The Magazine for ENERGY EFFICIENCY in Blower and Vacuum Systems

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April 2018

INDUSTRIAL VACUUM & BLOWER SYSTEMS

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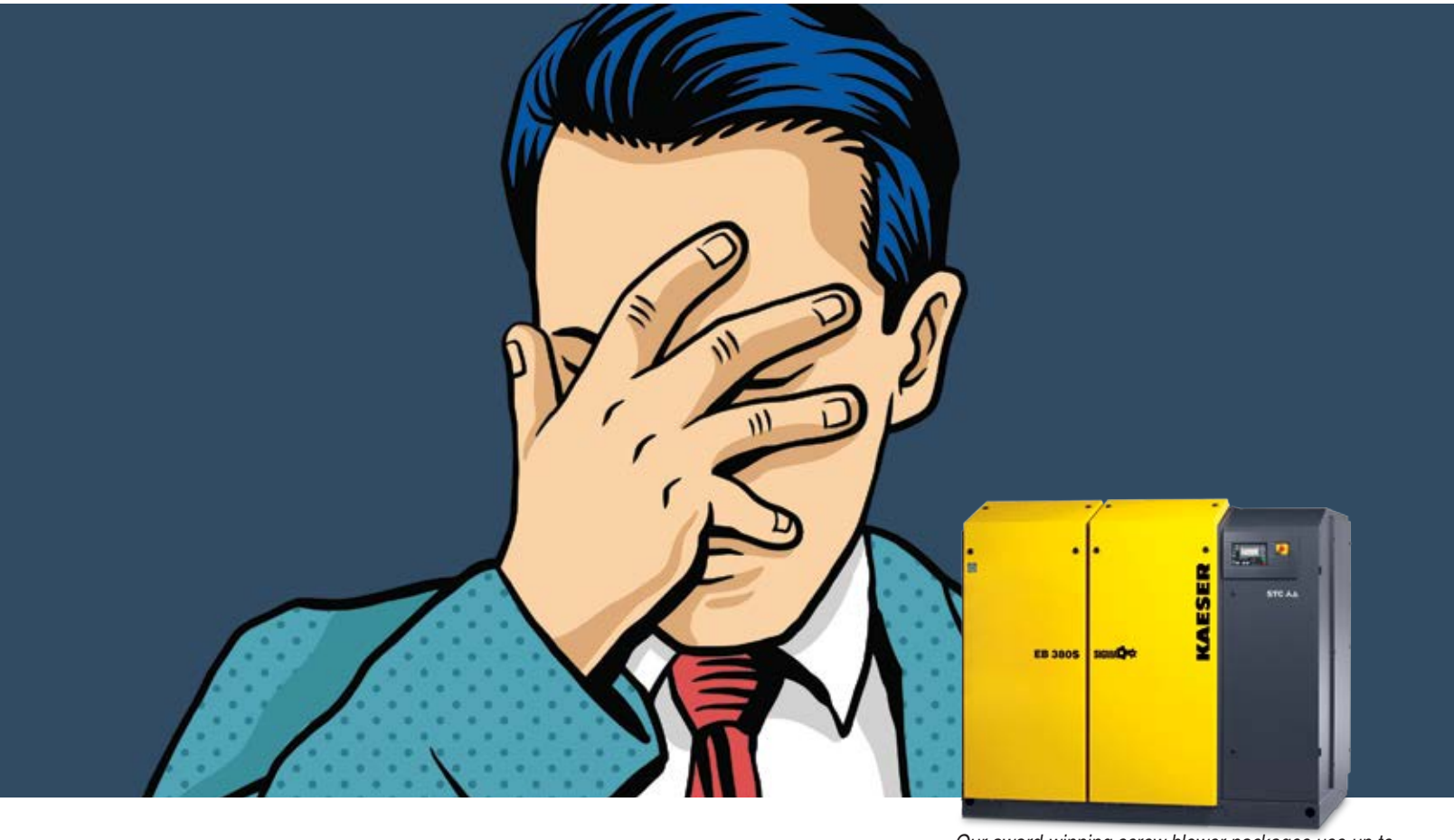

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COLUMNS

FROM THE EDITOR

I hope Spring has found you when you receive this issue! Our first article profiles Republic Manufacturing, a Texas-based company helping clients replace compressed air with their air knife systems. We hope you enjoy the article as it examines the important design variables of pressure, flow and velocity. Republic then shared an excellent case study of a bakery able to reduce spoilage and improve the product while saving energy with a new air knife system.

Suttero Bazenheid is one of the most advanced meat processing companies in Switzerland. The meat processing facility, which commenced operations in 2012, was built following the "Minergie" standard, meaning that it complies with strict regulations for sustainable construction. When creating vacuum for packaging, Suttero Bazenheid relies on a centralized vacuum system from Busch. This is significantly more energy-efficient in operation than a decentralized vacuum system.

Darigold is a dairy marketing and processing cooperative producing over 8.4 billion pounds of milk a year. The cooperative also processes and distributes butter, cheese, fluid milk, cottage cheese and other cultured dairy products. Currently, Darigold, Inc. has 11 processing facilities located in Washington, Oregon and Idaho. We hope you enjoy our article reviewing their use of vacuum systems in their plants.

A metal producer, in the Midwest, spends an estimated $2.4 million annually on electricity to operate their compressed air system. Don Van Ormer, from Air Power USA, provides us with an audit article highlighting a few of the demand-side projects and focuses on "blow-off" air projects where 2,339 cfm of compressed air was replaced by three 25 horsepower single-stage rotary lobe blowers, a 72" air knife and thirty-six (36) ¼" nozzles.

This is a special year for us as we launch the inaugural 2018 Best Practices Expo & Conference, September 17-19, at the Chicago O'Hare Crowne Plaza. Please consider visiting us and registering for the event at www.cabpexpo.com!

Thank you for investing your time and efforts into **Blower & Vacuum Best Practices.**

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

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TECHNOLOGY PICKS

Pro-Closure Sound Enclosures from Hardy Pro-Air

Hardy Pro-Air Systems & Service presents the Pro-Closure, a sound attenuating enclosure designed to meet the most demanding needs of industry, taking into account environment, economics and process. The Pro-Closure can provide up to 18 dBa free field noise attenuation and a secure environment for equipment.

The Pro-Closure can provide up to 18 dBa free field noise attenuation.

The Pro-Closure is available as an engineered solution, or for retro-fit. Standard design features include acoustically insulated steel sound panels, vented pressure relief valve, power ventilation of the enclosure and more. The Pro-Closure also features an integral gauge panel, providing readings on the system pressure/vacuum, the inlet filter restriction and the blower discharge temperature. With easy access for maintenance, timely service can be performed in order to change oil, air filters and maintain V-belt drives.

The Pro-Closure can be custom engineered to specification. With specialty materials available, Hardy Pro-Air can customize the Pro-Closure with temperature control based on heat calculations, as well as engineering plans for project management.

About Hardy Pro-Air

Hardy Pro-Air is the Dynamic Result of the merger and integration of independently successful systems design and sales of Hardy Systems with the service & manufacturing expertise of Pro-air Service. Organized as a division of Meyer Machine & Equipment, we are focused on Sales and Service of air and material handling equipment for companies and municipalities nation-wide. Our Systems group brings to the table the ability to take projects from concept all the way to start-up. With our veteran staff we can consult on possible solutions to meet the most demanding applications. We have a wide range of products to meet the needs of any situation. We take pride in offering the service to support your organization for the equipment that we sell in addition to other manufacturers. For more information, please visit www.hardyproair.com.

New PHOENIX 4 Helium Leak Detector from Leybold

After 15 years, Leybold is launching the PHOENIX 4, a new family of helium leak detectors to meet increasing quality requirements. This innovative product is equally suited to the demands of research and development, as for those of industrial applications - from securing the ultra-high vacuum demands in CERN's particle accelerator, to industrial applications, such as leak detection in the Hyperloop vacuum transport system or for semiconductor production.

With its ergonomic design and improved measuring characteristics, the fourth generation PHOENIX sets new standards, especially in terms of operating comfort, response times, helium sensitivity and reliability. Moreover, the stationary and mobile models are easier to handle and

TECHNOLOGY PICKS

maintain than their predecessors. For example, it is now possible to change the filter without removing the housing. This compact, versatile helium leak detector is available in three classes, the PHOENIX Vario, PHOENIX Quadro and PHOENIX Magno. Each are designed for various customer applications with their different pumping speed configurations.

The thorough facelift focused on improving the monitoring and control functionality, as well as the need to meet the increased demands on leak detection performance. Accordingly, the PHOENIX 4 can be operated comfortably via a color touch display, or wirelessly with any Internet-capable mobile device, due to the integrated web server. The optimized design of the display allows users to intuitively navigate through the menu and the sensitive touch displays. Additionally, push-buttons can be easily activated.

"In the PHOENIX 4, we have added useful features to the proven equipment features of the predecessor L300i," explains Dr. Sina Forster, the responsible Leybold product manager. For example, the number of interfaces for data acquisition, communication and system integration has been increased. Additional communication and bus interfaces are now integrated directly at the leak detector, alongside new optional interface modules. These enhanced communication interfaces facilitate easy data export and the creation of test reports.

In addition to the new design and the intelligent connections, the PHOENIX is also defined by its "inner values." The entire PHOENIX-4 series is based on a uniform technology platform and contains the identical measuring system, not least for economic reasons. The models

The fourth generation of the PHOENIX, one of the fastest and most reliable leak detectors on the market, is now available to enhance user experience worldwide.

RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

and versions are differentiated by the backing pumps and pumping speed configurations.

As the smallest in its class, the PHOENIX 4 Vario is a suitable space-saving system in special research applications. The designers went without an integrated backing pump leaving more flexibility, not least due to its low weight of 30 kilograms. The next variant in line, the PHOENIX 4 Quadro, has an oil-sealed TRIVAC rotary vane vacuum pump as backing pump. In the dry version of the Quadro, a diaphragm pump is used. This variant is perfect for use in analytical technology, the food and packaging industry, as well as in automotive production. The model range is rounded off with the most powerful leak detector, the PHOENIX 4 Magno for large test volumes. In the oil sealed version, the SOGEVAC rotary vane vacuum pump is installed, whereas in the dry version, the oil-free scroll vacuum pump SCROLLVAC is utilized.

