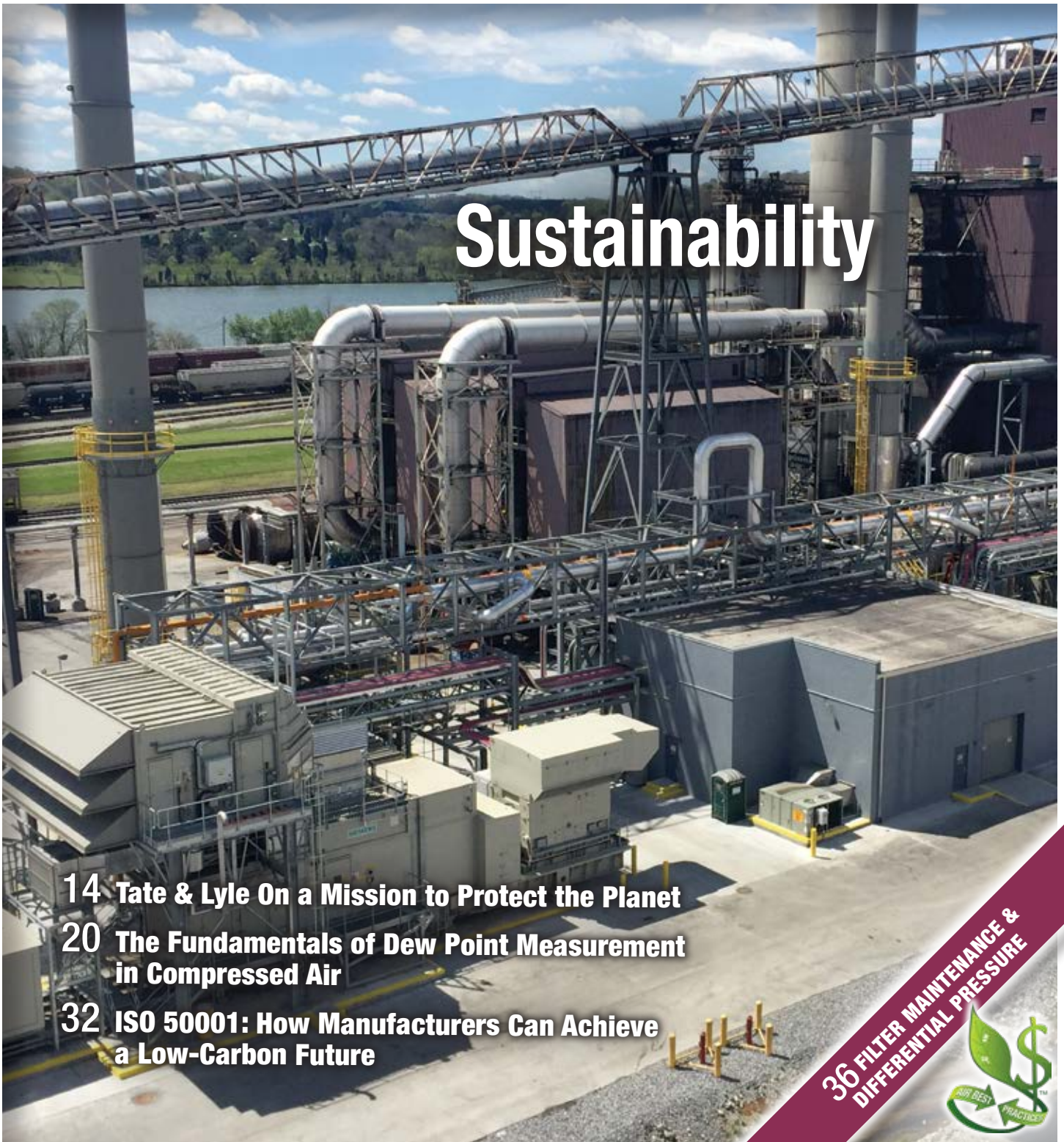
The Magazine for ENERGY EFFICIENCY in Compressed Air Systems

COMPRESSED AIR BEST PRACTICES

airbestpractices.com

September 2020



Sustainability

Air, Gas, Vacuum and a Whole Lot More!

Solutions that are made to work together.
Solutions that are made to work for you.

- 24/7 Remote Monitoring
- Centralized Control System
- Family-Style Controllers Across Models and Technologies
- Single Service Contract for Multiple Machines
- Nationwide Support by Factory-Trained Service Technicians

The Connected Efficiency Journey

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

www.atlascopco.com/air-usa

FEATURES

QUALITY, SAFETY & RELIABILITY FEATURES

PRODUCTIVITY, SUSTAINABILITY & ENERGY CONSERVATION FEATURES

COLUMNS

FROM THE EDITOR

Quality, Safety and Reliability

Dew Point measurement is an area of opportunity, in many plants, to improve process quality and safety. It can also potentially reduce energy consumption by causing one to re-examine compressed air dew point specifications of -40˚F (-40˚C) for an entire plant-when only a certain section of the plant needs it. Vaisala's Anthony Cote has sent us a solid article titled, "The Fundamentals of Dew Point Measurement in Compressed Air Systems."

Adsorbents play a critical role in the performance of heated desiccant compressed air dryers. Artem Vityuk, from BASF, has sent us a very nice review of the pros and cons of activated alumina, molecular sieve and silica gel adsorbents used in these dryers.

Maintaining compressed air filters is perhaps not the first thing people think of when optimizing compressed air systems. When one looks at the differential pressure impact, however, their profile is worth elevating. This is one of the many points Parker Hannifin's Mark White makes in a very good article he's sent us on the proper maintenance of compressed air filters.

Productivity, Sustainability & Energy Conservation

Tate & Lyle operates more than twenty production sites including six corn wet mills, four of which are in the U.S. To learn why they continue to be recognized by the U.S. EPA's ENERGY STAR® program, our own Mike Grennier had the distinct privilege of interviewing their Director of Sustainability, Anna Pierce, and Nick Waibel, their Global Energy Lead.

ISO 50001 is a global standard for energy management systems, launched in 2011 and revised in 2018. It is the topic explored in an article sent to us by Energair's Graham Coats. It's clear compressed air performance monitoring and management fall squarely within the scope of this global standard.

Best Practices 2020 ONLINE EVENT!

Please consider reserving portions of September 23-24, 2020 for the Best Practices 2020 ONLINE EVENT! Free for all to register at www.cabpexpo.com, this is a great opportunity for maintenance teams, specifying engineers and sales engineers to receive training (and PDH hours)! We will offer LIVE Online Forums and Keynotes, plus hours of pre-recorded sessions.

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

ROD SMITH, *Editor*
tel: 412-980-9901, rod@airbestpractices.com

MK Series
Ultra Reliable, Clean & Dry Air

mikropor
Manufacturing Forward

- **Protect the Dryer**
  Always Pre-Filter to protect heat exchangers
- **Protect Downstream Air Quality**
  Always polish (Post-Filter) to give a final air quality
- **Keep Running in High Ambient / Higher Inlet Temp**
  Oversized Refrigerant Condenser
- **Attend to critical service/run indications**
  Microprocessor system operation management
- **Refrigeration Circuit Health Monitoring**
  Gauges standard
- **3rd Party Performance Verified (CAGI)**
  Performance as promised

CAGI Compressed Air & Gas Institute
PERFORMANCE VERIFICATION PROGRAM

Please contact us for a complimentary consultation **support@mikroporamerica.com**

4921 Ohio Street, Michigan City, IN 46360

www.mikroporamerica.com

COMPRESSED AIR SYSTEM INDUSTRY NEWS

Tamturbo Awarded the Solar Impulse Label for Sustainability

Tamturbo Touch-Free air compressor technology has been awarded the Solar Impulse Efficient Solution Label for sustainability. The Solar Impulse Foundation is a non-profit organization founded by the visionary Bertrand Piccard who is famous for his two round-the-world flights, recently in a solar-powered airplane and before that non-stop in a balloon. Piccard advocates that environmental protection holds great economic market opportunity.

The evaluation by the experts of the Solar Impulse Foundation was based on three sections: Feasibility, Environment and Profitability, and Tamturbo Touch-Free technology received top marks on all three areas

The Feasibility evaluation is aimed at determining the technical viability of the solution, ensuring the solution is feasible in the real world. This section is composed of two criteria: credibility and scalability of the concept and it considers the technical requirements of the proposed solution and captures its ability to be credible based on a resilient technology or concept and its potential to be technically scaled up and deployed in the real world without additional constraints. The second criterion in the Feasibility section, scalability, describes whether the manufacturing or distribution of the solution at scale are technically feasible.

The environmental impact -section is aimed at determining the impact of the Solution at the different phases of its lifetime: production, transportation, and distribution, as well as use and disposal phase. This section is composed of one criterion and it considers the potential to enable a direct positive impact on the environment compared to the mainstream alternative identified. The evaluation focuses on the following elements: energy use, CO_2 emissions, water use/materials use, air quality, ecosystem preservation. It evaluates if the Solution delivers an incremental environmental benefit versus a mainstream alternative, considering the lifecycle of its value chain.

Tamturbo Touch-Free air compressor technology has been awarded the Solar Impulse Efficient Solution Label for sustainability.

The Profitability -section is aimed at determining the capacity of a Solution to deliver an economic incentive for the client, as well as to generate profits for the seller in a short term. This section is composed of two criteria and it considers the capacity of a solution to deliver an economic incentive for the client to the mainstream alternative and the capacity of the solution to generate profits for the seller in the short term, regardless of the marketing strategy and the novelty of the product. The first criterion of the profitability describes whether the total cost of ownership of the solution lower compared to the mainstream alternative. The second criterion in the profitability section covers the seller's profitability and evaluates whether the Solution itself can be profitable for the seller within 5 years, with a sale's price at which clients would buy it.

The second criterion in the profitability section covers the seller's profitability and evaluates whether the Solution itself can be profitable for the seller within 5 years, with a sale's price at which clients would buy it.

All in all, the Efficient Solution Label and the efficiency assessment report of the Solar Impulse Foundation nicely sum up the core benefits that our customers using the Tamturbo Touch-Free™ technology are familiar with already: significant energy and maintenance savings and lowest total cost of ownership.

About Tamturbo

Tamturbo is a Finnish industrial growth company in the cleantech sector that enables cleaner and more energy-efficient industrial compressed air production with a new generation of Touch-Free™ compressor technology and service models that add value to customers. Tamturbo develops and manufactures air compressors, which offer a more environmentally friendly solution that is completely oil-free, energy-efficient and a long-lasting option which is significantly cheaper for the customer than traditional technology in terms of total cost of ownership. It is possible to implement the solution as an Air-as-a-Service business model, in which case the customer only pays for the compressed air they use. For more information, visit www.tamturbo.com.

Tamturbo
JUST AIR

TOUCH-FREE = RELIABILITY
RELIABILITY = PEACE OF MIND

Magnetic force Levitates a 268mph, 80 ton train – running parts that don't touch, don't wear. Thanks to the similar Touch-Free™ Technology, Tamturbo® compressors are not only uniquely wear-free but also 100% Oil-Free and Care-Free.

www.tamturbo.com +1(314) 662-0188 Americas and +358 40 766 5678 Global

COMPRESSED AIR SYSTEM INDUSTRY NEWS

Atlas Copco Solar Panel Installation Set to Save 57% Energy

Atlas Copco Power Technique inaugurated its new solar panel installation at the Paragon Way facility in Rock Hill, South Carolina. The 2,397 roof-mounted solar panels will provide approximately 57% of the energy consumed within the facility while saving approximately 600 metric tons of CO_2 every year.

One square foot of solar panel gives an output of approximately 12 watts of power. If laid end-to-end, the solar panels would spread nearly three miles. The new installation will make the best use of the greater than 3,000 hours of sunlight in South Carolina every year.

The total project investment was more than $2 million and was 50% funded through grants provided by the Federal government and the state of South Carolina for green-energy initiatives. The investment was made in 2019 and the installation was reaching full capacity already from March 2020. The official unveiling event in March was delayed by the events of COVID-19.

Frederic Genestout, general manager of the manufacturing facility at Atlas Copco Power Technique said, "Thanks to this solar initiative our carbon footprint will be more than halved, which shows our commitment to the sustainable values that are so important at Atlas Copco."

The 200,000 square-foot facility is home to more than 400 employees and is the U.S. headquarter for the Power Technique business area and BeaconMedaes medical gases division. Products manufactured at this facility include mobile compressors, generators, and a wide range of medical equipment, including oxygen-control systems. In 2019, the plant was the proud recipient of the Charlotte Business Journal's Supply Chain Innovator of the Year.

About Atlas Copco Group

Great ideas accelerate innovation. At Atlas Copco, we have been turning industrial ideas into business-critical benefits since 1873. Our passionate people, expertise and service bring sustainable value to industries everywhere. Atlas Copco is based in Stockholm, Sweden, with customers in more than 180 countries and about 37,000 employees. In 2019, revenues were BSEK 104, approximately 10.8 BUSD. For more information, visit www.atlascopco.com

Atlas Copco Paragon Way facility in Rock Hill, South Carolina.

It's time to check your oil vendor to ensure **maximum** savings and service.

- **Competitive** pricing
- **Fast, free shipping** on pallets*
- **Responsive** sales team & in-house technical expertise
- **Private-label** packaging

*Exclusions apply.

SEVAIR

Severe-Service Compressor Lubricants

Contact us and start saving today.

Technical Sales Group | AMSOIL INC.
One AMSOIL Center | Superior, WI 54880
sevair@amsoil.com | www.sevair.com
Phone: (715) 399-6325

COMPRESSED AIR SYSTEM INDUSTRY NEWS

WEG Acquires New Startup of Digital Solutions

WEG S.A. announced to its shareholders and the general market an agreement to acquire control of the startup BirminD, a technology company active in the Artificial Intelligence market applied to Industrial Analytics. With the closing of the agreement, WEG will own 51% of the share capital of BirminD, with the possibility, provided in the agreement, to increase its participation in the business in the future.

Founded in 2015 in Sorocaba (São Paulo State, Brazil), BirminD is a company that provides industrial optimization solutions focusing on bringing the most advanced concepts of industrial analytics, one of industry 4.0 pillars. The company serves medium and large customers by offering industrial analysis solutions, optimization of control loops and evaluation of the financial return on services even before executing them and without the need for an automation specialist, using machine learning and artificial intelligence techniques.

Immediately, customers of motor and inverter asset management system: WEG Motor Fleet Management or from commercialized MES systems, will have services, tools and applications to extract additional information from the database ("data-lakes") of this software.

Recently WEG announced the acquisition of the startup Mvisia, which specializes in artificial intelligence solutions applied to computer vision for the industry. Now, with the acquisition of BirminD, the company complements its digital ecosystem and starts offering artificial intelligence technologies applied to both images and industrial analytics.

About WEG

Founded in 1961, WEG is a global electric-electronic equipment company, operating mainly in the capital goods sector with solutions in electric machines, automation and paints for several sectors, including infrastructure, steel, pulp and paper, oil and gas, mining, among many others. WEG stands out in innovation by constantly developing solutions to meet the major trends in energy efficiency, renewable energy and electric mobility. With manufacturing units in 12 countries and present in more than 135 countries, the company has more than 31,000 employees worldwide. WEG's net revenue reached R$ 13.3 billion in 2019, 58% from external markets. For more information, visit www.weg.net.

With the acquisition of BirminD, the company complements its digital ecosystem and starts offering artificial intelligence technologies applied to both images and industrial analytics.

Atlas Machine Employees 3-D Print Face Shields

Employees at Atlas Machine and Supply are ready to help when there is a need. And if there is just one positive amid the historic pandemic we are experiencing, it is the increasing number of the acts of kindness all around us. Two employees at Atlas Machine are among those who decided to show in a tangible, non-traditional way, their concern about the spread of COVID-19. One of those who stepped up to help others is employee Jeremy Rydberg and his 12-year old son, Jake. Jeremy is Vice President of Corporate Development at Atlas.

The two decided to use a 3-D printer to produce face shields for medical personnel. Next, several employees working in the Machine Shop volunteered to assemble the parts of the face shields made by Jeremy and Jake into their final form. A total of 30 shields, along with replacement lens, were ultimately produced for the Pleasure Ridge Park Fire Department. The department's medical response team is now using the face shields when making medical runs in the area.

Another employee who recognized a need coming out of the pandemic is Steve Wallace, a Service Manager for Atlas' Industrial Products Group in Cincinnati. Steve came up with the idea of using a 3-D printer to create an "ear relief" accessory that connects to traditional medical masks. "Basically you can strap a surgical mask to this bracket and it holds it in place instead of your ears," said Steve about his creation. "So far I have made a little over 100. I donated about 85 to St Elizabeth's Hospital where my aunt and cousin work and sent about 25 down to you guys for distribution to any family members of Atlas employees that are in health care."

COMPRESSED AIR SYSTEM INDUSTRY NEWS

Steve says his creation is simple but effective. "I will try to accommodate anyone who needs some." Thank you, Steve, Jeremy and Jake, for helping to keep more people safe during the pandemic crisis.

The department's medical response team is now using the face shields when making medical runs in the area.

About Atlas Machine and Supply, Inc.

Atlas is over a century old and based in Louisville, Kentucky. The family-owned company designs, repairs, and remanufactures complex equipment and components for industry and municipalities throughout the United States and internationally. The company is also a leading supplier of industrial air compressors, related products and has a full-service department for compressed air. For more information, visit www.atlasmachine.com.

VP Academy Now Features All VPFlowScope Flow Meters & VPVision

VPInstruments, manufacturer of leading flow metering equipment for easy insight into energy flows, provided a major update for the VP Academy, VPInstruments online e-learning platform. The update contains the addition of the VPFlowScope DP, VPFlowScope Probe and the VPFlowScope In-line product range. VP Academy enables you to learn at your own time and pace. Both fundamental steps and

in-depth knowledge of the VPInstruments' products are provided on the platform. This online learning environment is especially designed to make instructions and information as easy and as effortless as possible. Therefore, information and instructions are provided in text, visuals, and videos. With this extension, the VP Academy features now all VPFlowScope flow meters and our VPVision energy monitoring solution. Visit https://vpacademy.vpinstruments.com/.

Our VPFlowScope® product family measure compressed air or other industrial gases, like nitrogen, oxygen, helium and more. The VPFlowScope flow meters provide insight from supply to demand side, in saturated and dry air, and can be used for mobile or permanent measurements. The VPFlowScopes all incorporate the 4-in-1 measurement principle: (bi-directional) flow, pressure, temperature, and total flow.

About VPInstruments

VPInstruments' products are recommended by leading energy professionals worldwide and offer the most complete measurement solution for compressed air flow, gas flow and electric energy consumption. Our monitoring software, VPVision, can be used for all utilities, and enables you to see where, when, and how much you can save. Our products can be found all over the world. We serve all industrial markets, for example, automotive, glass manufacturing, metal processing, food and beverage, and consumer goods. For more information, visit www.vpinstruments.com.

With this extension, the VP Academy features now all VPFlowScope flow meters and our VPVision energy monitoring solution.

PRODUCTIVITY, SUSTAINABILITY & ENERGY CONSERVATION

Food & Beverage Ingredients Firm Tate & Lyle ON A MISSION TO PROTECT THE PLANET

By Mike Grennier, Compressed Air Best Practices® Magazine

Tate & Lyle's plant in Loudon, Tennessee, in one of the company's two Energy Star-accredited facilities recognized by the U.S. Environmental Protection Agency as a leader in energy efficiency.

When your business revolves around Mother Nature and what she offers, sustainability takes on a whole new meaning.

Such is the case with Tate & Lyle, a leading global producer of food and beverage ingredients – and a company that demonstrates its commitment to sustainability time and time again in all aspects of its business.

"We are acutely aware of the threat posed to the world's land, water and air by modern day production and consumption," said Anna Pierce, Director of Sustainability at Tate & Lyle. "In keeping with our purpose we are committed to robust, urgent action backed by science to protect our planet's resources for the benefit of future generations."

Tate & Lyle's sustainability actions involve countless initiatives worldwide to minimize its environmental impact by reducing emissions and using water sustainably. Whether it's the use of a low-pressure blower instead of a high-pressure compressed air system to save energy, or a $75 million natural gas-fired Combined Heat and Power (CHP) system to replace coal as a power source at its corn wet mill in

"As an example, we were using higher pressure air compressors for an application that didn't need that amount of pressure so we installed a blower rated to deliver air at 15 psi, which saved $30,000 a year."

— Nick Waibel, Global Energy Lead, Tate & Lyle

Lafayette, Indiana, Tate & Lyle is on a mission to protect the planet.

Improving Lives for Generations

Headquartered in London, England, Tate & Lyle operates more than 20 production facilities globally including six corn wet mills, four of which are located in the United States where much of the company's production and around half of its employees are based. Its other corn wet mills are located in the Netherlands and Slovakia. Tate & Lyle also operates numerous blending facilities that use ingredients produced by the corn wet mills, as well as other ingredients, to create food solutions for a wide variety of customers.

Tate & Lyle defines its purpose as "Improving Lives for Generations." To do so, it strives to support healthy living, build thriving communities, and care for the planet. Toward that end, the company is recognized as a leader in environmental sustainability and reduced its Carbon Dioxide Equivalent Emissions (CO_2e) by 21.8% since 2008. CO_2e is a term used to describe different greenhouse gases in a common unit.

This year, Tate & Lyle analyzed its carbon footprint with the support of an external expert and determined that just under 30% of its carbon emissions are from Scope 1 and Scope 2 CO_2e emissions, which are classified as energy sources used in or purchased for its facilities. The remainder of its carbon footprint consists of Scope 3 emissions, which are related to its purchase of goods and services (principally corn).

Anna Pierce, Director of Sustainability, Tate & Lyle.

FOOD & BEVERAGE INGREDIENTS FIRM TATE & LYLE ON A MISSION TO PROTECT THE PLANET

After completing its analysis, Tate & Lyle set new targets based on where it has been and where it believes it should be in 2030 and beyond – and what it will take to get there. In addition to being science-based, its commitments include the following:

- By 2030, it will have delivered a 30% absolute reduction in its Scope 1 and Scope 2 CO_2e emissions, with an ambition to reach 20% reduction by 2025.
- By 2030, it will have delivered a 15% absolute reduction in its Scope 3 CO_2e emissions.
- By 2025, it will eliminate the use of coal as an energy source from all of its operations.
- By 2030, it will reduce water use by 15%.
- By 2030, 100% of its waste will be beneficially used with an ambition to reach 75% by 2025.

Pierce said the company's aggressive sustainability goals are predicated on the importance of protecting natural resources for the benefit of future generations.

"As we embarked on setting our new climate change, water and waste reduction targets, we kept asking ourselves, "In a decade's time, will we look back and feel as though we've done enough?"

Milling Consumes 30 Trillion BTUs Per Year

A major area where Tate & Lyle has targeted continued to progress in sustainability is at its corn wet mills. Tate & Lyle Global Energy Lead Nick Waibel said the four U.S. corn wet mills alone represent 80% of the company's energy use. In total, Tate & Lyle grinds the equivalent of 1.5 million acres of corn per year at its six corn wet mills – and in the process – consumes approximately 30 trillion British Thermal Units (BTUs) of energy annually.

"Wet mills are energy- and water-intensive," Waibel said. "Unlike a dry mill that takes a kernel of corn and grinds it to ferment the

Work is underway at Tate & Lyle's corn wet mill in Lafayette, Indiana, where the company has launched a $75 million project to install a natural gas-fired Combined Heat and Power system for use as a power source instead of coal.

mash, a wet mill utilizes additional energy and water to separate that corn kernel into its four different components including starch, fiber, gluten and germ."

Waibel said Tate & Lyle purchases a mix of natural gas, coal and electricity to power its highly automated corn wet mills, with each mill using an energy scheme best suited to the processes and needs of the operation.

Identifying and implementing initiatives designed to save energy involves each mill working regularly and closely with the corporate energy group on strategic plans aimed at sustainability improvements. Tate & Lyle also conducts energy assessments multiple times per year at its mills and other production plants. To so do, members of the corporate energy team gather with engineers and technical managers at a given mill to assess the operation's energy usage. Engineers from other mills join the team, as well as employees representing other job functions, including plant operators and area technologists. The strategy is to gather ideas for sustainability from a diverse range of sources – and those who know the plants best, Waibel said.

