Sustainable, Safe & Reliable On-Site Utilities Powering Automation

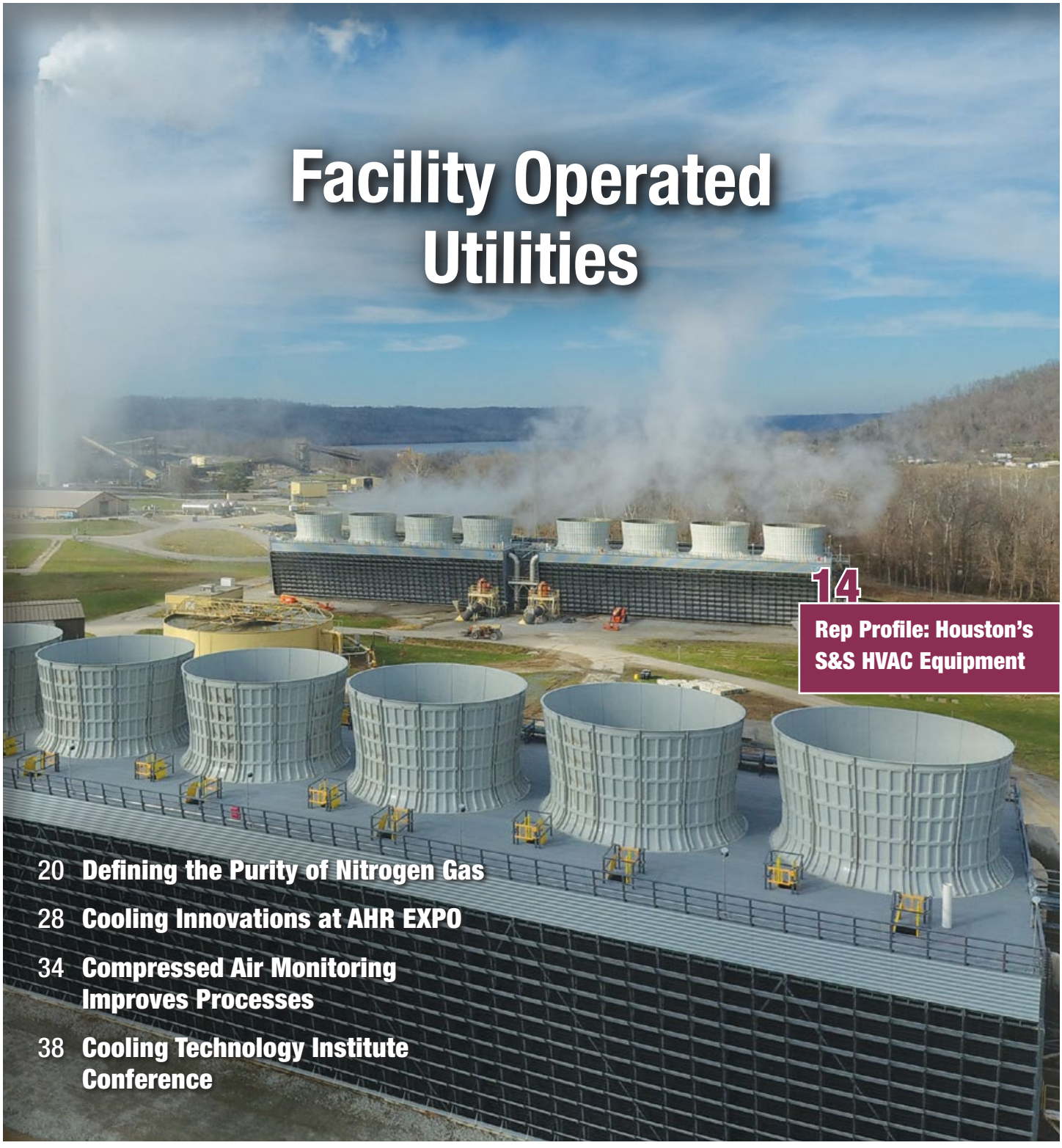
COMPRESSED AIR | CHILLER & COOLING

BEST PRACTICES

airbestpractices.com

coolingbestpractices.com

April 2024



Facility Operated Utilities

Increase Efficiency with a Playlist of Industries

What do air compressors, chillers, and aeration blowers all share? Well, maybe nothing unless you take advantage of connectivity and compatibility to enhance your plant's energy efficiency. With Atlas Copco, you are guaranteed innovation in every step and equipment that works in perfect harmony. Choose Atlas Copco — the playlist of industries!

866-472-1013 | www.atlascopco.com/air-usa

COMPRESSED AIR SYSTEM FEATURES

COOLING SYSTEM FEATURES

EVERY ISSUE

COVER IMAGE provided courtesy of EVAPCO.

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

FROM THE EDITOR

Facility Generated Nitrogen, Compressed Air and Cooling Systems

This April 2024 Issue has content on nitrogen, vacuum, compressed air, chillers and cooling towers. These are all "facility generated" systems able to either stop production or conversely optimize it. The trades supporting these technologies, for commercial and industrial facilities, are very competent and it's the responsibility of the owner operators to leverage these technologies and services.

Our first article is a profile titled, "Houston's S&S HVAC Equipment." Founded twenty years ago as a Rep for SPX Marley Cooling Towers, this firm led by President Angela Sherman, has become a leader in the Houston region. Check out the innovative "trim out" service they launched years ago to great success.

We thank the Compressed Air & Gas Institute (CAGI) for their article titled, "Defining the Purity of Facility Generated Nitrogen Gas." This educational piece highlights the importance of understanding the optimal nitrogen purity specification for a production process.

Our new monthly Subscriber Corner features "Crazy Systems & Maintenance" stories from Argentina and Florida and "Readers From Around the World" pictures from the IPPE Show, including a vacuum system improving the throughput of a rotary meat packaging machine.

"Refrigerant Compressor, Chiller and Cooling Tower Innovations at AHR EXPO 2024" is the title of Bill Smith's excellent show report. If you weren't able to attend, this will give readers an excellent review of new refrigerants and technologies introduced.

Emerson continues to provide us with excellent compressed air monitoring content. Hendrik Priemer's article describes how monitoring can improve process efficiency while reducing energy use.

Bill Smith provides us with a second show report titled, "The 2024 Cooling Technology Institute Annual Conference." Take a look to get an update on the educational materials, standards and technology visitors to this event experienced.

We are now accepting speaker abstracts for the Best Practices 2024 EXPO & Conference taking place October 29-31 in Atlanta at Cobb Galleria. Please mark your calendars to visit us and if you'd like to speak visit https://cabpexpo.com/conference/speaker-submission/

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

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

BEST PRACTICES EXPO & CONFERENCE CABPEXPO.COM
COMPRESSED AIR / VACUUM / COOLING

CAGI Compressed Air & Gas Institute

COOLING TECHNOLOGY INSTITUTE

2024 MEDIA PARTNERS

SMC®

Automation - Controls - Process

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

Moisture is found in compressed air lines & exhausting from valves & actuators on equipment, thereby reducing component life and machine efficiency.

Tired of draining water & oil from your compressed air lines every spring , as well as cleaning or replacing pneumatic components well before their lifespan?

The Solution:

Remove the Moisture

The SMC Dryer Advantage

- **Environmentally friendly R124a/R407C refrigerant**
- **Simple control system, incorporating easy to read evaporator gauge**
- **Stainless steel heat exchanger providing long-life & low-pressure drops**

SMC Dryers provide low energy consumption & efficient operation in sizes to work with air compressors from 1/3 to 100 horsepower (0.24kW to 75kW) & flow ranges from 10 scfm to 400 scfm.

Air Management System

Level up your sustainability, digitalization, & condition-based maintenance

- **Save energy and improve sustainability**
  Programmable automatic pressure reduction and shut-off times
- **Enhance your maintenance capabilities**
  Measurement and follow-up of flow, pressure and temperature

Providing Sustainable, Energy Efficient and CO_2 Reducing Components for Industrial Automation

SMC Corporation of America (800) SMC.SMC1 (762-7621) www.**smcusa**.com

SMC Automation (Canada) Ltd. (800) SMC.SMC1 (762-7621) www.**smcautomation**.ca

Energize Your Efficiency

Compressed Air Technology & Industry News

Ingersoll Rand Acquires Friulair

Ingersoll Rand, a global provider of mission-critical flow creation and industrial solutions, closed on the acquisition of Friulair in an all-cash upfront purchase price of approximately $146M.

Based in Italy, Friulair is recognized globally for its design and production of dryers, filters, aftercoolers, and accessories for the treatment of compressed air as well as its chiller product line. The addition of Friulair will increase the scale of Ingersoll Rand's air dryer business, significantly increasing the company's access to the original equipment manufacturer channel and will add new chiller production capabilities. It also adds manufacturing locations in Cervignano del Friuli, Italy and Si Racha Chon Buri, Thailand.

Friulair employs approximately 215 people and has approximately $65 million in revenue. Through the realization of synergies and the deployment of IRX, Ingersoll Rand expects to realize Adjusted EBITDA margins in excess of 30% by year three of ownership.

"Acquiring Friulair will give us the opportunity to accelerate growth across food and beverage and pharmaceutical end markets, in addition to scaling our existing air treatment business," said Vicente Reynal, chairman and chief executive officer of Ingersoll Rand. "I am excited to welcome the Friulair team into the Ingersoll Rand family."

Friulair will join Ingersoll Rand's Industrial Technologies and Services (IT&S) segment.

About Ingersoll Rand

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

Sauer Compressors Appoints Two New Managing Directors

Two new managing directors strengthen the management team of the Sauer Compressors Group. The compressor manufacturer has appointed Nicole Fässler as CFO and Mladen Milcinovic as COO.

As CFO, business economist Nicole Fässler is responsible for the new management area of Finance, HR and IT. The Swiss national has extensive experience in the areas of finance and digitalization. She was most recently employed in the management of a medium-sized company in the watch industry.

Mladen Milcinovic has been appointed COO at Sauer Compressors and oversees the Operations area. The mechanical engineer and business economist gained many years of experience in compressor technology before specializing in Operations. Most recently, he was Managing Director of a medium-sized industrial company.

The two new Managing Directors will succeed Franck Lallart, who left the company at the end of 2023. Lallart has held various roles at Sauer Compressors since 2012 and has been a member of the group's management board since 2018.

The Sauer Compressors Group continues to grow. It currently employs around 1000 people in 15 international companies. To accommodate this growth, the group's management now consists of five members: Hendrik Murmann (CEO), Dirk Slottke (CSO), Peter Mißfeldt (CTO), Nicole Fässler (CFO) and Mladen Milcinovic (COO).

The new management of Sauer Compressors: (from left) Hendrik Murmann (CEO), Nicole Fässler (CFO), Mladen Milcinovic (COO), Dirk Slottke (CSO) and Peter Mißfeldt (CTO).

Compressed Air Technology & Industry News

About Sauer Compressors

Sauer Compressors is a medium-sized German group of companies with 15 international subsidiaries. The company looks back on 140 years of history and over 90 years of experience in compressed air and gas technology. These days, the focus is on the development, manufacture and sale of oil-lubricated and oil-free medium- and high-pressure compressors for applications in commercial shipping, navy, industry and offshore sector. The four product lines SAUER, HAUG, GIRODIN and EK focus on specific fields of application. The SAUER line comprises oil-lubricated high-pressure compressors for a wide variety of applications, while HAUG stands for oil-free and hermetically gas-tight compressors. The GIRODIN and EK lines offer special compressors for the naval market. The modern reciprocating compressors for compressing air as well as a variety of gases reach pressures of 20 to 500 barg. In addition to standard products, customized solutions are offered for every type of application for individual customers, OEMs and globally active companies. With a worldwide network of representatives and partners, Sauer is always close to its customers. By supplementing the compressor range with high-quality accessories, engineering services, assembly and service concepts, Sauer provides complete system solutions right up to complete turnkey installations. Further information at www.sauercompressors.com

Bobcat Company Donates to Engineering School

Bobcat Company is donating $250,000 to the University of Mary in Bismarck, N.D., in support of the Hamm School of Engineering.

"Supporting STEM-based education is a key component of Bobcat's foundation of innovation – a longstanding belief that has generated community progress and fueled the curiosity needed to build the technology of tomorrow," said Mike Ballweber, president of Doosan Bobcat North America. "We are proud to support University of Mary as they advance educational opportunities for the next generation of groundbreaking engineers."

Headquartered in West Fargo, N.D., Bobcat is the state's largest manufacturer and a major employer with more than 3,800 North Dakota-based employees at facilities in Bismarck, Gwinner, Fargo, West Fargo and Wahpeton.

Bobcat's donation will support the engineering school through the University of Mary's Vision 2030 Capital Campaign, a comprehensive strategic planning initiative to enhance and transform the university campus and offerings. The Hamm School of Engineering facility opened in 2020 and is state-of-the-art designed to encourage collaboration and hands-on learning. The school offers ABET accredited degrees in mechanical, electrical and civil engineering. The Hamm School of Engineering also offers computer science, environmental engineering, construction engineering and construction management.

"We are extremely humbled and grateful for this gift from Bobcat Company, an innovative and industry leader throughout the world," said Jerome Richter, executive vice president at the University of Mary, and the person leading the Vision 2030 Capital Campaign. "We appreciate

Bobcat's continued commitment to our Hamm School of Engineering students. Our students are highly sought after, recruited by firms well before they graduate, and not only are they trained in technical skills, but also well-formed servant leaders who are culturally prepared for the workplace."

As the largest employer of engineers in North Dakota, Bobcat understands firsthand the tremendous need right now for engineers locally, regionally and globally. Data shows, 70% of the students in the Hamm School of Engineering are from out of state, and last year, 67% of its graduates stayed in North Dakota to work for engineering firms. Therefore, this donation exemplifies the strong partnership between University of Mary and Bobcat, and just as important, the collaboration for continued growth and prosperity in the state.

