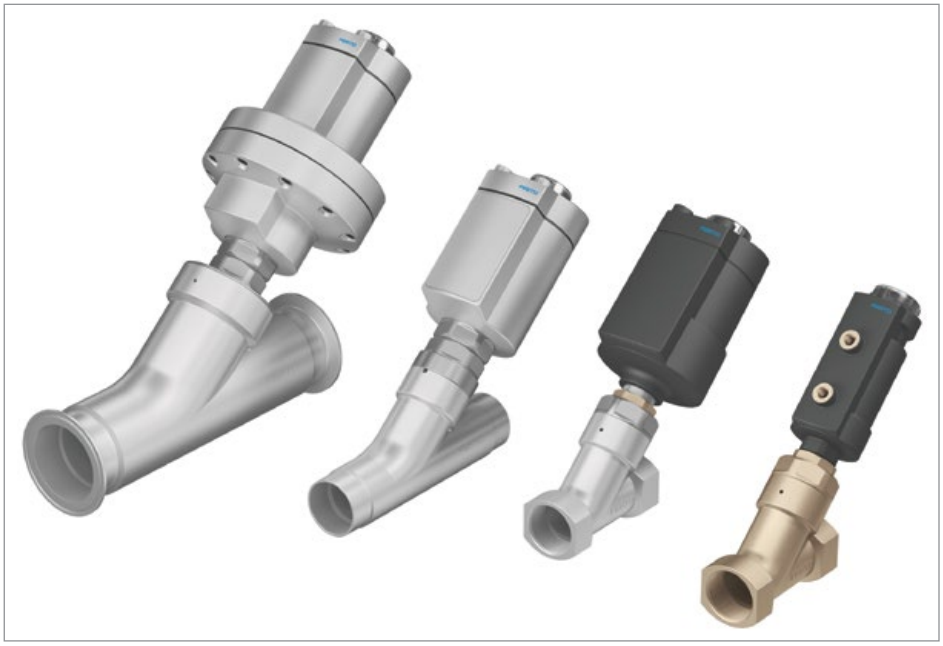
Bobcat-branded material handling equipment, industrial air compressors and portable power products are expected to be available for customer purchase through Doosan Bobcat's extensive, global dealer network at a later date. Bobcat and these rebranded product lines will proudly remain part of the broader Doosan Group portfolio.

*About Doosan Bobcat, Inc.*

*Doosan Bobcat, Inc. is a company within the Doosan Group. Doosan Group is a top-tier global enterprise proudly serving customers and communities for more than a century. Doosan Bobcat is based in Seoul, South Korea. Doosan Bobcat represents world-renowned brands, including Bobcat® equipment, Doosan® Industrial Vehicles, Doosan® Portable Power products, Ryan® and Steiner® grounds maintenance equipment and Geith® attachments. These Doosan companies are world leaders in the engineering, innovation, manufacturing and marketing of compact construction, landscaping and grounds maintenance equipment, forklifts and materials handling equipment, generators, air compressors, lighting systems, light compaction equipment, and attachments. Committed to empowering people to accomplish more, Doosan Bobcat is dedicated to building stronger communities and a better tomorrow. For more information, visit www.doosanbobcat.com.*

### Festo Introduces VZXA Angle Seat Valve

The new Festo VZXA family of pneumatically actuated angle seat valves delivers installation, maintenance, operational, and inventory benefits thanks to a unique modular design. When a VZXA actuator is removed for maintenance or changeover, for example, the stem, seat, and seal stay inside the valve body, allowing the process system to remain pressurized. In applications containing hazardous materials, those materials reside safely within the system, saving cleaning time and lowering health and safety risks of contamination. No other angle seat valve offers these operational benefits.



*The valve family's standardized design ensures every VZXA actuator is compatible with every valve body for simplified ordering and inventory management.*

Reinstalling the actuator is simply a matter of screwing it into the valve body. The actuator does not have to be pressurized, which eliminates strain on the stem, seat, and seal and lowers the potential of damaging the valve seat. The modular design is ideal for valve manifold applications where speedy assembly, ease of maintenance, and compact size are pluses.

