The Magazine for ENERGY EFFICIENCY in Compressed Air Systems

COMPRESSED AIR BEST PRACTICES

airbestpractices.com

July 2016

Sustainable Manufacturing

SUSTAINABLE MANUFACTURING FEATURES

12

30

COLUMNS


36

FROM THE EDITOR | Sustainable Manufacturing

This publication focuses on the positive side of life, so we will grudgingly acknowledge the fact that every now and then, the government does something efficiently. I always encourage our readers to examine the ENERGY STAR® Industrial Partnership program run by the U.S. Environmental Protection Agency.

The majority (75%) of our readers are Energy Managers employed by multi-factory organizations. Many of these have encouraged their corporations to join the ENERGY STAR® Industrial Partnership group. They've consistently told me of the excellent value they've received from joining this group, led by Industrial Partnership Group Director, Elizabeth Dutrow.

The value is delivered in expert training. As multi-factory organizations take a look at becoming more "Sustainable", lean management functions are adopting the training roadmap, provided by ENERGY STAR®, to make energy management a continual process – not a series of one-off projects – within their lean management framework.

In this issue (on page 22), we highlight the manufacturing and process industry companies recognized as 2016 ENERGY STAR® Partners of the Year. Many of their Energy Managers are on our Editorial Board and we congratulate them!

The compressed air industry continues to be a strong partner to industry in it's effort to become more sustainable – while more profitable. In this issue we cover new technologies introduced at the 2016 AICD Conference & Exposition as well as a host of other "Best Practice" articles.

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

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➤ Join Hank van Ormer and Compressed Air Best Practices® Magazine to review real-world compressed air dryer sizing issues – by signing up for our free July 28th Webinar titled, "Common Desiccant Compressed Air Dryer Sizing Errors" at **www.airbestpractices.com/magazine/webinars.**

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INDUSTRY NEWS

Atlas Copco Named the Official Compressed Air Provider of Charlotte Motor Speedway

Atlas Copco, a leading provider of sustainable productivity solutions, was named the official compressed air provider of Charlotte Motor Speedway in the spring of 2016. Located in Concord, N.C., Charlotte Motor Speedway is a 1.5-mile superspeedway that annually hosts the NASCAR® Sprint All-Star Race, the Coca-Cola 600 and the Bank of America 500 in its 89,000 seat stadium.

A NASCAR hub since 1960, the property includes six racing tracks in addition to the speedway itself. Encompassing nearly 2,000 acres, the complex hosts a range of events including weekly short-track racing series for Legend Cars and Bandoleros; regional and national car club competitions; World Karting Association regional, national and international races; and drag racing at the zMAX Dragway.

The maintenance shop is run by two-full time employees charged with ensuring the fleet of 200 vehicles and other maintenance equipment runs at peak performance. With such a large enterprise, reliable and quality compressed air is a foundation of daily operations. Charlotte Motor Speedway decided to change compressors when substandard air quality and excessive compressor noise affected daily maintenance routines.

Atlas Copco installed a GA VSD+ (variable speed drive) 25 horsepower air compressor in the speedway's maintenance shop during the spring of 2016. It was selected for its performance, durability, small footprint and low noise operation. "The GA VSD+ filled a very big need for the guys in the shop," said Shaun Johnson, executive director of operations, Charlotte Motor Speedway. "The GA VSD+ delivers on its performance promises, and it's so quiet you hardly even know it's there."

The patented VSD+ technology reduces energy use by more than half compared with traditional compressors. The GA VSD+ also offers improved performance, silent operation down to 62 dB(a), and a compact footprint thanks to its vertical drive train design. Powered by a permanent interior magnet motor coupled to Atlas Copco's best-in-class screw element, this compressor sets the industry standard.

Atlas Copco Compressors LLC is part of the Compressor Technique Business Area, and its headquarters are located in Rock Hill, S.C. The company manufactures, markets, and services oil-free and oil-injected stationary air and gas compressors, air treatment equipment, and air management systems, including local manufacturing of select products. The Atlas Copco Group, which celebrated its 140th anniversary in 2013, is among the Top 100 sustainable companies in the world and a member of the Dow Jones World Sustainability Index. Atlas Copco has also been recognized by Forbes, Thomson-Reuters and Newsweek, among others, for its commitment to innovation and sustainability. Atlas Copco Compressors has major sales, manufacturing, production, and distribution facilities located in California, Illinois, Massachusetts, North Carolina, South Carolina, and Texas.

For more information, visit www.atlascopco.us.

Ingersoll Rand Acquires Assets of USE Co., Inc.

Ingersoll Rand (NYSE:IR), a global leader in compressed air and gas systems and services, announced that it has acquired the assets of USE Co., Inc. (USE), an Ingersoll Rand distributor based in Santa Fe Springs, California.

USE, an Ingersoll Rand Compressed Air Equipment and Accessories Distributor since 1923, sells compressed air equipment, parts and services to industrial customers in the greater Los Angeles area. The company has approximately 40 employees who will join the Ingersoll Rand team, as the Ingersoll Rand Santa Fe Springs Customer Center.

The Santa Fe Springs Customer Center will be part of the newly formed Ingersoll Rand Los Angeles District, together with the Buena Park Customer Center (recently acquired Osterbauer Equipment Services). The Los Angeles district has approximately 75 employees.

"We're really pleased that the Santa Fe Springs Customer Center, our 40th in North America, is formed on the 45th anniversary of our first company-owned customer center, which was in Richmond, Virginia," said Todd Wyman, president of Ingersoll Rand Compression Technologies and Services. "We welcome these employees to the Ingersoll Rand team, and celebrate both events as our firm commitment to serving the compressed air systems and product lifecycle needs of our customers, and being the best place for top talent in the field."

USE was formed in 2013 with the merger of U.S. Equipment Co., Inc. and Arnel Compressor, Inc.

About Ingersoll Rand

Ingersoll Rand (NYSE:IR) advances the quality of life by creating comfortable, sustainable and efficient environments. Our people and our family of brands — including Club Car®, Ingersoll Rand®, Thermo King® and Trane®

— work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; and increase industrial productivity and efficiency. Ingersoll Rand products range from complete compressed air systems, tools and pumps to material and fluid handling systems. The diverse and innovative products, services and solutions enhance our customers' energy efficiency, productivity and operations. We are a $13 billion global business committed to a world of sustainable progress and enduring results.

For more information, visit www.ingersollrand.com or www.ingersollrandproducts.com.

Parker GSF Announces EPA Refrigeration Certification Course

Parker GSF Division has announced quarterly 2-day training events featuring Basics of Refrigeration Training and an EPA Technician Certification review and exam.

The Basics of Refrigeration Course is held Day 1 and will cover how to vacuum and recover a refrigeration system, how to read refrigerant gauges on test equipment, how to operate a recovery machine, the basics of brazing and how to replace a compressor.

The EPA Technician Certification review session and exam for Section 608-Stationary Equipment is held Day 2 and will help certify contractors as required by EPA dated November 14, 1994. All applicants must be pre-registered at least two weeks prior to the exam date.

The courses will be held in the Parker GSF Lancaster, NY facility with targeted class sizes of no more than ten people per session. 2016 Course dates are June 8-9, September 7-8, November 9-10. Cost is $595.00.

To register or for questions contact Allan Hoerner at allan.hoerner@parker.com or (800) 343-4048

Kevin Ray Joins DV Systems As Sales Manager

DV Systems, a leading manufacturer of air compressors, announced the addition of Kevin Ray as Sales Manager – U.S. In his role, Mr. Ray will focus on building the distribution network and strengthening relationships with existing distributors.

A graduate of Wilmington University, Mr. Ray brings with him rich experience in a 25-plus year career focused primarily on compressed air technology. He has worked in various roles holding positions in application engineering, product management, marketing management, e-commerce and key account management. He most recently was involved in managing the business development of an alternative energy project.

Kevin Ray, Sales Manager - U.S. for DV Systems

DV Systems is pleased to have someone as highly qualified as Kevin who will focus on nurturing existing partnerships and expanding our U.S. distribution network. The Company sees a huge capacity for long-term future growth in the U.S., and is committed to expanding our US operations. Kevin brings a wealth of valuable experience, which will positively relate to our customers and the entire DV Systems team.

For more information visit dvcompressors.com

INDUSTRY NEWS

Jon Hilberg Joins Sullair

Sullair, an industry leader in innovative compressed air solutions since 1965, announced the appointment of Jon Hilberg, as Senior Product Management Specialist. Hilberg is charged with building on the existing compressed air treatment business. He will also explore and develop Sullair's "Internet-of-things" technologies.

Previously, Hilberg served as President and CEO of KMC Controls, a privately held manufacturer of building automation controls; management and business development at Airtek Corporation; Vice President & GM of Mikropul, a filtration company in Charlotte, NC; President of Parts Services International, a leader in the compressed air aftermarket business; Director of the Americas for the OEM relationship of Ingersoll-Rand/Flair Corporation; Regional Sales manager at Deltech Engineering; and as a Sales/Applications Engineer at Sullair from 1977-1988.

Jon Hilberg, Senior Product Management Specialist, Sullair

A graduate of Purdue University with studies in Engineering and Business Management, Hilberg also received training through Parker's executive Art of Management series, as well as many seminars in 80/20, LEED, QRM & LEAN and finance for executives.

About Sullair

Since 1965, Sullair has developed and manufactured air compressors with proven reliability and wear-free durability. Sullair is globally recognized as a leading manufacturer of portable air compressors, contractors' air tools, stationary air compressors, compressed air treatment equipment and vacuum systems.

Additionally, Sullair provides customers with a full line of aftermarket parts, fluids and services. Sullair has manufacturing capabilities in Michigan City, Indiana; Shenzhen and Suzhou, China; Mahindra World City, India; as well as a JV (IHI-Sullair) based in Suzhou.

About Accudyne

Accudyne Industries is the parent company of Sullair, and a global provider of precision-engineered, process-critical and technologically advanced flow control systems and industrial compressors that deliver consistently high performance and give confidence to the mission of its customers in the most important industries and harshest environments around the world. Today, Accudyne is powered by ~3,000 employees at 15 manufacturing facilities, supporting a broad range of industries in more than 150 countries.

For more information, visit www.sullair.com, and www.accudyneindustries.com.

