

BLOWER & VACUUM BEST PRACTICES[®]

blowervacuumbestpractices.com

May 2022

Industrial Vacuum

INDUSTRIAL VACUUM & BLOWER SYSTEMS

- 12 Vacuum Pumps for Pneumatic Suction Conveying
- 22 Vacuum Solutions for Plastic Recycling
- 28 Technology News

AERATION BLOWER SYSTEMS

- 5 Industry News
- 16 Kansas WRRF Aeration Blower Upgrades Save 40% in Energy Costs



PROUDLY PRESENTING THE 2022 EXPERT WEBINAR SERIES



Loran Circle
Senior Consultant,
Circle Training
& Consulting



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



Antonio Mayne, P.E.
Utilities Optimization
Engineer, Molson Coors
Beverage Company



Ron Marshall
Chief Auditor,
Marshall Compressed
Air Consulting



Tom Taranto
Owner, Data
Power Services



Julie Gass
Lead Mechanical
Process Engineer,
Black & Veatch



Fred Constantino
S&C Project
Engineering Advisor,
ASME

JAN 20 **Air Compressor Component Function, Troubleshooting & Maintenance**
Presenter Loran Circle, Senior Consultant, Circle Training & Consulting – Sponsored by BEKO Technologies
Thursday, January 20, 2022 – 2:00PM EST

FEB 17 **Compressed Air Piping System Sizing & Design**
Presenter Tim Dugan, P.E., President and Principal Engineer, Compression Engineering Corporation – Sponsored by Trace Analytics and Unipipe
Thursday, February 17, 2022 – 2:00PM EST

MAR 10 **On-site Nitrogen Generation Replacing Bulk Liquid Nitrogen**
Presenter Antonio Mayne P.E., Utilities Optimization Engineer, Molson Coors Beverage Company – Toronto Brewery – Sponsored by Atlas Copco
Thursday, March 10, 2022 – 2:00PM EST

MAR 24 **How to Hunt for Vacuum Leaks: Is it Worthwhile?**
Presenter Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting – Sponsored by Best Practices 2022 EXPO & Conference
Thursday, March 24, 2022 – 2:00PM EST

APR 28 **Air Compressor Cooling, Water- or Air-Cooled?**
Presenter Tom Taranto, Owner, Data Power Services – Sponsored by Kaeser Compressors
Thursday, April 28, 2022 – 2:00PM EST

MAY 12 **Hot Solutions for Multiple and Multi-brand Compressors Remote Monitoring**
Presenter Tim Dugan, P.E., President and Principal Engineer, Compression Engineering Corporation – Sponsored by Kaishan
Thursday, May 12, 2022 – 2:00PM EST

MAY 19 **ASME PTC 13 Wire-to-Air Performance Test Code for Blower Systems Part 1**
Presenters Julie Gass, Lead Mechanical Process Engineer, Black & Veatch, Fred Constantino, S&C Project Engineering Advisor, ASME and Andrew Balberg, President, Lone Star Blower and Compressor – Sponsored by Lone Star Blower & Compressor
Thursday, May 19, 2022 – 2:00PM EST

JUN 09 **Sizing and Maintaining Compressed Air Systems**
Presenter Loran Circle, Senior Consultant, Circle Training & Consulting – Sponsored by Kaishan
Thursday, June 9, 2022 – 2:00PM EST

JUN 23 **Compressed Air System Design for Lowest kW/100scfm**
Presenter Tom Taranto, Owner, Data Power Services – Sponsored by VPInstruments and BEKO Technologies
Thursday, June 23, 2022 – 2:00PM EST

JUL 21 **Applications for Adiabatic Cooling Technology**
Presenter Bert J. Wesley, Sr. Principal Industrial Plant Engineering Practice Leader, Woodard & Curran – Sponsored by Evapco
Thursday, July 21, 2022 – 2:00PM EST

JUL 28 **ASME PTC 13 Wire-to-Air Performance Test Code for Blower Systems Part 2**
Presenters Hiran DeMel, Senior Project Manager and Principal Technologist, Jacobs and Jacque Shultz, Senior Turbomachinery Specialist, Howden – Sponsored by Howden
Thursday, July 28, 2022 – 2:00PM EST

AUG 18 **Liquid Ring Vacuum Pump Sizing Fundamentals & Best Practices**
Presenter Chris Halbach, Senior Applications Engineer, Wintek Corporation
Thursday, August 18, 2022 – 2:00PM EST

OCT 20 **Two Factors for Cooling Tower Efficiency: Site Selection & VFD Fan Control**
Presenter Nick McCall, P.E., Technical Manager, Woodard & Curran – Sponsored by SPX Cooling Technologies, Inc.
Thursday, October 20, 2022 – 2:00PM EST

OCT 27 **Compressed Air: What You Don't Know Can Hurt You**
Presenter Ron Marshall, Chief Auditor, Marshall Compressed Air Consulting – Sponsored by VPInstruments and Kaeser Compressors
Thursday, October 27, 2022 – 2:00PM EST

NOV 10 **ASME PTC 13 Wire-to-Air Performance Test Code for Blower Systems Part 3**
Presenters John Conover, Consultant, Mark Addison, Senior Engineer, Artesian Water Company, and Fred Constantino, S&C Project Engineering Advisor, ASME – Sponsored by APG-Neuros
Thursday, November 10, 2022 – 2:00PM EST

DEC 08 **Compressed Air: Reliable Source for Nitrogen Generation**
Presenter Loran Circle, Senior Consultant, Circle Training & Consulting – Sponsored by Rogers Machinery and Parker
Thursday, December 8, 2022 – 2:00PM EST



Bert J. Wesley
Sr. Principal Industrial
Plant Engineering
Practice Leader,
Woodard & Curran



Mark Addison
Senior Engineer,
Artesian Water
Company



Chris Halbach
Senior Applications
Engineer, Wintek
Corporation



Nick McCall, P.E.
Technical Manager,
Woodard & Curran

Register for Free Today at
airbestpractices.com/webinars

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

SPONSORED BY



INDUSTRIAL VACUUM & BLOWER SYSTEMS

- 12 Vacuum Pumps for Pneumatic Suction Conveying**
By Uli Merkel, Busch Vacuum Solutions
- 22 Vacuum Solutions for Plastic Recycling**
By Tracy Mosshart, Edwards – Industrial Vacuum



AERATION BLOWER SYSTEMS

- 16 Kansas WRRF Aeration Blower Upgrades Save 40% in Energy Costs**
By Mike Grennier, Blower and Vacuum Best Practices Magazine

EVERY ISSUE

- 4 From the Editor**
- 5 Industry News**
- 28 Technology News**
- 34 Advertiser Index**
- 34 The Marketplace | Jobs and Technology**



FROM THE EDITOR



Industrial Vacuum & Blower Systems

Pneumatic conveying systems gently transport raw materials to production equipment in a plant. Uli Merkel, from Busch Vacuum Solutions, has sent us an interesting article titled, “Vacuum Pumps for Pneumatic Suction Conveying.” Read it to learn which vacuum technologies work best at different vacuum levels for suction conveying.

Edwards – Industrial Vacuum has sent us an excellent article titled, “Vacuum Solutions for Plastic Recycling.” Did you know more than 300 million tons of plastic is produced every year and that vacuum systems are playing a key role in creating more efficient plastic recycling processes? Tracy Mosshart writes, “. . .the primary applications for vacuum are extrusion, drying, pyrolysis and distillation.” The article then outlines which vacuum pump technologies are most suited for these applications.

Aeration Blower Systems

Our own Mike Grennier strikes again with an insightful article titled, “Kansas WRRF Aeration Blower Upgrades Save 40% in Energy Costs.” The story is about the Kill Creek water resource recovery facility, in Gardner, Kansas, which is a Kruger Bio-denitro oxidation ditch plant. It opened in 2002 and is designed to treat an average of 2.5 Million Gallons per Day (MGD) and a peak capacity of 7.5 MGD. It serves nearly 25,000 residents. We thank the folks at Inovair for bringing us this case study.

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

RODERICK M. SMITH

Editor

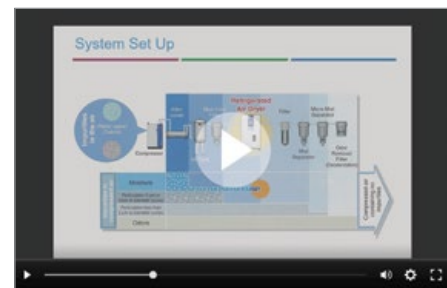
tel: 412-980-9901

rod@airbestpractices.com



Upcoming Webinars

Receive 1.0 PDH Credit by attending our Expert Webinars. Complimentary registration at <https://www.blowervacuumbestpractices.com/magazine/webinars>



➤ **May 19, 2022:** ASME PTC 13 Wire-to-Air Performance Test Code for Blower Systems Part 1 – *Presenters Julie Gass, Lead Mechanical Process Engineer, Black & Veatch, Fred Constantino, S&C Project Engineering Advisor, ASME and Andrew Balberg, President, Lone Star Blower and Compressor*

Sponsored by Lone Star Blower and Compressor

➤ **July 28, 2022:** ASME PTC 13 Wire-to-Air Performance Test Code for Blower Systems Part 2 – *Presenters Hiran DeMel, Senior Project Manager and Principal Technologist, Jacobs and Jacque Shultz, Senior Turbomachinery Specialist, Howden*

Sponsored by Howden



Enviro/Tech is a registered trademark.



2022 MEDIA PARTNERS



BLOWER & VACUUM INDUSTRY NEWS

Aerzen USA Acquires Vooner FloGard® Corporation

Aerzen USA announced the acquisition of Vooner FloGard® Corporation, headquartered in Charlotte, North Carolina, with manufacturing operations in Greeneville, TN. Vooner is a premier manufacturer of vacuum pumps and vacuum system components. “The acquisition of Vooner increases Aerzen USA’s capabilities and application knowledge and provides us with greater access to our core markets of paper, food, power, mining, and chemical,” said Aerzen USA President Tony Morris

Vooner FloGard has over 31 years of experience with corrosion and erosion-resistant vacuum pump applications, including patented vacuum pump designs and vacuum system engineering capabilities. Additionally, Vooner is an OEM for complete vacuum systems for slurry dewatering, evaporation, pneumatic conveying, condenser exhausters, and felt cleaning in paper mills generating aftermarket business of actuators and sales opportunities for long term low-cost vacuum pumps.

“We are pleased we could come to terms with Aerzen USA and are excited about the opportunities we will have together,” said Charles H. Wunner, President and CEO of Vooner. Corporate Secretary Barbara Wunner said, “The synergy with our two companies is strong, and we are excited about the growth opportunities ahead for Vooner as a member of the Aerzen USA team.”

About Vooner FloGard

Vooner was founded in 1983 to supply long-term, low-cost liquid ring vacuum pumps, vacuum systems, and compressors worldwide. Vooner vacuum pumps and compressors are designed to reduce and maintain long-term low operating costs for a

wide variety of applications. Customers trust Vooner pumps designed to resist and prevent destructive corrosion and erosion using stainless steel parts. For more information, visit www.vooner.com.

About Aerzen

AERZEN is an international manufacturer of Positive Displacement Blowers, Hybrid Blowers, Screw Compressors, and Turbo Blowers. The high-quality machines are used for air and gas applications in wastewater treatment, pneumatic conveying of bulk materials, and process gas conveying. Aerzen USA is a wholly owned subsidiary of Aerzener Maschinenfabrik GmbH. Aerzen USA’s headquarters is in Coatesville, PA, with multiple offices and service centers throughout the United States. For more information, visit www.aerzen.com.

Busch Vacuum Solutions Opens Service Center in Pennsylvania

Busch Vacuum Solutions USA, one of the largest manufacturers of vacuum pumps, blowers, compressors, and systems, announced the opening of their new 19,000 square foot Service Center located outside Philadelphia, Pennsylvania USA. The new Service Center

houses a team of vacuum pump experts providing full-service for Industrial and Medium High Vacuum (MHV) pumps. Services at the facility include repair, maintenance, training, and remanufacturing designed to improve vacuum equipment operation. It also serves as a distribution hub for replacement vacuum pumps, spare parts, and accessories.

Turgay Ozan, President of Busch LLC said, “The relationship with our customers does not end with equipment installation. Making sure they have a highly efficient and reliable vacuum supply is one of our top priorities.” Ozan also said, “The Pennsylvania facility demonstrates our commitment to providing the best possible customer support for the growing Northeast and mid-Atlantic markets.”

Some upgraded building features include a fully exhausted disassembly area, blast room, and overhead visual production planning to track flow line activity. By implementing the Lean Flow Production Concept, a first pass yield of defect-free vacuum pumps, with on-time delivery results in better efficiency.



Busch Vacuum Solutions USA new 19,000 square foot Service Center located outside Philadelphia, Pennsylvania USA.

Blower & Vacuum Industry News

The entrance to the facility includes an equipment display, allowing visitors to get an up-close look at the internal components of a vacuum pump. Other features include a new training center and conference room available for customer meetings.

The new Busch Service Center is in the Valley Forge Business Center at 2450 Boulevard of the Generals Norristown, Pennsylvania. For more information, customers can call 1-888-BUSCHUS (287-2487) or email service@buschusa.com.

About Busch Vacuum Solutions

Busch Vacuum Solutions offers vacuum and pressure solutions for all industries from individual vacuum

pumps, blowers, and compressors to tailor-made vacuum systems. Nationwide Service is available on-site or within one of eight service centers. Busch USA is part of the global Busch family-owned company with over 3,500 employees in more than 40 countries. For more information about Busch visit www.buschusa.com.

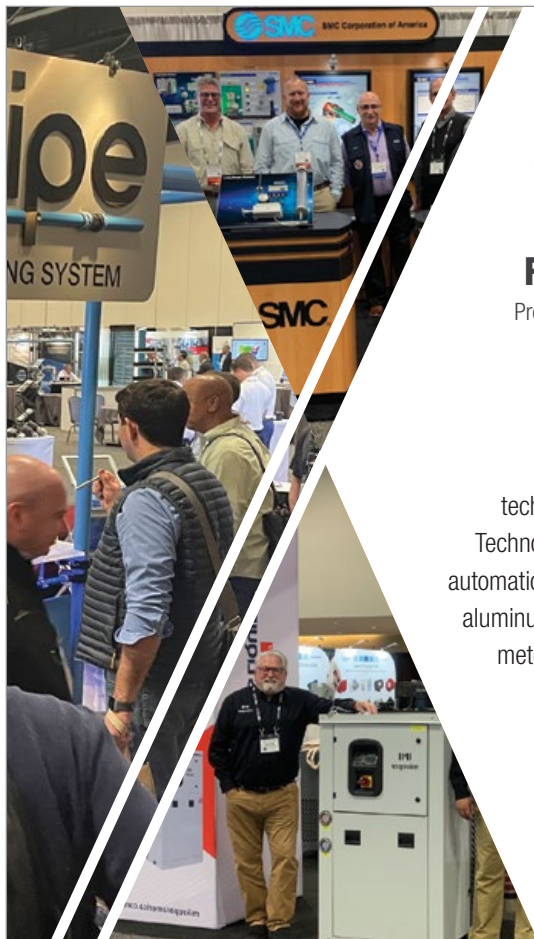
Atlas Copco Acquires HHV Pumps

Atlas Copco has completed the acquisition of HHV Pumps Pvt. Ltd. The company designs and manufactures vacuum pumps and systems for applications used in a wide range of industries. HHV Pumps was founded in 2009 and is based in Bengaluru, India, and has 151 employees. In the fiscal year of 2020 the company had revenues of approximately MUSD 6.

HHV Pumps is a leading provider of vacuum pumps used for chemical and pharmaceutical industries, electrical power equipment, general industry, and rotary vane pumps used for manufacturing refrigeration and air-conditioning. The purchase price is not material relative to Atlas Copco's market capitalization and is not disclosed. The acquired business becomes part of the Industrial Vacuum Division within the Vacuum Technique Business Area.

About Atlas Copco Group

Our industrial ideas empower our customers to grow and drive society forward. This is how we create a better tomorrow. Atlas Copco is a global industrial group, founded in 1873 in Stockholm. In 2020



BEST PRACTICES

2022 EXPO OCTOBER 4-6 ATLANTA
COMPRESSED AIR / VACUUM / COOLING

ON-SITE UTILITY
Education, Certification
and Networking!

Four Reasons to Send the Team to the EXPO!

Projects get done by sales engineers working with engineering firm and manufacturing personnel. Affordably priced at only \$25 per person, the EXPO is designed to motivate the whole team!

Network, solve problems and view the latest technologies from leading global manufacturers! Technologies include: air compressors, compressor automation software, compressed air dryers, filtration, aluminum piping & storage, flow/pressure/dew point meters, leak detectors, motors & drives, nitrogen generation, chillers, water treatment, cooling towers, blowers and vacuum pumps.

#1. New Technology EXPO

#2. New Technology EXPO Classroom

#3. Daily EXPO \$1,000 Energy Treasure Hunt RAFFLE!

#4. Two Catered Networking Events

Register at cabpexpo.com

Exhibition Booth Inquiries: bill@airbestpractices.com

Sponsored by



Atlas Copco had revenues of BSEK100 (BEUR 10) and at year end about 40 000 employees. For more information, visit www.atlascopcogroup.com.

Centrisys Secures Maintenance Contract for NYC WWTPs

Centrisys Corporation, a leading North American manufacturer of decanter and thickening centrifuges and dewatering systems, announced that it has secured a contract with the New York City (NYC) Department of Environmental Protection to provide maintenance and repairs for 83 existing decanter centrifuges located in eight NYC wastewater treatment facility locations. Centrisys' contract was bid in partnership with Jett Industries, Inc.; a leading general contractor focused on constructing and modifying water and wastewater treatment facilities.

“Aligning with Centrisys in the contract bidding process to support NYC’s wastewater treatment facilities allowed us to bring all of our collaborative strengths to the table to ensure we provided recommendations that offer facility efficiencies and an innovative problem-solving approach,” said Kevin Miedreich, project manager with Jett Industries, Inc. “The cooperative arrangement allows our team to lean on our in-depth knowledge of facility processes and expedite lead times.”

The NYC wastewater treatment facility locations included in Centrisys’ maintenance and repair contract include:

- Oakwood Beach, NYC Bay, Staten Island | (4) CP4-1.1 centrifuges
- Red Hook, East River, Brooklyn | (2) SC3-3 centrifuges
- North River, Hudson, New York | (1) BSC5-2 centrifuge
- 26th Ward, Jamaica Bay, Brooklyn | (16) CP4-1 centrifuges
- Wards Island, Upper East River, New York | (16) CS26-4 2PH centrifuges
- Hunts Point, Upper East River, Bronx | (16) CS26-4 2PH centrifuges

NYC manages 14 wastewater resource recovery facilities that treat 1.3 billion gallons of wastewater daily. The treatment system consists of over 6,000 miles of sewer pipes, 135,000 sewer catch basins, over 495 permitted outfalls for the discharge of combined sewer overflows, and 95 wastewater pumping stations that transport to the wastewater resource recovery facilities located throughout the five boroughs. New York City’s sludge is digested and transformed to biogas. After digestion, the leftover solids are then dewatered.

“Centrisys has built a remarkable relationship with the NYC Department of Environmental Protection as we have collaborated on significant projects together in recent years,” said Michael Kopper, president and chief

THE LATEST IN OIL-FREE VACUUM TECHNOLOGY

- Intelligent variable speed drive
- Minimal maintenance
- Efficient water cooling
- Control and monitoring
- Washdown available



Busch offers the latest vacuum technology with solutions that perfectly meet your needs, for applications including vacuum drying, freeze drying, degassing, heat treatment, thermoforming, cooling, vacuum packaging and more.

VISIT US AT AISTech! #1652

1-800-USA-PUMP | info@buschusa.com | buschusa.com

U
BUSCH
VACUUM SOLUTIONS

- Bowery Bay, Upper East River, Queens | (4) CP4-1 centrifuges
- Newton Creek, East River, Brooklyn | (24) BSC3114 thickeners

Blower & Vacuum Industry News



executive officer of Centrisys. “In 2020, we announced the installation of 32 American-made CS26-4 Centrisys decenter centrifuges at NYC’s largest wastewater treatment plants. We appreciate their trust in our team and look forward to further supporting NYC with our maintenance and repair expertise in the years ahead.”

About Centrisys Corporation

Centrisys is a USA manufacturer of dewatering centrifuges, sludge thickeners and provides global centrifuge service, repair, and parts for all decenter centrifuge brands. CNP, a division of Centrisys, supplies nutrient recovery and advanced biosolids treatment systems for phosphorus recovery and thermal hydrolysis processes. For more information about

Centrisys Corporation has secured a contract with NYC to provide maintenance and repairs for 83 existing decenter centrifuges.



BEST PRACTICES

2022 EXPO OCTOBER 4-6 ATLANTA
COMPRESSED AIR / VACUUM / COOLING

ON-SITE UTILITY
Education, Certification
and Networking!

Four Reasons to Send the Team to the EXPO!

Projects get done by sales engineers working with engineering firm and manufacturing personnel. Affordably priced at only \$25 per person, the EXPO is designed to motivate the whole team!

#1. New Technology EXPO

#2. New Technology EXPO Classroom

#3. Daily EXPO \$1,000 Energy Treasure Hunt RAFFLE!

#4. Two Catered Networking Events

Exhibitors present new technologies during EXPO hours. 2021 presentations were from: FS-Curtis/FS-Elliott, Asahi-America, Energair, Kingston Valves, Sauer Compressors, VPIinstruments, PneuTech, BOGE America, HydroThrift, Aerzen Rental, SMC, BEKO Technologies, Tamturbo, Fluke, UE Systems, Sullair, Hertz Kompressoren, Van Air Systems

Register at cabpexpo.com

Sponsored by



Exhibition Booth Inquiries: bill@airbestpractices.com

Centrisys Corporation and its maintenance and repair contract with the NYC Department of Environmental Protection, visit www.centrisys-cnp.com.

McDermott Appoints Michael McKelvy President and CEO

McDermott International, Ltd announced Michael McKelvy has been named President and Chief Executive Officer. He will also serve as a member of McDermott's Board of Directors. Lee McIntire, who has been serving as interim CEO since June 2021, will continue as a member of McDermott's Board of Directors.

"Michael joins McDermott at a pivotal time for the company as significant contract wins reflect increasing demand for McDermott's diversified and integrated solutions," said Nils

Larsen, Chairman of McDermott's Board of Directors. "His track record of international leadership and award-winning engineering, procurement and construction expertise will guide McDermott's talented global workforce as the momentum builds."

McKelvy has spent more than three decades working in the engineering and construction industry across the U.S. and international markets, including Europe and the Middle East. He previously led Gilbane Building Company as President and CEO since 2014 where he was instrumental in record growth, profitable operations and a strong customer commitment.

"McDermott's business model and commercial strategy carve out a unique position to further



Michael McKelvy, President and Chief Executive Officer, McDermott.

capitalize on the changing industry dynamics and facilitate the energy transition," McKelvy said. "I am eager and enthusiastic to join this already robust leadership team and continue

Screw compressors with a digital advantage

Howden is the world pioneer of rotary twin screw compressor technology, with over 40,000 installations worldwide, serving some of the most demanding applications.

Working together with our packagers and end users, and combining our engineering expertise with our unique digital solutions, we can:

- Prolong the life and safe operation of screw compressors
- Deliver performance optimization on demand
- Minimize unplanned downtime of your critical assets
- Enable smart and predictive maintenance strategies
- Reduce overall total cost of ownership

For more information on Howden products contact:

Houston Service Center, 7204 Harms Road, Houston TX 77041, USA
 Tel: 716-817-6900 | Email: inquiries.USA@howden.com
 Web: www.howden.cloud/CT2

Revolving Around You™



Howden



Blower & Vacuum Industry News

their progress to strengthen the portfolio and forge a new path for the industry.”

Prior to joining Gilbane, McKelvy spent 26 years at CH2M Hill where he held multiple leadership positions and ultimately became Chief Delivery Officer of the company. In this position, he was responsible for project execution across all domestic and global regions with oversight of risk, safety, security, procurement and quality. He spent his early career in operations as an architect and project manager at C.H. Guernsey & Company and Lockwood Greene, which became part of CH2M Hill.

McKelvy currently serves on the Board of Directors for RPS Group PLC, a leading global professional services firm. He holds a Bachelor

of Science in Environmental Design from the University of Oklahoma and a Bachelor of Architecture from Louisiana Tech University. He completed executive management programs at the University of Chicago Booth School of Business, University of Michigan Ross School of Business, Thunderbird School of Global Management, Stanford University Graduate School of Business and Babson College.

About McDermott

McDermott is a premier, fully-integrated provider of engineering and construction solutions to the energy industry. Our customers trust our technology-driven approach engineered to responsibly harness and transform global energy resources into the products the world needs. From concept to commissioning, McDermott's innovative expertise and capabilities

advance the next generation of global energy infrastructure—empowering a brighter, more sustainable future for us all. Operating in over 54 countries, McDermott's locally-focused and globally-integrated resources include more than 30,000 employees, a diversified fleet of specialty marine construction vessels and fabrication facilities around the world. To learn more, visit www.mcdermott.com.

Greek Poultry Farmers Invest in Biogas Plants from WELTEC BIOPOWER

WELTEC BIOPOWER has so far been significantly involved in 17 of 30 Greek agricultural and waste biogas plants. This is no coincidence, because WELTEC is an established technology and market leader there. One of these AD plants has been built in Megara, 30 kilometers west of Athens, in 2015. In the past



BEST PRACTICES

2022 EXPO OCTOBER 4-6 ATLANTA
COMPRESSED AIR / VACUUM / COOLING

ON-SITE UTILITY
Education, Certification
and Networking!

Four Reasons to Send the Team to the EXPO!

Projects get done by sales engineers working with engineering firm and manufacturing personnel. Affordably priced at only \$25 per person, the EXPO is designed to motivate the whole team!

Designed to reward the people who make Energy Treasure Hunts in manufacturing plants happen! This is why only distributor sales engineers and service technicians, auditors/consultants/engineers and manufacturing plant personnel are eligible to win. Network at the Welcome Reception and the Official Networking Event!

2021 Winners: Shawn Anderson, Ring Power Corp. • John Blisky, Gentex Corp. • Clint Hill, National Compressor Services • Matt Brockman, Atlantic Compressors • Manuel Elizalde, Tunna Industrial • Brian Coder, Tate Engineering

- #1. New Technology EXPO
- #2. New Technology EXPO Classroom
- #3. Daily EXPO \$1,000 Energy Treasure Hunt RAFFLE!
- #4. Two Catered Networking Events

Register at cabpexpo.com

Sponsored by



Exhibition Booth Inquiries: bill@airbestpractices.com

year, WELTEC expanded this biogas plant and since March 2021 the plant is in operation with a doubled output of one megawatt. Around a year after the expansion, the operators' resume is consistently positive: "The plant was already running very successfully before the expansion. An above-average plant availability of 97% confirms that the extension with WELTEC was the right decision," said John Tektoros, the Greek WELTEC sales partner, from a conversation with the owners.

It was also crucial for the extension that enough substrates were available. The area around Megara is known for keeping chickens and the biogas plant is also on the site of a chicken farm with 20,000 laying hens. As a result, some of the input materials are permanently secured. In addition to the chicken droppings, roughly equal amounts of olive oil pomace, cattle, and pig manure, as well as whey are used for energy production. Since the plant was enlarged, the daily amount of the substrate mix has risen to 190 tons.

Originally the plant comprised a digester made of stainless steel with a volume of 3,993 cubic meters, a 530-kilowatt CHP, and a storage unit. For the increased input volume, WELTEC BIOPOWER built another 3,993 cubic meter stainless steel digester with a height of 6.30 meters and a diameter of 28.41 meters. In addition, another pre-storage unit, a second 530-kilowatt CHP and an unpacking system for cheese and vegetables were installed. However, this unpacking system is only used in case of irregular deliveries of expired food. A solids feeder is not required since the pumpable substrates are brought into the storage units via a central pump block and then conveyed into the digesters.



WELTEC expanded this biogas plant the has doubled output by one megawatt.

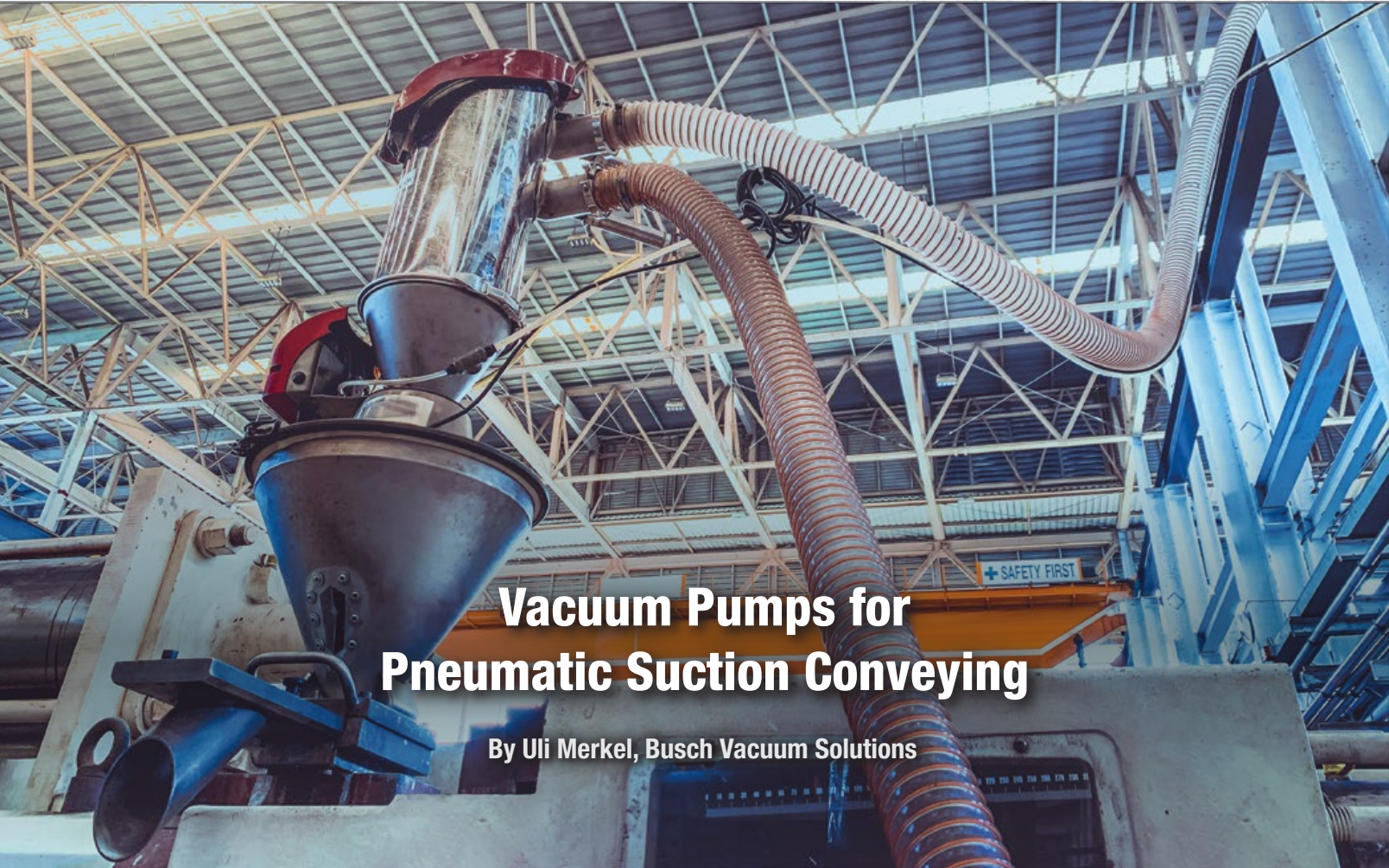
John Tektoros is proud of this special energy plant and said, "The plant in Megara is one of the most efficient biogas projects in Greece. Our many years of experience and knowledge as well as the highly developed biogas technology from WELTEC are two decisive reasons. And the icing on the cake for the success of this plant is the strategically favorable location, the care of the operators and the use of the heat for stables and offices. So, it is hardly surprising that one of the two operators decided to build another biogas plant in Ritsona, 40 kilometers north of Athens. This is about to be completed and will go into operation in spring. Just like in Megara, only organic residues are used to generate energy in Ritsona."

These plant projects are examples of circular economy thinking and the consistent use of existing waste. Konstantinos Nikakis, board member of the Greek biogas operator association HABIO, emphasizes the importance of such projects and said, "Waste-to-energy plants are urgently required in the new energy

age to minimize harmful carbon emissions and to achieve climate neutrality. In any case, the supply situation with substrates of animal and vegetable origin is very good; the potential in Greece is enormous. In addition, there is also vegetable and other recyclable waste. In view of this number of raw materials, agriculture has very good prerequisites to make its contribution so that Greece can achieve its climate goals." It is now up to the individual players to bring Greece into the new energy age.

About WELTEC BIOPOWER

The WELTEC Group from Vechta, Germany, has developed into a globally leading specialist for the construction and operation of biogas and biomethane plants since it was founded back in 2001. The Group designs, plans and sets up energy plants, operates them on a permanent or temporary basis, provides 24/7 service and delivers sustainable usage concepts for output flows, thereby covering the entire biogas value chain. For more information, visit www.weltec-biopower.de.



Vacuum Pumps for Pneumatic Suction Conveying

By Uli Merkel, Busch Vacuum Solutions

► Nowadays, pneumatic suction conveying is an important technology for feeding bulk goods gently through piping systems to the various process steps. In the area of food processing, the pharmaceutical and chemical industry and for material feed in plastics processing, suction conveying is indispensable when powder or granular materials have to be transported. The proper choice of the vacuum generator essentially determines the operating costs of a pneumatic conveying system. Modern vacuum technology today enables the economical and environmentally friendly operation of vacuum conveying systems.

In order to be able to select the most effective method of vacuum generation, it is vital to be very familiar with the operating conditions of the vacuum conveying system and to apply this knowledge when selecting the vacuum pump. These parameters are of crucial importance

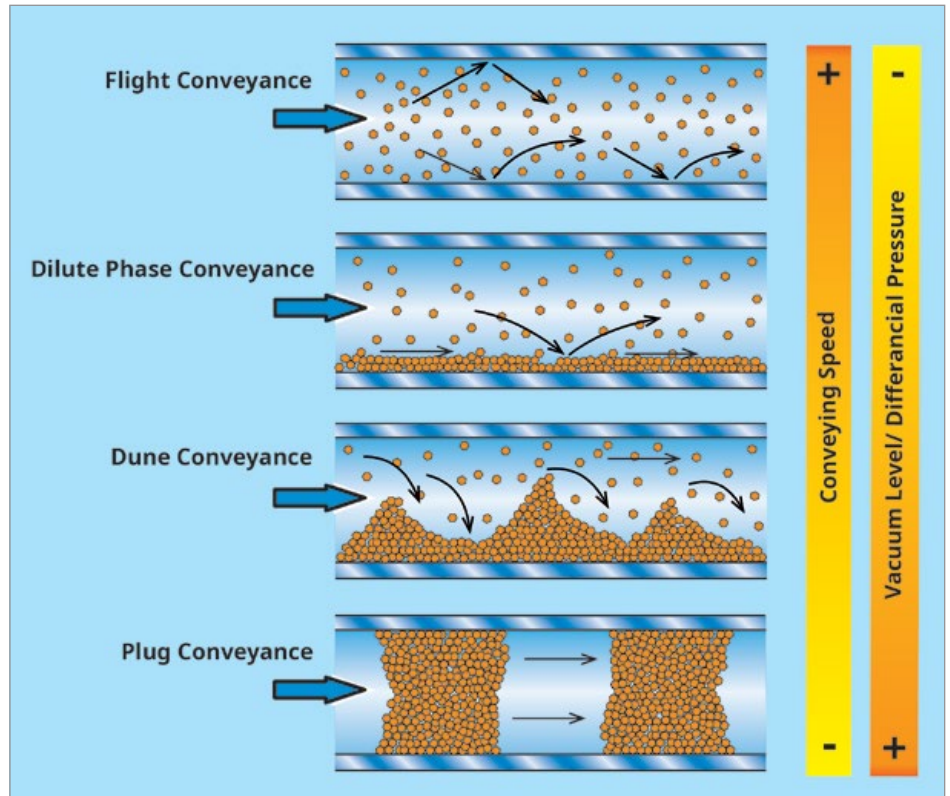


Figure 1: Different conveying methods require different differential pressures or vacuum levels.

in order to select the most suitable one from various principles for vacuum generation. On the one hand, the conveyed material and its properties must be known. Additional influential parameters are pipe routing, length and diameter as well as the type of conveying (Figure 1). These parameters can be used to determine the required differential pressure (Δp). The differential pressure and the volume flow are the main influential parameters for the technical selection of the vacuum pump or vacuum system. For the economic efficiency calculation, operating costs must be considered in addition to acquisition costs. This includes the energy consumption, possibly further acquisition costs for throttle regulation, valves or control depending on the vacuum generation, the operating time (e.g. continuous operation, batch operation) as well as the maintenance effort and costs.

Different Principles of Vacuum Generation

The following mechanical vacuum pumps, which achieve different differential pressures or vacuum levels, are mainly used for suction conveying (Figure 2):

- Side channel blowers
- Rotary lobe blowers
- Rotary vane vacuum pumps
- MINK claw vacuum pumps

Side Channel Blowers

Small side channel blowers achieve high volume flows, making them suitable for use in short conveyor tracks and in flight conveying when low differential pressures and high volume flows are required. Side channel blowers compress oil-free and are relatively

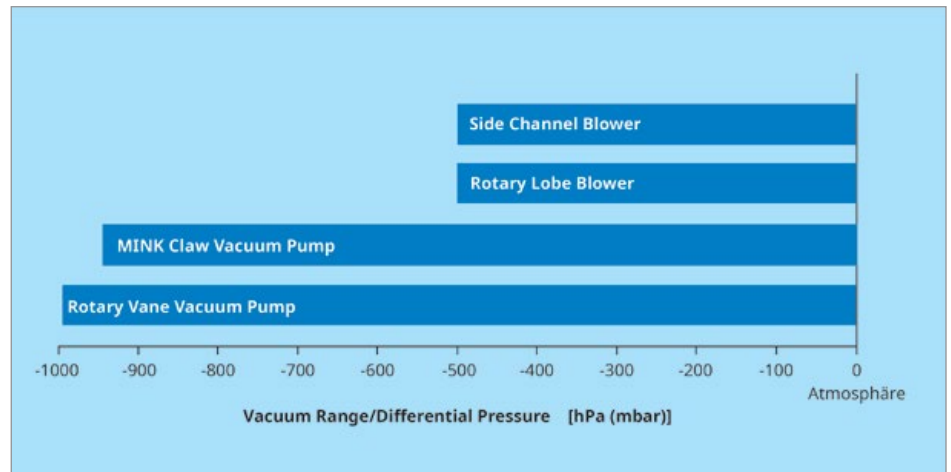


Figure 2: Vacuum levels (ultimate pressures) of the various blowers and vacuum pumps.



Figure 3: Rotary lobe blowers with and without acoustic enclosure.

inexpensive to acquire. However, side channel blowers do not have a stable characteristic curve and are therefore not stable in volume. If they are operated at their performance limits, they have an above-average energy requirement.

Rotary Lobe Blowers

Rotary lobe blowers (Figure 3) operate contact-free and thus without oil in the compression chamber. They can be used for differential pressures up to 500 hPa (mbar). Due to these relatively low differential pressures, the use

Vacuum Pumps for Pneumatic Suction Conveying

of rotary lobe blowers in suction conveying is limited to applications requiring high volume flows at low differential pressures. In this

area of application, rotary lobe blowers are characterized by their low power requirement.

Rotary Vane Vacuum Pumps

Rotary vane vacuum pumps (Figure 4) are the ideal vacuum generators for suction conveying when high differential pressures are required and long conveyor tracks must be overcome. In addition, rotary vane vacuum pumps are always suitable when products must be conveyed slowly (plug conveying, Figure 1).

Ultimate pressures of up to 0.1 hPa (mbar) can be achieved with rotary vane vacuum pumps, which corresponds to a vacuum of 99.99 percent. No other vacuum generator in suction conveying achieves such a high vacuum (Figure 2) and can also operate at lower differential pressures. This guarantees a stable characteristic curve over the entire pressure range from atmospheric pressure to operating pressure. Rotary vane vacuum pumps are lubricated with circulating oil. This means that they have an internal oil circuit, which requires regular maintenance.

Claw Vacuum Pumps

Claw vacuum pumps (Figure 5) have been the standard vacuum generators in pneumatic suction conveying for several years. This is a development that has been justified by their energy efficiency, the fact that they are nearly maintenance-free and can be controlled on a demand-driven basis. Claw vacuum pumps are available in various versions and sizes from 60 to 1200 m³/h each with standard motors or with variable speed drives.

Claw vacuum pumps compress oil- and contact-free. This makes them nearly maintenance-free and extremely energy-efficient.



Figure 4: Rotary vane vacuum pump.



Figure 5: MINK claw vacuum pump.

Conclusion

Vacuum for pneumatic suction conveying processes can be generated by various mechanical vacuum pumps. Which vacuum pump is the right choice depends on the technical parameters of the conveying system. It is important to be very familiar with all these parameters in order to select the suitable vacuum generator. In the economic efficiency calculation, the acquisition costs for the vacuum generator and any further investments, the operating time and the maintenance effort or the resulting costs must be taken into account. A vacuum expert finds the technically most sensible and economically most favorable solution for vacuum generation. **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

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

All images courtesy of Busch Vacuum Pumps and Systems.

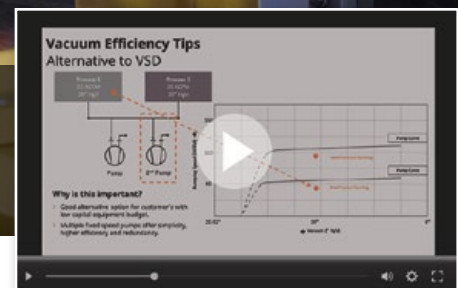
For similar articles on **Industrial Vacuum Conveying Technology**, visit <https://www.blowervacuumbestpractices.com/technology/conveying>



Visit our Webinar Archives to listen to expert presentations on **Industrial Vacuum Technology** at <https://www.blowervacuumbestpractices.com/magazine/webinars>

Need More Vacuum Tips and Tutorials?

Learn Industrial Vacuum Best Practices - View Our **FREE* On-Demand Webinars**

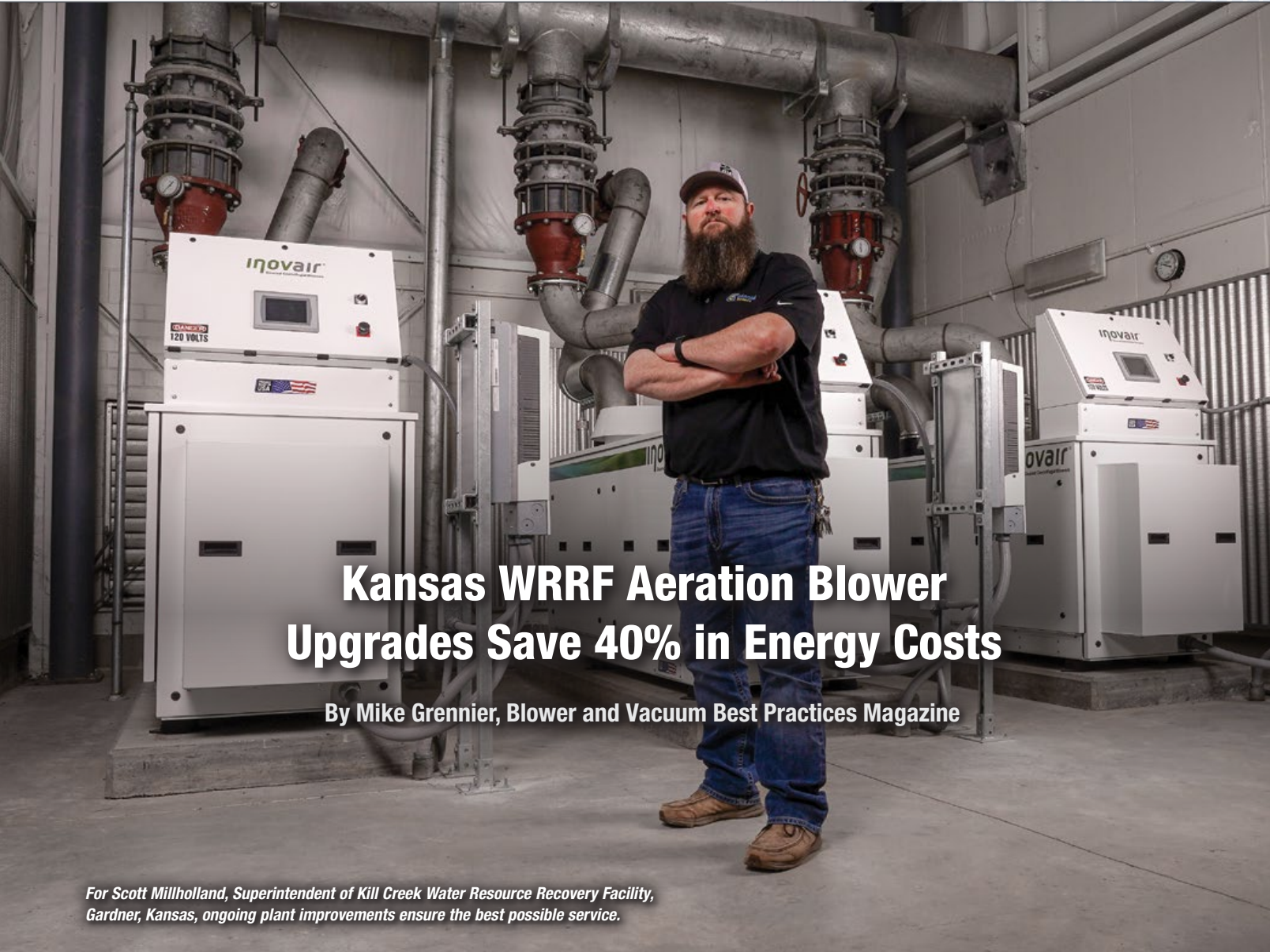


Our Extensive Library of Webinars Includes These Titles

- Vacuum Specification Fundamentals: Flow vs. Pressure
- How to Correctly Size Vacuum Pumps
- 5 Tips on Optimizing VSD Vacuum Pumps
- Pros & Cons of Centralized Vacuum Systems

*Included with your free magazine subscription

Get **FREE** Instant Access* at [blowervacuumbestpractices.com/magazine/webinars](https://www.blowervacuumbestpractices.com/magazine/webinars)



Kansas WRRF Aeration Blower Upgrades Save 40% in Energy Costs

By Mike Grennier, Blower and Vacuum Best Practices Magazine

For Scott Millholland, Superintendent of Kill Creek Water Resource Recovery Facility, Gardner, Kansas, ongoing plant improvements ensure the best possible service.

► Municipal wastewater treatment is highly technical and complicated, yet the operating strategy at Kill Creek Water Resource Recovery Facility (WRRF) in Gardner, Kansas, isn't. That's because the focus is to save money without sacrificing quality, all while operating safely at all times.

To that end, the plant recorded another win in its long list of accomplishments when it replaced aging multistage blowers with high-speed integrally geared blowers in 2020. The new blowers with Variable Frequency Drive (VFD) control are credited with a 40% reduction in energy consumption for aeration.

This results in an annual savings of \$35,000. The blower upgrade, which also helps protect the safety of employees, is expected to deliver a payback of less than five years.

Kill Creek WRRF Superintendent Scott Millholland said it's all about ongoing improvements and the use of advanced technology to deliver the best possible service.

"Safety is always No. 1 on our list and second is making sure the plant is performing at its best as we meet our permit limits," said Millholland, noting energy savings plays a key role in performance. "The more energy we save, the

more it increases our revenue long-term so it's saving citizens money. That's money we can use on future infrastructure projects."

Energy Gains Importance

The Kill Creek facility is a Kruger Bio-denitro oxidation ditch plant. It opened in 2002 and is designed to treat an average of 2.5 Million Gallons per Day (MGD) and a peak capacity of 7.5 MGD. It serves nearly 25,000 residents.

The plant uses phased isolation ditch technology for Biological Oxygen Demand (BOD) reduction and biological nutrient removal. Major components include an

influent lift station with submersible pumps; a headworks operation with a channel grinder, step-screens, and biological odor control; two rapid-sludge removal sedimentation basins; a gravity thickener basin; a Pre-Thickened Aerobic Digester (PAD) system with two digester basins; a non-contact UV disinfection system; and screw press for sludge dewatering.

Since its inception the plant has continuously implemented cost-savings measures and upgraded technology as part of its capital improvement plans. A prime example is the plant's ability to reduce biosolids production through efficient processes and the replacement of a belt press with a screw press for dewatering. Those measures alone save the plant upwards of \$60,000 per year in operating expenses.

In 2016, the plant began evaluating ways to reduce energy consumption whether that meant changing out incandescent lightbulbs for LED lights, better insulation throughout the facility or any number of technological upgrades.

"We went through a big change," Millholland said. "We're one of the biggest energy users in the entire city and we wanted to do more to conserve energy."

Powering Airlift Pumps and Diffusers

Sludge at the plant is treated in two aeration digester basins, each measuring 51 feet by 62 feet with a depth of 21 feet. As an extension of the activated sludge process, each basin is aerated via two air diffuser headers that span the length of the digester and are equally spaced to provide even distribution of air.

Blowers supply air to the diffusers, as well as five airlift pumps used to transfer Return



Energy efficiency is a priority for the Kill Creek treatment plant's aeration digesters.



Integrally geared Inovair IM-20 blowers help the plant save energy, while also solving heat and noise issues.

Activated Sludge (RAS) to the head of the plant and Waste Activated Sludge (WAS) to the digesters. A higher focus on energy conservation drove Millholland to consider the replacement of three, 125-horsepower (hp) seven-stage blowers installed when the plant began operation.

"Our blowers run 24 hours a day, seven days a week because you have to have the air for the airlift pumps," Millholland said. "We never had any problems with our original blowers as far as maintenance, but they were on our list of equipment to be replaced and we knew they used a lot of power."

Kansas WRRF Aeration Blower Upgrades Save 40% in Energy Costs



Existing intake filters and piping were reused, reducing installation costs for the new blowers.

To validate potential energy savings, the plant measured energy consumption of the multistage blowers. The assessment suggested newer technology could dramatically reduce blower energy consumption. An upgrade would also allow the plant to address noise and heat issues with the blowers, housed in an enclosed room next to the digesters.

“Those blowers created a noise level inside that building that was up over 110 dBA. You had to wear earplugs at all times, and it made it very difficult to communicate with each other. It was loud,” Millholland said. The blowers also generated heat that would cause blower room temperatures to reach 140°F (60°C) during summer months.

**Need More Aeration Blower
 Tips and Tutorials?**

**Learn Aeration Blower Best Practices – View Our
 FREE* On-Demand Webinars & Articles**

Library of Aeration Blower Webinars Includes

- Techniques for Determining Savings from Aeration Blowers
- Sorting Through the Menu of Aeration Blower Technologies
- Aeration Blower Turndown Strategies
- Where Does Blower Air Go? Process Fundamentals

Library of Aeration Blower Articles Includes

- Madison Utilities Wastewater Treatment Plant Blower Upgrade Saves Energy
- Sewage Treatment Plant Retrofits Diffusers to Cut Energy Consumption 50%
- Black & Veatch: Ensuring Aeration Blowers Meet the Needs of Wastewater Treatment Plants
- Calculating Most-Open-Valve Aeration Control

*Included with your free magazine subscription

New Blowers a Perfect Fit

The Kill Creek WRRF team chose to partner with Inovair (www.inovair.com) to install new blowers in late 2019 after reviewing numerous bids. Based in Lenexa, Kansas, Inovair is a short distance from the plant.

Together, the team at the plant and Inovair opted to replace the original three blowers with three VFD, integrally geared IM-20 blowers. As with the original blowers, the IM-20 units are each designed to deliver up to 1,905 scfm at 7.5 psig – yet the new 75-hp blowers do so with much less horsepower than the original 125-hp machines.

In addition to efficiently providing air, the low-profile IM-20 blowers are well suited for applications where space is limited. The blowers, which fit through a standard 36-inch man-door, were installed in the same footprint used for the multistage blowers. Additionally, piping for the installation only needed to be slightly modified to accommodate the original inlet filters and the main discharge line.

Plant Saves \$35,000 in Annual Energy Cost

Soon after the new blowers were installed, the plant measured the blowers' electrical consumption. Millholland said he couldn't be more pleased with efficiencies realized.

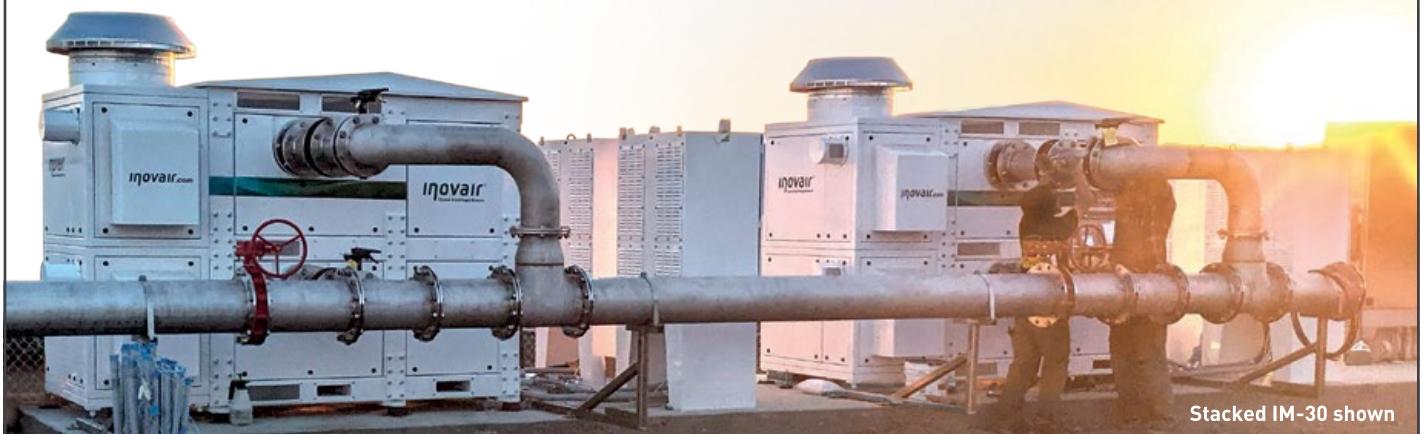
"Each new blower pulls 45 amps, which compares with the older blowers that were each running 100 amps," he said. Efficient blower operation, aided by VFD capability, has allowed the plant to reduce electrical consumption for aeration by 40% for a \$35,000 annual savings. Since the installation of the blowers, the plant has gone from being the No. 1 consumer of energy in the city to the third largest energy user.

Equally important as energy savings is the ability of the new blowers to deliver air to the airlift pumps and diffusers at a constant pressure of 7.2 psig, which is vital to the operation. Doing so was a challenge in the

inovair[®]
Geared Centrifugal Blowers

- ☪ Highest Efficiency, Without Complexity
- ☪ Durable Indoor/Outdoor Applications
- ☪ Owner Serviceable / Ease of Maintenance

SIMPLY MORE
RELIABLE



Stacked IM-30 shown



☎ 1-855-INOVAIR | ✉ sales@inovair.com

η = Efficiency[™]

FREE SUBSCRIPTION

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



The Magazine for Quality & Reliability in Energy-Efficient Blower & Vacuum Systems

Blower & Vacuum Best Practices is part of a family of magazines dedicated to **Optimizing Onsite Utilities Powering Automation & Processes like Aeration**. This is a technical magazine, reaching 14,300 subscribers, who are dedicated to optimizing industrial blower and vacuum systems and municipal wastewater aeration blower systems.

To subscribe visit blowervacuumbestpractices.com

Subscribe Now!



Kansas WRRF Aeration Blower Upgrades Save 40% in Energy Costs

past given swings in ambient temperatures that can range from 35°F (1.6°C) to 65°F (18.3°C) in a single day.

“When we would get big swings like that, we had to manually adjust the old blowers to maintain needed pressure,” Millholland said.

Manual adjustments are no longer needed given VFD control on the new blowers, said Nate Neufeld, Sales Manager, Inovair.

“When ambient temperatures are low, the speed of the blower is automatically reduced so the blower uses less power to deliver air,” Neufeld said. “Efficiencies gained translate to energy savings.”

Today, a single blower will handle the bulk of the plant load while a second automatically kicks on if and when needed to maintain pressure at 7.2 psig without fail. The third unit serves as a backup unit with all three rotated into operation on a seven-day cycle.

The blower upgrade has eliminated other challenges related to heat, as well as noise. Now the temperature in the blower room is usually closer to ambient during summer months, which adds to the comfort level. With the noise level now below 80 dBA the blower room is also more conducive to the plant’s goals for a safe work environment.

Millholland said the blower project is another example of how a focused approach with clear goals continues to benefit the Kill Creek WRRF and taxpayers. And aeration blowers, said Millholland, is something the plant won’t need to think about for a long time.

“We’re sitting in a pretty good spot,” he said. **BP**

All photos courtesy of Inovair. For more information on Inovair visit <https://inovair.com>, email: sales@inovair.com, tel: 1-855-INOVAIR

To read similar articles on **Aeration Blower Technology**, please visit <https://blowervacuumbestpractices.com/technology/aeration-blowers>



Visit our Webinar Archives to listen to expert presentations on **Aeration Blower Systems** at <https://www.blowervacuumbestpractices.com/magazine/webinars>

150 YEARS
of Quality,
Reliability &
Performance

PERFORMANCE³ NEW LEVELS OF EFFICIENCY IN AERATION BLOWER SYSTEMS



PD BLOWER • HYBRID BLOWER • TURBO BLOWER

Lower your energy consumption for WWTP aeration and gain process efficiencies with a choice of three blower technologies:

Positive Displacement Blower

Hybrid Blower

Turbo Blower

This is Performance³.

One Source – Three Technologies

Let an Aerzen Aeration Specialist guide you to the right technology for your application.

Get a quote for the solution with the lowest energy cost and ability to control the aeration process over a broad range of operating conditions.



AERZEN
EXPECT PERFORMANCE

Achieve Performance³

Call for a quote:

610-380-0244

Email:

aerzen@aerzenusa.com

Vacuum Solutions for Plastic Recycling

By Tracy Mosshart, Business Development
Manager, Edwards – Industrial Vacuum



► More than 300 million tons of plastic is produced every year, and much of it ends up causing environmental problems. In response to these challenges, there are widespread global efforts to increase recycling capacity and innovate for more efficient and effective recycling solutions. Vacuum plays a critical role in achieving these improvements.

Typically, the purpose of the vacuum in these processes can essentially be generalized to removal of contaminants. The contaminants can be anything (from chemicals and residues to even water or air in some cases) other than the plastic polymer or byproduct that the recycling process intends to refine and produce. Additionally, because the source of material is often mixed waste trash, there can of course be heavy loads of contaminants mixed in with the input material.



High performance vacuum system with dry screw/booster, scrubber system, and knockout pot.

The performance requirements and demands on the vacuum systems for plastic recycling are significantly increasing, due to several factors – extra efforts required to remove the contaminants inherent to recycling, the increasing sophistication of materials and higher purity demands.

These factors are all contributing to the need for higher performance vacuum technologies.

There are two primary targets of plastic recycling:

1. Reproducing the plastic polymer back to its original “virgin” form
2. Converting the plastic waste material into other forms, such as petrochemicals, synthetic fuels, or oils

For these processes, here are the primary applications where vacuum is applied:

- | | |
|--------------|-----------------|
| 1. Extrusion | 3. Pyrolysis |
| 2. Drying | 4. Distillation |

Extrusion

When the target is to recycle back to the original basic polymer, typically, the process involves extrusion. The extrusion process entails melting the input plastic material, then forcing it through the extruder where it mixes, forms, and cools back to solid form. Vacuum is used along the extruder to remove contaminants – through degassing/devolatilization (removing air, water vapor, unreacted monomers, other volatile compounds).

In any plastic extrusion process this can get tricky because inevitably, polymer material gets pulled into the vacuum system leading to contamination that can become a waste handling issue and/or detrimental buildup in the vacuum system. Add to that the contaminants inherent with recycled material, and the trouble can be compounded.

Drying

Prior to processing, the incoming waste plastic material is shredded and washed with water and/or solvents. The water/solvents are removed in a drying process. Performing this process under vacuum pressures accelerates the drying and allows it to happen at a lower temperature, below 212°F (100°C). This is more efficient, requires less heat and therefore less fuel, lowering financial and environmental cost.



An extruder degassing module system.

Pyrolysis

Pyrolysis is commonly used for recycling applications for converting plastics into other petrochemicals. Pyrolysis is a thermal process using high heat for thermal decomposition in the absence of oxygen. Vacuum systems can be used to remove the air (therefore oxygen) prior to the thermal decomposition.

Although most versions of Pyrolysis are performed at atmospheric pressure or higher, one version called Flash Vacuum Pyrolysis is performed at less than atmospheric pressure, requiring a vacuum system.

Vacuum is also sometimes used to remove vapors (which can be hazardous) or suck out liquid materials after a pyrolysis reaction step, before opening the reactor to atmosphere.

Distillation

The pyrolysis process results in various liquid chemicals depending on the source material and type of thermal decomposition. These materials require further refining to create the final desired product. Distillation is a common process used for separation and purification of the various chemicals. Vacuum distillation can be performed at lower temperatures, which is desirable for materials that are temperature sensitive and require less heat therefore reducing (or eliminating) fuel requirements.

FREE SUBSCRIPTION

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



**EVERY ISSUE CONTAINS
 BEST PRACTICES FOR**

Industrial Vacuum
 Vacuum Generation
 Industrial & Aeration
 Blowers
 Blow-Off Air

Subscribe Now!



Subscribe at
blowervacuumbestpractices.com

Vacuum Solutions for Plastic Recycling

Typical Vacuum Technologies Used for Plastic Recycling Applications

1. Liquid Ring
2. Rotary vane (oil sealed)
3. Dry claw
4. Dry screw
5. Mechanical vacuum boosters
6. Equipment to handle contamination, etc.

Liquid Ring Vacuum Technology

Liquid ring vacuum pumps (LRVP's) are the front-line soldiers for plastic extrusion and recycling applications. These typically work well on less demanding applications where the level of vacuum is not as critical for performance. LRVP's reasonably tolerate process upsets and extra junk sent to the pumps.

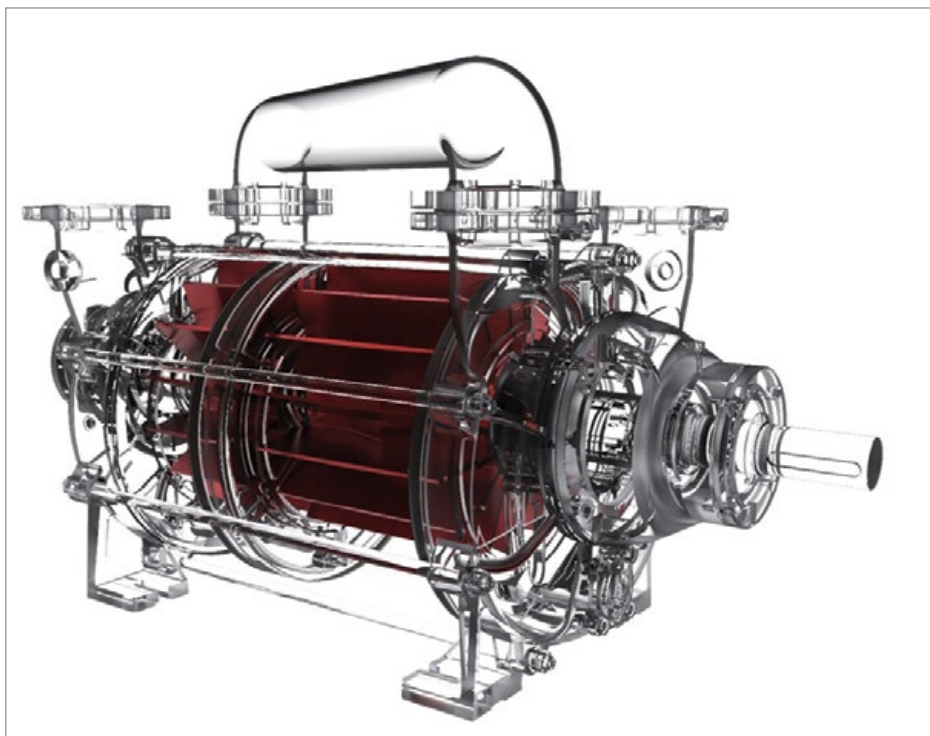
However, since LRVP's use a liquid (typically water) as the mechanism for creating the

vacuum, whatever contaminants that get into the system inevitably get entrained into the liquid/water. This compromises the performance of the vacuum pump, reducing the depth of vacuum that can be achieved, and can lead to other problems such as cavitation and mechanical issues.

In order to avoid the contamination issues, an LRVP can be operated with a once-through (no recirculation) setup for the seal fluid. This has a heavy environmental impact, however, as the pump requires a high volume of clean source water, that must then be flushed to a waste treatment handling facility.

Oil Sealed Rotary Vane Technology

Rotary vane pumps use a thin film of oil as a vacuum seal on vanes that slide in and out of an eccentric rotor. RV pumps are available in capacity ranges to cover the vast majority



Liquid ring vacuum pumps (LRVP's) are the front-line soldiers for plastic extrusion and recycling applications.

of plastics/recycling applications and can achieve deep vacuum levels with dual stage versions.

However, this technology is only suitable for less demanding applications with minimal process carryover and contamination, which readily mixes with the oil and significantly impacts performance.

Dry Claw Technology

Dry claw vacuum pumps perform without the need for any sealing fluid, therefore performance is not impacted by such contamination, nor is there a waste fluid handling concern as with wet pumps. However, the carryover polymers, monomers, and other contamination can tend to build up and

interfere directly with the pump mechanisms. Filtration and other strategies such as solvent flushing are often included to prevent or remove the contamination buildup.

The claw type pumps used in plastics/recycling are usually single stage versions, which can typically achieve medium vacuum levels (around 28"HgV or 50 TorrA), therefore not intended for higher performance or deeper vacuum requirements.

Dry Screw Technology

Dry screw vacuum pumps perform without the need for any sealing fluid, therefore performance is not impacted by such contamination, nor is there a waste fluid

handling concern as with wet pumps. However, the carryover polymers, monomers, and other contamination can tend to build up and interfere directly with the pump mechanisms. Filtration and other strategies such as solvent flushing are often included to prevent or remove the contamination buildup.

Dry screw pumps can achieve deeper vacuum levels to >29.8" HgV (<0.01 TorrA), and are available in high throughput capacities. This is a very efficient and effective choice for higher demand and higher performance requirements.

Mechanical Vacuum Booster Technology

Rotary lobe vacuum boosters are used, along with any of the previously mentioned

Worried About Moisture & Oil Contamination in Food Production?

Learn Quality & Safety Best Practices – View Our
FREE* On-Demand Webinars & Articles

Library of Food Safety Webinars Includes

- Safety and Quality in Compressed Air: Why You Should Care
- Integrating ISO 8573-1 Compressed Air Quality Classes into SQF Food Safety Certification
- Safe Quality Food Standard: 5 Compressed Air Criteria
- Global Food Safety Initiative (GFSI) Compliance: Two Compressed Air System Specifications

Library of Food Safety Articles Includes

- Compressed Air GMPs for GFSI Food Safety Compliance
- Sampling and Testing for Compressed Air Contaminants
- Unilever Ice Cream Plant Reduces Compressed Air Consumption
- Keep Contaminants Out of Food & Bev Processing Air Supplies

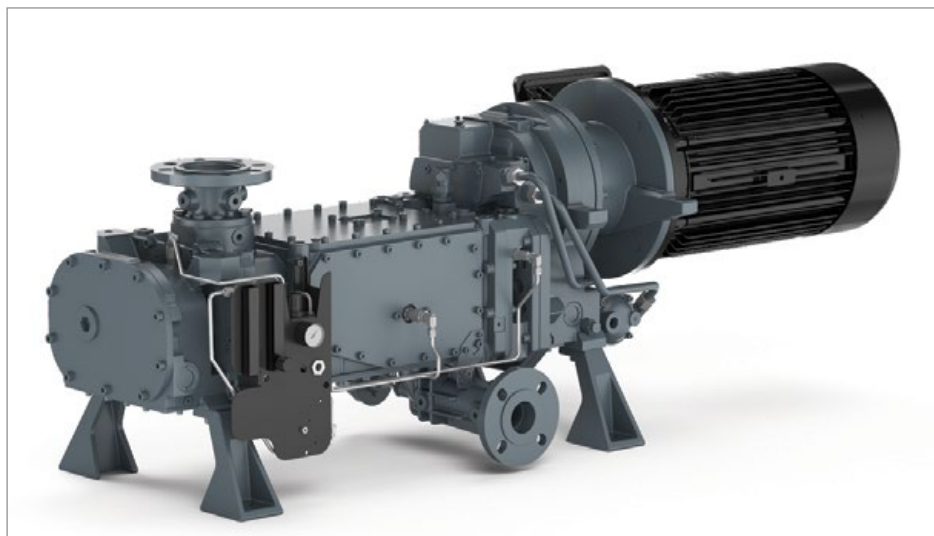
*Included with your free magazine subscription

COMPRESSED AIR
BEST PRACTICES
airbestpractices.com

Get **FREE Instant Access*** to Webinars & Articles >>>

<https://airbestpractices.com/magazine/webinars> · <https://airbestpractices.com/industries/food>
<https://airbestpractices.com/standards/food-grade-air>

Vacuum Solutions for Plastic Recycling



Dry screw pumps can achieve deeper vacuum levels to $>29.8''$ HgV (<0.01 TorrA), and are available in high throughput capacities.

technologies when higher throughput is needed at deeper vacuum levels – especially on the higher performance requirement applications.

Traps, Filters, Knockout Pots, etc.

As already highlighted, the tricky polymers and various contaminants can have detrimental effects on the vacuum system such as compromising the seal fluid in wet (oil sealed and liquid ring) pumps, and can even lead to damaging or locking up pump mechanisms. To limit these performance issues, often various arrangements of traps, filters, knockout pots, etc. are designed into the vacuum system. The selection of this ancillary equipment depends on the specifics of the application, the type of polymer, the contaminants involved, and the type of vacuum pump employed.

For instance, Edwards has created a unique vacuum scrubber system that traps and inerts the carryover polymer and other impurities

before they get to the vacuum pump. This scrubber does a tremendous job of keeping the contaminants and harmful materials out of the vacuum pumps and downstream, benefitting the vacuum system and the environment.

Conclusion

The levels of contaminant, and tricky nature of the materials related to plastics/polymers and especially recycling, pose extra demands for the vacuum systems. This is especially true for the recycling applications with higher performance requirements. There are many variables that factor into determining the ideal vacuum solution for plastic recycling applications. Edwards can help achieve the highest performance for these challenging plastic

recycling applications, with the most complete portfolio of vacuum technology, and the application expertise to engineer ideal solutions. Visit <https://www.edwardsvacuum.com/en> **BP**

About the Author

Tracy Mosshart joined Edwards in 2004 and has performed various roles in addition to prior industrial systems experience. He holds a BS degree in Mechanical Engineering from Virginia Tech, and MBA from Georgia State. Tracy is now serving as Business Development Manager for Engineered Systems in the Edwards Industrial Vacuum business.

About Edwards

With over 100 years of rich heritage, Edwards is the partner of choice for tens of thousands of customers in critical applications around the world. Vacuum is required in diverse sectors, from the generation of power to the production of steel, to the challenging environments of space simulation and high energy physics research. Everywhere you find vacuum requirements, you will find Edwards leading the way. From medicines to mobile phones, from computers to coffee beans, to cars and chemicals, we pride ourselves in making a difference to people's lives. And we do it responsibly, ensuring that we innovate sustainably, whilst helping our customers to maintain their competitive advantage and operational excellence. Edwards is part of the Atlas Copco Group (NASDAQ OMX Stockholm: ATCO A, ATCO B), a Sweden-based provider of industrial productivity solutions.

For similar articles on **Industrial Vacuum Applications in Plastics**, visit <https://www.blowervacuumbestpractices.com/industries/plastics>



Visit our Webinar Archives to listen to expert presentations on **Industrial Vacuum Technology** at <https://www.blowervacuumbestpractices.com/magazine/webinars>

BLOWER & VACUUM BEST PRACTICES

blowervacuumbestpractices.com

FREE SUBSCRIPTION

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



2022 FOCUS INDUSTRIES!

Food Processing • Food Packaging • Food & Beverage Packaging • Power, Pressure & Flow Measurement

The Magazine for Quality & Reliability in Energy-Efficient Blower & Vacuum Systems

Blower & Vacuum Best Practices is part of a family of magazines dedicated to **Optimizing Onsite Utilities Powering Automation & Processes like Aeration**. This is a technical magazine, reaching 14,300 subscribers, who are dedicated to optimizing industrial blower and vacuum systems and municipal wastewater aeration blower systems.

Industrial Blower & Vacuum Systems

Highly targeted manufacturing and process industry readers optimize the use of industrial blowers and vacuum pumps. These readers work together with sales engineers from industrial distributors of blowers and vacuum pumps prepared to provide “Best Practice” advice. The projects include replacing compressed air with blowers for pneumatic conveying, centralizing vacuum systems, replacing liquid ring with dry vacuum pumps and deploying VSD technology to match load with demand.

“Data loggers were placed on the vacuum system pumps, at an envelope manufacturer, measuring 870,000 kWh at a cost of \$70,000 per year. Interesting to note that the compressed air system consumed 3.5 times less power.”

— Ron Marshall, Marshall Compressed Air Consulting

Aeration Blower Systems

Operators at wastewater treatment plants, process engineers at engineering firms, and municipal sales reps representing blowers receive the magazine. They turn to our editorial pages whose content is directed by noted aeration blower experts. Here they find ideas and advice on calculating/sizing aeration blowers, the latest specification trends from engineering firms and improve their understanding of new Blower Standards like ASME PTC 13.

“Advanced control algorithms like floating control and direct process flow control are becoming more common. These trends will continue to shape and improve blower control technology in the future.”

— Tom Jenkins, JenTech Inc.

To subscribe visit blowervacuumbestpractices.com

Subscribe Now!



BLOWER & VACUUM TECHNOLOGY NEWS

Atlas Copco Introduces HEX@GRID Vacuum Control Platform

For intelligent networking of machines and systems, it is elementary that industrial processes can be controlled centrally. To prepare industrial vacuum users for the Internet of Things and Industry 4.0 scenarios, the manufacturer Atlas Copco has developed the innovative HEX@GRID control platform. The central multi-pump control has a multitude of intelligent functions and sets new standards in terms of connectivity and energy efficiency.

In terms of optimized operating processes, users can improve their vacuum performance. In addition, costs can be saved with the HEX@GRID because a properly tuned vacuum system is easier and more cost-effective to operate and maintain. “Another benefit for users relates to connectivity, because with the new controller all vacuum components can be integrated into one system,” said the responsible product manager, Yuri Vanderveken.



HEX@GRID – the innovative control platform for industrial vacuum users.

This allows customers to operate their systems from a single source, regardless of location. For example, if several components of a vacuum system with variable speed control (VSD) must keep the pressure constant. “With the help of the HEX@GRID’s optional 10-inch HMI interface, users get a complete insight into the central vacuum system,” Yuri Vanderveken said. “The individual, intuitive user interface allows the values of the system components to be entered and monitored in real time via laptop, tablet or smartphone,” the product manager said.

Thanks to the full connectivity of the HEX@GRID, updates and new functions can also be downloaded directly. A notification function on the selected end device always keeps users up to date. Regular checks of the vacuum system become an easy finger exercise, and calibration also becomes easier. “If required, the user can add schedules, plan actions and thus secure the entire process. With the help of the central setpoint control, the vacuum system can be operated in a stable and intelligent way,” said Yuri Vanderveken.

Depending on the application, different HEX@GRID versions are available to the user. For vacuum users with a HEX@, MK5 or another Atlas Copco controller, there is a standard HEX@GRID version as well as an updated version with Optimizer. “Both versions can also control third-party products,” said Yuri Vanderveken. For vacuum systems consisting of DZS VSD+ or GVS VSD+ pumps, the VSD+ app is suitable; for a system with up to 16 vacuum pumps, the LINK HEX@GRID with pressure sensor and virtual machine control.

With LINK control, the user has the advantage of operating the vacuum pumps as one virtual machine. Depending on the process, these pumps are started one after the other at 60%, each time the first pump acting as the VSD leader is reaching full capacity. Once all follower pumps are at 60% and the leader pump runs out of capacity, these follower pumps can increase their capacity in steps of 10% as 1 machine. For processes with a predefined operating time, the provision of reserve pumps is crucial. The LINK control coordinates the use of backup pumps to optimize maintenance intervals.

The standard version of the HEX@GRID platform controls up to eight pumps. “It has virtual machine control and thus the same working principle as the LINK where we have a leader pump adapting VSD to the demand and follower pumps working as one within the 60-100% capacity range” Yuri Vanderveken said. The bottom line is that this can lead to a reduction in energy consumption of up to 10 % compared to conventional sequencers.

“In addition, the operating hours of different pumps in a network can also be balanced out,” said Product Manager Yuri Vanderveken. The tip of the technological iceberg however is the Optimizer control algorithm. Each individual pump in a vacuum system has a different specific energy at different speeds and inlet pressures. HEX@GRID uses that information

to continually optimize the speed of each of those individual pumps by calculating the most energy efficient way to control the entire system based on the demand. As an addition up to 20 pumps can be controlled by the Optimizer control.

About Atlas Copco Vacuum Technique

Great ideas accelerate innovation. At Atlas Copco Vacuum Technique we collaborate with our customers to turn industrial ideas into leading edge technology in vacuum and abatement solutions. 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 40 000 employees. Revenues of BSEK 100/ 10 BEUR in 2020. For more information, visit www.atlascopco.com.



BEST PRACTICES

2022 EXPO OCTOBER 4-6 ATLANTA
 COMPRESSED AIR / VACUUM / COOLING

ON-SITE UTILITY
 Education, Certification
 and Networking!

Four Reasons to Send the Team to the EXPO!

Projects get done by sales engineers working with engineering firm and manufacturing personnel. Affordably priced at only \$25 per person, the EXPO is designed to motivate the whole team!

Network, solve problems and view the latest technologies from leading global manufacturers! