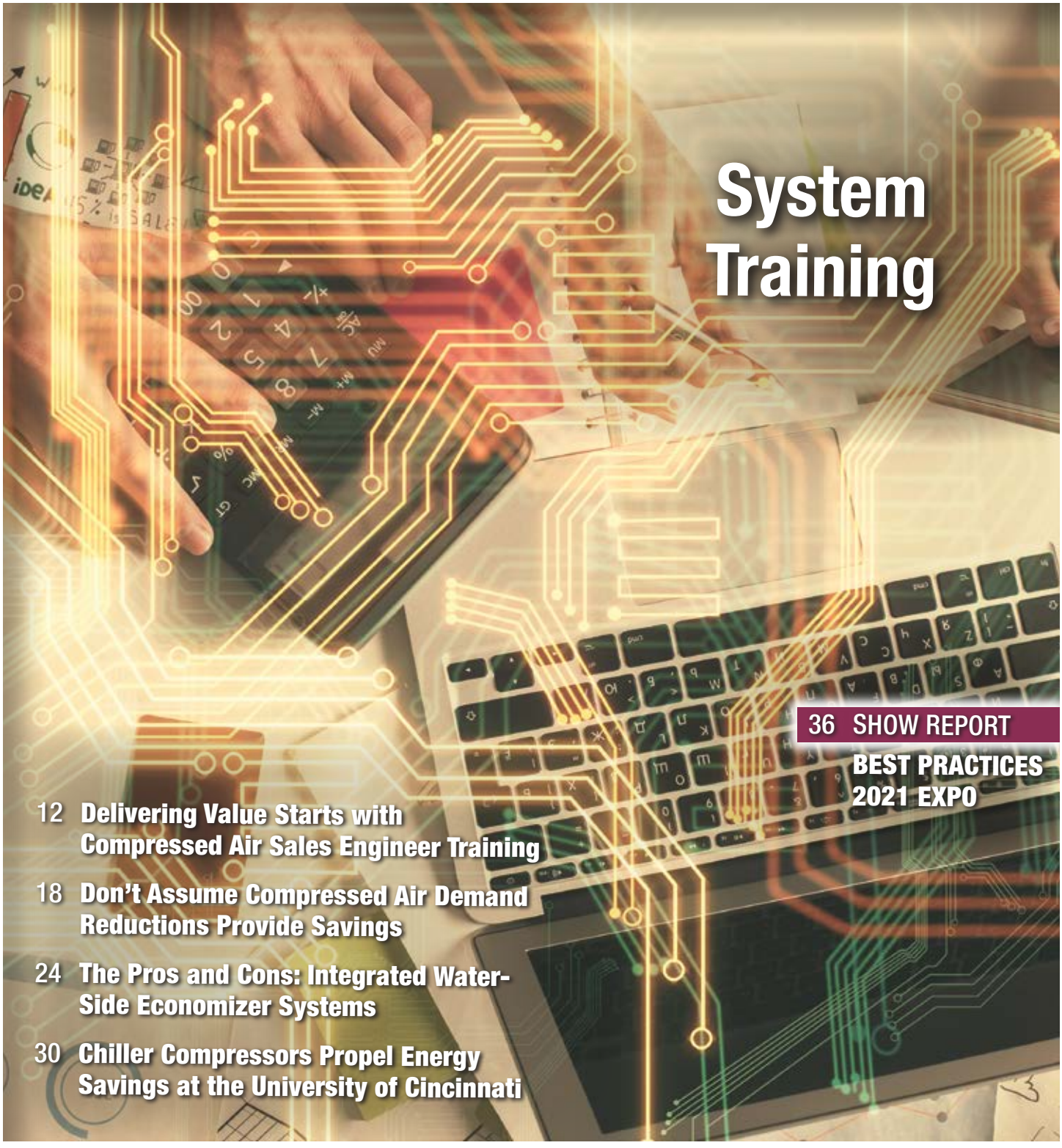
Reliable, Safe and Energy/Water-Efficient Systems Powering Automation

COMPRESSED AIR | CHILLER & COOLING BEST PRACTICES

airbestpractices.com

coolingbestpractices.com

January/February 2022



System Training

Atlas Copco

What's Your Biggest Challenge?

Well, if it's your compressed air then help is at hand. Atlas Copco has a full menu of services to support your needs. From 'how to' videos and whitepapers, to air analysis and testing, all the way to full system audits. The connected efficiency journey:

Audit → Design/Install → Optimize → Monitor → Service & Support

866-546-3588 | www.atlascopco.com/air-usa

COMPRESSED AIR SYSTEM FEATURES

COOLING SYSTEM FEATURES

SUSTAINABILITY & EFFICIENT TECHNOLOGY NEWS

EVERY ISSUE

Compressed Air Best Practices® (USPS# 17130) is published monthly except January-February combined by Smith Onandia Communications LLC, 37 McMurray Rd., Suite 104, Pittsburgh, PA 15241. Periodicals postage paid at Pittsburgh, PA and additional mailing offices. POSTMASTER: Send address changes to: Compressed Air Best Practices®, 37 McMurray Rd, Suite 104, Pittsburgh, PA 15241.

FROM THE EDITOR

System Training

Sales engineers are the experts arriving at plants every day and recommending what systems should be installed. A ten-year energy, quality and reliability profile is largely determined by the quality of these recommendations. For this reason, our own Mike Grennier offers us a profile of sales engineer training being done by several firms with his article, "Delivering Value Starts with Compressed Air Sales Engineer Training."

Training end users is the objective of the article written by Paul Edwards from Compressed Air Consultants, Inc. His article is provocatively titled, "Don't Assume Compressed Air Demand Reductions Provide Proportional Energy Savings." His article states one of the biggest supply-side (of compressed air) misconceptions, "a cfm saved is a cfm earned."

Many are looking to "free cooling" solutions to achieve energy and water-saving goals in cooling systems. How does one choose between air-side or water-side economizers? Rob Landes, from Daikin Applied, has sent us an excellent article titled, "The Pros and Cons: Integrated Water-Side Economizer Systems."

We'd like to thank Ken Koehler, from Danfoss, for sending his excellent article titled, "Oil-Free Magnetic Bearing Chiller Compressors Propel Energy Savings at the University of Cincinnati." I'm proud of this future Big 12 school!

We'd like to thank the compressed air industry for its' support during the Best Practices 2021 EXPO & Conference held November 2-4, 2021. Our enclosed Show Report details how the event provided continuing education, certification and networking opportunities to equipment sales engineers, engineering firm and manufacturing plant personnel.

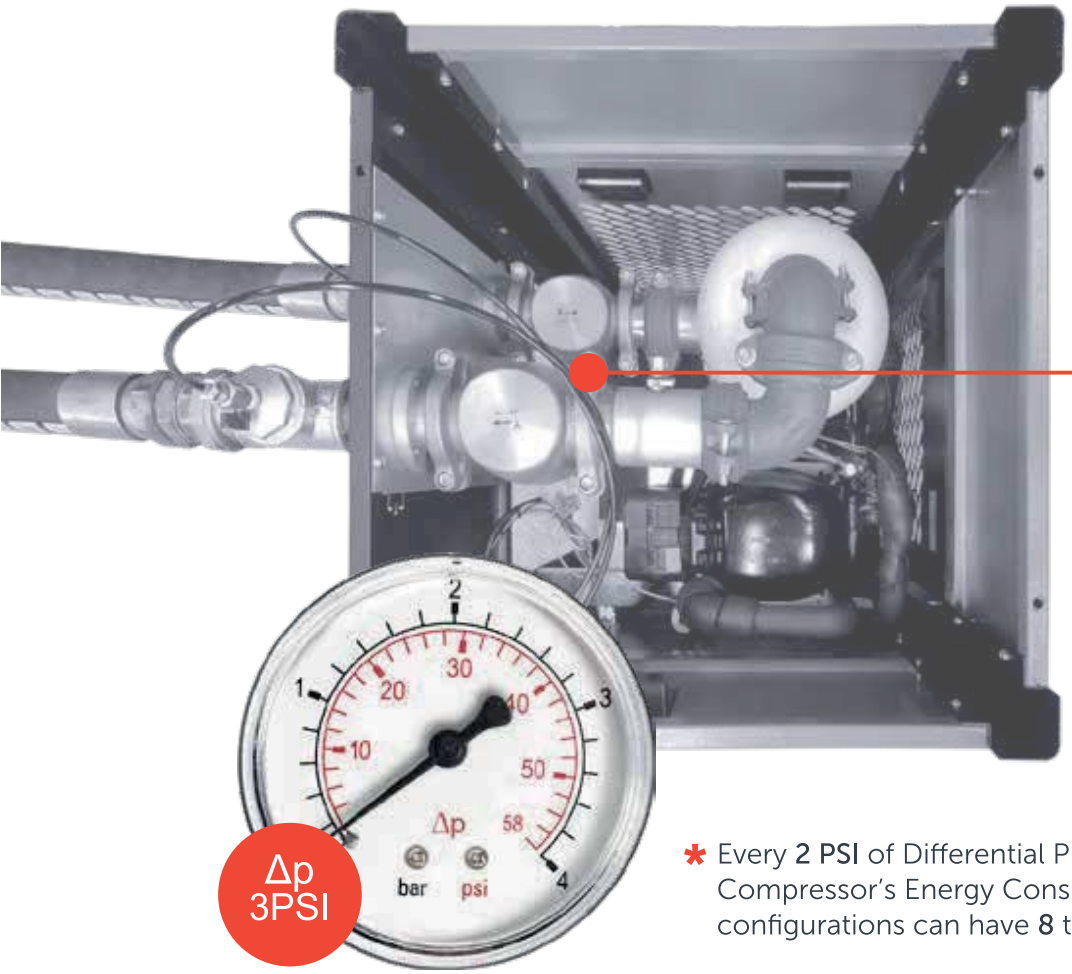
Thank you for investing your time and efforts into ***Compressed Air and Chiller & Cooling Best Practices.***

RODERICK M. SMITH
Editor
tel: 412-980-9901
rod@airbestpractices.com

mikropor

Manufacturing Forward

Save up to *5% Power from the Feed Air Compressor



Engineered and integrated Pre/Post Filtration with greater media surface

* Every 2 PSI of Differential Pressure equals to 1% of Feed Air Compressor's Energy Consumption. Other Filters and Dryer configurations can have 8 to 12 PSID or more.

- Complete Air Treatment (less than 3 PSID differential - CAGI Verified)
- Engineered Pre/Post Filtration with greater media surface
- Highly Efficient, Ultra Low Pressure Differential Heat Exchanger
- Air Quality Class 1.4.1 as per ISO 8573

MEMBER OF CAGI Compressed Air & Gas Institute

MK-US & MCY-US
Air Treatment Packages

Please contact us for a Complimentary Consultation
support@mikroporamerica.com

4921 Ohio Street, Michigan City, IN 46360

www.mikroporamerica.com

CORPORATE GHG-REDUCTION NEWS*

Featuring: Carbon Disclosure Project, Stanley Black & Decker

* Scope 1 and 2 GHG Emissions from Direct Operations

Rest In Peace: Edward James McMorrow Jr. 1954-2021

Edward was born on February 23rd, 1954, to Edward McMorrow Sr. and Rita McMorrow in Brockton, Massachusetts. After Ed graduated from Kent's Hill Preparatory Academy in 1973, he went on to study Business at Champlain College in Burlington, Vermont.

In 1985, Ed met the love of his life and wife-to-be, Theresa Marie McMorrow with her son, Warren Spencer Anzalone (41) and went on to have two more beautiful children, Erin Shanley McMorrow (32) and Edward James McMorrow III (30).

After moving from the East Coast, Ed began to work in the compressed air industry. Ed was a part of the ICDA group, one of the largest distributor organizations in the industry. Ed was the president of the ICDA from 1996-1998, and was instrumental in helping grow not just the products he represented but the entire industry.

In 1999, he and Theresa founded Peerless Energy Systems. Under Ed's leadership, Peerless Energy Systems quickly became one of the leading Sullair distributors in the Midwest. They currently have over 30 employees and 3 locations in 2 states.

From there, Ed helped found a best practices peer group called Industrial Compressed Air Products. The ICP group grew its membership and with its expansion also helped continue the success of its chief brand, Sullair. The ICP group grew larger under Ed's leadership over the years and with the support of the membership transformed from a best practices peer group into one of the industries' most powerful independent brands. Ed helped to

create unmatched value in the compressed air industry by leading ICP to partner with companies on the cutting edge of technology like EAP, BEKO, BASF, and CAS. Throughout his years in the compressed air industry, he also worked with the United States Department of Energy and their efficiency group named The Compressed Air Challenge. He was influential in getting manufacturers to standardize on testing practices to more accurately rate air compressors. This lead directly to millions in dollars of energy savings yearly.

Edward always put family first, as a dedicated father, grandfather and husband. He was a strong, kind, loving, and generous person, which was felt by many in the community. He enjoyed various activities throughout his robust life and on any given day, he could be found on the green playing golf, up at the Nest hunting, boating on the lake with his friends and family, supporting his beloved Cornhuskers (Go Big Red!), showing off his dancing skills or just relaxing at home watching old westerns with Theresa.

Edward was preceded in death by his parents Edward and Rita McMorrow. He is survived by his devoted wife of 35 years, Theresa McMorrow; his sister Nikos Kavanya; his children, Erin (Stephen)McMorrow-Bils, Edward (Conner) McMorrow and Warren (Laura) Anzalone; grandchildren, George and Annabelle Anzalone and Callan McMorrow; and seven nieces and nephews. He will forever be in their hearts and missed every day.

2% of Companies Worldwide Worth $12 Trillion Named on CDP's 2021 A-List of Environment Leaders

London, 7th December 2021: 272 companies worldwide – worth US$12 trillion in market cap – have today been highlighted for their environmental leadership, based on their level of transparency and performance on climate change, forests and water security.

These leading companies have been named on CDP's prestigious annual A List, and are among nearly 12,000[1] ranked A to D- on their environmental performance by CDP – the non-profit that runs the world's environmental disclosure system for companies, cities, states and regions.

Some big names on CDP's A List include **Diageo, Infosys, PepsiCo, TETRA PAK, AstraZeneca, Colgate Palmolive** and **Lenovo Group.**

Nature had a clear seat at the table at this year's COP26 summit, and the Glasgow Pact as well as the IPCC's Sixth Assessment Report made it clear that environmental issues are interconnected and must be managed together.

Companies gradually seem to be recognizing this and adopting a more holistic approach to reporting. 14 pioneering companies – including **L'Oréal, Unilever, HP** and **Lenzing AG** – achieved a triple A for their performance on all three environmental themes in 2021, an increase on last year's record of 10. What's more, the number of companies on CDP's Forests A List rose from 16 to 24 while the Water A List grew from 106 to 118.

The number of companies on the Climate A List has dropped from 280 last year to 200 in 2021, as the consensus on what qualifies as climate leadership has evolved and the bar raised. Much of the low hanging fruit at companies' disposal has now been utilized and more ambitious action is urgently required.

Among other criteria, to score an A, companies must have robust governance and oversight of climate issues, rigorous risk management processes, verified scope 1 and 2 emissions and be reducing emissions across their value chain. Most also now have well established emissions targets that have been approved by the Science Based Targets initiative, and evidence of targets which cover their scope 3 emissions.

It is encouraging to see that many other companies made a significant improvement in the quality of their disclosures this year and moved up in the rankings. 509 companies improved their scores from a C or below in 2020 to a B in 2021, meaning they have advanced from merely disclosing and being aware of their environmental impact, to taking action to manage it.

While it is positive to see the leadership of some pioneering companies, and the efforts of others to improve, these companies represent only the tip of the iceberg. Just 2% of all scored companies made the A List, and 58% scored between C and D-, meaning they are only just beginning to recognize their environmental impact. It is also concerning that 16,870 companies worth US$21 trillion in market cap – including **Chevron, Exxon Mobil, Glencore** and **Berkshire Hathaway** – failed to respond to the request for information from their investors and clients, or provide sufficient information in their response.

These non-disclosing companies are now going against a tide of change, with a series of environmental disclosure requirements being developed and announced at COP26 and throughout 2021, as well as more companies than ever disclosing environmental information every year. CDP recorded over 13,000corporate disclosures, representing some 64% of global market capitalization in 2021 – an all-time record. In addition, there is rising market demand for corporate environmental transparency. More than 590 investors with

Corporate GHG-Reduction News

over US$110 trillion in assets and 200 major buyers with US$5.5 trillion in procurement spend requested corporate environmental data through CDP in 2021.

Companies that publish their environmental data consistently and on an annual basis can protect and improve their reputation, get ahead of regulation, boost their competitive advantage, uncover risks and opportunities, track and benchmark progress and get access to lower costs of capital. There is also evidence to suggest that companies that score highly on environmental metrics perform well financially. The Stoxx Global Climate Change Leaders index, which is based on CDP's A List, has seen an average annual return that is 5.8% higher than its reference index over the past eight years.[2]

Dexter Galvin, Global Director of Corporations & Supply Chains at CDP, said: "COP26 highlighted the necessary role corporates play in driving the real economy changes to tackle the climate and ecological emergency, and keep us within 1.5°C. It is fantastic that more businesses are disclosing their impact every year and recognizing the interconnectedness of environmental issues. We now need to see even more ambitious action on climate, and more businesses stepping up on other areas of natural capital. 17,000 corporates failing to even take the first step and report their environmental data is far too many. These companies are not only putting the planet at risk, but themselves. If they continue with business as usual, they will end up on the wrong side of public opinion, regulation and investor sentiment. And scrutiny is rising – empty targets or greenwash simply won't fly."

Some examples of environmental action from companies on the A List include:

- In December 2020, **Unilever** implemented a climate transition plan to help reach its net-zero target. In May, it was put to a vote at the AGM and received an overwhelming 99.6% approval rate.

- **Landsec,** the property development and investment company, has established a voluntary internal price on carbon of US$107.50/tonne (£80) to help drive its activities towards the practices required to limit the most dangerous effects of climate change.

- **Amaggi,** the Brazilian commodities company, has integrated geospatial tools and data into 100% of its purchasing decisions, cross referencing its suppliers against their environmental impacts. This allows Amaggi to ensure traceability as well as monitor and manage potential deforestation across its value chain.

- In 2021, **Kao Corporation,** the chemicals and cosmetics company, commenced support for approximately 800 small-scale plantations in Indonesia to acquire sustainable palm oil (RSPO[3]) certification with the aim of doing so for 5000 plantations in the region by 2030.

- **Fujitsu Limited,** the IT service company, works across its value chain with clients in Asia to find solutions for areas increasingly experiencing water issues e.g. The Jakarta State Disaster Prevention Bureau uses Fujitsu's disaster information management system to establish timely and accurate responses to natural disasters.

- **Owens Corning,** the world's largest manufacturer of fiberglass composites, has incentives for the CEO and CSO to reduce water usage as it relates to the company's 2020 and 2030 goals. The performance indicators relate to the reduction of water

withdrawals, reduction in consumption volumes and improvements in efficiency across direct operations.

Alan Jope, CEO of Unilever, said:
"Business can only thrive on a healthy planet. Unilever sees CDP as a key partner in delivering the change business needs to make, working with some of the most influential companies, cities and regulators to build sustainable economies. We're delighted that Unilever has been awarded Triple A status for our approach to climate action, water security, and forestry. And it's great to see so many other companies on the list, indicating a real step change in ambition and shared accountability as we gear up to a net-zero world."

James McCall, Chief Sustainability Officer at HP Inc., said:
"To drive change, companies need to take decisive and urgent action to support the communities we serve, and the natural ecosystem we all depend on. We believe that purpose driven companies should lead by example, creating a path for our supply chain, business partners, and customers to join us. Being recognized on CDP's A Lists for Climate, Forests and Water for the third consecutive year is an honor, and serves as further motivation for us to continuously raise the bar. CDP's robust disclosure process is an important mechanism to drive accountability as we strive to be the world's most sustainable and just technology company."

CDP scores companies based on a transparent methodology covering disclosure, awareness, management and leadership. Between now and 2025, to support the need to reach net-zero emissions and full nature recovery by 2050, CDP will develop its scoring methods to focus even more on tracking against scientific benchmarks and pathways reflecting companies' historic, current and projected impacts; product portfolios; and investment and transition plans. These scores will provide a clear assessment of a company's ambition and how they are performing against targets, driving greater credibility and accountability.

As part of its new five-year strategy, and to help tackle the climate and ecological emergency, CDP will also be expanding its work to cover more environmental issues. This will include land, oceans, biodiversity, resilience, waste and food.

Olivier Mariée, CEO of CPR Asset Management, said:
"As an asset manager, we are strongly committed to support, through our investments, the advancement of the Paris Agreement goals. Since our

1. 11,759
2. Based on the cumulative performance of the STOXX Global Climate Change Leaders and the STOXX Global 1800 indices between 19 December 2012 and 17 November 2021 (Gross Return).
3. Roundtable on Sustainable Palm Oil

Corporate GHG-Reduction News

launch of the CPR Invest – Climate Action international equity fund with CDP in 2018, CDP's scores have been central to our designing of credible, impactful climate investment solutions across all mainstream asset classes. The expanding breadth of their coverage is of critical importance in building diversified and robust investment universes, and their data and modeling provides an insightful source of information to select companies that are ahead of the transition towards a low-carbon economy."

Carola van Lamoen, Head of Sustainable Investing at Robeco, said:
"Investor expectations on climate, water, biodiversity and deforestation data have risen drastically in recent years and there is no doubt that this will continue. Robeco supports CDP in its efforts to enhance transparency and comparability in companies' environmental disclosures. The reporting framework CDP provides enables companies to stay abreast of the growing investor demands for sophisticated disclosures on environmental risks and impacts. For us, CDP is a valued source of information that provides insights into environmental risk management practices and performance across a set of indicators, and supports our engagement with companies."

About CDP

CDP is a global non-profit that runs the world's environmental disclosure system for companies, cities, states and regions. Founded in 2000 and working with more than 590 investors with over $110 trillion in assets and over 200 purchasers with $US5.5 trillion in buying power, CDP pioneered using capital markets and corporate procurement to motivate companies to disclose their environmental impacts, and to reduce greenhouse gas emissions, safeguard water resources and protect forests.

Over 14,000 organizations around the world disclosed data through CDP in 2021, including more than 13,000 companies worth over 64% of global market capitalization, and over 1,100 cities, states and regions. CDP is a founding member of the Science Based Targets initiative, We Mean Business Coalition, The Investor Agenda and the Net Zero Asset Managers initiative. Visit cdp.net or follow us @CDP to find out more.

Stanley Black & Decker Recognized With CDP's Double 'A' Score For Global Climate and Water Stewardship

NEW BRITAIN, Conn., Dec. 14, 2021 – Stanley Black & Decker (NYSE: SWK) today announced that for the fourth consecutive year, it has been recognized for its leadership in climate action and water security by global environmental non-profit CDP. For the eighth year, the company also achieved CDP Leadership Status.

CDP recognized Stanley Black & Decker for being a leader on corporate environmental ambition, action and transparency worldwide and demonstrating significant action on climate change and water security risks.

Stanley Black & Decker is one of 40 companies that achieved a double 'A' out of nearly 12,000 businesses that were scored based on data submitted through CDP's questionnaires in 2021. The company was one of 200 companies that made the 2021 climate change 'A List' and one of 118 companies named to the water security 'A List'.

"Environmental, Social & Governance (ESG) is at the core of how we operate as a global corporate citizen and we are committed to being a force for good to help create a more sustainable world," said Stanley Black & Decker's Corporate Responsibility Officer, Deb Geyer. "We are honored to have our efforts recognized with this achievement. From large-scale solar projects, to boiler and chiller upgrades, LED light retrofits and waste heat recovery initiatives, we are dedicated to working towards achieving cleaner water, minimizing waste generation and landfilling, and reducing our greenhouse gas emissions."

CDP's annual environmental disclosure and scoring process is widely recognized as the gold standard of corporate environmental transparency. In 2021, over 590 investors with over $110 trillion in assets and 200 major purchasers with $5.5 trillion in procurement requested that companies disclose data on environmental impacts, risks and opportunities through CDP's platform. A record-breaking 13,000 companies responded.

"Many congratulations to all the companies on this year's A List," said Paul Simpson, CEO of CDP. "Taking the lead on environmental transparency and action is one of the most important steps businesses can make, even more so in the year of COP26 and the IPCC's Sixth Assessment Report. The scale of the risk to businesses from climate change, water insecurity and deforestation can no longer be ignored, and we know the opportunities of action far outweigh the risks of inaction. Leadership from the private sector is essential for securing global ambitions for a net-zero, nature positive and equitable world. Our A List celebrates those companies who are preparing themselves to excel in the economy of the future by taking action today."

A detailed and independent methodology is used by CDP to assess these companies, allocating a score of A to D- based on the

comprehensiveness of disclosure, awareness and management of environmental risks and demonstration of best practices associated with environmental leadership, such as setting ambitious and meaningful targets.

The full list of companies that made this year's CDP Climate Change and Water Security A Lists are available here: https://www.cdp.net/en/companies/companies-scores

Stanley Black & Decker's Corporate Social Responsibility strategy ties the company's purpose – For Those Who Make the World – with the United Nations' 2030 Sustainable Development Goals. The strategy focuses the company's efforts on three key pillars: empowering makers, innovating with purpose and creating a more sustainable world. By 2030, Stanley Black & Decker plans to enable 10 million creators and makers to thrive in a changing world, innovate our products to enhance the lives of 500 million people, and go beyond carbon neutral in its global operations, meaning its carbon capture is greater than its carbon emissions. To achieve going beyond carbon neutral, Stanley Black & Decker is investing in carbon capture technology, has set targets to reduce its supply chain emissions by 35% by 2030 and is working towards mapping its water risks and setting context-based targets to reduce water insecurity throughout its operations.

In 2021, Stanley Black & Decker released its first consolidated Environmental, Social & Governance report, "A Force for Good," which highlights all aspects of the company's sustainability and societal efforts and clear governance practices. The full report is available here: https://www.stanleyblackanddecker.com/who-we-are/2020-esg-report/.

About Stanley Black & Decker

Headquartered in New Britain, Connecticut, Stanley Black & Decker, an S&P 500 company, is a leading $14.5 billion global diversified industrial with 56,000 employees in more than 60 countries who make the tools, products and solutions to deliver on its Purpose, For Those Who Make The World. The Company operates the world's largest tools business featuring iconic brands such as DEWALT, STANLEY, BLACK+DECKER and CRAFTSMAN; the world's second largest commercial electronic security company; and is a global industrial leader of highly engineered solutions within its engineered fastening and infrastructure businesses. Learn more at www.stanleyblackanddecker.com.

Delivering Value Starts with Compressed Air Sales Engineer Training

By Mike Grennier, Compressed Air Best Practices® Magazine

Training of sales engineers is a top priority for those who manufacture, sell and service compressed air systems. (Photo courtesy of Atlas Copco.)

➤ Uptime. Profitability. Quality. Sustainability. Those goals are shared by leading manufacturers who have another thing in common: They use compressed air to achieve their goals, which is why those who make, sell and service compressed air systems say anything less than top-notch training of sales engineers is unthinkable considering how the sales team directly influences whether a compressed air system will fall woefully short, or deliver immeasurable value for years on end.

"Sales engineers are the 'tip of the spear,' of customer-facing personnel," said Jim Donohue, Competence Development Manager at Atlas Copco (www.atlascopco.com). "It is critical we develop people to represent our company well, but most importantly, to serve our customers effectively, efficiently and completely."

Simply said, there's a lot riding on the knowledge of a sales engineer for those who invest in compressed air systems to power their plants, said Frank Melch, Vice President – Sales, Zorn Compressor & Equipment (www.zornair.com), based in Pewaukee, Wisconsin.

"End-users take the lead from salespeople, and it comes down to the competency of the sales representative involved," said Melch. "That's a big responsibility. A big responsibility. Sales reps have to understand what's going on, how to size the solution correctly and apply controls correctly to make a successful installation."

A Customer-centric Approach

There was a time when air compressor manufacturers and local compressed air sales and service companies provided customers with solutions based upon product-centric information.

But that's no longer a viable practice given today's competitive manufacturing environment according to those who set out to establish long-term relationships with users of compressed air.

"Customers expect sales engineers to deliver value," said Adam Bitner, Director of Sales, North America, at Sullair (www.sullair.com). "This can only be achieved if the sales engineer

is properly equipped to provide clear, thoughtful solutions. Although product differentiators matter, the days of product-centric discussions have largely been replaced by more customer-centric discussions around efficiency, reliability, productivity and after sale support."

Focusing on each operation's application and specific goals in addition to a host of potential solutions as part of a comprehensive approach is crucial, echoes Ron Mazur, Atlanta Sales Manager for Blake & Pendleton (www.blakeandpendleton.com), based in Macon, Georgia.

"A lot of customers think it's only about what happens in the compressor room and that's not always the case. The best thing for any customer is for our people to understand how a system works as a whole," Mazur said.

The overarching goal is to help decision-makers who purchase and manage compressed air systems get it right, said Jim Miller, President of CASCO USA, headquartered in Pittsburgh, Pennsylvania.

"Most manufacturers rely on the expertise of the equipment provider in the compressed air industry to recommend and install the right system," Miller said, adding that CASCO USA (www.cascousa.com) takes an engineered-approach to sales. "Training and competency in compressed air is absolutely essential. While there are some customers who know compressed air, most have an entire plant to take care of and need outside expertise."

Training and More Training

Creating and fostering compressed air expertise involves ongoing training and education, whether sales engineers are in the early, or later stages of their careers.

"There's a difference between training and development," said Melch of Zorn. "In general, training is the initial learning whereas development extends years into somebody's career where we're expanding knowledge and skill sets."

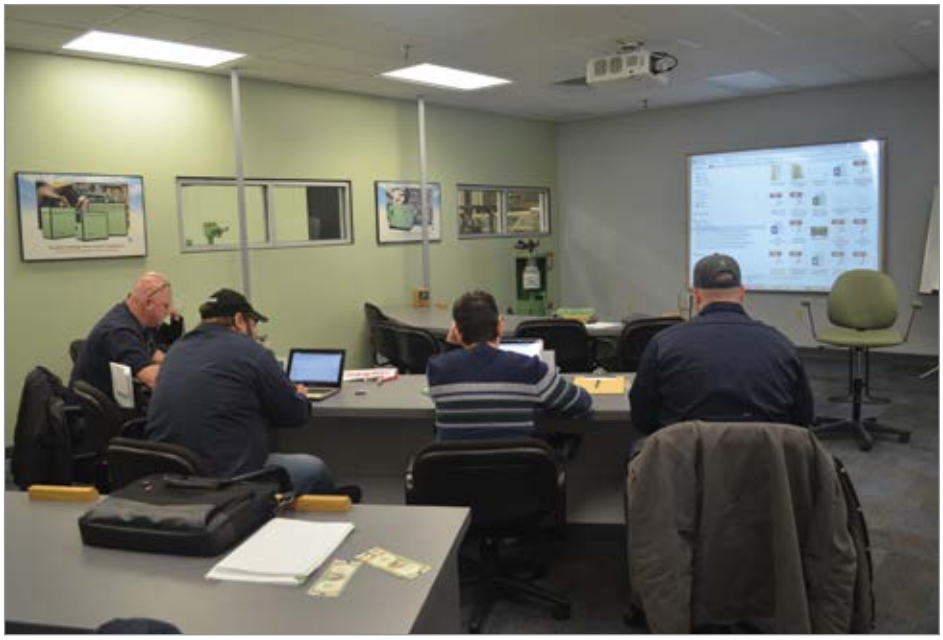
Training programs involve a mix of classroom sessions, online programs, and daily on-the-job training opportunities, as well as nearly constant teaching and learning sessions during regular sales meetings that often involve problem-solving and role-playing. OEMs and local compressed air companies alike also take advantage of resources made readily available by the Compressed Air and Gas Institute (CAGI) and the Compressed Air Challenge.

Throughout the years, OEMs and local air compressor companies have developed extensive programs designed to address the steep learning curve in the compressed air industry, as well as the experience gap due to the aging workforce. An example is Atlas Copco's Integrated Mentorship Program for Air Compressor Technologies (IMPACT), which readies sales representatives to assume field-based sales positions across the United States. The six-month program provides intensive, practical, hands-on training that gives participant's the equivalent of one year's work in the industry.

Donohue said the Atlas Copco program is based on a clear understanding on how to best train sales recruits.

"We know 10% of a person's knowledge comes from classroom learning, 20% comes from learning from others and 70% comes from doing the actual task and we hold regular

Delivering Value Starts with Compressed Air Sales Engineer Training



The success of a compressed air system is often driven by a comprehensive view of the application and the solution installed. (Photo courtesy of Sullair.)

in-person training sessions to cover this," Donohue said. "But we also know a person will learn more from being out in the field working with colleagues than they ever could in the classroom environment and our program gives them as much as the foundation they need to optimize their time in the field."

Others, including Melch of Zorn, couldn't agree more regarding the importance of field training. Zorn as with others make it a point to ensure new sales recruits shadow seasoned sales and service veterans on the job early and often.

"Everything is first understanding compressed air; the physics involved. Then it's the technologies, then understanding all of the

components of a system. Then we'll go out and have them make sales calls," Melch said. "We try to get them into compressor rooms pretty quickly. It's like your best hitter in baseball hitting it off the tee every day. They need the reps."

The length of training programs for local compressed air companies range from six months to one year or longer. Typically, programs will match the competency level of the trainee.

"There is no one answer to the extent of training," said Mazur, noting that Blake & Pendleton doesn't generally think of training as training. "We think of it more as a mentoring program. Based on the knowledge of the individual and their grasping of that knowledge, the program can be short, or it can be a number of years."

Aiming for Compressed Air Efficiency

Aside from soft skills and sales techniques, training programs concentrate on best practices, including compressed air efficiencies since most who sell compressed air systems recognize that electricity accounts for 76% of compressed air costs over a 10-year period. The remaining costs of a system includes the upfront purchase and installation costs and maintenance expenses.

"The industry has shifted over the past 30 years to focus on energy reduction and efficiency," said Bitner of Sullair. "Broadly speaking, efficiency gains are widely available in most compressed air systems. Sales engineers are tasked to help customers identify these areas. For example, controls are a core training topic for new sales engineers."

A thorough understanding of air compressor controls is nothing less than vital, said Melch.

"You have to understand part-load controls," said, Melch who echoed thoughts of others by adding there are numerous aspects to efficiencies that require thorough training and knowledge gained through experience.

"It goes beyond understanding a VFD is most efficient at part load. You have to identify peak demand and then understand how to meet it, even if it only happens once a day. Let's understand the load demand because that's going to affect the control scheme. And operating costs are going to be determined by how the system meets different levels of demand."

In addition to controls, sales representatives throughout the industry are trained to fully comprehend compressed air fundamentals including the relationship between power, pressure, and flow. Equally important is a working knowledge of data logging, information gathering, and analyses of the information as part of compressed air supply- and demand-side assessments. In many cases, sales engineers are taught to bring in specialists when an application calls for a detailed compressed air audit.

An example is Blake & Pendleton's partnership with iZ Systems, which specializes in compressed air and vacuum energy audits. Typically, a Blake & Pendleton sales engineer

Delivering Value Starts with Compressed Air Sales Engineer Training

will collect basic data and then bring in an iZ systems (www.izsystems.com) auditor for a deeper dive as needed, Mazur said. Newer sales recruits will often tag along during the auditing process.

"We'll put those young guys with an auditor so they can spend a week understanding the full auditing process," Mazur said. "We try to get our people to start in the compressor room, then work their way out, ask the right questions and then spend time with seasoned auditors."

Gaining a Holistic View

Whether it's orchestrated by an OEM or a local compressed air company, training programs

OEMs and local compressed air sales companies commonly turn regular sales meetings into teaching and learning opportunities. (Photo courtesy of Zorn Compressor & Equipment.)

In-depth training continues to evolve as an ongoing and essential requirement for sales engineers in the compressed air industry. (Photo courtesy of Sullair.)

stress the importance of a holistic view of a company's compressed air needs and the solution needed. This includes training in compressed air quality, especially given its impact on air compressor uptime, production, and end-products.

"Air treatment training is critical since sales engineers need to apply the correct dryers, filter, etc. around the end product," said Bitner. Training related to air quality at Sullair, and other companies includes an understanding of ISO air quality standards and classifications, as well as government regulations impacting various industries.

Bitner, as with others, notes how sales training related to air quality emphasizes the importance of thorough discussions with end users.

"When it comes to air quality, our sales engineers are encouraged to have the customer define that terminology very clearly because 'clean, dry air' means different things to different people," he said.

Like others, Donohue said compressed air quality training is crucial given the importance of air quality on a plant's operation.

"We focus heavily on air treatment using the ISO 8573-1 air quality standards as our guide," he said. "Our sales engineers don't leave the training room until they have a thorough understanding of air purity requirements, including particulate loading, pressure dewpoint and oil content, and which applications require more stringent air quality."

Knowledge is Everything

For most OEMs and local compressed air companies, in-depth sales training is an ongoing and essential requirement given the complexities of compressed air systems, the critical role the systems play in virtually all manufacturing operations and the diversity of applications. Training is also something that continuously evolves.

"There are a lot of moving pieces when you're training an individual," Mazur said. "What we try to do is put together a platform that works best, but you need to be flexible in that platform in my eyes."

Today, training of compressed air sales representatives, said Melch, is about much, much more than selling products.

"A more knowledgeable sales rep is a more confident the sales rep and that person is going to do a better job for the customer," Melch said. BP

To read similar ***Compressed Air Technology*** articles, visit https://www.airbestpractices.com/technology

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

Don't Assume Compressed Air Demand Reductions Provide Proportional Energy Savings

By Paul Edwards, President, Compressed Air Consultants

As end users become more energy conscious, plant personnel and operators have responded by looking at ways to reduce the kwh's of their air compressors. The purpose of this article is to show there isn't always a proportionally linear relationship between what happens with flow reductions on the demand side of a compressed air system – and what happens with the energy consumption in the air compressor room. Optimizing an entire compressed air system requires precise knowledge of the supply side, how compressed air is used in the process itself and how those two relate together.

Twenty years ago, Compressed Air Consultants, Inc. was formed to focus on some industries where compressed air demand-side improvements delivered significant results. As our skills in these industries developed, we became aware of the common use of many erroneous economic justifications for demand-side compressed air system improvements. Some of these "improvements" are made on the basis of an incorrect calculation for the payback while others are just made off the cuff without an understanding of the cost impact. There are other cases where clients miss opportunities through benign ignorance. This article explores the issue in greater detail. The four basic types of mistakes include:

- Supply Side Misconceptions – "a cfm saved is a cfm earned"
- Common "Best Practice" Demand-Reduction Projects vs. Precise Process Understanding
- Incomplete Understanding of Improvement Options
- Benign Ignorance – The Cost of Compression

Supply Side Misconceptions – "a cfm saved is a cfm earned"

The misconception associated with the compressed air supply side is the assumption that "a cfm saved is a cfm earned." This assumption of a proportionally linear relationship ignores the impact, on air compressor energy savings, realized by the type of existing air compressor controls and where in the control band the machine is running. Suppliers of point of use demand-reduction equipment tend to be guilty of this mistake. They might go to an informative website like the DOE's Energy Tips and read that compressed air costs 18-30 cents per 1000 ft^3 of air. They then extrapolate that reducing 10 cfm at 10 cents/1000 ft^3 means they will save $1300 per year. If the plant requires a 2-year payback, they think they have $650 to spend to fix it. And they'd be wrong.

For most control systems, the energy reduction is linear but not always proportional to the

cfm reduction. In the case of a load no-load air compressor, the theoretical best is 70% so that the $1300 savings is actually $910. In the case of a modulating screw compressor, the savings is 30% or $390. These two examples would not have a two-year payback for a $650 solution.

Other technologies such as variable speed drive (VSD) screw air compressors, geometry-controlled screw air compressors, reciprocating and centrifugal air compressors come closer to a 1:1 savings ratio. Reciprocating compressors are generally close to a 1:1 ratio but there are caveats for the other technologies.

- **VSD air compressors** often have varying performance where the compressor is on its airend performance curve. We have seen cases where the demand side improvements drive the VSD into a poorer performance point reducing its efficiency by 10% on average. So a 30% reduction in compressed air demand might only get 20% total savings. The same is true of geometry controlled air compressors.

- **Centrifugal air compressors** sometimes employ a blow-off strategy. No matter how much compressed air is taken off the system, it ends up just blowing off more. In this case, there are zero savings.

- **Drawdown (Reduce Air and Costs Go Up):** In the case of a screw air compressor operating in drawdown, reducing demand will actually allow it to catch up a little bit more by raising the discharge air pressure. Therefore, reducing the demand can increase the energy consumption since the same number molecules are being compressed to a higher pressure. This is obviously a rare case, but it does happen.

The point is that often solutions are implemented without an understanding of what is happening on the control system of the air compressors. The real return on investment is dependent upon the control system and where in the performance curve the air compressor is running.

The implication of this is that demand side improvements should not be made until the air compressor control strategy is completed if return on investment is the highest priority. It's the low hanging fruit that often allows one to go after the higher hanging fruit which ultimately reduces the overall operating costs the most.

Common "Best Practice" Demand-Reduction Projects vs. Precise Process Understanding

With all due respect to some articles in this fine magazine, "common best practice demand-reduction projects" often aren't as effective as a precise understanding of the application and the process. It's never good to use compressed air, right? Actually from a Return-on-Investment perspective, sometimes compressed air is the best solution.

Errors using "common best practice demand-reduction projects" often occur due to implementation without the calculation of the correct actual cost to implement. Panel cooler replacements often fall into this category. We've seen recommendations to eliminate the use of

Don't Assume Compressed Air Demand Reductions Provide Proportional Energy Savings

Filtration issues on a panel cooler.

panel coolers because the auditor/salesperson thought that any reduction of compressed air was a "Best Practice". For example, the panel cooler below consumes 35 cfm of air. Was it the right recommendation? To know the answer, you'd have to know:

- The panel OEM temperature requirements
- The ambient temperature
- The amount of heat generated by the panel
- The process duty cycle

- The cost of compressed air taking the controls into consideration

Another error we see involves purchasing and installing new demand-reduction equipment, rather than simply fixing an incorrect system set-up. Assessments of existing process equipment demonstrate an inadequate understanding of the existing equipment and how it can run. One product that has entered the market is a new type of pulsejet for dust collectors. It shows great promise in that it has quite a few desirable features associated with it. However, some of the justifications for the technology suggested that the new supplier didn't understand how the old technology should be set up. Those evaluations assumed that the existing set up was correct in terms of pulse duration and interval. They were not. When the current air consumption was estimated, no accounting was made for the fact that those settings on the existing pulsejets could be altered without impacting the performance of the dust collector. Again, there may have been a positive ROI for the upgrade, but the user couldn't make an accurate informed decision with the information provided to him.

A third area where the assessment of existing equipment can go wrong pertains to the duty cycle of an application within a process. Understanding the duty cycle (or not) keeps coming up with the calculations used when analyzing the use of compressed air for blow-off vs. blower air. The picture below shows the inside of a hood where compressed air is used to remove dust from a bag of cement.

Blower air can handle this task more than adequately but is not always justifiable. The informed recommendation involves understanding not only the duty cycle within the operation of the facility but the duty cycle within the process itself. In this case, a proximity switch can be used to determine where the bag is located and the air can be turned on and off in between bags. This makes the calculation more difficult but more accurate.

Incomplete Understanding of Improvement Options

Another problem is when a customer doesn't understand all of the options at their disposal when it comes to a demand side improvement. If done through ignorance, then it is understandable even though it shows a lack of expertise. If it is done purposefully, which does happen more than it should, then it is irresponsible. In some cases, capital and operating costs can increase when there were better options available.

One example of a customer and a salesman not knowing their options involved the purchase of 10 bar air compressors to feed some air cannons. The plant had problems clearing blockages in the process so the decision was made to supply the existing air cannons with higher pressure air to impact the process with more force. What no one realized is that this €75,000 investment in 10 bar air compressors would just about double the cost of this application. No one considered whether there were other options.

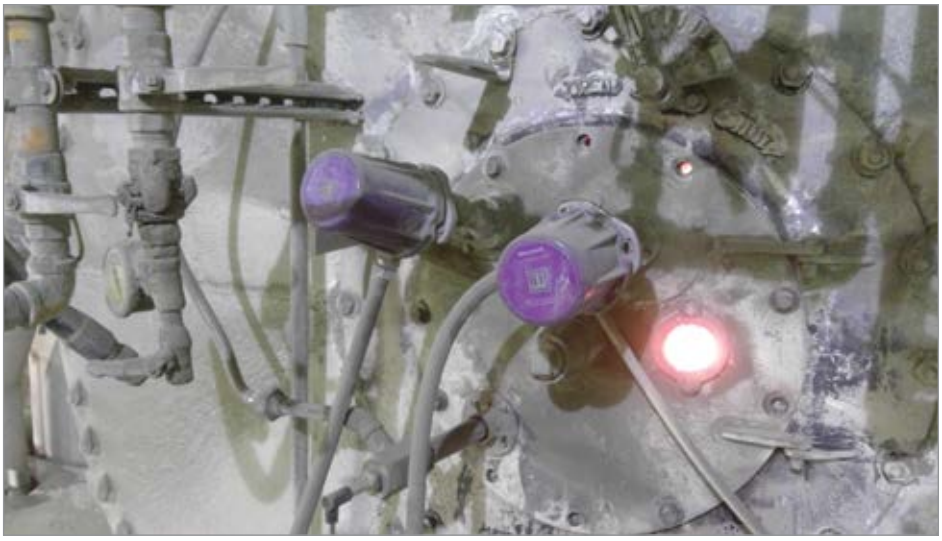
Don't Assume Compressed Air Demand Reductions Provide Proportional Energy Savings

What were their options?

- **Fire twice as often, spend no capital.** Since the cost of the air consumption doubled, an alternate approach would be to fire twice as often and see if that eliminated the problem. If it did, then they could slowly back off on their timing settings to figure what the minimum requirement really was. This would have eliminated the They could have fired their existing air cannons up to twice as often and not spent the capital. As long as they didn't exceed a doubling of the interval, their operating cost would have been equal or less with no capital outlay.

- **Upgrade the Air Cannons with a Return on Investment.** They could have upgraded the air cannons to a

The inside of a hood where compressed air is used to blow-off dust from a bag of cement.



Two ultraviolet detectors use compressed air to keep the sight glasses clear and help keep the lenses cool. The cost of the air was $2500 per year per instrument.

better valve. This would cost less money and the air cannons got a much higher blasting force for a smaller volume of air. This would give the plant multiple options using the existing air system rather than installing a dedicated one. This would result in a reduction of the operating cost. This is the only approach that would actually provide a return on investment as the other two did not.

Benign Ignorance – The Cost of Compression

Benign ignorance is when a lack of understanding leads to an excess cost. The plant has an opportunity but doesn't realize it. This often happens when an operator assumes that all compressed air costs the same. One example where the design engineer caused a cost increase is a common one when it comes to barrier air for instrumentation.

In this picture, two ultraviolet detectors use compressed air to keep the sight glasses clear and help keep the lenses cool. The cost of the air was $2500 per year per instrument.

For a positive pressure combustion chamber, the OEM recommends the use of blower air that is at a greater pressure than the combustion chamber. This means that a pressure blower which already was supplying air to other instruments could have been used at a cost of $40 per year.

However, this kiln runs at a negative pressure. In this situation, the OEM recommends "For a negative pressure combustion chamber, drilling a few holes in the section of the sight pipe outside of the combustion chamber allows atmospheric pressure to flow through the sight pipe and into the chamber." This means it could have been done for zero cost. Given that the $40 solution was a belts and suspenders approach, it is what was recommended.

Conclusion

The purpose of this article is to show there isn't a proportionally linear relationship between what happens on the demand side of a compressed air system and what happens with the energy consumption of the air compressor room. In many industries, there are opportunities and pitfalls when it comes to cost reduction on the demand side. Properly optimizing an entire system requires knowledge of the compressed air supply side and the process equipment itself and how those two relate together. BP

For more information contact Paul Edwards, President, Compressed Air Consultants, tel: 704.376.2600, email: paul.edwards@loweraircost.com, www.loweraircost.com

To read similar ***Compressed Air System Assessment*** articles, visit https://www.airbestpractices.com/system-assessments

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

The Pros and Cons: Integrated Water-Side Economizer Systems

By Rob Landes, Product and Applications Engineering Manager, Positive Displacement Chillers, Daikin Applied

As businesses embrace environmental initiatives to combat climate change, facility managers and building operators are feeling pressure to increase building efficiency, reduce energy consumption and operating costs. Many are looking to 'free cooling' solutions to achieve those goals. Free cooling can take two different forms: air-side economizers that directly exchange cool outdoor air with the building or water-side economizers that use outdoor air to cool the chilled water used to cool the building. This article focuses on water-side economization in particular using two different methods: stand-alone dry coolers and air-cooled chillers with integrated free cooling coils.

Determining the most effective free cooling strategies requires taking a myriad of factors into consideration. No one scenario may be perfect, but simulations can help reveal which types of buildings and applications are the most likely to benefit.

There's a catch, however: These aren't one-size-fits-all solutions. Free cooling chillers perform differently depending on facility size and location, and effectively applying them into a facility requires understanding the key optimization strategies to make integrated free cooling a viable solution.

The Rise of the Integrated Water-Side Economizer

Before integral mounting of economizer coils on air-cooled chillers was commonly available, some systems were designed to use separate dry coolers to subject the building heat to the cool outdoor air. Both solutions offer different advantages but making the best choice requires an understanding of the nuances between the two competing designs.

The Old Way: Stand-Alone Dry Coolers and Chillers

A dry cooler is a stand-alone, fluid-to-air heat exchanger that receives the building cooling loop glycol directly, then exchanges the heat with the outdoor air to cool the loop glycol before returning it to the building or routing through the chiller. In warmer ambient conditions where the dry cooler is unable to cool the fluid completely, the fluid flows through the chiller to receive supplemental mechanical cooling.

To control the fluid flow path, the three-way valves connecting the building cooling water loop to the chiller and fluid cooler open or close, allowing the flow to bypass the dry cooler or chiller when appropriate, which helps manage pressure drop.

The New Way: Integrated Free Cooling

Similar in concept to a dry cooler, integrated free cooling uses glycol to air coils, but unlike dry coolers, these coils are typically attached to the chiller on the outside of the primary condenser coil to cool the process fluid using low temperature ambient air. Integrated free cooling chillers typically operate in one of three "modes."

In mechanical cooling mode, the unit functions just like a normal air-cooled chiller, cooling the glycol using the refrigeration cycle. This is done when the ambient temperature is above the leaving glycol temperature.

In hybrid mode, glycol is diverted first through the air coils where it is partially cooled, and then diverted into the evaporator where it is further cooled to meet the design fluid temperature setpoint. Hybrid mode is used when the ambient temperature is below the entering fluid temperature, but not low enough to achieve 100 percent free cooling.

Because hybrid mode operates in mild ambient temperatures, it can often represent the greatest number of run hours. This means optimizing operation during hybrid mode is crucial for maximizing system efficiency and achieving the best return on investment.

Free cooling mode takes place when ambient temperatures are well below the leaving fluid temperature setpoint, often 20-30°F (11.1-16.7°C) lower, depending on the particular system design. In this mode, all the cooling of the glycol is achieved through the use of the coils and the compressors are turned off. As a result, this mode draws very

The Pros and Cons: Integrated Water-Side Economizer Systems

low levels of power since only the condenser fans and fluid pumps require electricity.

The greatest benefit to integrated free cooling is a repeatable and optimized control sequence, developed by factory engineers who understand chiller efficiency curves and who can customize the operating sequence to improve the efficiency of the combined system. This is different than applying separate dry coolers and chillers, where the controls to make the equipment work together typically have to be installed and programmed by a third party.

However, it is important to understand that integrating free cooling coils onto the chiller does come with some drawbacks. In addition to heavier weight and higher initial cost, there is an efficiency penalty to the mechanical cooling mode. Adding free cooling coils over the existing condensing coils can increase the air pressure drop, causing the fans to work harder and raise the condensing temperature, which can lead to lower mechanical cooling efficiency when compared to a similar chiller without those coils. For free cooling to make sense, there must be enough load in the winter, where free cooling saves tremendous kilowatt usage, to more than offset the summertime efficiency penalty and still provide a reasonable payback period. Evaluating this balance is where building energy simulations can provide tremendous value.

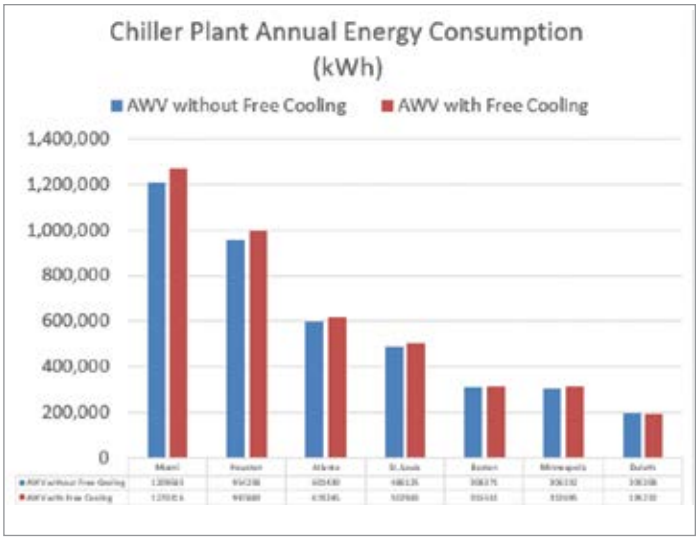
Evaluating the Benefits of Free Cooling: The Scenarios

To assess the potential effectiveness of integrated water-side economizer coils for different climates and building types, 365-day building energy simulations are a useful comparative tool. The following simulations covered three prototype buildings across seven climate zones, and used the U.S. Department of Energy's EnergyPlus (version 8.5) total building energy simulation tool to model a chiller plant consisting of commercially available chillers with and without integrated free cooling. The model generated hourly building loads based on typical meteorological year weather data and standard ASHRAE 90.1 inputs for building envelope and lighting power densities.

It is important to remember that studies like this are comparative so they can serve as good indicators for which applications may be better or worse than other applications. However, actual energy usage and dollar savings values may vary significantly in any given building. These simulations serve as a good starting comparison, rather than a conclusive rule.

Hospital Simulation

The first scenario applied integrated free cooling to a hospital application. In this hospital, the chiller runs predominantly in mechanical cooling mode in the summer months and shoulder seasons due to a sizable



In Figure 1, the blue bars represent a standard chiller without integrated free cooling, modeled in the different locations on the X axis. The red bars represent a chiller with an integrated free cooling coil. Comparing the red and blue bars, free cooling represents an increase in overall energy usage for this application.

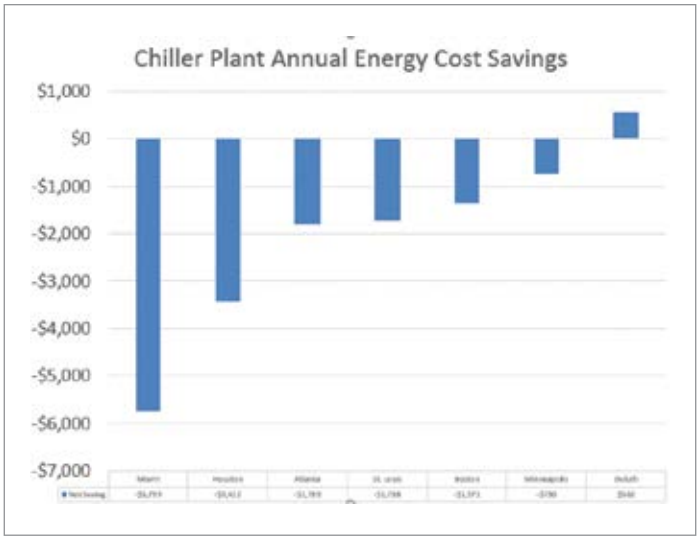


Figure 2 depicts the savings associated with integrated free cooling when compared to a non-free cooling chiller for each hospital location. Note that none of the locations experienced net savings throughout the year with the inclusion of integrated free cooling. This is due to very low run hours for free cooling due to smaller internal loads in the wintertime that were almost completely offset by the cooling effect from the ventilation air, leaving almost no run hours for the integrated water-side economizer.

cooling load and because temperatures are too warm for free cooling. Despite the presence of a wintertime cooling demand, free cooling operation sees limited run hours in this application due to the impact of fresh air ventilation.

Building codes typically require high ventilation rates for hospitals so cool outdoor air already provides the bulk of the cooling during the colder ambient conditions when hybrid cooling or free cooling would normally be active. As a result, there is relatively little load left to remove using the free cooling function. Conversely, in the summertime, the free cooling coils reduce the efficiency of the mechanical cooling, so the net effect is a higher overall energy use, even in cold climates like Duluth, Minn. This highlights one key aspect of chiller integrated free cooling: It provides the best benefits when used in conjunction with an application that has higher wintertime run hours, and cannot cost-effectively use air-side economizing to meet the wintertime cooling demand.

Data Center Simulation

The next simulation examined the cooling needs and performance of a relatively small data center, which used chilled glycol to indirectly cool its servers. For this data center, the wintertime load is much higher than the previous hospital scenario because the load is tied to the electrical load of the servers, as opposed to being dependent on ambient temperature. Additionally, data centers generally run warmer chilled water temperatures so more hours of free cooling are available.

This trend can be seen by looking at the varying heights of the red and blue bars in Figure 3. In a location like Miami, because the number of free cooling hours is small, using integrated free cooling results in higher energy use because of the lower use of mechanical cooling. In all other locations, however, simulations showed that integrated free cooling resulted in energy savings – with significant savings noted in moderate to cold climates. For example, in Duluth, the annual energy usage dropped to almost half when using a chiller with an integrated water-side economizer, resulting in more than $50,000 of annual energy savings.

As previously mentioned, it's important to recognize that in the case of data centers, the chilled water loop leaving fluid temperature is often

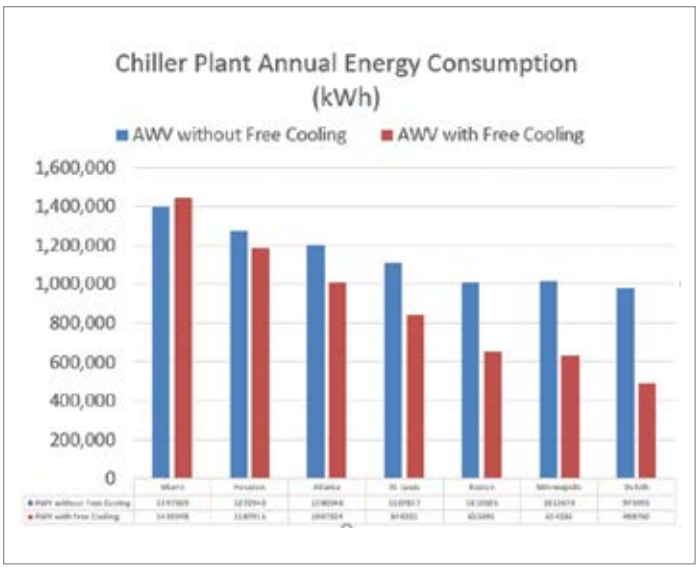


Figure 3 depicts energy consumption in a data center simulation featuring a 350-ton air-cooled screw chiller.

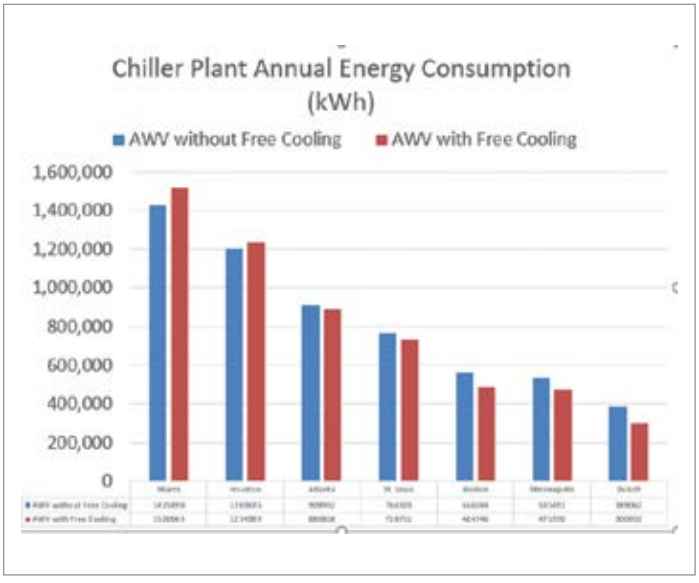


Figure 4 shows how an integrated free cooling chiller can offer energy savings for an office building application when applied in moderate and cold climates.

designed for higher temperatures than those normally used for comfort cooling. While a typical comfort cooling application may use a 44°F (6.7°C) degrees Fahrenheit leaving fluid temperature, data centers often use 55°F (12.8°C) or higher, with the most common designs in the 60-70°F (15.6-21.1°C) fluid temperature range. This means that free cooling can engage at a relatively higher ambient temperature than

The Pros and Cons: Integrated Water-Side Economizer Systems

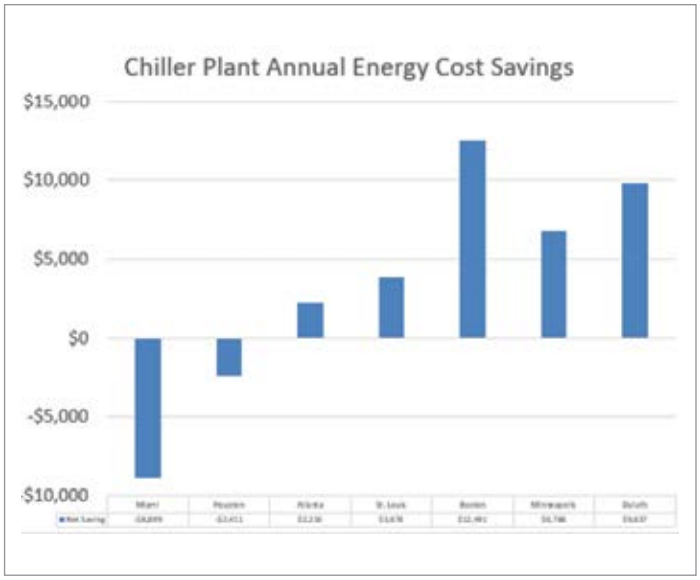


Figure 5 shows yearly energy savings resulting from integrated free cooling in the Atlanta office building simulation.

comfort cooling applications that use lower leaving fluid temperature designs, leading to a higher number of free cooling operating hours and better payback.

Office Building Simulation

The final simulation evaluated free cooling in a medium-sized office building with a 600-ton comfort cooling load and ASHRAE-standard ventilation rates. The results fell somewhere between data centers and hospitals, with less winter load and run hours than a data center, but more than a hospital, due to lower ventilation.

In reviewing the results, Atlanta was just under break-even. So climates cooler than Atlanta could expect to see some energy savings in an office-building-type application.

The yearly spend on energy is shown in Figure 5, with the best result seen in Boston, which achieved $12,000 in annual energy savings. Many older buildings and systems may have ventilation rates less than those modeled here so energy savings in those instances could be even more pronounced.

Tapping into Savings Potential

Overall, these results demonstrate that integrated free cooling can result in significant energy savings when applied to the correct application. For data centers in particular, the energy savings of integrated free cooling during the cooler months far offset the penalty to mechanical cooling efficiency during the warmer months in all but the balmiest climates. It makes sense, then, that other applications with similarly high wintertime loads, such as process cooling applications for plastic manufacturing, pharmaceutical production, or food and beverage production, could similarly benefit from integrated free cooling, especially if those applications also use elevated leaving fluid temperatures.

Even office buildings and similar comfort cooling applications may see some benefit from an integrated free cooling solution. Due to climate and building differences, however, integrated free cooling may result in more varied results and thus requires more careful consideration. BP

About the Author

As a Chiller Product and Applications Engineering Manager for Daikin, Rob Landes helps develop screw and scroll chillers that are not only efficient and reliable, but also cutting edge. For 13 years, Landes has worked for Daikin Applied both in product management and engineering roles. Prior to his current role, he worked with various HVAC products as a technician for a residential service and installation contractor.

About Daikin Applied

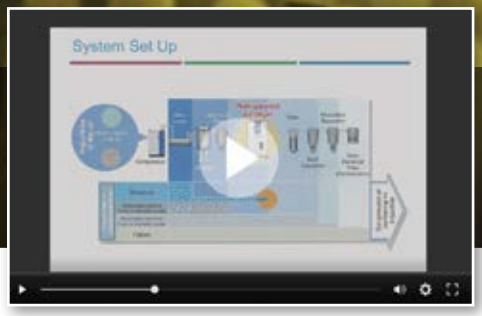
A member of Daikin Industries, Ltd., Daikin Applied designs and manufactures advanced commercial and industrial HVAC systems for customers around the world. The company's technology and services play a vital role in creating comfortable, efficient and sustainable spaces to work and live – and in delivering quality air to workers, tenants and building owners. Daikin Applied solutions are sold through a global network of dedicated sales, service and parts offices. For more information, visit www.daikinapplied.com.

To read similar ***Chiller Technology*** articles visit
https://coolingbestpractices.com/technology/chillers

Visit our Webinar Archives to listen to expert presentations on ***Chiller Technology*** at https://coolingbestpractices.com/magazine/webinars

Worried About Moisture & Oil Contamination in Food Production?

Learn Quality & Safety Best Practices - View Our FREE* On-Demand Webinars



Our Extensive Library of Webinars Includes These Titles

- Safety and Quality in Compressed Air: Why You Should Care
- Integrating ISO 8573-1 Compressed Air Quality Classes into SQF Food Safety Certification
- Safe Quality Food Standard: 5 Compressed Air Criteria
- Global Food Safety Initiative (GFSI) Compliance: Two Compressed Air System Specifications

*Included with your free magazine subscription

Get FREE Instant Access* at **airbestpractices.com/magazine/webinars**

Oil-Free Magnetic Bearing Chiller Compressors Propel Energy Savings at the University of Cincinnati

By Ken Koehler, Senior Business Development Manager, Danfoss

The University of Cincinnati (UC) is a state-supported institution of higher learning and a public research university, founded in the early 1800s and the proud home of the UC Bearcats. The University serves over 47,000 undergraduate and graduate students, including 12,000 employees across the UC campus that spans over 200 acres and is located in the greater Cincinnati metropolitan area. UC operates two central utility plants (east and west) that serve the overall UC campus and also support six area hospitals.

Like many universities across America, The University of Cincinnati had a major challenge having to operate aging central utility plants with older technology, reduced efficiencies and capacities, with chilled water equipment at the end of its service life. Even so, UC needed to maintain plant operations under diverse load conditions, including critical hospital utility demands that are currently expanding and in daily periods subject to energy tariff.

UC's overall strategy was to develop a multi-year utility plant modernization program, with goals to maximize operational performance, increase efficiencies, recapture lost capacities, reduce peak electric demand and improve operating flexibility through high-performance, oil-free chiller technology and planned optimization strategies.

The critical factors for UC's chiller solution included:

- Enhanced operational flexibility
- Increased central plant efficiency
- Ability to operate chillers at low loads
- Expanded redundancy
- Ease of installation
- Reduced downtime and maintenance

The University turned to Smardt Chiller Group, the global leader in oil-free, magnetic-bearing centrifugal chillers, and achieved a 32% reduction of kWhr in the new chillers' energy needs compared to the previous unit. This reduction primarily stems from the performance of the chillers' Danfoss Turbocor® Oil Free Variable Twin Turbo (VTT) compressors that significantly increased production efficiencies and capacities while reducing maintenance costs. The compressors provide enhanced redundancy safeguards and part-load operation while reducing maintenance costs and streamlining management of equipment with a 30+ year service life.

One of three installed Advanced Technology 2,400-ton Magnetic Bearing V Class Chillers from Smardt.

To replace the aging 5,200-ton unit, UC ordered the first two of three Advanced Technology 2,400-ton Magnetic Bearing V Class Chillers from Smardt. The need was particularly urgent because the University's chiller fleet supplies chilled water to a campus HVAC system that also covers a network of six hospitals and research centers, and any drop in capacity could greatly affect the comfort of patients and personnel – and, most importantly, patient lives.

University of Cincinnati had another major challenge – the annual summer electric distribution ratchet tariff. The tariff is a surcharge that potentially boosts energy costs for the University from June 1 through September 30. If the new chiller wasn't in place, University of Cincinnati could face significant charges. As a result, the pending fee established a hard deadline for the chiller installation, start-up and commissioning. The surcharge – levied by the local energy distribution entity and approved by the Public Utilities Commission (PUCO) – works by imposing a financial penalty for energy import from the grid. PUCO urges large-scale energy users like University of Cincinnati to find ways to reduce their penalty by lowering their energy use during the tariff season.

Despite those restrictions, Smardt helped University of Cincinnati meet this tight deadline. Following the chiller design and manufacturing process, the first chiller arrived on site May 29, 2019, and installation began immediately. Two days later, it went into operation – a day before the tariff season began. The second chiller was installed by July 1, 2019 and went into operation soon after.

Following their installation, University of Cincinnati purchased a third Smardt V Class 2,400-ton chiller and installed it in 2020 during the COVID-19 pandemic. The third chiller replaced a 28-year-old chiller the University removed from service. In a testament to the adaptability and problem-solving capabilities of the project team, University of Cincinnati, Smardt and Stoermer-Anderson, Inc. reconfigured this chiller's design because a support beam inside the facility could not be moved.

Now fully in service, the three new chillers – which were painted crimson red and black in a show of school pride – represent about 15% of the campus chiller capacity while delivering significant energy savings over the previous units. These first three chillers mark the beginning of UC's 10-year modernization program with next phases commencing in 2022.

New Chillers Generate Significant Energy Savings

The replacement strategy was to apply innovative technology for current and future demand requirements. The University must be able to deliver reliable utilities every day, all day while maintaining a 99.9% energy reliability rating in the provision of these utility services.

Oil-Free Magnetic Bearing Chiller Compressors Propel Energy Savings at the University of Cincinnati

Upon installation of the first two chillers, University of Cincinnati began logging a substantial reduction in kWhr performance, including achieving a top performance of 0.27 kW/ton while averaging 0.36 kW/ton over their monthly operation. This bested the previous chiller's established 0.68 kW/ton baseline. While a standard measurement of energy conversion, the kW/ton metric is also tied to the PUCO electric tariff, meaning the better the performance, the smaller the surcharge. Within the first nine months of operation, the units saved the University 1,588,000 kWhrs.

At one year of operation, University of Cincinnati reported:

- A reduction in operating costs of 28% annually
- A savings of $107,984 in electric commodity costs
- A decrease of approximately 700 kW in campus electric demand, which created a $75,704 reduction of tariff fees

By the two-year mark, which included the startup of the third chiller, University of Cincinnati saw continued improvements in operations, reporting:

- A reduction in operating costs of 32% over two years
- A savings of $340,859 in electric costs
- A sustained decrease in campus electric demand – repeating a 700 kW decrease and annual fee reduction of $75,704

University of Cincinnati also established operation predictions for the three chillers through 2030. According to University of Cincinnati estimates, it expects:

- Total KWhr reduction: 56,663,038
- Total Smardt-attributed kWhr reduction: 36,596,529
- Energy cost reduction: $2.15 million
- Smardt-attributed energy cost reduction: $1.46 million
- Maintenance cost reduction (Smardt's new installations vs. previous chillers): $216,000

"After the first full year, we were extremely impressed with the results of the first two chiller installations," said Mike Hofmann, director, utilities & technical services, University of Cincinnati. "When we tallied the year-two efficiency numbers for all three chillers, our numbers climbed further – this made us very happy. Likewise, the good news continued with the projections through 2030, which continue to suggest tremendous savings long-term. Taking all these expected performances into account, we now predict return on investment (ROI) within four years of each chiller's startup."

Chillers Slash CO_2 Emissions

Along with the reduced energy costs, the new chillers reduced the University's CO_2 output by 1,991 tons per year. This reduction is the equivalent of:

- Eliminating 5,004,112 passenger vehicle miles
- Opting not to burn 2,200,767 pounds of coal
- Allowing 32,924 tree seedlings to grow for 10 years
- Matching the CO_2-processing capacity of a 2,439-acre forest for one year
- 349 homes' energy usage for one year

The primary energy savings in the new Smardt chiller units derives from the six Danfoss Turbocor Variable Twin Turbo (VTT) compressors used in each.

Danfoss Turbocor VTT1200 Compressors Enable Impressive Part-Load Performance

The primary energy savings in the new Smardt chiller units derives from the six Danfoss Turbocor VTT compressors used in each. Compared to other units, the Turbocor compressors operate on varying load conditions. Unlike the industry standard, each V Class Smardt chiller uses six 400TR compressors. Savings are achieved by running several compressors simultaneously at a lower load, rather than one or two compressors at maximum capacity. For example, if the chiller demands a load of 800 tons of refrigeration (TR), the chiller's smart controls order three compressors to run at 267TR each, instead of pushing two compressors to 400TR. This is further evidenced in comparison to the existing 5200TR units where unloading down to these low part loads proves to be more challenging in operation and also yields lower efficiencies. The Danfoss Turbocor® VTT oil-free, magnetic bearing compressor technology eliminates complex oil and refrigerant lubrication management systems, resulting in a simplified chiller design, increased reliability and reduced maintenance. Chillers with multiple VTT compressors with Danfoss variable speed drives lower capacity by reducing the number of compressors operating to enable outstanding part-load efficiencies, while still operating reliably and offering enhanced redundancy.

During the initial survey of their operation, the chillers' smart controls maintained the compressors within the highest efficiency of the compressor operating map I/O curve over 60% of the summer operating hours to achieve their energy use reductions.

Additional energy efficiency is generated by using a sequenced compressor startup, which taps the variable speed functionality to match load demand.

Oil-Free Magnetic Bearing Chiller Compressors Propel Energy Savings at the University of Cincinnati

Smardt's six-compressor configuration is different than the industry standard, which usually calls for one or – at most – two compressors per machine. This configuration helped deliver the following results to University of Cincinnati:

- 16% more efficient production versus the industry standard and a "best in class" performance
- Reduced operating costs by 32% annually over a two-year period
- Reduced demand for electricity by 2 million kilowatt hours annually
- Chilled water produced at 0.34 kW/ton over 52% of its operating hours to date
- 1,991 tons fewer CO_2 emissions because of less electric usage

Compressor Efficiencies Add To Savings

The Danfoss Turbocor VTT compressors operating inside each of the chillers are critical to achieve the high level of performance sought by University of Cincinnati Utilities. Compressors, by far, are the most important component of any chiller unit, and Danfoss Turbocor engineered the HVAC industry's first oil-free variable speed magnetic bearing compressor that simultaneously offers the highest full- and part-load efficiencies in the industry. Danfoss designed these compressors for OEMs as they strive to meet the stricter chiller efficiency requirements expected in ASHRAE 90.1-2016, using either Path A or Path B.

Further, these compressors meet the operational requirements of water-cooled or evaporatively-cooled chiller applications by offering nominal capacity ranges from 200 to 400 Tons (700 to 1430 kW).

Additionally, patented technology allows the variable twin turbo series of compressors to eliminate the cost and complexity of inlet guide vanes and variable geometry diffusers. At the same time, this design choice simplifies the capacity control, extends the stable operating range and improves compressor efficiency.

Award-Winning Energy Reduction

After recording the operational results for the new Smardt Advanced Technology Magnetic Bearing V Class Chillers – namely a 32% reduction of kWhr demand, reduced CO_2 emissions, lowered maintenance costs and a predicted short ROI – the project earned the Region III Innovative Energy Project of the Year (2020) from the Association of Energy Engineers. The University also won the International District Energy Association's (IDEA) CampusEnergy 2020 Video Contest (https://www.youtube.com/watch?v=1AUiUEME5m0). UC has been named among "the top tier of the Best National Universities," according to U.S. News & World Report, and also named a "green university" by the Princeton Review.

"The results of this chiller project – from the quick turnaround by Smardt to the energy savings derived from the Danfoss Turbocor compressor configuration – helped us achieve the savings we wanted on the ratchet tariff," said Hofmann. "Added benefits on CO_2 performance and maintenance savings were great bonuses. Taken together, this project has exceeded our expectations and we look forward to continuing our successful partnership with Danfoss and Smardt."

As phase I/II Smardt Chiller projects utilizing Danfoss Turbocor VTT oil-free, magnetic bearing technology are now completed, The University of Cincinnati is moving into the next phase in 2022 with both additional chillers and other utility plant equipment upgrades. The success of this project demonstrates the partnership between Smardt and Danfoss, and the contributions the Danfoss Turbocor VTT compressor technology provides for the Smardt V-Class chiller to ensure highly-efficient and reliable operation for the University of Cincinnati, its students, employees and the community at large. BP

About Danfoss

Danfoss engineers advanced technologies that enable us to build a better, smarter and more efficient tomorrow. In the world's growing cities, we ensure the supply of fresh food and optimal comfort in our homes and offices, while meeting the need for energy-efficient infrastructure, connected systems and integrated renewable energy. Our solutions are used in areas such as refrigeration, air conditioning, heating, motor control and mobile machinery. Our innovative engineering dates back to 1933 and today Danfoss holds market-leading positions, employing 28,000 and serving customers in more than 100 countries. We are privately held by the founding family. For more information, visit www.danfoss.com.

To read similar ***Chiller Technology*** articles visit https://coolingbestpractices.com/technology/chillers

Visit our Webinar Archives to listen to expert presentations on ***Chiller Technology*** at https://coolingbestpractices.com/magazine/webinars

Worried About Moisture & Oil Contamination in Food Production?

Learn Quality & Safety Best Practices – View Our FREE* On-Demand Webinars & Articles

Library of Food Safety Webinars Includes

- Safety and Quality in Compressed Air: Why You Should Care
- Integrating ISO 8573-1 Compressed Air Quality Classes into SQF Food Safety Certification
- Safe Quality Food Standard: 5 Compressed Air Criteria
- Global Food Safety Initiative (GFSI) Compliance: Two Compressed Air System Specifications

Library of Food Safety Articles Includes

- Compressed Air GMPs for GFSI Food Safety Compliance
- Sampling and Testing for Compressed Air Contaminants
- Unilever Ice Cream Plant Reduces Compressed Air Consumption
- Keep Contaminants Out of Food & Bev Processing Air Supplies

*Included with your free magazine subscription

COMPRESSED AIR BEST PRACTICES
airbestpractices.com

Get FREE Instant Access* to Webinars & Articles ›››

https://airbestpractices.com/magazine/webinars • https://airbestpractices.com/industries/food
https://airbestpractices.com/standards/food-grade-air

Continuing Education at the Best Practices 2021 EXPO & Conference

By Roderick Smith, Publisher, Best Practices Magazines and EXPO

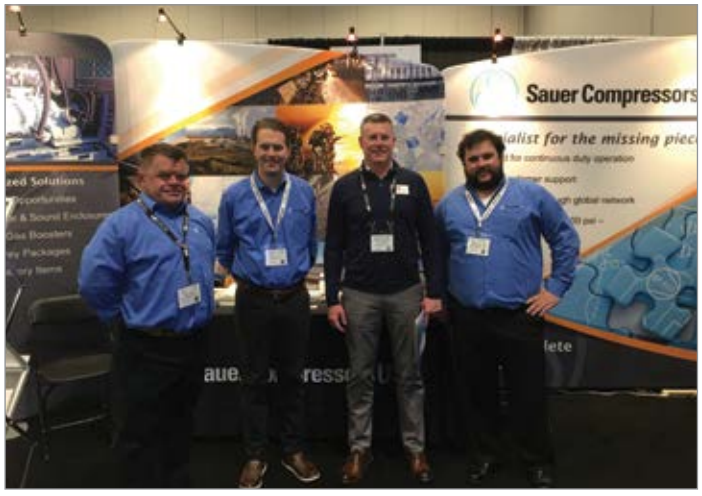
Peter Modrow, Nate Price, John Schmitt, David Andrews and Steve Hill (CompressAir) at the Sullair booth and CAGI Education Committee Chair, Chad Larrabee delivering Opening Remarks at the Best Practices 2021 EXPO & Conference.

The Best Practices 2021 EXPO & Conference, held at the Schaumburg Convention Center near Chicago O'Hare International Airport, will be remembered as a welcome industry reunion – after having been forced to be apart during a time. The EXPO & Conference focuses on "Optimizing On-site Utilities Powering Automation." Experts from all over the world convened to discuss compressed air, pneumatics, motors and drives, vacuum, aeration blower and chiller/cooling and water treatment systems.

Held November 2-4, 2021, this 3rd installment of the event continued to provide continuing education, certification and networking opportunities to equipment sales engineers, engineering firm and manufacturing plant personnel.

The publishers of Compressed Air Best Practices®, Blower & Vacuum Best Practices and Chiller & Cooling Best Practices magazines produced the three-day event. I would personally like to thank our sponsors and exhibitors, speakers, attendees and our Best Practices team members (Patricia Smith, Bill Smith, Kimberly Vickman, Patty Mackey and Clare Lamperski) whose amazingly positive and "can-do" attitude made the event possible.

CEO Bruce McFee (far right) and the Sullivan-Palatek team were glad to see their distributors at the show.



John Temple, Patrick Lamon, Chad Gooding (G3 Industrial Solutions) and Charles Kowalyshyn at the Sauer Compressors booth (left to right).

The Certified Compressed Air System Specialist (CCASS) Exam

We are honored to have the Compressed Air and Gas Institute as the overall event Sponsor. We were pleased to offer CAGI's relatively new Certified Compressed Air System Specialist (CCASS) Exam during the event. This proctored "pass/fail" exam is a part of CAGI's personnel certification program providing a means of verifying the capabilities of professionals in the compressed air industry and for those maintaining/operating compressed air equipment. This exam has its' own fee which folks paid directly to CAGI and our event offers these people a free EXPO pass. We'd like to recognize a sampling of the companies who sent professionals to take the exam.

Robert Haseley, Jenny Oblock, Chad Larrabee and Jan Pingel at the CAGI booth (left to right).

- CASCO USA (a group of sales engineers!)
- WestRock (packaging solutions manufacturer)
- Flow Solutions, Atlas Machine, Arizona Pneumatic, Tunna Industrial

The Conference

Conference registrants gain access to 100% of all the events at the three-day event. The Conference featured over 42 speakers sharing their expertise during Opening & Plenary Sessions, Track 1 on Compressed Reliability, Automation and Efficiency, Track 2: Cooling Systems, Vacuum, Aeration Blowers and Compressed Air Safety, and Compressed Air Challenge Level 1 Training.

Opening Session

CAGI Remarks
Chad Larrabee, Education Committee Chair, Compressed Air & Gas Institute

Compressed Air Monitoring Survival Guide – the Right Sensors at the Right Locations
Pascal Van Putten, CEO, VPInstruments

Innovations in Process Cooling Design
Bert J. Wesley, P.E., Sr. Principal, Industrial Plant Engineering Practice Leader, Woodard & Curran

Digital Innovation for Smart Water, Air and Energy Management
Meredith Englund, VP Water Partnerships, Ecolab & Aviran Yaacov, CEO, Ecoplant

Plenary Session

Improve Production Process Through-Put, Quality and Reliability with Compressed Air Assessments
Tom Taranto, Owner, Data Power Services

Collaborative Artificial Intelligence Drives Energy Conservation to Save California Dairies
Elhay Farkash, CEO, Zira Group

Commitment to a Collaborative Culture Key to Exceeding Sustainability Goals,
Nancy McDonell, CEO, Value of the Person

Three Levels of Compressed Air Systems
John Bilsky, Facilities Specialist for Compressed Air, Purified Water and N2 Systems, Gentex Corporation

Continuing Education at the Best Practices 2021 EXPO & Conference

The Opening & Plenary Sessions are open to all attendees including EXPO-only attendees and exhibitors. Held in "the big room with the stage", the goal is to provide motivation and examples of the way forward for "Best Practices."

The two conference tracks provide a venue for experts to speak and to meet one another. Track 1 focused on Compressed Reliability, Automation and Efficiency while Track 2 zeroed in on Cooling Systems, Vacuum, Aeration Blowers and Compressed Air Safety.

Formal Compressed Air Challenge Level 1 Training was provided by CAC President Steve Briscoe and by Instructor Frank Moskowitz. Attendance was excellent and it was scheduled in the afternoon so participants could attend the morning conference sessions.

TRAINING • EDUCATION • EFFICIENCY
COMPRESSED AIR CHALLENGE

Steve Briscoe
CAC President
& Instructor

Frank Moskowitz
CAC Level 1 and
Level 2 instructor

TRACK 1: Compressed Air Reliability, Automation & Efficiency

MAXIMIZING EFFICIENCY AND RELIABILITY IN COMPRESSED AIR SYSTEMS

Chair: Chad Larrabee, Global Product Management Leader

Maintaining for Reliability
David Sleeman, Aftermarket Sales Manager, FS-Elliot

The Industrial Digital Revolution and Compressed Air: Part 2
Jan Pingel, Product Leader, Digital Solutions, Ingersoll Rand

Centrifugal Control Strategies to Deliver Optimum Efficiency with High Variable Demand
Chris Nacrelli, Business Development Manager, Atlas Copco Compressors

Maximize Energy Savings and Improve the Bottom Line
Chris Knuffman, Business Line Manager, Reciprocating & Rotary Screw Compressors, Quincy Compressor

COMPRESSED AIR SYSTEM AUTOMATION & MEASUREMENT

Chair: Stephen Parry, International Sales Manager, Bay Controls

Selecting the Right Flow Meter is Vital for Compressed Air & Technical Gas Measurements
Pascal Van Putten, CEO, VPInstruments

Robotic Press Automation in Compressed Air Systems
Aviran Yaacov, CEO, Ecoplant

Batteryless Sensors for Vibration Monitoring in Compressed Air Systems
David Wentzloff, Co-CTO & Founder, Everactive

The Future of Compressed Air Control – a Giant Leap Forward
Stephen Parry, International Sales Manager, Bay Controls

COMPRESSED AIR AUDITS AND DEMAND REDUCTION PROJECTS

Chair: Jon Jensen, Energy Conservation Group Manager, SMC Corporation of America

Low Hanging Fruit: Demand Side Projects for Energy Efficiency
Jon Jensen, Energy Conservation Group Manager, SMC Corporation of America

Planning & Performing a Successful Compressed Air Leak Survey Using Ultrasound
Dean Wolever, Regional Manager, UE Systems

ASME EA-4 – 2010 Energy Assessment for Compressed Air Systems
Tom Taranto, Owner, Data Power Services

Compressed Air Challenge Training Today
Steve Briscoe, President, Compressed Air Challenge

IMPLEMENTING TURN-KEY ENERGY SYSTEM INTEGRATION PROJECTS FOR MAXIMUM SUCCESS

Chair: Tim Dugan, Principal Engineer, Compression Engineering Corporation

Definition, Technical Services, Models and Team Players for Successful Turn-key Energy System Integration Projects
Tim Dugan, Principle Engineer, Compression Engineering Corporation

Case Studies of a Small Firm Implementing Complex Compressed Air Piping Projects
Jason DuPriest, Principal Systems Engineer, JD Systems Integration

Case Studies of Turn-key Compressed Air Projects by a Compressor Dealer with an Installation Division
Josh Wamser, President, Industrial Compressor Solutions

Case Studies of Comprehensive Energy Construction Projects
Brandon Adams, Owner, Vector Energy Solutions

TRACK 2: Cooling Systems, Vacuum, Aeration Blowers & Compressed Air Safety

CHILLER & COOLING TOWER PROCESS COOLING OPTIMIZATION

Chair: Tom Stone, National Sales Manager-Industrial, Thermal Care

Industrial, Variable Speed Control – Energy and Water Consumption Savings for Cooling Systems
Tom Stone, National Sales Manager-Industrial, Thermal Care

VFD Motors in Cooling Systems: Shaft Voltage Causes and Effects and Solutions
Tom Hedrick, Engineer, International Commissioning Engineers

Water Efficiency and Evaporative Cooling Systems
Dustin Cohick, Product Manager Water Systems, Evapco

Lessons Learned from Two Cooling System Audits
Tim Dugan, Principal Engineer, Compression Engineering Corporation

SAFE COMPRESSED AIR FOR THE FOOD & BEVERAGE INDUSTRY

Chair: Brian Mann, Air Systems Business Development Manager, Sullair

Factoring in the Sustainability Impact of Oil-Free vs Oil-Injected Compressed Air Systems
Brian Mann, Air Systems Business Development Manager, Sullair

Best Practices for Compressed Air / Process Gas Non-viable & Viable Sampling & Testing
Johnny So, Project Manager, Commissioning Agents

Energy Efficiency through Dew Point Switching for Desiccant Regeneration
Justin Walsh, Application Sales Engineer, Vaisala

Reducing Carbon Footprint Through Sustainable and Intelligent Products
Nathan Eisel, National Product Development Manager, SMC Corporation of America

VACUUM AND AERATION BLOWER SYSTEMS

Chair: Tom Jenkins, President, JenTech

Automated Solutions for Optimizing Aeration Blowers by Properly Using VFD
Bob Kisler, Sales Manager, Gardner Denver

Formulas for Sizing Aeration Blowers
Tom Jenkins, President, JenTech

Fundamentals of Vacuum in the Papermaking Process
Andy Smiltneek, President, Growth Solutions Consultants

Troubleshooting the Paper Machine Vacuum System
Andy Smiltneek, President, Growth Solutions Consultants

SAFETY: COOLING WATER TREATMENT/FILTRATION AND 3-A ACCEPTED PRACTICE RELATED TO COMPRESSED AIR

Chair: Roderick Smith, Publisher, Best Practices Magazines & Expo

Selecting Water Filtration Devices For Your HVAC Process Cooling Loops
Keith Karl, Filtration Product Manager, AquaPhoenix Scientific

Proven Plant-Based Water Treatment Technology Assists Corporate Sustainability Goals
Justin Wihelms, Application Engineer, HW Environmental

Proposed Modifications to 3-A Accepted Practice B-604-05-A Related to Compressed Air in Contact with Food Products and Product Contact Surfaces
Craig Reinhart, Principal, Reinhart Consulting –
Scott Grimes, Technical Training Manager, Donaldson

All attendees were treated to networking events including an Opening Reception and a fun Closing Party, at a local tavern, from which mysteriously the only record we have is from one of the shuttle bus rides back to the hotel (left to right)!

Networking, Knowledge Sharing and New Technology at the EXPO

The EXPO took place during the afternoons of the first two days of the event. EXPO registrants can attend for only $15 and are able to attend the Networking Events, the EXPO, the New Technology EXPO Classroom and participate in the Daily EXPO $1,000 Energy Treasure Hunt RAFFLE!

At the EXPO, BEKO Technologies, a Diamond Sponsor of the event, displayed two DRYPOINT RA refrigerated dryers, a DRYPOINT XC heatless desiccant dryer, CLEARPOINT coalescing and particulate filters, BEKOMAT zero air loss condensate drains, QWIK-PURE and ÖWAMAT oil water separators and more. The second generation DRYPOINT XC heatless desiccant dryer (up to 2,800 scfm, from 80 – 7,250 psig) has a redesigned frame assembly. The new frame design supports both powder-coated vessels independently, so less material is required, decreasing the cost and weight of the unit. Next, the 800 scfm (up to 6,000 scfm) RA VSD Series refrigerated dryer is equipped with vertically-mounted aluminum heat exchangers, as all are BEKO refrigerated dryers. Regional Sales Manager-West Randall Corthouts said, "Because demand in compressed air systems often varies, the RA VSD is intelligently equipped with two VSDs on the scroll compressor and condenser fan to monitor the incoming conditions and adjust to meet the required cooling capacity of the refrigerant in the downstream air/refrigerant heat exchanger."

A show highlight for me occurred when I ran into two long-time magazine readers from a major semiconductor manufacturer located in the southwest. I asked them what they were looking for on the EXPO floor and they answered, "We are looking for new air compressor technologies, the latest leak detectors and for a solution to a compressed air condensate

Josh Borrego and Tilo Fruth, from BEKO Technologies, solving a challenging centrifugal air compressor condensate problem for two EXPO attendees from a major semiconductor manufacturer.

Mike Kinnucane, Nitin Shanbhag and Jeff Crutchfield standing next to the MCHILL-US Series Water Process Chiller at the Mikropor booth (left to right).

Continuing Education at the Best Practices 2021 EXPO & Conference

Darren De Bie, Anthony Yacucci and Jan De Bie at the JORC booth (left to right).

The Altec AIR team announced new compressed air dryer technology coming in the 3rd quarter 2022!

David Sleeman, Luke Gigliotti, Carolyn Rorer, Scott Folsom, Shawn Duwal and Danielle Naser at the FS-Curtis and FS-Elliott booth (left to right).

problem our vendors haven't been able to solve." This last part intrigued me because they are very knowledgeable with compressed air – so I asked for more information and learned something new! I didn't know the intercooler heat exchangers of centrifugals are under negative pressure when off-loaded. The problem is their standard condensate drains, requiring positive pressure, don't work until pressure is restored-but by then the condensate has already been swept downstream.

I knew enough to understand the problem and suggested we visit the BEKO booth where it turned out BEKO Technologies President Tilo Fruth started his career in precisely this area of "custom-engineered drain applications"! I left with the good feeling of knowing my friends from Texas were on their way to their problem being solved at our EXPO. This was a reminder to me that often the most important asset at a trade show booth is the knowledge of the exhibitor.

Mikropor, a leading manufacturer of compressed air treatment systems and atmospheric air filtration solutions, is pleased with the recent growth of its organization. With three hundred new employees joining the team in 2021 (1,100 total), 3.5 million ft^2 of production space at headquarters in Ankara, Turkey, a 200,000 ft^2 facility in Michigan City, IN and other manufacturing operations across the globe, Mikropor anticipates another 35 years of creating "Tomorrow's Technology" since its inception in 1987. Mikropor's portfolio ranges from several refrigerated and desiccant dryer technologies, compressed air and atmospheric filtration, nitrogen generators and more. Mikropor is an active CAGI member, and participant in the CAGI Refrigerated Compressed Air Dryer Performance Verification Program. "We are the exclusive global provider with performance verified ΔP of air treatment – both dryers and filtration, per se. By equipping our dryers with pre- and post-filtration, we can provide the third-party performance verified ΔP of the system to any end customer, auditor or any business requiring efficient and reliable compressed air treatment," said Nitin Shanbhag, President, Mikropor America.

JORC Industrial, a global compressed air condensate management specialist, was celebrating their 30th anniversary and had a significant presence at the show as a Platinum Sponsor. On display at the JORC Industrial booth were its Level Sensed Drains (SMART-GUARD, MAG-11, NUFORS XF), timer drains (COMBO, OPTIMUM, TEC-11, D-LUX-N/O), EPA-Compliant SEPREMIUM 750 Oil-Water Separator (70 cfm up to 2,500 cfm), and more. JORC Industrial's oil-water separators have useful

features like a visual element life indicator that let you know when your elements need replaced and an overflow indicator to avoid messy spills.

Platinum Sponsor, Hertz Kompressoren reported the continued growth of their Charlotte-based U.S. operations. Stephanie Brockman told me they currently have several job openings available needed to support this growth. They were displaying their oil-free multiplex HS Series scroll packages which go up to 50 hp. They then showed me their new WAVE Series 3-stage, air-cooled, direct-drive, reciprocating, high-pressure booster compressor. The range is from 15 to 40 hp and with a pressure rating up to 580 psi.

Platinum Sponsor, PneuTech, prominently displayed their UniPipe aluminum piping system. "Aluminum is the ideal material for compressed air piping, due to its lightweight, low cost and ease of installation. Unipipe is designed to minimize labor costs and ensure leak-free performance for decades of service," said Derrick Taylor, Director of PneuTech USA. Unipipe is available in 13 sizes, from 3/4" to 10". They offer four product options for different pressure ratings and applications, including Unipipe Air (for compressed air systems), Unipipe Nitro (for nitrogen and other inert gases), Unipipe Vac (for vacuum applications), and Unipipe HP (for high-pressure applications exceeding 232 PSI and up to 1015 PSI).

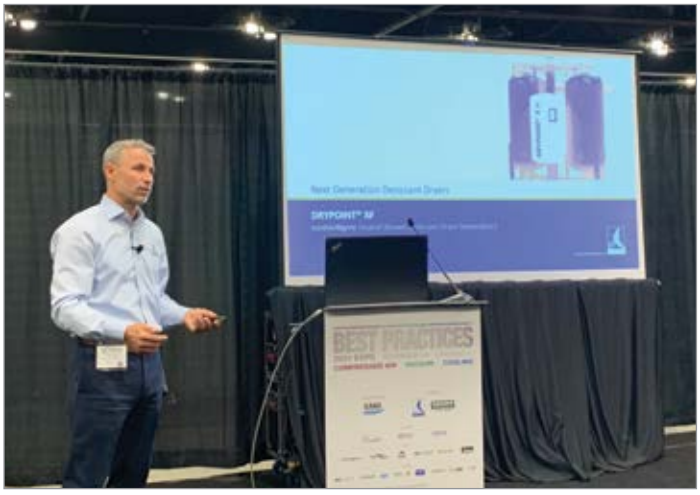
The New Technology EXPO Classroom

EXPO visitors also had the opportunity to wander in and out of the New Technology EXPO Classroom. From 1 to 5:30 pm each day, nine exhibitors

Bob Groendyke, Stephanie Brockman and Mert Alpagut at the HERTZ KOMPRESSOREN booth (left to right).

The PneuTech booth featuring the Unipipe Aluminum Piping System

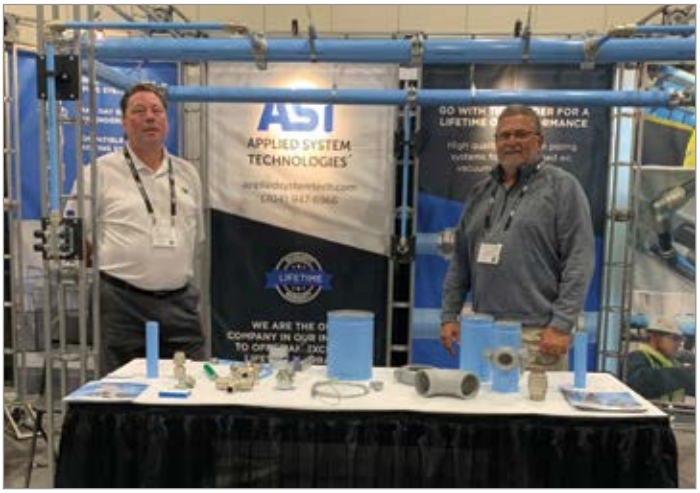
Nicolas De Deken, President, Energair, presenting new air compressor automation technology, at the New Technology EXPO Classroom.



Tilo Fruth, President, BEKO Technologies, introducing new desiccant compressed air dryer products, at the New Technology EXPO Classroom.

Continuing Education at the Best Practices 2021 EXPO & Conference

Jon Jensen, Nathan Eisel, Aleksandr Shmushkin, Scott Minato and Rick Dunlap at the SMC Corporation of America booth (left to right).



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

Mike Rigor and Allie Stanley at the Parker Hannifin booth.

had the opportunity to share their new technologies with EXPO attendees. Technologies featured included centrifugal air compressors, aluminum piping, thermoplastic piping, air compressor automation, air compressor and blower rental equipment, valves, flow metering, closed-loop evaporative systems, ultrasound leak detectors, refrigerated and desiccant dryers, and oil-free scroll air compressors.

New Technology EXPO Classroom Presentations

Saving Energy with the New EcoTurbo and NXHE 2-Stage Air Compressors
Scott Folsom, Director of Channel Development, FS-Curtis and FS-Elliott

Thermoplastic Piping for Use in Building Services Piping
Robert Marsiglia, Commercial Products Sales Manager, Asahi-America

Minimizing Downtime and Maximizing Performance with Airmatics IoT
Nicolas De Deken, President, Energair

Kingston Valves: Safely Protecting People, Processes, and Equipment
Theresa Hinkler, Regional Sales Manager, Kingston Valves

The Features and Benefits of Using Compressed Air Rentals
Jim Riley, Rental Sales Manager, Sauer Compressors USA

VPVision: the Next Level in Energy Management of Factory Utilities-Made Easy!
Pascal van Putten, CEO, VPInstruments

The Advantages of Aluminum Piping for Compressed Air Systems
Derrick Taylor, General Manager, PneuTech

Booster Compressor Sizing & Applications
Jerry Elsen, Sales Manager-Americas, BOGE America

Closed Loop Evaporative Systems
Keith Beatty, Regional Sales Manager, HydroThrift

Selecting the Right Technology for a Low Pressure Rental Project
Scott Werner, Business Development Manager, Aerzen Rental USA

Wireless Technology for Asset Monitoring
Nathan Eisel, National Product Development Manager, SMC Corporation of America

Next Generation Desiccant Dryers and Innovations in Intelligent Industrial Products in 2022
Tilo Fruth, President, BEKO Technologies

Touch-Free Technology-the Difference Between Oil-Free and Free-of-Oil
Hannu Heinonen, Vice President Americas, Tamturbo

See the Sound: Find Compressed Air System Leaks Using Fluke Acoustic Imagers
Aaron Woody, Product Specialist, Fluke

Energy Conservation with Ultrasound – A Hands On Experience
Dean Wolever, Regional Manager, UE Systems

The Advantages of VSD Controlled Refrigerated Dryers
Brian Mann, Air Systems Business Development Manager, Sullair

Oil-free Scroll Air Compressors for High Purity Air
Bob Groendyke, VP General Manager, Hertz Kompressoren USA

Maintenance Free Compressed Air Dryer
Matt Phillis, Regional Sales Manager, Van Air Systems

The Daily EXPO $1,000 Energy Treasure Hunt RAFFLE!

The Daily EXPO $1,000 Energy Treasure Hunt Raffle is designed to reward the people who make Energy Treasure Hunts in manufacturing plants happen! This is why only distributor sales engineers and service technicians, auditors/consultants/engineers and manufacturing plant personnel are eligible for the daily raffle prizes of Visa Gift Cards of (1) $500 and (2) $250. To be eligible, contestants have to visit the Sponsor Booths of the Raffle and get their Treasure Hunt cards stamped. Congratulations go to the following winners in 2021!

Shawn Anderson (Ring Power) and John Bilsky (Gentex), receiving their treasure chests, from Rod Smith, during the Daily EXPO $1,000 Energy Treasure Hunt RAFFLE (left to right)!

- Shawn Anderson, Ring Power Corp.
- John Bilsky, Gentex Corp.
- Clint Hill, National Compressor Services
- Matt Brockman, Atlantic Compressors
- Manuel Elizalde, Tunna Industrial
- Brian Coder, Tate Engineering

Save the Date: Atlanta, October 4-6, 2022!

The event was another success and we are looking forward to seeing everybody again October 4-6, 2022 at the Cobb Galleria Centre Atlanta! The location is in the exciting new area, north of downtown, connected to "The Battery" entertainment zone and the Atlanta Braves ballpark. Please save the date and plan on sending your sales engineers and maintenance staff for continuing education, certification and networking opportunities! For more information please visit https://cabpexpo.com or contact Bill Smith at email: bill@airbestpractices.com BP

COMPRESSED AIR INDUSTRY & TECHNOLOGY NEWS

SPX FLOW to be Acquired by Private Equity Firm

SPX FLOW, Inc., a leading provider of process solutions for the nutrition, health and industrial markets, announced it entered into an agreement to be acquired by an affiliate of Lone Star Funds in an all-cash transaction valued at $3.8 billion, including the assumption of debt. The purchase price represents a premium of nearly 40% over SPX FLOW's closing stock price on July 16, 2021, the last trading day prior to the publication of an article in the July 19, 2021, edition of The Wall Street Journal stating that the Company received an unsolicited purchase offer. "We are pleased to have reached this agreement with Lone Star, which is the result of a comprehensive review of alternatives, including a robust sale process, conducted by our Board in consultation with independent advisors," said Robert F. Hull, Jr., Chairman of the SPX FLOW Board of Directors."

SPX FLOW, www.spxflow.com

Sullair Acquires Compressor-Pump & Service

Sullair, an industry leader in innovative compressed air solutions since 1965, has acquired its Salt Lake City-based distributor, Compressor-Pump & Service. CPS had served as an independent Sullair distributor since 1991, where they've specialized in the sales and service of compressors, blowers, pumps, vacuum pumps and related equipment. "CPS is a loyal and long-time Sullair distributor with a commanding market share," said John Randall, President and CEO of Sullair. "We are committed to providing CPS customers with unwavering and uninterrupted support from Sullair, from the names and personnel to which our customers have grown accustomed." CPS is headquartered in Salt Lake City and is well-positioned to service customers throughout their 83-county territory which spans Utah, Northern, Central & Western Nevada, Southeastern Oregon, Central & Southern Idaho, and Southwestern Wyoming.

Sullair, www.sullair.com

Kaeser M59PE Mobilair Portable Compressor

Available in two models, the M59PE can deliver 135-165 scfm with a pressure range of 150-200 psig or 165-195 scfm with a pressure range of 100-150 psig. The M59PE is perfectly suited for a wide range of applications, and its flexibility makes it ideal for the rental market. "This unit is the next generation in portable compressor technology and increases our range of variable pressure machines in this market," said Chance Chartters, National Sales Manager – Mobilair. The M59PE is designed for reliability, durability, and efficiency in all environments. A German-made Hatz diesel engine meets US Tier 4 Final specifications and provides hours of consistent, high performance operation with the lowest possible emissions. The patented Anti-frost Control automatically adjusts operating temperature based on ambient conditions, and along with the optional tool lubricator, protects tools from freezing.

Kaeser Compressors, https://us.kaeser.com

Aerzen Rental TVS2500 Air Compressor

Aerzen Rental has added a new air compressor for the 10 bar range to its extensive portfolio of rental solutions. The TVS2500 has been specially developed to meet today's high demands and sets standards in terms of power density, energy efficiency and quiet running. By introducing the TVS2500, AERZEN Rental adds a real power package for large volumes to its high-performance TVS series and completes its range of 10 bar rental compressors for the oil-free conveying of air. The TVS2500 is the largest air compressor made by the expert for rental packages to date and is characterized by a robust design, efficient technology, particularly quiet operation and high temperature resistance.

In addition, the new all-rounder meets the highest environmental requirements and makes a significant contribution to the sustainable organization of industrial processes.

Aerzen, www.aerzen.com

COMPRESSED AIR INDUSTRY & TECHNOLOGY NEWS

Ohio Transmission Corp. Acquires Critical Rental Solutions

Ohio Transmission Corporation (OTC), an industrial equipment service provider and distributor headquartered in Columbus, Ohio, announced the acquisition of Critical Rental Solutions, a leading provider of oil-free air and temperature control rental equipment throughout the United States. Critical Rental Solutions will operate under OTC's Air Supply Group. Headquartered in Houston, TX over the last 37 years, Critical Rental Solutions has grown to two sales and field service locations in Texas and has approximately 42 employees. "Having CRS join our robust family of compressor brands and products, will allow OTC to offer best-in-class compressed air solutions to a wide range of end markets throughout North America," said Adam Gibbs, OTC President of Air Supply Group.

Ohio Transmission Corporation, www.otcindustrial.com

JORC Industrial Celebrates 30 Years

JORC Industrial is celebrating its 30th anniversary as the Condensate Management Specialist in the Compressed Air Industry. In 1991, Marc and Joke de Bie founded JORC Industrial, in the garage of their home in the Netherlands. On December 31, 1999, the ownership of JORC Industrial changed to the family's second generation. As a result of dedication and ambition, the company has grown into a global manufacturer and a specialist in compressed air condensate management products. With locations in The Netherlands, USA, Slovenia and China – JORC Industrial serves customers in 110 countries. The JORC organization is designed to ensure top quality compressed air condensate management products at the best possible cost and with the fastest delivery. The ambition, determination, focus and company principles were laid down right from the start.

JORC, www.jorc.com

VPInstruments Releases VPVision 7

VPInstruments is proud to introduce release 7 of the VPVision energy management system. VPVision is the complete real-time energy monitoring solution for all utilities within your company. Real-time energy monitoring is key to energy savings. VPVision is your guiding hand to target energy savings and to improve the performance of your factory. In this newest release 7, the VPVision software has gotten a complete make-over. The modern design offers better navigation, improved stability, and increased performance. The software is more intuitive and self-explanatory, making a user manual almost redundant. Release 7 features many upgrades, including: save time by remote access, quick navigation with linked widgets and the right dashboard for the right job. With these new features, VPVision release 7 brings monitoring of your utilities to the next level.

VPInstruments, www.vpinstruments.com

SONOTEC SONASCREEN Acoustic Camera

SONOTEC, the ultrasonic specialists based in Halle, Germany have expanded their product range with the new acoustic camera SONASCREEN. The camera generates acoustic images from both the audible and ultrasound frequency range. The device enables maintenance teams to quickly locate leaks in compressed air and vacuum systems. By introducing the new industrial imager, SONOTEC provides a supplementary device for predictive maintenance and energy auditing to ensure operational reliability and energy efficiency. The SONASCREEN is offered at an affordable price to make it available to a broad range of customers and their applications. The new acoustic camera localizes sound sources and visualizes complex acoustic information in different colors. The device extends the vision to areas the eye cannot see. This is enabled by the method called beamforming where the position of sources in wave fields, such as ultrasound fields, is determined.

SONOTEC, www.sonotec.eu

CHILLER & COOLING INDUSTRY & TECHNOLOGY NEWS

Oil-Free Water-Cooled Centrifugal Chiller

Carrier unveiled its innovative new AquaEdge 19MV oil-free water-cooled centrifugal chiller designed to deliver reliable performance, incredible efficiency, easy installation and a wide operating range. With capacity from 300 to 700 tons, the AquaEdge 19MV combines best-in-segment efficiency for design and the ability to operate at severe conditions due to unexpected building operation or extreme weather. The AquaEdge 19MV leverages proven EquiDrive two-stage back-to-back compressor technology, now with magnetic bearings, to achieve best-in-segment performance while staying quiet and cool under pressure. This revolutionary EquiDrive compression and drive train technology provides expanded operating range while improving chiller energy efficiency and building resiliency for specifying engineers, building owners and facility managers.

Carrier, www.carrier.com

SPX Acquires Cincinnati Fan

SPX Corporation announced that it has completed the acquisition of Cincinnati Fan & Ventilator Co., Inc., a leader in engineered air quality solutions, including blowers and critical exhaust systems. Under the terms of the purchase agreement, a subsidiary of SPX merged into Cincinnati Fan for consideration of $145 million in cash, which includes consideration for the estimated value of certain tax assets associated with the acquisition. SPX currently anticipates revenue from Cincinnati Fan in a range of $60-70 million in 2022. Once fully integrated, SPX anticipates that the acquisition will be accretive to its HVAC segment margin.

SPX Corporation, www.spx.com

Digital Indoor Environmental Quality Management Solutions

Trane is introducing new digital indoor environmental quality management solutions that provide building owners and facility managers with actionable insights for healthier and more efficient indoor spaces and occupants' peace of mind. The integrated solutions work seamlessly with smart sensing technologies such as Awair Omni indoor air quality monitoring devices that measure airborne contaminants, including particulate matter, volatile organic compounds and carbon dioxide that can impact wellbeing, comfort and productivity. The data-driven insights also support smarter energy usage and air quality monitoring requirements for building certifications, including WELL, LEED, RESET and Fitwel. Trane's new Indoor Air Quality dashboard then brings the data to life, enabling building owners and facility managers to monitor, manage and share more information about the indoor air quality within the building.

Trane Technologies, www.tranetechnologies.com

HVACR Educator Resources Platform

Emerson has launched its first HVACR Educator Resource platform designed to provide industry educators with access to tools, training and educational materials to enhance learning for the next generation of HVACR professionals. The HVACR Educator Resource site includes additional training tools, student learning materials and educator trainings. For those who register, there are exclusive HVACR educational tools and curriculum for educators that offers training kits, causes and prevention of compressor failure curriculum, a compressor multiples technology E-learning module and HVACR career recruitment materials. Within the site, there is a wide range of educational features including a Copeland scroll compressor training kit. This kit offers a detailed look inside a scroll compressor, through a torn-down model from Emerson's state-of-the-art lab, offering a hands-on approach to learning the fundamentals of compression technology.

Emerson, www.emerson.com

CHILLER & COOLING INDUSTRY & TECHNOLOGY NEWS

Tire Valve Manufacturer Uses Chase Chillers

Chase Cooling Systems values the individuality of each of its customers. Recently, Chase Cooling Systems assisted a leading tire valve manufacturer in establishing consistent cooling in their new facility. During the manufacturing process, the product may be subject to very high temperatures, mostly centered in the brazing furnaces. To provide cooling to brazing furnaces, the facility chose to use a unit from the CWE series. The chiller provides chilled water at 55°F temperature to the cooling tunnels immediately following the three brazing furnaces. These cooling tunnels have a combined heat load of 150,000 Btu/h. Fortunately, the CWE068 under these conditions has a cooling capacity of 180,000 Btu/h, easily meeting the current heat load and providing room for increased demand. A properly sized system is crucial to system success. Though it may be tempting to vastly oversize the system, that will only cause problems in the future. Proper system sizing is key to the long-term success of the cooling system.

Chase Cooling System, www.chasechillers.com

Nidec Expands U.S. Motors Production

Nidec Global Appliance has initiated a substantial production capacity expansion. The additional capacity will support variable speed motors under the U.S. Motors and Rescue brands, focused on heating, ventilation and air conditioning systems. The investment of approximately $18 million USD will increase production capacity by 1.5 million units per year. The capacity expansion supports 48 frame variable speed motors for HVAC systems. It includes the U.S. Motors lines SelecTech, PerfectSpeed, EcoTech and EcoApex48, and the RESCUE line of replacement motors. These products drive the fans and blowers that move air throughout ventilation and temperature control systems. Variable speed technology can regulate the motor velocity according to the HVAC system's demand, which makes it highly energy efficient. The energy savings that can be achieved by 1.5 million variable speed motors, compared to legacy motors, represent 600 GWh per year.

Nidec Global Appliance, www.nidec.com

Medium-Voltage Drive

Danfoss has expanded its medium voltage drives product portfolio with the new VACON 1000 medium-voltage drive. Based on Danfoss' unsurpassed experience in advanced AC drive technologies, the VACON 1000 air-cooled MV drive is the preferred choice for industrial medium voltage general purpose applications, especially for variable torque loads such as pumps and fans. Available in voltages from 2.4 kV up to 11 kV, the VACON 1000 offers the smallest footprint in the medium voltage drive industry below 215 A for an air-cooled MV drive. Its stand-alone design allows for simple and safe installation and fast commissioning, while its modular design ensures easy spare parts management and maintenance. Well-equipped basic configuration can be extended with a wide range of options. Built for reliability, the VACON 1000 features a high MTBF that enables up to 200,000 hours of non-stop operation, detailed fault monitoring for reduced downtime and a redundant cooling fan option that reduces downtime due to potential fan failures.

Danfoss, www.danfoss.com

Modine Names GM, Global Refrigeration & Industrial Coolers

Modine Manufacturing Company announced that Mario Signorini has been appointed General Manager, Global Refrigeration & Industrial Coolers. In this role, Mr. Signorini will lead the Company's Coolers business and will report to Adrian I. Peace, Vice President, Commercial and Industrial Solutions. Modine produces evaporator unit coolers, remote condensers, gas coolers, and dry and brine coolers for the commercial and industrial refrigeration market under the ECO brand name and industrial heat transfer products such as transformer oil coolers, air unit heaters and motor and generator coolers under the COILTECH brand name. Mr. Signorini most recently served as the Vice President Global Non-Nuclear Sales at Westinghouse Electric Company and as President and Chief Executive Officer of Mangiarotti SpA, a subsidiary of Westinghouse Electric

Modine Manufacturing Company, www.modine.com

COMPRESSED AIR

BEST PRACTICES

airbestpractices.com

FREE SUBSCRIPTION

DIGITAL EDITION FREE WORLDWIDE | PRINT EDITION FREE TO U.S. SUBSCRIBERS

2022 FOCUS INDUSTRIES!

Reliability • Food Processing • Plastics • Food Packaging • Compressed Air System Assessments • Nitrogen Generation
Food & Beverage Packaging • Automotive Tiers 1 & 2 • Power, Pressure & Flow Measurement • Air Quality & Safety • IoT & Industry 4.0

The Magazine for Safety, Quality & Reliability in Energy-Efficient Compressed Air Systems

Compressed Air Best Practices® is part of a family of magazines dedicated to **Safe, Quality and Reliable Systems Powering Automation.** The U.S. Department of Energy estimates compressed air represents 30% of industrial energy use. Each issue features expert articles on how to conduct **Best Practice System Assessments** to reduce energy consumption while enhancing **Quality, Safety and Reliability.**

"Some of our plants have created Air Strike Teams to focus on compressed air, particularly compressed air leaks. The teams have purchased ultrasonic leak detectors, and we expect these will help us with our Energy Treasure Hunts."

— Michael Jones, Director of Corporate Energy, Intertape Polymer Group

"We have had supply-side compressed air audits performed, within the last three years at around forty percent of our plants. Generally, we are looking for a ten to fifteen percent energy savings from most of the projects we identify and execute."

— Daniel K. Pemberton, Corporate Project Engineer, Berry Global

Subscribe Now!

To subscribe visit **airbestpractices.com**

THE MARKETPLACE

TECHNOLOGY & JOBS

Job & Product Marketplace Advertising Information

Reach 16,200+ readers of Compressed Air Best Practices® Magazine with Marketplace Ads every month! Job Marketplace ads are also placed for one month on www.airbestpractices.com and promoted in our three monthly e-newsletters.

Ad dimensions are 2.36" wide x 3.91" tall. We can help you design the ads. Send us your logo, product photo, and text to rod@airbestpractices.com. We recommend 20-50 total words of text.

Prices are $625 per Job or Product Marketplace Ad ($440 if 6 or more ads are placed). Contact Rod Smith at rod@airbestpractices.com to schedule your Marketplace Ads.

COMPRESSED AIR BEST PRACTICES®
www.airbestpractices.com

ADVERTISER INDEX

Company	Page	Web Site
Kaeser Compressors	Outside Back Cover	https://us.kaeser.com/cabp
Atlas Copco	Inside Front Cover	www.atlascopco.com/air-usa
BEKO Technologies	Inside Back Cover	www.bekousa.com
Mikropor	5	www.mikroporamerica.com
Sullair	7	www.sullair.com
Compressed Air and Gas Institute	8	www.cagi.org/personnel-certification
Tamturbo	9	www.tamturbo.com
CDI Meters	11	www.cdimeters.com
Clean Resources	13	www.cleanresources.com
Best Practices 2022 EXPO	14, 20, 43	https://cabpexpo.com/
Altec AIR	15	www.AltecAIR.com
Anest Iwata	17	www.anestiwata.com
Applied System Technologies	19	www.appliedsystemtech.com
Sahara Air Products	21	www.saharahenderson.com
Compressed Air Challenge	23	www.compressedairchallenge.org
Evapco	25	www.evapco.com
Best Practices Webinars	29, 35	www.airbestpractices.com/magazines.webinars
Cx Energy	33	www.CxEnergy.com

Advertising/Editorial Rod Smith • rod@airbestpractices.com • Tel: 412-980-9901
Subscriptions Administration Patricia Smith • patricia@airbestpractices.com • Tel: 412-980-9902
A Publication of Smith Onandia Communications LLC
37 McMurray Rd., Suite 104, Pittsburgh, PA 15241

THE MARKETPLACE

TECHNOLOGY & JOBS

WE HAVE OPTIONS!

With all new energy saving controller systems

XCp the premium dryer with BEKOTOUCH
- Industrial PLC with 3.8" HMI
- Animated P&ID

Available options:
- Outdoor package with freeze protection
- Dew point monitoring/demand
- Low dew point performance
- Stainless steel tubing
- MODBUS communications

XCe the economic dryer with basic controller
- Compressor sync
- Maintenance alarm
- Status LED
- High quality angle body valves

DRYPOINT® XC heatless desiccant dryers offer a convincing, economic solution to the problem: **BEKO TECHNOLOGIES** has developed an adsorption dryer design that is focused completely on reducing energy consumption. By significantly reducing pressure drops and using the most energy efficient components possible, energy savings of up to 80% can be realized when compared to conventional designs. The energy savings alone offer a complete economic payback after an average of only three years.

+1 (800) 235-6797 www.bekousa.com

Truth in Compressed Air
Reliable | Efficient | Innovative

BEKO

Had Enough?

If you're tired of oil-free compressor equipment, service and support that's more trouble than it's worth, it's time to take action.

With their Built for a lifetime engineering, our 2-stage oil-free rotary screw compressors deliver the best combination of efficiency and reliability.

- Flows from 192 to 1,774 cfm
- Pressures from 45 to 145 psig
- Designed for lower service costs and more uptime
- Fixed or variable speed models available
- Excellent specific performance (kW/100 cfm)
- Integrated refrigerated and heat-of-compression dryer options
- Advanced control and monitoring
- Heat recovery-ready

Learn more about how Kaeser's fresh take on oil-free design reduces downtime and increases your productivity. Visit us.kaeser.com/cabp.

Where innovation meets reliability.

KAESER COMPRESSORS®

Built for a lifetime.

Kaeser Compressors, Inc. • (866) 516-6888 • us.kaeser.com/cabp