Over the years, several Bobcat team members have served as advisor committee members for University of Mary engineering students. Bobcat also supports classroom presentations and senior design projects, and recruits University of Mary students every year for full-time employment, co-op and intern experiences throughout various departments.

"As a company based in North Dakota, we are committed to nurturing the state and region's future innovators, engineers and technology leaders," said Scott Schuh, Doosan Bobcat chief technology officer and senior vice president. "That requires investment in the initiatives that will create the next generation of STEM professionals, whose technology and engineering expertise will ensure our state's businesses continue to grow and thrive."

Individuals interested in learning more about the University of Mary's Vision 2030 Capital Campaign can visit www.umary.edu, or those

Bobcat's donation will support the engineering school through the University of Mary's Vision 2030 Capital Campaign.

Compressed Air Technology & Industry News

who want to inquire about the Hamm School of Engineering can contact the university at 701-355-8030 or enroll@umary.edu.

About Bobcat Company

Since 1958, Bobcat Company has empowered people to accomplish more. As a leading global manufacturer, Bobcat has a proud legacy of innovation, delivering smart solutions to customers' toughest challenges. Backed by the support of a global dealership network, Bobcat offers an extensive line of worksite solutions, including loaders, excavators, tractors, utility vehicles, telehandlers, mowers, turf renovation equipment, light compaction, portable power, industrial air, forklifts and industrial vehicles, attachments, implements, parts and services. With its North American headquarters in West Fargo, North Dakota, Bobcat leads the industry with its innovative offerings designed to transform how the world works, builds cities and supports communities for a more sustainable future. The Bobcat brand is owned by Doosan Bobcat, Inc., a company within Doosan Group. For more information, visit www.bobcat.com.

Next Air & Gas Expands Production Facility

In early March 2024, Next Air & Gas began expansion in their production facility, extending manufacturing from their existing 20,000 square feet facility. The new facility provides an additional 15,000 square feet, with further expansion up to 50,000 square feet. The new facility is located adjacent to their main offices of operation.

The new facility will focus on the production of desiccant and refrigerated dryer manufacturing. Next's pre-existing facility will support the development and manufacturing of future nitrogen, oxygen, and heat of compression product lines.

"One of our core values is to look to the long term–and this expansion project is a testament to that belief. Next is tremendously grateful for the surge of growth seen in 2023, and we are beginning to prepare for what is expected in 2024. This development is a key deliverable to meet manufacturing demand

A surge of opportunity driven by the demand for global compressed air treatment drives growth for the manufacturer in Tennessee.

and allows our primary facility to act as our "hub" for innovation and design. This aligns with our plan to support growth and new product development offerings for the years to come," said Kevin F. Zarif, Vice President, Next Air & Gas.

About Next Air & Gas

Next Air & Gas, headquartered in Lenoir City, TN, is the next chapter in the Zarif's air treatment legacy spanning over 30 years in the industry. The company is led by Founders CEO Mike Zarif and Vice President Kevin F. Zarif. NEXT Air & Gas is a research/development firm and mass manufacturer of compressed air & gas dryers, with a specialty in desiccant and refrigeration drying technologies, process cooling, compressed air filtration, and gas generation in nitrogen and oxygen. The vision of the company is to build upon its manufacturing experience and capabilities with a concentration on the development of innovative air & gas treatment products. For more information, visit nextairgas.com.

DENSO Works with ESG to Update Compressed Air Systems

DENSO, a leading mobility supplier, is working with Energy Systems Group (ESG) to increase the sustainability of operations at its thermal manufacturing facility in Battle Creek, Michigan. Through the collaboration, the leading energy solutions company is replacing and updating compressed air systems at the DENSO site, enhancing its energy efficiency and climate friendliness.

In summer 2024, when updates are expected to be complete, the new systems will begin to help DENSO remove nearly 3,000 tons of carbon dioxide annually from the thermal facility's operations.

"Our commitment to being green doesn't only apply to our products. It also motivates us to continuously seek new ways to operate more sustainably and conserve more energy," said Todd Greer, a director of Facilities and Engineering Production at DENSO's Battle Creek thermal facility. "We are grateful for ESG's support, as it will be crucial to our pursuit of Eco Vision 2025, DENSO's global initiative to halve energy use and double clean and green activities by next year."

ESG uses its rich energy management and sustainable infrastructure expertise to deliver holistic, future-focused solutions to customers in various industries and federal, state and local governments.

"Partnering with DENSO is a great opportunity to further our efforts to create a more resilient, sustainable future for our planet," said ESG Account Executive, Michael Nordloh. "In this project, we are excited to help DENSO optimize its compressed air usage in Battle Creek, which will reduce the site's carbon footprint while providing significant energy and cost savings."

The program is the latest initiative DENSO has implemented at the Battle Creek thermal facility that supports its Two Great Causes: Green – achieving carbon neutrality by 2035 – and Peace of Mind – creating a safe and seamless world for all.

Compressed Air Technology & Industry News

In September 2023, DENSO announced with Michigan Governor Gretchen Whitmer it was investing $63 million in the Battle Creek thermal facility to retool production lines and accommodate products that support electrified vehicles.

In April 2023, the Battle Creek thermal facility alongside other Michigan businesses joined the Consumers Energy Business Renewable Energy Program. Enrolled businesses agree to match energy they use with wind and solar energy that Consumers Energy develops in Michigan, helping spread clean energy across the state.

About DENSO

In North America, DENSO is headquartered in Southfield, Michigan, and employs 27,000+ engineers, researchers, and skilled workers across nearly 50 sites in the U.S, Canada and Mexico. In the United States alone, DENSO employs 17,500+ employees across 14 states (and the District of Columbia) at 41 sites. In the fiscal year ending March 31, 2023, DENSO in North America generated $11.3 billion in consolidated sales. DENSO is committed to advancing diversity and inclusion inside the company and beyond – a principle that brings together unique perspectives, bolsters innovation and pushes DENSO forward. To learn more about DENSO operations in the region and to review current career opportunities, please visit www.denso.com.

Hycomp Now Part of Atlas Copco Group

Hycomp Inc.'s technology has become part of Atlas Copco Group. The company designs, produces, sells and services specialized high-pressure oil-free compressors and boosters for a variety of industries.

Hycomp is a privately owned company located north of Salt Lake City, Utah, and has 37 employees. In 2023 the company had revenues of MUSD 8 (MSEK 85)*.

"Hycomp has extensive know-how in high-pressure oil-free compressors, and the acquired technology complements our existing technologies, allowing us to extend our current product range," said Vagner Rego, Business Area President, Compressor Technique.

The purchase price is not disclosed. Hycomp's technology will become part of the Professional Air division within the Compressor Technique business area.

About Atlas Copco Group

Atlas Copco Group enables technology that transforms the future. We innovate to develop products, services and solutions that are key to our customers' success. Our four business areas offer compressed air and vacuum solutions, energy solutions, dewatering and industrial pumps, industrial power tools and assembly and machine vision solutions. In 2022, the Group had revenues of BSEK 141, and 49 000 employees. For more information, visit www.atlascopcogroup.com.

BLOWER & VACUUM BEST PRACTICES blowervacuumbestpractices.com

COMPRESSED AIR BEST PRACTICES airbestpractices.com

CHILLER & COOLING BEST PRACTICES coolingbestpractices.com

PROUDLY PRESENTING THE 2024 EXPERT WEBINAR SERIES

Don Van Ormer
Auditor, APEnergy

Julie Gass
Lead Mechanical Process Engineer, Black & Veatch

Andy Smiltneek
President, Growth Solutions Consultants

Mike Flowe
President, Flowe Nitrogen Systems

Hiran de Mel
Senior Project Manager and Principal Technologist, Jacobs

Tom Taranto
Owner, Data Power Services

Todd Dunn
Vice President Sales & Marketing, Zorn Compressor & Equipment

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

JAN 25
ASME PTC13 in Action: Practical Approach to Blower System Performance Testing
Presenter Julie Gass, Lead Mechanical Process Engineer, Black & Veatch and Hiran de Mel, Senior Project Manager and Principal Technologist, Jacobs – *Sponsored by Inovair*
Thursday, Jan 25, 2024 – 2:00PM EST

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

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

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

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

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

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

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

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

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

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

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

JUL 25
Instrumentation and Monitoring for Vacuum Systems
Presenters Emma Larrabee, Marketing Manager and Todd Dunn, Vice President Sales & Marketing, Zorn Compressor & Equipment – *Sponsored by Quincy Compressor*
Thursday, July 25, 2024 – 2:00PM EST

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

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

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

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

OCT 03
Selecting PSA vs. Membrane Nitrogen Generation Systems
Presenter Mike Flowe, President, Flowe Nitrogen Systems – *Sponsored by Pneumatech*
Thursday, October 3, 2024 – 2:00pm est

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

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

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

DEC 19
Selection Criteria for Oil-Free Air Compressors
Presenter TBD – *Sponsored by FS-Curtis/FS-Elliott*
Thursday, December 19, 2024 – 2:00PM EST

Register for Free Today at airbestpractices.com/webinars

Missed a Webinar? Register to View from our Archives at https://www.airbestpractices.com/webinars

SPONSORED BY

Houston's S&S HVAC Equipment

By Terri Perrin

S&S HVAC replaced a cooling tower at the top of the 26-storey Lyric Tower in downtown Houston.

Back in the 1980's, when most female high school students may have been dreaming of becoming a teacher, a nurse or other more traditional 'female' roles, Angela Sherman had her heart set on becoming a sales engineer and running her own business.

In 1986, Sherman graduated from Georgia Tech as a Mechanical Engineer and was hired by Carrier, then Honeywell, before realizing her dream of owning her own business in the Greater Houston area. In 2007, she and her husband Steve Sherman, started S&S HVAC – the 'S&S' stood for 'Sherman and Sherman'.

"In February 2008, SPX approached me about Marley® cooling towers," explains Angela Sherman. "They were doing a corporate reorganization, and I had an opportunity to become their representative. The Marley brand continues to be a prominent product in the cooling space. The honor to represent the Marley Cooling Tower line is a real achievement because it is such a well-respected brand that's asked for by name. Like tissues. No-one asks you for a tissue, they ask for a Kleenex. We were lucky to be in this market, as most people feel that Marley cooling towers are a leading option."

Angela Sherman, President, S&S HVAC Equipment

Fast forward to 2024

Today, S&S HVAC is a trusted commercial and industrial HVAC manufacturers' representative with about 20 employees. It continues to be led by Steve Sherman (Sales Engineer, Treasurer), Scott Steffen(Vice President) and Angela Sherman (President). Robert Hatcher is their service sales manager. They specialize in hydronic equipment, parts and service and have been a trusted partner for more than 1,000 commercial and industrial clients to date. In addition to Marley cooling towers, the other premium products lines they represent include Patterson Pumps, Patterson-Kelley Boilers, Puroflux Filtration, and Kinetics Noise Control solutions.

"I may be President, but I'm still an active salesperson," says Sherman. "I still quote, budget, and troubleshoot jobs… and, for me, working with our customers is the fun part. In addition, as owner, I have to ensure our employees are happy, plus look after insurance, computer systems, and all the little things you don't really think about. Thankfully, Scott and I share those responsibilities."

Sherman adds that their team's dedication and commitment to customer service creates a seamless experience from the time of inception, through engineering design, product specification, procurement, installation and final commissioning. And their seasoned sales engineers maintain open communication and offer value-added guidance and solutions at each stage of the project.

Factors to Consider When Specifying a Cooling Tower

"SPX and their brands have a solid reputation," explains Sherman. "It's one of the few companies that have a full product line, which has allowed us to be a true consultant of cooling towers. We can suggest different options based on footprint, horsepower, energy efficiency – whatever the customer's criteria are. And people, as much as the equipment, have an impact. Having a great product takes you a long way but your reps have to be responsive, good listeners and know their products."

"There are a multitude of factors to be considered, whether replacing or repairing an existing cooling tower or installing in new construction. Floating floors in a high-rise, for example, must be addressed because they allow the absorption of noise from the heavy equipment. You can't have noise transfer into the whole building. Switching from a wooden tower to stainless steel, is another example. A footing evaluation and possible reinforcement may be required, due to age and corrosion. The fact that our sales team are all engineers ensures that we address these types of issues with technical skill and confidence."

Sherman believes that the recent shift, with large brand chilling companies moving from factory direct to independent reps, is a transition that will continue. Why? Mostly because of economics. With product reps working directly with customers, the manufacturer doesn't have to concern themselves with office overhead, employees, insurance, different taxes in each state, and more. It's a win-win situation.

Whether or not to have service departments is also at issue. It's very market driven and is a question that Marley is always asking. S&S HVAC only works on cooling towers with their own employees and subcontracts to major contractors. Having an in-house service team allows them to offer the full spectrum – to

Houston's S&S HVAC Equipment

Cooling Tower Installation and Piping Reconfiguration

In January 2024, the S&S HVAC team worked with MLN Company, a premier Mechanical Contractor in Houston to replace the cooling towers for the offices of a major corporation in Houston. The piping was previously installed in such a way that it was very difficult to take down the towers without taking down the entire plant. They worked with MLN Company and piped the towers differently as a temporary fix to allow for one cell to remain running while others were replaced. Once that was complete – piping was replaced to the original configuration.

Basis Of Design:
Marley NC Cooling Tower

- Induced Draft Crossflow Design, Three Cell Configuration

Construction

- Complete Stainless-Steel Construction (casing, structure, collection basin, and distribution basins).
- Marley Geareducer® Drive w/ 5 Year Warranty
- Point-Load Anchor Configuration for Installation on Structural Steel as Designed

S&S HVAC worked closely with a mechanical contractor to reconfigure cooling tower piping.

