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INDUSTRIAL BLOWER & VACUUM SYSTEMS

- 10 Improved Vacuum Supply Conserves Energy at Meat Processing Operations**
- 24 Meat Processor Saves Millions of Gallons of Water with Engineered Vacuum Solution**

AERATION BLOWER SYSTEMS

- 18 Review of New ASME PTC 13 Test Code for Blower Systems**
- 28 Expert Viewpoint: Howden America on Blower Controls**

January/February 2020

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FROM THE EDITOR



Welcome to 2020 and Happy New Year! The number sounds futuristic to me. The future is here and now for Sustainability – and we again offer our readers excellent articles describing what’s being done to reduce water and energy consumption in blower and vacuum systems.

Industrial Blower & Vacuum Systems

Dieter Hein is fully committed to Sustainability. A leading supplier of meat and sausage specialties to clients in Europe and the U.S., their two production plants often are “first adopters” of new technologies able to reduce energy consumption. They’ve done it again by integrating Industry 4.0 – ready Busch vacuum technology, able to swiftly respond to different pressure requirements, into their centralized vacuum systems.

Interested in Sustainability and want to save millions of gallons of water? How about 225 gallons per minute? If yes, perhaps the vacuum system isn’t the first thing you thought of, right?! Replacing liquid ring vacuum pumps (which use a lot of chilled water) is now possible through good system engineering involving the use of filters, some with the colorful name of knock-out pots (!), able to protect lubricated rotary vane vacuum pumps. Thanks go to Solberg and Becker for teaming up to co-write an excellent meat processing plant case study.

Aeration Blower Systems

The ASME PTC 13 Wire-to-Air Performance Test Code, for both positive displacement and centrifugal blowers, is published! PTC 13 was written by a diverse group representing every stakeholder. Blower manufacturer Aerzen was a member of the PTC 13 Committee and Darrel Hill has provided us with a review of the code with very practical implementation/use considerations.

The selection and application of blower controls often has a bigger impact on energy efficiency and durability, than the selection of blower technology itself. Blower & Vacuum Best Practices appreciated the opportunity to interview Tim Hilgart, from Howden Americas, on this topic. As the Environmental and Digital Data Advantage Sales Leader, Hilgart provides insights into where we’ve been and where the market is headed as it relates to the adoption of blower control technology.

We have announced the 2020 Best Practices Expo & Conference, September 20-23, at the Schaumburg Convention Center located in Chicago’s convenient outskirts near O’Hare International Airport. Please consider registering for the event to learn and share “Best Practices”!

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

ROD SMITH

Editor

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BLOWER & VACUUM TECHNOLOGY PICKS

Kaeser Compressors Adds Turbo Blowers

With the July 2019 acquisition of Pillaerator GmbH, Kaeser has added turbo blowers to its line of rotary lobe and rotary screw blowers. This action significantly expands Kaeser's offering for the water/wastewater market and other large flow, low pressure applications including bioreactors and flue gas desulphurization.

"The Pillaerator acquisition was an excellent fit due to both companies' high standards for product quality, innovative design, and energy efficiency," said Stephen Horne, Blower Product Manager for Kaeser USA. "Pillaerator's simple and reliable design has a proven record for performance with units operating around the world, and we are already getting a lot of interest from our US wastewater partners."

Available with flows from 4,700 up to 10,000 cfm, Pillaerator blowers feature gas-tight, permanent magnet motors with active magnetic bearings, integrated frequency converters and closed-loop water cooling. Units are compact and quiet plus advanced controls offer full interoperability with SCADA systems.

About Kaeser Compressors, Inc.

Kaeser Compressors is a leader in reliable, energy efficient compressed air equipment and system design. We offer a complete line of superior quality industrial air compressors as well as dryers, filters, SmartPipe™, master controls, and other system accessories.

Kaeser also offers blowers, vacuum pumps, and portable gasoline and diesel screw compressors. Our national service network provides installation, rentals, maintenance, repair, and system audits. Kaeser is an ENERGY STAR Partner. For more information, visit us.kaeser.com/turboblowers. To be connected with your local authorized Kaeser representative, please call (877) 417-3527.



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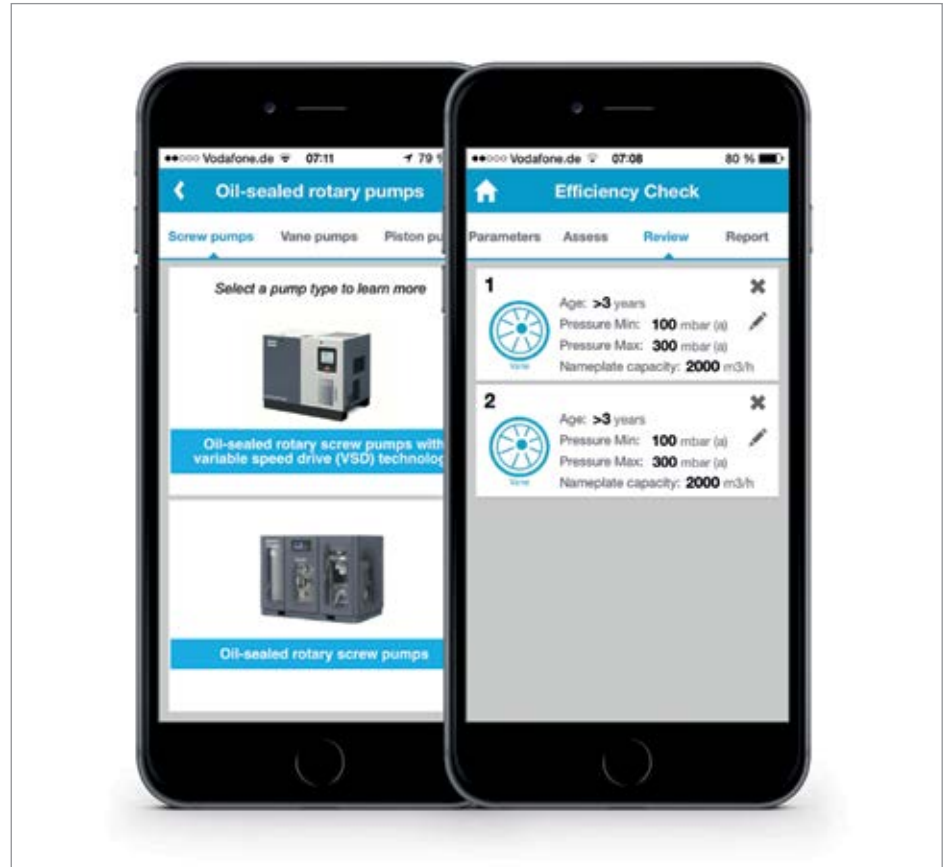
Atlas Copco Intelligent DZS Vacuum Pump Series

Atlas Copco is today announcing to the U.S. market the launch of three new intelligent VSD+ vacuum pumps. The DZS 100 – 400 VSD+ series pumps are a range of air-cooled, oil-free claw pumps made for particularly harsh applications. They come with built-in variable speed drive and can be controlled remotely by the new VSD+ App.

To better prepare the equipment for harsh application environments, Atlas Copco has also equipped its DZS 100, 200 and 400 VSD+ series with corrosion-resistant materials and a durable internal coating, while also reducing the environmental impact thanks to its low energy consumption, small space requirements, as well as handling of pollutants. The DZS pump range is perfect for conveying, clamping and drying processes, to name just a few applications.

In addition, the design principle supports uncomplicated maintenance. Cleaning or replacing the pump claws does not require gearbox stripping and retiming, enabling quicker and easier access to the inside of the pump. No new synchronization is necessary during the subsequent assembly, resulting in shortened downtimes and lower service costs.

To control the pumps, a VSD+ inverter drive has been integrated into the motors. This allows for the optimum performance points of the claw pump to be specifically controlled and for power consumption to be reduced. This function ensures that energy is saved and that the pumps' CO₂ footprint is reduced. Sustainability is further reinforced



Pump series accompanied by new app that enhances the intelligence of vacuum pumps.

in the immediate process environment: Certified to ISO 8573-1 Class 0 standards, the completely oil-free DZS VSD+ pumps are 100% harmless to the quality of the ambient air during operation. This eliminates the risk of oil-induced contamination and damage to sensitive applications and products in the environment, providing a guarantee that neither man nor the environment will be harmed by the use of the pumps.

The new DZS range, along with the current GVS A VSD+ range, are the first models to benefit from the advanced technology

of the newly developed VSD+ App. The new app allows the vacuum pumps to be controlled and monitored in real time from a smartphone. Pumps can also be commissioned optionally by entering fewer set points. With just a few clicks, the performance of the pump can be precisely adjusted to the respective process requirements, this added functionality helps ensure greater user-friendliness and noticeably more energy-efficient operation.