In addition to the sensitivity and reproducibility of reliable leak rate measurements, users of the PHOENIX-4 family benefit from the fast-operational readiness and adaptability of the helium leak detector models throughout the range. “These performance characteristics are just as important in high-energy physics, e.g. at the Centre for German Electron Synchrotron DESY for basic scientific research in Hamburg, as they are in semiconductor production," says Leybold’s product manager Dr. Sina Forster. Forster concludes, "The two of the most important features of a helium leak detector in all modern applications are its accuracy over a wide measuring range and its time of response.”

About Leybold

Leybold is a part of the Atlas Copco’s Compressor Technique business area and offers a broad range of advanced vacuum solutions for use in manufacturing and analytical processes, as well as for research purposes. The core capabilities center on the development of application- and customer-specific systems for the creation of vacuums and extraction of processing gases. Fields of application are secondary metallurgy, heat treatment, automotive industry, coating technologies, solar and thin films such as displays, research & development, analytical instruments, as well as classic industrial processes. For more information, visit www.leybold.com.

About Atlas Copco

Atlas Copco is a world-leading provider of sustainable productivity solutions. The Group serves customers with innovative compressors, vacuum technique and air treatment systems, construction and mining equipment, power tools and assembly systems. Atlas Copco develops products and services focused on productivity, energy efficiency, safety and ergonomics. The company was founded in 1873, is based in Stockholm, Sweden, and has a global reach spanning more than 180 countries. In 2016, Atlas Copco had revenues of 11 Bilion Euros and more than 45,000 employees.

Since 1952, Atlas Copco is present in Germany. Under the roof of two holdings located in Essen, more than 20 production and sales companies are gathered (February 2017). By end of 2016, the group employed about 3800 people, including about 100 trainees. www.atlascopco.com.

New Anti-Static Super Air Knife from EXAIR

EXAIR’s new Gen4 Super Ion Air Knife eliminates static electricity 34% better at low inlet pressures, saving compressed air and money. Production speeds, product quality and surface cleanliness can improve dramatically. It eliminates static on plastics, webs, sheet stock and other product surfaces where tearing, jamming or hazardous shocks are a problem. Gen4 products have undergone independent laboratory tests to certify they meet the rigorous safety, health and environmental standards of the U.S.A., European Union and Canada required to attain the CE and UL marks. They are also RoHS compliant. New design features include a metal armored high voltage cable to protect against abrasion and cuts, integrated ground connection and electromagnetic shielding.

The Gen4 Super Ion Air Knife incorporates EXAIR’s Super Air Knife minimizing compressed air use by inducing surrounding airflow at a

The Gen4 Super Ion Air Knife is available in 3" to 108" long.

TECHNOLOGY PICKS

ratio of 40:1. The unique amplified airflow carries the ions to the target, making it possible to eliminate static charges in less than a half second. Air volume and velocity are infinitely controllable from a "breeze" to a "blast" to gently wipe or forcefully blow away debris.

EXAIR's Gen4 Super Ion Air Knife product line is available from stock in 3" to 108" long. The electrical ion source is shockless and there is no radioactive element. A new selectable voltage power supply has been designed to operate Gen4 products. Visit EXAIR.com to see the entire Gen4 static elimination product line. Applications include surface cleaning, neutralizing plastics, bag opening, printing machinery, packaging operations and elimination of painful static electricity shocks. Price starts at $399.

For more information, visit www.exair.com.

USA-Manufactured ZRD Rotary Valve from Coperion

The Coperion ZRD rotary valve is specially designed for food, mineral, plastics and chemical applications. The valve is engineered for heavy-duty industrial service with pressure differentials up to 21 psi(g) [1.5 bar(g)] and temperatures up to 212 °F [100 °C]; higher temperature options are available. The ZRD is often used as a discharging and metering valve for conveying products in powder and granular form.

The Coperion rotary valves are highly regarded as top-quality products in the plastics, chemical, food, pharmaceutical and minerals industries around the world.

RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

An extensive range of sizes is available, with large throughputs ranging from 500 to 400,000 + lb per hour (subject to bulk density and application). The valves have a pressure surge-proof (pressure shock) rating of 145 psi(g) [10 bar(g)], and are suitable for isolation according to NFPA standards (for select sizes up to 12 inch). The ZRD comes standard with air purged seals completely mounted with plastic or stainless-steel tubing, solenoid and filter regulator with gauge. Standard seal option includes the popular T3 PTFE and quad ring assemblies, eliminating the need for air purge in most applications. In addition, the ZRD comes with a sealed-for-life outboard bearing arrangement, separated from product, with and without purge gas by way of a dedicated relief opening.

Coperion and Coperion K-Tron will debut the US-manufactured ZRD rotary valve at this year's International Powder and Bulk Solids Conference and Exhibition (April 24-26, 2018, Donald E. Stephens Convention Center, Rosemont, IL / USA) in Booth 1413 and at NPE 2018 (May 7-11, 2018, Orange County Convention Center, Orlando, Florida / USA) Hall West, Hall Level 2, Booth W729.

For additional information on Coperion & Coperion K-Tron Rotary Valves visit: www.coperion.com/components.

About Coperion

Coperion is the international market and technology leader in compounding systems, feeding technology, bulk materials handling systems and services. Coperion designs, develops, manufactures and maintains systems, machines and components for the plastics, chemicals, pharmaceutical, food and minerals industries. Within its four divisions – Compounding & Extrusion, Equipment & Systems, Materials Handling and Service – Coperion has 2,500 employees and nearly 30 sales and service companies worldwide. Coperion K-Tron is a brand of Coperion.

TECHNOLOGY PICKS

Maxum Announces Nozzle Bar

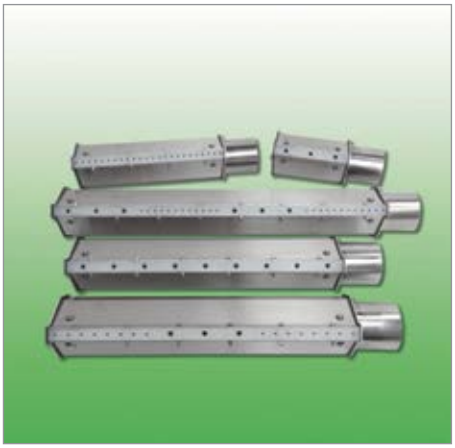
Maxum has announced the Nozzle Bar®, a patented air blow-off device looking and installing like an air knife, but offering the full blow-off power of individual air nozzles. The Nozzle Bar uses less energy and reaches further distances. Its internal nozzle system is fully customizable for optimum blow-off of any part, providing powerful force to reach deep cavities and varying part shapes and distances.

It's well known air nozzles provide better blow-off force than slotted air knives. The problem has been individual nozzles mounted to a manifold take up room, have fixed positions and flow rates, and can be very expensive. Maxum's new Nozzle Bar solves those problems with its internal nozzle system customizable with a variety of flow rates and patterns, and its converging and laminar flow design to maximize velocity and blow-off distance. With Maxum's converging and laminar flow technology, air reaches the part in a stronger, faster, more concentrated form than slot-style air knives, improving efficiency while slashing energy usage.

By matching pattern convergence from the superior penetration of nozzles, the Nozzle Bar can be customized to provide powerful blow-off force to reach deep cavities and varying part shapes and distances. It can dry complicated shapes using more air where it is needed, and less air where it is not, all from a single nozzle bar. For complex parts inside washers, racked parts, unusual shaped containers, and many other applications this provides powerful blow-off unmatched by any air knife design. A wide choice of stock patterns and flow rates are available.

Maxum's innovative air blow-off and drying equipment remove water, liquids, and debris, successfully preparing products for assembly, packaging, labelling, inkjet printing, inspection, powder coating, and more using energy efficient blow-off equipment. Whether it is fruit, vegetables, bottles, cans, metal parts, circuit boards, extrusions, or any other air blow-off application, the Maxum mix of creativity and science ensures the success of your application.

For more information, consult Maxum's newly designed web site, www.maxumair.com.



The patented Nozzle Bar® air device from Maxum.

Republic Manufacturing Delivers Food Grade BLOWER & AIR KNIFE SYSTEMS

By Wes Lucko, Blower & Vacuum Best Practices Magazine

The Republic Regenerative Blower Kit is installed along with the VFD and HEPA filter.

➤ Blower & Vacuum Best Practices interviewed Republic Manufacturing VP of Sales & Marketing, Rich Leong

BVBP: Good morning. Thank you for taking the time. To start things off, tell me a little about Republic Manufacturing.

Good morning. Republic Manufacturing has been in business since 1962. We draw on our experience and expertise to provide value, from the initial consultation to post-implementation support. Most of our products and systems are designed, manufactured, and tested at our headquarters in Dallas, Texas.

The company was originally a sheet metal fabricator, and quickly grew to become one of the largest in North Texas by intentionally adapting to the changing market conditions – offering products and services attractive to large corporations. The company became the in-plant contractor for these large corporations.

In 1991, Republic took on the distribution of air moving equipment and the building of package systems. After a number of years as a distributor and repair center of all types of air moving equipment, Republic designed and manufactured its own centrifugal blowers and air knife drying systems, offering distinct advantages over existing systems within the industry.

Currently, our product range includes blowers, vacuum pumps, compressors, air knives, motors and systems. While many products are available for immediate shipment, Republic's in-house staff of engineers can design custom options to meet the specifications necessary, utilizing state-of-the-art software and machinery.

BVBP: I know there is a lot of interest in your regenerative blowers. Could you walk me through some of the main points for these products?

Absolutely! First, our line of regenerative blowers, also known as side channel blowers, are for vacuum or compressed air applications in both horizontal and vertical mounted positions. Airflow capabilities range from 50 to 776 CFM, vacuum capabilities from 47" to 236" of water (1.7 psi to 8.53 psi) and pressure capabilities up from 47" to 307" of water (1.7 psi to 11.09). TEFC electric motors are cUL and CE certified and come in single and three-phase, dual frequency and multi-voltage versions for worldwide applications. Horsepower ranges from 1/2 to 40 HP (from 0.4 to 30 kW).