- No modification to structural steel required.
- 15 mil PVC Fill w/ Integral Louvers & Drift Eliminators

Pipe Connections

- Dual Top Inlet with HC Valves
- Depressed Sump Outlet w/ Trash Screens & Anti-Vortex Plates
- Bottom Equalizer, Bypass, Drain & Overflow Connections

Enhanced Service Options

- Motors Positioned Outside the Moist Airstream
- Exterior Motor Access Platforms
- Exterior Door Access Platforms
- Internal Plenum Walkway, Ladder and Access Platform
- Fan Deck Access Ladders with OSHA Cage & Extension to Grade
- Fan Guards
- External Lube Lines w/ Dipstick

Controls

- Make-Up Water Float Assemblies
- Electric Basin Heaters w/ Control Panels
- Vibration Limit Switches

Tower Duty

- 7650 gpm
- Wet Bulb = 80 F
- Approach = 6 F
- Hot Water Entering = 96 F
- Cold Water Leaving = 86 F
- Range = 10

install, clean, inspect, repair or replace cooling towers. Sherman adds that they started the service department within a couple of years of starting the company, to provide the best possible service overall.

"For installation, for example, think of it like getting an Ikea desk," explains Sherman. "It comes in a box, but sometimes the instructions aren't easy to understand. It's the same with cooling towers. Some will be delivered, and the installation instructions are complicated. So, at S&S HVAC, we started providing a 'Trim Out' package in 2010. It includes all components the customer may need from a ladder and a handrail, to setting motors, installing external platforms – basically everything that is required for set-up. And our team works with the contractor for installation. Every mechanical contractor we have worked with loves it. We started a trend! In Houston, all of our competitors now do this as well."

New Construction Utilizing New Technology

"With new construction, where there is an architect and owner, the client typically hires an engineer," reports Sherman. "We work closely with engineers from the start, using an SPX program called CoolSpec™ Product Selector, to design footings, piping, access, electrical, etc. It's an intuitive tool that compares and selects Marley® and Recold® brand evaporative cooling products – open-circuit and closed-circuit, crossflow and counterflow cooling towers, fluid coolers and

Houston's S&S HVAC Equipment

S&S HVAC team members providing "trim out" work installing a SPX Marley cooling tower at a Houston area high school.

evaporative condensers. We put the data from our visit to the installation site into CoolSpec and, in 15 minutes, can generate project specific drawings. Engineers can then take that information and cut and paste it into their project. Some of them do this at the starting point, to compare systems. They can then change or improve it if they want.

"Once the specs are created, it goes out for bid to general and mechanical contractors. We are the preferred supplier, so there is a preference, when it is financially feasible to use us, over the competition. Especially if the location is critical on space, because architects want the cooling tower to be hidden from view, if at all possible."

Maintenance, Repair or Replacement

"We also work with building managers/owners for towers that need inspection, cleaning, repair or replacement. These towers may not be the Marley brand. Some may be made of wood, which was common many years ago, and they need complete replacement with a new stainless-steel tower. We help them find the best way to achieve this. And that's why we always go to the job site before quoting.

We look and measure, to ensure good placement and sound footings. Most often, the replacement must be done over the weekend with a planned shutdown and be back running for Monday morning. It gets a little hairy if it's too windy to operate the crane – that removes the old towers and lifts new ones into place – or if other challenges arise. It's fast paced."

Sherman gives an example of when they replaced a wood cooler tower on the 26-storey Lyric Tower in downtown Houston for Hines – one of the largest privately held real estate investors and managers in the world. She says the tower was kind of in a hole on the top of the building, with not much space around it, and was difficult to access. Cranes tall enough for the high-rise were hard to come by and, after 9-11, helicopters are not allowed in downtown Houston. They looked at rebuilding the wood tower, piece by piece with Hines, the design engineer, T &D Engineers, and the installing contractor, Graco Mechanical, but this wasn't an option (they don't make wooden towers like they used to, and it wouldn't last very long).

A stainless steel package cooling tower was the best option. Luckily, they found a crane large enough to support the project, which required us to shut down a downtown street on a busy weekend, with the crane taking up an entire city block, hire police to direct traffic, and lift old components down and the new tower up, all in one weekend. Each situation is like a puzzle you have to solve, between us, the contractor, and sometimes the crane operator.

"Our team is proud to be known as a reliable partner in our industry, and we value the relationships we build with our customers, both large and small," concludes Sherman.

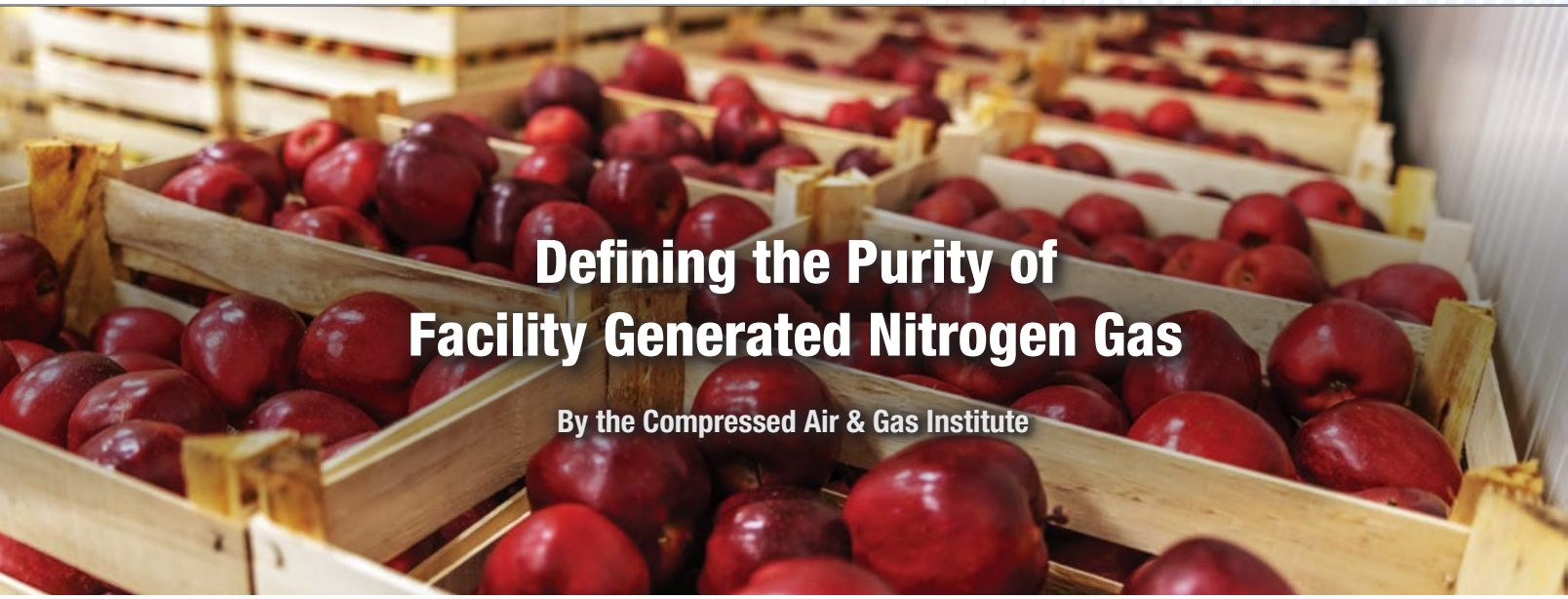
"Those relationships are only possible because of our commitment to excellence at every level. That's why we're dedicated to providing quality products and services that are always delivered with integrity." BP

All photos courtesy of S&S HVAC.

For more information visit: https://sshvac.com/ and https://spxcooling.com/cooling-towers/

For similar articles on ***Cooling Towers*** please visit https://coolingbestpractices.com/index.php/technology/cooling-towers.

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



Defining the Purity of Facility Generated Nitrogen Gas

By the Compressed Air & Gas Institute

While oxygen is unquestionably the most important gas in our atmosphere, as it is essential for most animals and human life, nitrogen is the most widely used atmospheric gas. Nitrogen is the go-to gas for countless industrial, medical, and scientific applications. This is because nitrogen is in vast supply, inert, and possesses the desirable characteristics of being colorless, odorless, and tasteless. The purity of nitrogen significantly affects the outcome of the application for which it is used and how the industry measures the purity of nitrogen gas is the focus of this article.

Stating the Purity of a Stream of Nitrogen (N_2) Gas

A 16-ounce beer glass contains 8 ounces of delicious, craft-brewed beer. Is the glass half-full or half-empty? Psychologists will position that the "half-full" answer reflects an optimist whereas a "half-empty" answer reflects a pessimist. Regardless of the psychological interpretations, both answers are correct statements of the volumetric condition of the glass.

A similar dual-answer scenario exists when stating the purity of a stream of nitrogen (N_2) gas. The atmosphere is comprised of 78% nitrogen and 21% oxygen with all other gasses representing the remaining 1% of the atmosphere. Since these two gasses are the predominant atmosphere constituents, the purity of nitrogen in a N_2 gas stream is typically stated as either the percentage of nitrogen in the sample relative to oxygen or, alternately, by the amount of O_2 remaining within the sample as measured in ppm of O_2. For example, a nitrogen stream that is rated at 95% purity will contain 5% O_2. This means that in a 1-million molecule sample of 95% purity nitrogen, there will be 50,000 molecules of O_2, an O_2 content of 50,000 ppm. Another way of stating the purity of the 95% pure nitrogen would be to state that the gas stream has an O_2 content of 50,000 ppm.

Nitrogen purity below 99.5%, an O_2 concentration of greater than 5,000 ppm, is usually stated in terms of the percentage of nitrogen in the sample. As nitrogen purity levels reach 99.9% and higher, it is more common for the nitrogen purity to be stated in reference to the ppm of O_2 remaining in the process gas stream. For example, a process gas stream having a nitrogen purity of 99.9% will be stated as having an O_2 content of 1,000 ppm. Similarly, a process gas stream having a nitrogen purity of 99.999% will be stated as having an O_2 content of 10 ppm. As the nitrogen purity increases, stating its purity in terms of the remaining O_2 content is a more precise measurement. Also, the convention within the gas industry is to state the concentration of N_2 as the total number of "9s" both to the left and to the right of the decimal point of its purity percentage. For example, a N_2 purity of 99.9% will be referred to as 3-9s of

CAGI
Compressed Air & Gas Institute
www.cagi.org

Wall-mounted membrane N_2 generator, such as might be used for dispensing beer.

The Compressed Air and Gas Institute (CAGI)

The Compressed Air and Gas Institute (CAGI) is the united voice of the compressed air industry, serving as the unbiased authority on technical, educational, promotional, and other matters that affect compressed air and gas equipment suppliers and their customers. CAGI educational resources include e-learning coursework, selection guides, videos, and the *Compressed Air & Gas Handbook*.

The Nitrogen Generation Section consists of the following member companies:

- Atlas Copco Compressors
- Holtec Gas Systems
- Mikropor America
- Nano-purification solutions
- Parker Hannifin Corporation, Industrial Gas Filtration & Generation Division

For more information, visit the CAGI web site at www.cagi.org, and follow CAGI on LinkedIn.

purity. The above-described stream of N_2 containing 10 ppm of O_2, 99.999% N_2 purity, will be referred to as a gas purity of 5-9s.

Facility Generated Nitrogen

Since nitrogen is quite plentiful within our atmosphere, it is economical for small to large nitrogen users to invest in facility generated nitrogen rather than rely on the delivery of cryogenic N_2. Gaseous separation of nitrogen from the atmosphere involves either Pressure Swing Adsorption (PSA) or Membrane separation technology.

PSA nitrogen generation involves passing compressed air through a bed of adsorbent material, typically Carbon Molecular Sieve (CMS), that has been selected to adsorb oxygen. O_2 bonds to the adsorbent material. This results in a nitrogen enriched gas stream with N_2 purities in the range of 95% to 99.999%. Once the adsorbent material has become saturated with O_2 it is desorbed by a pressure reduction and the O_2 returns to the atmosphere. To supply a continuous flow of nitrogen gas to the process, PSA systems typically use twin adsorption towers, one of which is generating N_2 while the other tower is regenerating itself by desorbing O_2.

Membrane technology involves passing compressed air through a membrane consisting of hollow filaments that are perforated with microscopic pores. The pores allow the smaller O_2 molecules, along with water vapor, to permeate the filament and exhaust to atmosphere while the larger N_2 molecules remain within the filaments and are exhausted as a continuous stream of N_2 in the purity range of 95% to 99.9%. Purities

Defining the Purity of Facility Generated Nitrogen Gas

Small, twin tower PSA N_2 generator. (Note: Some designs may include multiple pairs of beds.)

A large PSA style N_2 generator such as might be used for circuit soldering applications – capable of 10,500 SCFH of 99.995% N_2 (less than 50 ppm O_2.).

Small, cabinet membrane N_2 generator.

Mid-sized PSA N_2 generator as often used for laser cutting operations – produces 5700 SCFH of 99.99% N_2 (less than 100 ppm of O_2.).

higher than 99.9% can be achieved with membrane technology, but to do so requires significantly more compressed air than is required by a PSA system of equal purity and production capacity.

Typical Facility Generated Nitrogen Applications

The reason why the oxygen content in a stream of nitrogen gas is so important is because many industrial processes are adversely affected by the presence of even small concentrations of oxygen. Oxygen is an extremely reactive molecule that attracts electrons from other elements and oxidizes them. Oxygen is responsible for many of the undesirable oxidation reactions that occur in nature and industry: rusting steel, spoiling organic matter (food), and unwanted combustion of flammable liquids. Thus, controlling the oxidation process in industrial applications involves either eliminating oxygen or reducing the oxygen to nitrogen ratio to the point that the oxygen is incapable of producing detrimental amounts of oxidation.

Described below are three typical applications where a facility generated, enriched nitrogen atmosphere is critical.

