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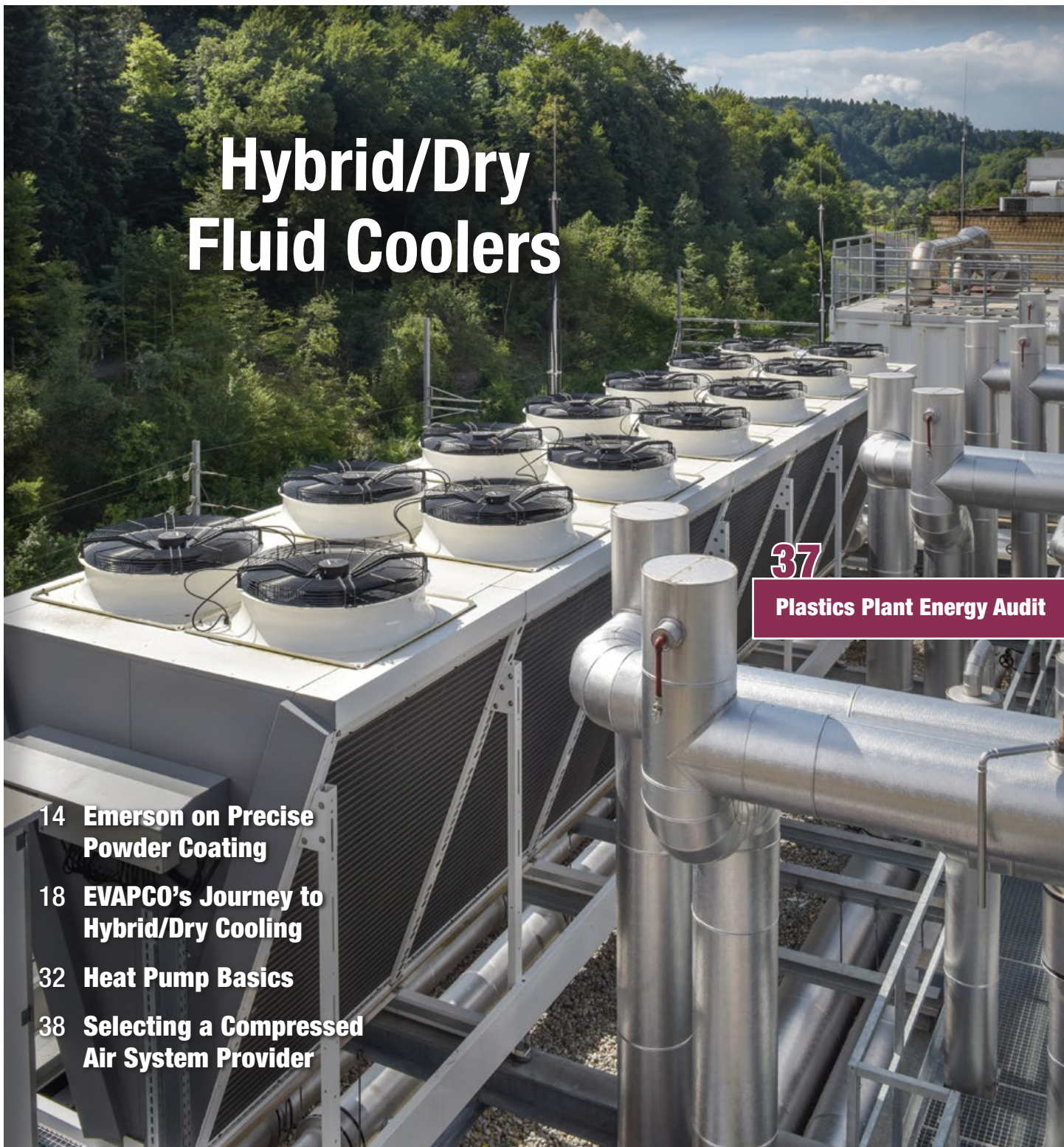
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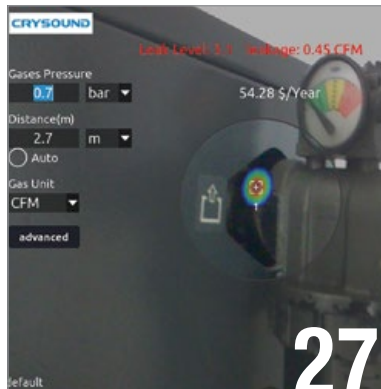


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FROM THE EDITOR



Skate Where the Puck Is Going to Be

We're honored, this month, to bring you a feature on EVAPCO's journey to bring hybrid and dry fluid cooling technologies to market. Chad Nagle, Senior Vice President HVAC IP Sales and Marketing, EVAPCO, sat down with us, and Associate Content Manager Bill Smith led the interview.

EVAPCO's story isn't about reacting to market demands, but anticipating them: Skating to where the puck is going to be, to use Wayne Gretzky's saying, which Nagle mentioned in our interview. EVAPCO needed to have low- or no-water cooling options ready when its largest customers demanded them, and that meant starting the process a decade ahead of time.

Preparation is key. That's true for EVAPCO, and it's true for Abundant Air Compressor of Springfield, MO, as well. Our feature on Abundant Air Compressor highlights work Owner Richard Compton did for a local auto repair chain. Compton wins customers with his dedication and well-stocked truck, which is ready for any emergency.

In fact, preparation is all over this issue. Paul Edwards and Mauricio Uribe of Compressed Air Consultants offer four tips for selecting a compressed air service provider. It's good information to have before purchasing an air compressor. Ron Marshall of Marshall Compressed Air Consulting presents an audit from a plastics plant showing how careful preparation and planning – in this case, placing a variable speed drive air compressor where it runs in its most efficient range – saves thousands of dollars per year.

Here at *Best Practices*, we're preparing for the coming year, where we plan to report on more of the compressed air, chiller and cooling worlds than ever before. Our columns Readers From Around the World and the newly renamed Real-World Installations & Maintenance highlight content sent in from our readers. Longer features tell stories from companies of all sizes. Whether you work at an industrial plant, engineering company or distributor or rep firm, we want to hear from you. Share your experiences with us so we can all learn where the puck is going next.

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Readers From Around the World

We salute all Best Practices Magazine Subscribers from around the world who own, operate, maintain, engineer and provide expertise for the on-site utilities (compressed air, nitrogen generation, vacuum, blowers, chillers, cooling towers and pumps) powering modern plant automation. This subscriber-driven monthly column hopes to build community and recognize all subscribers!



Our Associate Content Manager Bill Smith caught up with the readers at left and below while attending EVAPCO's EVAPCollege in June. To the left are Jesse Folk and James Lynch of Mechanical Resource Group (left to right), an HVAC sales and service specialist in Nashville, TN. Folk is a Project Operations Manager and a First Sergeant in the Tennessee National Guard. Lynch is an Account Manager and a Navy veteran with six years of active duty. A special shoutout to Mechanical Resource Group for knowing the value of military experience. Visit <https://www.mechanicalresource.com>.

Below are Dexter Vines of Dowdy & Associates, Chris Cimino of Hoffman & Hoffman and Cameron Fisher of Fluid Equipment Solutions of New England (left to right). Vines is a Sales and Marketing Executive in Birmingham, AL, Cimino a Sales Engineer in Wilmington, NC, and Fisher a Sales Engineer in Amesbury, MA. Visit <https://dowdyandassociates.com>, <https://www.hoffman-hoffman.com> and <http://www.fesone.com>.



C.H. Reed has expertise in compressed air systems, paint and powder finishing systems, and fluid handling and process equipment. It's based in Hanover, PA, with locations across the northeast and mid-Atlantic. We snapped this team photo during a recent visit. James Rogers (top left in the doorway) is retiring soon and we'd like to congratulate him on an amazing career. Visit <https://www.chreed.com>.



Submission Guidelines

We invite our subscribers to send in pictures so we can see the people who read our Best Practices magazines! Those holding a recent magazine issue will receive first consideration. Please send a high-resolution picture as a JPG or PDF file and a note describing the team and company to Troy Dreier at troy@airbestpractices.com.

Compressed Air Technology & Industry News

Atlas Copco Compressors Appoints Sanjeev Sharma as President and General Manager

Atlas Copco appointed Sanjeev Sharma as President and General Manager of Atlas Copco Compressors. Sharma is succeeding Robert Eshleman who has decided to retire after 38 years of service within the Atlas Copco Group.



Sanjeev Sharma, President and General Manager, Atlas Copco Compressors

In his new position, Sharma will oversee Atlas Copco Compressors' customer center in the United States and will be responsible for all Atlas Copco Compressors sales, marketing and service operations. "Sanjeev has experience in the compressor industry and brings over 28 years of experience in various management positions with Atlas Copco," said Philippe Ernens, President, Compressor Technique Business Area. "We're excited to have his expertise, experience and leadership as he transitions into the role of President and General Manager of the U.S. Customer Center."

Sharma is currently the Regional General Manager of Atlas Copco Middle East. Prior to that, he served as the General Manager of Atlas Copco Philippines, Vice President of Marketing – East in the Industrial Air Division, Global Product Marketing Manager – Screw Compressors at Atlas Copco Airpower in Antwerp, Belgium, Business Manager for oil and gas at Atlas Copco Middle East and Application and Sales Engineer – Turbo Compressors at Atlas Copco UK. Sharma completed his undergraduate studies in engineering at Liverpool University and his master's degree in business administration at Cardiff Business School – University of Wales, UK.

About Atlas Copco Compressors

Atlas Copco Compressors is part of the Compressor Technique Business Area, headquartered in Rock Hill, South Carolina. Atlas Copco Compressors provides innovative solutions including world-class compressors, vacuum pumps, air blowers, quality air products and gas generation systems, all backed with full service, remote monitoring and

auditing services. With a nationwide service and distribution network, Atlas Copco Compressors is your local, national and global partner for all your compressed air needs. For more information, visit <https://www.atlascopco.com/en-us/compressors>.

Gardner Denver Unveils PureAir T/TVS 90-355 kW Series

Gardner Denver is pleased to announce the launch of the new PureAir T/TVS 90-355 kW Series. Continuing a 160-year legacy of innovation, this latest series upholds the company's unwavering commitment to delivering cutting-edge, highly efficient and reliable oil-free air compressors.

Key features of the PureAir T/TVS Series include:

- Class 0: 100% oil free: Ensuring clean, uncontaminated air for critical applications.
- GD Governor™ Controller: Offers precision control and monitoring, providing peace of mind.
- RotorArmor™ airend coating: Enhances efficiency and extends the life of the airend.

- Quiet enclosure with compact footprint: Reduces sound levels and floor space requirements.
- Up to 131°F (55°C) operation: Built for harsher environments.

The PureAir T/TVS Series fixed and variable speed rotary screw air compressors are designed with several features that enhance their efficiency and reliability. At the heart of the Gardner Denver PureAir compressor is a rotary screw airend with optimized design in order to provide high efficiency. Another way to reduce energy costs is by using a variable speed compressor for operations that require varying air demands. This can easily save up to 25% energy (compared to a fixed speed air compressor) by using just the right amount of energy required to do the job and no more.

About Gardner Denver

Gardner Denver offers a wide array of compressors, blowers and vacuum products for various industries worldwide, along with a full range of aftermarket services. Established in 1859, the company has a global presence supported by thousands of employees and dedicated channel partners. For more information, visit <https://www.gardnerdenver.com>.



Gardner Denver has launched the next generation of PureAir T/TVS Series oil-free compressors.



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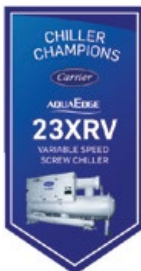
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*Select Models

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carrier.com/19MV

Compressed Air Technology & Industry News

FS-Elliott Launches P650 Centrifugal Air Compressor

FS-Elliott is proud to introduce the P650, the newest member of the Polaris Line. Like all FS-Elliott's centrifugal air compressors, the P650 delivers ISO 8573-1 Class 0, oil-free air to power your operations.

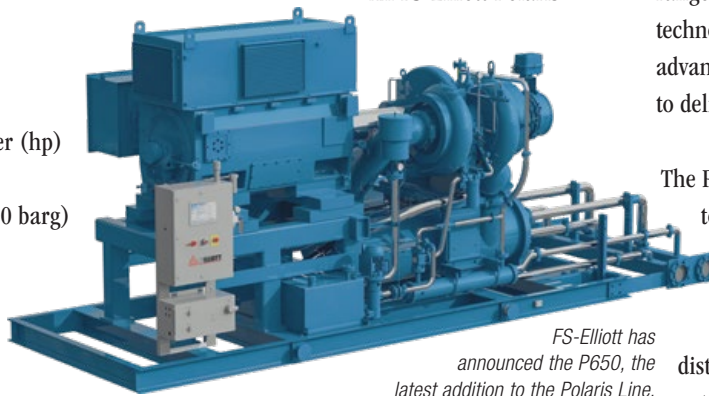
Product range information:

- Flow: 5,000-10,140 cfm (8,840-17,280 m³/hr)
- Power: 700-2,000 horsepower (hp) (500-1,500 kW)
- Pressure: 32-145 psig (2.2-10 barg)

The P650 features the latest aerodynamic designs to optimize performance

and efficiency, saving on energy costs and reducing your carbon footprint. Available Regulus control systems feature powerful PLC controllers and large touchscreen color HMIs that make operation simple and straight forward while using the latest control philosophies for reliable, efficient operation.