"A lot of this is driven by the local engineers," Waibel said. "Efficient energy performance must be driven from the ground up and it must be ingrained in our culture. Our operations teams are very proud of their energy performance and they take a lot of pride in what they do."

It also helps that the culture at Tate & Lyle encourages ongoing and open communication between plants.

"We're big enough to have a lot of ability to leverage different experiences and knowledge within the company, yet we're small enough that we're a very close-knit group. The plants talk to each other and we have monthly calls about energy and water. So when one engineer implements something successful in on plant, another plant knows it can call that same engineer to help lead them down the right road."

"Pinching" Compressed Air Use

One utility in particular the plants discuss frequently is compressed air, especially given the role it plays in the wet corn mill process and the opportunity for energy savings, Waibel said.

"Compressed air is a very important utility for us, not only for our operations, but also environmentally," he said. "Our plants are highly automated and we rely on it for controlling a lot of the valves, solenoids and actuators for processes in addition to many other uses. Even when we have annual plant shutdowns with a plant going black on power compressed air is the one utility we don't shut off, thanks to rental air compressors."

Nick Waibel, Global Energy Lead, Tate & Lyle.

FOOD & BEVERAGE INGREDIENTS FIRM TATE & LYLE ON A MISSION TO PROTECT THE PLANET

The compressed air systems at Tate & Lyle are configured to match the needs of each corn wet mill. Most plants use centralized multi-stage centrifugal air compressors in combination with desiccant dryers to supply air at 90-100 psi with pressure dewpoints as low as -40°F. Plants may also use satellite rotary screw air compressors, as well as low-pressure blowers where needed.

In addition to evaluating compressed air systems and their energy consumption regularly and as part of annual energy assessments, Waibel also encourages decision-makers to use the principles of pinch analysis to optimize compressed air systems.

"Pinch analysis is a methodology for minimizing energy consumption by calculating thermodynamically feasible energy targets for processes within a plant," Waibel said. "The process data is represented as a set of energy streams that are combined into hot and cold composite curves. The 'pinch' identifies the point where the process is energy constrained and we design our heat recovery network around it. It may not be economically feasible to get to 'perfect' but it gives you some parameters and a target you can design to. Pinch theory has been ingrained in our culture for over the past 30 years."

Waibel said that while the teams at Tate & Lyle do not formally use pinch methodology to evaluate compressed air energy us,e they use it to guide decision-making.

"Compressed air is not quite a pinch scenario, but the principles still apply. You need to supply air at the level for which it needs to be used," he said. "As an example, we were using higher pressure air compressors for an application that didn't need that amount of pressure so we installed a blower rated to deliver air at 15 psi, which saved $30,000 a year."

Other examples of efforts to reduce compressed air energy consumption abound at Tate & Lyle. An operation in Slovakia recently installed new, more efficient compressors outfitted with Variable Frequency Drives (VFDs) and it now expects to save one million kilowatt hours of electricity annually.

Meanwhile, the company recently approved a multi-million project to upgrade the compressed

air system at its corn wet mill in Loudon, Tennessee. The initiative will replace aging air compressors with energy efficient units. The project also includes advanced compressed air system controls and metering devices in the ongoing effort to reduce energy costs.

More to ROI than Financial Payback

Whether it's a project as large as the compressed air system upgrade at the Tennessee operation or ongoing work at the mills to identify and repair compressed air leaks, Tate & Lyle carefully evaluates the return on the investment (ROI) for all sustainability initiatives. Yet ROI is not always based solely on financial payback, Waibel said.

"Obviously, we're looking for payback," he said, "but working within the framework of our sustainability goals we ask how is it to going to help with carbon emissions? Is it going to save water usage? Sure, it's about using money wisely but it's also about the environment. We're really fortunate to have a board and executive leadership team that genuinely cares about sustainability and our environmental impact. If something has a proven sustainability benefit, they will accept a lower payback or choose to invest if it's the best option, because of the total commitment to our sustainability goals."

In addition to its commitment to sustainability, Tate & Lyle prides itself on ability to operate efficiently.

"Companies can spend all the capital they want but if they don't save energy or operate reliably, it's not sustainable, which is why our plants take a lot of pride in their successes with energy performance," Waibel said.

Tate & Lyle also takes great pride in knowing its energy savings efforts have elevated the company to a position as a clear leader in sustainability. Toward that end, Waibel said Tate & Lyle is the only company in the corn wet mill sector with plants in the United States that have consistently earned the Environmental Protection Agency (EPA) ENERGY STAR certification since 2012. In fact, the company's corn wet mill in Lafayette earned the certification for the past five years running. The mill in Loudon has been ENERGY STAR certified for the past three years.

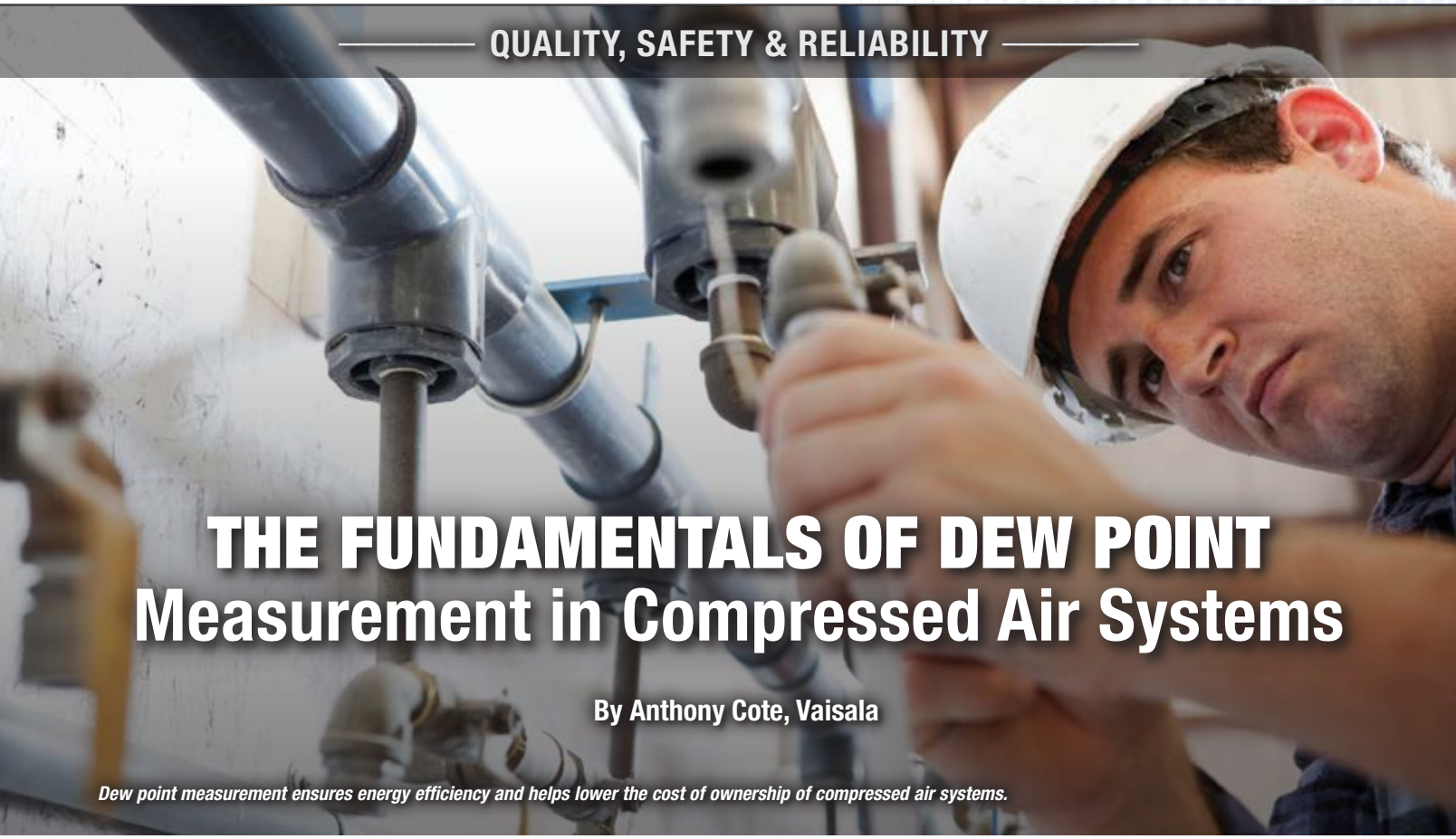
Waibel said he could not be more optimistic about Tate & Lyle's continued success with sustainability.

"Our future is bright from both an energy use and sustainability outlook," he said. "We achieved our CO_2e reductions we established for our 2008 baseline. We've also laid out our 2030 goals with a checkpoint in 2025. Our executive leadership is fully committed to hitting those goals, and I know for certain we will." BP

All photos courtesy of Tate & Lyle.

To read similar articles on ***Sustainability***, please visit https://airbestpractices.com/sustainability-projects.

QUALITY, SAFETY & RELIABILITY



THE FUNDAMENTALS OF DEW POINT Measurement in Compressed Air Systems

By Anthony Cote, Vaisala

Dew point measurement ensures energy efficiency and helps lower the cost of ownership of compressed air systems.

In industry, compressed air is everywhere. Think of it like electricity – a power source that drives conveyors, packaging lines, spray-painting equipment, metal presses – the list goes on and on. But this comes at a cost, literally. Compressed air is one of the largest consumers of energy, which accounts for approximately 75% of the lifetime cost of a compressed air system.

Fortunately, energy saving opportunities are also everywhere, it just takes a little effort to recognize them. For compressed air systems, nothing offers a better return on investment than dew point measurement for ensuring energy efficiency and lowering the cost of ownership. What follows is a review of dew point and methods for measuring it with compressed air systems.

Quality Air Critical to Production and Products

Dew point is simply the temperature to which air must be cooled for the water vapor within to condense into dew or frost. At any temperature, there is a maximum amount of water vapor that the air can hold. This maximum amount is called the water vapor saturation pressure. If more water vapor is added beyond this point, it will result in condensation.

Condensation in pressurized air is a big problem because it causes blockages in pipes, machinery breakdowns, contamination and freezing. Modern facilities using compressed air can identify and avoid those problems simply by keeping an eye on dew point.

Dew point monitoring can be achieved by installing high-quality dew point sensors and monitors in the compressed air system. The use of a pressure dew point monitoring system allows you to be sure you are reliably maintaining the desired moisture level in a compressed air system.

"By using stable dew point measurement devices, you can avoid over-drying, save energy and protect your equipment from corrosion."

— Anthony Cote, Vaisala

The quality of the air you use is critically important to the end result of the process. Take spray painting as an example. Poor-quality air – i.e., air that contains dust, other particles, or water – will result in a poor-quality paint finish, and therefore a wasted product that can't be sold. In semiconductor production, wet gases in compressed air systems can lead to problems such as low yield and poor reliability, while dust in the air can cause the products to short circuit.

On packing lines in the food and drinks industry, clean, dry air is an absolute must to maintain hygiene and preserve end-product quality. For example, if you're using a filling gas to fill up packs of ham, you don't want anything in there that isn't supposed to be there. When air is pressurized, humid air condenses and forms water droplets, which can lead to rust – and this can end up in with the food. When you're drying plastics to make soda bottles, excessive moisture can result in brittle bottles with a cloudy finish.

Pressure Dew Point Defined

Dew point is focused primarily on temperature and relative humidity. However, that same point of saturation is affected by the pressure. So, before we continue, it is necessary to distinguish between "dew point" and "pressure dew point."

Dew point is related to non-pressurized, atmospheric air (atmospheric dew point). The term "pressure dew point" is encountered when measuring the dew point temperature of gases at pressures higher than atmospheric pressure. It refers to the dew point temperature of a gas under pressure. This is important because changing the pressure of a gas changes the dew point temperature of the gas.

Because water vapor pressure and dew point are increased by air compression, it is critical to take this into consideration if you are bleeding the air to atmosphere before taking a measurement. The dew point at the measurement point will be different from the dew point in the process.