Long term fruit storage: Oxygen causes fruit to spoil. To eliminate the oxidation of stored apples, the cold storage room is flooded with low purity nitrogen. Nitrogen purity levels of 95% to 99% adequately do the job allowing apples to remain fresh in storage for 6 months or longer. The N_2 source for this application is mainly supplied by gaseous membrane separation systems.

Circuit board soldering: The electronics industry relies on high-quality soldered connections to join electrical components together on printed circuit boards. The to-be joined components are wetted with hot, liquid metal (solder) that hardens to form a long-lasting joint. Oxygen in the process in as small a concentration as 1000 ppm reacts with the hot liquid solder creating metal oxides, known as dross, which interfere with the soldering process. Soldering in a nitrogen enriched environment that has an O_2 content not greater than 1000 ppm reduces dross production, increases joint integrity, and increases productivity by

Defining the Purity of Facility Generated Nitrogen Gas

minimizing scrap and re-work. Depending on the size of the soldering operation, the required volume of 3-9s purity N_2 can be supplied by either membrane or PSA technology.

High speed laser cutting of thick stainless steel: During the cutting process, O_2 in the atmosphere will allow oxidation at the cut edges, making them tarnished and unable to allow paint to adhere in the cut area. To achieve a bright, no-tarnish finish when laser cutting ½" or thicker stainless steel, the cut must be isolated with a cone of high purity nitrogen having a purity range of 99.99% to 99.999% (4-9s to 5-9s)…that's an oxygen content of no greater than 100 ppm to 10 ppm. The faster the cutting speed, the higher the purity of nitrogen that is required. The N_2 source for this application is mainly supplied by gaseous PSA separation systems that can economically deliver both the purity level and volume required for this continuous operation.

Nitrogen is the preferred gas for industrial and scientific applications because of its utility in accomplishing the following:

- Prevent oxidation of materials
- Prevent bacteriological growth
- Reduce the level of combustion-supporting gas
- Prevent O_2 incursion into processes
- Provide a dry atmosphere

In all of the above processes, nitrogen is introduced to reduce the concentration of oxygen and eliminate or reduce the detrimental effects of oxidation. The nitrogen purity that is required depends upon the application and how much oxygen the nitrogen gas is required to displace. The convention within the gas generation industry is to state the purity of lower-purity nitrogen streams as the percentage of N_2 while stating the purity of higher-purity nitrogen streams by the ppm of O_2 remaining in the gas stream.

Conclusion

Facility generated nitrogen generation systems provide a reliable, efficient, and safe solution to supplying the nitrogen which industry requires. Two processes are used for facility generated N_2 generation: Pressure Swing Adsorption (PSA) and Membrane separation. Both methods can produce low and high purity N_2 in acceptable volumes to satisfy the majority of applications found in industry. Selecting the best N_2 generation source depends upon the purity of nitrogen required, the volume of nitrogen required, and the costs of the generation equipment. Industries that invest in facility generated nitrogen generation systems are discovering that they can economically and reliably harvest the endless supply of nitrogen in the atmosphere to deliver a continuous supply of high purity, clean, and dry nitrogen gas to satisfy their production requirements. On site N_2 generation systems have proven to be a reliable and economical alternative to storing and utilizing cryogenically produced N_2. BP

To read more ***Nitrogen Generation Technology*** articles, visit https://www.airbestpractices.com/technology/air-treatment.

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

SUBSCRIBER CORNER

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, pumps) powering modern plant automation. This subscriber-driven monthly column hopes to build community and recognize all subscribers!

Atlas Copco rotary screw vacuum pumps supporting a rotary meat packaging machine at the Amcor Moda booth at IPPE 2024 in Atlanta (International Production & Processing Expo). Vacuum Sales Manager Shelly Oliverios (pictured) explained they are two stage machines (with a booster) providing 0.5 Torr pressure. He said the system allows for greater machine speeds due to providing more flow per horsepower and VSD energy savings versus the prior vacuum system. Visit https://www.atlascopco.com/en-us/vacuum-solutions

AERZEN Rental was represented at the IPPE Show by subscribers Scott Werner and Meghan Babineaux (left to right). They told me they are seeing interesting pneumatic conveying applications at 20-50 psi and are getting into temporary rental aeration grids for wastewater. Visit https://www.aerzenrental.com/en-us.html

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 Roderick Smith at rod@airbestpractices.com.

SUBSCRIBER CORNER

In the real world, our subscribers (sales engineers, service technicians and facility maintenance personnel) regularly witness "crazy" on-site utility (compressed air, vacuum, blowers, chillers, cooling towers, pumps…) system designs and maintenance practices. This subscriber-driven monthly column hopes to raise awareness, provide a learning opportunity and have a bit of fun!

Why is a Compressed Air Storage Tank Cold – in Sunny Argentina?

Ing. Marcelo Cassani is a U.S. DOE AIRMaster+ Qualified Specialist and the Owner of Pneumac Service S.A., based in Buenos Aires, Argentina. Visit https://www.pneumatic-service.com.ar/

He writes: "When I was conducting a compressed air audit, at a tissue paper facility, the customer referred to having experienced several issues with moisture and water affecting the reliability of the system."

"After reviewing the installation and finding a poor configuration of the compressed air drying equipment, we continued paying detailed attention to the system. That was when something very peculiar was discovered."

"Despite being in the sun, one of the compressed air storage tanks was cold. Using a thermal camera, we discovered this tank was 60% full of water. I asked the customer to remove the valve in order to remove the water and clean the obstructed condensate drain. Once removed, over 2,000 liters (500 gallons) of water flooded the street outside the facility.

The simple solution was to change the compressed air condensate drain, on the tank ($120), and include it in the preventative maintenance routine.

Using a thermal camera, the compressed air audit discovered the compressed air storage tank was 60% full of water. Photo credit: Marcelo Cassani, Pneumac Service S.A.

Two thousand liters (500 gallons) of water came pouring out of the compressed air storage tank. Photo credit: Marcelo Cassani, Pneumac Service S.A.

Drilled PVC Piping Presents a Serious Safety Hazard in Florida

Daniel Smayda is the Owner of Advance Air Compressor Sales & Repairs, based in the greater Tampa Bay, Florida, region. Visit https://advanceaircomp.com/

He writes: "I visited a small facility and they allowed me to review their compressed air system. I found they had installed the piping themselves and used PVC plastic piping. Not only is PVC plastic piping not recommended, but they drilled in screws to secure elbows and fittings on the piping."

"The facility was notified in writing that this is a flagrant OSHA violation and that the piping is at risk to explode – which could cause life-threatening injuries to employees. " We proposed removing this piping immediately and installing an aluminum piping system designed for compressed air. We have not heard back from them yet."

The client drilled in screws to secure fittings and elbows in plastic PVC piping being used for the compressed air system. This is at risk to explode and harm workers. Photo credit: Daniel Smayda, Advance Air Compressor Sales & Repairs

Submission Guidelines

We invite our subscribers to send their observed "Crazy" Systems & Maintenance experiences to Roderick Smith at rod@airbestpractices.com. Please send a high-resolution picture as a JPG or PDF 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.

Refrigerant Compressor, Chiller and Cooling Tower Innovations at AHR 2024

By Bill Smith, Associate Content Manager, Chiller & Cooling Best Practices Magazine

The 2024 AHR Expo drew 48,034 attendees.

The 2024 AHR Expo co-sponsored by ASHRAE and AHRI, was held Jan. 22-24 at McCormick Place in Chicago, IL, concurrent with the ASHRAE Winter Conference. A total of 1,875 exhibitors spread across 527,520 square feet, and 120 free educational sessions drew 48,034 total attendees. Driven by decarbonization and green transition megatrends, this event highlighted the global refrigerant transition; adoption of heat pumps; integration of building automation systems and AI; and optimization of the energy/water nexus in applied equipment. This article recaps the response and innovation from manufacturers of chillers, cooling towers and related equipment.

Refrigerants, Refrigerant Compressors & Chillers

"Regulations are driving change in our industry," said Brian Dail, Application Engineering Manager, Danfoss – citing the AIM Act, Inflation Reduction Act, and the Securities and Exchange Commission's (SEC) proposal of rules to enhance and standardize climate-related disclosures for investors. Legislation to phase-out high-GWP refrigerants is escalating, and a global refrigerant transition is underway. Starting in 2024, the United States Environmental Protection Agency (EPA) issued a final rule that cuts the production of high-GWP hydrofluorocarbon (HFC) refrigerants by 40%.

"We're really focused on the hydrofluoroolefin (HFO) conversion. R-410A has been a workhorse in the chiller industry for a long time. We're now going to see a pivot to R-454B," said John Keating, Vice President and General Manager, Honeywell Refrigerants. "You will also see R-513A as a replacement for R-134A." Global chiller company Multistack will now utilize the Honeywell Solstice R-454B in its chillers and heat pumps.

"R-32 is now the refrigerant of choice for Daikin," said James Macosko, VP Product Management, Daikin Applied. "Our Trailblazer AGZ air-cooled scroll chiller has been converted from R-410A to R-32."

Chiller and heat pump manufacturers discussed broad capacity ranges, utilization of lower-GWP refrigerants, exceeding integrated part-load value (IPLV) efficiency standards, physical footprint optimization, centrifugal interstage refrigerant economization, and much more.

Kyle Fields and Eddie Rodriguez displaying a Turbocor oil-free magnetic bearing refrigerant compressor model at the Danfoss booth (left to right).

John Keating displaying Solstice R-454C, R-454A and L40X at the Honeywell booth.

Carrier displayed the AquaEdge 19MV2 water-cooled two-stage VSD centrifugal chiller (R-515B or R-513A), and AquaSnap 30 RC air-cooled scroll chiller (R-32). The AquaEdge chiller is equipped with refrigerant-side economizer, a two-stage back-to-back compressor design with inlet guide vanes on both stages to decrease turbulence. "These guide vanes provide a smooth refrigerant flow through the compressor with less turbulence, providing more capacity per RPM – and with our VSD technology, every RPM we can shave off, we're leveraging a cubic ideal fan loss," said Scott McDonough, Associate Director – Water Cooled Centrifugal Chillers. Carrier's AquaSnap air-cooled scroll chiller has been updated with R-32 and a smaller footprint. The AquaSnap is also equipped with a shell and tube evaporator – which is not typical to see on scroll chillers, according to Frank Silva, Product Manager. Carrier also introduced PLV Pro, a free software for chiller plant design.

Mihir Nandkeolyar and Fred Berry at the Johnson Controls booth (left to right).

"Consider the role AI will have in building controls over the 20-year life of a chiller installed today. Your chiller plant must have the largest operating envelope possible, because that defines the space the AI can optimize within," said McDonough.

Johnson Controls displayed a YMAE air-to-water inverter scroll heat pump (R-454B), a YVWH-200 water-to-water dual screw heat pump (R-1234ze or R-515B), a CYK-400 water-to-water compound centrifugal heat pump (R-1234ze or R-515B), and more. All three are capable of simultaneous heating and cooling operation. The YMAE can produce up to 140°F hot water, while the water-to-water units reach 170°F (CYK) and 176°F (YVWH) hot water temperatures. The YMAE exceeds ASHRAE 90.1-2022 IPLV efficiency standards by 54%.


Wallace Kittredge and Ian Goicochea at the Climate Control Group booth (left to right).

Frank Silva with the AquaSnap 30 RC air-cooled scroll chiller at the Carrier booth.

Lancelot Sharpe at the Copeland booth.

Refrigerant Compressor, Chiller and Cooling Tower Innovations at AHR 2024

ClimaCool, part of Climate Control Group, manufactures air-source and water-source modular scroll chillers with brazed plate heat exchangers in Oklahoma City – an epicenter for the commercial geothermal movement, according to Ian Goicochea, VP of Channel Sales. These products have dual scroll compressors achieving ideal turndown, redundancy, and flexible operation.

Copeland displayed an 80-ton model of its oil-free centrifugal refrigerant compressor (R-513A, R-515B, R-1234ze) with Aero-lift bearing technology. This product ranges from 50-200 tons, is equipped with two-stage impellers, variable inlet guide vanes, a brushless permanent magnet motor, and has options for interstage vapor injection. The Aero-lift bearing technology utilizes self-lifting fluid film to provide frictionless performance.

Daikin Applied displayed a Trailblazer EWYT 25-ton air-source heat pump (R-32); a Trailblazer AGZ (converted from R-410 to R-32) air-cooled scroll chiller with microchannel aluminum coils with a new Daikin blue coil coating option (10-year warranty) for coastal environments; and a WMT two-stage oil-free magnetic bearing centrifugal chiller with R-1233zd, an A1 classified refrigerant for lowest flammability, toxicity and a GWP value of one according to Everett Hettema, Marketing Engineer.

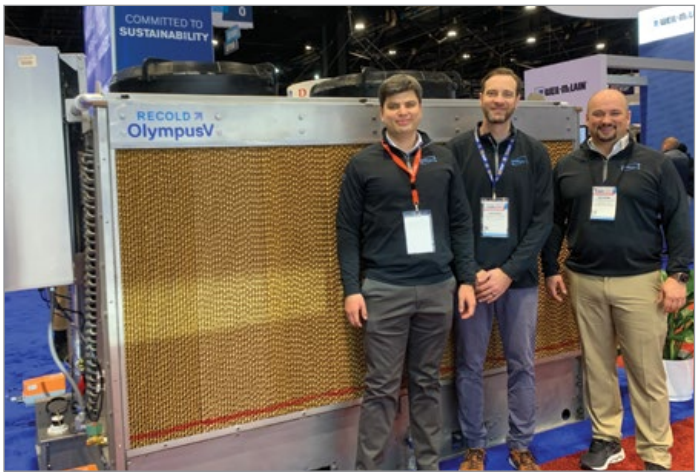
Initial Heat Rejection – Cooling Towers & Fluid Coolers

Operators and specifiers are receiving more and more options on how to reject their initial heat loads. Through the performance certified and tested open evaporative, hybrid, dry and adiabatic heat rejection technologies available today, users have the ability to optimize energy and water use according to their facilities' process requirements, decarbonization initiatives or environmental constraints.