All FS-Elliott Polaris



FS-Elliott has announced the P650, the latest addition to the Polaris Line.

Compressors are backed by an industry leading, two-year full package warranty along with the company's SteadAir five-year airend warranty.

Backed by FS-Elliott's 60 years of experience, the state-of-the-art aerodynamic design of the P650 boosts high-stage efficiency across a wide range of turndown and supports HOC drying technology for system energy savings. The latest advances in centrifugal controls also contribute to delivering maximum energy savings.

The P650 features a removable airend design to make field replacements extremely simple as well as horizontally split airend components to allow for inspection and maintenance without disturbing air piping. The suite of control options available provide a large color HMI and various easy-to-use control modes to suit customer needs.

"The P650 is designed to deliver reliable, efficient compressed air to customers so they can focus on maximizing their productivity," said Michael Wik, Director of Product Management, FS-Elliott. "The P650 is unmatched in aerodynamic performance, reliability and ease of maintenance, resulting in providing the lowest cost of ownership for compressed air. We know this new addition to the Polaris line will continue to make FS-Elliott a market leader for centrifugal compression technology."

About FS-Elliott

FS-Elliott is a global leader in the engineering and manufacturing of oil-free, centrifugal compressors, with operations in over 90 countries. For 60 years, FS-Elliott has combined commitment to quality with advanced technology so our customers can increase their productivity and lower system operating costs. For more information, visit <https://www.fs-elliott.com>.

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Sauer Compressors USA Names Business Development Managers

Sauer Compressors USA, an affiliate of J.P. Sauer & Sohn, has enhanced the structure of its sales team to include three new business development positions to assist with developing key markets and products.

Joshua Peter, a seasoned professional with over 13 years of experience at Sauer Compressors USA, has been appointed as the Naval Business Development Manager. His extensive knowledge and leadership skills will be instrumental in driving growth in the naval sector.

Jonathan Parmet has joined Sauer Compressors USA's team as the Commercial Shipping Business Development Manager. Parmet will

spearhead efforts to expand Sauer Compressors USA's presence and market share within the commercial shipping industry in this strategic role. Parmet brings over a decade of experience in business development and sales within the maritime sector.

Paul Frank has been promoted to the position of HAUG Business Development Manager. In this role, Frank will lead the company's efforts to expand and enhance its HAUG oil-free and gas-tight compressor solutions, driving growth and innovation within this critical segment.



Joshua Peter, Naval Business Development Manager; Jonathan Parmet, Commercial Shipping Business Development Manager; Paul Frank, HAUG Business Development Manager (from left to right)





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Compressed Air Technology & Industry News

Frank has been with Sauer Compressors USA for over 15 years, during which he has consistently demonstrated exceptional leadership, technical acumen and a commitment to customer satisfaction.

Don Eaton, President and CEO of Sauer Compressors USA, expressed the company's confidence in the newly appointed Business Development Managers. He said, "We are thrilled to announce the appointments of these exceptional individuals within the Sauer Compressors USA family. Their diverse backgrounds and extensive experience will undoubtedly enhance our capabilities and strengthen our position as a leader in high-pressure air and gas compressor solutions.

We are confident that their contributions will be instrumental in advancing our mission to deliver innovative, reliable and high-quality solutions to our customers."

About Sauer Compressors USA

Sauer Compressors USA specializes in manufacturing medium and high-pressure air and gas compressors for naval, commercial maritime, offshore, research and development and demanding industrial applications. In addition to air, Sauer Compressors are saturated in the CNG, N₂, He, H, CO₂ and inert gas markets. Sauer Compressors USA, located in Stevensville, MD, is an affiliate of J.P. Sauer & Sohn, headquartered in Kiel, Germany. For more information, visit <https://www.sauerusa.com>.

Ireland-based Powerflow Opens North America Operations

Ireland-based Powerflow Electronics, a global leader in compressor condensate drains, electronic controls and automation equipment, has announced the expansion of its operations into North America. The opening of a new facility in Michigan City, IN, marks a significant milestone in the company's 40-year history of pioneering innovation and manufacturing excellence.



John J. Power, President and Fergal Power, CEO

Since John Power founded Powerflow in 1982, he has been at the forefront of engineering innovation and manufacturing automated solutions including automatic drains for the compressed air and gas industry.

Innovation is the heart of Powerflow. From introducing the original timer controlled solenoid drains to developing the first electronic zero-loss drains, Powerflow has established a strong reputation as the world leader in condensate management, intelligent electronic controls and industrial automation.

"Powerflow's North America facility signifies our commitment to meet the growing demands of our long-time customers there and continue to serve them," said Fergal Power, CEO,

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Compressed Air Technology & Industry News

Powerflow Electronics. “Our USA facility will provide a strategic base for us to extend the reach of our industry-leading products and services. Our continued focus is to support our long-standing partnerships, deepen technical collaborations and build new customer relationships in the region.”

Powerflow’s robust portfolio also includes electronic controls for industrial filtration, baghouse filters, irrigation, agriculture, wastewater treatment and many other pulse-type operations. These products have earned the company the status of the supplier of choice for the world’s leading OEMs.

Mark McCullagh, Vice President of Global Business Development, said, “This expansion

is not only a testament to Powerflow’s continuing growth but also to the commitment to innovation and pioneering solutions for our customers. We are ready to steer this new chapter of operational growth and customer engagement.”

Powerflow has served customers in North America, and globally, for decades and the new USA office underscores its ambition to build on 40 years of manufacturing excellence. The company proudly maintains joint venture and private-label arrangements with leading OEM companies across many industry sectors. Powerflow is proud of its long-time market partnership with Clean Resources, a leading supplier of oil water separators and condensate management solutions. Clean

Resources is committed to serving compressed air distributors and service teams across North America.

About Powerflow

Powerflow Electronics specializes in electrical, electronic and electro-mechanical control and automation products. With over 40 years of experience, Powerflow provides precision-engineered and energy-saving solutions to OEMs and SMEs in over 90 countries worldwide. Powerflow is a world leader in compressed air condensate management and industrial automation. For more information, visit <https://powerflowelectronics.com>.

Hitachi Global Air Power US Expands Sullair DS Series

Hitachi Global Air Power US announced the expansion of its oil free air compressor lineup with the introduction of the Sullair DS Series 280-450kW industrial rotary screw air compressors.

“We’re broadening our oil free compressed air business in response to customer need,” said John Randall, President and CEO, Hitachi Global Air Power. “We offer advanced, proven technology in the oil free compressed air space where we have seen demand accelerate. Expanding our oil free offerings to include higher power ranges enables us to offer more solutions for our customers while delivering the same reliability and durability our Sullair compressors are known for.”

The Sullair DS 280-450 Series is engineered with efficiency and convenience in mind. It features a compact, high efficiency two-stage air end with carbon steel rotors and a patented blend of PTFE rotor coating with a PSA topcoat. Multiple removable door panels and easily accessible maintenance components simplify servicing, while an intuitive 10-inch color

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touchscreen controller provides integrated graphing and performance data at a glance. Additionally, all units come equipped with AirLinx® remote monitoring capabilities, offering real-time notifications for service alerts, temperature monitoring and more.

“We’ve been in the oil free compressed air business for a long time – nearly 50 years – so we have a lot of experience building reliable and durable solutions in this space,” said Bob Lord, Senior Product Manager, Hitachi Global Air Power. “Class 0 oil free air is critical for industries like food and beverage manufacturing and robotics, where contamination must be avoided at all costs. We’re thrilled to add to our reputation as a market leader in oil free compressed

air solutions with this exciting expansion.”

About Hitachi Global Air Power US

Headquartered in Michigan City, Indiana, Hitachi Global Air Power’s compressed air solutions power manufacturing operations all around the globe, from food and beverage to pharmaceuticals and computer chips. As part of Hitachi Industrial Equipment Systems, Hitachi Global Air Power operates ISO 9001 certified factories in Michigan City, Indiana and Suzhou, China, and sales offices strategically located in Europe, Australia, Southeast Asia, and South and Latin America. Through brands Hitachi, Sullair and



Hitachi Global Air Power has announced the expansion of its oil free air compressor lineup with Sullair DS280-450.

Champion (Australia), its machines have provided legendary reliability, durability and performance for more than 57 years. For more information, visit <https://www.hitachiglobalairpower.com>.

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Achieving Precise Powder Coating Control and Greater Productivity

Sames Kremlin partnered with Emerson to optimize compressed air flow in its powder coating machines

By Sumit Kapde, Global Business Development Manager, Robotics and Proportional Valves, Emerson

► Powder coating is a dry finishing technique that offers a more durable and environmentally friendly alternative to traditional liquid paint. It's primarily used in automotive and appliance manufacturing. To achieve an even finish while minimizing material waste, it's important powder coating machines feature a precise compressed air flow.

Sames Kremlin has developed powder coating solutions for high productivity since 1960. The global company recently partnered with Emerson to optimize the flow of compressed air with minimum reaction time for its powder coating machines. Through expert engineering support, Emerson helped Sames develop a valve block solution using ASCO™ 202 Preciflow proportional valves and AVENTICS™ manual regulators that provide uniform coating thickness and greater transfer efficiency while minimizing overspray and material waste.

Engineering a Valve Block with Optimal Control

In automotive applications, powder coating is applied to wheels, frames, trim pieces,

engine components and other car parts for a durable, chip-resistant finish. In appliance manufacturing, powder coating is used on washing machines, dryers, refrigerators, dishwashers and other appliances due to its excellent resistance to scratches, corrosion and heat. Achieving a level powder coating application requires high-performance equipment with optimal control.

Sames Kremlin spray guns, pumps and atomizers are designed to deliver an optimal powder coating application. These tools include sophisticated control systems with fast proportional valves and compact blocks, electrical systems and air flow settings to manage the air pressure carrying

the powder, ensuring proper delivery and minimizing overspray.

When building powder coating solutions, it can be a challenge to optimize compressed airflow with minimum reaction time. Without this level of control, the coating thickness may not be uniform and transfer efficiency – the amount of powder adhering to the object being sprayed – may be low. The resulting overspray can waste powder material.

The control of a powder coating machine – and the quality and efficiency of the application – depends on the performance of the valve block. This is why the design team at Sames Kremlin came to Emerson with specific goals when developing a valve block for its powder coating machine.

It wanted a compact valve block with optimum control that could achieve high transfer efficiency to minimize overspray of powder, as well as uniform coating thickness to minimize coating defects.



An AVENTICS™ manual regulator

It's important to understand how poor valve control affects coating thickness and transfer efficiency. In a valve block, the proportional valve acts like a conductor for the powder. It receives an electronic signal from the control panel and adjusts the opening accordingly. When an operator activates a powder coating machine, a compressed air stream carries the electrostatically charged powder particles toward the object being coated. This allows for precise control over the amount of powder flowing into the spray gun.

If the air flow is poor, it results in uneven flow and slow or sluggish air. Uneven flow can lead to areas with too much or too little powder, resulting in an inconsistent coating thickness. A thin and uneven coating offers less protection, while a thick coat can be wasteful and prone to defects like dripping or sagging. Slow or sluggish air may not carry the powder particles effectively, causing them to fall short or drift off course. This reduces transfer efficiency and increases waste.

Precise airflow control can help minimize overspray, reducing material waste and lowering overall coating costs. A well-directed air stream focuses powder on the object, minimizing the chance of it drifting off as overspray. Additionally, minimizing reaction time in the airflow control system allows for quicker adjustments to maintain consistent air pressure and prevent imperfections.

A few factors cause overspray, including longer response time in the proportional valve flow, pressure change requirements, inaccurate pressure adjustments into the valve blocks and incorrect voltage of the machine that charges the powder material, as well as the distance and angle of the spray gun to the work piece.

One requirement the Sames team stipulated was the valve block's size. Having a compact

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valve block is important because the size of the powder coating machine is restricted. The valve block must be installed in tight spaces along with other components inside the machine to reduce the distance between powder material to the spray equipment.

Powder Spray Precision with Fast Response Times

Emerson used its proportional valve expertise and innovative technology to help Sames Kremlin engineer a compact valve block with optimum control to precisely manage the powder coating patterns in its machine.



An ASCO™ 202 Preciflow proportional valve

Emerson and Sames developed and tested possible valve block solutions that met the optimal flow and pressure requirements with high response sensitivity. Together, they chose ASCO 202 Preciflow proportional valves and an AVENTICS manual regulator.