THE FUNDAMENTALS OF DEW POINT MEASUREMENT IN COMPRESSED AIR SYSTEMS

Dew point temperatures in compressed air range from ambient down to -80°C (-112°F) in special cases. Compressed air systems without air drying capabilities tend to produce compressed air that is saturated at ambient temperature. Systems with refrigerant dryers pass the compressed air through a cooled heat exchanger, causing water to condense out of the air stream. These systems typically produce air with a dew point no lower than 5°C (41°F). Desiccant drying systems absorb water vapor from the air stream and can produce air with a dew point of -40°C (-40°F) and drier if required.

Supply and Demand Side Dew Point Measurement

Dew point is often measured on the supply side of a compressed air system. The measurement values can be shown directly on a display or on the dryer's control panel. These values indicate a dryer's performance and quality – and can also control desiccant tower regeneration to reduce energy consumption. Moisture contamination increases operating and maintenance tasks and costs in numerous ways. Whatever the source of the moisture, discovering the problem early on means that corrective actions can be implemented faster. This helps to avoid major problems that could lead to long and costly service breaks and lack of capacity.

The problem of excess humidity can be solved by using dryers, the two basic types of which are refrigerant dryers and desiccant dryers.

Refrigerant dryers use a refrigeration system and heat exchangers to drive down the temperature of compressed air to 2°C to 5°C (36°F to 41°F), which is also the dew point of the air. The excess water vapor condenses and is separated from the air, and the air is then warmed up.

Desiccant dryers operate on the basis of adsorption. In adsorption, material (adsorbate) travels from a gas or liquid phase and forms a superficial monomolecular layer on a solid or liquid substrate. Chemical beads, called desiccant, adsorb water vapor from compressed air. The most common desiccants are silica gel, activated alumina and molecular sieve. A desiccant dryer is considerably more effective than a refrigerant dryer. Although it typically provides a -40 °C (-40°F) dew point, even -100°C (-150°F) pressure dew points are possible.

Desiccant dryers usually have two desiccant-filled towers and switching valves that direct the compressed air flow first through one tower and then through the other. A desiccant dryer's basic operation consists of one drying cycle and one regeneration cycle, which is continuously repeated. While one tower dries

Air quality is critically important to the end result of the process.

the air, the parallel drying tower is in the regeneration mode.

Dew point monitoring ensures the dryer is functioning according to its specifications. Concerning desiccant dryers, dew point measurement can also be used to control the desiccant regeneration interval. Regeneration is not started until the desiccant tower has been used to its full capacity as indicated by a rise in the outlet air dew point. Unlike conventional timer-based regeneration, this system takes into account the fact that when compressed air is dry, the regeneration interval may be much longer than for moist air. Because it avoids unnecessary regeneration, dew point dependent switching (DDS) provides the user with up to 80% savings in the energy costs of drying compressed air, typically making a realistic repayment period for the investment less than one year.

On the demand side of a system, dew point instruments are installed throughout the distribution network and before critical end-use applications to give operators and plant personnel a quick assessment of moisture conditions at specific points in the system. These instruments confirm that the compressed air produced has been kept dry enough throughout the entire facility.

The key goals for measuring dew point in a compressed air system are to ensure that energy is not being wasted and that capacity is not being lost.

ISO8573.1 and Reliably Measuring Pressure Dew Point

ISO8573.1 is an international standard that specifies the quality of compressed air. The standard defines limits for three categories of air quality:

- Maximum particle size for any remaining particles.
- Maximum allowable dew point temperature.
- Maximum remaining oil content.

All remaining particles in the air will be 0.1 µm or smaller, and the maximum oil content will be 0.01 mg/m3. There are also several

THE FUNDAMENTALS OF DEW POINT MEASUREMENT IN COMPRESSED AIR SYSTEMS

Common Dew Point Monitoring Applications

- Medical and breathing air: Dew point monitoring is required for compliance with most medical gas and breathing air regulations. Stringent controls guarantee safe breathing conditions for hospital patients and firefighters.
- Industrial compressed air systems: Help to ensure the reliable operation of pneumatic devices and prevent corrosion and icing in compressed air lines.
- Plastics drying: Maintaining proper dryer performance avoids wasted material and costly production downtime – as well as ensuring product quality.
- Food and pharmaceutical industries: Several applications within the food and pharmaceutical industries utilize compressed air. Typical applications include drying, coating quality control, filling, and packaging.
- Trains and buses: Brake, door, and air-conditioning systems on mass transit rely on dew point measurement in their compressed air to ensure safety and reliability.

other ISO 8573 standards, as well as related topics such as measurement and test methods, to carefully research to avoid problems.

Users often ask how pressure dew point is reliably measured in compressed air. Some principles of measurement apply to all types of instruments:

- Select an instrument with the correct measuring range: Some instruments are suitable for measuring high pressure dew points, but not low pressure dew points. Similarly, some instruments are suitable for very low pressure dew points but are compromised when exposed to high pressure dew points.
- Understand the pressure characteristics of the dew point instrument: Some instruments are not suitable for use at process pressure. They can be installed to measure compressed air after it is expanded to atmospheric pressure, but the measured dew point value will have to be corrected if pressure dew point is the desired measurement parameter.
- Install the sensor correctly: Follow instructions from the manufacturer. Do not install dew point sensors at the end of stubs or other "dead end" pieces of pipe where there is no airflow.

Some technologies, such as the Vaisala DRYCAP® sensor, provide fast dew point measurements from ambient temperature down to -80°C (-112°F) with an accuracy of plus or minus 2°C (plus or minus 3.6°F) over the entire range. In addition to the general principles given above, consider the following when selecting a dew point instrument:

- The best installation for a dew point sensor isolates the sensor from the compressed air line. This is accomplished by installing the sensor in a "sample cell" and connecting the cell to a "T" in the compressed air line at the point of interest. A small amount of compressed air is then bled past the sensor. The cell should be made of stainless steel and connected to the "T" with tubing (1/4 inch or 6 mm). It is useful to install an isolation valve

Dew point relates to non-pressurized, atmospheric air (atmospheric dew point). Pressure dew point is referred to when measuring the dew point temperature of gases at pressures higher than atmospheric pressure.

between the cell and the air line. This enables easy installation and removal of the sensor.

- A flow-regulating device is necessary to control airflow past the sensor. The desired flow rate is only one slpm (two scfh). The regulating device can be a leak screw or a valve. To measure pressure dew point, the regulating device is installed downstream of the sensor, so that when the isolation valve is opened, the sensor is at the process pressure. To measure dew point at atmospheric pressure, the regulating device should be installed upstream of the dew point sensor.

- Do not exceed the recommended flow rate. When measuring pressure dew point, an excessive flow rate will create a local pressure drop at the sensor. Because dew point temperature is pressure sensitive, this will create an error in the measurement. The most common installation for a dew point sensor isolates the sensor from the compressed air line.

A word about calibration. We recommend a one- or two-year calibration interval, depending on the instrument. Sometimes a simple field check against a calibrated portable instrument is enough to verify correct operation of other instruments. Check detailed calibration information in the user's guide shipped with the instrument. Any time you have doubts about the performance of your dew point instruments, it is wise to check their calibration.

Multiple Advantages of Dew Point Monitoring and Measurement

Since the importance of clean, dry compressed air – and the cost associated with it – is so high, carefully managing and monitoring of it becomes a crucial task for any industrial process or plant. By using stable dew point measurement devices, you can avoid over-drying, save energy and protect your equipment from corrosion. BP

About the Author

Anthony Cote is the Technical Product Marketing Manager for Vaisala's Industrial and Liquid Measurements product lines in the United States. Based in Massachusetts, he has been a syndicated, award-winning writer on B2B and B2C regional and global issues, ranging from metrology to cybersecurity, commercial drone technology to SaaS applications. Email: anthony.cote@vaisala.com.

About Vaisala

Vaisala is a global leader in industrial and environmental measurement. Building on over 80 years of experience, Vaisala provides observations for a better world. We are a reliable partner for customers around the world, offering a comprehensive range of innovative observation and measurement products and services. Our newest offering – the Indigo 520 Transmitter – provides several industry innovations, including dual-probe and multi-parameter support. The transmitter is a universal host device for our Indigo-compatible, stand-alone smart probes – which include our dew point probes as well as many other probes. Headquartered in Finland, Vaisala employs approximately 1,850 professionals worldwide and is listed on the Nasdaq Helsinki stock exchange. For more information, visit www.vaisala.com/en or https://www.linkedin.com/company/vaisala/

All photos courtesy of Vaisala.

To read similar ***Compressed Air Purification System Assessment*** articles, visit https://www.airbestpractices.com/system-assessments/air-treatment-n2

QUALITY, SAFETY & RELIABILITY

Adsorbents for Heat Reactivated COMPRESSED AIR DRYERS

By Artem Vityuk, Adsorbent Solutions, BASF Corporation

In the field of externally heated adsorption dryers there is a large variety of different systems on the market offering substantial flexibility in terms of process flows, dew points and energy demand. Often, economic parameters and project-specific requirements ultimately define the individual user-specific solution. This article discusses the basic types of desiccants used in compressed air dryers.

Activated Alumina Adsorbent

Activated alumina is one of the most popular and probably the most established adsorbent used in the compressed air industry. Produced by thermal decomposition and subsequent activation of aluminum trihydroxide (gibbsite) it offers high surface area and high porosity matrix with good affinity towards polar compounds, especially water.

The surface of alumina is composed of basic oxygen atoms, acidic low coordinated aluminum (Lewis acid sites) atoms, hydroxyls (dissociatively adsorbed water molecules) and physisorbed water molecules. Their relative concentrations depend essentially on synthesis conditions of alumina and its degree of hydration affected by the temperature and the water partial pressure. Highly hydrophilic

"In a standard dehydration process moisture is transferred from gas phase to a solid and accumulated in a well-developed pore system via adsorption."

— Artem Vityuk, Adsorbent Solutions, BASF Corporation

nature of alumina surface makes it perfect choice for adsorbing polar molecules and especially water.

Dynamic capacity of activated alumina adsorbent might vary depending on the specific manufacturing process, degree of hydration (i.e., loss on ignition), impurities but generally lies around 12 to 14 weight percentage at 7 bar and 95°F (35°C) saturated.

Major advantages of activated alumina include fairly high robustness in a presence of liquid moisture and high stability toward alkaline components, for example, ammonia, amines or other high-basicity organics. Combined with wide availability and relatively low cost, this makes activated alumina a good conservative choice for heat-regenerated dryers.

However, there are also some drawbacks associated with activated alumina which include sensitivity towards long-chain, heavy hydrocarbons (i.e., air compressor oil vapors) which tend to deposit on a surface and block the pore system of alumina, reducing its water adsorption properties. Another disadvantage frequently encountered when working with activated alumina is its degradation via rehydration. Rehydration is a process when a portion of aluminum oxide is converted to aluminum hydroxide (i.e., Boehmite) in a presence of moisture at elevated temperatures which are frequently referred to as steaming conditions. Unlike aluminum oxide, aluminum hydrates do not exhibit high surface area and porosity needed for efficient water sorption. Rehydration and contamination with heavy hydrocarbons are the primary mechanisms of alumina deactivation when in service in heated compressed air dryers.

Activated alumina adsorbents are most often offered as smooth spheres or in a granular shape. Spherical alumina has been a preferred solution for most of compressed air dryers manufacturing companies for over 40 years. Activated alumina has been established as the conservative standard in compressed air industry.

Molecular Sieve Adsorbents

The commercial molecular sieves generally belong to the zeolite class of minerals, i.e., hydrated alkali metal or alkaline earth aluminosilicates. The crystals have a robust cubic structure, which does not collapse on heating, so that activation results in a geometric network of cavities connected by pores. The pores are of molecular dimensions and cause the sieving action of these materials. Molecular sieves are crystalline aluminosilicates with frameworks stabilized by monovalent or multivalent cations from the alkali or alkaline earth group, as well as water in its as-synthesized form. This crystal water can be removed by thermal treatment without damaging the crystalline structure to create the conditions for a reversible process such as water adsorption/desorption[1].