Regenerative blowers have the impeller directly connected to the motor shaft, and the blowers come as a single-stage (one impeller), double-stage (two impellers) or triple-stage (three impellers). The bearings are outside the compression chamber, ensuring maximum operational reliability under high differential pressure.

BVBP: What is the biggest takeaway when comparing compressed air systems to your centrifugal blowers?

Our line of centrifugal blowers can provide a steady volume of air to supply energy-efficient pressure or vacuum. Air enters at the center of a spinning impeller, and is divided between the impeller's vanes. As the impeller turns, it accelerates the air outwards using centrifugal force. This high-velocity air is then diffused and slowed down in the surrounding blower housing to create pressure. The pressure, or vacuum, offers a wide range of volumetric flows possible due to the geometry of the open impeller.

Centrifugal air is energy-efficient and inexpensive, especially when compared to compressed air as an alternative. Centrifugal blowers use much less horsepower to create flow, thus using less energy than compressed air. When replacing compressed air, centrifugal blowers can offer a payback of months or even weeks.

REPUBLIC MANUFACTURING DELIVERS FOOD GRADE BLOWER & AIR KNIFE SYSTEMS

We currently have 6 centrifugal blowers ranging in size, in order to best fit our customer's performance requirements. Horsepower options available range from 3 hp to 75 hp. A max flow of 500 cfm and a pressure rating of 103 inches of water (3.72 psi) can be achieved, or 4,000 cfm and a pressure rating of 165 inches of water (5.96 psi) depending on the model size.

BVBP: In regards to drying applications, what makes air knives so different from something such as compressed air nozzles? What is the advantage to the air knife?

An air knife is a pressurized air plenum with a uniform continuous gap allowing pressurized air to exit in a laminar flow pattern. The exiting air velocity creates an impact air velocity directly onto the surface of the product to shear away moisture or particulates without mechanical contact. This impact air velocity can range from a gentle breeze, to greater than 40,000 feet per minute.

We incorporate a teardrop design to minimize the internal turbulence of air entering the knife, while projecting it in a highly controlled manner through the discharge. As air enters the knife, the lack of sharp edges within the knife minimizes pressure loss and turbulence, while the air moves along the walls and is concentrated at the discharge.

Compressed air is highly inefficient and very expensive for drying applications. The horsepower required to create the flow necessary to achieve some success in such applications consumes an exorbitant amount of energy. For example, consider a compressor air system used to dry product on a 36" length span of conveyor. Running 24/7, this system will cost over $1,434 per week to operate. However, utilizing a Republic Air Knife System costs only a little over $104 per week to operate. Not only is the Air Knife System more efficient to operate than the compressed air system, but the results will also be much more effective with a drier and cleaner product.

The air knife is installed and piped to the blower with a food grade hose, immediately following the application of the icing.

BVBP: Why would less air equate to a higher quality finished product? More is better, right?

No, more is not always better. This is easiest to understand when we look at the relationship between pressure, flow and velocity.

Pressure is the measure of force applied on an area. Common units for pressure are inches of water (inH_2O), or pounds per square inch (PSI). If an application is expected to have a high backpressure, the blower must be rated to operate at that pressure. This will determine the type of blower you should use in your application.

Flow is a measure of air output in terms of volume per a unit of time, measured as cubic feet per minute (CFM). Flow is critical when the air needs to fill a space. In all of these cases you need to supply a given volumetric flow rate continuously filling and replenishing the application space.

Velocity refers to how fast the air is moving in distance per unit of time, measured as feet per second. One example to better illustrate this, is a water blow-off system using air knives. In a blow-off system, the air is required to make physical contact with the surface water with enough force to knock the water free. The force comes from the air impacting at high velocity. Forcing a volume of air through a constricted outlet increases the velocity. While the air is moving very quickly, it is not necessarily at a high volumetric flow rate.

Compressed air commonly found in shops utilizes electricity to store energy as static pressure up to 200 PSI. When it comes to applications requiring any amount of laminar airflow, dynamic pressure is critical, both for functionality and cost efficiency. Although shop air is ideal for blow off or situations requiring short, powerful bursts of air, smooth flow at moderate pressures is preferable for an even distribution of air. Centrifugal blowers have high efficiencies and produce high velocity streams at moderate pressures, ensuring the right balance of flow and pressure is consistently applied to the end product.

BVBP: Can you think of a recent example to further demonstrate the advantages of blower technology, where one might be overlooking its benefits and using compressed air instead?

Air knives are no stranger to the food industry. Canners, bottlers and food packagers in general have been using air knife systems to dry their products prior to secondary operations or shipment for years. However, we were recently approached to use air knives for a less traditional operation.

A national food company worked with Republic to provide a solution to a problem they were experiencing in their bakery. The bakery makes honey buns, cinnamon rolls and apple fritters. The baked goods travel along on a conveyor moving at a speed of

REPUBLIC MANUFACTURING DELIVERS FOOD GRADE BLOWER & AIR KNIFE SYSTEMS

The icing glaze drips like a waterfall along the conveyor.

approximately 45 feet per minute. The delicious treats are glazed by icing, dripping like a waterfall as they move along the conveyor.

Initially, the bakery tied into their compressed air system utilizing modular 2 1/2" compressed air knives rated at 12 CFM at 100 PSI each. The width of the production line was 24" requiring 12 of these air knives. The initial trial system had a manual flow control on it to limit the amount of compressed air contacting the product. It was immediately apparent this approach was not going to work effectively, was hard to dial in and would draw too much air off of their compressor.

The problem was two-fold: the icing was uneven and too thick. The bakery wanted Republic to create a solution to level the icing and smooth it over the entire baked good evenly. The bakery had nine production lines throughout the nation, requiring attention.

Our solution was to design an air knife system to level the icing consistently across the baked good. Republic prefers to couple air knives with centrifugal or regenerative blowers. These blowers are energy-efficient and inexpensive, especially when compared to compressed air as an alternative. They require much less horsepower to create flow, thus using less energy than compressed air.

"Republic prefers to couple air knives with centrifugal or regenerative blowers. These blowers are energy-efficient and inexpensive, especially when compared to compressed air as an alternative."

— Rich Leong, VP Sales & Marketing, Republic Manufacturing

BVBP: Given the application, do these air knives comply with USDA, NSF and 3-A standards?

In this particular application, the low-pressure air coming from the air knives was in direct contact with the food. As such, the air knives needed to be sanitary, with no chance of harboring bacteria that could be transferred onto the food. We suggested using the Republic Food Grade Air Knives for this application. These air knives are specifically designed to comply with all USDA, 3-A, and ANSI/NSF/3-A Standards for use in meat, poultry, dairy and general food processing. The air knives were connected to food grade hoses using all stainless steel fittings.

The KPHRC500 regenerative blower pressure kit was used. This blower at maximum performance provides 2.74 psi and 221 cfm, requiring 3.4 horsepower, 6.0 Amp. In this case, the blower utilizes a variable frequency drive to turn adjust the flow to reach the sweet spot needed to level the icing. The actual flow needed varies, so the VFD provides more control of the airflow to the line operator. A HEPA filter helped ensure contaminants did not get into the airstream.

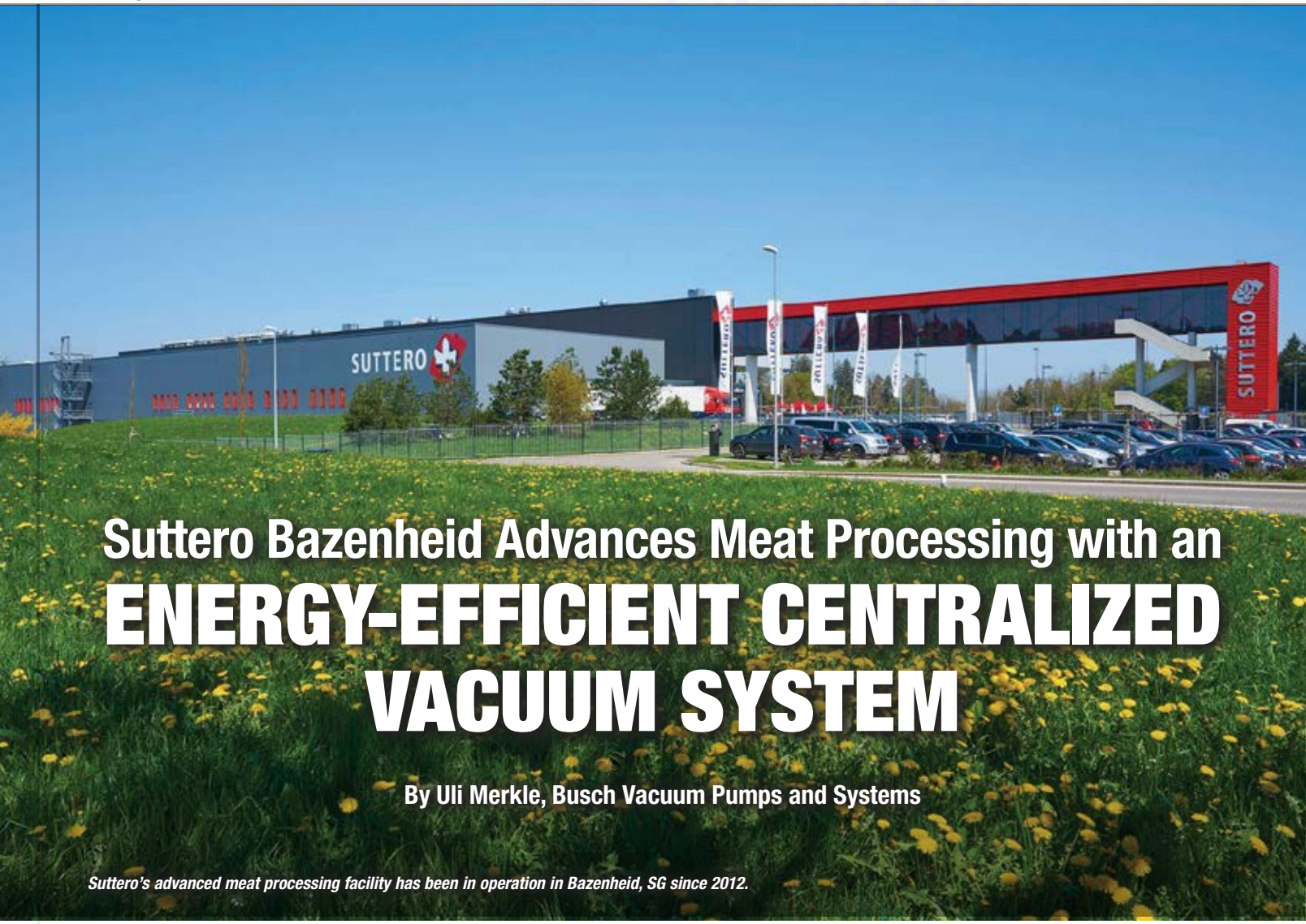
The Republic Food Grade Air Knives allow the customer to easily clean them as needed, and allow the necessary food plant inspections to be straightforward. All components, including the adjustable air knife brackets, must be USDA, 3-A, and ANSI/NSF/3-A compliant. This means they need to be easily cleanable, have no edges or pits where food could become trapped, and must be made all of food grade stainless steel.