EVAPCO introduced the PHW induced-draft parallel hybrid fluid cooler – designed to maximize heat rejection, allowing reduction of connected

Everett Hettema and Jim Macosko at the Daikin Applied booth (left to right).

Matt Sneizek, Troy Reineck and Tony Parrotta at the EVAPCO booth (left to right).



Bakhtiyor Ubaydullaev, Andrew Rogers and Dustan Atkinson displaying the OlympusV Adiabatic System at the SPX Cooling Tech booth (left to right).

Al Schildwachter, Dave Blodgett and Martin Previtera at the Delta Cooling Towers booth (left to right).

horsepower. The CTI-certified PHW is designed as a compliment to EVAPCO's ESW4, the company's largest and most energy-efficient single cell evaporative cooler. The PHW offers high-tonnage capacity and layout flexibility for industrial plants, data centers and large HVAC applications, especially where requirements call for fewest units, connections and fans. Two box sizes are offered: 12 x 24 ft. and 14 x 26 ft. Fan motor sizes are 30-100 hp, with two 7.5 hp pump motors per cell. Hot process fluid enters the coil through lower coil connections. Cooled water from the basin is pumped through distribution nozzles to be sprayed over the coils. Ambient air is drawn into the unit from above in parallel flow with water over the coil. A portion of the recirculated water evaporates; this evaporation – with cooled water flowing over the tubes, removes heat from the process fluid. Cooled process fluid leaves the coil through top coil connections, returning to the system. The PHW includes EVAPCO's XPak bonded block fill and high efficiency drift eliminators.

SPX Cooling Tech introduced its new OlympusV Adiabatic Systems – featuring the Marley OlympusV adiabatic fluid cooler, and Recold OlympusV adiabatic condenser and CO_2 cooler. Each unit is equipped with a CoolBoost Opti AD control panel, electronically commutated (EC) fans, stainless steel coils, a recirculating water distribution system for scale mitigation and extended adiabatic pad life.

Delta Cooling Towers, a manufacturer of cooling towers with a high-density polyethylene shell, displayed its anti-microbial cooling tower. Construction is underway for a new Delta manufacturing facility in West Virginia. It will operate the largest molding machine in North America, according to the Delta team.

Baltimore Aircoil expanded its Trillium Series adiabatic fluid cooler to achieve a 1,300-ton capacity in a double stack configuration. It's blue 6" deep adiabatic pads have antimicrobial properties and UV protection. "The saturation of the deeper pads suppresses the dry bulb temperature further. The closer you can get to the wet bulb temperature, the cooler the air that goes across the coils will be," said Rich Goodale, Baltimore Aircoil.

Tower Tech announced its full product line has received FM Approval certification, complementing its existing certifications for

Refrigerant Compressor, Chiller and Cooling Tower Innovations at AHR 2024

wind, seismic, missile impact and thermal performance. Its factory-assembled fiber reinforced polymer (FRP) cooling towers can now be upgraded with FireStrong and StormStrong FRP composite technology. Tower Tech also introduced hybrid closed circuit fluid coolers with modular, stacked FRP coils instead of metal coils.

REYMSA displayed a model of its new HFCE Series closed-circuit hybrid fiberglass fluid cooler. To offer hybrid head rejection capabilities, the HFCE Series is equipped with a Type L copper coil and UV stabilized PVC fill. REYMSA customers have the options between direct drive fan systems with induction or permanent magnet motors, and gear drive with induction motor.

Güntner, manufacturer of dry and adiabatic fluid coolers, introduced its aircore cloud IoT solution. "It's a complete platform able to derive data from the IoT to develop analytics for performance optimization and serviceability," said Zachary Wernlund, Smart Solutions Manager, Güntner.

Nimbus displayed its Virga hybrid adiabatic cooling systems from 5 to 450 tons per unit. Nimbus offers spray-type adiabatic systems with a stainless-steel shell and copper coils.

Filtration, Controls and Maintenance

Mikropor displayed its atmospheric air filtration solutions. Jeff Thibodeau is an industry expert on ambient air quality and filtration. Thibodeau serves as Vice President of Atmospheric Air Filtration for Mikropor America and serves with the National Air Filtration Association. Mikropor also offers the M-Chill process water chiller.

Watts displayed its smart strainer solutions to protect hydronic pump stations, water loops and and heat exchangers. With auto-flush capability,

David Longacre and Rich Goodale at the Baltimore Aircoil booth (left to right).

Mathu Solo, Micah Curtis and Jay Harris at the Tower Tech booth (left to right).

The REYMSA Cooling Towers team at AHR Expo.

Zachary Wernlund and Jascha Heynck at the Güntner US booth (left to right).

strainer maintenance is automated to blowdown the system with a solenoid valve.

Delta Electronics displayed VTScada, a monitoring and control platform for energy across the industrial spectrum to enhance HVACR equipment performance and efficiency. Its VFDs with A2L certification and more than 97% AC-AC efficiency adjust motor speeds to meet demand.

In addition, its magnetic bearing compressor solutions, with an IPLV exceeding ASHRAE 90.1, high reliability and lower maintenance costs, contribute to the overall energy efficiency.

"It is important all parties understand the safe handling, storage and transportation of mildly flammable (A2L) refrigerants and have a plan in place for R-410A recovery and reclamation," said David Budzinski, President, Residential and Light Commercial, Johnson Controls.

Superior Signal displayed its AccuTrak ultrasonic leak detectors for refrigerant leak detection. In another hall, NAVAC launched and demoed its NR7 refrigerant recovery unit compatible with all common refrigerants – including newer A2L refrigerants.

The 2025 AHR Expo will be held February 10-12 at the Orange County Convention Center in Orlando, FL. For more information visit www.ahrexpo.com. BP

To read similar ***Chiller or Cooling Tower Technology*** articles visit https://coolingbestpractices.com/technology.

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

Jerry Petit at the Nimbus Advanced Process Cooling booth (left to right).

Ryan Loeffler, Jerry Orahood, Jeff Thibodeau, Evren Yazici and Tunga Eltetik at the Mikropor booth (left to right).

Jenn Carlino at the Watts booth.

Jared Burkholder at the Delta Electronics booth.

Improve Process Efficiency and Reduce Energy Use with Compressed Air Monitoring

By Hendrik Priemer, Product Manager
IIoT Applications, Machine Automation, Emerson

Pneumatic systems power many processes in processing and packaging lines. However, if they run unchecked, compressed air leaks can develop and inefficient processes can use more energy than they require.

This usually happens when manufacturers don't have access to detailed, local data about how much compressed air their machines or lines use. To improve process efficiency, reduce energy costs and operate packaging and processing lines more sustainably, companies of all sizes have started monitoring compressed air consumption.

Some manufacturers have integrated digital technologies that unlock pneumatic data across the factory floor, then translate it into valuable insights that scale in the cloud. Together, these technologies are available as part of a pre-engineered compressed air monitoring cabinet solution that provides detailed, real-time analysis of how compressed air consumption behaves and is simple to install, commission and deploy.

In this way, a compressed air monitoring cabinet makes it possible for companies to quickly and easily gain visibility into actual energy use and better control consumption, with resolution that can scale from individual machines to lines, from a single factory to multiple plants. By continually monitoring pneumatic systems in real time, operators can detect anomalies that lead to leakage losses, as well as improve process efficiency by balancing pneumatic devices and automating manual tasks.

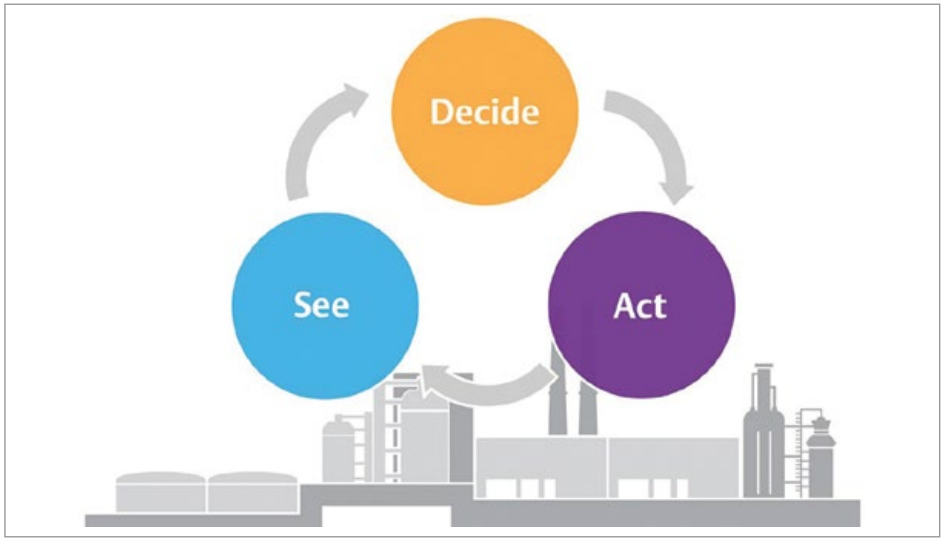
Save Energy By Detecting Early-Stage Leakage

Access to real-time pneumatic data makes it possible for manufacturers to make informed decisions and take meaningful action that can continually improve process efficiency and sustainability. Compressed air generation makes up about 20% to 30% of a typical manufacturing facility's electricity consumption. Without compressed air monitoring, up to 30% of the compressed air generated goes to waste. This waste occurs for several reasons, including leaks caused by failures at joints and tubes, exposure to vibration and normal component wear, and the suboptimization of machines and devices.

Continuous monitoring capabilities allow operators to detect leaks and other anomalies in their early stages. By addressing pneumatic issues before they can grow, companies can reduce compressed air use by 20% to 30%.

Companies can use the following formula to calculate potential energy savings:

A = Yearly or monthly energy costs
A X 30% = B (Compressed air energy cost)
B X 25% = C (Wasted energy cost)
C X 25% = D (Monthly/yearly savings)
D = Potential savings delivered



Compressed air monitoring technologies utilize the See, Decide, Act cycle to automate or digitize leak detection. (image courtesy of Emerson)

For example, a company that spends $1 million per year on energy costs could save up to $18,000 annually.

Here's how early-stage leak detection works. Compressed air monitoring uses technologies that automate or digitize each step of a continuous loop called the See, Decide, Act cycle.

During the See stage, smart airflow sensors measure values such as flow, pressure, temperature and with smart software applications, such as the Compressed Air Manager App from Emerson, carbon dioxide generation and energy can be analyzed and calculated.

During the Decide stage, the sensors send collected data to an edge gateway that continuously aggregates and transmits the data to analytics software. The software contextualizes and presents the flow sensor data as statistics and trends, providing insight into current and historical consumption. In addition, the recorded data generates detailed analyses that provide information on energy consumption and the amount of carbon dioxide produced, as well as calculates the machine's idle time. This value shows the percentage of time compressed air is being used even though the machine is stopped. Operators can use this information to make quick decisions and take the most appropriate action.

During the Act stage, the analytics software can share the information it collects with various other platforms, such as HMI/SCADA solutions or manufacturing execution systems (MES), using a standardized connector. Operators and maintenance teams can use this information to reduce machine downtime, schedule maintenance calls to repair leaks, and optimize compressed air consumption.

Improve Process Efficiency Through Automation And Pneumatic Balancing

Continuous compressed air monitoring can also help manufacturers significantly reduce maintenance costs, decrease unplanned downtime by 20% and improve overall equipment effectiveness (OEE) by 5% to 10%.

On average, 76% of companies manually test for compressed air leaks across their facilities. This often requires a third-party service or experienced internal personnel to check every machine. These periodic audits can cost an average of $46,000 per machine per year due to service, equipment, training investments, and leaks have time to develop and grow between them.

In comparison, compressed air monitoring can continuously measure airflow in real time, identify anomalies in their early stages and send personnel notifications to address them. With around-the-clock access to pneumatic system health, operators can track parameters that deviate from baseline values, investigate possible issues, plan maintenance and quickly address potential issues before they can become big problems. In this way, automated detection can save companies a significant amount of time and maintenance costs compared to manual audits, as well as minimize failures and the downtime that results.

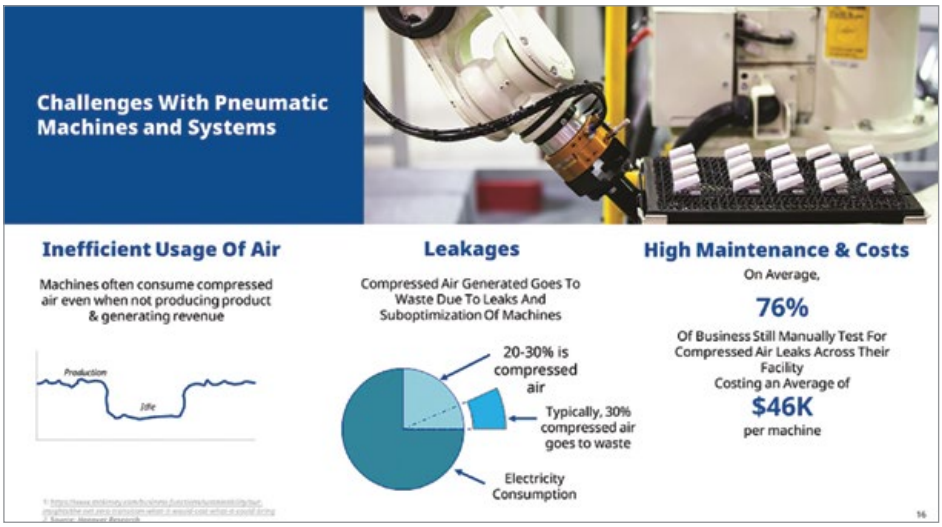
By addressing potential issues as they arise, companies can increase machine availability and, in turn, overall equipment effectiveness (OEE) values. On average, most packaging equipment typically operates at around 65% OEE. This means there's a lot of potential for improvement and greater productivity. One way to do this is by using compressed air monitoring to balance pneumatic devices, such as actuators.