Ideal for high-precision flow control, ASCO Series 202 Preciflow proportional valves feature low hysteresis, excellent repeatability and high sensitivity. With an operating pressure of up to 145 psi (10 bar),

Series 202 Preciflow valves have a compact, lightweight, frictionless architecture that saves valuable space, resulting in smaller valve blocks in powder coating machines.

Acting as a valve block, ASCO 202 Preciflow proportional valves and the AVENTICS manual regulator together maintain an ideal airflow that allows the powder to pass via the spray gun in the optimized pattern. By precisely controlling the powder flow, the Series 202 Preciflow valve achieves the desired coating thickness, while the AVENTICS manual regulator adjusts compressed air pressure in the main line.

With this combination of technologies, the Sames valve block is a compact, lightweight, high-performance solution with faster response time than tested competitor products.

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for Emerson to identify, engineer and test the best valve block for the Sames Kremlin powder coating machine. Through extensive testing, the valve block provides excellent results and meets all performance requirements.

The valve block designed by Emerson for Sames Kremlin increases end user productivity and reduces waste. Featuring ASCO 202 Preciflow proportional valves and AVENTICS manual regulators, the highly precise valve block has minimum response time and low hysteresis, helping optimize compressed air flow and reduce overspray.

The support and expertise of the Emerson team gave Sames Kremlin an advantage over its competitors. By partnering with Emerson, Sames Kremlin better serves its customers and helps them achieve the outcomes that matter most. With greater powder coating performance, manufacturers can maintain product consistency and quality while reducing total cost of ownership. And, by reducing overspray, as powder material can be hazardous, the solution helps manufacturers practice sustainable production techniques.

By partnering with Emerson, Sames Kremlin solved its technical challenges and achieved its goals using Emerson's engineering expertise and portfolio of proportional valves and regulators. The valve block designed by Emerson for powder coating and paint applications offers fast response time and low hysteresis. The combined strength of Sames Kremlin powder coating technology and Emerson valve automation reduces overspray and waste, helping end users reduce material consumption and total cost of ownership. **BP**

About the Author

Sumit Kapde, Global Business Development Manager, Robotics and Proportional Valves, Emerson, is an accomplished global business development manager. Throughout his career, Kapde has helped clients from diverse industries enhance productivity through strategic implementation of tailored solutions. He holds an MBA in International Industrial Management from Hochschule Esslingen in Germany. Additionally, he earned a bachelor's degree in chemical engineering from Nirma Institute in India.



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EVAPCO's Journey to Dry and Hybrid Cooling Technologies

The cooling giant is well prepared to meet industrial demand for water conservation

By Troy Dreier, Senior Editor, Chiller & Cooling Best Practices Magazine



► Due to climate change, population growth in water-scarce regions and aging infrastructures, water conservation has taken on a new urgency. Industrial plant processes and commercial HVAC applications are actively investing in water conservation measures. Process cooling and HVAC central plant utility system manufacturers are therefore expanding their offerings of technologies able to conserve or eliminate the use of water.

In an interview with Chiller & Cooling Best Practices Magazine, Chad Nagle, Senior Vice President of HVAC IP Sales and Marketing, EVAPCO, shared details about his company's efforts to lead the industry in dry and hybrid fluid cooling technology.

Dry and Hybrid Fluid Cooling Can Save Millions of Gallons Per Year

Dry fluid coolers use ambient air to reject heat from hot process fluids running through the unit's closed-circuit coil heat exchanger.

Dry coolers have either flat or V-shaped configurations. Hybrid fluid coolers combine closed-loop dry cooling with evaporative cooling for an efficient design that uses less water. Hybrids can be run in dry mode when



Chad Nagle, Senior Vice President HVAC IP Sales and Marketing, EVAPCO

the temperature set point can be met by dry cooling alone. Adiabatic coolers are a type of dry cooler that use some water to pre-cool the ambient air used to reject heat from the process fluid. The pre-cooling of the ambient air is achieved with either saturated adiabatic pads or spray nozzles equipped on the unit's exterior shell.

Nagle shared a few recent projects illustrating how dry and hybrid solutions are able to save significant amounts of water. In one industrial project, an evaporative solution would have used 24.3 million gallons of water per year. The client went with a hybrid adiabatic solution using only 1.9 million gallons of water per year, a savings of 22.4 million gallons.

A second example was about a small scale data center. It had two options to fulfill its cooling requirements. One was an evaporative

Above: EVAPCO's corporate headquarters in Taneytown, MD

cooling tower using 9.7 million gallons of water per year. The second option was an eco-ATWB hybrid fluid cooler using 3.3 million gallons of water per year – a savings of over 6 million gallons.

A Water Conservation Trend Which Began in Europe

How buildings handle their water use often depends on where in the world they are. The investing principle of environmental and social governance (ESG) has people thinking about how to save water and energy. It has found an ear at small and large companies alike.

The growth of data centers has also changed the playing field. Up until the Covid epidemic,

EVAPCO saw most of its work in commercial HVAC and heavy industry. But Covid meant more people studying and working from home. That, combined with the rise of artificial intelligence, made data center growth explode, and data centers come with huge cooling demands. Hyperscale data centers often have to abide by peak daily water use limits, which are challenging to meet with evaporative technologies. Luckily, this is a problem the company saw coming.

“What matters to us and our customers is balancing the energy and water usage profile for the application at hand,” Nagle said. “We have a full spectrum of products, fully evaporative to fully dry, and that covers everything in between. We can listen to our

customers and move within that spectrum as needed.”

Today’s water conservation efforts started decades ago in Europe, something Nagle got a clear view of as Managing Director and later President of EVAPCO Europe from 2004 to 2017. Water scarcity and legislation forced European countries to grapple with the issue earlier. When measures cross the ocean, they typically find a home in California first, then New York, then water-scarce states like Nevada, Nagle noted.

As for what specific rules companies need to be aware of, that depends on their location. Local zoning rules typically determine the water allotment.

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EVAPCO's Journey to Dry and Hybrid Cooling Technologies



An EVAPCO eco-ATWB-H fluid cooler

“It’s not a big deal for a typical commercial HVAC application, like a hotel or a school,” Nagle said. “They don’t use a lot of water. But when you get into an industrial application with heavy usage, one using water 24/7, that’s where that type of zoning rule comes into play, restricting the technologies owners may use to cool the plant.”

Investing in Dry Cooling Technology

In 2008, the company began exploring dry cooling technologies. As dry cooling had already found a home in Europe, the company decided its best path to market was purchasing a company manufacturing dry coolers. It selected Flex Coil, located in Denmark. It would become EVAPCO Europe A/S.

Flex Coil was a custom coil tube and fin manufacturer, producing small heat exchangers that were incorporated into other companies’ equipment. EVAPCO brought this technology to its corporate headquarters in Taneytown, MD, where its Research & Development department improved on it.

“Our goal was to develop a fully rated dry-coil product line we could promote globally, with the same product available on every continent,” Nagle said. “We learned you could try to do it yourself or you can go buy a company that understands the technology. Then, you’re not in first gear. You start in third or fourth gear, and you only have to drive it home.”

The acquisition put the company well ahead of demand in North America. By skating where the puck was going to be, it ensured it had dry cooling products ready for customers.

Nagle returned to the U.S. in 2017, around the time the company launched its dry cooler product lines in North America. Closed-loop cooling isn’t new for the company, he noted. The company made closed-circuit coolers from its debut in 1976 and still manufactures them globally today.

Hybrid Cooling Systems Gain Momentum

“Around 2010 is when we took our traditional bread-and-butter ATW induced draft, counterflow, closed-circuit cooler, and started to look at ways to move towards dry,” Nagle said. “You can take a bare tube heat exchanger and not run water over it, and you will get some dry capacity. The idea is how do you get more?”

EVAPCO’s efforts in hybrid cooling began in the 2010s, putting fins around the outside of its elliptical evaporative coil. That increased



Assembly of an eco-Air Series Dry Cooler in the Key Building located at EVAPCO headquarters in Taneytown, MD.



The company's leadership in product design and quality continues in its state-of-the-art, 60,000-square foot Wilson E. Bradley Research and Development Center located in Taneytown, MD.

wet performance a bit, but more importantly allowed the cooler to operate at higher dry bulb switch points. In 2013, it introduced the eco-ATWB-H, taking the same ATW with fins on the tube and adding a finned dry cooler above the drift eliminator, outside the water stream. That innovation allowed the company to significantly improve the dry capacity. Evaporative cooling was still available, but the design offered a much higher potential for dry cooling.

Putting wet and dry cooling in the same footprint allows facilities to reduce water use by running dry longer in the year. It also offers reduced energy demand thanks to the increased surface area.

EVAPCO Dry Cooling Is Created

More recently, in 2022, it created a new company called EVAPCO Dry Cooling, to support the demand for field-erected dry coolers – a demand largely caused by the growth of data centers. This company creates customized

solutions optimizing both water and energy consumption. It also tackles challenges such as plot area and waste constraints that are unique to larger jobs.

“For our dry cooling technology, we have single-stack dry coolers and double-stack dry coolers. This is the next big step,” Nagle explained. “They can be very, very big with giant fans. They have large, heavy industrial clients including hyperscale data centers. At the end of the day, land is money, so operators want to use the land they have for the data center, and not for a yard full of equipment not bringing in any revenue.” eco-Air double stack dry coolers can reach 40-feet in length and 18 feet 9-inches in height.

A data center with water restrictions would need football fields of traditional dry coolers to provide enough cool water, but data center operators want to use their land for data centers, not cooling. They’ll invest in cooling systems offering a smaller footprint.

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EVAPCO's Journey to Dry and Hybrid Cooling Technologies



A large-scale cooling installation for a North American data center.

“What we did is we went from our single-stack dry coolers to our double-stack dry coolers, which basically shrinks the plot area nearly in half by putting in twice as much coil,” Nagle explained. “Taking it a step further, we have a field-erected version which decreases plot area even further, and using large diameter fans drastically reduces auxiliary power consumption.”

The disadvantage to this kind of installation is that it's a construction project. Rather than having factory-built pieces dropped off and connected, these custom solutions need to be constructed on-site.

The Choice Is Between Evaporative, Dry or Hybrid

Don't look for these dry cooling solutions to find an audience in cities with tall buildings that have big HVAC loads. Putting dry coolers on high-rises would be a challenge. They already struggle to find rooftop space for evaporative cooling, Nagle said.

The choice for operators is between low-power, high-water use solutions; high-power, low- or no-water solutions or hybrid solutions that take a middle path. The biggest challenges are in commercial HVAC in areas with high ambient dry bulb conditions and data centers or industrial projects with process temperatures below the dry bulb temperature.

“It's hard to use a dry cooler when you want 90°F (32°C) water and it's 95°F (35°C) outside. If you could visualize, you're putting 95°F (35°C) air across the heat exchanger, asking it to cool it to 90°F (32°C). That's just not going to happen,” Nagle said.

While hybrid and dry cooling is on the rise, the company knows evaporative cooling will

always have a place. “Evaporative cooling is never going to go away. It's the most efficient heat transfer technology, unquestioned. Recently, we have collaborated with end users to integrate multiple cooling technologies within the spectrum on the same project to realize significant daily and annual water savings,” Nagle said.

In the last few years, the company has seen slower commercial HVAC sales since more people are working from home and many office towers experience high vacancies. However, market forces are leading to new online demands, and the technologies providing them need cooling.

“Our biggest growth opportunity is in the industrial process and data center space. The jobs are big and more time-consuming, but they can be lucrative. These end users expect exacting standards, which Evapco has answered through third-party thermal performance certification via CTI Standard 201 on all of their products,” Nagle said. **BP**

About EVAPCO

EVAPCO provides a full spectrum of global product solutions for the commercial HVAC, industrial refrigeration, power generation and industrial process markets with 78 active patents on the market today. Headquartered in Taneytown, MD, the company's products are engineered and manufactured in 25 locations in 10 countries and supplied through a sales network of more than 170 offices. For more information, visit <https://www.evapco.com>.

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For Abundant Air Compressor, Reliability Is a Best Practice

A-1 Custom Car Care benefits from reliable, clean and dry compressed air

By Compressed Air Best Practices® Magazine

► *Compressed Air Best Practices* sat down with Richard Compton, Owner of Abundant Air Compressor of Springfield, MO, and one of his clients, Kenny Schulte, Owner of A-1 Custom Car Care, to talk about why this regional air compressor installation and maintenance company is known for its excellent service.

Compton, a fixture in Springfield compressed air systems for more than two decades, has worked to build his reputation as a dependable partner. Compton started his company two years ago after many years working in the compressed air industry.

A Reputation Built on Solid Service

Compton has completed multiple compressed air projects for A-1 Custom Car Care, which has two locations in Springfield, and three others in Republic, MO, Rogers, AR, and Fayetteville, AR.

“Rick did all of our air compressor work,” Schulte said. “Since we’ve owned the business, we’ve opened up two locations and he came in on the very first one we opened up. It opened in January and was quite a deal. It was probably a 10,000-square-foot area, and we

have seven lifts in the building. Equipping all that was an ordeal. We were very happy with the end result.”