The bakery's new food grade air knife system was installed and was an immediate success. The product quality increased as icing was spread more evenly and to the desired level; thus, reducing waste of the finished product. However, a couple of unintentional benefits came with the new system. The excess icing removed from the product could be recaptured and reused; consequently reducing waste. In addition, the conveyor was cleaner, reducing the time needed for the staff to clean at the end of each shift.

BVBP: Thank you very much for your time. BP

For more information on Republic Manufacturing please visit www.republic-mfg.com

To read similar articles on ***Air Knife and Nozzle Technology*** visit www.blowervacuumbestpractices.com/technology/air-knives-nozzles



Suttero Bazenheid Advances Meat Processing with an ENERGY-EFFICIENT CENTRALIZED VACUUM SYSTEM

By Uli Merkle, Busch Vacuum Pumps and Systems

Suttero's advanced meat processing facility has been in operation in Bazenheid, SG since 2012.

Suttero Bazenheid is one of the most advanced meat processing companies in Switzerland. The business premise belongs to Ernst Sutter AG. Meat from cows, calves and pigs is jointed here for further processing in other processing companies. The meat may also be processed to form fresh meat products for wholesale and retail.

The meat processing facility, which commenced operations in 2012, was built following the "Minergie" standard, meaning that it complies with strict regulations for sustainable construction. A photovoltaic system is installed on the roof to enable environmentally friendly energy generation,

> "Right from the planning phase, it was clear to Stefano Martinetti, Head of Area and Technology, that the vacuum required for packaging should be generated by a centralized vacuum system, as this represents the most energy-efficient type of vacuum generation."
>
> — Uli Merkle, Busch Vacuum Pumps and Systems

with the solar power being fed into the local public network. Energy for the entire Ernst Sutter AG company – and consequently the Suttero Bazenheid premises as well – is generated via hydropower. In addition, around 75% of the energy from refrigeration is also used to generate hot water. When creating vacuum for packaging, Suttero Bazenheid relies on a centralized vacuum system from Busch. This is significantly more energy-efficient in operation than decentralized vacuum supplies on individual packaging machines. As a result, Ernst Sutter AG has created a production plant that corresponds to the latest standards, both from a technical and ecological perspective.

Ernst Sutter AG, with six production plants and two regional logistics platforms, is one of the most important Swiss companies in the meat processing and meat product production sector. It delivers to specialized butcher shops as well as retail and wholesale companies throughout Switzerland. In addition, various specialties such as "Bündnerfleisch" (an air-dried meat produced in the Grisons canton of Switzerland), "Bündner Rohschinken" (a raw ham product from the same area), and "Appenzeller Mostbröckli" (a cured, smoked and dried meat product from Appenzell), are exported to the EU and Far East.

Plant Operating Procedures

It has a long tradition in this respect, dating back to the year 1909. Today, more than 1,000 employees work for Ernst Sutter AG. In setting up the Suttero Bazenheid meat processing facility, most fresh meat processing performed

Packaging under clean room conditions: one of the packaging lines that is connected to the centralized vacuum supply.

SUTTERO BAZENHEID ADVANCES MEAT PROCESSING WITH AN ENERGY-EFFICIENT CENTRALIZED VACUUM SYSTEM

A skin-packaged end product: pig kidney pieces from Suttero.

within the Ernst Sutter AG group of companies was concentrated at this location. The raw ingredients, mostly comprising sides of pork and beef, are predominantly procured from the nearby Bazenheid abattoir or Gossau. The pork and beef sides that are delivered are placed into cold rooms, separated by animal type. Using fully automatic process control, the individual sides in the cold rooms are collected, and automatically supplied to the respective jointing lines. Each workplace on the jointing lines is equipped with an advanced computer, which shows the responsible employee, which work steps need to be performed. These work steps are recorded electronically and allocated to the individual parts. This enables each portioned piece of meat to be allocated to a side of pork or beef; therefore ensuring the origin of the slaughtered animal and other information is traceable and/or accessible.

Fresh meat products are packaged on a total of eight packaging lines, which are equipped with thermoforming or tray sealer packaging machines. Approximately two thirds of products are skin packaged while others, such as mincemeat, are packaged under a controlled atmosphere. The products are distributed under different names, some of which belong to the company itself, and some of which are external brands. Of the 300 employees at Bazenheid, around 180 work in the production department, in single-shift operation. Special shifts are only performed when necessary, during the summer fresh meat season.

Centralizing the Vacuum System

Right from the planning phase, it was clear to Stefano Martinetti, Head of Area and Technology, that the vacuum required for packaging should be generated by a centralized vacuum system, as this represents the most energy-efficient type of vacuum generation. Fewer vacuum pumps are needed for a centralized vacuum supply than would be necessary for decentralized vacuum generation. In addition, two-stage evacuation made it possible to install rotary vane vacuum pumps with smaller pumping speeds, and therefore a smaller motor rating.

The Busch centralized vacuum system supplies the tray sealer packaging machines with three independent ring lines. A rough vacuum of 50 millibar is constantly kept available in one of these. A vacuum accumulator guarantees that the required vacuum level is permanently and quickly available. In a second ring line, there is a medium vacuum of four millibar. If packages are evacuated, this initially only takes place up to the rough vacuum level. Once this is complete, a valve switches to “medium vacuum”, and final evacuation to four millibar of ultimate pressure is performed. This control means that the packaging chamber, and the packages, can be evacuated quickly and reliably before being closed, enabling very short cycles. A third independent ring line goes to the packaging lines with thermoforming packaging machines. It provides the forming stations in the packaging lines with what is referred to as

a forming vacuum of 100 millibar, and that is used to pull the heated plastic film into shape.

The centralized vacuum system is controlled on a demand-driven basis in such a way that the required pressures are automatically kept available in all three-ring lines. The only vacuum pumps in operation are the ones that are needed. As the maximum cycle time and greatest possible packaging volumes are not always used on all packaging machines, generally only some of the vacuum pumps will be in operation at any given time.

The centralized vacuum system achieves further energy savings through the omission of vacuum pumps in the packaging groups: the heat dissipation caused by the operation of the vacuum pumps, and the heated exhaust air, are not emitted directly into the packaging rooms. As a result, less power is needed for air-conditioning in these rooms – which also has a positive effect on energy consumption. As the centralized vacuum system is installed on an intermediate floor directly above the production and packaging rooms, its exhaust air is used to heat the intermediate floor during the winter months.

Reliability Through Redundancy

In addition to energy efficiency, the reliability of the vacuum supply is of course also a top priority. As Stefano Martinetti puts it: "Only a centralized vacuum system can guarantee a redundantly arranged and reliable vacuum supply for all eight packaging lines." Busch AG is a partner and vacuum specialist, which planned and implemented the centralized vacuum system in such a way that it was custom-tailored to the technical conditions at Suttero Bazenheid. The system fundamentally consists of several vacuum modules for rough, medium and forming vacuums, and there is also a reserve unit. The reserve unit enables maintenance work to be performed during ongoing operation. Individual vacuum modules are released for maintenance in this process. To enable this to happen, the reserve module is automatically switched on. This also has the advantage that no

SUTTERO BAZENHEID ADVANCES MEAT PROCESSING WITH AN ENERGY-EFFICIENT CENTRALIZED VACUUM SYSTEM

Busch centralized vacuum system for supplying vacuum to the packaging lines.

service personnel need to enter the hygiene-sensitive packaging and processing area for maintenance work.

The key components of this centralized vacuum system are the R 5 rotary vane vacuum pumps and Panda vacuum boosters. This combination means that the pumping speed and ultimate pressure of the system are significantly increased, meaning that lower energy consumption is required than when using larger vacuum pumps with comparable performance.

Extended Service Intervals

The demand-driven control is programmed in such a way that all vacuum pumps reach the same number of operating hours, even though generally not all vacuum pumps are operated at the same time. In contrast to the decentralized installation of vacuum pumps directly in the packaging machines, where they usually run through, this has the advantage that fewer operating hours are incurred overall for each vacuum pump. The result of this is that service intervals can be extended. Service intervals are organized in such a way that a visual check of oil levels is performed once a month, while an oil change and filter replacement are performed during an annual maintenance process. BP

For more information, visit www.buschusa.com or call 1-800-USA-PUMP, email: info@buschusa.com.