Improve Process Efficiency and Reduce Energy Use with Compressed Air Monitoring

Each pneumatic device has an optimal ratio of airflow to pressure. When this ratio is just right, processes run on effectively and efficiently. If devices receive too much airflow, processes waste energy. If devices receive too little airflow, processes run ineffectively and product quality may suffer. Using data received from compressed air monitoring, operators can appropriately balance pneumatic devices.

Start Monitoring Compressed Air Quickly And Easily

Innovations in digital technology make it simpler than ever for manufacturers to start monitoring pneumatic systems. Instead of piecing together sensors and software from various vendors and engineering a larger system on their own, companies can source a single, integrated solution.



Compressed air monitoring can help companies overcome common pneumatic system challenges, including inefficient use of air, leakage and high maintenance costs. (image courtesy of Emerson)

The cabinet solution from Emerson includes AVENTICS AF2 airflow sensors, a PACSystems edge gateway and a SolaHD industrial power supply. (image courtesy of Emerson)

Compressed air monitoring cabinets are preengineered, installation-ready packages that are fully assembled and include all hardware and connected software. This makes them easy to set up, configure and quickly deploy. Multiple smart airflow sensors can be directly connected, configured and put into operation just as simply, making the solution highly scalable as well.

At Emerson, we took a Floor to Cloud™ approach to develop our cabinet solution. The solution includes our AVENTICS™ AF2 airflow sensors, which collect pneumatic data across the factory floor, as well as a PACSystems edge gateway and advanced software that translate data into valuable insights that scale in the cloud. Once the edge gateway collects, processes and validates data, generated information and insights can be pushed to leading systems, such as MES, HMI/SCADA solutions via appropriate interfaces, such as OPC UA.

The cabinet solution also includes a SolaHD industrial power supply for stable and secure power for the individual components, as well as a power-over-Ethernet (PoE) switch that supplies power to smart airflow sensors via the existing Ethernet cable.

The core element of compressed air monitoring is the software application it uses. With OPC UA, the Compressed Air Manager App from Emerson offers a standardized interface known industrywide, with which data can be exchanged with third-party systems. The app comes pre-installed on the edge gateway, seamlessly connects with AF2 flow sensors and provides automatic parameterization

and configuration. Its centralized dashboard displays both individual machine air consumption and total air consumption across a line or entire facility. Users can see key performance indicators (KPIs) and metrics such as air flow, pressure, energy cost and CO_2 emissions as well as machine idle time and compressed air consumption when machines are not in use.

By using the Compressed Air Manager App, users can directly access and control connected AF2 flow sensors from wherever they are. This makes it possible for companies to continuously monitor air consumption data, trends and costs from the individual machine level up to the complete line or facility and empower teams with in-the-moment insights that drive continuous improvement. In this way, companies can increase energy savings, reach sustainability initiatives and reduce maintenance intensity and air audits. As the app continues to evolve, users will benefit from future updates, as well as current features.

Greater Visibility For Greater Outcomes

Integrated cabinet solutions make taking the first step to monitoring compressed air faster and simpler than ever before. A complete control cabinet solution offers companies a ready-to-use solution that can be put into operation easily and quickly without much additional effort, especially with typical factors like power supply, switch wiring, ingress protection (IP) enclosure and software installation and setup already taken care of.

By monitoring compressed air, manufacturers can gain greater visibility and obtain insights and actionable information that can improve process efficiency, reduce energy costs and, as a result, achieve greater sustainability and productivity. BP

About the Author

Hendrik Priemer serves as a Product Manager specializing in Industrial Internet of Things (IIoT) applications within the field of Machine Automation. In his role, he oversees the execution of new product development initiatives and holds worldwide accountability for advancing the IIoT Strategy pertaining to hardware and software solutions designed for Machine Automation. His collaborative endeavors contribute significantly to the creation of cutting-edge products engineered to elevate the intelligence and sustainability of solutions brought to the market.

Hendrik Priemer, Product Manager, Intelligent Automation, Emerson

For more information visit Emerson at http://www.Emerson.com

To read similar ***Pneumatics and Instrument Technology*** articles, please visit https://www.airbestpractices.com/technology/instrumentation.

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

The 2024 Cooling Technology Institute Annual Conference

By Bill Smith, Associate Content Manager, Chiller & Cooling Best Practices Magazine

Image courtesy of EVAPCO.

The 2024 Cooling Technology Institute (CTI) Annual Conference for manufacturers, owner-operators, and suppliers of heat rejection equipment (i.e., cooling towers, adiabatic coolers and dry coolers) was held Feb. 4 – 8 at the Westin Galleria in Houston, TX. This article will share some updates to CTI standards and acceptance test codes, synopsize the event's educational curriculum, share perspective, and highlight products and services offered by a sampling of firms at the event's trade show.

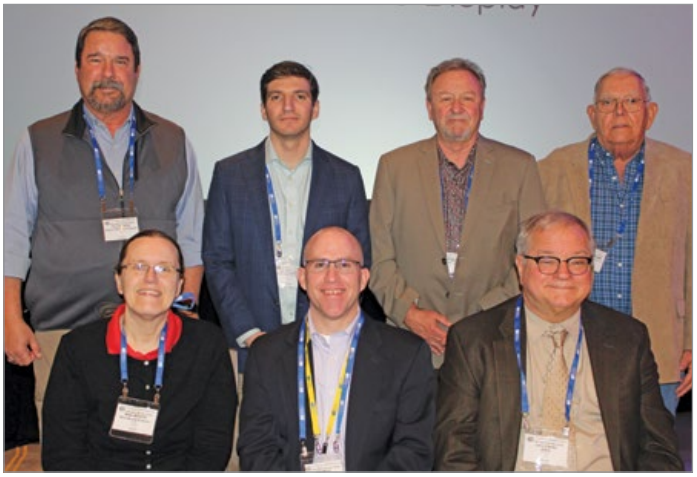
Jim Baker has begun his two-year term as CTI President for 2024-2025. Baker has been a member of CTI as an Owner/Operator during his time with Phillips 66, as a Manufacturer (SPX Cooling Tech), and now as a Supplier (Galebreaker Industrial). His predecessor, Ken Mortenson (SPX Cooling Tech), will continue his involvement with CTI on the Past Presidents Committee, and with the Engineering Standards & Maintenance Committee. "Jim is an excellent communicator and an important leader in our business. He is highly qualified and will do a fantastic job," said Mortenson.

Evolving Standards and Acceptance Test Codes

CTI's three standing committees – Engineering, Standards & Maintenance (ESM); Performance & Technology (P&T); and Water Treatment (WT) gather at the event to review, draft and update CTI's existing and developing acceptance test codes (ATC) and standards (STD) covering thermal performance, sound, drift, materials, plume abatement, vibration, fire resistance and much more.

The CTI STD 201 Thermal Certification program and ATC 105 originated around evaporative equipment. CTI has since developed a test code for dry fluid coolers (ATC-105DS), which led to a dry certification program (STD 201RS-Dry). In the past year, CTI published ATC 105 Adiabatic, the acceptance test code for adiabatic fluid coolers. Now, CTI is in early stages of incorporating

Ricky Mull, David Wheeler and Mike Womack – CTI Thermal Certification Administrator, with CleanAir Engineering (left to right).



The 2024 Ask-the-Expert Seminar panel. Front row: Nina Woicke; Bill Miller, LS Enterprise; John Zibrida, ZIBEX. Back row: Thomas Kline, Structural Technologies; Jacob Faulkner, Cooling Tower Test Associates; Jim Baker, Galebreaker Industrial; and Bob Cunningham, International Water Consultants (left to right).

adiabatic technology into a thermal certification program, according to Scott Nevins, Director of HVAC Product Development with EVAPCO – recently appointed as Chair of the P&T Committee.

"Once the adiabatic certification program is in place, then ASHRAE can adopt the minimum efficiency standards for adiabatic equipment in 90.1," said Nevins.

Last year, CTI announced the development of a sound certification program for evaporative and air-cooled heat rejection equipment. Now, the STD 204 Sound Certification is in the Ad-Hoc/Board Review phase. Once approved and released, the STD 204 program will begin certifying that lines of heat rejection equipment conform to manufacturers' published sound pressure level data, using the long-standing test code for sound, ATC 128.

According to Nevins, fourteen standards or test codes were open for revision at the time of the event.

"The ATC-106 test code for mechanical draft evaporative vapor condensers is undergoing its annual revision cycle," said Graham Nettleton, Chair of the ATC-106 Committee, and Product Development Engineer for EVAPCO.

ESM Committee leadership includes Ken Mortenson and Joe Evans, SPX Cooling Tech; James Blake, American Lightning Protection Systems; Jamie Bland, Composite Cooling Solutions; Nina Woicke (independent); and Jon Bickford, Alliant Energy. P&T Committee leadership includes Scott Nevins, EVAPCO; Jared Medlen, Mesa Associates; and Nick Mascarenhas, Baltimore

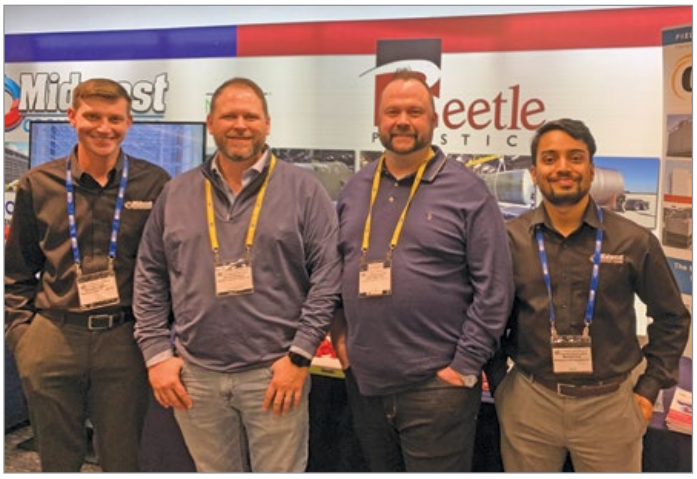
Travis Whaley and Billy Childers with Aggreko Cooling Tower Services (left to right).

Bill McQuade and Frank Morrison with Baltimore Aircoil Company (left to right).


Thomas Underwood, Erik Johnson and Geoffrey Smith with American Cooling Towers (left to right).

Rob Vandenboer, Alexis Jensen, Graham Nettleton and John Ahern at the EvapTech booth (left to right).

The 2024 Cooling Technology Institute Annual Conference



Brandon Malone, Jarrod Rowland, Luke Waltrip and Manish Puri with Midwest Cooling Towers (left to right).

Emily Rose Giunta, Alexandra Vosburgh, Anthony Shank, Carolina Lebron, Kenneth Schall, Larry Burdick, Joseph Evans, Corey Baker and Mike Partington with SPX Cooling Tech (left to right).

Sean Mullins and Michael Offik at the ABB booth (left to right).

Aircoil. The Water Treatment Committee leadership includes Bob Hendel, Veolia; Al Feltzin, Becht; and Pete Elliot, ChemTreat.

These standards and codes are of great benefit to specifiers, owners and operators. During the Owner Operator Seminar exclusive to end users, one engineer from a global firm shared accounts from peers who had very costly experiences with non-CTI-certified equipment that did not perform as stated. Owner/operators, manufacturers and suppliers work in tandem to develop codes and standards beneficial to each party.

"For example, the drift test code (ATC 140) was developed years ago when owner-operators approached CTI facing new regulations regarding particulate size at property boundaries," said Scott Nevins.

Educational Curriculum

The Conference featured about 30 technical paper presentations, a water treatment panel discussion, a half day Educational Seminar chaired by Frank Morrison with Baltimore Aircoil, and the long-standing Ask-the-Expert Seminar.

Dave Wheeler with CleanAir Engineering presented new features of the updated CTI Toolkit version 4.1 – a CTI resource featuring an air properties calculator with fully ASHRAE-compliant psychometrics, thermal design worksheets, performance evaluators and more. CleanAir is one of CTI's licensed thermal certification test agencies, and offers cooling tower testing, consulting, sales and more out of four technical centers in Chicago, Houston, Pittsburgh and France.

During the Ask-the-Expert Seminar, Jeff Mallory from Sergeant & Lundy asked about winter temperature ground fogging mitigation. Other questions ranged from tower fill microstructure fouling behavior, whether plume abatement has any impact to legionella exposure, pressure ratings for counterflow spray nozzle retrofits, counterflow fill media gauge thickness distinctions between layers, and more.

"There were many interesting questions during Ask-the-Expert this year, particularly focused on environmental issues," said Corey Baker, Manager – Thermal Performance & Ratings, SPX Cooling Tech.

The Educational Seminar featured *Alternative Sources for Cooling Tower Makeup Water* by David Anton, Ascend Materials and Robin Wright, Veolia; *Cooling Tower Service and Maintenance* by Yaram Yerushalmi, YWCT; *Selecting Materials for Fan Blades and Fans* by Ricardo Reis Costa and Leandro Moutinho, FanTR; and *Fundamentals of Adiabatic Heat Rejection* by Andrew Sickler, Baltimore Aircoil.

Heat Rejection Equipment Manufacturers

American Cooling Towers, based in Santa Ana, CA offers factory assembled ACF Series (counterflow) and ACX Series (crossflow) cooling towers, multiple field erected cooling tower designs, parts, rentals and more.