About 150 different zeolite structures have been discovered, however, only Zeolite A and Faujasite (X and Y) are widely used in commercial applications related to dehydration of gases and liquids. The pores of Zeolite A

BEST PRACTICES

2020 ONLINE EVENT! SEPTEMBER 23-24

COMPRESSED AIR / VACUUM / COOLING

Sponsored by CAGI Compressed Air & Gas Institute

AGENDA AT A GLANCE

Wednesday, September 23

10:00AM: First Wave of Pre-Recorded Sessions

1:00PM: Live Keynote Presentations

Thursday, September 24

10:00AM: Second Wave of Pre-Recorded Sessions

1:00PM: Live Keynote Presentations

3:00PM: Live Discussion Forum

Note: All times listed are U.S. EST

BEST PRACTICES 2020 ONLINE EVENT!

The Best Practices 2020 ONLINE EVENT! will take place September 23-24. The event will produce LIVE Keynote Presentations and Forums plus hours of pre-recorded sessions featuring leading experts from around the world.

FREE for all to register at www.cabpexpo.com, this is a great opportunity for maintenance teams, energy managers, specifying engineers and sales engineers to receive training (and PDH hours)!

5 Event Tracks

Track 1: Compressed Air Technology Fundamentals & Maintenance

Track 2: Compressed Air System Energy Conservation

Track 3: Industrial Blower & Vacuum Fundamentals & System Optimization

Track 4: Aeration Blower Sizing & Specifications

Track 5: Chiller & Cooling Tower Fundamentals & Specifications

SAVE THE DATES! Register for FREE and view the agenda of presentations and speakers at cabpexpo.com

TECHNOLOGY/SYSTEM ASSESSMENT SPONSORS

DIAMOND

BEKO

KAESER COMPRESSORS Built for a lifetime.

PLATINUM

PneuTech JORC

GOLD

Sauer Compressors USA · Sullivan Palatek · SPXFLOW · applied system technologies · SULLAIR · Atlas Copco AIR · Parker · Aircel

SILVER

MC · CURTIS · BAY · Nidec · NL

SUPPORTING ORGANIZATIONS

COMPRESSED AIR CHALLENGE · Plant Services

ADSORBENTS FOR HEAT REACTIVATED COMPRESSED AIR DRYERS

are restricted by eight-membered oxygen rings. The free aperture for this structure (i.e., measured pore size) is about 3.3 Å for the K+ form (3A), 3.9 Å for the Na+ form (4A), and 4.3 Å ~ for the Ca ++ form (5A). Faujasite is represented by two forms – X and Y- with pores restricted by 12-membered oxygen rings. The pores of these materials are relatively large with a free aperture of about 7.4-12.5 Å. The X and Y zeolites differ from each other only with regard to the Si/Al ratio which controls cation density, and therefore, affects adsorptive properties[2].

The two most common types used in commercial dehydration applications are zeolite A and zeolite X. Zeolite A has a relatively simple cube-like structure composed of four truncated octahedrons. In zeolite X, the truncated octahedrons are interconnected in a way which results in a different spatial structure. The microporous and highly ordered structure of molecular sieves ensures very high surface areas in such materials, often in a 700-900 m^2/g range. The pores lead to a cavity with an adsorption surface. The pore diameter is defined precisely by the synthesis of the zeolite. A change of the pore opening diameter is achieved by replacing some of the sodium ions of the Zeolite A by other monovalent and multivalent alkali or alkaline earth ions.

Although molecular sieves are not the standard desiccant solution in compressed air drying, they are used for applications where very low pressure dew points down to -100˚F (37.78˚C) are required. Molecular sieves are extremely efficient as desiccants. While static water uptake is normally about 21 weight percentage for most commonly used 4A type (equilibrium capacity at 77˚F (25˚C) and relative humidity 80%), the shape of the isotherm allows it to reach very low pressure dew points. Another important difference between molecular sieves and activated alumina/silica gels is their ability to maintain water uptake at elevated temperatures and low water partial pressures. For example, water uptakes of ~ 12-14 weight percentage are feasible over 4A at 200˚F (93.33˚C) while activated alumina retains only residual water loading at this temperature. The downside of such high affinity to moisture is the need to heat up molecular sieve beds to high temperatures to drive the water off. Regeneration temperatures in 450˚F (232.22˚C) to 550˚F (290˚C) ranges are often used for efficient reactivation.

A major disadvantage of molecular sieves for gas dehydration is relatively high sensitivity toward impurities in the gas such as heavy hydrocarbons, highly acidic (traces of acids, SO_x, NO_x et) or highly basic components (i.e. amines, NaOH et.). Structural disintegration of molecular sieves under impact of aggressive and reactive contaminates results in dust formation and pressure drop increase across the adsorbent layer. Although fouling problems could frequently be minimized by installation of a buffer layer, gas composition needs to be carefully monitored. Molecular sieves do not tolerate liquid water, breaking when exposed, so beds must be protected against carryover of free water into the bed.

ADSORBENTS FOR HEAT REACTIVATED COMPRESSED AIR DRYERS

Silica Gel Adsorbents and Sorbead® Air

Silica gel is an amorphous and highly porous form of silicon dioxide (SiO_2) exhibiting high surface areas and favorable water adsorption properties. The most common production method involves precipitation of Si-precursor under optimized and well-controlled conditions. In this process $Si(OH)_4$ molecules condense to form a siloxane matrix. Hydrolysis and condensation occur simultaneously resulting in a three-dimensional siloxane network. The formed hydrogel is subject to aging and drying to remove bound water yielding high pore volume high surface Si-O-Si-OH matrix. Silica gel is commercially available as granular and spherical bead material of various size-ranges and have been widely used in compressed air industry for more than 60 years.

BASF has introduced a new silica gel adsorbent named Sorbead® Air. Unlike standard silica gels, the adsorbent is an alumino-silicate gel produced in the form of hard, spherical beads with high resistance to crushing and a low attrition rate. Characterized by high pore surfaces (up to 850 m^2/g) and large pore volume, the adsorbent allows for exceptional dynamic adsorption capacities, often up to 20 weight percentage (at 7 bar and 95°F [35°C] saturated). This implies that one kilogram (kg) of the adsorbent adsorbs up to 200 grams of moisture. The associated moisture uptake allows one to operate a dryer on a longer cycle time – which in practice implies less frequent regeneration and thus lower average electrical power consumption.

This silica gel adsorbent permits low regeneration temperatures, in the dryer, to desorb water as compared to activated alumina and molecular sieves. Temperatures of ~ 250°F (121°C) to 280°F (138°C) are sufficient for reactivation to reach -40°F (-40°C) pressure dew point. While used routinely to achieve -40°F (-40°C) pressure dew points, under optimum operating conditions pressure dew points down to -75°F (23.89°C) are feasible[3].

The common misconception frequently seen in the compressed air industry associated with the use of silica gel-type adsorbents is their very low stability and tendency to partially disintegrate in a presence of high moisture levels or liquid water. This concept is a bit misleading and some clarifications are needed. While exposure of liquid water on freshly regenerated (i.e. dry) silica gel bead is likely to enforce a stress, which could lead to sphere disruption, such conditions

Sorbead Air R is mainly used for the continuous drying of compressed air and technical gases (e.g. N_2, O_2).

Sorbead Air WS water-resistant alumino-silicate gel adsorbents have high capacity and protect other adsorbents and catalysts from water and moisture in a broad range of applications.

are rarely seen in commercial dryers while those are in a regular service. In a standard dehydration process moisture is transferred from gas phase to a solid and accumulated in a well-developed pore system via adsorption. Such "wetted" silica gels are stable and normally resistant even to liquid water. It is the stability in a dry state (i.e., regenerated) toward liquid water which is addressed with a liquid water-resistant type. BP

About the Author

Artem Vityuk is a Global Market Manager at BASF Corporation and is responsible for portfolio of adsorbents and intermediates, including adsorbents used in the compressed air industry.

About BASF

BASF's Catalysts division is the world's leading supplier of environmental and process adsorbents and catalysts. BASF offers the widest portfolio of adsorbent technologies for a broad spectrum of applications in industries such as refining, petrochemical, chemical, and gas processing. The BASF portfolio includes proprietary alumina, silica, alumino-silica gels and a broad line of base metal oxide guard bed materials. BASF is a market leader in supplying adsorbents for compressed air industry.

For more information, visit https://catalysts.basf.com/products-and-industries/adsorbents.

All photos courtesy of BASF.

References:

1. *Handbook of Natural Gas Transmission and Processing. Principles and Practices. Third Edition.* Saeid Mokhatab, William A. Poe, John Y. Mak, Gulf Professional Publishing 2015.
2. Molecular sieves adsorbents, BASF, BF 9569 USL Rev. 09/15
3. Adsorbents solutions for compressed air drying, BASF, BF 10511, 08/2018

To read similar articles about ***Compressed Air Purification Technology*** please visit https://www.airbestpractices.com/technology/air-treatment.

PRODUCTIVITY, SUSTAINABILITY & ENERGY CONSERVATION

ISO 50001: How Manufacturers Can Achieve A LOW-COST AND LOW-CARBON FUTURE

By Graham Coats, Energair

Ask a manufacturer for their thoughts on green business and, privately, they may tell you that it does not necessarily equate to good business. Probe a little deeper and they might even tell you that you can have one or the other – sustainability or profitability – but not both. Thankfully, this viewpoint is changing.

First, there is the linear relationship between energy usage and cost; the more a manufacturer uses, the higher its energy bill – and as the cost of energy continues to increase, this symbiotic bond becomes even more apparent. On that basis alone, there is a clear incentive to limit energy usage to an essential level. In doing this, carbon footprint naturally decreases.

Secondly, there is a wave of new technology, primarily driven by cloud-based, IoT-led systems and that also includes control and monitoring products. These not only offer manufacturers forensic levels of data about the performance of their compressed air assets, but in many cases also facilitate the automatic adjustment of them, individual or grouped, to

"ISO 50001 is about continual improvement, so you should always be looking to review, refresh or even revamp your plan. "

— Graham Coats, Energair

optimize performance where any operational gains or energy reductions can be made.

Lastly, there is a wraparound framework in the form of ISO 50001, a global standard for energy management systems that was launched in 2011 and subsequently revised in 2018. The standard exists to help organizations, from small- and medium-size enterprises to expansive conglomerates, continually reduce energy usage – and therefore cost and carbon emissions – through the provision of a structure that manufacturers can systematically follow and scale up and down accordingly.

A Bird's Eye View

I have worked in the compressed air performance and monitoring industry for many years. I have also been behind the scenes of many successful organizations that rely heavily on compressed air, and it never fails to amaze just how much potential there is for manufacturers to make energy saving and performance gains – with relatively minimal effort, too.

More often than not, the reason for manufacturers not spotting and exploiting this potential is the absence of a coherent energy management system, or an organization-wide lack of understanding of how to get the most from their assets.

In the same way that a military unit without a commanding officer lacks a sense of purpose or structure, a manufacturing facility without an energy management system is unlikely to get the best from its compressed air system. If we think of ISO 50001 as that overarching framework for an organization to follow, then we can begin to see how the global standard can be used to get the best from a facility.

For an organization to prove that it meets the standard it has to undergo a management system audit, either internal or external. The question, therefore, is how can those utilizing compressed air effectively evaluate their assets' performance as part of an ISO 50001 energy management system and, in doing so, grow their bottom line and minimize their negative environmental footprint.

The Road to Compliance

The current ISO 50001 standard guidance is a 42-page document, so in the interests of brevity I have distilled its essence into six clear areas. This is not meant as a substitute; it is essential that all manufacturers interested in implementing an energy management system that meets ISO 50001 standards work through the guidance. However, this aims to provide a broad illustration of the main points that need to be considered when embarking on the journey.

Graham Coats, Director at Energair.

ISO 50001: HOW MANUFACTURERS CAN ACHIEVE A LOW-COST AND LOW-CARBON FUTURE

1. Be clear from the outset. What are the drivers behind achieving ISO 50001? Is it part of a cost-cutting exercise? Is it a way in which to bolster your corporate responsibility program? Or are you looking to add value to your business? By identifying what you really want from the outset, you are more likely to stick to the plan – and make it easy for your team to stick to the plan – as you move through the process.