JHF Co. Partners Up with Ameren Missouri BizSavers® Program

John Henry Foster Company (JHF Co. - St. Louis, MO), a leading supplier of compressed air and hydraulic systems for industrial customers, is once again working closely with Ameren Missouri, as it relaunches its energy efficiency incentive program. "The Ameren Missouri BizSavers® program offers a variety of ways for customers to reduce energy consumption and better manage their energy costs," said Dan Laurent, director, Energy Services for Ameren Missouri. "We're investing approximately $158 million over three years to offer a comprehensive portfolio of programs for our residential and business customers".

Specializing in compressed air energy reduction and compressed air system optimization, John Henry Foster Company assists eligible participants to receive cash incentives through low-cost or no-cost efficiency measures.

For the past six years, JHF Co. has been an Ameren Missouri Trade Ally. As a Trade Ally and Registered Service Provider (RSP) of

INDUSTRY NEWS

Over the past six years, the John Henry Foster Company has helped Ameren Missouri customers save over 17 million kWh; resulting in over $1 million in incentives.

Ameren Missouri, John Henry Foster Company is trained to conduct surveys and assist in implementations of energy saving projects. By assisting Ameren Missouri customers, JHF Co. has helped save over 17 million kWh; resulting in over $1 million in incentives.

For more information please contact JHF Co. at tel: 1-800-444-0522 or visit www.jhf.com

Sparks Dynamics & NIST Drive Down Energy Costs

Sparks Dynamics, while conducting research with energy efficiency scientists from NIST (National Institute of Standards and Technology), a federal science laboratory, instrumented the existing plant compressed air system with the ReMASTER monitoring solution.

It was discovered the existing system was operating so inefficiently, an entirely new compressed air system could be installed with the aid of a Pepco rebate- meeting government mandates to save energy while providing an attractive financial return. The new system was designed and engineered to maximize energy efficiency, provide enhanced reliability for the plant and allow for growth (33% more capacity for the central compressed air system).

Sparks Dynamics managed the entire project and completed an energy study that resulted in a $370,000 Pepco utility rebate. The project will provide NIST with over $140,000 in energy cost savings per year. The system will continue to be monitored by Sparks Dynamics' ReMASTER cloud based monitoring and analytics solution 24/7 to ensure it continues to run at optimal performance and will alert personnel of any anomalies. Sparks Dynamics ReMASTER solution can augment any existing compressed air system regardless of manufacturer to provide situational awareness leading to enhanced efficiency and reliability.

Founded in 1901 and now part of the U.S. Department of Commerce, NIST is one of the nation's oldest physical science laboratories. Congress established the agency to remove a major handicap to U.S. industrial competitiveness at the time—a second-rate measurement infrastructure that lagged behind the capabilities of the United Kingdom, Germany, and other economic rivals. Today, NIST measurements support the smallest of technologies—nanoscale devices so tiny that tens of thousands can fit on the end of a single human hair—to the largest and most complex of human-made creations, from earthquake-resistant skyscrapers to wide-body jetliners to global communication networks.

Visit www.sparksdynamics.com

Quality Compressed Air Services Opens New Orleans Branch

Since opening in 2003 in Jackson, MS, Quality Compressed Air Services, Inc. (Quality) has provided clients with prompt service, quality products and reliable equipment. Starting with just two employees, Quality began as a service based company offering service and repair on air compressors, air dryers, air diaphragm pumps and any equipment pertaining to the compressed air industry. Since expanding into Louisiana, Quality opened two fully staffed and operational locations in Baton Rouge and Lafayette and is now proud to announce the opening of an additional branch in New Orleans, LA!

Our New Orleans branch is providing prompt service, quality products and reliable equipment to the southeastern region of Louisiana. This office is located at 915 Peters Rd. Harvey, LA 70059 and can be contacted at (504) 371- 4767.

QUALITY
COMPRESSED AIR SERVICES, INC

Quality Compressed Air Services prides itself on timely service and provides 24/7 emergency technical support to respond to any compressed air need at any time. Each Quality facility is stocked with common repair and preventive maintenance parts to better suit clients' needs and reduce downtime.

For more information visit www.qcas-inc.com or call toll free at (877) 721-7227 or call our direct branches directly.

German Lab Relies upon WATER-INJECTED OIL-FREE AIR COMPRESSOR

By Martina Bopp

Rotary screw air compressor that makes its own lubricant from the surrounding air delivers oil-free compressed air to an environmental laboratory in Stuttgart, Germany

➤ Introduction

Many sensitive sectors of industry require oil-free compressed air. However, meeting this demand is often not as simple as it sounds. One way is to use oil-injected air compressors with downstream air treatment to meet the demand. A second option is oil-free air compressors, which operate without lubricants. Both versions have their own advantages as well as risks. Another alternative is to use rotary screw air compressors that use water as a lubricant. In an environmental laboratory in Stuttgart, Germany, this has been proven to be a clean and sustainable solution.

> "The special feature here, is that the air compressor collects the lubricating water directly and exclusively from the ambient air."
>
> — Martina Bopp

At a major construction site 'Stuttgart 21', 30 trucks full of earth are waiting for the results of a representative soil sample. At another location, a mineral water factory, a batch of sparkling water cannot be delivered because of suspicions that the water is contaminated. In both cases, fast and reliable laboratory results are required. This is the bread and butter of SUI Synlab Umweltinstitut GmbH in Stuttgart. "We are one of the largest service providers in Germany for the analysis of soil, water, air and food," explains the Technical Director of the environmental laboratory, Michael Tokarsky. And the samples come not only from Germany, but also from France, the Netherlands, the Czech Republic, Hungary, Bulgaria and now also the United Arab Emirates.

Nitrogen Generation Requires Oil-free Compressed Air

Where does the compressed air come in? The laboratory uses spectrometers for the analysis of the environmental samples. These require nitrogen to operate, which is filtered out of compressed air using the membrane method by nitrogen generators at Synlab. The problem here is that even the slightest amount of oil could cause severe damage to the generator. This is why the environmental laboratory needs absolutely oil-free compressed air – and in enormous quantities: it takes 1000 liters of compressed air to produce 100 liters of nitrogen.

GERMAN LAB RELIES UPON WATER-INJECTED OIL-FREE AIR COMPRESSOR

"We used to do this with dry rotors," reports Michael Tokarsky. With dry-running, i.e. unlubricated air compressors, the high operating temperatures impose high loads on the material. "There were equipment failures," continues the Technical Director.

"Every morning I was expecting the call saying we have no compressed air. That means we have no nitrogen and cannot do our work. So I looked around for an alternative." Oil-injected air compressors cover a wide performance range. The fact that the oil is subsequently separated using filters or catalytic converters means there is a certain residual oil content, and the risk that something could go wrong and oil could get into the system anyway.

Sullivan-Palatek recently announced its incredible opportunity to be the sole distributor and representative for German air compressor manufacturer, AquaAir, in the United States. Aqua Air water-injected rotary screw air compressors are innovative in both operation and design, providing 100% oil-free air from 5-150 hp. Though somewhat new to the market, Aqua Air has proven success in a very competitive oil-free market. A case study provided from Germany, breaks down just one of many of the successful product installations.

An Environmentally Sound Solution

"Water-injected air compressors seemed to me to be a practical solution," says Tokarsky. "However, there are not many suppliers in the market, most of them cover a higher performance range than we require and do no offer output-controlled machines. Then I discovered the company Aqua Air during my internet research."

The company was founded in 2011, and supplies oil-free screw compressors, either as an OEM kit or as an operationally ready system from 4 to 22 kW and 75 to 110 kW. The basis for this is the special Aqua Air technology, the focus of which is on rotors manufactured from polymer materials. The compressors use water for lubrication, sealing and cooling, and thus operate entirely without oil. Not even the slide bearings have so much as a drop of grease. The special feature here, is that the air compressor collects the water directly and exclusively from the ambient air.

Aqua Air technology is a self-contained design generating the necessary coolant directly and exclusively from ambient air – by using the water from the atmosphere. In this manner, the air

compressor produces no waste oil. Maintenance costs are also reduced as purchasing, filtering, and disposing of oil-based lubricants is not necessary. The key system components are water-free floating bearings, a condensate separator system with no mechanical components, a leak-free water filtration system, the self-healing proprietary polymer material air end , and inlet air control valve with a three-stage heavy duty inlet filter.

This was precisely what Michael Tokarsky was looking for. Nevertheless, at first he had some reservations. "As Technical Director, I have a responsibility to secure reliable partners, whose manufacturing facility is not in some backyard garage. Innovative

The Sullivan-Palatek Aqua Air unit is being introduced with 5-15 hp models at pressure between 72-145 psi (5-10 bar).

GERMAN LAB RELIES UPON WATER-INJECTED OIL-FREE AIR COMPRESSOR

is well and good, but if one machine works and another does not, that is a problem. So I drove out to visit Aqua Air in Augsburg, to get an idea of the company for myself." And what Tokarsky saw there convinced him. "For one thing, there was a very tidy production hall, and on the other I met the director, co-developer, and head of the company Marco Lodni, who is deeply involved in the subject matter. He is really passionately involved, and knows exactly what he can expect his machine to do."

Trial Run

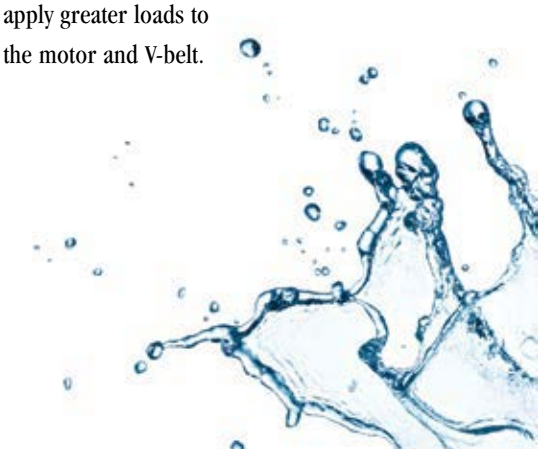
Because they had no reference customers yet in Germany from the field of environmental analysis, we decided together to perform a trial run at the environmental laboratory of Synlab in Stuttgart. Compressor type LTWA 11-8 was selected. It has a 11 kW drive motor and delivers 8 bar pressure at a volume flow rate of 1.71 m^3/h. When it was delivered in the middle of October, a further advantage of the machine became apparent: its design is compact, about half the size of comparable devices. "This paid off with our poor infrastructure, because there is no lift down to the basement. Three of us were able to carry the system down easily," reports Michael Tokarsky. A further positive aspect is that the compressor does not need a water connection in the way water-lubricated compressors from other manufacturers do.