Aggreko Cooling Tower Services announced it was granted a patent applying to its rental evaporative cooling towers contained within an ISO-compliant shipping container frame. The patented solution integrates the versatility of a certified CSC shipping container with a purpose-built, modular cooling tower. This enables efficient transport by land, sea, and air without cost escalation and permit restrictions associated with transporting oversized loads.

At the Baltimore Aircoil booth, Bill McQuade, P.E., LEED AP, FASHRAE, and Frank Morrison, CTI Marketing Chair and Technical Director for Baltimore Aircoil, discussed its modular cooling tower solutions, and TrilliumSeries adiabatic products with new CO_2, ammonia and fluid cooler models now available.

EvapTech, a subsidiary of EVAPCO, offers new and replacement field erected cooling towers and a variety of cooling tower aftermarket services. According to John Ahern, Vice President of Engineering (retired), EvapTech is now offering the first FM Approved splash-filled crossflow cooling tower, the Series ESX. These products share high quality fire-retardant fiberglass pultrusions with proven structural integrity and a design methodology confirmed by FM Approvals Standard Class 4930 for resistance to extreme natural hazards.

Midwest Cooling Towers, based in Chickasha, OK, offers new construction, repairs and parts for fiberglass composite or traditional wooden field erected cooling towers. Midwest recently acquired Fort Worth-based Composite Cooling Solutions, who is introducing the Phoenix PL fiberglass counterflow heavy-duty modular cooling tower (120 – 500 tons per unit). Precision Cooling Towers in Henderson, KY, is also part of Midwest.

SPX Cooling Tech displayed a model of its factory assembled Marley NC crossflow cooling tower with Ultra Quiet Fan option, with thermal capacities from 101 – 2,189 tons per cell in capacities from 303 – 6,567 gpm. Apart from its factory assembled capabilities, SPX offers a broad range of field erected towers, natural and forced draft concrete towers, Geareducer Solutions gearbox offerings, and much more.

David Sayker and Bob Neely at the Amarillo Gear Company booth (left to right).

Caitlin Banta, Peter Rye, Jason Hill, Dylan Ziegler and Angel Perez at the Brentwood Industries booth (left to right).

Noah Bieberly and Rob Coffee with Proco Products (left to right).

The 2024 Cooling Technology Institute Annual Conference

Jon Southworth with Regal Rexnord – Cambridge Water Screens.

Robert Sterling at the WEG booth.

Chris Klopper with WetCooling Software.

"Overall, the show has had great attendance, a lot of great technical discussion and very insightful papers this year," said Corey Baker, SPX Cooling Tech.

Component Suppliers

ABB discussed its variable speed direct drive cooling tower motor and drive systems for industrial applications. Its RPM AC synchronous PM motor with laminated finned frame construction provides an efficient power dense package. The ACS880 cooling tower drive has custom cooling tower features like trickle current motor heating, locked motor rotor functionality to prevent wind-milling, and more.

Amarillo Gear Company is rolling out its new Gen II GT1712 right angle gearbox for cooling towers. Improvements include a leak-free design, lower operating temperatures, extended oil life, low-noise operation, lower maintenance and cost of ownership.

Brentwood Industries engineers and manufactures film, trickle and splash fills for any cooling tower requirements, as well as drift eliminators, inlet louvres, nozzles, and other accessories. They displayed ThermaCross, Brentwood's latest thermally engineered advancement to vertical-fluted fills. Also displayed was ShockWave, Brentwood's latest cross-fluted, high efficiency fill.

Proco Products manufactures expansion joints for industrial and commercial installations using pumping, piping or ducting which requires expansion or movement joints to deal with thermal expansion, vibration or ground movement.

Regal Rexnord displayed its Traveling Water Screens, a self-cleaning water filtration system with mechanically or manually rotated mesh belt. The belt lifts debris from the basin, then an internal spray system deposits debris into a collection trough for disposal. Regal Rexnord's cooling tower portfolio also includes couplings and fan brakes, gear drives and motors.

Galebreaker Industrial offers windscreens, CFD modeling, winterization screens, debris filters, plume abatement, recirculation screens and other solutions for air-cooled condensers, cooling towers and heat exchangers. Windscreen protection can help reduce mechanical damage, recover thermal deficiency and improve performance of a cooling tower. Galebreaker windscreens stabilize fan pressure, reduce dynamic fan blade loading, increases fan flow rate, reduces recirculation, and more benefits.

WEG is introducing the W23+ Sync synchronous electric motor line meeting ultra-premium (IE5) and higher efficiency levels, cutting losses by more than 40% compared to the IE3 efficiency.

WetCooling Software showcased its thermal performance evaluation and design software for induced draft counterflow, crossflow, and natural draft counterflow cooling towers. Features include databases of different fans, splash and film fill; operating and atmospheric conditions; three software modes for verification, performance curves and design; and more.

Testing & Water Treatment

Environmental Safety Technologies has provided legionella testing and services to cooling tower operators since 1977.

Fluirco displayed its HydroFlow water treatment system to treat and prevent scale, corrosion, and bacteria. In short, the HydroFlow water conditioner applies an electric signal throughout the system, preventing adhesion of scale to piping and equipment, while killing bacteria and microbial growth.

HPNow displayed its patented GOgen on-site peroxide generation system for cooling tower water treatment. The system generates hydrogen peroxide, a "green oxidant," from only water and electricity as an alternative to chemical treatment.

"It was great to see everybody, and to see a lot of new and younger faces," said Nina Woicke, Vice Chair, ESM Committee. CTI President Jim Baker also discussed his goal to further enhance participation from younger professionals.

The CTI 2025 Annual Conference and Expo will occur February 2-6, 2025 at the Peabody Memphis in Memphis, Tennessee. BP

For more information about the Cooling Technology Institute, visit www.cti.org.

For similar articles on ***Cooling Technology*** please visit
https://coolingbestpractices.com/index.php/technology/cooling-towers

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

George Young with Environmental Safety Technologies.

Derek DeShaw displaying HydroFlow at the Fluirco booth.

Jim Baker – CTI President, Jeff Ebert and Jamie Wilde with Galebreaker Industrial (left to right).

Chiller & Cooling System Technology & Industry News

EVAPCO's New PHW Induced-draft Parallel Hybrid Fluid Cooler

EVAPCO's new PHW induced-draft parallel hybrid fluid cooler is designed to maximize heat rejection, allowing reduction of connected horsepower. The CTI-certified PHW is designed as a compliment to EVAPCO's ESW4, the company's largest and most energy-efficient single cell evaporative cooler.

The PHW offers high-tonnage capacity and layout flexibility for industrial plants, data centers and large HVAC applications, especially where requirements call for fewest units, connections and fans. Two box sizes are offered: 12 x 24 ft. and 14 x 26 ft. Fan motor sizes are 30 hp to 100 hp, with two 7.5 hp pump motors per cell.

Hot process fluid enters the coil through lower coil connections. Cooled water from the basin is pumped through distribution nozzles to be sprayed over the coils. Ambient air is drawn into the unit from above in parallel flow with water over the coil.

A portion of the recirculated water evaporates; this evaporation – with cooled water flowing over the tubes, removes heat from the process fluid. Cooled process fluid leaves the coil through top coil connections, returning to the system. The PHW includes EVAPCO's XPak bonded block fill and high efficiency drift eliminators.

EVAPCO's new PHW induced-draft parallel hybrid fluid cooler.

About EVAPCO

EVAPCO provides a full spectrum of global product solutions for the commercial, HVAC, industrial, refrigeration, power generation and industrial process markets. For more information, visit www.evapco.com.

Carrier Updates AquaEdge 19MV Centrifugal Chiller

Carrier is introducing an updated, more compact version of the AquaEdge 19MV water-cooled centrifugal chiller in Asia, North America, and the Middle East. Carrier is a part of Carrier Global Corporation, global leader in intelligent climate and energy solutions.

The AquaEdge 19MV is available with low GWP refrigerant R-515B and R-513A and is designed to deliver reliable performance, incredible efficiency, easy installation and a wide operating range. Now with capacity extension down to 200 tons (703kW) and a narrower footprint that is 18% smaller than previous versions of the 19MV, the chiller combines best-in-segment efficiency for design and the ability to operate at severe conditions due to unexpected building operation or extreme weather.

"Our goal is to optimize building performance and resilience and the AquaEdge 19MV has once again proven that one doesn't need to sacrifice footprint to achieve uncompromising performance and robust operation," said Scott McDonough, Associate Director, Global Product Management, Centrifugal Chillers, Carrier.

The updated AquaEdge 19MV leverages the same proven EquiDrive two-stage magnetic bearing compressor design to achieve best-in-segment performance while staying quiet and cool under pressure. The compression technology provides an expanded operating range while improving chiller efficiency and

The Carrier AquaEdge 19MV water-cooled centrifugal chiller.

building resiliency for specifying engineers, building owners and facility managers.

It also features a Greenspeed intelligence variable frequency drive that enables starting and operating with cold condenser water while providing enhanced performance at off-design conditions and a Carrier SmartVu control panel that provides intelligent control and easier tracking and analysis of operational data.

The use of lower GWP refrigerants supports Carrier's 2030 Environmental, Social & Governance (ESG) 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, global leader in intelligent climate and energy solutions that matter for people and our planet for generations to come. For more information, visit www.carrier.com.

SPX Cooling Introduces OlympusV Adiabatic Cooling Series

SPX Cooling Tech, a full-line, full-service industry leader in the design and manufacture of evaporative cooling towers, fluid coolers and more, has introduced OlympusV (pronounced *o-lym-pus-vee*) Adiabatic Systems, a series of adiabatic cooling products designed to provide a flexible cooling solution for operators and engineers of commercial refrigeration, industrial refrigeration, HVAC or industrial process systems.

The series consists of three products, each available in various sizes and coil type based on application. The products include Recold® OlympusV CO_2 Cooler, Recold OlympusV Condenser and Marley® OlympusV Fluid Cooler.

"OlympusV adiabatic cooling products balance the water-saving benefits of an air-cooled heat rejection system with the energy efficiency of a water-cooled solution to provide more flexible cooling," said Marshal Zabel, Senior Global Product Manager with SPX Cooling. "These products typically operate dry a majority of annual hours, limiting site water use to only those times when ambient temperatures and cooling loads are at their highest."

Each unit is delivered with user-friendly, smart controls allowing operators to adjust water and energy usage based on the needs of their unique operating conditions. The CoolBoost Opti AD control panel allows operators to choose between Water Conservation Mode and Energy Conservation Mode, each of which prioritizes savings of the associated onsite resource during peak cooling loads.

"These products can be effectively applied in a variety of conditions, even in hot and dry environments, because of their flexible operating modes," added Zabel. "And they can help engineers and operators in a variety of markets, from grocery facilities to food processing to data center applications."

Other design features include electronically commutated (EC) fans for reduced maintenance and sound, stainless steel coils for durable performance, and a unique recirculating water distribution system designed to help improve performance and reduce scale for extended adiabatic pad life.

The OlympusV Adiabatic Cooling System from SPX Cooling Tech.

About SPX Cooling Tech

SPX Cooling Tech is a leading global manufacturer of cooling towers, fluid coolers, evaporative condensers, industrial evaporators and air-cooled heat exchangers from brands that include Marley®, Recold® and SGS Refrigeration. Since 1922, our brands' cooling systems and components, coupled with technical services, have supported applications in HVAC, refrigeration, and industrial process cooling. SPX Cooling Tech and its product brands are part of SPX Technologies, Inc. For more information, visit www.spxcooling.com.

Chiller & Cooling System Technology & Industry News

Multistack Chillers to Utilize Honeywell Solstice 454B Refrigerant

Honeywell announced that global commercial chiller company Multistack will utilize Honeywell's next-generation refrigerant, Solstice 454B in its chillers and heat pumps for commercial building applications.

This partnership comes after a decade-long collaboration between the companies on research and development of hydrofluoroolefin (HFO) refrigerants, supporting the industry-wide commitment to eliminating fossil fuels in buildings through the adoption of energy-efficient alternatives.

"Since Solstice 454B offers a very close performance match compared to R410A, manufacturers can benefit from an easier and faster re-design process of their existing cooling systems - making it the best choice for customers seeking low-GWP refrigerant alternatives to R410A," said John Keating, vice president and general manager, Stationary Refrigerants, Honeywell. "By working with leading cooling and heating equipment manufacturers such as Multistack, we enable our customers to meet their sustainability targets, contributing to a more sustainable and eco-conscious approach in the HVAC industry."

As legislation to phase-out high-GWP refrigerants escalates, it drives the need for efficient refrigerant alternatives to support the industry's transition to low-GWP refrigerants. Starting in 2024, the United States Environmental Protection Agency (EPA) issued a final rule that cuts the production of high-GWP hydrofluorocarbon (HFC) refrigerants by 40%, underscoring the urgency for manufacturers to identify alternative solutions to tackle climate change.

"Multistack recognizes the importance of providing HVAC solutions that promote energy efficiency and advance the transition from fossil fuels to electrification, which is why we utilize the most optimum refrigerant choices available," said Scott DeGier, vice president of sales at Multistack. "Partnering with Honeywell to implement Solstice 454B in our applications allows us to remain compliant, provide the same cooling performance our customers expect, and reduce the industry's environmental footprint."