In addition, users have quick access to numerous operation parameters, including

values such as inlet pressure, rotor speed, running hours and service intervals can be monitored and controlled at a glance in real time. The new app also makes it easy to commission the connected pumps through the target pressure, start/stop delay and stop level parameters. When the pump is started, the app automatically connects via Bluetooth. Once the desired values have been entered, the innovative DZS 100 – 400 VSD+ series starts operation immediately.

You can download the Atlas Copco VSD+ from your relevant app store. Minimum requirements are IOS 8.0 and Android 4.03. Atlas Copco plans to make the app available for other vacuum pump models in the future.

Atlas Copco Group & Atlas Copco Compressor Technique

Great ideas accelerate innovation. At Atlas Copco, we have been turning industrial ideas into business-critical benefits since 1873. Our passionate people, expertise and service bring sustainable value to industries everywhere. Atlas Copco is based in Stockholm, Sweden, with customers in more than 180 countries and about 37,000 employees. In 2018, revenues were BSEK 95, approximately 10 BUSD. Atlas Copco Compressor Technique partners with customers to turn industrial ideas into smart, connected air and gas solutions and leading-edge compressed air technology. By listening to our customers and knowing their needs, we deliver value and innovate with the future in mind.

Atlas Copco Compressors

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

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To further strengthen the Roots® legacy, Howden now manufactures the world-renowned rotary positive displacement blowers and centrifugal compressors in Connersville, Indiana, U.S.A.

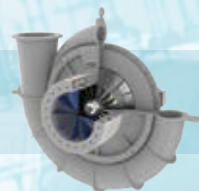
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BLOWER & VACUUM TECHNOLOGY PICKS

PDC Introduces ElastoTITE Elastomer Hinged Check Valves

Process Development & Control (PDC) a leading manufacturer of industrial butterfly valves and actuators for HVAC, furnace, power, blower, flow control, and exhaust air transfer systems has expanded its product line to include the ElastoTITE Elastomer Hinged Check Valve.

ElastoTITE offers many advantages over typical elastomer hinge valves. Most significantly, its patented anti-fatigue layer acts as a safety net, keeping the valve plates tethered to the check valve. That feature prevents the catastrophic failure of loose parts escaping down the pipeline and damaging expensive equipment. The anti-fatigue layer also reduces the wear on the seal to hinge interface.

ElastoTITE's other features include a full ported design to promote high CV (flow rate),

no metal-to-metal rotating parts, and an intelligently angled hinge bar. The valve can be installed in any orientation with the spring assist option, enabling increased speed at which the reversed flow is checked. PDC can customize ElastoTITE for specific applications.

The company currently offers four styles of check valves. Cast Wafer has sizing from 2" to 24", matching ANSI 125/150LB flanges and a 4-rib cage structure to help resist adverse pipe stress. The Male Thread End NPT (National Pipe Tapered Pipe Thread) conforms to ASME/ANSI B1.20.1 standards on both ends. PDC's Plain End Check Valves match schedule 40/80 pipe outside diameter with a smooth finish. The ends on the Grooved End ElastoTITE Check Valve match ANSI/AWWA C-606 specification. The company's Male Thread End, Plain End and Grooved End Check Valves are available in sizes from 1" to 12".

About PDC

PDC manufactures ElastoTITE and other industrial valves at its facility in Coraopolis, PA, near Pittsburgh. The company, which was founded in 1970, also manufactures and distributes butterfly and check valves, actuators and associated flow control components for customers worldwide. PDC owns more than 300 valve patterns that are supplemented by custom cut variations which support the company's 11 core product segments. Applications include furnace, compressor-blower, gas recovery, gas equipment engine, HVAC, environmental, LNG and power generation. The ISO 9001-2015 certified company's products are increasingly used in "green" alternative energy applications. For more information call 800-732-4070, email sales@pdcvalve.com or visit www.pdcvalve.com.

ControlAir Announces New 480V Precision Vacuum Regulator

ControlAir Inc. announced the new Type 480V Precision Vacuum Regulator. It is the first vacuum regulator offering from ControlAir. The Type 480V Precision Vacuum Regulator provides precise control up to full vacuum. The unit is designed with a push type locking knob which allows for smooth output adjustment and the ability to lock in your setpoint to avoid unintentional adjustments.

The Type 480V senses output pressure deviations to within 1/2 inch water column pressure. Regulating range is from 0 to 30 inches Hg. The unit is small in size and lightweight, less than 1 lb. The standard



PDC's ElastoTITE elastomer hinged check valve features an anti-fatigue layer that prevents valve plate separation from the hinge bar.

bracket and integral panel nut allow for versatile installation options. A soft valve seat design provides tight shut off and eliminates leakage in steady state operation.

The Type 480V is ideal for any process requiring precise regulation of vacuum pressure. It is suitable for a wide range of applications which include semiconductor manufacturing, medical OEM, mass spectrometry, pick and place, and leak testing.

The Type 480V Vacuum Regulator atmospheric intake is 0.04 scfm. Sensitivity is 0.13 kPa. Ambient temperature range is 32° to 140° F. Flow rate is 100 scfh maximum. The in and out ports are 1/4 inch NPT and the gauge port

is 1/8 inch BSPT. Standard options include bracket and integral panel nut for versatile installation options.

ControlAir Inc. manufactures precision pneumatic and electro-pneumatic controls. ControlAir's markets include process control, semiconductor, printing and converting presses, diagnostic and surgical medical equipment, robotics, quality control, automotive, analyzers, compressors, pumps and paint equipment. For more information, including full product specifications with PDF files, 3-D Interactive Catalogs, downloadable 3-D and 2-D CAD drawings, and company profile, visit ControlAir's website at www.controlair.com.



The 480V Precision Vacuum Regulator is designed with a push type locking knob which allows for smooth output adjustment.



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BLOWER & VACUUM TECHNOLOGY PICKS

Piab Makes piCOBOT® Even More Collaborative

Piab's cleverly designed vacuum operated end-of-arm-tool (EOAT) piCOBOT® is now available with a generic electrical interface as well as several options for mechanical mounting plate dimensions in accordance with the ISO 9409-1 standard, enabling it to be configured to work with any collaborative robot and smaller industrial robots. By offering generic compatibility for piCOBOT®, Piab is answering calls from several manufacturers of so called cobots wishing to use the company's unique vacuum EOAT in collaboration with their cobots. Originally certified to work with cobots from Universal Robots, piCOBOT® now extends its reach into the cobot market offering a high degree of configurability.

Through a user-friendly online configuration tool, Piab's customers can choose between a generic electrical interface including a standard cable or one specified by Universal Robots. Customers are also able to choose various different mechanical interfaces, configuring tools that precisely meet their specific requirements and/or applications.

Offering plug-and-play extensions to cobots, piCOBOT® ensures safe and effective human-robot interaction. Featuring Piab's proprietary and highly efficient COAX® vacuum technology, piCOBOT® comprises a vacuum pump unit and a gripper unit fitted with suction cups. Piab's extensive range of suction cups enables customers to tailor their own solutions.

"The cobot market is exploding at the moment, so it is hardly surprising that manufacturers are interested in combining their cobots with our genuinely flexible and user-friendly end-of-arm-tool. piCOBOT® enables energy-optimized and safe operation, ensuring that the manufacturers' cobots become as productive as possible," said Jan Schieche, Global Product Manager Automation.

Providing optimal payload capacity for the cobot, piCOBOT® including the gripper weighs only 1.59 lb. Despite its minimal weight, Piab's EOAT is still able to lift objects weighing up to 15.4 lb. A compact format and low build height of 2.72 in also allow piCOBOT® to be used in space-restricted areas. Designed for maximum flexibility and

reach, piCOBOT® is 3.82-5.59 in wide and its gripper arm is tiltable to +/-15 degrees.

"piCOBOT® can now be used to extend the reach of all cobots regardless of brand, making collaborative robots even more collaborative, and in doing so promoting more user-friendly and productive working environments," said Jan Schieche.

About Piab

Piab provides smart solutions for the automated world, helping thousands of end users and machine producers in e-commerce logistics, food, pharma, automotive and other manufacturing industries to improve energy-efficiency, productivity and working environments. With 430 employees and SEK 1bn in sales 2017, Piab is a global organization, serving customers in almost 70 countries from a network of subsidiaries and distributors. By leveraging the ongoing technological development in automation and robotics, and targeting high-growth segments and geographies, Piab's vision is to become the global leader in gripping and moving solutions. For more information, visit www.piab.com.



Piab's end-of-arm vacuum tool piCOBOT® is now configurable for any cobot.