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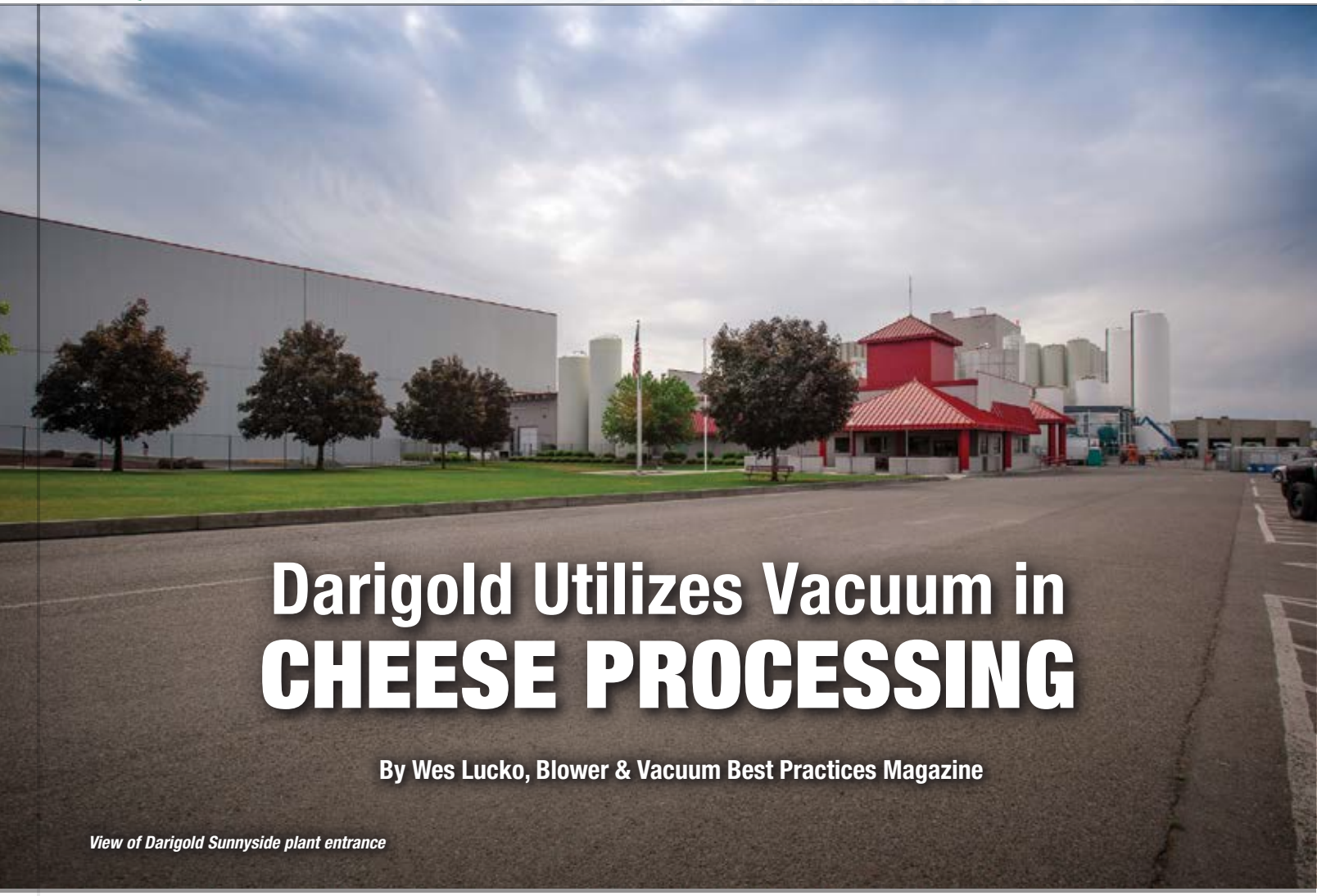

Darigold Utilizes Vacuum in CHEESE PROCESSING

By Wes Lucko, Blower & Vacuum Best Practices Magazine

View of Darigold Sunnyside plant entrance

➤ Blower & Vacuum Best Practices Magazine interviewed Darigold Sunnyside Technical Manager, Tom Rouleau

BVBP: Good morning. Thank you for taking the time. To start things off, tell us a little about Darigold and your role there.

Darigold is a dairy marketing and processing cooperative producing over 8.4 billion pounds of milk a year. The cooperative also processes and distributes butter, cheese, fluid milk, cottage cheese and other cultured dairy products, as well as ingredients products for food manufacturers. These products are sold under the Darigold® brand name.

Currently, Darigold, Inc. has 11 processing facilities. It is a subsidiary of Northwest Dairy Association, which is owned by about 476 farm families. The members are farmers from Washington, Idaho, Oregon and Montana, where its manufacturing facilities are also located. Some plant locations include Seattle, Spokane, and Sunnyside in Washington, Portland in Oregon and Boise, Jerome, and Caldwell in Idaho.

Today, we manage one of the largest dairy co-ops in the United States. Our dairy farms and plants are truly awe-inspiring and efficient facilities. Our butter is made by one of America's only European-style vacuum churns, which makes butter with fewer air bubbles. Having the latest technology also helps Darigold produce less waste, fuel consumption and lower environmental impact.

I serve as the technical manager and my technical specialty is in cheese manufacturing. However, I get involved in all aspects of the plant operations, including sitting in with the energy team and helping drive that along, kind of like a facilitator role. That's what I would say I do more than anything else, facilitation. I've been here at this plant for about 21 years.

We've made progress over the years, and it keeps getting better and better. Right on track with our energy goals and moving ahead.

BVBP: What are the main applications of vacuum systems when it comes to your plant?

There are 16 Travainni vacuum pumps (one for each tower), handling the movement of cheese. In addition, there are 8 vacuum pumps

being used for automated packaging of blocks as they exit the cheese towers. Finally, there are 3 large vacuum pumps, used for providing vacuum to the cheese blocks at sealing. All of this takes place in the tower area. The pumps for moving the cheese are water-sealed pumps; heat is dissipated through a re-circulating water system through a plate heat exchanger; heat is then exchanged through a closed loop to a cooling tower. Many of our vacuum pumps are Travainni in order to consolidate and keep parts consistent throughout the plant. All of them are stainless interior liquid ring pumps. Our evaporators use 20 hp pumps, where our cheese tower pumps are 7.5 hp. All other vacuum pumps are oil sealed and air-cooled.

There are 4 main applications for vacuum systems at Darigold.

1. Cheese towers – transport curd with air, and compression of the curd to blocks of cheese. Compression is attained by rapid restoration of atmospheric pressure from deep cycle vacuum.
2. Packaging operations
   A. Opening of bags to insert product
   B. Case packers to move corrugated into position
   C. Sealing of individual blocks of cheese
3. Evaporators – lowering boiling point of fluids to remove water/ concentration of milk and whey products. Along with this, is the use of MVR technology to recover heat from vapor removed.
4. Drying – transport powder output from drying to storage bins and to packaging operations.

BVBP: Let's take it one step at a time then. Could you tell me about the cheese towers and how they operate?

Vacuum is applied at the top of the towers to put the entire unit under vacuum. The towers are roughly 15 feet tall. Cheese curds are drawn through a line, approximately 120 feet away, and fill the tower, which has a rectangular inner chamber. The cheese curds themselves are around 3/8" in diameter. There is a Lumenite probe level transmitter on the tower indicating the level of cheese. Once the tower is filled to the appropriate level, the valve allowing curds to enter the line shuts off.

Vacuum is retained on the entire unit for a period of time and starts to build up. The amount of time and amount of vacuum is programmed to drive different results dependent upon the type of cheese, process flow and other parameters. This can be as high as 20 inches of vacuum.

Upon completion of the vacuum cycle, the vent valves on top of the tower open quickly to allow the entry of atmospheric air. This sudden entry of air creates pressure differential, compressing the curd into a solid column 15' long (the size of the tower).

A guillotine is located at the bottom of the column, opening up to release the column of cheese. The process works like an extrusion, and drops the cheese down onto a plate. We call this an elevator. It lowers the entire stick to a pre-determined depth, cuts it off with the guillotine, starting the cycle over again. The blocks are about 14.5 inches in length and right around 11 inches in width, typically weighing 42 to 43 lb. Above the guillotine the vacuum process repeats the cycle to maintain continuous operations.

BVBP: Do packaging and sealing play a role during this process?

Shortly after, yes. While the column of cheese is being cut into blocks, an automatic bagger at the base of the cheese tower installs a cheese bag. An auto-bagger utilizing a separate vacuum pump opens the bag. While the guillotine is holding the block of cheese, we then introduce the bag on the chute just outside the tower. Another cylinder pushes the cheese block into the bag. An interesting side note to this is the original autobagger design included the use of Venturi valves to create the vacuum using compressed air. We evaluated energy consumption necessary to

View of cheese tower operation.

DARIGOLD UTILIZES VACUUM IN CHEESE PROCESSING

create the vacuum, and found we were able to provide more reliable vacuum while supplying the vacuum needs for two autobaggers at approximately ¼ the energy requirement, using a single small vacuum pump.

The block continues down a conveyor where it is prepared for sealing. Three blocks at a time enter a chamber. The chamber closes over the blocks and begin to develop vacuum. The pumps we use are Busch SV-1025-C-000-IKZZ 75 hp. We are looking for 30mbar vacuum to be achieved and a cycle time of about 25 seconds to keep up with production capacity. Once maximum vacuum is attained, a seal bar then applies heat to fuse the bag together. The chamber is then vented slowly. When the cycle completes, the lid on the chamber opens and allows the vacuum-sealed blocks to release. The blocks then travel to corrugated case packers.

BVBP: How is vacuum used in the evaporator process of your milk and whey products?

The concept is simple, we are trying to boil water off while preserving the product. As we lower the atmospheric pressure, the boiling point reduces, allowing us to boil it at a much lower temperature. This allows us to not cook the proteins in the milk or the whey powder.

The evaporator is a series of tubes pumping steam and hot water through them, boiling the milk. Steam generates off of the boiling milk and this is where energy conservation takes part, as this steam has energy value. The steam sucks over toward the vacuum pump. Here, a separator is located allowing us to condense the vapors.

We condense the vapors by means of a very large 500 hp turbo fan, creating pressure. You're taking steam vapors, going from a low-

Overview of the Sunnyside plant looking towards milk receiving operation from top of dryer building.

pressure state to a high-pressure state, and turning them back into a liquid. That liquid is then reintroduced back into the series of tubes for reheating, increasing efficiency. Now, you don't require makeup steam going into the process. The vacuum is typically 23-24" Hg., using 20 hp Travainni liquid ring pumps. The turbofans for mechanical vapor recompression are specialized fans manufactured by Schiele in Germany; with an oil cooled shaft and professionally balanced.

In addition, we also use vacuum to transport milk powder from our dryer to storage bins. This is an important consideration as the atmosphere of our drying plant is tightly controlled, and the use of traditional blowers could result in the addition of moisture and other contaminants to the powder.

BVBP: Is addressing vacuum leaks similar to addressing compressed air leaks?

It is a relatively similar process, albeit slightly more difficult. Air leaks will make a lot of noise, the vacuum leak will also make a lot of noise, but there is already so much ambient noise to begin with. We utilize the same bleed down test one might use on a compressor. You shut everything off, let it bleed off, and time it. With a vacuum pump you get the whole system under vacuum, shut off the pump, and identify how long it takes to bleed off the vacuum. Very similar process.