Modularity lends itself to valve body repair as stem, seat, and seal are individual components with readily available replacement parts. The valve family's standardized design ensures every VZXA actuator is compatible with every valve body in the family. The universal fit between actuators and valve bodies simplifies ordering and inventory management.

An online valve configurator enables the correct valve for the application – standard or custom – to be specified and ordered in a matter of minutes. Normally open, normally closed, and double acting actuators are available.

Line connections include threaded, sanitary clamp, and welded end. Sanitary clamps work best in washdown and clean-in-place applications where quick connect/disconnect are beneficial. Valve body materials include stainless steel and brass. Actuator bodies are stainless steel or polymer. Each VZXA actuator has an optical indicator showing valve position.

## Compressed Air Technology News

Accessories include sensors for digital feedback, a piloting banjo valve, and stroke limiter for the open stroke. Valve body sizes up to two inches are assembled at the Festo Mason, Ohio, Global Production Center. Delivery can be expected within a week for both standard and custom configurations.

Angle seat valves are used for high volume flow control of water, steam, and corrosive materials. They are in high demand because of their nearly universal applicability in terms of wide temperature and pressure ranges, compact footprint, long service life, low cost, material options, high performance, and ready availability.

*About Festo U.S.*

*Festo is a leading manufacturer of pneumatic and electromechanical systems, components, and controls for process and industrial automation. Celebrating 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.us.*

### Exair Announces New Air Atomizing Spray Nozzle

EXAIR's Atomizing Spray Nozzles create a fine liquid mist perfect for washing, coating, cooling, dust control and more. These nozzles offer an assortment of flow rates and patterns including flat fan, round and hollow cone


*Exair's new Air Atomizing Spray Nozzle video provides key features and advantages.*

patterns and are highly effective with a wide range of liquids making them a perfect tool for a variety of industries. To better illustrate their utility as well as the various styles, EXAIR has created a quick video demonstrating how Atomizing Nozzles can assist in a myriad of processes.

Combining liquid and compressed air, atomizing nozzles create a fine atomization for superior coverage and can be easily adjusted to fit the application's demands. EXAIR Air Atomizing Nozzles come in three distinct styles including internal mix, external mix and siphon fed. In the video, EXAIR will demonstrate some of the key features and advantages of Air Atomizing Nozzles. Providing a detailed look at the nozzles' construction and capabilities, the video also offers examples of useful applications as well as a general idea of what the varying spray patterns resemble.

The stainless-steel construction of these atomizing nozzles adds to their durability and corrosion resistance. EXAIR atomizing nozzles are available in 1/8, 1/4 and 1/2 NPT and also have patented No Drip models available for processes needing to conserve precious liquids or protect product finishes. All models are clog resistant, CE compliant and come with our 5 year Built to Last Warranty. Air Atomizing Nozzles start as low as $203.

*For more information visit https://exair.co/lanvid.*

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*"We've got to have the correct compressed air volume, psi and cleanliness at every CNC machine."*

— Jeff Smith, Building Supervisor, Roush Yates Manufacturing Solutions (April 2022 Issue)

*"This major automotive plant now has a compressed air system operating at optimal efficiency – this has helped them earn ISO 50001 Certification."*

— Hector Lara, President, Airtec (March 2022 Issue)

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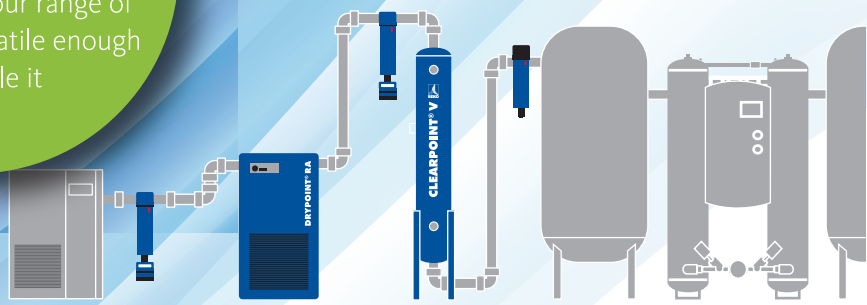


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