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JAN 24 **How to Conduct a Compressed Air Leak Audit**
 Presenter Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting
 January 23, 2020 – 2:00PM EST

JUN 06 **VSD Air Compressor Installation Guidelines**
 Presenter Loran Circle, Senior Consultant, Compressed Air System Training & Consulting
 June 18, 2020 – 2:00PM EST

FEB 28 **Verifying Blower System Energy with PTC 13**
 Presenter Tom Jenkins, P.E., President, JenTech Inc.
 February 20, 2020 – 2:00PM EST

JUN 27 **Where Does Blower Air Go? Process Fundamentals**
 Presenter Tom Jenkins, P.E., President, JenTech Inc.
 July 16, 2020 – 2:00PM EST

MAR 14 **Designing Piping Systems for Low Pressure Drop**
 Presenter Tom Taranto, Owner, Data Power Services
 March 19, 2020 – 2:00PM EST

JUL 18 **Calculating Storage for Demand Events**
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 August 20, 2020 – 2:00PM EST

APR 04 **How to Correctly Size Vacuum Pumps**
 Presenter Chris Gordon, President & CEO, Blackhawk Equipment
 April 16, 2020 – 2:00PM EST

AUG 22 **Vacuum System Efficiency Projects**
 Presenter Chris Gordon, President & CEO, Blackhawk Equipment
 October 15, 2020 – 2:00PM EST

APR 25 **Air Compressor Master Controls to Prevent Control Gap**
 Presenter Tim Dugan, P.E., President and Principal Engineer,
 Compression Engineering Corporation
 May 21, 2020 – 2:00PM EST

DEC 12 **Measuring KPI's: kW, Flow, Pressure, Dewpoint**
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INDUSTRIAL BLOWER & VACUUM SYSTEMS



Improved Vacuum Supply Conserves Energy AT MEAT PROCESSING OPERATIONS

BY ULI MERKLE, BUSCH VACUUM PUMPS AND SYSTEMS

► The right vacuum solution not only ensures product quality in meat processing operations; it also helps companies achieve important sustainability goals. Such is the case at two leading meat processing companies in Germany, both of whom added Busch Vacuum Pumps and Systems solutions to their operations and saved energy and more as a result.

Dieter Hein: Increasing Efficiencies and Improving Sustainability

EG Fleischwarenfabrik Dieter Hein GmbH & Co. KG produces a wide array of meat and

sausage specialties for customers across Europe and the United States. The story of Fleischwarenfabrik Dieter Hein began over 80 years ago, with a butcher shop in Görlitz established by master butcher Georg Hein. His son Dieter Hein continued the tradition, opening a small shop in Osnabrück in 1961. The next step in the company's development was the inauguration of the current meat production factory in Hasbergen on the outskirts of Osnabrück in 1975. A second production facility opened in Görlitz in 1996.

As a comprehensive supplier, Dieter Hein produces cold cuts of meat for wholesalers,

ranging from ready-to-serve roast convenience foods – such as meatballs, kebab meat burgers and crispy sliced bacon – to specialty produce for delicatessens, such as uncooked, cold meat, ham, roast meats, turkey and much more.

As a company committed to environmental awareness, Dieter Hein has always strived toward energy-efficient production and preserving resources. With these goals in mind, it set out to further increase the efficiency of its central vacuum supply at its Hasbergen production plant.

Industry 4.0-ready Vacuum Pump Vetted

Given its focus on energy conservation, Dieter Hein had already installed a centralized vacuum supply for its packaging machines at the plant, consequently tapping into huge energy-savings potential. To save even more energy, it installed a Busch R 5 RA 0760 A PLUS rotary vacuum pump on the central vacuum system. Dieter Hein is Germany's first-ever meat processor to pilot the Busch R 5 PLUS vacuum pump, which is Industry 4.0-ready and equipped with built-in pressure control and a Programmable Logic Controller (PLC).

At the processing plant, more than 300 employees work in three shifts, whereby the third shift is tasked with cleaning. Produce is packaged using a total of nine automatic thermoforming machines, which are connected to a central, fully automatic, on-demand vacuum supply. A vacuum pumping unit generates the rough vacuum for pre-evacuating the packaging chambers to 45 millibars. Control valves activate a fine vacuum pumping unit as soon as the system has generated the 45 millibars at which point a second evacuation process starts to reduce the conditions in the packaging to a vacuum level of 3 to 4 millibars. A third vacuum module generates the vacuum for thermoforming the base foil in the forming station of each individual packaging machine.

To cut the energy consumption even further, Dieter Hein's Thomas Pelke, Head of Maintenance, and Bernd Wörner, Head of the Energy Division, decided to trial Busch's R 5 PLUS vacuum pump.

The vacuum pump features a frequency-controlled motor and an integrated control unit as standard. A pressure sensor permanently

measures the vacuum level at the inlet to the vacuum pump. As a result, the R 5 PLUS can quickly respond to any change in demand by adapting the pumping speed to current requirements. The control range stretches from 35 to 60 hertz, equivalent to a pumping speed of 440 to 760 cubic meters per hour.

The new vacuum pump was integrated into the central vacuum supply at the end of 2018, replacing the unregulated rotary vane vacuum pump with a pumping speed of 630 cubic meters per hour. Installed over 20 years ago, the existing pump was responsible for maintaining the system's rough vacuum. The new vacuum pump was not connected to the central vacuum supply's control unit as it is self-regulating. The control system was programmed using the built-in display, though

this was restricted to setting the required vacuum level to 45 millibars.

Varied Vacuum Levels Satisfied with Less Energy

It only took a few weeks of operating time for the benefits of this intelligent vacuum pump to come to the fore. In the previously installed central vacuum system, the rough vacuum tended to fail when multiple packaging machines suddenly required a high pumping speed and the vacuum pump had already been switched off because the required vacuum level had been reached. As a result, the unregulated vacuum pump had to restart first and it consequently took longer to reach the full pumping speed of 630 cubic meters per hour.

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IMPROVED VACUUM SUPPLY CONSERVES ENERGY AT MEAT PROCESSING OPERATIONS

The new R 5 PLUS maintains a speed of 35 hertz. At this speed, it consumes roughly 60 to 70% of the nominal motor rating of 18.5 kilowatts while also maintaining the selected vacuum level. So, if the pumping speed suddenly increases – for instance, if several packaging machines are switched on at the same time to operate at the same speed – the R 5 PLUS reacts straight away and can increase the output up to 120% until the surge in demand has been satisfied.

The vacuum pump's 7.5-inch display lets Wörner keep an eye on the recorded data at

all times. Wörner has realized that, on average, the R 5 PLUS runs at just 60% of its capacity. It consumes just 60 to 70% of the nominal motor rating in electrical power because it maintains the selected vacuum level. On this basis, the vacuum pump's motor actually consumes roughly 6 to 8 kilowatts. This figure is shown directly on the display – a particularly useful feature when the goal is to achieve maximum energy savings during operation without having a negative impact on the packaging quality or cycle time. The company can also analyze data recorded over an extended period because

data is permanently stored on the integrated PLC. Data can be printed out in tables or graphs at any time. Wörner also noticed yet another benefit as soon as they started up the pump, noting, "The pump is practically silent." To be precise, the vacuum pump generates a noise level of just 70 dBA at top speed.

As the energy manager at Dieter Hein, Wörner is very happy with the results of the trial. Apart from saving additional energy, the vacuum pump allows the company to react specifically to the packaging machines' power requirements, it records data permanently on the integrated PLC, and links this data to the packaging machines' PLC or PLC-control unit.

Peter Mattfeld & Sohn: Reducing CO₂ Emissions and Operating Costs

As the first EC-certified butchering facility in Hamburg, Peter Mattfeld & Sohn GmbH is committed to resource-saving and sustainable production. An energy management audit in 2010 led to the decision to replace the vacuum supply on the individual packaging machines with a much more energy-efficient central vacuum system from Busch. This change has reduced CO₂ emissions by 20 tons per year, which is an enormous benefit for the environment. At the same time, operating costs were reduced by 8,100 euros annually.

Peter Mattfeld & Sohn butchers and processes up to 1,200 pig halves and 100 beef quarters



Dieter Hein is well known for its meat and sausage specialties.



“The newly installed vacuum system had fewer vacuum pumps than previously required for the decentralized solution. This in itself brought further energy savings.”

— Uli Merkle, Busch Vacuum Pumps and Systems

per day. The meat products are cut to customer requirements or packaged as standard products and sold to customers throughout Germany. Already in its third generation, Peter Mattfeld & Sohn is located on the premises of the meat wholesale market in Hamburg. The former agency for pig and beef halves has developed into a company with 150 employees today.

The butchering of pork halves and beef quarters remains an important business area of Peter Mattfeld & Sohn, and one of the specialties is the North German heifer meat. The cash and carry fresh foods market for bulk purchasers, wholesale meat imports, as well as the artisan convenience food production, form three further pillars of the business.

The broad business segment and product range also explain the complexity of the customer base. In addition to the general food industry, wholesalers and communal caterers from the clinics and catering sectors throughout Germany are among their customers.

Peter Mattfeld & Sohn was already a participant in the “Unternehmen für Ressourcenschutz” (companies for resource protection) project of the Hanseatic City of Hamburg in 2009 and is also Hamburg’s environmental partner.