With our evaporators we can fill up the whole system with water, and let it leak out. It's easy to see a leak coming out, but it's very difficult to see one coming in. This necessitates a fair amount of downtime, but we've had to do it on occasion due to a severe problem. After many years of operation, it is not unheard of to develop cracks in the metal. This eventually

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DARIGOLD UTILIZES VACUUM IN CHEESE PROCESSING

View of new dryer building at south end of plant.

leads to leaks in the ducts due to heating and expansion. In order to detect and/or avoid leaks, all the pieces of the puzzle have to be looked at and monitored.

- Gasket changes
- Daily monitoring of operational conditions
- How many vacuum pumps are running?
- What level of vacuum?
- How much steam load?

Leak detection is very much an investment coming with the technology. We do have a sonic listening device for evaluation of vacuum systems. We are looking at electronic vacuum sensors on our cheese towers, as an optimizational and operational tool to standardize each unit. This would also allow us to identify how much bleed by we have.

Take our bag sealers for our cheese as an example. They are essentially a large seal and meal type of device where we put 40 lb blocks in, three at a time. A clamshell comes down, with big Busch pumps driving the vacuum. When testing we take it down to 30 millibar, to obtain a solid vacuum level. Those have electronic gauges on them for monitoring.

Lastly, our turbo fans are a huge factor when it comes to leak detection. We have these very large fans with 500 hp motors for condensing vapors. Any kind of vacuum leak on those can really increase energy consumption. It will cause us to generate less vacuum inside the evaporator. This raises the boiling point of our product, so now you are adding more steam to heat it, jeopardizing the product. Going through with sonic ears, identifying where the leaks are and re-commissioning it is very important. It is time consuming and a major investment, but it's worthwhile since the leak is occurring 24/7. A small leak can add up really fast, just like on compressed air.

BVBP: Thank you very much for your time. BP

For more information, visit www.darigold.com.

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Rotary Lobe Blowers, Nozzles and Air Knife SAVE $248,000 IN ENERGY

By Don van Ormer, Air Power USA

A metal producer, in the Midwest, spends an estimated $2.4 million annually on electricity to operate their compressed air system. The current average electric rate, at this plant, is 5.5 cents per kWh, and the compressed air system operates 8,760 hours per year. This system assessment recommended a group of "near-term" compressed air demand reduction projects and then a group of separate "longer-term" projects focused on optimizing the air compressors, the controls and the heated desiccant compressed air dryers.

The near term demand-reduction projects are able to reduce compressed air flow requirements by 5,804 cfm and reduce energy costs by $500,000 annually. The estimated project cost was $200,000. Due to article length constraints, this article will highlight a few of the demand-side projects and focus on a "blow-off" air project where 2,339 cfm of compressed air was replaced by a 72" air knife, thirty-six (36) ¼" nozzles and three 25 horsepower single-stage rotary lobe blowers.

The Current Compressed Air System

Annual plant electric costs for compressed air production, as operating today, are $2.2 million per year. If the electric costs of $187,274 associated with operating ancillary equipment such as compressed air dryers are included, the total electric costs for operating the air system is $2.4 million per year.

The air system operates 8,760 predictable hours per year. The load profile or air demand of this system is relatively predictable depending on which processes are on.

The primary air compressors in "Power House #1" are 2,000-hp older Joy centrifugal, 3-stage units that appear to be well maintained and operating within their proper parameters. Compared to a newer model Cameron (Joy)

"It can never be assumed a reduction in compressed air demand will automatically turn into a reduction in electricity (kW) used by the air compressors in the system."

— Don van Ormer, Air Power USA

of similar size will have about 25% more turndown to blow off and have a full load specific power efficiency improvement of about 12%.

In "Power House #2", the smaller 400-hp class XLE, 2-stage, double-acting, water-cooled, reciprocating air compressors have about the same full load specific power as the existing 2,000-hp Joy centrifugal compressors. The XLE units all have 5-step unloading and, due to their basic design, are very efficient and effective trim units. These units are well maintained and effectively controlled by plant personnel with typically only one machine at part load.

The basic system with the two compressed air supplies is somewhat out of balance since while the XLE units have a unit at part load one of the 2,000-hp centrifugal units is often also in blow off.

The overall "near-term" strategy for improving the compressed air system is based on stabilizing the Joy control system and operating more efficiently along with implementation of identified air conservation projects throughout the plant. Due to article length constraints, we will highlight a few of the demand-side projects implemented to reduce unnecessary uses of compressed air.

Does a Reduction in Compressed Air Use Translate to Less Energy Used by the Air Compressors?

It can never be assumed a reduction in compressed air demand will automatically turn into a reduction in electricity (kW) used by the air compressors in the system. At lower flow demand most compressors use less energy but in proportion to the reduction in air flow.

The unloading curve above reflects what the 5-step unloading XLE units in Power House A will do at part loads. You can see that as the demand flow in air falls, the input power also falls but at a much lower rate. This curve will vary by type of compressor, type of unloader control, installation, piping and storage, and machine condition.

In short, there is no way to fix a recoverable value just based on cfm value at pressure alone.

When only a leak survey is being done and a full assessment (including the supply side) it is hard to do this accurately. The best that can be done is to estimate the average load condition of each unit, measure the input kW to each machine and use the DOE part load curves for the appropriate type compressor and control and you will be "in the area".

TABLE 1. KEY AIR SYSTEM CHARACTERISTICS – CURRENT SYSTEM

MEASURE	NO. 2 CENTRIFUGAL NOT IN BLOW OFF	NO. 2 CENTRIFUGAL IN BLOW OFF
Average System Flow	24,851 scfm	24,014 scfm
Average Compressor Discharge Pressure	106 psig	100 psig
Average System Pressure	85 psig	85 psig
Input Electric Power	4,484.3 kW	4,484.3 kW
Operating Hours of Air System	5,699 hrs	3,061 hrs
Specific Power (scfm/kW)	5.85 scfm/kW	5.66 scfm/kW
Electric Cost for Air /Unit of Flow	$56.56/scfm yr	$31.43/scfm yr
Annual Electric Cost for Compressed Air	$1,405,541/year	$754,954/year
	$2,160,495 yr	