"I'm not really a fan of maintenance contracts," says Michael Tokarsky. "I want to understand the machine myself before I have to call someone and say, 'Please come!' But the point is simple, we need operational reliability." For this reason, the maintenance was part of the inquiry from the start, and it is also covered. "We arrange this through contracted partners based locally," explains Reinhard Wundsam, Sales and Marketing Manager of Aqua Air, continuing, "They handle the sale of machinery on the one hand, and the services and maintenance on the other."

Overall Michael Tokarsky was more than satisfied with the trial run. "I was very sceptical when I went into this. I would have had no problem saying, 'No, that won't work'. But seeing the product at work simply convinced me. The machine has now been running for almost six months in what is essentially the toughest environment." It has been operating without stopping, 24 hours a day, 7 days a week. "And the system produces just barely more air than we can use," explains Tokarsky.

Conclusion

So the system is continuously switching back and forth between standby and operating mode. Switching the compressor on and off would generate a higher load current and apply greater loads to the motor and V-belt.



"In principle, we're torturing the machine," says the Technical Director of the laboratory. "This is not economical or resource-friendly, which is why we want to control this in future using a frequency converter."

The environmental laboratory will soon be relocating to new and larger premises. There they will have two Aqua Air compressors, as a redundant system with a corresponding control system. "We have between six and eight production sites where compressed air is used. Thanks to our good experience, a colleague in the field of human diagnostics has already expressed interest in the Aqua Air compressors." BP

For more information regarding Aqua Air products, please contact a Sullivan-Palatek dealer or contact Sullivan-Palatek directly at email: info@palatek.com, tel: 219-874-2497 or visit www.sullivan-palatek.com

To read similar ***Air Compressor Technology*** articles, please visit www.airbestpractices.com/technology/aircompressors

"We have between six and eight production sites where compressed air is used. Thanks to our good experience, a colleague in the field of human diagnostics has already expressed interest in the Aqua Air compressors."

— Michael Tokarsky

The Benefits of Regular AIR COMPRESSOR CLEANING

By Jared Kantar, CLS, Product Support Engineer, Isel, Inc.

When some people think about compressed air, they imagine the big, loud, dirty, unreliable machine in the back corner of their facility. Many businesses around the world rely on compressed air, and an unreliable air compressor can mean stopping an entire facility, costing thousands of dollars in lost productivity and repair labor. Additionally, that loud machine in the back corner is also a major energy consumer. So much so that many industry professionals refer to it as the "fourth utility."

One of the biggest causes of lost reliability and increased energy consumption in a compressor is varnish. Preventing, controlling and removing varnish from compressors may not be a topic of discussion over the water cooler, but a good plan that is continuously executed can result in thousands of dollars in savings.

What is Varnish?

Varnish is not a specific compound, but a term that broadly describes the by-products of lubricant degradation. When most people think of varnish, they typically think of the thick, black, sticky material that gums up control valves and causes their compressors to run hot. When left unchecked, this sticky material can begin to harden and become even more of a menace. Varnish also has a tendency to attract and hold onto harmful particulates, such as small pieces of wear metals, which can lead to wear and tear of lubricated components.

One of the biggest factors influencing lubricant degradation, leading to varnish creation, is heat. The commonly quoted Arrhenius rate rule specifies that for every 18°F (10°C) the lubricant operating temperature increases, the rate of oil oxidation will double. This means that a compressor running hot due to excessive varnish can fall into a trap of exacerbating the issue by reducing the rated life of fresh lubricants.

> "Many businesses around the world rely on compressed air, and an unreliable air compressor can mean stopping an entire facility, costing thousands of dollars in lost productivity and repair labor."
>
> — Jared Kantar, CLS, Product Support Engineer, Isel, Inc.

Some of the other common causes for varnish formation are:

- Fluid Cavitation
- Static Discharge
- Coking on Hot Surfaces
- Caustic Chemical Contamination
- Reactive Intake Gases
- Coolant Contamination
- Hydrolysis
- Grease Contamination
- Chloride Contamination
- Oil or Additive Incompatibilities

What Does Varnish Do To Your Air Compressor?

The side effects of varnish formation in your air compressor may not be immediately evident in day-to-day operations. Due to the process occurring slowly over time, it can be the invisible enemy of an equipment operator. Common symptoms of a varnish issue include an increase in the operating temperature of the equipment, increased energy consumption, and decreased oil life. The sticky film that coats every internal surface can also lead to increased wear and decreased reliability of your equipment. Some other common issues related to varnish include:

- Deterioration of seal materials
- Sticking of moving components, such as control valves
- Catalytic degradation of lubricants
- Increased bearing wear
- Decreased heat transfer
- Plugging of oil flow ports and strainers
- Reduced filter efficiency and life

THE BENEFITS OF REGULAR AIR COMPRESSOR CLEANING

How Do You Prevent & Control Varnish?

Preventing and controlling varnish is not as easy as picking a high-quality lubricant. In fact, some synthetic base fluids such as polyalphaolefins (PAO) can actually have the opposite effect. While these base fluids have a greater resistance to oxidation, varnish can still form through the other mechanisms previously listed. Due to these high-purity base fluids having a lower natural solvency than synthetic esters and polyalkylene glycols (PAG), or less refined mineral oils, their ability to suspend and carry any varnish-like compounds is significantly reduced. In other words, when the varnish does form, they have a higher tendency to deposit it within the system.

Preventing and controlling varnish is a multi-step process that involves fully understanding not only your equipment, but also your oil. The first step is to perform regular oil analysis on the in-use lubricant. Oil analysis is an excellent tool for tracking lubricant degradation. While there are a number of lubricant properties to monitor, the three major watch points are the total acid number, metals counts and viscosity at 40˚C. While laboratories will look at other lubricant properties, the previously listed three are the major watch points. Not changing a lubricant when the oil analysis indicates it is time is a major mistake that can quickly lead to severe varnish buildup. Over-utilization of the lubricant is another leading cause for varnish in equipment.

In addition to regular oil analysis, a qualified oil analysis laboratory can also perform tests that are specific to identifying and quantifying varnish within a lubricant. Each test has its own pros and cons; some will offer a lower cost or the ability to perform the test in the field in exchange for precision or quantification. Some of the additional tests that can be performed on the lubricant to help identify varnish in equipment are:

- Ultra-Centrifuge Test
- Colorimetric Analysis
- Blotter Spot Test
- Microscopic Particle Counting
- Membrane Patch Colourimetry
- Sediment & Oil Color Observation

Additionally, sources of cavitation and electrostatic discharge should also be investigated if a system is experiencing varnishing of the oil. New filter designs feature higher flow rates and smaller pore sizes that can cause static charges to build on the filter element. The discharges from this static buildup can lead to sparks with temperatures over 10,000˚C (18,000˚F), which can cause severe localized degradation of the oil. Similarly, the collapsing of air bubbles formed by cavitation can generate temperatures over 1000˚C (1800˚F), which can also lead to severe localized lubricant degradation.

With so many different routes that can lead to varnish formation inside of equipment, it is inevitable that an operator will have to deal with the effects of varnish. Luckily, new technology on the market has made the restoration process to remove this harmful material from the equipment easier and safer.

How Can You Clean Varnish?

Even the highest quality lubricants cannot withstand thermal degradation caused by the high, localized temperatures of some degradation mechanisms. One common method to eliminate varnish from the lubricant is through off-line filtration. Technologies such as electrostatic separators, cellulose media and balanced charge agglomeration has proven this is a viable technique. However, what about the varnish that has adhered to the internals of the compressor? This is where a top-treat or run-in cleaner can help. Not only do these cleaners allow varnish removal without

ISEL COMPRESSOR CLEANING TEST CASES

PROPERTY	CASE #1	CASE #2	CASE #3	CASE #4
Make	Brand A	Brand A	Brand B	Brand B
Model	ES11-50H	35/25-400	SSR EP-75	XFE150
Hours On Compressor	35,767	21,413	58,601	95.871
Initial Viscosity (cSt)	39.7	40.0	41.0	48.8
Initial TAN (mgKOH/g)	1.3	23.3	6.19	4.40
Initial Power Draw (K.watts)	28.04	130.35	27.01	73.46
Initial Oil Temperature (˚F)	191	198	186	187
Post-Cleaning Viscosity (cSt)	33.7	37.9	33.4	43.9
Viscosity % Change	-15.1%	-5.3%	-18.5%	-10.0%
Post-Cleaning TAN (mgKOH/g)	0.22	0.20	0.21	0.47
TAN % Change	-83.1%	-99.1%	-96.6%	-89.3%
Post-Clean Power Draw	23.85	126.50	20.17	67.40
Power Draw % Change	-14.9%	-3.0%	-25.3%	-8.3%
Post-Cleaning Oil Temperature (˚F)	186	183	174	185
Oil Temperature % Change	-2.6%	-7.6%	-6.5%	-1.1%
COST SAVINGS PER YEAR*	**$1,307.28**	**$1,201.20**	**$2,134.08**	**$1,890.72**

*Based on 10 hours per day, 5 days per week, 52 weeks per year, at $0.12/kWhr

the need for expensive off-line filtration techniques, but they also make these off-line techniques more effective by removing the varnish from internal surfaces and allowing it to be carried to the separation equipment.

Typically, these cleaners are either a fully formulated lubricant or a concentrate that is poured in with the existing lubricant. Fully formulated cleaners are designed to replace the lubricant every two to four oil changes to help remove any light varnish from internal surfaces. These cleaners typically have a service life of approximately 2000 hours and can be useful for maintenance teams that cannot service a machine twice in one week. The downside to fully formulated cleaners is they are not as effective on heavy varnish buildup that is sometimes found in compressors.

Concentrated cleaners, such as Isel 5031, are typically added at a 10 percent concentration to the existing lubricant and run in the compressor for a short period time. These cleaners have the ability to quickly dissolve light varnish and cut through heavy varnish coatings. The downside to these cleaners is they cannot be used for an extended period of time and must be removed from the compressor within one to two weeks of adding to the sump.

Not all cleaners are the same, however. Some of them contain harmful chemicals that require specialized handling and disposal. Others are formulated utilizing volatile components that can vaporize and end up in the discharge gas stream, while re-depositing any varnish they had solubilized. An ideal cleaner is not only non-toxic and non-hazardous, but also non-volatile, such as Isel 5031. This will prevent it from evaporating into the gas stream and re-depositing the varnish it cleaned up, while also ensuring it can be easily disposed of with standard used oil.

Test Cases

By understanding how varnish is formed and what factors influence it, operators can be more prepared on how to effectively eliminate it. A recent study performed by Isel showed that cleaning a compressor with heavy varnish buildup can result in an average energy savings of 3 to 5 percent, while also reducing operating temperatures by approximately 5˚F. Not only will the reduced operating temperature help extend the life of future oil changes, but the reduced energy consumption can quickly pay off the cost of the cleaning.

The table "Isel Compressor Cleaning Test Cases" lists four compressors that were experiencing varnishing issues and were cleaned utilizing a concentrated cleaner. Cleaning the compressors resulted in better cooling with the removal of the insulating layer of varnish, and lower energy consumption. When averaged, the four compressors consumed $1600 less worth of electrical energy alone – when calculated for 2600 hours of run time per year at $0.12/kWhr. In facilities with longer operational times or multiple compressors, the cost savings from electrical energy consumption alone become a significant factor. This proves that cleaning your equipment of any varnish buildup has an immediate return of value for the facility. BP

For more information visit www.iselinc.com

To read similar articles visit www.airbestpractices.com

THE 2016 ENERGY STAR® PARTNER OF THE YEAR AWARD WINNERS

By Compressed Air Best Practices® Magazine

The U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) honored, in April in Washington D.C., 149 businesses and organizations in 35 states for their commitment to saving energy and protecting the environment through superior energy efficiency achievements. Recipients of the 2016 ENERGY STAR® Partner of the Year Award included Bristol-Myers Squibb, Celanese Corporation and Owens Corning. "This year's Partner of the Year Award winners prove every day that saving money and protecting the environment go hand in hand," said EPA Administrator Gina McCarthy.

There are many award categories. Compressed Air Best Practices® Magazine focuses it's circulation strategy on the industrial companies participating with ENERGY STAR® and follows the Partner of the Year award categories of "Sustained Excellence" and "Energy Management". "ENERGY STAR® Partner of the Year Award winners help families, individuals, and businesses become more energy efficient," said Energy Secretary Ernest Moniz. "By offering energy-efficient products, services, and programs, this year's awardees continue to provide Americans with lower utility bills, new jobs, and fewer greenhouse gas emissions."

The following information comes from the ENERGY STAR® website:

https://www.energystar.gov/about/2016_energy_star_award_winners

2016 Award Winners: ENERGY STAR® Partner of the Year – Energy Management Category

We highlight this partial list of industrial process/manufacturing companies recognized. Forty-seven organizations were awarded the Partner of the Year award for strategically and comprehensively managing their energy use. These organizations promote ENERGY STAR® products and practices in their own operations, while providing energy-efficient products and services to their customers.

Bristol-Myers Squibb

Bristol-Myers Squibb is a global BioPharma company focused on discovering, developing, and delivering innovative medicines that help patients prevail over serious diseases. The company has built a robust energy management program by utilizing ENERGY STAR® energy management tools and actively participates in the ENERGY STAR® partnership. Bristol-Myers Squibb is receiving ENERGY STAR® Partner of the Year recognition for furthering its commitment to the environment and its energy management program over the past year. Key 2015 accomplishments include:

- Achieving an absolute energy use reduction of 14 percent and greenhouse gas emissions reduction of 17 percent from a baseline year of 2009.
- Implementing 50 new major energy projects in 2015, bringing the total number of projects implemented since 2009 to 275. These projects generate an annual average savings of $14.5 million from an investment of $35.1 million.
- Earning ENERGY STAR® certification for three buildings.
- Engaging over 200 employees, vendors and industry peers through Energy Treasure Hunts that identified plant-wide energy savings opportunities averaging 15 percent with total cost savings potential of over $7.5 million.
- Actively participating in the ENERGY STAR® Focus on Energy Efficiency in Pharmaceutical Manufacturing and Industrial Partnership.

- Promoting energy efficiency and building capacity for better energy management among employees through numerous energy fairs, lighting fairs, and Earth Day observances.
- Building a culture of continuous improvement through employee engagement using ENERGY STAR® resources as the keystone of the energy program.

Owens Corning

Owens Corning develops, manufactures, and markets insulation, roofing, and fiberglass composites. Many of the company's products and systems save energy and improve comfort in commercial and residential buildings. Owens Corning is receiving ENERGY STAR® Partner of the Year recognition for its vigorous energy management program. Key 2015 accomplishments include:

- Achieving an average reduction in energy intensity of more than 3 percent per year for the past five years.
- Completing 77 energy projects for a savings of $7.8 million in 2015.
- Expanding its use of clean power by implementing three renewable energy projects, including a 2.4 megawatt solar canopy and two wind power supply agreements for new installed capacity.
- Allotting and sustaining a dedicated capital funding pool specifically for energy projects.
- Building a strong company energy team with energy leaders at plants and several Certified Energy Managers (CEM) throughout the organization.
- Implementing a system for sharing best energy management practices across the company, ENERGY STAR® Partner Share, to help develop new ideas and to learn from ENERGY STAR® industrial partners.

Celanese Corporation

Celanese Corporation is a global technology leader in the production of differentiated chemistry solutions and specialty materials used in most major industries and consumer applications. The company is receiving ENERGY STAR® Partner of the Year recognition for formulating a robust energy management program using ENERGY STAR® resources. Key 2015 accomplishments include:

- Reducing energy intensity by 7 percent since 2010 and 28 percent since 2005.
- Completing 200 energy projects to save more than $16 million in 2015, including the startup of a $160 million gas-fired steam boiler system to prevent greenhouse gas emissions and air pollution and to improve energy efficiency.
- Investing in energy efficiency in core production by starting up a state-of-the-art methanol unit.
- Performing energy-saving Treasure Hunts in four facilities in the United States and Mexico to identify more than 500 energy-saving opportunities.
- Sharing its energy management expertise among the ENERGY STAR® industrial partners.
- Communicating energy efficiency and ENERGY STAR® throughout Celanese.

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THE 2016 ENERGY STAR® PARTNER OF THE YEAR AWARD WINNERS

2016 Award Winners: ENERGY STAR® Partner of the Year – Sustained Excellence

We highlight this partial list of industrial process/manufacturing companies recognized for their achievements. Not listed below are Award Winners CalPortland and General Motors, who have already been highlighted in Compressed Air Best Practices® Magazine. The 93 Sustained Excellence winners continue to demonstrate remarkable leadership each year in the ENERGY STAR® program while remaining committed to environmental protection through superior energy efficiency.

Allergan, Inc.

Allergan, Inc. is a diversified global company engaged in research and production of brand-name and generic pharmaceutical products. In early 2015, Allergan merged with Actavis and greatly increased the size and operations of the company. Over the course of the year, the company strategically managed energy and greenhouse gas emissions throughout its operations and supply chain. Allergan is receiving ENERGY STAR® Partner of the Year—Sustained Excellence recognition for continuing the success of its energy management program through a major corporate merger. Key 2015 accomplishments include:

- Achieving more than a 1-percent energy intensity reduction for U.S. operations while integrating the operations of two pharmaceutical companies.
- Earning ENERGY STAR® certification at two U.S. manufacturing plants.
- Continuing to work with supply chain partners to reduce their carbon footprint through better energy management practices.

Allergan

- Participating actively in EPA's ENERGY STAR® Focus on Energy Efficiency in Pharmaceutical Manufacturing.
- Engaging employees through biannual energy fairs that use ENERGY STAR® materials, and promoting energy efficiency in communities around the world through projects at community events.

Corning Incorporated

CORNING

Corning Incorporated is one of the world's leading innovators in materials science. For more than 160 years, Corning has applied its expertise in specialty glass, ceramics, and optical physics to develop products that create new industries and transform people's lives. Corning is receiving ENERGY STAR® Partner of the Year—Sustained Excellence recognition for the growth of its energy management program and commitment to helping others learn valuable skills and strategies. Key 2015 accomplishments include:

- Achieving a six-percent improvement in corporate energy productivity in 2015, and a 32-percent improvement since 2007.
- Linking R&D opportunities with energy management-driven business objectives and developing more sustainable processes.
- Engaging new energy management team members in extensive and immersive energy management training internally and externally among the ENERGY STAR® industrial partners.
- Supporting the ENERGY STAR® Focus on Energy Efficiency in Glass Manufacturing by arranging for the group to meet annually with Syracuse University's

THE 2016 ENERGY STAR® PARTNER OF THE YEAR AWARD WINNERS

Center of Excellence in Environmental and Energy Systems to stimulate new ideas for program development.

- Engaging 36 plants in the ENERGY STAR® Challenge for Industry, with eight named Achievers.
- Supporting the ENERGY STAR® industrial partners' annual meeting by sharing communications strategies within an energy management program.

Colgate-Palmolive Company

Colgate-Palmolive Company (Colgate) is a global consumer products company operating in over 200 countries and territories. Colgate understands the importance of energy management and the potential consequences of climate change and is committed to acting responsibly to protect its people and the environment. Colgate is receiving the ENERGY STAR® Partner of the Year—Sustained Excellence recognition for the company's ongoing sustainability efforts in mitigating climate change through energy efficiency. Key 2015 accomplishments include:

- Improving energy efficiency by 2.8 percent compared to 2014 and more than 20 percent since 2005. Since 2009, Colgate has avoided over $295 million in energy costs while reducing carbon dioxide emissions by more than nine percent.
- Implementing a climate change strategy that influences the company's carbon footprint through ambitious emissions goals, management of energy, and providing for low carbon products, energy, and supply chain. The company increased renewable energy purchases by 30 percent in the United States.
- Engaging employees through Energy Treasure Hunts to identify over 200 energy reduction ideas for an estimated 36,664 megawatt hours in energy savings.

COLGATE-PALMOLIVE

- Achieving the ENERGY STAR® Challenge for Industry at 13 facilities, 10 of which are repeat winners.
- Expanding the "Save Water" campaign in new markets to raise awareness of water conservation.
- Sharing best practices with other ENERGY STAR® partner companies.

Eastman Chemical Company

EASTMAN

Eastman Chemical Company is a global specialty chemical company that produces a broad range of products found in items people use every day. Eastman is receiving ENERGY STAR® Partner of the Year—Sustained Excellence recognition for the richness of its energy management program and support of external organizations. Key 2015 accomplishments include:

- Improving energy intensity by nine percent since 2008, avoiding $30 million in energy costs in 2015.
- Focusing on the energy efficiency of a core manufacturing process, distillation, through work with two universities. As a result, development of a new energy-saving technology is moving forward, and process improvement engineers are being trained to optimize the operations of existing units.
- Securing the Designed to Earn the ENERGY STAR® designation for the new Eastman Corporate Business Center.
- Supporting a local school system in measuring and managing energy in its buildings using ENERGY STAR® resources.
- Continuing to leverage the benefits of ENERGY STAR® and improve energy efficiency by collaborating with other ENERGY STAR® industrial partners and suppliers and engaging employees and communities.

HanesBrands

HanesBrands is a socially responsible, leading marketer of everyday basic apparel under some of the world's strongest apparel brands, including Hanes, Champion, and Playtex, among others. Hanesbrands is receiving ENERGY STAR® Partner of the Year—Sustained Excellence recognition for the company's continued efforts in sustainability by leveraging successes in energy management, environmental management, and product development. Key 2015 accomplishments include:

- Achieving a three-percent energy intensity reduction compared to 2014 and a 25-percent reduction since 2007, contributing to a 23-percent reduction in carbon emission intensity. Over this period, Hanesbrands reduced water use intensity by 32 percent.
- Establishing an aggressive new "2020 Vision" to reduce energy and carbon emissions by 40 percent and water use by 50 percent from a 2007 baseline year. Hanesbrands participates in a program to responsibly produce cotton, including decreasing greenhouse gas emissions associated with its growth.
- Achieving the ENERGY STAR® Challenge for Industry at five plants in 2015 to bring the company's total number of achieving plants to 23.
- Pioneering the use of biomass combined heat and power plants to replace fossil fuel use at plants in developing countries.
- Implementing a multimedia communications strategy to inform people through 440 million media impressions about energy management and ENERGY STAR®.

HANES Brands Inc

Merck & Co., Inc.

Merck & Co., Inc. (Merck) is a global, research-based pharmaceutical and healthcare company with a vision to be "the most energy-efficient company in the pharmaceutical industry and a leader among FORTUNE 500 companies." Merck has a successful energy and sustainability program that reaches high levels of performance. Merck is receiving ENERGY STAR® Partner of the Year—Sustained Excellence recognition for its continued leadership in energy management and strategic focus on helping others achieve world class status for energy management. Key 2015 accomplishments include:

- Achieving a two-percent reduction in energy intensity for U.S. facilities and a two-percent reduction globally from 2014. Since 2010, Merck has reduced energy intensity by 16 percent in the United States and 13 percent globally.
- Earning ENERGY STAR® certification for one manufacturing plant and three office buildings in addition to helping a former plant earn certification under a new owner.
- Sharing best practices and mentoring ENERGY STAR® partners.
- Actively participating in the ENERGY STAR® Focus on Energy Efficiency in Pharmaceutical Manufacturing.
- Engaging employees through the creation of an online Energy Treasure Hunt tool that allows individuals to submit energy-saving ideas.
- Investing more than $12 million in energy efficiency projects through the Merck energy efficiency capital fund.

MERCK Be well

Nissan North America

Nissan North America, Inc. is the manufacturing and operations headquarters for Nissan in the United States and Mexico. The Nissan Green Program (NGP) guides Nissan's global energy efficiency strategies and was implemented to support the company's environmental philosophy: Symbiosis of People, Vehicles, and Nature. Nissan is receiving ENERGY STAR® Partner of the Year—Sustained Excellence recognition for its continued energy management performance, improvement, and promotion of energy efficiency. Key 2015 accomplishments include:

NISSAN

- Achieving a one-percent energy intensity reduction from 2014 while production volumes increased significantly. Since becoming an ENERGY STAR® partner in 2006, Nissan has saved more than 5.34 trillion British thermal units, equivalent to the amount of energy needed to drive a Nissan LEAF™ more than 4.7 billion miles.
- Maintaining ENERGY STAR® certification of its automobile assembly plants for 10 consecutive years while earning certification at six office buildings.
- Finishing in third place in overall contributions to the ENERGY STAR® Pledge by securing commitments to reduce over 101 million pounds of greenhouse gas emissions.
- Providing support to the first Motor Vehicle Supplier Energy Management Training Camp.
- Expanding support for ENERGY STAR® certification of K-12 schools. Nissan assistance was critical to the certification of five schools in Tennessee and the recertification of 20 schools in Mississippi.

The Boeing Company

The Boeing Company is a manufacturer of commercial jetliners and military aircraft. Boeing's comprehensive energy management program remains focused on improving the environmental performance of its operations. The company is receiving ENERGY STAR® Partner of the Year—Sustained Excellence recognition for its continued advancement in energy management. Key 2015 accomplishments include:

- Improving energy intensity by seven percent over the prior year while absolute energy use decreased by four percent. During this time, aircraft deliveries increased about 10 percent.
- Investing $7.8 million in direct energy conservation to reduce energy use by more than 42,000 million British thermal units annually. Projects include commissioning a new chiller plant for one of the world's largest buildings, lighting improvements, securing renewable energy, and HVAC retro commissioning.
- Promoting energy efficiency and ENERGY STAR® through special events including Earth Day celebrations.
- Encouraging self-managed Green Teams throughout Boeing operations. In 2015, Green Teams grew by 30 percent.
- Building a skilled energy management workforce by encouraging site energy engineers and professionals to achieve qualifications including Certified Energy Manager (CEM) from the Association of Energy Engineers, among others.
- Supporting an annual meeting of its energy management experts to review the company's energy management strategy.

BOEING

THE 2016 ENERGY STAR® PARTNER OF THE YEAR AWARD WINNERS

Toyota

Toyota Motor Engineering & Manufacturing North America, Inc. is manufacturing headquarters for 14 vehicle, engine, and parts plants across the United States, Canada, and Mexico. Toyota is receiving ENERGY STAR® Partner of the Year—Sustained Excellence recognition for its continued efforts and industry leadership in industrial energy management. Key 2015 accomplishments include:

- Achieving a five-percent reduction in energy intensity form 2014, during a period of increased production, contributing to over 6,600,000 million British thermal units in energy savings and $640 million in cost savings since 2002.
- Earning ENERGY STAR® certification for four automobile assembly plants.
- Achieving the ENERGY STAR® Challenge for Industry at three plants.
- Providing support for the first Motor Vehicle Supplier Energy Management Training Camp.
- Sharing best practices through the ENERGY STAR® Focus on Energy Efficiency in Motor Vehicle Sector, the ENERGY STAR® Industrial Partnership, and Kentucky Association of Manufacturers.
- Launching new communication efforts to highlight Toyota's partnership with ENERGY STAR®. BP

TOYOTA

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SHOW REPORT:
Compressed Air Technology at the
AICD CONFERENCE & EXHIBITION 2016

By Roderick Smith, Compressed Air Best Practices® Magazine

Brandon Dial, Keith Sportsman, Frank Brookshire, Curt Greifer and Kent Tolman (Maddox Air Compressor) at the ELGi Compressors booth.

Biren Bhalla, Garth Greenough, Bogdan Markiel, Ken House and Kevin Ray at the DV Systems booth.

The 2016 AICD Conference & Exhibition was held May 15-17, at the Hyatt Regency in downtown Chicago, Illinois. The Association of Independent Compressor Distributors once again produced a first-class event recording new highs for both member attendees and exhibitors. There were roughly 76 exhibitors, so although I tried to be diligent, I must apologize in advance to the many booths/companies I was not able to spend time with.

Sullivan-Palatek exhibited a most interesting new technology at the AICD - the new 5-15 hp Aqua Air water-injected, 100% oil-free rotary screw air compressors. This innovative design requires no make-up water as it generates the necessary coolant directly from ambient air. There are several innovations, in the operational design of the unit, including the floating bearings for the airend and the self-healing proprietary polymer materials used on the rotor profiles. President Steve Van Loan said the Aqua Air has received a tremendous amount of interest from their distribution network. I have been watching Sullivan-Palatek over the years and am impressed by their steady and consistent growth march into larger facilities, new product line technologies, and their active involvement in CAGI decision-making.

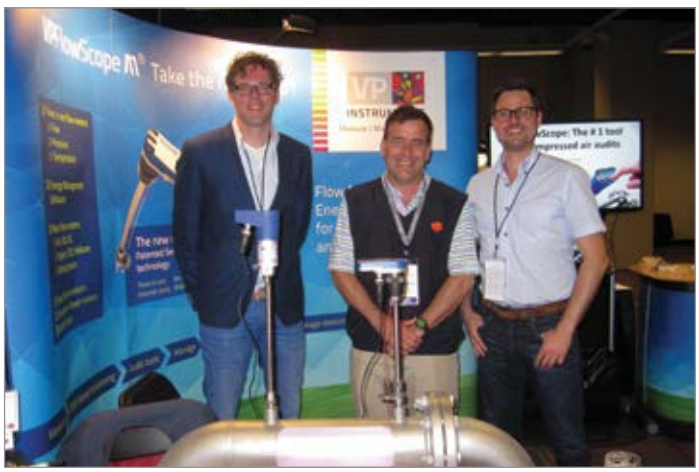
Their sales strategy is truly distributor-focused and their growth is tied to the growth of their sales channel partners – like Quality Compressed Air Services, which has grown from two employees into a company with four branches in Mississippi and Louisiana.

VP Instruments continues to pioneer compressed air flow metering installation, with unique products like the VP FlowScopeM patented replacement sensor cartridges. They also focus on installation training with Menno Verbek and Pascal van Putten tackling issues like bi-directional flow and moisture in the compressed air systems head-on. They also presented VP Vision, their web-based energy management system for end users wanting to manage the mass flow, temperature and pressure data coming from the VP FlowScope.

ELGi Compressors announced the addition of Brandon Dial to their U.S. sales team. Keith Sportsman announced ELGi's excitement at the growth in their U.S. sales over the past three years. They credited their growth to the continued development and cooperation of air compressor distributors across the U.S. - as well as to ELGi's commitment to inventory, quality designs and the industry's first-ever lifetime warranty on air ends-called UPTIME Assurance™. Their move to a larger facility in Charlotte is now complete and they said it is permitting them to further expand their product offerings. More news on that is coming.

Dave Raffin, Brian Stober and Bruce McFee at the Sullivan-Palatek booth.

Marka Peterson, AICD President Phil Kruger (Harris Equipment) and Laura Gunn at the Trace Analytics booth.



Pascal van Putten, Jervey Inglesby (A-10 Compressed Air Services), and Menno Verbek, at the VP Instruments booth.

> "The Association of Independent Compressor Distributors once again produced a first-class event recording new highs for both member attendees and exhibitors."
>
> — Roderick Smith, Compressed Air Best Practices® Magazine

SHOW REPORT: COMPRESSED AIR TECHNOLOGY AT THE 2016 AICD CONFERENCE

Eugene White and Quentin Jackson (McGee Company) at the JORC Industrial booth.

Don Salamon, Joe Fresch and Jean-Christophe Lecocq at the Chicago Pneumatic booth.

Chad Timmer and Mike Holtvluwer at the Clean Resources booth.

DV Systems announced the hiring of Kevin Ray as their U.S. Sales Manager based out of their Charlotte stocking warehouse. Bogdan Markiel said they were very pleased with the market acceptance of their range of 10 – 200 horsepower lubricated, single-stage, variable speed drive, rotary screw air compressors. They also announced their new line of DF Series compressed air filters.

JORC Industrial continues to steam along as the specialist in condensate management with an exclusive focus on condensate drains and oil-water separators. Eugene White reemphasized their commitment to service and same-day deliveries.

Announcing a new hire was oil/water separator manufacturer Clean Resources. Mike Holtvluwer communicated the appointment of Chad Timmer, as the new VP of Sales.

Nano Purification continues it's march towards greater market share and business expansion-even outside the U.S.. Nick Herrig and David Peters said they'd hired a new Regional Manager for the U.K. and described their newly acquired manufacturing operation in Newcastle, U.K. I find their application engineering work with nitrogen generation in the food industry very interesting. Energy-savings are attainable when those nitrogen specs are challenged and tested.

Trace Analytics has established itself, in my view, as an excellent technical resource for those wanting to test and verify compressed air quality. Compressed air quality specifications can also carry an energy cost. Ruby Ochoa is an authority for those wanting to firmly understand ISO 8573.1-2010 Quality Classes and Testing Procedures per ISO 8573.3 . I was pleased to hear Marketing Director Laura Gunn say the compressed air industry has really responded to their service of on-site or lab-based testing of compressed air quality. They help companies learn how to establish a firm testing protocol able to comply with the requirements of an auditor from a total quality management system such as SQF (Safe Quality Foods) Certification.

Speaking of SQF, the gentleman who first introduced me to SQF is current AICD President Phil Kruger, the General Manager

& EXHIBITION

of Harris Equipment. Phil gave an excellent training session on SQF during one of the break-out sessions. He couldn't stop smiling, by the way, over the record number of AICD Member attendees and exhibitors.

"We are excited about AICD and the opportunities we have before us. We see ourselves as an association that can bring manufacturers and distributors together for mutual benefit. Over the years AICD has been known for the great shows that we put on, but we are more than a show. We are an association and we exist to provide a service and/or a value-add for every member business and exhibitor alike. With a dynamic leadership team and the technology available to us, we will strive to bring information, products and networking opportunities to our members, providing a means for every member to become a stronger business. I, personally, am very excited to be part of AICD as it achieves its full potential."

- Phil Kruger, AICD President

The conference side of AICD is growing. The break-out sessions included Phil Kruger's session on SQF, Fares Kabbani from Air Energy presented, "Valuing a Compressor Distributorship" and a round-table session with managers from several air compressor distributors spoke about "Hiring and Retaining Service Techs." Bob Langdon was the Keynote Speaker and also conducted a break-out session. His speech was titled, "Hello to Sold." I found

Joe Fecko, Adrian Fernandez, Russ Jones, and Rob Merrion and Michael Merrion (Remco Equipment Company) at the Beko Technologies booth.

Jim McFadden, Todd Allison, Jane Sexton, Matt McQuillin and Dave Peters at the nano purification booth.

Ted Schultz and Kurt Peter at the Compresyn booth.

> **"We see ourselves as an association that can bring manufacturers and distributors together for mutual benefit. I personally am very excited to be part of AICD as it achieves its full potential."**
>
> **— Phil Kruger, AICD President**

SHOW REPORT: COMPRESSED AIR TECHNOLOGY AT THE 2016 AICD CONFERENCE

Anil Peddi, Leslie Kern, Jim Hughes and Rick LaFollette (Air & Hydraulic Equipment) at the SKF booth.

David Brockett, AICD Board Member Lisa Lewis (Michigan Air Solutions) a nd Don Devries at the ISEL Lubricants booth.

Michael Wlodarski and Mary Wlodarski at the Hydrothrift booth.

many valuable pieces of information which a manager can take back to improve business profitability and the effectiveness of the sales force. One piece of advice Mr. Langdon gave really made an impression on me, "Whoever asks the questions, controls the direction of the conversation."

Beko Technologies' current focus on a complete suite of advanced instrumentation technologies reminds me of twenty years ago when everybody said electronic demand-drains were too expensive-and now they are standard components in most systems. Beko's Atlanta-based U.S. business, under the leadership of Tilo Fruth, is now manufacturing significant volumes of OEM-business membrane dryers as well as heated and heatless desiccant compressed air dryers. More on this another day, but they are excited about the introduction of a new line of "hyperintelligent" heated desiccant dryers.

Hitachi continues their push with oil-free rotary screw and oil-less scroll air compressors. Camilo Villalobos explained the DSP Series has models ranging from 30-300 hp featuring VSD control and innovative stainless steel 1st and 2nd stage rotors with a patented HX-18 coating. The SDS Series provides larger rotary screw models from 335 to 900 hp. The oil-less scroll SRL Series complements these product lines with stand-alone models from 2 to 7.5 hp and multiplex units from 10 to 40 hp.

Schulz Compressors, out of Acworth, Georgia, has hired industry veteran Terry Emery as their Sales Manager. Export Manager and

> "Whoever asks the questions, controls the direction of the conversation."
>
> — Bob Langdon, Keynote Speaker

& EXHIBITION

true globe-trotter, Fabio Rosa, told me their U.S. business has seen significant growth over the past two years. With $2 million+ invested in inventory, they are proud of their fast deliveries for tank-mounted 5-20 hp reciprocating air compressors and their 15-100 hp VSD rotary screw air compressors (soon going up to 200 hp).

Chicago Pneumatic Compressors had a nice combined booth with their Pneumatech product offering. Of course, it was nice to trade war stories with Joe Fresch again. Chicago Pneumatic President, Jean-Christophe Lecocq introduced me to their new 10-20 horsepower variable speed, direct-drive rotary screw air compressor. They also provide the option to have it tank-mounted with an integrated refrigerated dryer.

Solberg has a wonderful company culture and it's easy to see why when you meet Charlie and Tor Solberg. They continue their strong presence with intake filters and silencers for compressors and blowers, inlet filters for vacuum pumps and air/oil separators for air compressors and vacuum pumps.

SKF, led by Leslie Kern, introduced the new Smart Valve technology on their SFD Separator-Filter-Dryer. This point-of-use heatless desiccant dryer is interesting as it can use as little as 8% purge air while delivering a – 40°F pressure dewpoint. The Smart Valve provides "synchronous compressor control matching dryer to compressor run times and permitting smart cycle selection."

I hope this provides a small glimpse of the event. To really understand it, one must attend! The AICD will hold the 2017 Annual Conference and Exposition, May 21-23 in Reno, Nevada. What a great site selection! For more information, please contact Kasey Gould from the AICD at email: aicd2015@gmail.com or visit www.aicd.org BP

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Nitin Shanbhag (Boge America), Janiece and Peter Humble (Enerquip), Jason and Carin Hedeen (C-Aire), Jamie Webb (Central Air Equipment) and Jerry Elsen (Boge America) at the Boge America booth.

Gabe Kami, Zach Balcunas, Mike DeLisi, Travis Dingee, Joe Thode and Darren Leonard at the Solberg booth.

Fabio Rosa, Mark Nelson, Terry Emery and Janelle King (HydraFlow West) at the Schulz Compressors booth.

CABINET COOLER CHANGE SAVES COMPRESSED AIR ELECTRICAL COSTS

By Ron Marshall for the Compressed Air Challenge®

KNOW PRESSURE COMPRESSED AIR CHALLENGE

➤ As a result of compressed air awareness training and a focus on energy management, two facilities in different parts of the world have reduced their compressed air demand substantially by removing vortex style cabinet coolers from some of their electrical panels and reworking the cooling systems. These facilities were previously unaware of the high cost of compressed air and how much could be saved if other methods of cooling were used. This article describes some of their efforts in demand reduction.

A Canadian Furniture Manufacturer

A Canadian furniture manufacture had previously run into trouble, with the electrical relays and control transformers, in an electrical panel of a specialized machine used to make components for modular office furniture. The components in the sealed panel were overheating causing early failure. Simple fan powered ventilation was tried but excessive amounts of ambient sawdust entered the cabinets causing problems. The solution selected was compressed air powered vortex coolers pictured in Figure 1. These coolers have no moving parts, require little maintenance, and are simple to install, but the downside is the high cost of the compressed air used to power these units.

These coolers were operating 24 hours a day, seven days a week, while consuming approximately 20 cfm (cubic feet per minute) each. Based on a compressed air system specific power of 22 kW per 100 cfm, each

"The components in the sealed panel were overheating causing early failure. Simple fan powered ventilation was tried but excessive amounts of ambient sawdust entered the cabinets causing problems."

— Ron Marshall for the Compressed Air Challenge®

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Figure 1: Vortex coolers were discovered during an assessment at a furniture manufacturer.

cooler was consuming about 4.4 kW of power worth equivalent to about $3,855 per year at 10 cents per kWh.

The maintenance staff recognized that the many coolers in the plant were consuming considerable volumes of compressed air and attempts were made to control the flow. The coolers were fitted with thermostatic controls that were to turn off the air input when conditions allowed. Monitoring was done to gauge the effectiveness of this control and it was discovered that some savings were gained that saved 25% of the base case power. This control, however, proved ineffective during typical production shifts because the cooling provided by the vortex coolers was not enough to pull down the temperature to the thermostat set point.

Figure 2: Thermostatically controlled refrigerated coolers were retrofitted to the cabinets and consumed about 96% less energy

Refrigerant Style Cabinet Coolers

A trial was conducted using refrigerant style cabinet coolers (Figure 2) designed for industrial environments. These units were like air conditioning units and provided both isolation from the ambient dust and cooling

CABINET COOLER CHANGE SAVES COMPRESSED AIR ELECTRICAL COSTS

Best Practices for Compressed Air Systems Second Edition

Learn more about optimizing compressed air systems

This 325 page manual begins with the considerations for analyzing existing systems or designing new ones, and continues through the compressor supply to the auxiliary equipment and distribution system to the end uses. Learn more about air quality, air dryers and the maintenance aspects of compressed air systems. Learn how to use measurements to audit your own system, calculate the cost of compressed air and even how to interpret utility electric bills. Best practice recommendations for selection, installation, maintenance and operation of all the equipment and components within the compressed air system are in bold font and are easily selected from each section.

that was much less energy intensive than compressed air powered coolers. These coolers were installed as a trial financed by the local power utility. The utility monitored the new coolers for 3 months (Figure 3) and assessed the new energy consumption.

The refrigerant coolers not only consumed considerably less energy at full load, but the units were also thermostatically controlled so they turned off when the cabinet temperature was satisfied. There were significant periods of time where the machines were not producing product and the control circuitry was not generating heat. During these periods, the units turned themselves off and consumed no power. In all, the monitoring showed the refrigerant coolers consumed about 4 percent of the energy the original compressed air powered coolers consumed.

Based on the savings, this project paid for itself in about 1.2 years. It should be noted that the refrigerant coolers require maintenance that adds cost to the operation. Due to the dust, the cooling surfaces must be cleaned occasionally to prevent clogging.

An Asian Automobile Manufacturer

Malaysian automobile manufacturer Proton also discovered, through awareness training and a visit from an international expert in compressed air, that the cabinet coolers they were using were costing them considerable energy. This company embarked on an energy management program based on ISO 50001 where significant energy users were identified. Compressed air was identified as just one of the areas of concern with considerable potential for savings possible.

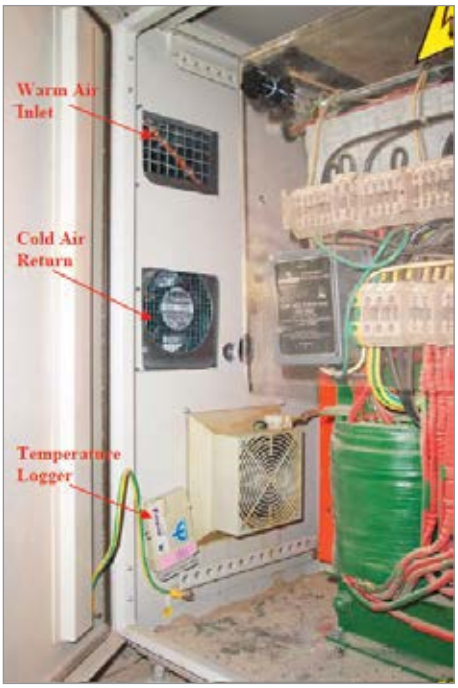

Figure 3: The refrigerated coolers provide some isolation from ambient dust and a good circulation flow inside the cabinet.

> "The refrigerant coolers not only consumed considerably less energy at full load, but the units were also thermostatically controlled so they turned off when the cabinet temperature was satisfied."
>
> — Ron Marshall for the Compressed Air Challenge®

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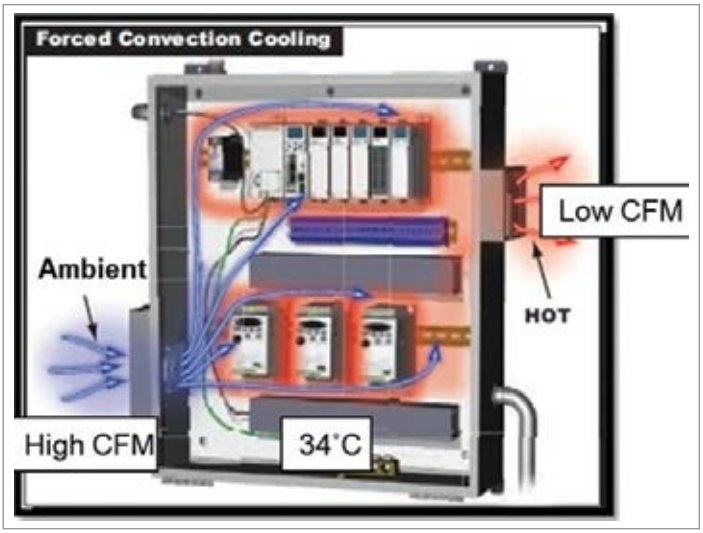

Figure 4: Proton, An Asian auto producer designed a forced convection cooler than uses ambient air to replace their many compressed air powered cabinet coolers (Used with permission).

Unaware of the high energy cost of compressed air, a considerable number of electrical control panels were initially outfitted with compressed air powered vortex coolers. Things ran that way without issue for many years. The ambient conditions are much cleaner at an automotive assembly plant than at the furniture manufacturer - allowing different energy efficiency measures to be applied. In Proton's case, their facility engineers came up with a forced convection cooling system (Figure 4), rather than refrigerant cooling, to enable elimination of the compressed air coolers. This system used multiple donut fans (Figure 5) to pressurize the control panel slightly by applying more input fan capacity than output capacity. The inlet air is filtered through the cleaning media to prevent excessive dust from entering the panel. This provides a pressurized panel and prevents any ambient dust from entering the cabinet from various cracks. The panels were carefully

Figure 5: Donut fans provide an adequate flow of cooling air for most panels. Where more cooling is required refrigerated coolers are used.

sealed to prevent any infiltration of dirt from any other areas.

In Proton's case the use of cabinet coolers was extensive, with approximately 3,500 cfm of compressed air consumption identified in the many hundreds of electrical panels in this very large car assembly facility. Application of these fans is estimated to have turned off one large centrifugal air compressor and reduced the average compressed air electrical consumption in the facility by 533 kW, savings of roughly $618,000 in US dollar equivalent. Proton also identified additional benefits of the retrofit were the reduction of ambient noise caused by the coolers, helping create a quieter workplace.

Importance of Awareness

In both of these cases the operators of the production equipment were unaware of the inefficiency of their chosen cooling method until they attended compressed air efficiency training and started tracking their costs. Bringing in a knowledgeable expert to do a walkthrough also helped them identify areas of improvement that could provide a substantial reduction in compressed air energy consumption and a significant energy savings for the plants. This shows the high value of attending compressed air training.

Time and time again the effectiveness of awareness training has been shown in plants all across the world. Attendees learn that compressed air is not free, it is one of the most expensive utilities used to transmit energy. Attendees learn ways to reduce compressed air costs by controlling their compressors better, producing compressed air more efficiently, reducing waste, and eliminating inappropriate end uses. These are two examples of the success of the training program and the significant benefits that can be gained in applying energy efficiency measures through new-found knowledge. BP

For more information about the Compressed Air Challenge, contact Ron Marshall, email: info@compressedairchallenge.org

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"Compressed air is not free, it is one of the most expensive utilities used to transmit energy. Attendees learn ways to reduce compressed air costs by controlling their compressors better, producing compressed air more efficiently, reducing waste, and eliminating inappropriate end uses."

— Ron Marshall for the Compressed Air Challenge®

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New Sullivan-Palatek 100% Oil-Free Water-Injected Aqua Air Compressor

Sullivan-Palatek, Inc., a leader in innovation and design, is excited to announce the recent opportunity to be the sole distributor for German compressor manufacturer, Aqua Air, in the United States. Aqua Air water injected rotary screw compressors are innovative in both operation and design, providing 100% oil-free air from 5-15 hp. The design provides cool clean air, is a self-contained system and requires zero make-up water. The compressor will be offered as a package that includes a Sullivan-Palatek Refrigerated Dryer.

A necessary solution for dozens of industries, 100% oil-free production of compressed air is now safe and sustainable. The self-contained compressor generates the necessary coolant directly from ambient air, using the most natural and environmentally-friendly fluid available: pure water! Using only water from the atmosphere, Aqua Air produces no waste oil, and maintains outstanding performance throughout its entire lifecycle. This makes production economically feasible, since no costs are incurred for procuring, filtering and disposing of oil-based lubricants.

The Aqua Air water-injected rotary screw air compressor

Internally, Aqua Air uses a maintenance and wear-free floating bearing design created with the highest grade tolerances which are the foundation for a long life and reliable screw compressor air end. The rotor profiles are a unique composition of a self-healing proprietary polymer material enhancing efficiency and long-term performance. Durable and reliable, the separation and return of condensate into the circulation system takes place without any mechanical components. A performance-engineered inlet air control valve and a three-stage, heavy-duty inlet filter with remote inlet connection are standard supply. This design improves air control and system performance with minimal pressure drop. The integrated injection manifold and water filter manifold are directly bolted to each other. By using o-rings, the seal between the essential components is leak free. The water filter has separate filter elements for operation and bearing injection.

Headquartered in Michigan City, Indiana, Sullivan-Palatek leads the industry for design and manufacturing of air compressors. In business since, 1984, Sullivan-Palatek was awarded the prestigious Pillar of the Industry award from the Association of Equipment Manufacturers for achieving Gold status for supporting the I Make America Campaign in 2012, 2013, and 2014.

About Sullivan-Palatek

Sullivan-Palatek produces all portable and industrial compressors as well as air ends in Michigan City, Indiana. Sullivan-Palatek represents both electric and portable air compressors and offers a complete line of accessory items such as air dryers, filters, and remediation clean up systems. info@sullivan-palatek.com www.sullivan-palatek.com

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Sustainable Energy Savings 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 in 75 to 80 locations. We've done literally hundreds of compressed air modifications, changes, upgrades and audits."
– William Gerald, CEM, Chief Energy Engineer, CalPortland (feature article in August 2015 Issue)

"Compressed air is essential to any manufacturing process, particularly in the automotive industry, and it accounts for about 23 percent of total energy costs at our powertrain facility."
– Mike Clemmer, Director/Plant Manager-Paint & Plastics, Nissan North America (feature article in October 2015 Issue)

"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.

"Each of our 10 production plants has an Energy Coordinator who is part of the corporate energy team."
– Michael Jones, Corporate Energy Team Leader, Intertape Polymer Group (feature article in July 2014 Issue)

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Kaeser Launches Redesigned DSD200 and 250 Rotary Screw Compressors

Kaeser's redesigned DSD 200 and 250 direct drive rotary screw compressors deliver the "built-for-a-lifetime" reliability, simple maintenance, and sustainable energy savings you expect from the Kaeser name, with flows from 544 - 888 cfm for the DSD 200 and 678 – 1059 cfm for the DSD 250, and pressures up to 217 psig.

Kaeser's redesigned DSD 200 and 250 direct drive rotary screw compressors.

These new DSD models deliver lower life cycle costs with their simple maintenance and reduced energy costs. Units are up to 24% more efficient than the competition. Additional built-in heat recovery options multiply energy savings potential.

Series features include an enhanced cooling design, eco-friendly filter element, integral moisture separator with drain, and an Electronic Thermal Management system. Units also come standard with Sigma Control 2™. This intelligent controller offers unsurpassed compressor control and monitoring with enhanced communications capabilities for seamless integration into plant control/monitoring systems and the Industrial Internet of Things (IIoT).

To learn more about the new DSD 200 and 250, visit www.kaesernews.com/dsdx To be connected to your local representative for additional information, please call 877-586-2691.

About Kaeser

Kaeser 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 diesel screw compressors. Our national service network provides installation, rentals, maintenance, repair, and system audits. Kaeser is an ENERGY STAR® Partner.

DENT Instruments Announces Collaboration with Emerson to Launch An Industry-First Wireless Power Meter

DENT Instruments, a global leader in the design and manufacture of power and energy measurement instruments, along with Emerson, a recognized leader in bringing technology and engineering together, have announced a strategic collaboration, making wireless power measurement a reality.

In an ongoing effort to improve equipment reliability and customer ease of use, DENT Instruments has combined their revenue-grade PowerScout 3037 Power Meter with Emerson's Smart Wireless technology to provide a superior measurement solution that will greatly impact energy efficiency and sustainability for a vast array of customer markets.

“DENT’s versatile PowerScout Meters coupled with Emerson’s WirelessHART technology and global reach creates a much-needed energy information solution for our mutual commercial and

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TECHNOLOGY PICKS

industrial customers," remarked Christopher Dent, President of DENT Instruments. "The DENT - Emerson partnership is a perfect blend of complementary technologies that brings increasingly important energy information to the world."

This DENT-Emerson joint solution provides customers the following:

- "Easy to install" design and mounting features support plug-and-play deployment in new or existing WirelessHART® mesh networks
- Measurement of over twenty energy variables are available to meet users' needs
- Optimized connectivity for 99.999% data reliability via WirelessHART's self-organizing, self-healing mesh network technology
- Highly secure network communication via data encryption, critical key management, and end-to-end security features

The new Wireless Power Meter monitors voltage, current, power, energy, and other electrical parameters on single and three-phase electrical systems with revenue-grade accuracy. Continuously monitoring electricity consumption and power quality at submeter levels enables more granular energy management and effective monitoring.

"The introduction of the Power Meter to building maintenance, data centers, processing, industrial automation, cold chain, and more, will have a significant impact as it measures energy at the point of consumption," says Ken Russell, President of Therm-O-Disc. "We are enabling customers to better understand their power usage quality and therefore improve their energy efficiency. The list of markets and industries that would benefit from using the Power Meter is long, and the benefits are substantial."

Power Meter customer trial devices are available now through Emerson's Therm-O-Disc business unit. For more information, visit them online at www.tod.com.

About DENT Instruments

DENT Instruments designs and manufactures power meters and data loggers for today's energy professionals. DENT's products are often the first step in developing strong energy strategies, for maintaining peak operations, and for lowering operating costs. For over 25 years, DENT Instruments has built a reputation for providing instruments of the highest quality whose robust design, small size, and remote data acquisition make them the loggers of choice for companies large and small.

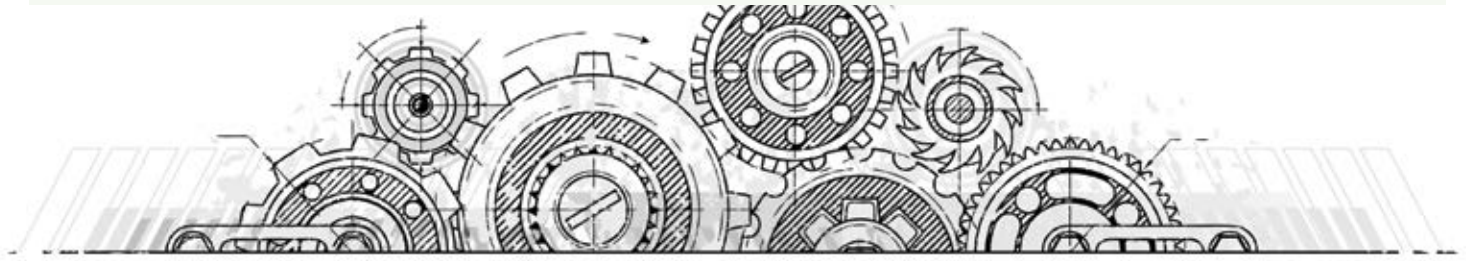
DENT Instruments is headquartered in Bend, Oregon and is a locally-owned and managed business, and is a key contributor to the economic health and well-being of Central Oregon. To learn more about DENT Instrument, visit www.dentinstruments.com.

About Emerson

Emerson, based in St. Louis, Missouri (USA), is a global leader in bringing technology and engineering together to provide innovative solutions for customers in industrial, commercial, and consumer markets around the world. The company is comprised of five business segments: Process Management, Industrial Automation, Network Power, Climate Technologies, and Commercial & Residential Solutions. Sales in fiscal 2015 were $22.3 billion. For more information, visit www.Emerson.com.

About Therm-O-Disc

Therm-O-Disc, part of Emerson Climate Technologies, is a leader in the design and manufacturer of sensors and controls for multiple industrial and consumer industries. The company's product line includes a broad range of specialized sensing capabilities, including bimetal and NTC temperature, differential pressure, relative humidity, thermal cutoffs, and wireless communications. Therm-O-Disc is headquartered in Mansfield, Ohio. For more Information, visit www.tod.com



TECHNOLOGY PICKS

Siemens Offers New Sinamics S120M Decentralized Servo Drive

Expanding on its popular Sinamics S120 multi-axis drive system, Siemens introduces the new Sinamics S120M, a compact, ready-to-connect motor with integrated drive that offers users the option of moving the motor inverter outside the control cabinet and directly onto the motor, thereby reducing both cabinet space and required cooling.

The addition of the Sinamics S120M distributed format into the S120 offering adds a high degree of flexibility for new and existing machines, as well as introducing innovative production line setups that can now be achieved.

Typical applications for the Sinamics S120M include packaging, printing, glass, textile and other processes, where machinery and production lines require multiple servo axes in a space-restricted environment.

The decentralized S120M axes are connected back to the central S120 components in the cabinet via a hybrid cable and the AM600 adapter module. The pre-assembled hybrid cable contains all

The new Sinamics S120M distributed servo drive system enables decentralized configuration of the drive and integration of the inverter power unit directly onto the driven axis of the motor. Less cabinet space, less cooling energy and shorter cable runs result for the machine builder or production line end-user.

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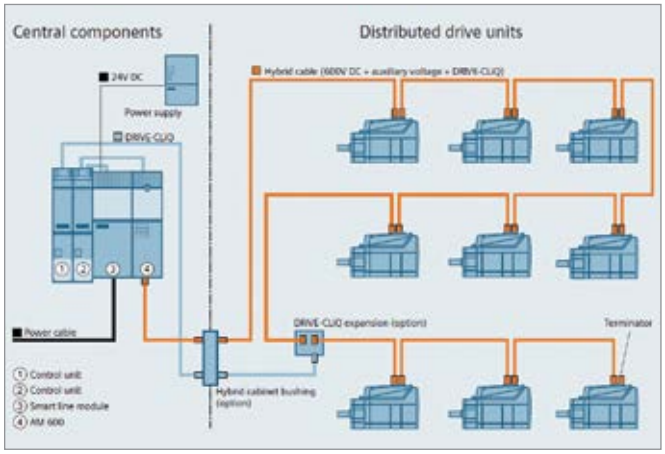
encoder and power cables and serves multiple S120M axes through a daisy chain connection. This single-cable solution drastically reduces the number and length of cables and is easily expanded for additional axes.

As a fully integrated format of the Sinamics S120 drive system, all existing Safety Integrated functions and communication options are available, and the benefits of power sharing between axes across the DC bus are completely realized. Additional design features of the S120M include a synchronous servomotor with multi-turn absolute encoder, optional holding brake and an integrated power unit (motor module) available in three shaft heights covering the power range of 0.25–1.5 kW.



This schematic shows a typical distributed drive application, where all inverter power modules are mounted directly onto the driven axis of the appropriate motor in the machine.

For more information about the new Sinamics S120M distributed servo drive system, please visit: www.usa.siemens.com/S120M-PR.

About Siemens USA

Siemens Corporation is a U.S. subsidiary of Siemens AG, a global powerhouse focusing on the areas of electrification, automation and digitalization. One of the world's largest producers of energy-efficient, resource-saving technologies, Siemens is a leading supplier of systems for power generation and transmission as well as medical diagnosis. With approximately 348,000 employees in more than 190 countries, Siemens reported worldwide revenue of $86.2 billion in fiscal 2015. Siemens in the USA reported revenue of $22.4 billion, including $5.5 billion in exports, and employs approximately 50,000 people throughout all 50 states and Puerto Rico.

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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.

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SOLUTION:

Kaeser ran a KESS (Kaeser Energy Saving Simulation) using supply side audit data and designed a complete system solution that would dramatically reduce the specific power from 62.0 kW/100 cfm to 17.5 kW/100 cfm. New energy efficient compressors, an air receiver, as well as a system master controller were installed. The new system has the same number of compressors and total horsepower as before, but it provides even more flow.

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The Sigma Air Manager (SAM) master controller monitors the four new compressors and selects the most efficient combination of units to meet the plant demand. With its built-in SAC *Plus* software, SAM continually tracks energy consumption so the plant benefits from having an ongoing compressed air energy audit. As a matter of fact, the specific power has been reduced more than anticipated—all the way down to 16.7 kW/100 cfm.

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