At this location, Compton installed a two-stage, five-horsepower (hp), lubricated reciprocating



Above: An A-1 Custom Car Care center in Springfield, MO.

Kenny Schulte, A-1 Custom Car Care, and Richard Compton, Abundant Air Compressor (left to right).

air compressor, mounted to an 80 gallon wet storage tank, as well as much of the piping. He chose a reciprocating air compressor for its lower purchase and maintenance costs.

A-1 Custom Car Care uses compressed air to power the mechanics' hand tools, control the locks on its four-post vehicle lifts and control part of the ADAS alignment machine used to calibrate vehicles with collision avoidance features. The mechanics also use compressed air to separate tires from their rims, balance tires and remount them.

The partnership between Abundant Air Compressor and A-1 Custom Car Care was solidified when A-1 had an urgent request, and Abundant was ready to assist. OSHA regulations demanded the facility's hoses be properly collared or the company could be fined. Compton provided the hose banding tool Schulte and his team needed to band and crimp all their hoses for quick disconnects at all five locations.

"In order for the hose to be up to standards, it has to have a collar," Compton explained. "Slide that hose bar in, you have a clamping device. Clamp that collar down around there to hold it on the hose bar. Do it the wrong way and they actually pop off." That meant A-1 had several hoses out of compliance, as each lift at every A-1 location had them. "We got rid of the old, and got it all done right."

Over time, chemicals can speed the deterioration of the ends of hoses and wear them down. Because of OSHA regulations, cutting the existing hoses off and replacing them was not an option, so Schulte turned to Compton for help.

"He had the tool, he loaned it to me for three weeks. That's how our relationship has been," Schulte said. Providing quick

help – and refusing to take any payment for it – cemented a long-term relationship that continues today.

Compressed Air Tools, Fittings and Hoses Always On-Hand

For the compressed air systems in his shops, reliability is a top priority, Schulte said. When those compressed air systems power lifts holding two-ton vehicles, it stands to reason. He also looks for reliability in partners.

"If I call Rick with a problem, he's there if at all possible because he knows how important this stuff is," Schulte said. "We had a fitting leaking horribly not long ago. It was late in the morning when I called him, and he was there before 2 p.m. and had the stuff good to go. You just don't get that everywhere."



The 5-hp, lubricated, reciprocating air compressor installed at A-1's new Springfield location.

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For Abundant Air Compressor, Reliability Is a Best Practice



Black iron piping installed at A-1 Custom Car Care's new Springfield location.

The issue was with a half-inch impact wrench, an expensive tool that can warp if the problem isn't repaired.

Compton credits forward-thinking for making this, and many more examples like it, happen. When Compton leaves his shop, his truck is stocked with items many other technicians don't carry.

"Compressed air piping, any kind of hose and things of that nature, those parts – most guys don't carry that kind of stuff," Compton said. "When I leave there, I want to be able to say

I'm done with the job and anything that comes up, and I want to be prepared to have it. Most things I normally see out there, I will be able to fix them on the spot."

All the A-1 Custom Car Care facilities in Schulte's portfolio have now benefitted from Compton's upgrades. A-1 is rolling ahead thanks to its partnership, helping to keep safety at a maximum, downtime at a minimum and productivity at optimum levels. **BP**

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Plastics Plant Audit Improves VSD Air Compressor Arrangement

An experienced compressed air system auditor can suggest a more efficient system configuration

By Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting

► A compressed air system assessment was conducted at a plastics product manufacturing company in Manitoba, Canada, with surprising results. The plant produces 10-foot-wide extruded plastic sheets used in food packaging. The purpose of the assessment was to determine the efficiency of the compressed air production system and look for ways to improve it.

The compressed air production system consisted of three independently controlled air-cooled,

lubricated, rotary screw air compressors. It had two 50-horsepower (hp), fixed speed air compressors and one 50-hp, variable speed drive (VSD) air compressor. Together, they had a total rated output of about 580 cfm at 125 psi (8.6 bar). The air compressors operated in a less efficient cascaded pressure band arrangement, causing wide variation in plant pressure. The compressed air was dried and cleaned using heatless desiccant compressed air dryers with dewpoint control and parallel

coalescing filters, one set of filters and one dryer per compressor. The desiccant dryers control their purge with a freeze mode that turns off the purge when the associated air compressor is unloaded.

Total effective system storage volume, including piping, was determined to be about 1,600 gallons, a good capacity for a system of this size. Compressed air systems with VSD control do not need huge storage. The plant's compressed air piping system was a well-sized three-inch loop with little pressure loss.

Non-Traditional VSD Air Compressor Use

The assessment used cellular connected data loggers (Figure 1) to measure and track air compressor power (calculated from amps), plant pressure, compressed air flow and dew point for a period of four weeks.

Readings showed the compressed air system ran at fair efficiency (specific power of 28 kW/100 cfm, including dryer purge) during this measurement period. Optimal specific power for compressed air systems of this size running at about 100 psi (7 bar) would be about 18 kW/100 cfm or lower, including optimized compressed air dryers, suggesting

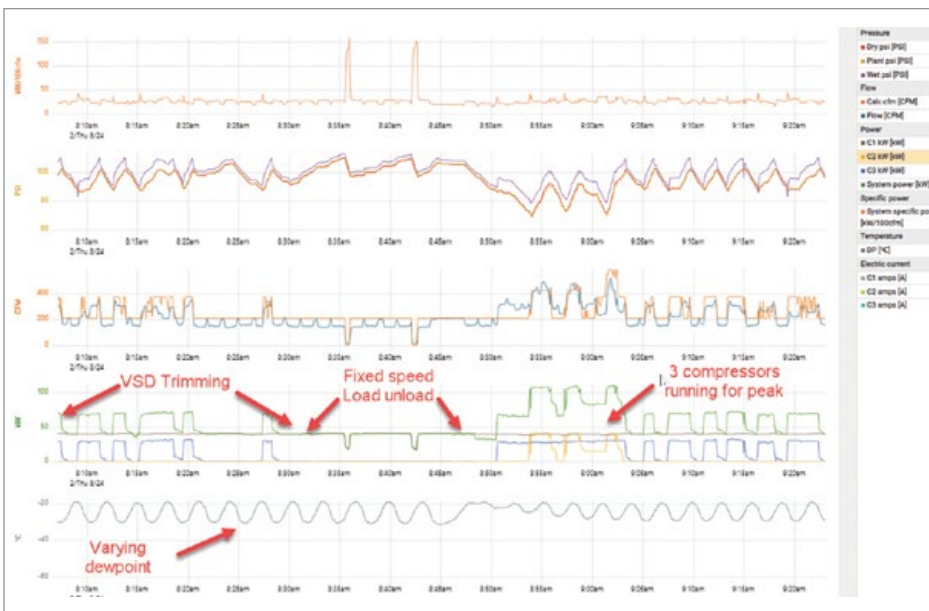


Figure 1: The data trace showed the VSD air compressor was low on capacity and not running in the traditional lead position.

Plastics Plant Audit Improves VSD Air Compressor Arrangement

an approximate 36% improvement could be gained if air compressor control and efficiency were improved.

Air compressor control was run in a fixed order of preference based on a cascaded pressure switch settings scheme. The VSD air compressor ran as a trim unit in a non-traditional way. The VSD never ran in its variable range, where it is most efficient, but simply loaded and unloaded at minimum speed. Its capacity was found to be much less than rated due to incorrect adjustment (the air compressor should have been running at 88 Hz at full load but was incorrectly limited to 60 Hz). This mismatch in capacity would have created a control gap if

traditional control was used, where typically the VSD air compressor was always the lead unit.

Traditionally, VSD air compressor control has the VSD air compressor nested within the pressure bands of the base-loaded, fixed speed air compressors. This ensures the VSD is always the lead unit and never runs unloaded, and the base load stays fully loaded if more than one air compressor is required to satisfy the plant flow. In this case, however, the VSD air compressor was set with its pressure band in the lower position of a traditional cascaded control strategy, which allowed the fixed speed air compressor to load and unload inefficiently during times where only one air compressor was required to satisfy the flow. Due to this incorrect strategy, the VSD air compressor had many hours of unloaded run time when it ran and consumed power, but produced no air.

Data logging showed low air compressor system efficiency due to the undesirable VSD air compressor placement and the use of old, less

efficient air compressors as base units (Figure 2 and Figure 3). Measurements also showed the total combined capacity of the existing air compressors was not enough to hold adequate plant pressure during peak demands of 510 cfm if one compressor was out of service, resulting in low pressure.

Improvements to supply side system efficiency and lower compressed air operating costs can be achieved if a more efficient and properly sized VSD air compressor is installed to replace the existing VSD. Calculations show a properly sized VSD air compressor could eliminate the control gap and run alone 98% of the time.

Desiccant Dryer Issues and Inappropriate Uses

The dewpoint-controlled heatless desiccant compressed air dryers halted purge operations whenever their associated air compressors were off. There appeared to be higher than normal purge flow and poor dewpoint (Figure 4)

	Avg
Pressure	
■ Dry psi [PSI]	96.48
■ Plant psi [PSI]	96.41
■ Wet psi [PSI]	99.24
Flow	
■ Calc cfm [CFM]	330.39
■ Flow [CFM]	250.00
Power	
■ C1 kW [kW]	25.78
■ C2 kW [kW]	14.81
■ C3 kW [kW]	30.30
■ System power [kW]	70.89
Specific power	
■ System specific power [kW/100cfm]	28.21
Temperature	
■ DP [°C]	-25.23
Electric current	
■ C1 amps [A]	31.02
■ C2 amps [A]	16.78
■ C3 amps [A]	29.37

Figure 2: The data logger software tracked key parameters. The air compressors produced a flow of 330 cfm, however the actual measured demand was 250 cfm. The difference led to excessive compressed air dryer purge.

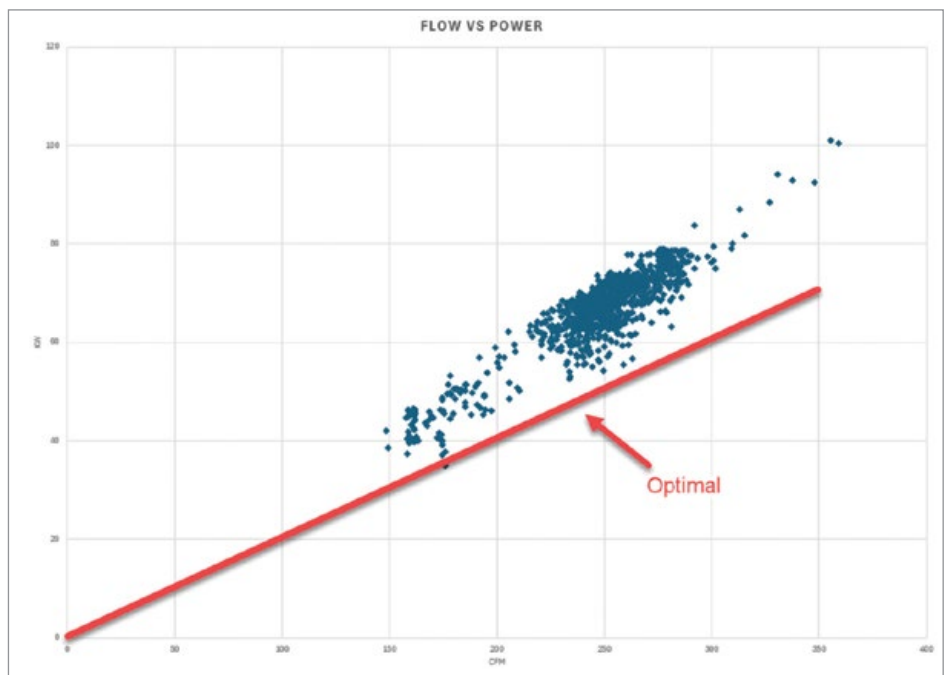


Figure 3: A flow vs power plot showed good power turnaround, but operation was less than optimal due to older, less efficient air compressors and an incorrect control strategy.

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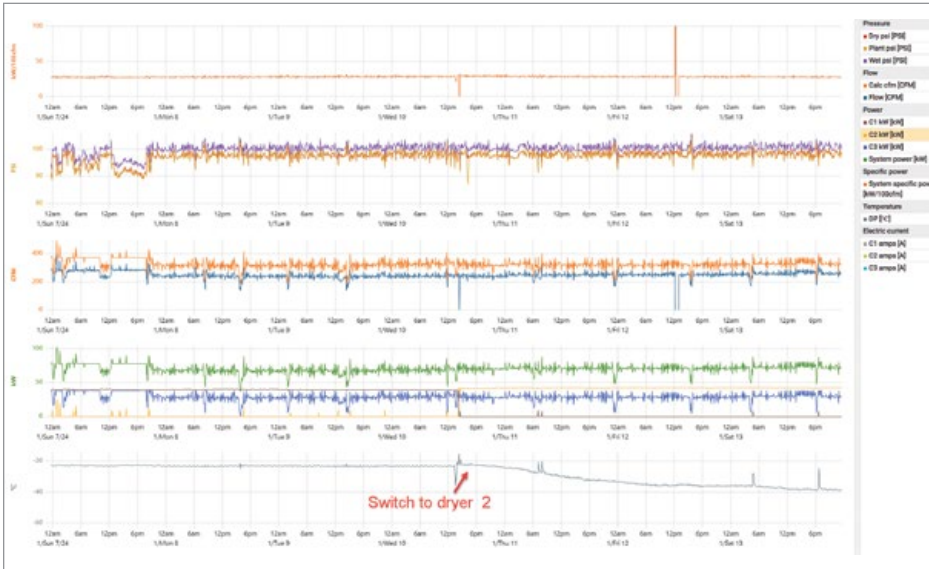


Figure 4: The main desiccant compressed air dryer had a leak between its towers resulting in poor dewpoint. This reading shows the drop in dewpoint when the healthy dryer started up.



Figure 5: An acoustical imager uncovered leaks, such as this one in the compressed air dryer enclosure.

produced by one of the desiccant dryers. This desiccant dryer was found to have a leak between towers, allowing wet air to enter the side being purged. A second desiccant dryer produced poor dewpoint when first turned on because of the way it was controlled during peak demands (it purged for only a few minutes when a third air compressor loaded).

Savings can be gained if the desiccant compressed air dryers are replaced with a

properly sized cycling refrigerated compressed air dryer. A similar plastics line at the plant uses this type of compressed air dryer.

Inappropriate uses were found that should be reduced or converted to more efficient energy sources:

- A compressed air demand called “pinning” uses 14 psi (1 bar) compressed air that is regulated down

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Plastics Plant Audit Improves VSD Air Compressor Arrangement

from 100 psi (7 bar). However, other lines at the plant perform the same work with no compressed air.

- Vacuum pumps in the plant use compressed air pulse cleaning for their inlet filters. This cleaning is uncontrolled and operates even when the vacuum pumps aren't running.
- A small number of leaks were detected (Figure 5).

Estimates based on the captured data show 567,000 kWh costing \$23,375 per year, while feeding an average of 240 cfm to the plant. (All monetary figures converted to USD using the current exchange rate at the time of publishing.)

Estimated savings for upgrading the VSD air compressor to higher efficiency and higher capacity, converting failing desiccant compressed air dryers to cycling refrigerated compressed air dryers and reducing wasted demand total \$9,160 per year, resulting in 39% lower energy use. **BP**

About the Author

Ron Marshall is a seasoned compressed air expert and the Chief Auditor at Marshall Compressed Air Consulting. With extensive experience conducting air system assessments, Marshall specializes in optimizing air compressor efficiency and reducing energy consumption. He is a Certified Engineering Technologist (C.E.T.), Certified Industrial Manager (C.I.M.) and Certified Compressed Air System Specialist, contributing valuable insights through his training sessions and writings on compressed air topics. His expertise and practical solutions have made him a trusted authority in the field of industrial compressed air systems. For more information, visit <https://www.compressedairaudit.com>.



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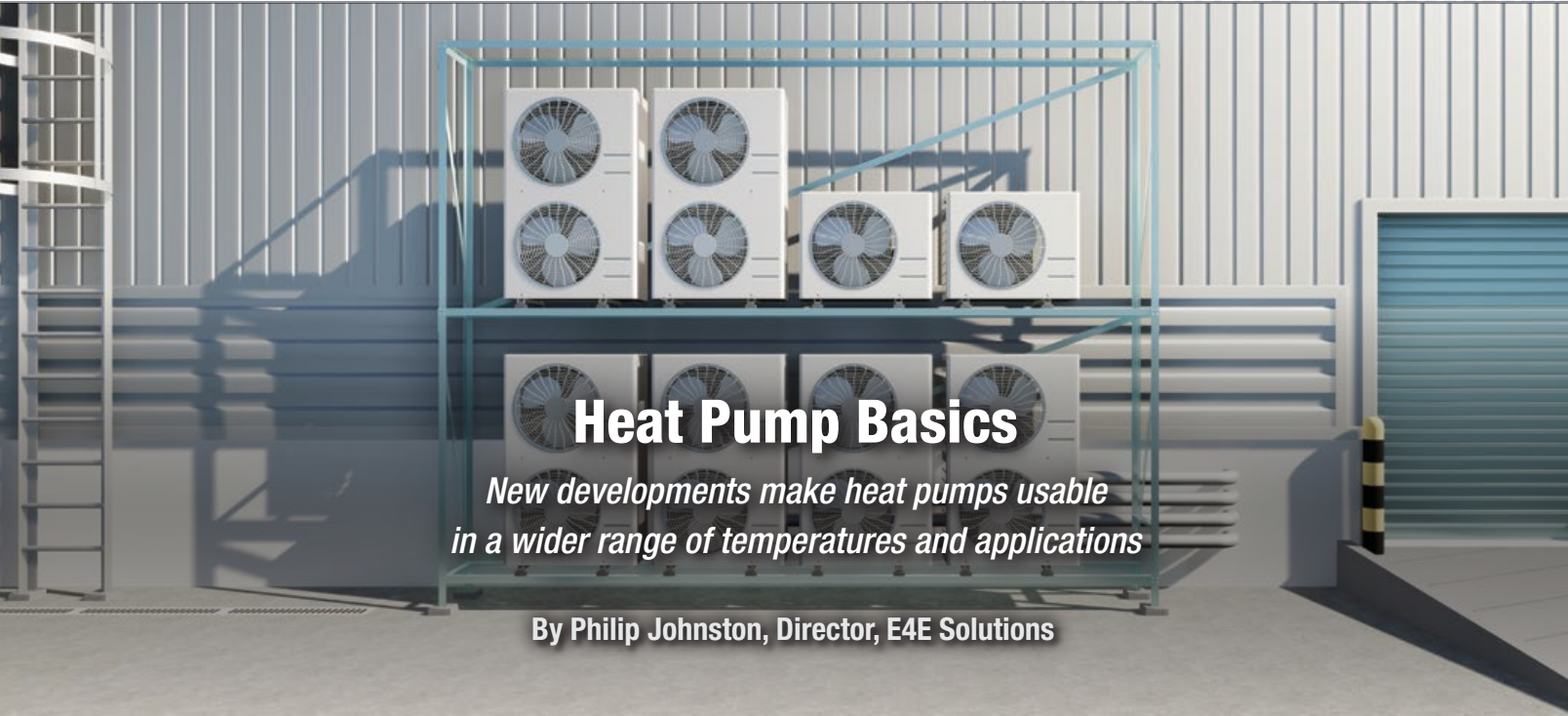


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MEAT





Heat Pump Basics

New developments make heat pumps usable in a wider range of temperatures and applications

By Philip Johnston, Director, E4E Solutions

► Heat pumps have found growing popularity as a high-efficiency solution for cooling and heating. With greater public awareness and organizational emphasis on sustainability, these systems are a viable upgrade to a wide range of processes, from residential climate

control to industrial heating and cooling applications. The flexible functionality of heat pumps – namely their ability to reverse the traditional vapor-compression cycle – offers them significant advantages over refrigerant and combustion-based systems.

The Refrigeration Cycle

The vapor-compression cycle drives the operation of many cooling and heating systems, including heat pumps. The principal function of the vapor-compression cycle is to transport heat from one load to another. Sometimes the

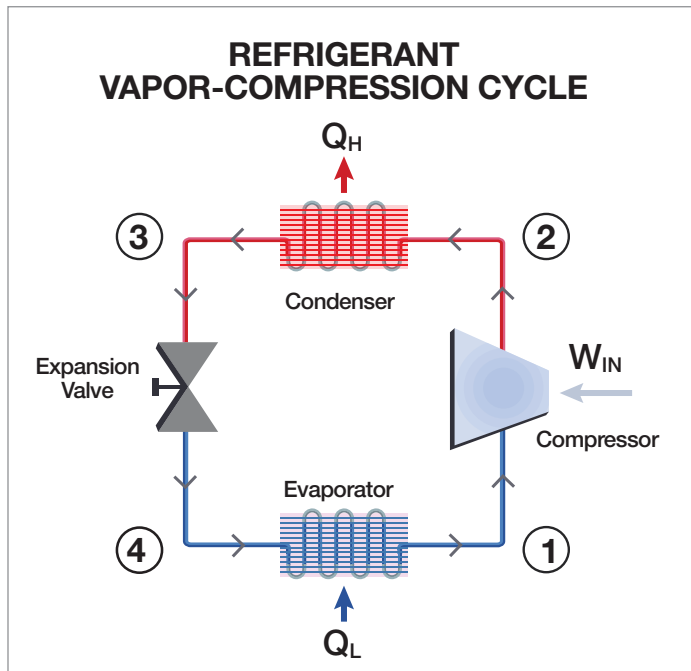


Figure 1. The refrigeration cycle: Most industrial cooling and refrigeration systems use a vapor-compression cycle. Work is provided by the compressor to move the refrigerant through the system. The evaporator absorbs heat into the cool liquid refrigerant and the condenser rejects heat from the hot refrigerant gas into the environment.

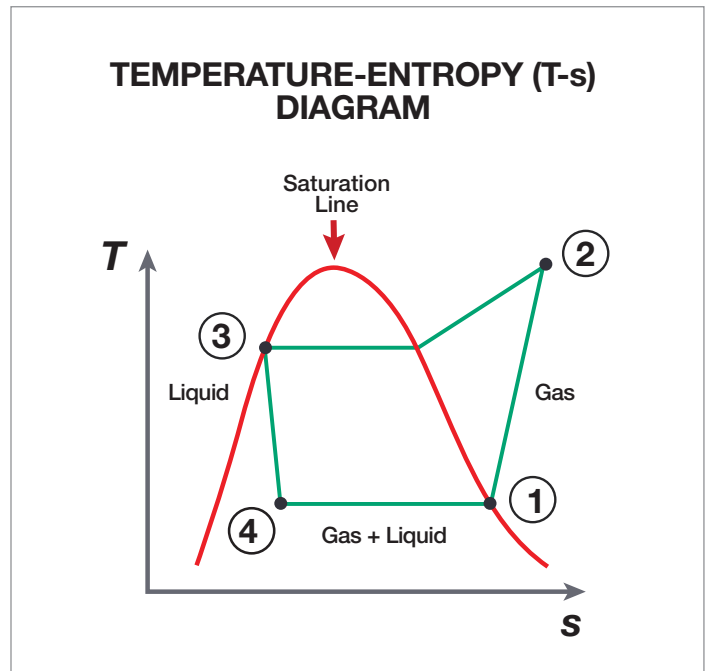


Figure 2. Temperature-entropy changes in the refrigeration cycle: The refrigerant experiences changes of state continuously throughout the cycle. Heat converts the liquid into a gas and the loss of heat drives the gas to become a liquid again. The saturation line signifies when the refrigerant has reached a pure state of either liquid or gas.

heat removed with the cycle is useful (cooling applications) and other times the heat added is useful (heating applications). This cycle is most often a closed-loop system, meaning the mass of the refrigerant used in the process stays the same as it changes states to allow for the absorption and rejection of heat.

The flow of refrigerant through the cycle is driven by the mechanical work provided by the refrigeration compressor, which can be powered by electricity, steam or other forms of energy. There are four major components of a system designed to use the vapor-compression cycle: the compressor, condenser, expansion valve and evaporator. The refrigeration compressor pressurizes and heats the refrigerant to keep it flowing through the process. The condenser and evaporators allow the heat exchange needed to add or remove energy from the load. The expansion valve regulates the pressure of the refrigerant when it is in a liquid state.

The vapor-compression cycle is effective because of the immense amount of energy absorbed when the refrigerant changes from a liquid to a gas and equally large amount of energy released when the refrigerant changes from a gas back to a liquid. Figure 1 and Figure 2 show the major components of a refrigerant-based cooling or heating system and the temperature-entropy changes throughout the process.

Starting the process from the exit of the evaporator, saturated vapor (state one) is forced into the refrigeration compressor. While there are many different approaches to compressor design, they will pressurize and heat the saturated vapor into a superheated hot gas (state two). This hot gas flows into the condenser, which removes heat from the refrigerant and rejects it to the environment. The most common methods of rejecting heat with a condenser use ambient outside air (air-cooled systems) or temperate water

(water-cooled systems). As heat is rejected, the superheated gas decreases in temperature and condenses into a liquid. Once the refrigerant has exited the condenser, it will be a saturated liquid (state three). An expansion valve, or other form of throttling device, regulates mass flow of the refrigerant to induce a decrease in pressure. This release of pressure in the refrigerant causes some of the liquid to reach critical conditions and flash, meaning it changes to a vapor state instantaneously, creating a liquid-vapor mixture (state four) before the refrigerant enters the evaporator. Like the condenser, the evaporator is designed for heat exchange, however, the evaporator absorbs heat from the environment. As heat is absorbed, the liquid molecules in the refrigerant change state into a gas. Finally, upon absorbing the designed heat equal to

the cooling capacity of the equipment, the refrigerant leaves the evaporator as a saturated liquid and completes the cycle.

The Mechanics of Heat Pumps

One of the earliest known heat pump installations, designed by Robert C. Webber in 1945, took waste heat from a cellar freezer and used it for comfort heating in a home¹. While the idea of the heat pump is not new, its applications have expanded in recent years due to technological advancements.

The innovation of heat pumps comes from adding reversibility to the traditional vapor-compression cycle used in cooling and refrigeration. In heat pumps, the evaporator and condenser are identical because they switch roles depending on the operational mode of

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Heat Pump Basics

the equipment. In cooling, the cycle follows the same steps as described previously. In heating, a reversing valve changes the direction of the refrigerant flow, and the evaporator and condenser switch roles. Heat is now absorbed from the environment and rejected to the load. The graphic below shows the configuration changes depending on the operation mode of the heat pump.

One limitation of heat pumps is their reliance on external temperature conditions to provide cooling or heating. In recent years, this limitation has been mitigated through more efficient design approaches and alternative heat sources.

The simplest and still most common form of heat pump is the air-source heat pump, which

takes heat from the ambient outside air when heating. The cooling operation works much like a traditional air-cooled cooling system using the vapor-compression cycle. An evolution of this simple design is the geothermal heat pump, which uses water or the ground as a heat sink or heat source. The main benefit to using water or ground is the temperature fluctuation is much less than with ambient outside air. Smaller temperature fluctuation means there will be a sufficient temperature differential for heat transfer, whether the body is serving as a heat sink or heat source.

A water-source heat pump carries the refrigerant deep into a body of water where the temperature is stable throughout the year. If the heat pump is cooling, then heat will be rejected into the body of water. The opposite

occurs if the heat pump is heating. If the coils are not placed deep enough into the water, the temperature of the surface water can fluctuate similar to ambient outside air and diminish the performance of the heat pump.

Ground-source heat pumps are growing in popularity because the consistency of ground temperature offers the best performance over the course of a year. There are two main approaches to the design of the ground coils. A vertical design has refrigerant piping extend from the heat pump deep into the ground with little to no horizontal piping. This design may not be feasible if there are other utility lines beneath the ground. A horizontal design still goes deep into the ground but turns horizontal once an adequate depth is reached so coils run parallel with the surface.

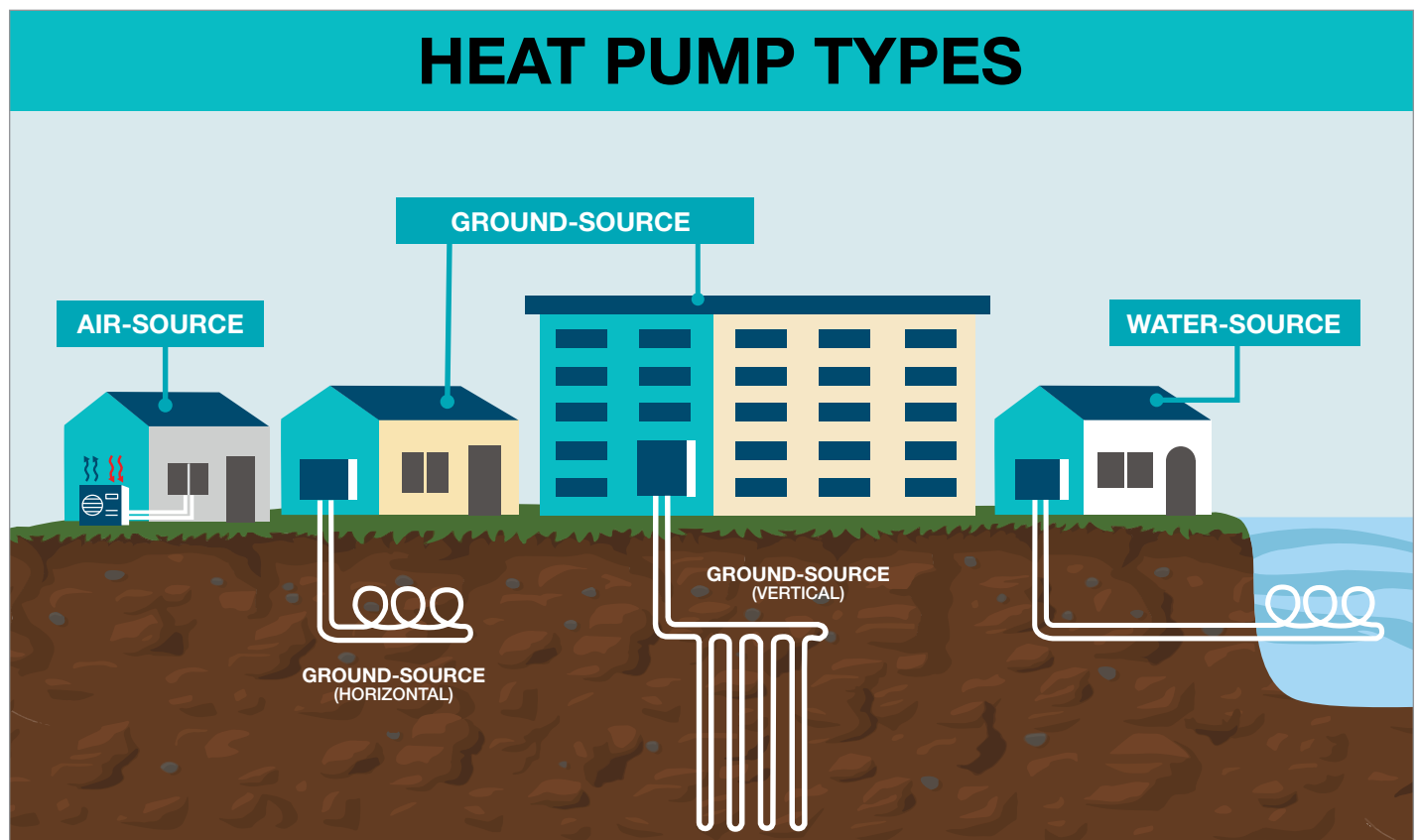


Figure 3: There are various types of heat pumps used today, categorized by the method of heat rejection to the environment. The simplest form rejects heat to the ambient air, and is called an air-source heat pump. Other forms reject heat to large heat sinks in the environment and are collectively called geothermal systems. Geothermal heat pumps either reject heat to the ground (ground-source) or a nearby body of water (water-source).

New Horizons for Heat Pumps

As businesses place greater emphasis on sustainability, heat pumps are increasingly relevant to decarbonization programs. They are dramatically more energy efficient than traditional heating methods and their cooling efficiencies are on par with most other equipment available. Boilers and other combustion-based heating systems are limited by the heating value of the fuel used. Conversely, heat pumps use the heat available in the surrounding environment, allowing their efficiency to far exceed combustion-based heating equipment in most applications.

The application of heat pumps is rapidly shifting from residential air conditioning in Southern states to industrial scale cooling and heating throughout the country. One driver

for this trend is the improvement of air-source heat pump design. When heat pumps were first introduced, there were limits to the acceptable ambient outside air temperatures for a heat pump to properly absorb or reject heat with the environment.

Continuous research and development from manufacturers has brought the acceptable outside air temperatures down such that heat pumps can work in most regions of the United States today. We are now at a point where heat pumps could be used for commercial and industrial applications.


One exciting heat pump opportunity is the possibility of providing cooling and heating simultaneously with a single piece of equipment. Essentially, heat is absorbed from a

It is important to understand while heat pumps can serve many commercial and industrial applications today, there are still limitations to the temperatures they can achieve. Common heat pumps are not designed for low-temperature refrigeration and high-temperature heating applications. However, it is possible future innovations will allow heat pumps to work in these situations.


load that needs to be cooled and then the heat is rejected to a load that needs to be heated. One load would have to be followed, meaning it drives the operation of the heat pump and ensures the design temperature is reached on

38

variants for comfort cooling, heating, medium temperature and data center cooling applications



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that side. The other load would likely serve as supplemental cooling or heating and reduce the load of the main equipment.

Real-World Heat Pumps in Action

Organizations throughout the U.S. are embracing heat pumps on a large scale for their facilities. The following examples illustrate a few applications for high-capacity heat pump systems, including quantifiable benefits over alternative heating and cooling equipment.

A large industrial wastewater treatment plant in Missouri recently installed a variable refrigerant flow (VRF) heat pump system for all comfort cooling and heating at the site. The system is composed of many air-source

heat pumps. There are 13 condensing units, 10 wall-mounted evaporators and 16 ceiling-mounted evaporators in total with 50 tons of cooling capacity and 660,000 BTU per hour of heating capacity.

One benefit to varying the mass flow of refrigerant through the cycle is reduced power consumption of the refrigeration compressor, allowing optimal performance in partial load conditions. The cooling performance in this system is comparable to the average chiller (COP = 3.5 to 4.7)². The heating performance, however, is much better than combustion-based heating equipment. A typical boiler or hot water generator will have an efficiency of 85-95% (COP less than 1) while heat pumps in this system have a rated COP

greater than 3, resulting in a 300% increase in heating efficiency.

In another example, a major corporation needed to replace an outdated heating system at a large office complex in Colorado. The existing system used 3 MMBtu per hour of steam for comfort heating and domestic hot water (serving potable water throughout and to a kitchen at the base of the building). The steam system was replaced by two 1.5 MMBtu per hour, condensing water boilers to serve the same loads for the building.

Heat pumps were not as well-known for commercial applications at the time of installation, so they were not considered, and this presented a missed opportunity.

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Three condensing units for an air-source heat pump system supporting all of the comfort heating and cooling loads for a wastewater treatment facility in Missouri.

It is likely the comfort cooling and heating load, as well as the domestic hot water load, for the entire building could have been served by heat pumps. This approach would have improved the cooling efficiency from replacing the existing packaged rooftop units (COP = 2.3 to 3.5) and dramatically improved the heating efficiency by 200-500%. An alternative design approach could have enabled simultaneous cooling and heating for different loads, further enhancing building performance.

Over the next decade, there will be a rapid integration of heat pumps in cooling and heating applications. Commercial uses are already expanding, and industrial use will dramatically increase over the next decade.

Heat pumps cannot serve every cooling and heating application for industrial and commercial sectors today, particularly industrial-scale processes requiring specialized equipment. However, there are still substantial opportunities to leverage these systems in industrial environments especially as the technology advances. When applicable, leveraging the benefits of heat pumps to provide heating and cooling in one system is an excellent way to reduce utility costs and carbon emissions. **BP**

About the Author

Philip Johnston is a Mechanical Engineer who partners with clients to optimize their industrial energy systems in service to their energy and sustainability goals. He has over a decade of experience developing viable energy and carbon strategies encompassing a wide range of processes, such as chilled water, refrigeration, steam, compressed air and process heating and cooling.

About E4E Solutions

E4E Solutions specializes in the development, design, engineering, implementation and financing of innovative energy efficiency and de-carbonization projects that deliver energy savings, reduce operating costs and modernize and renew utility system infrastructures. For more information, visit <https://e4esolutions.com>.

Endnotes

- 1 Banks, David (August 2012). An Introduction to Thermogeology: Ground Source Heating and Cooling. John Wiley & Sons. p. 123.
- 2 COP is Coefficient of Performance, a common efficiency metric for cooling and heating systems. The higher the COP, the better the performance is for the equipment. Typical modern chillers perform at an average of 0.75 to 1.0 kW/ton, or a COP of 3.5 to 4.7.

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4 Tips for Selecting a Compressed Air System Provider

Choosing the right air compressor is important, but so is the system design, service provider and manufacturer

By Paul Edwards, President, Compressed Air Consultants, and Mauricio Uribe, Head, European Operations, Compressed Air Consultants

We are often asked, “Who makes the best air compressor?” While the question is straightforward, the answer is anything but. This common oversimplification has led countless clients down a path of unnecessary expense, costing some tens of thousands, others hundreds of thousands and, in some cases, millions each year. As an independent consultancy with 40 years of experience, Compressed Air Consultants sees the fixation on brands as economically risky. It’s not only about who makes the equipment, but about how each piece of the system coalesces to support your business’s unique demands.

The truth is, an air compressor, no matter its renown, is merely one leg of a four-legged stool. To stay upright, to support your business effectively, it needs the stability provided by the other three legs: system design, service provider and manufacturer. Overlook one in favor of brand and you add risk.

Our company motto, “It’s about money, not air” can serve as a starting point. It’s a reminder the end goal is not merely the generation of compressed air, but the generation of profit

Above: A test stand capable of testing up to 400-hp air compressors. (Picture courtesy Process and Power, Memphis, TN.)

through the efficient and reliable operation of compressed air systems. Let’s dissect the four components that form the foundation of a compressed air system.

1. Product: Put Application Requirements Over Brand

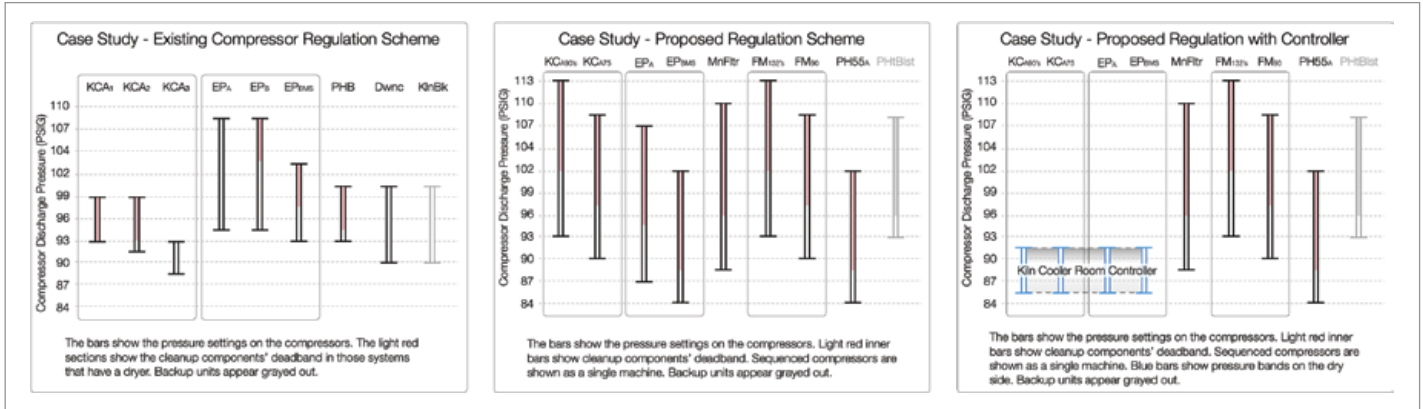
The marketplace teems with various air compressor brands, each touting its superiority. However, the best air compressor isn’t necessarily the one you may think is best, but the one where the entire value proposition aligns with the plant’s requirements. Choosing the right product for your facility means considering performance, energy efficiency and system compatibility.

There is often a trade-off between these requirements. Double-acting, lubricated, reciprocating air compressors may be a strong fit for high-demand applications, but they have higher oil carryover, cost considerably more and their maintenance requirements can be greater than other machines. Yet, at the same time, their overall efficiency at full and part load is best in class.

No single company makes best-in-class products for each and every size and style of air compressor. For nearly every type there are multiple vendors that can meet application requirements. When purchasing air compressors, optimizing capital spend comes



Both images show reliable compressors, but they aren’t designed for the same function. Subtle feature differences between similar technologies can have a dramatic effect.



These three control systems will produce different results. It's critical all parties, with authority to make changes to a system, understand system operation.

down to keeping application requirements generic while allowing each vendor to identify the specific gains provided by their design and the value each provides to the plant.

2. System Design: Customization Is Key

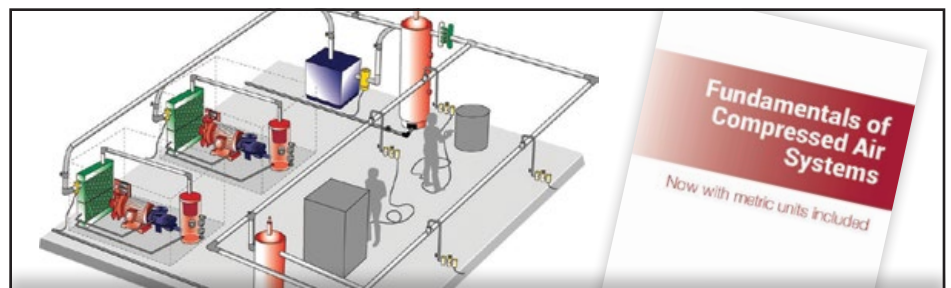
An air compressor is only as good as the system it's part of. A well-designed system is tailored to your plant, taking into account the compressed air demand profile, the environmental conditions and future scalability.

Whether creating a new compressed air system or a retrofit, work with an experienced system designer who is equipped with all the necessary data. For most plants, the design will consider compressed air supply, distribution and demand elements still to come. The air compressor control strategy has a greater impact on operating costs than the air compressor does, so pay close attention to the control strategy!

As an example, an air compressor company realized a customer's request for bid likely was based on an expensive assumption. Plant pressure was 115 psig (8 barg) and no one in purchasing or maintenance knew why. Instead of bidding the job, the air compressor company recommended a system audit. The audit uncovered a single application that required less than 10 cfm at 100 psig (7 barg),

while all other applications required 90 psig (6 barg). The customer decided to install a dedicated air compressor for the 100 psig (7 barg) application, then design the rest of the system for 90 psig (6 barg), saving capital and improving overall system efficiency.

New air compressors need to be integrated with other system air compressors and components. The system should include open protocols for external controllers and SCADA communications. True, this is an issue for both air compressors and controllers, but



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4 Tips for Selecting a Compressed Air System Provider

it often has a greater effect in the system's overall efficiency than the intrinsic efficiency of a new air compressor. Over the years, we have encountered multiple installations where an air compressor controller would not support VSD air compressors, yet the system included a VSD air compressor. Typically, this air compressor would run at minimum load or in load/unload mode or, in some cases, fully loaded, which is far from their maximum efficiency.

VSD air compressors add a new dimension to this discussion. They're often presented as a surefire way to improve system efficiency by minimizing part load energy waste. However, VSD technology is often misapplied, and their advantages can be lost if they are not properly integrated.

3. Service Provider: The Right Support

Maintenance can't be an afterthought. The best equipment can be rendered ineffective by poor service. A service provider's expertise, responsiveness and thorough understanding of your operations are crucial. Select a company that understands the equipment, has multiple service technicians trained to work on your specific air compressor and has the infrastructure to do all service work locally.

Every service provider has limits on the largest air compressor they can work on based on the disconnects they have in their shop. Consider the case of a 400-horsepower (hp) rotary screw air compressor experiencing a major airend failure. Some distributors don't have the capacity to handle such repairs. If they repair the airend but can't start the air compressor,

you'll only discover whether or not the repair was successful when the air compressor is reinstalled at your plant.

Plant service organizations with comprehensive infrastructure can test air compressors on the stand, identifying and correcting any issues before the unit is returned. While competence is crucial, it's equally important for customers to ensure their service provider has the necessary infrastructure.

Another example shows the value of having a trusting relationship with a service organization. One manufacturer experienced an airend failure, but didn't have enough information to repair the unit under a warranty. The distributor had a long relationship with the plant, and knew the plant had been meticulous in maintaining the air compressor. The distributor negotiated an arrangement with the client where all parts and lubricants were discounted 20% until the plant had recouped the cost of the repair, as well as an extra 25% for its trouble. Creating this win-

win situation cemented the trust between the distributor and plant.

The maintenance provider needs to understand the air compressor system management strategy, including pressure setpoints and control settings. Multiple groups within a plant should have a basic understanding of the system's design. Create a design basis document and be sure it's understood by all responsible parties.

4. Manufacturer: Partner in Success

The air compressor manufacturer's role extends beyond the sale. A true manufacturing partner supports the equipment throughout its lifecycle.

Customers turn to air compressor suppliers and maintenance providers first when experiencing issues or looking to improve their compressed air systems. Plants look for honest advice from organizations that have more compressed air equipment knowledge than they do. When problems arise, is there

a sense of shared responsibility?

The answer varies from brand to brand and distributor to distributor, but it's worth considering for any existing or potential supplier. Align with manufacturers that are invested in your success. They should provide ongoing training, updates and support to help you get the most out of your investment.

There is no single best air compressor on the market, but there is a solid formula to evaluate suppliers. For years of high reliability and lower costs, always consider application requirements, system design, the service provider and OEM support. **BP**



The key to all air compressor technology is to apply it to the right application.

About Paul Edwards

Edwards started with Ingersoll Rand in 1982 and worked in various field and office positions. He opened Compressed Air Consultants in 2003 as an independent audit organization with the tagline "It's about money, not air." Living up to that standard means the company's advice often differs from traditional approaches, but the goal is to drive operating costs down and productivity up while spending as little capital as possible.



Compressors in several positions in the US and Latin America, and started auditing compressed air systems in 2003. During his career as an auditor, he has taken part in over 100 compressed air audits in world-class companies in a wide range of industries across five continents. Since 2022 he has been appointed as Head of European Operations for Compressed Air Consultants.

About Compressed Air Consultants

Compressed Air Consultants is an independent, 20-year-old auditing firm. It specializes in creating ROI projects through demand-side analysis and improved use of existing assets. In most of its audits, gains can be realized without purchasing new compressors. Its three principles (two in the United States and one in Europe) have 100 years of combined compressed air experience. Visit <https://www.loweraircost.com>.



About Mauricio Uribe

Uribe is a Mechanical Engineer with over 30 years of experience in compressed air systems. He worked for Ingersoll Rand and Bauer

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Chiller & Cooling System Technology & Industry News

Carrier's AquaEdge 19MV Now Available with Ultra-Low GWP Refrigerant

The award-winning AquaEdge® 19MV water-cooled centrifugal chiller is now available with ultra-low global warming potential (GWP) refrigerant R-1234ze(E). Carrier is a part of Carrier Global Corporation, a global leader in intelligent climate and energy solutions.

The ultra-low refrigerant option, R-1234ze(E), has a GWP100 of less than one, according to the Intergovernmental Panel on Climate Change Fourth Assessment Report. GWP is a measure of a substance's climate warming impact compared to CO₂. The addition of an ultra-low GWP refrigerant continues Carrier's commitment to providing customers with solutions that use the right refrigerant for each application, while helping to reduce carbon footprint.

The 19MV continues to be available with the option of R-513A or R-515B refrigerants and

is designed to deliver reliable performance, incredible efficiency, easy installation and a wide operating range. It has received numerous honors, including being named the 2022 Commercial Comfort Product of the Year by a panel of independent engineers for *Engineered Systems Magazine* and receiving a gold award in the HVAC category for Consulting-Specifying *Engineer Magazine's* 2023 Product of the Year program.

In January, Carrier introduced an updated, more compact version of the 19MV, with a narrower footprint that is 18% smaller than the previous version. Both versions of the 19MV provide the ability to operate at severe conditions due to unexpected building operation or extreme weather. In North America, the chiller is manufactured at Carrier's commercial HVAC factory in Charlotte, North Carolina.

Carrier is shifting to lower GWP refrigerants across its chiller offerings. Carrier is committed to offering the right refrigerant for each

application. The use of lower GWP refrigerants supports Carrier's 2030 Goals, including helping customers avoid more than 1 gigaton of greenhouse gas emissions by 2030.

About Carrier

Founded by the inventor of modern air conditioning, Carrier is a world leader in high-technology heating, air-conditioning and refrigeration solutions. Carrier experts provide sustainable solutions, integrating energy-efficient products, building controls and energy services for residential, commercial, retail, transport and food service customers. Carrier is a part of Carrier Global Corporation, a global leader in intelligent climate and energy solutions that matter for people and our planet for generations to come. For more information, visit <https://www.carrier.com/commercial/en/us>.

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Carrier's AquaEdge® 19MV water-cooled centrifugal chiller is now available with ultra-low GWP R-1234ze refrigerant.



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Calibrated flow meter: Using a calibrated turbine flow meter will provide accurate system flow information for commissioning and operation. With a high functioning flow meter, users will have preprogrammed warnings and alarms to trigger a low flow or high flow condition that could damage system equipment or indicate a potential system issue.

Continuous data logging: System fluid flow rate, warm fluid temperature, cool fluid temperature and ambient temperatures are continuously logged for easy access and evaluation. This information is stored and can be exported for troubleshooting evaluation.

Data exportation: All system activities, alarms and data can be exported via USB drive to a Microsoft Excel file (.csv) that can show cooling system operating history.

Remote monitoring: System fluid flow rate and cool fluid temperature can be remotely monitored via a 4-20 mA analog signal provided by the control panel.

Maintenance reminders: Preprogrammed pump motor lubrication reminders for personnel.

About HydroThrift

Since 1973, HydroThrift has steadily grown into a world-wide supplier of packaged, closed loop cooling systems. Its experience with a wide variety of industrial equipment cooling applications has enabled HydroThrift to become a specialist in the design, engineering and fabrication of custom cooling systems. For more information, visit <https://www.hydrothrift.com>.

CTI to Develop Adiabatic Fluid Cooler Thermal Performance Certification Program

The Cooling Technology Institute has begun the development of a new thermal performance certification program for adiabatic fluid coolers. CTI anticipates launching this new program in the first half of 2025 as part of its existing Thermal Performance Certification Program based on CTI Standard 201.

This well-established program includes open- and closed-circuit cooling towers and dry coolers. Both forced and induced draft adiabatic fluid coolers are anticipated to be

covered by this new certification program, cooling either water or aqueous glycol solutions. By purchasing a CTI certified model, an owner/operator has assurance the heat rejection device will perform thermally as specified.

Currently, there are 98 manufacturers along with 29 private brand affiliates participating in the Thermal Certification Program from all regions of the globe with 271 certified open- and closed-circuit cooling tower and dry cooler product lines available to the market, comprising a total of over 80,000 individual models. All manufacturers who are interested in certifying either their cooling tower, dry cooler or adiabatic fluid cooler product lines are invited to do so by filling out the Thermal Certification inquiry form.

About Cooling Technology Institute

The Cooling Technology Institute is a broad-based industry association. Its mission is to advocate and promote, for the benefit of the public, the use of all environmentally responsible commercial cooling technologies such as wet cooling towers, air-cooled condensers, dry coolers, indirect cooling and hybrid systems by encouraging education, the development of codes, standards and guidelines, the use and oversight of independent performance verification and certification programs, research and development, information exchange and dialog with government agencies and organizations with a shared interest in evaporative heat rejection equipment. For more information, visit <https://www.cti.org>.



CTI has begun developing a new thermal performance certification program for adiabatic fluid coolers.

Chiller & Cooling System Technology & Industry News

Geoclima Introduces Circlermiser with Free Cooling

The Circlermiser with Free Cooling chillers are a revolutionary range by Geoclima that integrates free cooling technology into the Circlermiser series. These next-generation chillers use the cold ambient air to lower the entering water temperature and use cylindrical microchannel heat exchangers (Circlermiser) to further reduce the load on compressors. The series integrates the coils in a concentric configuration with the condenser placed inside the free cooling heat exchanger under a single fan.

The benefits are clear and tangible. They have a greater energy efficiency compared to traditional coils – thanks to the larger heat exchange surface of the condensing and free cooling modules. These chillers also have a high cooling capacity, up to 625.6 RT (2200 kW) and are optimized for mission-critical applications, thanks to the innovative integration of the two technologies.

For the design of this range, Geoclima's Research and Development division was inspired by the Circlermiser

series, using three complementary technologies. First, the use of cylindrical microchannel heat exchangers increases the heat exchange surface by 35% compared to traditional exchangers, all while maintaining the same footprint as a traditional chiller. This is an innovative AHRI-certified solution. Secondly, the series employs Turbocor technology, an oil-free centrifugal compressor with magnetic levitation. These compressors ensure exceptional performance and efficiency, significantly reducing environmental impact. Lastly, the chillers are equipped with high efficiency flooded evaporators that minimize the difference between evaporation temperature and fluid outlet temperature. This feature not only reduces energy consumption but also enhances overall performance and energy efficiency.

In addition to Circlermiser technology, the new range uses the free cooling system, which leverages ambient temperature to lower the entering water temperature when it is at least 3°K (5.4°F or 3°C) above the external temperature. The free cooling coils are MCHX microchannel cylindrical heat exchangers, with the condenser placed inside. This allows air to pass through the free

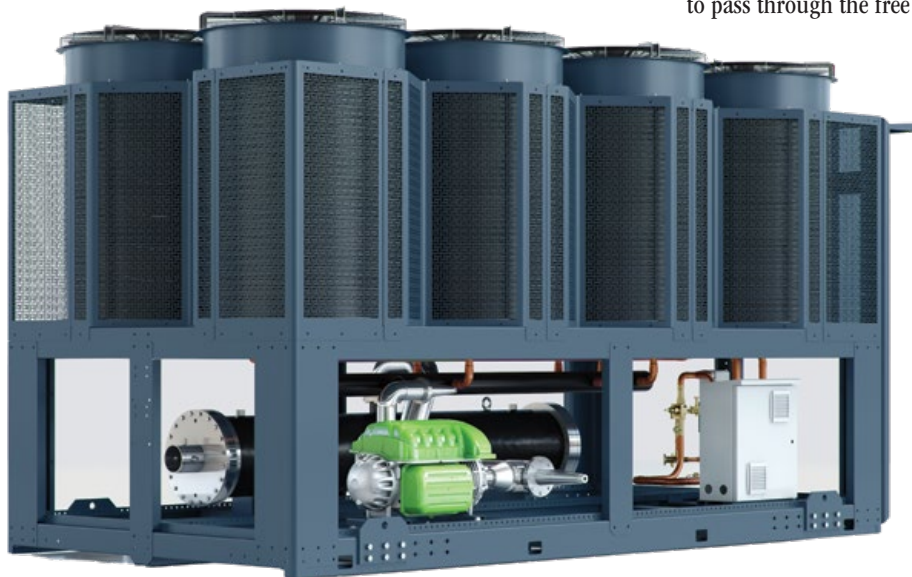
cooling coil before reaching the condenser. Thanks to these heat exchangers with a large surface area, the load on compressors is minimized or eliminated, even with positive ambient temperatures. Free cooling is therefore a particularly energy-efficient cooling technology.

The Circlermiser with Free Cooling range has also been designed with a focus on environmental sustainability. Besides being available with widely used R-513A and R-134a refrigerants, it is also compatible with HFO-R1234ze, which boasts a GWP (Global Warming Potential) of 6 and an ODP (Ozone Depletion Potential) of 0. Additionally, HFO-R1234ze guarantees particularly high efficiency. With an entering water temperature of 93.2°F (34°C) and a leaving water temperature of 75.2°F (24°C), the chiller can provide up to 625.6 RT and an E.E.R. (Energy Efficiency Ratio) at full load ranging from 18.19 BTU/Wh at 95°F (35°C) to 121.19 BTU/Wh at 59°F (15°C).

The combination of Circlermiser technology with the free cooling system guarantees unmatched performance, making it the ideal solution for mission-critical applications, including data centers, hospitals, power plants, pharmaceutical, food, chemical and automotive industries, as well as high-precision manufacturing plants.

About Geoclima

Since 1994, Geoclima has been designing and producing special chillers for applications in air conditioning and refrigeration systems, with a strong focus on quality and environmental sustainability. Geoclima Group counts multiple offices and companies around the world, with its headquarters in North-East Italy. Recently, it was acquired by Munters Group, global leader in energy-efficient air treatment and climate solutions. For more information, visit <https://www.geoclima.com>.



Geoclima has launched the Circlermiser with Free Cooling chillers.

AHRI Issues Safety White Paper in Support of Protecting ASME BPVC Section VIII Scope Exemptions

The American Society of Mechanical Engineers (ASME) is considering a scope change to its Boiler and Pressure Vessel Code (BPVC) Section VIII, Rules for Construction of Pressure Vessels, that would eliminate long-standing exemptions for certain equipment manufactured by AHRI's member companies and has the potential to also impact many other industries producing equipment with pressurized components. The change, if implemented, removes key exemptions the HVACR and water heating industry has successfully covered with its own codes and standards for decades, and would alter the way relevant standards and codes interact with, and are interpreted by, jurisdictions.



AHRI has issued a safety white paper in support of protecting ASME BPVC Section VIII scope exemptions.

AHRI and many other stakeholder organizations firmly believe existing codes and standards have served both the industry and the public well for many years, with an excellent, long-term safety record. Removing ASME's BPVC scope exemptions would place the BPVC in conflict with myriad codes and standards that currently occupy this space, such as those from nationally recognized testing laboratories (e.g., UL), SDOs (e.g., ASHRAE) and even other ASME codes. The current proposal has the potential to disrupt many industries and increase costs to the consumer with no offsetting benefits in terms of safety or performance. Unless stakeholders object, this change could be

adopted in the next edition of the ASME BPVC, due in 2025.

For information on the current status and potential impact of the current ASME proposal, along with information on how to comment, please contact Thomas Deary, AHRI Director of Codes, at TDeary@ahrinet.org.

About AHRI

AHRI is the trade association representing international manufacturers of heating, water heating, ventilation, air conditioning, commercial refrigeration (HVACR) and water heating equipment. For more information, visit <https://www.ahrinet.org>.

ASHRAE Launches Data Center Resources Hub

ASHRAE has launched a new Data Center Resources page to help professionals maintain optimal temperature and humidity levels in data centers, where servers and other computing equipment generate significant amounts of heat. This resource hub provides data center design and operations professionals with the latest standards, guidelines and best practices, helping them stay compliant while enhancing sustainability.

The new page offers a comprehensive range of technical materials, including publications, standards, guidelines and research papers, all developed by ASHRAE's renowned experts. These resources address various aspects of data center design and operation, such as cooling, power distribution, energy efficiency and thermal management. ASHRAE's goal is to empower professionals with the knowledge needed to optimize data center performance and make informed decisions.

"With the rapid growth of digital infrastructure, the demand for cloud computing, AI and big data continues to soar. Efficient cooling systems are

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Chiller & Cooling System Technology & Industry News

essential to cutting operational costs and reducing environmental impact,” said 2024-25 ASHRAE President M. Dennis Knight, P.E., BEMP, Fellow Life Member ASHRAE. “ASHRAE understands the unique challenges of data center cooling and is proud to offer this platform, providing professionals with the latest industry knowledge and resources in one place.”

Key highlights of the Data Center Resources page include:

ASHRAE Technical Committee 9.9 Datacom Encyclopedia: A collection of essential knowledge about important datacom topics such as facility design considerations, ITE design considerations, environmental guidelines, cooling technologies, energy efficiency in a central hub and more (annual subscription fee required for access).

Data Center Standards and Guidance: Foundational guidance such as ANSI/ASHRAE Standard 90.4-2022, Energy Standard for Data Centers and ASHRAE Standard 127-2020, Methods of Testing for Rating Air-Conditioning Units Serving Data Center (DC) and Other Information Technology Equipment, as well as new resources, such as updated data center chapters from the ASHRAE Handbook.

ASHRAE Datacom Series: A staple in the data center industry for nearly two decades, provides comprehensive treatment of data center cooling and related subjects.

In addition to technical resources, the page offers links to relevant ASHRAE conferences, events and professional development opportunities.




ASHRAE has created a Data Center Resources hub.

By connecting professionals with industry experts and fostering knowledge exchange, ASHRAE aims to facilitate continuous learning and professional development within the data center community.

About ASHRAE

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating ventilation, air conditioning, refrigeration and their allied fields. As an industry leader in research, standards writing, publishing, certification and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries. The Society is showcasing integrated building solutions and sustainability in action through the opening of the ASHRAE Global Headquarters building in metro-Atlanta, Georgia. For more information, visit <https://ashrae.org>.

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Real-World Installations & Maintenance

Edited by Troy Dreier, Senior Editor, Compressed Air Best Practices® Magazine

There's much we can learn from real-world compressed air, vacuum, chiller and cooling tower installations. This column asks readers to share lessons learned from system installations and maintenance practices they encounter in the real world.

Quality that Stands the Test of Time

We received this picture from a reader working in Houma, LA. He came across this piece of history while working for a manufacturer of liftboats, which are self-elevating boats used in offshore exploration and construction. This Gardner Denver air compressor was built in 1937. The reader notes it “predated World War II and survived countless hurricanes.”

We reached out to Curt Hertel, Vice President of Power Supply Industries (<https://www.psiind.com>), a Gardner Denver distributor, for help identifying it. He pegged it as either a 50-horsepower (hp) model WBQ or 75-hp model WBH single-acting, water-cooled, reciprocating air compressor. It was built in Quincy, IL, and included a radiator built in Racine, WI. “They were extremely reliable units,” Hertel notes.

A liftboat manufacturer in Houma, LA, got its money's worth from this Gardner Denver air compressor, which was built in 1937.



Necessity Is the Mother of Invention

Rob Marks is an Energy Management Engineer IV with Snohomish PUD, the second largest public utility in Washington state. It provides electricity to the homes and businesses of Snohomish County. Visit <https://www.snopud.com>.

Marks discovered this configuration while conducting a pre-walk for a new tenant's lighting project. The old tenant was a media blasting and coating shop. Lacking the right kind of plug for a one-inch pipe, it chose to make do with a hitch ball and a little bit of force.

That solution was certainly leaky and expensive, and could have been dangerous, notes Andrew Smith, Founder of SMARTCair. It wouldn't have passed any kind of safety or insurance inspection. A proper-sized pipe plug would cost a fraction of the price, he adds.



Terminating this compressed air pipe the right way – with a pipe plug – would have been the safer and cheaper way to go.

Submission Guidelines

We invite our subscribers to send their observed Real-World Installations & Maintenance experiences to Troy Dreier at troy@airbestpractices.com. Please send a high-resolution picture as a JPG or GIF file and a note describing the installation, what was wrong and what the solution should be. We will edit the text and remove equipment brand names and references from all materials. If we publish your submission, we'll thank you with a \$25 Amazon gift card.



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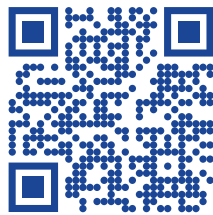
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