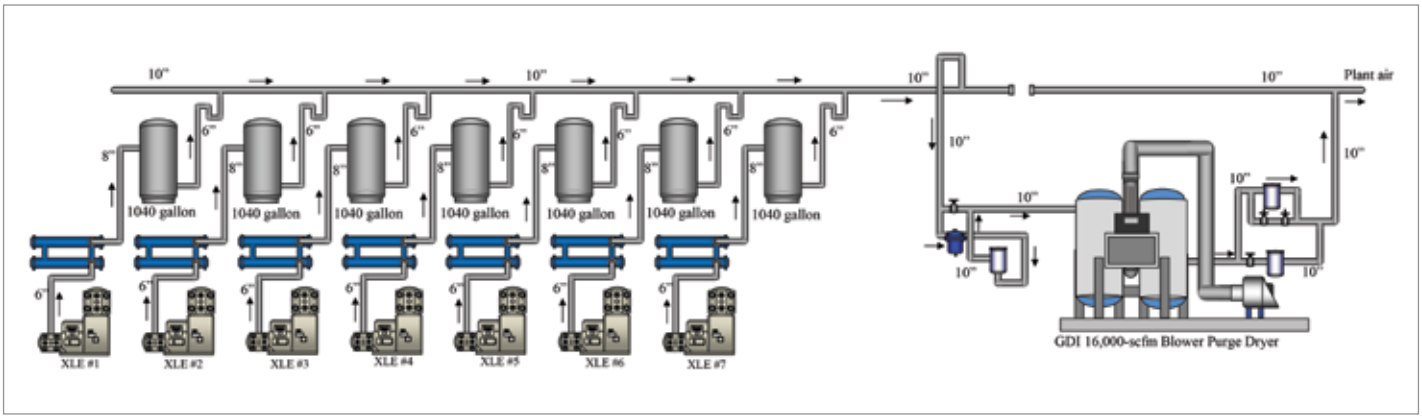

Figure 1. Power House #2

ROTARY LOBE BLOWERS, NOZZLES AND AIR KNIFE SAVE $248,000 IN ENERGY

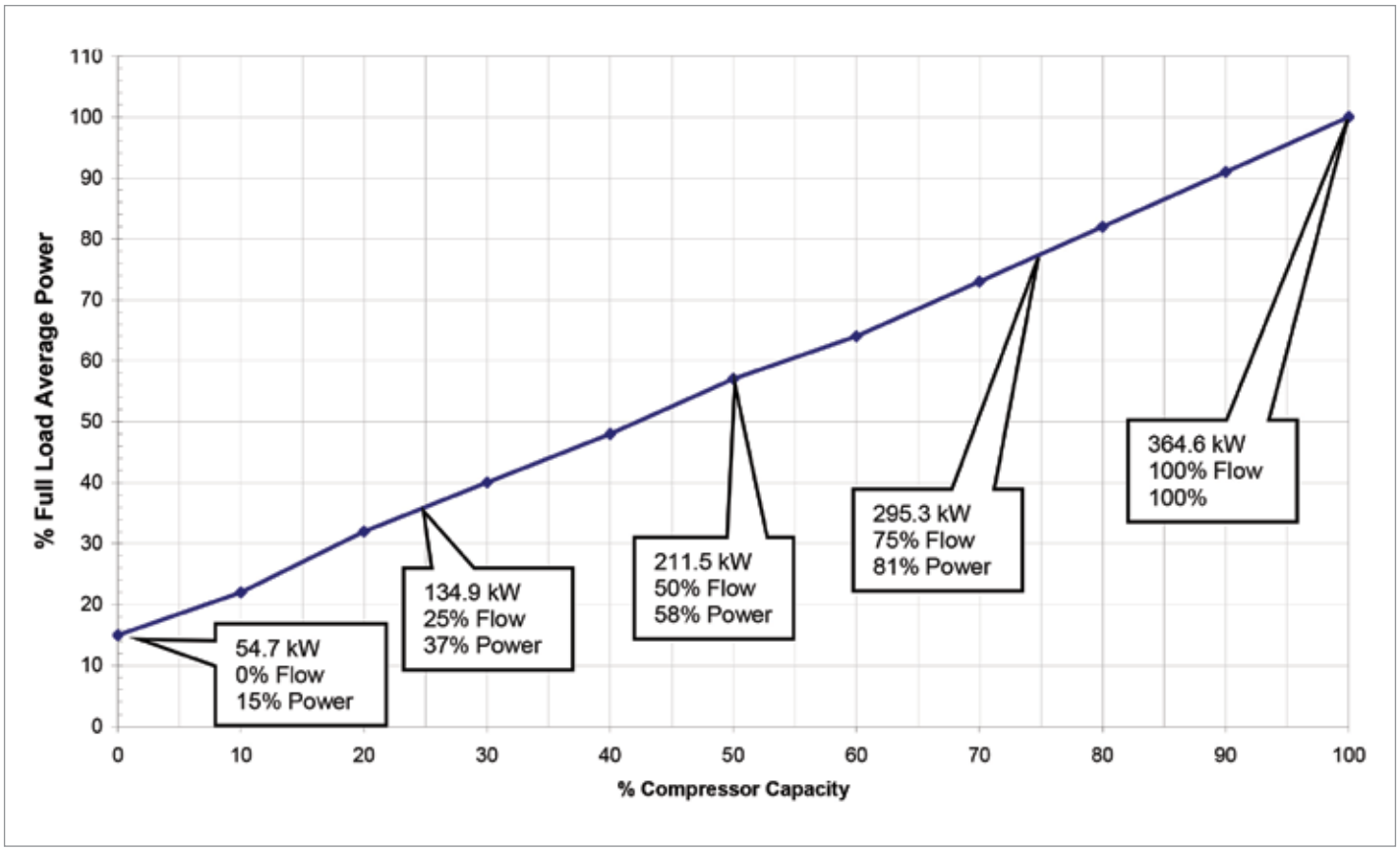

Figure 2. Capacity vs. Power Estimating Chart. Reciprocating Air Compressor with 5-Step Unloading (All data taken from the Compressed Air Challenge sponsored by the US DOE)

Compressed Air Use (Flow) Reduction Projects Deliver 5,804 cfm in Savings

Compressed air use (flow) reduction projects were identified totaling 5,804 cfm. Due to article-length constraints, we will expand only on a few of the projects. A summary, however, of all the projects is below.

- NEAR-TERM PROJECTS
  - Lower discharge pressure on Cameron units
  - Convert 75-hp induction motor fans on cooling towers A and B
  - Install level-activated or pneumatic-actuated condensate drains
  - Repair tagged leaks
  - Replace venturi nozzles and knife with single-stage blowers
  - Replace 30 cfm air from 1/2" line to 1/4" line pressurized cabinet
  - Checked bearing cooling temperature air; monitor regularly with ultrasound probe

Project #1. Install Zero Air-Loss Condensate Drains – 60 cfm Savings

The aftercoolers on both Joy centrifugal air compressors need zero air-loss condensate drains installed to replace the timed electric drains being used.

Project #2. Repair 374 Identified Compressed Air Leaks – 3,185 cfm Savings

A comprehensive survey of compressed air leaks was conducted at the plant and 374 leaks were identified, quantified, tagged, and logged. It was estimated these leaks total 3,185 cfm of lost compressed air. The cost of this project (including labor) was estimated at $37,400 and the annual savings at $337,624.

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Photos of compressed air leak locations.

TABLE 2. LIST OF BLOWING COMPRESSED AIR

LOCATION	QTY	COMPANY	MODEL	PIPE SIZE	PO/STOCK NUMBER	CFM	PSIG	TOTAL CFM USED
Bottom sqm vortec coolers	4	Ltw air management	308-35-h	1/4" npt		35	100	140
Top sqm vortec coolers	4	Ltw air management	308-35-h	1/4" npt		35	100	140
Top sqm compressed air, down at top of deflector roll	18	Exair	Hp1002ss	1/4" npt	260200440ar	32	80	576
Top sqm wash/air supply	18	Spraying systems co	Gga-ss3	1/8" npt	260209600	3	10	54
Sheet deflector at exit of stand 6	18	Exair	Hp1002ss	1/4" npt	260200440ar	32	80	576
Air blow-off between chopper and deflector roll (no longer used)	18	Vortec durablast adjustable	1200	1/8" npt		8 - 26	100	
Bottom sqm directed at bottom of sheet, attached to passline roll guard	15	Exair	1103ss	1/8" npt		10	80	150
Bottom sqm directed at bottom of sheet, attached to sqm	15	Spraying systems co	1/8tt-ss+r-ss	1/8" npt	260210980	19	80	285
Bottom sqm wash/air supply	19	Spraying systems co	Gga-ss3	1/8" npt	260209600	3	10	57
Exair amplifiers	3	Exair	120024	N/a	260226724	29.2	80	87.6
							Total Cfm (approx.)	**2,065.6**

Project #3. Replace Blow-Offs with an Air Knife, Nozzles and Rotary Lobe Blowers – 340 scfm Savings

RECOMMENDED PROJECT (#5) – Replace air blow offs listed with lobe type blowers at 9 psig at "Location A".	
Estimated high pressure compressed air savings	2,339 cfm
Total savings by installing venturi nozzles to reduce blow by	$247,934/year
Cost of three 25-hp, 500 cfm at 9 psig blowers (max pressure 12 psig)	$65,000
Energy cost to run three 25-hp blowers, estimated 20.7 kW each (total 62.1)	$20,493/year
Three single-stage, 500-cfm rotary lobe blowers rated at 6,000 hours/year	

Conclusion

In this article we have highlighted how the use of rotary lobe blowers, air knives and air nozzles can significantly reduce the use of compressed air. A compressed air leak survey is also described. We also point out the importance of having an analysis done to ensure reductions in compressed air demand will translate into reductions in air compressor energy consumption. BP

For more information, contact Don van Ormer, Air Power USA, at don@airpowerusainc.com or visit www.airpowerusainc.com.

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BLOWER & VACUUM SYSTEM INDUSTRY NEWS

Harris Equipment Named Tuthill Authorized Service Center

Harris Equipment has been named an Authorized Tuthill Service Center. Harris Equipment has been a valued channel partner with Tuthill for over 15 years, carrying their full product line and successfully selling blowers and blower packages in northern Illinois and Indiana.

In 2016, Tuthill was proud to announce Gary Pollack and his team at Harris Equipment had met the Tuthill standards to become an Authorized Service Center for WI, MI and northern IL – the only Authorized Service Center in the Midwest! Since the announcement, Harris Equipment has already seen the positive impact they have made in the region.

As an Authorized Tuthill Service Center, Harris Equipment is capable of servicing all Tuthill blower and vacuum technology, including positive displacement bi-lobe and tri-lobe blowers, as well as rotary piston, rotary vane, liquid ring and dry screw vacuums. As an Authorized Service Center, they are also able to service other makes and models. Technicians at Harris Equipment are trained on all different lubrication styles and have skill sets which can handle up to 12" gear diameters in vacuums and blowers. Their 46,000-sf. facility houses several hoists capable of lifting up to 5 and even 10 tons, as well as custom fabricated tooling specific to just blower repair.

The team at Harris Equipment (from left to right) Phil Kruger, Danny McAfferty, Gary Fleming, Sal Garcia and Gary Pollack.

Tuthill Vacuum & Blower Systems manufactures vacuum pumps, blowers and vacuum boosters for many different markets, applications and customers around the world. The common thread between all customers is they want superior aftersales service. In its 125-year history, Tuthill has learned the best aftermarket and repair service is provided at the regional level by channel partners who have unsurpassed product knowledge and strong local relationships with customers. This is why Tuthill has established regional Authorized CARE Centers through partnerships with companies who have made the necessary investments in training, inventory and equipment to best support Tuthill's globally installed base.

About Harris Equipment

Since 1936, Harris Equipment has proven to be a leading source for industrial reliability and industrial solutions resulting in customer's satisfaction. We provide a knowledgeable and diversified engineering and sales team to meet and exceed the industry's needs. Our clients are our focus and by offering a diversified portfolio of products and services, they can feel confident we provide peace of mind when it comes to their industrial needs. From compressed air to forklifts and from minor repairs to turnkey engineered solutions, Harris Equipment is the right choice when reliability and uptime is what you need. For more information, please visit www.harrisequipment.com.

About Tuthill Vacuum & Blower Systems

Tuthill Vacuum & Blower Systems, manufacturer of KINNEY® vacuum pumps and M-D Pneumatics™ blowers and vacuum boosters, is a leader in the design and manufacture of high performance, reliable positive displacement blowers, mechanical vacuum pumps, vacuum boosters and engineered systems ready to install and run. Since 1969, Tuthill Vacuum & Blower Systems has been manufacturing at its main facility located in Springfield, Missouri. For more information, please visit www.tuthill.com.

Leybold Awarded with the Milestone Award for Vacuum Technology

The use of vacuum in analytical technology and research and development is an essential factor enabling modern applications, like in the field of measuring instruments, for example. The selection of suitable equipment and the associated vacuum components is therefore crucial for success in laboratories. Since 1850, Leybold has been a partner of customers who have dedicated themselves to research. With innovative products, such as the new ECODRY plus dry compressing vacuum pump, this company tradition is continuing into the future, and Leybold has received an award recognizing this.

There are few sectors as innovative as the industries involved in laboratory and analytical technology. The trade magazine "Laborpraxis" has used its 40th anniversary as an opportunity to recognize some of the most spectacular technologies from this period in a milestone series under the heading "Laboratory and analysis technology - yesterday, today and tomorrow." On this occasion, the vacuum specialist Leybold received the milestone award for vacuum technology in one of 15 categories, presented at a major jubilee gala of the Vogel Verlag in Würzburg, Germany.

Group Publisher, Gerd Kielburger, commented at the award ceremony, "The laboratory and analytical industry is an essential enabler of global research and development - whether in universities or companies. We were able to award prizes to great companies that have led to countless innovations in other sectors and industries with their developments."

Leybold is particularly honored and delighted with the award, "We see the award as recognition of our efforts to keep our customers' challenges in focus. However, the award is also a great incentive for us to continue to develop smart and flexible solutions for our customers in the future," says Dr. Marlis Sydow, Leybold's senior market segment manager high vacuum and Petra Endrös, Leybold's head of sales for Southern Germany, who received the award at the gala.

About Leybold

Leybold is a part of the Atlas Copco's Vacuum Technique business area and offers a broad range of advanced vacuum solutions for use in manufacturing and analytical processes, as well as for research purposes. The core capabilities center on the development of

B. Meidel, Dr. Sydow, P. Endrös and M. Platthaus at the award ceremony.

application- and customer-specific systems for the creation of vacuums and extraction of processing gases. Fields of application are secondary metallurgy, heat treatment, automotive industry, coating technologies, solar and thin films such as displays, research & development, analytical instruments, as well as classic industrial processes. For more information, visit www.leybold.com.

About Atlas Copco

Atlas Copco is a world-leading provider of sustainable productivity solutions. The Group serves customers with innovative compressors, vacuum technique and air treatment systems, construction and mining equipment, power tools and assembly systems. Atlas Copco develops products and services focused on productivity, energy efficiency, safety and ergonomics. The company was founded in 1873, is based in Stockholm, Sweden, and has a global reach spanning more than 180 countries. In 2016, Atlas Copco had revenues of 11 Bilion Euros and more than 45,000 employees.

Since 1952, Atlas Copco is present in Germany. Under the roof of two holdings located in Essen, more than 20 production and sales companies are gathered (February 2017). By end of 2016, the group employed about 3800 people, including about 100 trainees. www.atlascopco.com.

BLOWER & VACUUM SYSTEM INDUSTRY NEWS

Andy Tuthill Named President, Tuthill Vacuum & Blower Systems

Andy Tuthill has been promoted to President of Tuthill Vacuum & Blower Systems. Andy relocated to Springfield in 2015 as director of manufacturing and was promoted to the position of vice president of operations in 2016. During his two-year tenure, Andy and his team achieved record productivity, on-time delivery and inventory turns.

Andy Tuthill has been promoted to President of Tuthill Vacuum & Blower Systems.

Prior to his roles at TVBS, Andy worked two years at Tuthill Transfer Systems within Product Management and Operations. Before Tuthill, Andy served our country for eight years as a Lieutenant in the United States Navy.

Andy has a Master's in Business Administration from Kellogg School of Management at Northwestern University, a Bachelor of Science from Vanderbilt University and a diploma from the Naval Nuclear Power School & Prototype.

About Tuthill

Tuthill Vacuum & Blower Systems, manufacturer of KINNEY® vacuum pumps and M-D Pneumatics™ blowers and vacuum boosters, is a leader in the design and manufacture of high performance, reliable positive displacement blowers, mechanical vacuum pumps, vacuum boosters and engineered systems ready to install and run. Since 1969, Tuthill Vacuum & Blower Systems has been manufacturing at its main facility located in Springfield, Missouri. For more information, please visit www.tuthill.com.

First Pump Repair at New Nash Service Center in Alabama

The Nash Division broke ground on a new operations and service center in Moody, Alabama. Ahead of schedule and almost a full week before the facility was set to open, the team completed assembly of a stainless steel clad, NASH 904™ pump for a customer in Florida. This was the first pump repair and assembly performed in the new service center.

The 50,000 square-foot, state-of-the-art facility offers OEM repair, testing, and parts for Gardner Denver NASH, and HOFFMAN & LAMSON products, as well as other brands of liquid ring vacuum pumps, compressors, and centrifugal blowers.

Designed to offer improved functional capabilities and reduced lead times, the Nash Moody Facility is positioned to deliver OEM service and support to several extremely critical process operations. These include, pulp & paper, chemical, oil & gas and general industrial customers in the Gulf Coast and southeastern United States. The Moody facility will replace the nearby Nash location in Trussville, Alabama, relocating the experienced team of Nash certified technicians and customer service focused employees.

About Nash

Nash, a division of Gardner Denver, is a leading manufacturer of liquid ring vacuum pumps, compressors and engineered systems serving the chemical, oil & gas, power, paper, mining, environmental and food

The new NASH facility, located at 2150 A.E. Moore Road in Moody, Alabama.

industries. Nash also provides global service and technical support for its products through its locations around the world.

For more information, visit www.GDNash.com, email: nash@gardnerdenver.com or call 1-800-553-NASH.

Pfeiffer Vacuum Welcomes Röntgen Award Winner

The Justus Liebig University Giessen is awarding its Röntgen Prize this year to PD Dr. med. Daniela Münzel. The Röntgen Prize is awarded each year at an academic award ceremony at the Justus Liebig University Giessen for outstanding work on basic research into radiation physics and radiation biology. It is named in memory of Wilhelm Conrad Röntgen, who was a professor in Giessen from 1879 to 1888. The €15,000 prize is donated by Pfeiffer Vacuum, the Dr. Erich Pfeiffer Foundation and the Ludwig Schunk Foundation.

This year's award winner, PD Dr. med. Daniela Münzel, is a senior physician at the Institute for Diagnostic and Interventional Radiology at the University Hospital rechts der Isar, part of the Technical University of Munich. She is receiving the award for her dedication to basic research to improve clinical imaging with X-rays. Particularly outstanding is PD Dr. med. Münzel's theoretical and practical knowledge of all areas of radiology. The scientific dedication of the Röntgen Award winner addresses a wide range of issues: work on CT (computer tomography)-based angiography and the development of CT to improve the imaging quality and reduce the radiation dose. In the course of her intensive research during the period she spent at the Harvard Medical School in Boston, she focused on the clinical potential of dual-energy CT and spectral CT with photon counting detectors.

"Vacuum technology also plays a part in the generation of X-rays. We are therefore particularly pleased that this year we have a prizewinner, PD Dr. med. Daniela Münzel, who has researched multiple areas of radiology in the course of her scientific work," said Manfred Bender, Pfeiffer Vacuum Technology AG's chairman of the Management Board, when congratulating the prizewinner.

The day before the prize was awarded at the Justus Liebig University in Giessen, PD Dr. med. Münzel visited the sponsoring company Pfeiffer Vacuum and reported on the results of her research.

About Pfeiffer Vacuum

Pfeiffer Vacuum (stock exchange symbol PFV, ISIN DE0006916604) is one of the world's leading providers of vacuum solutions. In addition to a full range of hybrid and magnetically levitated turbopumps, the product portfolio comprises backing pumps, leak detectors, measurement and analysis devices, components as well as vacuum chambers and systems. Ever since the invention of the turbopump by Pfeiffer Vacuum, the company has stood for innovative solutions and high-tech products used in the Analytics, Industry, Research & Development, Coating and Semiconductor markets. Founded in 1890, Pfeiffer Vacuum is active throughout the world today. The company employs a workforce of some 2,900 people and has more than 20 subsidiaries. For more information, please visit www.pfeiffer-vacuum.com.

Manfred Bender, CEO of Pfeiffer Vacuum Technology AG, the Röntgen Prize winner PD Dr. med. Daniela Münzel and Dieter Rühl, Dr. Erich Pfeiffer-Stiftung (from left).

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Blower & Vacuum Best Practices is a technical magazine dedicated to discovering Energy Savings in industrial blower and vacuum systems and in municipal wastewater aeration blower systems. Our editorial focus is on case studies and technical articles where application and system knowledge drives technology selection, creating energy savings in projects delivering excellent ROI's.

"Selecting the correct blower is the most important decision when designing a pneumatic conveying system."

– Roger Blanton, Howden Roots, ("The Heart of Pneumatic Conveying Systems-Positive Displacement Blower Calculations," April 2017 Issue)

"Strong, consistent vacuum pressure enables us to work faster and more precisely."

– Joe Legere, Executive Vice President, Modern Woodcrafts, ("Modern Woodcrafts Automates with Robotic Arms and Intelligent VSD Vacuum Pumps," July 2017 Issue)

From WWTP Aeration Blowers to Centralized Vacuum Systems

Our readers have embraced energy management practices as the next step. Our diverse key subscribers work at multi-factory manufacturing organizations and are targets to consider options such as VSD vacuum pumps in newly centralized systems. On the municipal side, over 1,000+ operators at wastewater treatment plants (WWTP's) and blower sales channels receive the magazine. Lastly, a growing group of industrial blower and vacuum OEM design engineers are looking for technologies able to improve their machines.

"For most aeration processes, 80% to 90% of the discharge pressure is static pressure resulting from diffuser submergence."

– Tom Jenkins, JenTech Inc., ("Aeration Blower Control Efficiency," September 2017 Issue)

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To subscribe visit **blowervacuumbestpractices.com**

BLOWER & VACUUM SYSTEM INDUSTRY NEWS

Kice Appoints Wade Hosman Technical Sales Manager

Kice announced the appointment of Wade Hosman as its technical sales manager, based out of Stuttgart, AR. In this role, Hosman will be responsible for the oversight of sales throughout the Southeast territory, providing support for this customer base for the diverse product lines offered by Kice.

Wade Hosman has been appointed technical sales manager at Kice.

Hosman is a graduate of Arkansas State University and has an MBA from Sam W. Walton College of Business. Prior to joining Kice, Hosman spent over 15 years with Riceland Foods, Inc.

"We are excited to welcome Wade to Kice Industries, he will be a great asset for us as we support our customers in this region," said Andy Forrester, Kice Industries' director of sales. Wade has a proven track record of delivering customer-focused solutions and technical expertise to customers. We look forward to him building strong partnerships with customers in this region."

About Kice Industries

Founded in 1946, Kice Industries is a fourth generation, family-owned business based in Wichita, Kan. with a team of approximately 300 employees. Kice Industries designs complete industrial air systems and builds most of the equipment specified for these systems. Applications include pneumatic conveying, dust control and aspiration. A multi-industry company, Kice Industries serves the grain, plastics, food, feed, wood and minerals industries. Just north of Wichita, the manufacturing and office facility totals 200,000 square feet on 25 acres. CFM Corporation a subsidiary of Kice Industries is a gray and ductile iron foundry located in Blackwell, OK. The foundry and machine shop is 65,000 square feet on 20 acres. For more information, please visit www.kice.com.

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

Blower & Vacuum Best Practices is published quarterly and mailed together with Compressed Air Best Practices®. 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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