2. Meaningful data is everything. Only by truly understanding your performance data can you understand where your compressed air system can be improved. Data is the bedrock on which your ISO 50001 goals should be built. This is of particular significance to me, given how my organization has created a cloud-based air compressor monitoring, performance and control solution that provides real-time data, analytics and insights and can manage an infinite number of locally interconnected fixed speed, variable speed or variable output air compressors. Of course, there are other solutions that allow manufacturers to get under the skin of their compressed air systems. The key thing is to use them, not only to help you on your journey towards becoming compliant – but also remaining compliant.

3. Consistency is key. Gaining accurate, meaningful and actionable data is one thing. Ensuring it remains so at every tier of an organization is another, particularly for global organizations with multiple sites. Making sure there is standardization of data and that nothing can be left open to interpretation as it passes from team to team – or even country to country – is essential for working within an ISO 50001 framework.

Energair's SMART-TAG device is part of the AIRMASTER™ portfolio of products designed to provide manufacturers with a holistic view of multiple air compressor performance.

4. Lead from the front. This is where the military analogy is relevant. As with all ISO standards, compliance follows dedication and hard work. If you are responsible for leading the journey to compliance and are fully engaged, great. However, given the work involved, you will need to ensure that everyone has bought into the standard and that the aims and objectives are woven into the fabric of the organization. Make sure that everyone in the organization is working toward the same goal or risk losing some troops along the way.

5. Call in the experts where necessary. Compressed air consultants may well equal cost, but if they can share knowledge and best practice – and ultimately get your organization to where it is going quicker – then maybe it is a worthy investment.

6. Painting the Golden Gate Bridge. So, you have made it. Your organization is now ISO 50001 compliant. Time to ease off? Sadly not. ISO 50001 is about continual improvement, so you should always be looking to review, refresh or even revamp your plan. Just as painting the Golden Gate Bridge is a never-ending job, as new compressed air technology and techniques become available you should be exploring where and how these can be implemented within your energy management plan.

Regularly Tend to ISO 50001

As far as ISO standards go, ISO 50001 needs little justification. It saves energy, cuts carbons emissions and provides a framework for

Data is the bedrock on which your ISO 50001 goals should be built.

manufacturers to achieve and maintain best practice. However, it is a living framework and one that must be tended to on a regular basis in order to remain relevant. The technology required to yield actionable data and improve compressed air performance exists. As long as the willing is there, too, then manufacturers across the world can expect to simultaneously future proof their organization, increase their bottom line and improve their sustainability credentials. A true win-win. BP

About the Author

With over 30 years' experience of starting and expanding businesses within the compressed air sector, Graham Coats has been instrumental in developing the key brands that make up CMC and growing Energair's reach throughout the United States. His most recent endeavor has been spearheading the launch of AIRMATICSTM, the next generation of air compressor controls that harness the full capability of IoT technology, offer manufacturers an Industry 4.0 compressed air solution and reduce compressed air-related energy costs by up to 30%. Contact Graham at tel: 855-289-9317, email: graham.coats@cmcnv.com.

About Energair

Energair is the North American arm of CMC – the global experts in compressed air control, performance and monitoring solutions. Providing compressed air service providers with a 360-degree performance, monitoring and control solution, Energair is a comprehensive range of products and services that can be used to help optimize manufacturers' compressed air performance, manage entire compressed air eco-systems through intuitive visual software and reduce manufacturers' air compressor-related energy bills. For more information, visit https://energair.com/.

All photos courtesy of Energair.

To read similar articles on ***Compressed Air and Energy Standards*** articles, please visit https://airbestpractices.com/standards.

QUALITY, SAFETY & RELIABILITY

MAINTAINING COMPRESSED AIR FILTERS and the Purpose of Differential Pressure Monitoring Devices

By Mark White, Parker Hannifin

Over 90% of manufacturing facilities worldwide use compressed air as part of their manufacturing process. This powerful utility is not without its problems, in the form of contamination. Therefore, air compressor filters are typically installed as part of a total purification system to ensure contaminants are reduced to acceptable levels and the compressed air system operates in a safe, efficient and cost-effective manner.

To ensure a continuous supply of high-quality compressed air is always available (and to keep energy costs low) filter elements must be replaced periodically. In this article, we address the myths regarding the best time to change filter elements and the role of differential pressure gauges in helping to ensure the effectiveness of air compressor filters.

The Foundation of Air Purification

The foundation of any purification system is its filtration and of the ten main contaminants found in a compressed air system, filtration is responsible for the treatment of nine of them. Coalescing filters are the most important piece of purification equipment as they reduce six of the ten contaminants and a look in any air compressor room will find a pair of coalescing filters (backed up with dry particulate and oil vapor removal filters).

For contamination reduction, compressed air filters use highly specialized filtration media in their filter elements and these elements function under extremely arduous conditions. Filtration media degrades over time and once the filtration media becomes damaged, the compressed air quality can no longer be maintained or guaranteed.

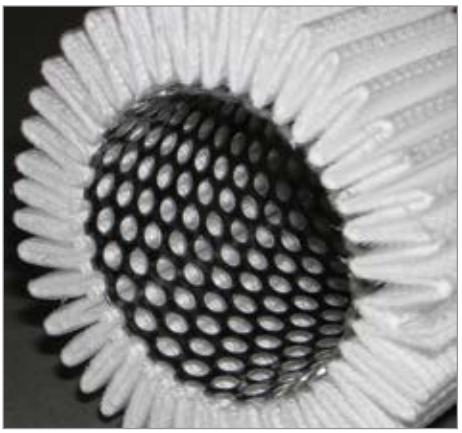
"Differential pressure is the result of a filter element collecting contamination but in no way has a direct correlation to the delivered air purity."

— Mark White, Parker Hannifin

The components of coalescing and dry particulate filters are almost identical. They typically consist of a pressure envelope or housing (filter head & bowl), a filter element and a drain (the only major difference being a float drain on the coalescing variants and a manual drain on the dry particulate variants). Many filters are also supplied with differential pressure monitoring devices as standard or as optional extras.

The heart of the filter is the filter element. Filtration media is typically wrapped or pleated between support cylinders to form the element (elements are available in differing filtration grades). Endcaps are secured to the cylinders to form an "integral" seal and an outer drainage layer is added to prevent "re-entrainment" of coalesced liquids. These filter elements do not last forever and require periodic change, however there is often confusion surrounding why the filter element needs to be replaced (and when). This, despite the critical role it plays.

Even a tiny hole the size of a pinpoint can have disastrous consequences. Compressed air will always take the path of least resistance and once the filter media is damaged the compressed air will force through the media, tearing and rupturing the length of the element. This will result in all of the contamination being carried downstream.



Compressed air filters are typically installed to ensure the compressed air system operates in a safe, efficient and cost-effective manner.

Large pressure differentials or "pressure spikes" can also rupture filter elements in an instant, again, allowing contamination to be carried past the filter and into the compressed air system. When pressurizing systems (or the filter after servicing), always ensure isolation valves are opened slowly to prevent damage.

Filtration is About Air Quality

As air compressor filters are installed to provide contaminant reduction to a specific air quality requirement (usually in accordance with an ISO 8573-1 classification), the primary reason to change filter elements should always be to maintain the air quality selected.

Constant monitoring of compressed air quality for all the different contaminants present is typically not a viable option for compressed air users. Validation of air quality to ISO 8573-1 classifications requires multiple, off-line, laboratory based tests (excluding pressure dew point) and the digital, constant monitoring test equipment now becoming available to test for oil and particles in compressed are typically not accurate to the levels shown in ISO 8573-1 and therefore not endorsed by the ISO standards.

Sometimes filter elements are not changed because they look "clean" or just to save money, but commonly, it has been the practice to change air compressor filter elements based upon the "pressure drop" (also referred to as differential pressure or dP) measured across the filter, as this has a direct impact on energy costs.

MAINTAINING COMPRESSED AIR FILTERS AND THE PURPOSE OF DIFFERENTIAL PRESSURE MONITORING DEVICES

Unfortunately, pressure drop is not an indicator of compressed air quality and can often hide a damaged filter element which is allowing contamination to pass downstream. One must remember that the reason for installing the filter in the first place is to reduce the contaminants found in the compressed air, and failure to maintain air quality can have a significantly higher financial impact compared to the energy consumed by a filter or the cost of replacing filter elements.

Differential Pressure Gauges Often Misunderstood

Many filter housings are supplied fitted with differential pressure gauges, which are also called differential pressure indicators. They indicate differential pressure by means of a moving needle, pop-up indicator or digital display. Although common in the industry, the accuracy and purpose of these devices is often misunderstood.

- Accuracy: Generally, all of these devices, no matter how they display the change in differential pressure are only "indicators" and are not precise "gauges." They typically have an accuracy of around plus or minus 25%. Calibration certificates will not be available for these devices.

Parker Oil-X Evolution high-efficiency air compressor filters.

- Display: Many of these devices mimic a real gauge, having graduated scales in mbar or psi; others simplify their display, dividing it either into two segments to indicate "Working within Parameters or Service Required" or three segments to include a "Needs Attention" warning. Segments can also be color coded "Green/Red" or "Green/Amber/Red." The default for these devices is always "Green," or "Good," and it doesn't indicate a problem with the filter element should the filtration media tear or rupture.

- Operation: Differential pressure monitoring devices show the difference in pressure created by the filter element as it blocks. While in principle, this is a straightforward measurement, there are several parameters that can affect the measurement.

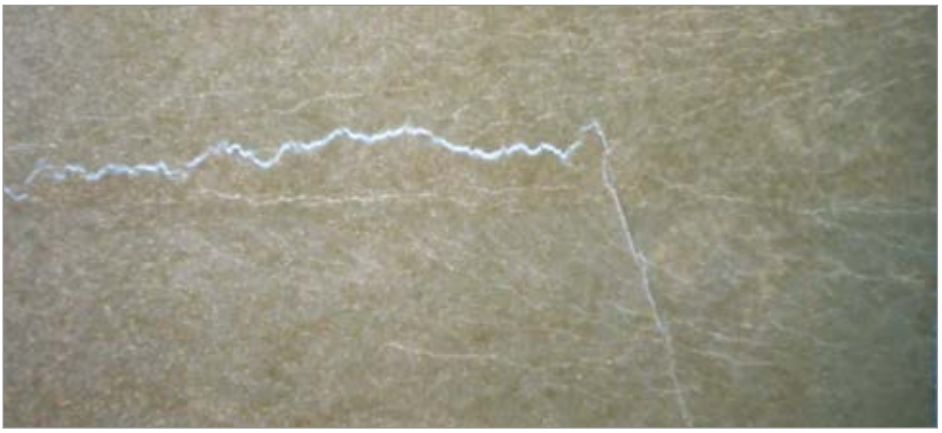
- Airflow: Compressed air filters are sized to match the compressed air flow rate of the system. Often, they are slightly "oversized." In addition, the system will very rarely operate at 100% maximum flow all of the time, therefore the compressed air flowing through the filter is constantly varying. Differential pressure is proportional to flow rate, therefore as the flow rate constantly varies, the differential pressure will also vary constantly. If a user looks at the differential pressure monitoring device at any time other than at maximum flow rate, they will not get a true indication from the device. This is especially true on compressed air systems with variable speed compressors installed.

- Element condition: If there is a hole, tear or rupture of the filter media, the indicator would not move as the compressed air will take the path of least resistance and pressure drop across the element would be almost non-existent.

If the differential pressure monitoring device is being used as a "service indicator," the needle on the device (or pop-up indicator) would always indicate in the green area and the element would never be serviced until the user eventually detected contamination downstream. By this time, it is too late and once contamination is introduced into the storage and distribution system, it is very difficult to remove and may often require specialist cleaning of piping and pneumatic equipment before the compressed air system can be operated again.

The Purpose of Differential Pressure Monitoring Devices

The differential pressure monitoring device fitted to a filter is seen by many as a service indicator. This is not helped by service manuals stating, "Change element when dP = xx psi," or "Change element when needle is in the red." Additionally, it is often thought that differential pressure is an indicator of air quality or total energy consumption, again this is not the case. In reality, the true purpose of a differential pressure monitoring device is to indicate premature blockage of a filter element and should not be used as a filter service indicator.



The indicator of a differential pressure monitoring device will not move if the filter element is torn or ruptured.

Here are common myths about pressure drop and filters – and facts to help put these same myths to rest.

Myth: "dP is an indication of air quality therefore the 'dP gauge' is an air quality indicator.

Facts: Dry particulate filters are used to reduce atmospheric particulate, rust, pipe scale and microorganisms found in compressed air. In addition to these contaminants, coalescing filters also reduce oil aerosols and water aerosols to acceptable levels.

Differential pressure is the result of a filter element collecting contamination but in no way has a direct correlation to the delivered air purity. For example, high differential pressure and/or failure to change elements when advised can result in a tear/rupture of the filter media. This would allow all the contamination to pass downstream, while the dP indicator would indicate low dP.

Myth: My filter is fitted with a "dP Gauge" to indicate when to change my filter element.

Facts: The devices fitted to the top of many compressed air filters are not gauges; they are a monitor or indicator. These devices are not as accurate as a true differential pressure gauge would be. They typically have an accuracy of around plus or minus 25%. They are not calibrated, nor are they available with a calibrated certificate. Indicators, monitors or "dP gauges" should never be used as a service indicator, only as a premature blockage indicator. Always follow the manufacturers recommended instructions for element change.

Myth: Compressed air filter elements should only be changed when the differential pressure rises.

Facts: Differential pressure is a measurement of pressure loss in a compressed air system. To achieve a constant downstream pressure required to operate equipment and processes, an air compressor must often operate at a higher operating pressure and/or for longer periods to overcome the pressure losses.

Every 14.5 psi (1 bar) of differential pressure an air compressor (positive displacement type)

MAINTAINING COMPRESSED AIR FILTERS AND THE PURPOSE OF DIFFERENTIAL PRESSURE MONITORING DEVICES

must overcome is equal to approximately 7% increase in electrical consumption. So, while keeping differential pressure losses low is good practice, compressed air quality is the main reason for changing a filter element.

The Benefits of Regularly Changing Filter Elements

There are numerous benefits to regularly changing compressed air filter elements, including:

- High quality compressed air
- Protection of adsorption (desiccant) dryer beds
- Protection of downstream equipment, personnel and processes
- Reduced operational costs
- Increased productivity & profitability
- Continued peace of mind

It's important to remember compressed air filters function under extremely arduous conditions, such as:

- Pressure variations
- Pulsing air demand
- Temperature variations – day/night and summer to winter
- High/low humidity – From 100% saturated air to extremely low dewpoints
- Chemical attack – from oily acidic condensate and lubricant additives

Coalescing filters are constantly soaked in oily, acidic condensate, while at the other end of the spectrum, dry particulate filters operate in very low humidity, which over time, weakens and degrades the strength of the filter media.

When the filter is operating, the filtration media in the filter element is bombarded

A differential pressure monitoring device is used to indicate premature blockage of a filter element. It should not be used as a filter service indicator.

Frequently Asked Questions – and Answers

Question: Can I wash filter elements?

Answer: No, it is not possible to wash contamination out of the filter media. Subjecting the filter media to hot soapy water or solvent will result in damage.

Question: My filter element doesn't look too dirty, surely, I don't need to change it?

Answer: Firstly, the part of the filter element you can see is the drainage layer (responsible for preventing coalesced liquids from being carried downstream). The main filtration media is below this and is not visible without dismantling the filter element. Secondly, coalescing and dry particulate filters capture aerosols and particles down to sub-micron sizes (1 micron = 1 millionth of a meter). The best a human eye can see is around 40-50 micron, therefore, it is not possible to see if a filter element is blocked or damaged.

Question: Are in-line activated carbon filters affected in the same way as coalescing and dry particulate filers?

Answer: In-line activated carbon filters often use the same housings as coalescing and dry particulate filters. These activated carbon filters however work differently. They utilize a bed of activated carbon to adsorb oil vapors (gaseous oil). Activated carbon has a fixed capacity to adsorb oil vapor and once this is used up, their elements or cartridges must be replaced. Smaller, in-line style activated carbon filters are typically matched to the system flow rate and pipe connections. The inlet concentration of oil vapor, the presence of liquid oil as well as the temperature, pressure and dew point of the air all affect the life of these elements and in-line air compressor elements require frequent changes throughout the year.

by high velocity dirt particles. This constant bombardment will eventually lead to weakening and failure of the filter media. Once the filtration media becomes damaged, the required air quality can no longer be maintained or guaranteed. Filter elements therefore have a finite operating life and manufacturers will recommend an element change time to maintain delivered air quality, however after this time, air quality cannot be guaranteed. Not changing filter elements in accordance with the manufacturer's recommendations can lead to:

- Inefficient production processes and damaged production equipment
- Spoiled, damaged or re-worked products
- Increased production downtime
- Increased manufacturing costs
- Contamination exhausting from valves and cylinders leading to unhealthy working environments
- Risk of personal injury, staff absences and personal injury claims
- Risk to consumer safety

A Balance Between Risk and Cost

Often a user's emphasis is on the cost of maintenance and replacement parts when these costs are insignificant compared to those associated with product spoilage should a filter element fail. What seems like a cost savings in the short term can turn out to be a costly mistake. Therefore, filter elements should primarily be replaced based upon manufactures recommendations to maintain air quality.

Secondary consideration should also be given to system pressure losses; however, for almost all modern compressed air systems, this should not be the main reason to change filter elements. The exception to this may be more applicable to older, more heavily contaminated compressed air systems, when it may be more cost effective to change filter elements before the manufacturers recommendation as the cost of replacement elements will be significantly lower than the energy cost associated with operating with higher differential pressures. BP

About the Author

Mark White is a Compressed Air Treatment Applications Manager at Parker Hannifin with 30 years of experience in the filtration and drying of compressed air.

About Parker Hannifin

Parker is the global leader in motion and control technologies, partnering with its customers to increase their productivity and profitability. Learn more at www.parker.com.

All photos courtesy of Parker Hannifin.

To read similar articles on ***Compressed Air Purification Technology***, visit https://airbestpractices.com/technology/air-treatment.

COMPRESSED AIR

BEST PRACTICES

airbestpractices.com

FREE SUBSCRIPTION

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

2020 FOCUS INDUSTRIES!

Food Processing • Chemicals & Oil Refining • Food Packaging • Maintenance & Refrigerants • Compressed Air System Assessments • Woodworking
Quality, Pressure & Flow Measurement • Reliability • Metal Fabrication & Machining • Food & Beverage Packaging • IoT & Industry 4.0

Optimize Onsite Utilities Powering Automation with Compressed Air Best Practices®

Compressed Air Best Practices® is a technical magazine dedicated to discovering **Energy Savings** in compressed air systems — estimated by the U.S. Department of Energy to represent 30% of industrial energy use. Each edition outlines **Best Practice System Assessments** for industrial compressed air users — particularly those **managing energy costs in multi-factory companies.**

"We're not just picking low-hanging fruit, we're walking on the fruit because compressed air represents such a major opportunity for energy reduction."

— Darren Borden, P.E., CEM, Energy Management Engineer, Corporate Health, Safety and Environment, Weston Foods

"We are committed to the protection of the environment and the conservation of natural resources, as well as quality. We knew a better way to approach compressed air would be one of the best ways to meet our goals."

— Carroll Bruckner, Maintenance Engineer, SumiRiko Tennessee

"Demand Side" and "Supply Side" information on compressed air technologies and system assessments is delivered to readers to help them save energy. For this reason, we feature Best Practice articles on when/how to correctly apply **air compressor, air treatment, piping, storage, measurement and pneumatic control technology.**

Industrial energy managers, utility incentive program managers, and technology/system assessment providers are the three stakeholders in creating energy efficiency projects. Representatives of these readership groups guide our editorial content.

"Implementation of the compressed air automation and data acquisition platform in combination with the upgrades to the system reduces the facility's annual energy consumption by 6,098,619 kWh per year, resulting in yearly savings of $600,000."

— Pascal van Putten, VPInstruments, and Tyler Costa, ALD, Inc. (feature article in June 2019 Issue).

Subscribe Now!

To subscribe visit **airbestpractices.com**

COMPRESSED AIR SYSTEM TECHNOLOGY NEWS

Kaeser Expands Secotec Dryers with New TF Series

The new TF series, with four models from 550-1130 scfm, integrates Kaeser's innovative SECOPACK LS latent heat thermal storage system that delivers consistent dew point control and energy efficiency under varying load conditions. SECOPACK LS contains a phase-changing material (PCM) that stores thermal energy as it cycles from a solid to a liquid state, greatly enhancing energy efficiency. The PCM module is 98% denser than conventional storage media. This, combined with topside air exhaust, creates a smaller overall footprint for the dryer.

TF dryers also feature a variable speed radial fan design that improves cooling and enables ducting and heat recovery. A dedicated fan in the electrical cabinet and optional water-cooling allow operation in high heat environments without loss of drying capacity. The SIGMA CONTROL SMART microprocessor controls the thermal storage process and provides both a remote on/off control capability and optional Ethernet interface so TF units can be easily integrated into plant operations and IIoT environments.

New Secotec TF dryers with SECOPACK LS deliver higher energy efficiency and better dew point control in a smaller footprint.

The TF dryer completes the transition to the advanced R-513A refrigerant in the SECOTEC line. With its 56% lower global warming potential, the use of R-513A is a clear demonstration of Kaeser's ongoing commitment to preserving our shared environment for future generations.

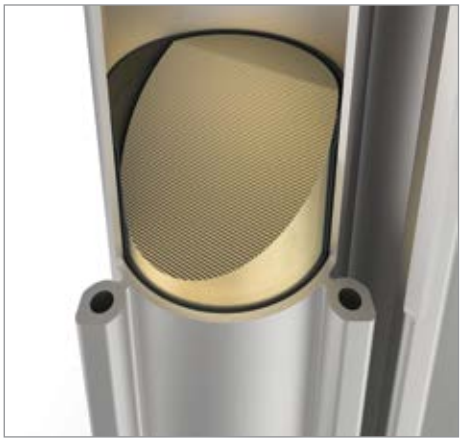
About Kaeser Compressors, Inc.

Kaeser Compressors is a leader in reliable, energy efficient compressed air equipment and system design. We offer a complete line of superior quality industrial air compressors as well as dryers, filters, SmartPipe™, master controls, and other system accessories. Kaeser also offers blowers, vacuum pumps, and portable gasoline and diesel screw compressors. Our national service network provides installation, rentals, maintenance, repair, and system audits. Kaeser is an ENERGY STAR Partner. For more information, visit www.us.kaeser.com.

Atlas Copco Introduces Cerades Solid Desiccant

Atlas Copco is introducing Cerades, its revolutionary, patented desiccant for compressed air dryers. As the first-ever solid, ceramic desiccant, Cerades offers operators of compressed air significantly better air quality, lowering pressure drops by up to 70%, with improved energy efficiency, lower service costs, and improved environmental benefits.

The technological advancement represented by Cerades is the result of Atlas Copco's extensive research and development aimed at radically improving desiccant dryer design, efficiency, and performance. The vibration resistant Cerades desiccant enables trouble-free installation and continuous operation in rigorous applications such as ones commonly found in the transportation industry.



Compressed air flows directly through Cerades' straight-structured tubes.

The desiccant is designed to deliver significant savings by streamlining the flow of the compressed air through a desiccant dryer. Compressed air flows directly through Cerades' straight-structured tubes, as opposed to pushing its way through the thousands of separate beads found in loose desiccant. This no-resistance flow means the air experiences a smaller pressure drop as it travels through the dryer, significantly lowering the energy cost of operation.

"Cerades really represents a quantum leap in dryer performance and maintenance," said Trey Ragsdale, vice president of industrial air for Atlas Copco Compressors USA. "This is a great example of looking beyond just the product to find a solution and looking at the complete process. Desiccant has not changed in decades, but the new Cerades desiccant outperforms traditional desiccant on every level."

The desiccant's structural integrity and long lifetime offer a number of operational and environmental benefits to customers. Traditional desiccant decays over time as

COMPRESSED AIR SYSTEM TECHNOLOGY NEWS

it bounces around during cycling. This can compromise air quality and necessitate more frequent maintenance. In addition, as loose desiccant decomposes, it releases a fine dust into the air system, which requires extra filtration and maintenance. The solid desiccant eliminates this dust problem, giving users an ISO 8573-1:2010 Class 2 air purity for particles without any extra filtration.

Cerades desiccant lasts on average a minimum of two years longer than traditional desiccant, and under normal operating conditions you would only change Cerades desiccant every seven years. Changing a traditional loose desiccant in a dryer, due to the amount of dust particles, is a time-consuming health and environmental hazard, which is eliminated by Cerades.

The new CD 20-335+ (CD+) range of more than 30 models are the first dryers where the Cerades desiccant will be used. In addition to the benefits created by the incorporation of Cerades, the CD+ is an extremely powerful, efficient, reliable, and quiet dryer which can operate continuously with 100% airflow. The CD+ range offers a standard-pressure dew point of -40°C/-40°F and users can adjust the dew point to optimize the dryer performance for the needs of their specific applications.

The Elektronikon® Touch controller is available to be ordered with the CD+ series. The touchscreen controller allows users to easily maximize dryer performance and efficiency, even more so in combination with SMARTLINK remote monitoring.

About Atlas Copco Compressors

Atlas Copco Compressors LLC is part of the Compressor Technique Business Area, headquartered in Rock Hill, South Carolina. Atlas Copco Compressors provides innovative solutions including world-class compressors, vacuum pumps, air blowers, quality air products and gas generation systems, all backed with full service, remote monitoring and auditing services. With a nationwide service and distribution network, Atlas Copco Compressors is your local, national and global partner for all your compressed air needs. Learn more at www.atlascopco.com.

Omega Air Introduces N-GEN Nitrogen Generators

The new N-GEN ASME series of Nitrogen Generators from Omega Air delivers up to 450 cfm and 99,999% purity, with a single unit and has proven its reliability over the years on the market. This series is designed to deliver stable high-purity nitrogen, 24/7, for any kind of application or operating condition and environment.

The new PSA generators are built from the most reliable components (filters, skid, columns from our own CNC machines and welding shop, Siemens controller and touchscreen interface), with a real attention for their robustness and lifetime (dynamic load calculated for minimum 2 million cycles, extremely long lifetime angle-seated valves), which makes our generators almost

Omega Air's N-GEN 250 ASME Nitrogen Generator.

maintenance-free for up to 10 years. Our expertise does not stop here, as we can propose different ways to save energy (stand-by mode, purity control mode, etc), according to the exact data of your application.

The generators are ASME certified and stamped (including safety valves) with NPT connexions, 115V/60Hz power supply and UL listed components. We can also, upon request, manufacture under many different certifications (such as CRN/CSA, ATEX, PED, etc), designs, voltages and frequencies.

About Omega Air

Omega Air is a recognized player on the air and gas treatment market, thanks to our two manufacturing plants, our large R&D department and, above all, our goal to deliver quality and energy efficient solutions to our customers all over the world. Apart from our PSA generators, we also manufacture membrane solutions, desiccant dryers for any type of gas, refrigerated dryers, filters and separators. Do not hesitate to contact us for any challenge you might face involving compressed gas treatment. We can deliver. For more information, visit www.omega-air.si.

Siemens Expands Inverters with Sinamics G120C

The Sinamics G120C, with a rated power range of 0.55 to 18.5 kW, sets new standards in its class with compact dimensions, fast commissioning times, simplicity of operation, ease of servicing and highly integrated functionality. The Sinamics G120C has been specially optimized for use in today's smaller control cabinets, mounted directly onto or positioned near production machines. These applications often require simple speed-controlled drives with a high power density in a smaller package.

This compact inverter offers one of the highest power densities in its class and can be mounted directly as a machine module, without sacrificing power. Compared to conventional systems on the market, the G120C requires up to 30% less space, with up to 40% higher power density. Quick-connecting plug-in terminals allow faster installation.

A port for inserting a memory card enables significantly faster inverter commissioning, as well. Instead of a blind cover, the operator panel may also be mounted for easier

COMPRESSED AIR SYSTEM TECHNOLOGY NEWS

commissioning. It can also be parameterized using a PC, via USB interface. Standard protective coatings on the enclosure make the unit extremely robust in hostile or corrosive environments. This new Siemens inverter is designed for ambient temperatures of up to 60°C (140°F).

Each G120C inverter features the integrated Siemens safety technology branded "Safety Integrated" as standard, to ensure the drives can be stopped safely. The unit is equipped with a double safe input ex-works to control the STO (Safe Torque Off) function without the need for external devices. The G120C also offers users the established control procedures of the Siemens Sinamics platform, including sensorless vector operation, which enables precise, cost-effective control and more energy-efficient operation of induction motors.

With the Sinamics G120C, Siemens Drive Technologies expands its product portfolio of inverters.

For network communications, this new inverter supports the Profibus bus system from Siemens. It can also be directly integrated into other widely-used communications structures via USS field bus protocol, RTU mode and CAN bus. The ex-works default setting on each G120C enables direct application without time-consuming parameterization work on the field bus system.

For more information, visit www.siemens.com.

The New QPVS Refrigerant Dryer from Quincy

Dryers are an important component of compressed air networks. They are responsible for removing moisture from compressed air, which protects downstream equipment and end products from contamination. Reducing the need for maintenance and prolonging the service life of pneumatic tools lowers operating expenses over time. The problem is that conventional fixed-speed refrigerant dryers only operate at one speed – full power – and thereby waste precious energy when a reduced output would suffice.

The Quincy QPVS variable speed drive refrigerant dryer has no such downsides. It delivers unbeatable energy savings and production quality and reliability in a compact, environmentally friendly unit.

COMPRESSED AIR BEST PRACTICES®
www.airbestpractices.com

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

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

A Publication of Smith Onandia Communications LLC
37 McMurray Rd. Suite 106
Pittsburgh, PA 15241

Compressed Air Best Practices® (USPS# 17130) is published monthly except January-February combined by Smith Onandia Communications LLC, 37 McMurray Rd., Suite 106, 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 106, Pittsburgh, PA 15241.

The QPVS features variable speed drive (VSD) technology. That means its compressor motor only consumes as much energy as is your air demand requires at any time. The result: Energy savings of up to 60%. This not only lowers operating costs significantly but also reduces your carbon footprint.

And, because electric costs constitute such a big part of the total cost of ownership of refrigerant dryers, the new QPVS often pays for itself in less than two years. But the new dryer not only cuts operating costs, it also increases production quality and reliability by delivering a consistent supply of high-quality air. Therefore, it eliminates the biggest downside of thermal mass dryers, which were introduced to make dryers more efficient. In addition to delivering more modest energy savings compared to the VSD dryers, their operating principle also always precludes them from delivering high-quality air.

These thermal mass dryers only run at full speed periodically. When they do, they cool a thermal mass, which helps dry the compressed air when the dryer shuts off. However, when this mass slowly warms again, the dew point increases, and the air quality suffers.

The QPVS, on the other hand, does not have this problem. While the air supplied by a thermal mass dryer may fluctuate by up to two purity classes, the new VSD dryer from Quincy consistently delivers Class 4 purity air – even in ambient conditions of up to 46°C in which thermal mass dryers are ineffective. And, because the QPVS always runs at a minimum of 20%, its low dew point, and as a result high-quality air, is available as soon as it starts up.

The benefits of the new variable speed drive compressed air dryer from Quincy extend well beyond the bottom line of the companies that invest in it. The QPVS also contributes to a greener world with its low carbon footprint. Its unprecedented energy efficiency results in a TEWI-score (Total Equivalent Warming Impact) that is much lower than that of its competitors.

Finally, all these features come in a compact package that takes up less space than conventional dryers. So, what do you get when you add up these benefits? An innovative leap forward in dryer technology from the compressed air specialists at Quincy.

About Quincy Compressor

Quincy's products are backed by nearly 100 years of air compressor industry experience. For more information, visit www.quincycompressor.com.

COMPRESSED AIR BEST PRACTICES®
www.airbestpractices.com

ADVERTISER INDEX

BLOWER & VACUUM BEST PRACTICES blowervacuumbestpractices.com

COMPRESSED AIR BEST PRACTICES airbestpractices.com

CHILLER & COOLING BEST PRACTICES coolingbestpractices.com

PROUDLY PRESENTING THE 2020 EXPERT WEBINAR SERIES

Ron Marshall
Chief Auditor, Marshall Compressed Air Consulting

Tim Dugan, P.E.
President and Principal Engineer, Compression Engineering Corp.

Loran Circle
Senior Consultant, Circle Training & Consulting

Tom Jenkins, P.E.
President, JenTech Inc.

Tom Taranto
Owner, Data Power Services

Chris Gordon
President & CEO, Blackhawk Equipment

JAN 23
Compressed Air Leak Management Best Practices
Presenter Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting
January 23, 2020 – 2:00PM EST
Co-Sponsors: Trace Analytics and UE Systems

FEB 20
Verifying Blower System Energy with ASME PTC 13
Presenter Tom Jenkins, P.E., President, JenTech Inc.
February 20, 2020 – 2:00PM EST
Sponsor: Inovair

MAR 19
Designing Piping Systems for Low Pressure Drop
Presenter Tom Taranto, Owner, Data Power Services
March 19, 2020 – 2:00PM EST
Exclusive Sponsor: Kaeser Compressors

APR 16
How to Correctly Size Vacuum Pumps
Presenter Chris Gordon, President & CEO, Blackhawk Equipment
April 16, 2020 – 2:00PM EST
Exclusive Sponsor: Busch Vacuum Solutions

MAY 21
Air Compressor Master Controls to Prevent Control Gap
Presenter Tim Dugan, P.E., President and Principal Engineer, Compression Engineering Corporation
May 21, 2020 – 2:00PM EST
Co-Sponsors: BEKO Technologies and VPInstruments

JUN 18
VSD Air Compressor Installation Guidelines
Presenter Loran Circle, Senior Consultant, Compressed Air System Training & Consulting
June 18, 2020 – 2:00PM EST
Sponsor: Open

JUL 20
Where Does Blower Air Go? Process Fundamentals
Presenter Tom Jenkins, P.E., President, JenTech Inc.
July 20, 2020 – 2:00PM EST
Sponsor: Open

AUG 20
Calculating Storage for Demand Events
Presenter Tom Taranto, Owner, Data Power Services
August 20, 2020 – 2:00PM EST
Co-Sponsors: BEKO Technologies and Kaeser Compressors

OCT 15
Vacuum System Efficiency Projects
Presenter Chris Gordon, President & CEO, Blackhawk Equipment
October 15, 2020 – 2:00PM EST
Exclusive Sponsor: Busch Vacuum Solutions

NOV 12
Measuring KPI's: kW, Flow, Pressure, Dewpoint
Presenter Tim Dugan, P.E., President and Principal Engineer, Compression Engineering Corporation
November 12, 2020 – 2:00PM EST
Co-Sponsors: Kahn Instruments and VPInstruments

Register for Free Today at airbestpractices.com/magazine/webinars

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

SPONSORED BY

VP INSTRUMENTS · KAHN · BEKO · TRACE Analytics · inovair · KAESER COMPRESSORS Built for a lifetime. · BUSCH · ue SYSTEMS INC

THE MARKETPLACE

TECHNOLOGY & JOBS

Job & Product Marketplace Advertising Information

Reach 16,000+ 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 $300.00 per Job Marketplace Ad and $350.00 per Product Marketplace Ad ($300 if 6 or more ads are placed). Contact Rod Smith at rod@airbestpractices.com to schedule your Marketplace Ads.

THE MARKETPLACE

TECHNOLOGY & JOBS

Product Upgrade Spotlight:

DRYPOINT® XCp PLC controller

BEKO's XCp premium line of heatless desiccant dryers have always featured our user-friendly advanced BEKOTOUCH Controller. We are proud to announce that this already-capable controller now includes a more powerful PLC, offering more flexibility and features for our customers.

Old Controller	VS.	New Controller
• Limited inputs/outputs		☑ 33% more digital inputs, 50% more analog outputs
• No expansion capacity		☑ Allows for expanded I/O, when needed
• Limited compatibility with optional features		☑ Easily accommodates optional features (-100°F PDP)
• No common alarm output		☑ Standard common alarm output
• User-friendly menus/screens		☑ No change (Don't fix what isn't broken!)

Our promise ☑

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

Truth in Compressed Air
Reliable | Efficient | Innovative

BEKO

Had Enough?

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

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

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

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

Where innovation meets reliability.

KAESER COMPRESSORS®

Built for a lifetime.

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