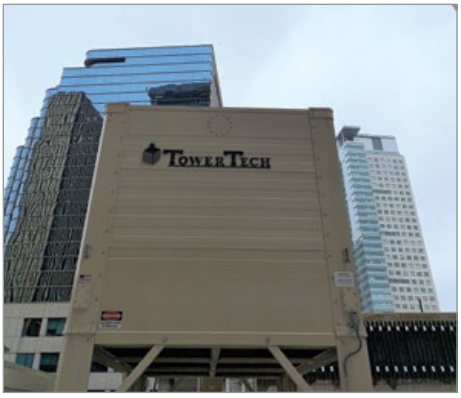
About Honeywell

Honeywell is an integrated operating company serving a broad range of industries and geographies around the world. Our business is aligned with three powerful megatrends – automation, the future of aviation and energy transition – underpinned by our Honeywell Accelerator operating system and Honeywell Connected Enterprise integrated software platform. As a trusted partner, we help organizations solve the world's toughest, most complex challenges, providing actionable solutions and innovations through our Aerospace Technologies, Industrial Automation, Building Automation and Energy and Sustainability Solutions business segments that help make the world smarter, safer and more sustainable. For more news and information, visit www.honeywell.com.

Tower Tech Launches FM Approved FireStrong Towers

Tower Tech USA, a leading cooling tower manufacturer, announced a momentous achievement as the only fully factory-assembled maker of Fiber Reinforced Polymer (FRP) cooling towers to receive an FM Approvals' certification.

This recognition demonstrates the company's commitment to designing and manufacturing world-class cooling tower solutions that meet the highest standards of fire and storm safety.



A Tower Tech cooling tower installation.

An FM-approved certification assures customers that the product they are investing in has undergone rigorous testing, meeting global standards for loss prevention against fire, wind, earthquakes and wind-borne debris from storms (hurricanes, tornadoes, derechos, etc.).

"HVAC systems and cooling towers are a significant investment," said Mathu Solo, President of Tower Tech. "An FM Approvals' certification ensures that customers have a high-quality product able to withstand some of the biggest risks their towers may face, such as fires and storms. The auxiliary benefit of buying a cooling tower that meets the highest of safety standards also means that you are reducing your maintenance costs and enhancing the reliability of your HVAC systems. We're proud to have earned approval from this globally recognized organization."

The FM Approvals' certification complements Tower Tech's existing certifications for wind, seismic and missile impact, positioning the cooling towers as the most resilient, reliable and strongest in the industry.

After thorough testing, the entire Tower Tech product line is now available in the FM-approved FireStrong configuration. Tower Tech offers the option to upgrade its products with FireStrong and StormStrong FRP

composite technology. The FireStrong upgrade will help harden a facility for potential fires, and the StormStrong upgrade helps combat extreme weather. FireStrong is a value-add for key infrastructure projects that need to exceed standard resiliency specifications.

About Tower Tech

Tower Tech is the leader in modular cooling tower design that has turned the industry upside-down by mounting fans on the bottom and introducing more efficient and innovative water-cooling technologies to the market. Our full line of open-circuit and closed-circuit towers lower the total lifetime cost of ownership and combat increased utility costs by saving water and electricity. Fiber Reinforced Polymer (FRP) components are factory-assembled in the USA in our ISO-certified facility. Tower Tech's HVAC technology is installed around the world in commercial and industrial markets from data centers, industrial applications and power generation plants to hotels and universities. Tower Tech is part of Creative Composites Group – the largest structural composites manufacturing group in the U.S. For more information, visit www.towertechusa.com.

Danfoss and Google Form Partnership on AI and Energy Efficiency

Danfoss and Google announced a strategic partnership to make use of the latest advances in artificial intelligence (AI) and promote energy efficient solutions in data centers.

Under the partnership, Danfoss, the Danish multinational engineering group, will use Google Cloud's generative AI capabilities to optimize the customer experience, streamline internal work processes and improve productivity across the organization. This can be done, for example, by using gen AI to collect and surface information, automate knowledge, generate product descriptions, and create solutions with chatbots in e-commerce.

As a global leader in energy-efficient solutions, Danfoss is working with Google to implement sustainable cooling systems for data centers and to design systems that reuse the excess heat produced by data centers. Danfoss Turbocor compressors provide highly reliable, highly efficient solutions when expertly applied by OEM partners and are being installed by Google to improve the energy efficiency and decarbonize heating and cooling systems in data centers.

Meanwhile, Danfoss' heat reuse modules will make it possible for Google to capture and reuse heat produced by data centers, providing a renewable energy source to supply heating on site and to neighboring commercial and residential buildings, communities, and industries that need heat for their processes. Going forward, Danfoss' expertise in decarbonization solutions will be used to an even greater extent to advance data center sustainability in Europe, North America and beyond.

The new agreement builds on an existing collaboration between the two companies, which were among the founders of the Net Zero Innovation Hub in Fredericia, Denmark, announced in September, 2023, where a number of major players joined forces to accelerate the green transformation of data centers. Danfoss and Google are now taking a step further by entering into a broader partnership.

Danfoss to leverage generative AI with Google to transform customer experience and streamline internal processes.

"At Danfoss, we want to revolutionize how we build and decarbonize data centers together with our customers. When we partner up across industries, like we have done with Google, we accelerate this development towards building better and more sustainable data centers - using technologies available today," said Jürgen Fischer, President, Danfoss Climate Solutions.

"This is a great example of a partnership utilizing each other's strengths and using technology to optimize the customer experience, increase productivity and reach sustainability goals. Danfoss is a leader in energy efficiency, and these solutions help support Google's 2030 goal of running our data centers on carbon-free energy 24/7. We're happy to deliver AI innovation through Google Cloud, enabling businesses like Danfoss to operate in new and smarter ways," said J.P. Clausen, Google Vice President of Data Center Innovation.

About Danfoss

Danfoss engineers solutions that increase machine productivity, reduce emissions, lower energy consumption, and enable electrification. Our solutions are used in such areas as refrigeration, air conditioning, heating, power conversion, motor control, industrial machinery, automotive, marine, and off- and on-highway equipment. We also provide solutions for renewable energy, such as solar and wind power, as well as district-energy infrastructure for cities. Our innovative engineering dates back to 1933. Danfoss is family- and foundation-owned, employing more than 42,000 people, serving customers in more than 100 countries through a global footprint of 95 factories. For more information, visit www.danfoss.com.

Chiller & Cooling System Technology & Industry News

Aggreko Awarded U.S. Patent for Rental Cooling Tower Systems

A fleet of Aggreko rental cooling tower systems.

Aggreko, a global leader in energy solutions, announces it was granted Patent 11,844,541 B2 by the United States Patent and Trademark Office (USPTO). The patent applies to a cooling tower for evaporative cooling of water contained within an ISO-compliant shipping container frame that helps customers save space, reduce project installation times, and improve overall job site and worker safety.

The patented solution integrates the versatility of a certified CSC shipping container with a purpose-built, modular cooling tower. This enables efficient transport by land, sea, and air without cost escalation and permit restrictions associated with transporting oversized loads. Its robust structural design and integrated telescoping substructure allow it to be used in hurricane-prone areas without the need for additional anchorage or structural engineering.

Aggreko's latest offering of industrial cooling tower systems provides energy savings of up to 80%, enabling customers to reduce emissions and minimize their carbon footprint. Thanks to its innovative design, the space needed for installation on job sites is also reduced by 22%. Additional features such as gates, ladders, and stairs, ensure the safety of workers when accessing the towers, during and after installation. A simplified installation process also removes the need for a worker to be under the suspended load during the procedure, eliminating an additional hazard.

"This latest patent reaffirms our commitment to bringing unique capabilities, expertise, and innovation to customers with any temporary cooling tower need, no matter how significant or urgent," said Billy Childers, Head of Cooling Tower Services at Aggreko. "From enabling solutions for industrial plant customers recovering from a cooling tower failure, to augmenting the capacity of an existing cooling tower, or providing temporary cooling services for planned system turnarounds, this patent aids in the delivery of our best-in-class service and support."

Aggreko is a global leader in temporary cooling solutions, capturing up to 55% of the market – and the only company to offer this mobile, flexible, and adaptable containerized solution.

An additional patent-pending submission will follow within the year and will serve as an integral part of the updated design.

About Aggreko

Aggreko is a global leader in providing energy solutions that help businesses grow and communities thrive. Operating in a rapidly changing energy market where reliable supplies of energy have never been more critical, we provide customers with power and temperature control solutions when, where and for however long they need it. Using the latest technologies, we combine our innovative thinking with our sector knowledge to help our customers achieve their goals, however complex, through a range of flexible, modular solutions. We're investing in more sustainable products, fuels, and services to make greener solutions accessible for our customers, supporting their move to a more sustainable and efficient future. Founded in 1962, we are headquartered in the UK and employ over 6,000 people worldwide. For more information, visit www.aggreko.com.

LG Opens New Scroll Compressor Production Line in Mexico

LG Electronics (LG) announced the opening of a new scroll compressor production line at its factory in Monterrey, Mexico. The new line bolsters LG's scroll compressor manufacturing infrastructure, enabling the company to produce more of its acclaimed, eco-conscious solutions while creating a shorter supply chain for servicing customers across North America.

LG's decision to establish a production line in Mexico comes at a time when many U.S. HVAC manufacturers are facing challenges due to escalating logistical disruptions. The strategic move places an LG scroll compressor production base in close proximity to key North American markets; setting up a production/logistics system that will help the company better respond to regional demand and lessen the impact on customers of factors such as logistic issues.

LG's scroll compressors play a major role in the company's heating, ventilation and air-conditioning (HVAC) components business.

Designed with the future in mind, Gen 3 Scroll Compressors are symbolic of LG's continuing leadership in HVAC innovation. In anticipation of refrigerant regulations taking effect in 2025,[1] and in line with the company's commitment to the environment and sustainability, the compressors utilize low GWP refrigerants. With GWPs less than 700 – far lower than the 2,088 GWP of R-410A – these refrigerants easily meet

the newest eco-focused standards for refrigerants. The structure of the Gen 3 Scroll Compressors also helps to ensure compliance with the latest efficiency standards[2] by reducing energy waste and heat loss.

"The new, state-of-the-art production line in Mexico will enable us to produce more of our eco-conscious scroll compressors and fortify our ability to service the North American market," said Kim Yang-sun, head of the Component Solution Business Unit at LG Electronics Home Appliance & Air Solution Company. "LG will continue to provide advanced technologies and components to meet the diverse needs of its global customers."

For more information, visit www.lg.com.

1 The state of California has passed legislation that will ban the use of refrigerants with a GWP over 750 from the year 2025.

2 LG's compressors meet the requirements of the U.S.'s new HVAC efficiency standard, which went into effect on January 1, 2023.

LG Electronics' Gen 3 Scroll Compressors produced in LG Electronics factory in Monterrey, Mexico.

ENVIRO/TECH INK • ENVIRO/TECH INK •

Enviro/Tech is a registered trademark.

SUSTAINABLE FORESTRY INITIATIVE

Certified Chain of Custody

Promoting Sustainable Forestry

www.forests.org

SFI-00993

COMPRESSED AIR BEST PRACTICES®

www.airbestpractices.com

ADVERTISER INDEX

Company	Page	Web Site
Kaeser Compressors	Outside Back Cover	https://us.kaeser.com/cabp
Atlas Copco	Inside Front Cover	www.atlascopco.com/air-usa
BEKO Technologies	Inside Back Cover	www.bekousa.com
SMC	5	www.smcusa.com
Applied System Technologies	6	www.appliedsystemtech.com
Mikropor	7	www.mikroporamerica.com
Altec AIR	8	www.AltecAIR.com
Sullivan-Palatek	9	www.sullivan-palatek.com
Tamturbo	10	www.tamturbo.com
Clean Resources	11	www.cleanresources.com
ENMET	12	www.enmet.com
Best Practices Webinars	13	www.airbestpractices.com/webinars
Hydrothrift	15	www.hydrothrift.com
CTI	17	www.cti.org
WCVC Networking Group	18	https://cabpexpo.com/womens-group/
Compressed Air and Gas Institute	19	www.cagi.org/training-and-certification-personnel-certification
PneuTech Nitrogen	21	https://pneutech.com/usa/
CDI Meters	23	www.cdimeters.com
Solberg	24	www.solbergmfg.com
Best Practices 2024 EXPO	27	www.cabpexpo.com
EVAPCO	31	www.evapco.com
Compressed Air Challenge	37	www.compressedairchallenge.org
AICD	45	www.aicd.org

Advertising/Editorial Rod Smith • rod@airbestpractices.com • Tel: 412-980-9901

Subscriptions Administration Patricia Smith • patricia@airbestpractices.com • Tel: 412-980-9902

A Publication of Smith Onandia Communications LLC
37 McMurray Rd., Suite 104, Pittsburgh, PA 15241

THE MARKETPLACE

TECHNOLOGY & JOBS

Job & Product Marketplace Advertising Information

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

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

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

BEKOKAT®

Hydrocarbon Removal Systems

The absence of hydrocarbons is paramount to a number of production and quality processes and products. In addition to oil, germs and bacteria also pose a real threat as harmful contaminants. What do you do once the intake air to your oil-free compressor is contaminated? There's no need to try and control the environment, instead trust the **BEKOKAT®** hydrocarbon removal system to ensure the constant delivery of oil-free compressed air for you.

Germ-Free Compressed Air

Generates amicrobic and spore-free air in accordance with ISO 8573-7.

Oil-Free Compressed Air

Can be combined with any compressor type and reliably produce air down to .003 mg/m3 and exceed ISO Class 1 standards.

Hydrocarbon Firewall

Using advanced and responsive machine controls together with our valving system we ensure both machine and plant safety.

Truth in Compressed Air

Reliable | Efficient | Innovative

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

The Hidden Costs of Compressed Air.

Compressed air is among your biggest power consumers; in fact the yearly energy bill for a compressor can surpass its initial cost. Further losses accrue from production downtime and scrap from unstable pressure or bad air quality.

KAESER provides the expertise to deliver consistent pressure and superior air quality throughout your facility, coupled with an energy-efficient system that delivers more air per kW.

Let's reveal your opportunities for signficant cost savings and production improvements.

SCHEDULE A SITE VISIT

KAESER COMPRESSORS®

us.kaeser.com/cabp • 866-516-6888