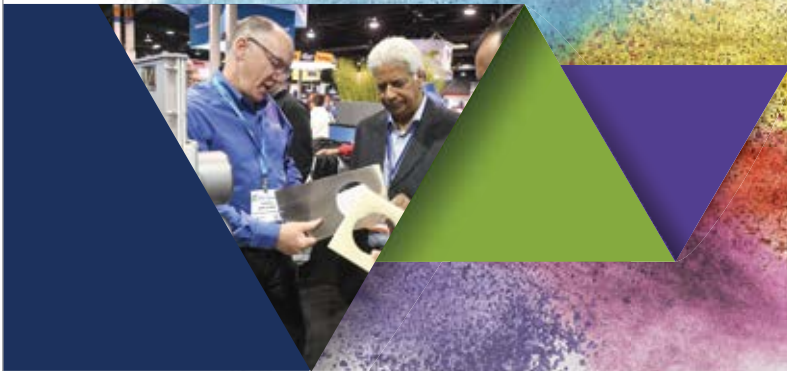
Unwanted Vacuum Pump Heat Emissions Drives Change

The decision to change the vacuum system was the fact that the existing vacuum pumps in the three thermoforming packaging

machines and one chamber packaging machine, with their heat radiation and exhaust air, unnecessarily heated the room air that was cooled to 48.2 °F (9 °C). Additional energy was then needed to cool the air in production areas. For Peter Mattfeld & Sohn Managing Director Kai Mattfeld it was clear he would bring Busch Vacuum Pumps and Systems on board as a recognized specialist for vacuum generation during packaging.

Busch offered a central vacuum system, which was installed in a room separated from the cooled production areas. The individual packaging chambers are evacuated in two stages to be able to run maximum cycle frequencies on the packaging lines. The critical pressure gradient is exploited in each case.

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IMPROVED VACUUM SUPPLY CONSERVES ENERGY AT MEAT PROCESSING OPERATIONS



Shown is the Busch R 5 RA 0760 A PLUS rotary vacuum pump at Dieter Hein's plant in Hasbergen, Germany.

This enables the fastest possible evacuation time and thus achieves the highest possible cycle time on every packaging machine. This involves one ring line for the rough vacuum for the first evacuation. Additionally, one ring line is used for the medium vacuum for the evacuation to packaging pressure, which also connects the packaging machines with the vacuum system. The reversing valves with the corresponding control unit are mounted on the packaging machines or in the control cabinet next to them. They control the transition from rough to medium vacuum.

For thermoforming packaging machines, the molding stations are supplied using a separate thermoforming vacuum pump unit. This ensures the previously heated base foils are sucked into the tray mold and take the desired shape. This separation into different vacuum stations is necessary as molding and packaging require different vacuum levels. Additionally, a substantially lower pumping speed is required for the two-stage evacuation of the packaging chamber.

One vacuum vessel each for rough, medium and forming vacuum also ensures the packaging pressure remains at a constant level, even when all packaging machines are running synchronously. In addition, these buffers ensure vacuum is immediately applied to the packaging chambers when required. The central vacuum system is fully automatic: it activates individual vacuum modules if a higher vacuum level is required and/or switches off individual vacuum modules if the demand in vacuum is lower.

Energy Savings Realized, Operational Reliability Bolstered

The advantages of the vacuum system were obvious soon after it was installed. The



Peter Mattfeld & Sohn GmbH's plant in Hamburg, Germany.

energy used to cool the production rooms could be reduced because there were no vacuum pumps installed any longer, avoiding unwanted heat emissions in the cooled rooms. The newly installed vacuum system had fewer vacuum pumps than previously required for the decentralized solution. This in itself brought further energy savings.

Additionally, the plant benefitted because individual vacuum pumps are automatically switched off by the vacuum system's control unit if the vacuum level in the vacuum vessels can be maintained with reduced pumping speed. The vacuum pumps in the packaging machines, on the other hand, ran non-stop from switching on the packaging machine to switching it off. Mattfeld said some vacuum pumps used to be in permanent operation from early in the morning until late in the evening, regardless of whether the machines were packaging or not.

Operational reliability was another important criterion when Mattfeld purchased the central vacuum system. Due to the modular design of the vacuum system and the subdivision into rough, medium and forming vacuum, the performance of a vacuum pump can be automatically adopted by a stand-by vacuum pump in the event of a failure. The failure of a vacuum pump thus has no impact on packaging, neither in terms of quality nor speed. This ensures maximum operational reliability for the vacuum supply to the packaging machines. In addition, it offers the advantage of allowing maintenance work to be carried out during ongoing operation, as individual vacuum pumps can be disconnected from the vacuum system and maintained while the central vacuum system continues to run. To ensure all regular



Shown is the central vacuum system at Peter Mattfeld & Sohn's operation.

maintenance work is carried out on time and professionally for a fixed rate, Peter Mattfeld & Sohn has signed a service agreement with Busch.

Several years after going into operation, Mattfeld knew his decision to centralize the vacuum supply was the right one – from an economic point of view and for the sake of the environment. **BP**

About Busch Vacuum Pumps and Systems

Busch Vacuum Pumps and Systems is one of the largest manufacturers of vacuum pumps, blowers and compressors in the world. Our products are at the forefront of vacuum and low-pressure technology. For more information, visit www.buschvacuum.com.

About the Author

Uli Merkle is Head of Marketing Services at Busch Dienste GmbH in Germany, part of the international group of Busch Vacuum Pumps and Systems, email: uli.merkle@busch.de.

All photos courtesy of Busch Vacuum Pumps and Systems.

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AERATION BLOWER SYSTEMS

A REVIEW OF ASME PTC 13 WIRE-TO-AIR Performance Test Code for Blower Systems

BY DARREL HILL, AERZEN USA

► Finally, a test code has been created that will provide accurate performance comparisons for both positive displacement and dynamic (centrifugal) blowers. ASME PTC 13 provides procedures for determining the required total operating electrical power of a packaged blower system, termed the “wire-to-air” performance. Here’s a review of PTC 13 and considerations related to this important standard.

ASME PTC 9 and PTC 10

Previous ASME Test Codes PTC 9 for positive displacement and PTC 10 for dynamic machines were inadequate for current technologies and the demands of customers and the market.

PTC 9 for positive displacement blowers is an inactive specification. The ASME website states, “This standard is no longer an American

National Standard or an ASME-approved standard. It is available for historical reference only.” For more, visit www.asme.org.

Aerzen (and others) recognized the inadequacies of PTC 10 many years ago and wrote about it in a white paper titled, “Why ASME PTC 10 is not sufficient to define the testing of a High-Speed Turbo Blower.”

1. PTC 10 allows for measuring the flow at the inlet of the blower. This assumes all the air entering the blower comes out of the discharge connection, which may not be true.
2. PTC 10 does not provide any guidelines for a contractual guarantee. Commercial items were outside the scope of this test code.
3. PTC 10 does not discuss or make any reference to the term “wire-to-air.” This was a test code primarily for bare stage testing and not appropriate for a packaged blower system with an integrated high-speed motor, variable frequency drive, controls, filtration, etc.
4. PTC 10 does not show any test arrangement where the blower is inside the box (the enclosure). Today’s customer and the market purchase a blower with a sound enclosure for the most part. The heat that could be trapped inside the enclosure and the pressure loss through the inlet air filtration will negatively impact the blower performance.
5. PTC 10 would allow a turbo blower test of just the blower core. As stated earlier, PTC 10 was written back in the days when a blower or compressor stage could be easily separated from the rest of the system and tested as an individual component.

ASME PTC 13 Goals

PTC 13 was written by a group that represented ASME, equipment manufacturers, specifying engineering authorities, and end users. Aerzen



The ASME PTC 13 conforming factory test facility at the Aerzen Coatesville, Pennsylvania, facility.

is proud to be a member of the PTC 13 Committee. PTC 13 was developed to attain the following goals:

- Develop a procedure to accurately verify the overall electric (wire) power required by an aeration blower to supply a specified volume of air, with a specified pressure rise, at a specified set of anticipated site inlet conditions.
- Focus on testing the total power required for all power consuming devices in modern integrated blower packages.
- Make the code applicable to both dynamic (axial and centrifugal) and displacement blower packages.
- Make the process of blower testing more accessible for



Darrel Hill, Director of Industrial Sales, Aerzen USA

specifiers and purchasers of Water Resources Facility (WRF) blowers by simplifying thermodynamic guidelines.

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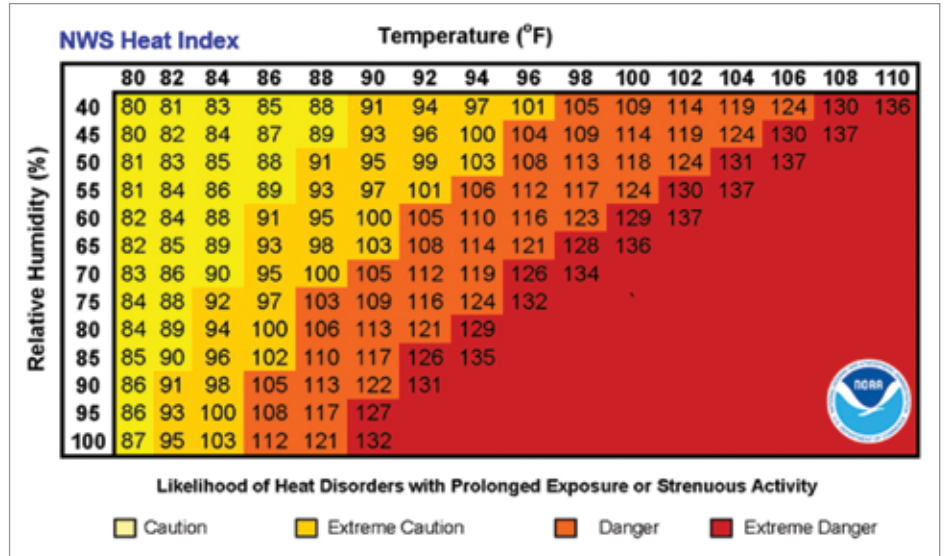


A REVIEW OF ASME PTC 13 WIRE-TO-AIR PERFORMANCE TEST CODE FOR BLOWER SYSTEMS

While this appears to be a perfect solution for all stakeholders, caution that this test code is not “self-driving” and the specifier must still get his or her hands “dirty” in order to get the desired results. Several decisions should be made, including:

1. What operating points should be tested? This takes some educated guesses, but you want to specify to the best of your ability, operating points that represent where the blower will operate when you get it installed at your plant. Many times, we see specifications that will list the historical maximum ambient temperature along with 100% Relative Humidity (RH). While this seems like a prudent decision, a deeper investigation would reveal this combination rarely, if ever occurs. The “heat index” is determined by the combination of ambient temperature and relative humidity. As an example, a U.S. record heat shows an index in Iowa of 131 °F... 90% RH and 92 °F.

Another downside of specifying extreme ambient conditions is that the blower needs to be oversized to provide the pounds of O₂ needed for aeration,



2. The test code is written for determining the wire-to-air performance of a blower system in a controlled environment. A decision needs to be made on what is included in the “blower system.” A checklist of components and boundaries is shown in PTC 13 for reference.
3. Commercial agreements are not provided for by this code. It’s important to ask:
 - What is the method for comparing test results with possibly leading to less efficiency at your normal operating point and reduced turndown.
 - What is the penalty or remedies if the test results fall short of the guarantee? How should the blowers be evaluated when performance results come in more positive on most specified points but may have a few points with greater energy consumption? Are these results to be averaged, or do they stand independently?
 - What is the allowable power tolerance between the guarantee and the test?



“PTC 13 testing is not for everyone. It is a rigorous test that may add cost and time to the project. Customers and specifying engineers should think about whether PTC 13 testing adds value for the project.”

— Darrel Hill, Aerzen USA

A REVIEW OF ASME PTC 13 WIRE-TO-AIR PERFORMANCE TEST CODE FOR BLOWER SYSTEMS

- If multiple blowers are purchased for the same application, are all the blowers tested? Does each test result stand independently, or are the results averaged?

A comprehensive list of items for which agreement shall be reached prior to conducting the performance test is included in Section 3 of the code. Some other important items not listed above include: Will the test be witnessed and who pays that cost? Will the test only be for establishing performance, or will there be other mechanical considerations such as vibration and noise? What amount of documentation is required, pre-test and post-test?



PTC 13 provides procedures for determining the required total operating electrical power of a packaged blower system, termed the “wire-to-air” performance.



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Also: While PTC 13 is an ideal technical solution for evaluating blower performance, it does not provide any contractual commercial guidance.

Finally, PTC 13 testing is not for everyone. It is a rigorous test that may add cost and time to the project. Customers and specifying engineers should think about whether PTC 13 testing adds value for the project. For example, if you are only purchasing small horsepower (hp) blowers, say 50 hp or less, the energy usage of Brand A blower versus Brand B blower may not be so important since energy savings may be minimal.

As a blower manufacturer, Aerzen wholeheartedly welcomes this new testing standard as it will:

1. Bring more awareness to the test procedures and methods used by manufacturers.
2. Add much-needed clarity during the bid phase of a project.
3. Allow customer to make accurate performance comparisons between different blower technologies and manufacturers. **BP**

About the Author

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About Aerzen USA

Aerzen USA is a wholly owned division of the German manufacturer, Aerzener Maschinenfabrik GmbH, and has been a recognized world leader in the production of rotary positive displacement machines since 1868. Aerzen USA is based in Coatesville, Pennsylvania. For more information, visit www.aerzen.com/en-us.

All photos courtesy of Aerzen USA.

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INDUSTRIAL BLOWER & VACUUM SYSTEMS



MEAT PROCESSOR SAVES MILLIONS OF GALLONS of Water with Engineered Vacuum Solution

BY TRAVIS DINGEE, SOLBERG MANUFACTURING,
AND MICK WENTZEL, BECKER PUMPS CORP. USA

► Part of the Solberg Manufacturing mission statement is to “innovate and discover new possibilities,” which is what they accomplished in partnership with Becker Pumps Corp. USA when tackling a unique pump and filtration challenge for a meat processing plant. Working together, the companies engineered a total vacuum solution that allows the plant to save millions of gallons of water per year.

Vacuum Key to Meat-Mixing Process

Vacuum can be used in many ways for the meat processing and packaging industry. From mixing ingredients to evisceration (removing organs, excess fat, bones, etc.), to the washing/preparation of the meats or even in the packaging of the meat itself, vacuum is critical to the industry.

In this case, Becker’s meat processing customer uses large tumblers/meat massagers to add ingredients to specialty meats like the

turkey, chicken, and ham products found in the local deli aisle. This application called for vacuum to be pulled on the tumblers/massagers to help infuse the spices into the meat. The customer has three locations across the United States with a total of 15 tumblers, each one using its own vacuum pump.

The company was spending a significant amount of money on water due to its existing installations of water sealed liquid ring vacuum pumps. Liquid ring pumps can consume large quantities of water when creating vacuum. Using this type of pump technology required the customer to pay for clean water coming in and also the wastewater going back out. In addition to these expenses, the customer needed to ensure the wastewater was “clean enough” to discharge back through the local sewer system adding more cost. One last concern for the customer was that their liquid ring pumps required the incoming water temperature to be maintained at a certain level, or they would risk losing pump

performance and fail to meet the vacuum level required for the meat-mixing process to continue trouble-free.

A liquid ring vacuum pump is a positive displacement pump that uses a rotating impeller and a sealing fluid, in this case water, to create vacuum. This technology is well suited for many vacuum applications. However, in today's world where plant operators are seeking to improve their energy consumption and water conservation practices, alternative vacuum pump technologies are being explored to help achieve environmental and sustainability goals.

Lubricated Vane Pumps: Part 1 of the Solution

The challenge with liquid ring vacuum pumps at the meat processor's operations is that, while the meat and spice product is being mixed, the vacuum pump can pull pieces of meat/fat, liquids/juices, spice



An engineered vacuum solution helps a meat processor save approximately 225 gallons of water per minute during a meat-mixing process – and save on wastewater treatment costs.

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

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MEAT PROCESSOR SAVES MILLIONS OF GALLONS OF WATER WITH ENGINEERED VACUUM SOLUTION

particulate and other contaminants into the vacuum pump. In this application, these pieces of meat, slugs of liquid, and excess spices are pulled through the pump where they are collected and disposed of before the contaminated water is released to the local sewer system.

Decision makers at the meat processing company were concerned about the amount of water they were using to operate their liquid ring pumps and proper treatment of the wastewater prior to disposal. Another concern was the need to properly maintain the water temperature to meet the requirements of the process. After conferring with Becker, the company decided to retrofit their process with Becker lubricated vane pump technology, eliminating the customer's concerns about water consumption, water temperature control, and wastewater disposal because the pumps require no water to operate.

Becker's lubricated rotary vane pumps use a sliding vane principle as opposed to a one-piece rotor, allowing them to operate without consuming water. If the rotary vane pump operates at a high enough temperature, the pump can tolerate moisture in vapor form coming from the process because the moisture will stay in vapor form and pass through the pump. However, the rotary vane pump is not designed to ingest larger slugs or sustained droplets of liquid.



A Solberg LRS Series knockout pot is the first line of defense for a lubricated vane pump used in meat processing application.

Given the harsh nature of the meat-mixing process and the associated heavy contaminant loads, the switch to lubricated rotary vane pump technology places the utmost importance on installing the proper filtration and separation to complete the vacuum system. Specifically, contaminants in the form of liquid slugs/droplets and debris, if ingested into the pump, will interfere with oil viscosity and impact pump performance resulting in

poor efficiency and increased maintenance. These ingested contaminants will eventually damage the bearings, vanes, and other working components of the pump. The emulsion of the oil can also potentially create rust on the internals of the pump. Ultimately, it will lead to downtime and costly pump rebuilds.

Knockout Pot and Policing Filter: Part 2 of the Final Solution

Becker consulted with Solberg to determine the solution that would minimize the potential of any issues with installing a lubricated rotary vane pump in the meat-mixing application. Working with the pump curve, application details, and desired outcomes for the project, Solberg and Becker collaborated to formulate a filtration solution that would protect the new lubricated vane pumps and deliver a total vacuum solution for the meat processing company.

The Solberg filtration and separation solution included its LRS series (liquid removal) knockout pot to capture the droplets, slugs of liquid, and seasoning particulate that come in both large clumps and fine dust.

The LRS style canister features an integrated mechanical baffle and an expansion chamber, while allowing for significant liquid/slurry holding capacity. It also features a five-micron, polyester filter element rated for



“The solution also saves costs since the company needed to pay for 225 gallons of water coming into the facility and leaving it during every minute the tumblers operated.”

— Travis Dingee, Solberg, Manufacturing, and Mick Wentzel, Becker Pumps Corp. USA

99% efficiency. This system was installed in-between the tumblers and the vacuum pump. The process air leaves the mixing tumblers and flows into the LRS knockout pot, hitting the integrated baffle, which immediately knocks out any liquid slugs and heavier particulate (meat/spice mixture) to the bottom of the canister. Through a change in airflow, the process air is then moved through the filter to collect any of the remaining seasoning dust and then carried out the outlet of the assembly as clean process air. The liquid/particulate sits in the bottom of the filter, to be drained/cleaned out between production runs. The filter can also be easily changed out between production runs.

Since the pump and filtration system was new to the meat processor, the Becker-Solberg team added a “fail-safe” or policing filter to the solution so staff at any operation would know if something was running incorrectly. The ST style inline vacuum trap located after the LRS filter and directly before the lubricated vane vacuum pump utilizes a clear bucket, which allows for visual inspection of the process to see if anything is bypassing the first filter. The same standard five-micron polyester filter element is also used in this housing and acts as a “last line of defense,” or short-term catastrophic failure protection for the pump in case regular maintenance isn’t performed on the first filter.

Saving Approximately 225 Gallons of Water Per Minute

In the end, the customer is highly satisfied with the results. Installed nearly two years ago by the Becker team, the pump and filtration solution saves the meat processor 11-15 gallons of



A Solberg ST inline vacuum filter adds another layer of protection for an engineered vacuum solution installed at a meat processor's plants.

water per minute, per mixer. That translates to roughly 225 gallons of water for each minute the mixers are running, saving the customer millions of gallons of water annually. The solution also saves costs since the company needed to pay for 225 gallons of water coming into the facility and leaving it during every minute the tumblers operated. In addition, the meat processing operations no longer need to maintain water temperatures or worry about the condition of the water that had been pushed down the local sewer system.

Today, Becker continues to install the innovative solution at other meat processing facilities that need a total vacuum solution for similar applications. **BP**

About the Authors

Travis Dingee is the National Accounts Manager at Solberg Manufacturing, email: Travis.Dingee@solbergmfg.com; and Mick Wentzel serves as Southeast Regional Manager at Becker Pumps Corp. USA, email: Mick.Wentzel@beckerpumps.com.

About Solberg Manufacturing

As an international market leader in filtration, separation, and silencing, award-winning Solberg Manufacturing, Inc., based in Itasca, Illinois, is recognized as a trusted partner to its customers, colleagues, and suppliers. Its diverse and highly effective filtration solutions play a role in operations around the globe. Solberg believes that having the proper filtration and separation technology is essential for any businesses operating rotating equipment. After all, the filter completes the system, protecting equipment while also reducing air, noise, and other forms of pollution in the work environment.

The Solberg name has become synonymous with quality in the aerospace, food processing, agriculture, pneumatic conveying, wastewater, medical, power generation, printing, plastics, and other manufacturing industries. For more information, visit www.solbergmfg.com.

About Becker Pumps Corp. USA

Becker manufactures a complete line of oil-flooded and oil-free rotary vane, regenerative blowers, rotary screw vacuum pumps, and low-pressure compressors. These pumps are incorporated into complete central systems and variable frequency drive units to offer an economical and environmentally friendly alternative to standard models. Becker has an internationally networked development team to work with customers on providing equipment manufacturers with the appropriate pump for their application. Manufactured to the highest quality standards in Germany, Becker has brought superior engineering to the global marketplace for over 130 years. Becker pumps can be found on virtually every type of equipment that requires vacuum or pressure. Becker pumps are also predominantly used in many different industries which include food packaging, printing, woodworking, paper converting, cosmetic, pharmaceutical, beverage, dairy, chemical, medical device and consumer packaging. To learn more, visit www.beckerpumps.com

All photos courtesy of Solberg Manufacturing and Becker Pumps Corp. USA.

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AERATION BLOWER SYSTEMS

EXPERT VIEWPOINT: HOWDEN AMERICA ON the Importance of Blower Control Technology

BY TOM JENKINS AND MIKE GRENNIER,
BLOWER & VACUUM BEST PRACTICES MAGAZINE

The value of controls technology to optimize blowers is only expected to increase as wastewater treatment plants and industrial operations alike look to improve production and save energy. Shown are Howden KA Single-stage turbo blowers at a major wastewater treatment plant.

► One of the most exciting technologies impacting the ability of end-users to optimize blowers at their wastewater treatment plants and manufacturing operations is controls. Blower & Vacuum Best Practices interviewed Tim Hilgart, of Howden America, to get his perspective on blower controls technology and its application.

Good morning! Tell us about your professional background and experience with blower control technology.

At Howden, I lead the Environmental Sales Team for North America, which covers the United States, Canada and Mexico. Environmental Sales is how we describe

the side of the business involving blowers and low-pressure, high-volume air compressors in the wastewater industry, as well as various marine applications. We have another division dedicated to industrial blowers used in industrial applications, such those found in cement manufacturing, mining, and food and beverage applications among others.



“About 15 years ago everyone kind of thought control technology was voodoo and they really didn’t know what was happening with it, but it somehow worked.”

— Tim Hilgart, Howden America

I earned a Bachelor of Science Degree in Electrical and Computer Engineering from Marquette University in 1996. Since then, blower control technology has been an integral part of my career. This includes my first job out of college at Energy Strategies Corp. (ESCOR), which is a company involved in advanced aeration controls. I later joined General Electric's Industrial Air and Gas Technology business unit. At both companies, I spent considerable time focused on PLC and HMI programming for blowers and various applications.

Describe a basic blower control system used in today's treatment plants and factories.

Fundamentally, a typical blower control system is comprised of controllers used on individual

blowers to modulate the airflow to the system, while a centralized Master Control Panel integrates the blowers and ensures they work together to achieve optimum energy efficiency based on the processes involved.

Realistically, there are three hardware and control strategies for blowers and air compressors.

The first is protection-only controls where you're basically making sure the blower is operating safely, and if it gets out of stable range, shuts it down to protect it. The second strategy is what we call "process controls" in which we vary the speed and/or change the guide vane parameters to change the flow and pressure output of the machine.

The third leg is tying the blowers in with the



Tim Hilgart, Environmental and Digital Data Advantage Sales Leader, Howden America.



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EXPERT VIEWPOINT: HOWDEN AMERICA ON THE IMPORTANCE OF BLOWER CONTROL TECHNOLOGY

master control, which coordinates all blower operations, including lead/lag swapping, total volume, total pressure output, and splitting the load and integrating it into larger process control systems.

We don't see a lot of blower packages sold with the master controls included. Instead, it's mostly the blower being sent out with its own control panel and then integrated into the master controller, whether it's at a treatment plant or industrial facility. Industrial customers have been integrating the blower control and integration into their Distributed Control Systems for the better part of a decade and we are starting to see that carry over to the environmental market as well. We're always willing to work with the customer as a trusted advisor to accomplish their goals.

Who typically sets up and configures the blower control system?

It's different for the municipal wastewater treatment market than it is with factories.

A project bid for treatment plants usually includes separate sections for the blower and controls, which then opens up the controls piece of it to systems integrators who are doing the integration of the blower with the overall SCADA system. Systems integrators are okay with process control coordination, but they usually rely on us, as the manufacturer, to handle the protection part of it. They don't want to take responsibility for a large piece of equipment like a blower. Many consulting engineers would like to see the manufacturer handle it all and take on the responsibility for controls

from A to Z, but that's typically not how it works, due to need for competitive bidding.

In the industrial side, we're seeing more end-users taking on responsibility for all aspects of the blower controls. As an example, we work with a glass factory and they've got a full-time staff of control engineers running around the plant making sure the equipment is all coordinated with the plant's master control system. Manufacturing operations are really taking on more self-responsibility for system integration.

How would you describe the comfort level of those who put blower controls into practice?

About 15 years ago everyone kind of thought control technology was voodoo and they really didn't know what was happening with it, but it somehow worked. End-users and operators didn't even want to touch a blower control panel. But the level of participation in the technology and the acceptance of automated controls has grown.

While the protection-only controls are usually hard wired, customers often make changes themselves to fine-tune the system as far as process control and we'll partner with them on those types of things. We're at the point now where operators and end-users anticipate using controls. In fact, I sometimes have to spend more time explaining how to change out an airflow transmitter than changing the settings on the control systems, which is exactly the opposite of how it was when the industry first began to adopt blower control technology.



Shown is Howden's EasyAir™ Turbo Blower, which is a fully integrated and compact single-stage blower for use in the wastewater treatment industry.

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What factors are driving this increase in acceptance of the technology?

I think it's kind of a reflection of society with everyone having smartphones and tablets. It's made everyone more comfortable with seeing this stuff.

Another trend we're seeing is end-users and consulting engineers saying, "Yeah, we see how all of these different types of blower technologies work, but I also really care about who's supplying it. Who's doing the actual packaging of it? Who's going to support it?" It's putting more emphasis on the need for support from blower manufacturers and distributors.

Are there other factors driving the need for support in the field?

The short answer is, yes. While controls knowledge is expanding the mechanical knowledge is slowing down, particularly at treatment plants. A lot of those facilities don't have the mechanical operators they used to have, which is a major concern for the field since nearly half of the professionals in the industry are retiring. You're losing a lot of guys with an electrical background who can fix a starter, let alone a Variable Frequency Drive (VFD). I think the quality of the operations have improved on the process side, but the mechanical capabilities of the plant staffing has started to regress a little.

We don't see this as much of this on the industrial side of blower applications. The industrial segment still has the solid base of mechanical talent in place. You still see lot of mechanical engineers at factories versus treatment plants.

I think another concern from the end-user's perspective as far as machines has to do with them getting bombarded with efficiency, reliability and total cost of ownership and everybody's got the best solution for it, whether it's rotary screw blowers, geared blowers, or high-speed centrifugal technology, etc. Their question is, "How do we know what's best and who's going to prove it for us?"



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There isn't an easy answer. At Howden we're trying to take on that challenge by providing the various technologies and saying, "Here's what's good in this application and this is what's good over in this other application and these are the trades offs." I think the market is looking for honesty. This is what ASME PTC 13 is designed to do. It should help level the playing field.

What does a higher comfortable level with blower controls mean as far as the Internet of Things (IoT) and Industry 4.0?

To answer that question, it's important to define these terms.

IoT describes the connection of devices and equipment in factories and the ability to transfer information over a network. IoT is about making things Internet-ready and being able to connect through the Internet. It's an enabling pillar that supports Industry 4.0.

Industry 4.0, which is also referred to as Factory 4.0., is about the way in which you take the information now available and use it. Everybody has servers full of equipment and operational data they've been collecting and storing over the years, whether the information is stored on a hard drive, or to a server maintained by a cloud provider. The question is, "What do you do with it?"

I think most everyone is aware of IoT but only about half of the users of blowers and air compressors are out there doing things with the data as part of Industry 4.0.

So how can end-users put data related to blower operation to good use?

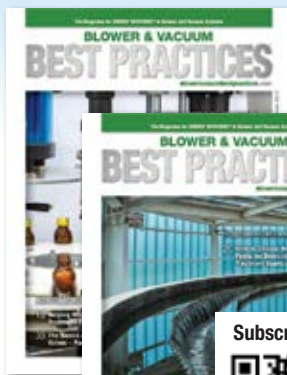
You want to be proactive rather than reactive, which is where the manufacturer comes in. I say that because we have the knowledge of knowing how that equipment is supposed to be running.

A buzzword now used is "digital twin," which describes the ability of the manufacturer to run a theoretical blower or air compressor

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EXPERT VIEWPOINT: HOWDEN AMERICA ON THE IMPORTANCE OF BLOWER CONTROL TECHNOLOGY

on its server that matches the machine at the treatment plant or factory. As a manufacturer we can see how the customer is operating it and we know what the output of the blower should be compared to what it's actually doing. That lets us go back to the customer and work toward predictive maintenance rather than reactive maintenance, allowing them more uptime for their equipment. It also allows us to optimize the efficiency of their system so they're spending less money on how they're running it.

What are you seeing as far as treatment plants and factories having the manufacturer involved in leveraging equipment data?

You don't always see blowers being applied in the right way at treatment plants, or not operating as efficiently as they could operate process-wise. As the trust between the manufacturer and treatment facilities develop it will allow companies like Howden to provide more guidance to plant operators.

The industrial side is a different story since it's about maximizing the efficiency of the machine to increase profit. They see the value of not only having the data but monitoring it and knowing how to run the data to their advantage. We're very busy from an industrial standpoint when it comes to the Industry 4.0 world and implementing our data driven advantages. Municipal wastewater treatment plants are typically more conservative and

slower to adopt new technologies, but when they do, they tend to dive deeper than other industrial segments.

Is there anything getting in the way of having blower manufacturers assist with Industry 4.0?

Data security has caused the most headaches for users as far as protecting stored data and sharing it.

It can be a little more difficult for wastewater treatment plants that discharge into federal waters because then they feel they have to follow Homeland Security procedures. It's less of an issue with industrial manufacturers.

But whether it's a treatment plant or a factory, there are building blocks that can be put in place to make it very secure. Then there's the idea of how you do it. We only do one-way communication. By that I mean we only want to gather data; we don't send it back into the system. We're just taking the data the plant or factory gives us to analyze. It allows security to be a lot better.

We also don't want to go in and make changes to the blower operation. Instead, we go back to the plant and say things like, "Here's what we're looking at. Here's the end of the month summary. Your blowers are getting maxed out

at night, if you change your recycle pump to do this or that you could save this much energy." We let them decide on the most responsible action. It becomes us partnering with them on things they can try and helping them make incremental improvements.

How do you see the future of blower operation unfolding at treatment plants and factories?

I think we're going to stop seeing the use only one blower technology. More and more operations are implementing mixed technologies. We've got a wastewater treatment plant right now running two geared turbo blowers, six multi-stage centrifugal blowers and two rotary blowers all on the same header. They run the blowers interchangeably. I think a wider mix of blower technologies is where the world is going.

I wouldn't be surprised if future success is based on how well you can operate different technologies at the same plant. That's only going to increase the importance of the controls piece of it. **BP**

Thank you for these insights.

For more information, contact Tim Hilgart, email: Timothy.Hilgart@howden.com, or visit www.howden.com.

All photos courtesy of Howden.

To read similar articles about **Aeration and Industrial Blower Technology**, please visit www.blowervacuumbestpractices.com/technology.



“I wouldn't be surprised if future success is based on how well you can operate different technologies at the same plant. That's only going to increase the importance of the controls piece of it.”

— Tim Hilgart, Howden America

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Pfeiffer Vacuum Opens New Plant in Wuxi China

Pfeiffer Vacuum, one of the world's leading providers of vacuum solutions, celebrated the expansion of its facility in Wuxi, China with a grand opening ceremony. Double its original size, the new, expanded facility marks a significant milestone in Pfeiffer Vacuum's development in China, as it allows the company to better respond to local customers' needs while supporting its strategic growth in the local coating and semiconductor market.

"This is part of our new growth strategy which includes a global investment program of €150 million," said Hugh Kelly, representative of the management board, "In addition to providing after-sales service, the bigger facility will now also allow for the production of dry pumps and our new leak detection systems ATC, as well as the assembly of pumping stations. With the introduction of industry-leading technologies and equipment, Pfeiffer Vacuum is better poised to react to the needs of local customers."

At the 2019 annual general meeting, Pfeiffer Vacuum shared 8 strategic pillars of the company, with Dr. Eric Taberlet, CEO of Pfeiffer Vacuum Technology highlighting the importance of the Chinese market to the company's development. As one of the key cities in the Yangtze River Delta region, Wuxi has been receiving strong government support to develop its semiconductor, electronics and solar industry. The expanded facility not only strengthens Pfeiffer Vacuum's presence in China but also enables closer proximity to its customers in China as well as the wider Asia market.

Since entering the China market in 2007, Pfeiffer Vacuum has maintained a steady growth with over 150 employees, largely part of the country's booming economy as well as strong market demand for scientific and high-precision vacuum technology. As the inventor of the turbomolecular pump, Pfeiffer Vacuum has been investing in Research & Development for nearly 130 years, with an aim to provide cutting-edge solutions and innovative products to customers and the wider industry.

In support of the vacuum technology industry in China, Pfeiffer Vacuum has been working closely with top local enterprises, scientific research institutions as well as other industry partners with its products and rich expertise. With the new, expanded facility, Pfeiffer Vacuum is set to deliver more value to local customers and deepen its commitment to the China market in the future.

About Pfeiffer Vacuum

Pfeiffer Vacuum 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 that are 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 3,200 people and has more than 20 sales and service companies as well as 8 manufacturing sites worldwide. For more information, please visit www.pfeiffer-vacuum.com.

Sulzer Confirms Field Service Agreement with Nidec

Following the recent agreement of Sulzer to provide sales and technical support for Nidec medium voltage (MV) drives in North America, the two companies have now formalized the field service offering. Having completed technical training, field service teams from Sulzer are now able to offer operators of Nidec MV drives onsite support.

Nidec Industrial Solutions is renowned for manufacturing high quality MV drives for



Pfeiffer Vacuum opens new plant in Wuxi China.



Sulzer and Nidec have formalized a field service agreement for MV drives in North America.

industrial applications, especially for oil & gas and power generation. Together, the combined expertise of these companies aims to deliver cutting-edge designs, excellent reliability and class-leading after-sales support.

This latest agreement takes advantage of Sulzer's extensive service center network in North America and its large number of field service teams to deliver expert support for electromechanical equipment.

Jim Mugford, President and Global Head of Sulzer Electro Mechanical Services said, "This is the next step in providing Nidec customers with industry-leading support that is available through our extensive service center network. This partnership demonstrates the level of technical expertise and industry knowledge that is required in modern industrial applications to ensure customers receive the best possible service."

The agreement with Nidec offers Sulzer's customers direct access to high quality MV

drives that can be designed to suit each application. At the same time, all Nidec customers will benefit from expert support on site as well as access to local, well equipped and modern maintenance facilities.

About Sulzer

Sulzer is the leading worldwide, independent service provider for the repair and maintenance of rotating machines including turbomachinery, pumps and electro-mechanical equipment. With a global network of over 180 technically advanced manufacturing and test facilities, Sulzer offers a collaborative advantage that delivers high-quality, cost-effective, customized and turnkey solutions, providing its customers with the peace of mind to focus on their core operations.

Sulzer Rotating Equipment Services, a division of Sulzer, can accommodate all brands of rotating equipment including turbines, compressors, generators, motors and pumps.

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With an enviable track record, dedicated teams of on-site engineers provide best-in-class solutions to ensure that the most effective service is delivered.

Sulzer is dedicated to providing superior service solutions to a range of industries including power generation, oil and gas, hydrocarbon and chemical processing, water and air separation. Every solution is customized to suit the business needs of each application – whenever or wherever that may be.

With a long history of providing engineering service support, Sulzer is headquartered in Winterthur, Switzerland where it began in 1834. Today, with sales over US\$ 3 billion and with approximately 14,000 employees, the Sulzer footprint spans across the globe.

The core aim is to deliver a flexible and cost-effective service that optimizes customer operational efficiency and minimizes downtime. For more information on Sulzer, visit www.sulzer.com.

Space Simulation – Leybold Supplies the Technology

Space missions and projects can only be successful if the materials and components used are first tested on Earth under space conditions. Leybold delivers the technology as an integrated supplier – up to the ultra-high vacuum.

Space missions are among mankind's most expensive research projects and can quickly cost several billion Euros. In order to ensure

that the corresponding components also function in the vacuum conditions prevailing in space, they are technically simulated on Earth using suitable pumps and systems. Leybold offers a wide range of standardized and specific system solutions with integrated fore vacuum and high vacuum pumps – individually tailored to the respective requirements.

A major application is, for example, the simulation and testing of electrical space propulsion systems for spacecrafts. For this purpose, ionized gas particles are accelerated by an electric field. Modern ion engines generate a gas flow of 0.1 to 10 mg/s. In order to maintain a good high vacuum at this considerable flow rate in the test chambers, a very high suction capacity is required – often in the range of 10,000 to 100,000 l/s.



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The experimental chamber systems required for this to produce the space conditions exist in all sizes: from a few liters for the testing of small objects such as printed circuit boards to several thousand cubic meters for proving the suitability of entire spaceships for space travel. The noble gas Xenon is the heaviest stable noble gas and is used in most cases for ion engines due to the high resulting thrust. However, the advantage of a large drive mass is a great challenge for vacuum pumps. One of the reasons is the poor thermal conductivity of Xenon gas, which leads to critical temperature increases in gas transfer vacuum pumps such as turbomolecular pumps. In addition, many large turbomolecular pumps would be required to achieve the required high pumping speeds.

Leybold has developed an optimized and simple cryogenic solution for Xenon pumping. The strong single-stage cold heads of the Gifford-McMahon type carry metal discs that condense the Xenon gas with a pumping speed at the edge of the theoretical limit.

Since it is necessary to reach a final pressure in the range of 10⁻⁵ Pa – far below the process pressure – before operating an ion engine, these applications also require a correspondingly powerful system of pre- and high-vacuum pumps in order to remove residual gases such as nitrogen, oxygen, etc. The pressure must be controlled by proper instruments throughout the testing process. Leybold provides all the necessary technology as well as technical consultancy, calculation, and design of the systems from a single source.

The demand for such vacuum test chambers increases as the number of Xenon ion engines for different space missions rises. Flexibility and time-to-market is the key factor for the success of these missions.



Leybold UNIVEX Testing Chamber.

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 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, food & packaging, as well as a multitude of other classic industrial processes.

About Atlas Copco

Great ideas accelerate innovation. At Atlas Copco, we have been turning industrial ideas into business-critical benefits since 1873. By listening to our customers and knowing their needs, we deliver value and innovate with the future in mind. Atlas Copco is based in Stockholm, Sweden with customers in

more than 180 countries and about 37,000 employees. Revenues of BSEK 95/ 9 BEUR in 2018. For more information: www.atlascopcogroup.com.

EDC Invests \$10M into APG-Neuros

As part of its commitment to help Canadian cleantech companies scale-up and export, Export Development Canada (EDC) is pleased to announce its support for APG-Neuros, with a \$10-million investment. "EDC has been working with APG-Neuros for 10 years, supporting their rapid growth and ability to perform in the international space," said Eugene Siklos, Vice-President of Investments at EDC. "To keep pace with the expanding cleantech market, the company wants to update their innovative high-efficiency turbo blower technology. We look forward to seeing what the company will accomplish."

The Quebec-based company has developed a ground-breaking approach to the water and wastewater treatment market, modernizing and

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Aeration Blower Systems

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"The need to control the rate of oxygen added to the aeration system has become particularly acute with the increasing application of nutrient control."

— Henryk Melcer, Senior Process Engineer/VP, Brown and Caldwell,
(feature article in April 2019 Issue)

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"As part of our ongoing focus on sustainability, we were excited to partner with Atlas Copco to pioneer the first waterless vacuum pump in the craft beer industry. We are now saving 5,000 gallons of water per day and \$35,000 per year."

— Julia Person, Sustainability Manager, Craft Brew Alliance,
(feature article in April 2019 Issue)

"Many rental air compressors, designed to deliver 1,600 cfm of compressed air at 90-150 psig, are used in 50 psig applications like pneumatic conveying, fermentation and fluid catalytic cracking."

— Matthew Piedmonte, Director, Aerzen Rental
(feature article in April 2019 Issue)

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bringing a much-needed change to the existing, aging industry. Currently, 75% of a typical wastewater treatment budget goes toward energy use. APG-Neuros' technology reduces that energy consumption by up to 40%, making the process more energy efficient. The company's turbo blower technology is currently used in various municipal and industrial wastewater treatment facilities in Canada and around the world.

This \$10 million investment will allow the company to finish the research and development phase on two new turbo blower products that will further reduce their customers' energy consumption. "We are very excited to benefit from EDC's investment in our growth. We are confident that our new products will generate record-high energy savings for our customers on a global scale," said Omar Hammoud, President and CEO of APG-Neuros. Supporting this innovative and fast-growing sector of the Canadian economy has been a priority for EDC since 2012. Since then, EDC has facilitated more than \$6 billion in cleantech business in 114 countries.

About APG-Neuros

APG-Neuros is recognized as the force behind the successful introduction of the high-efficiency turbo blower technology to the water and wastewater treatment market in North America, Europe and the Middle East, modernizing an aging industry. APG-Neuros turbo blowers are used in a variety of industrial applications and wastewater treatment processes, with over 5,000 units installed worldwide. APG-Neuros continues to lead the industry by constantly driving and propelling innovation forward through the most technologically advanced products and aeration solutions to achieve maximum energy efficiency and operational flexibility for our customers. For more information about APG-Neuros' products and services, please send your inquiries to sales@apgneuros.com or visit www.apg-neuros.com.

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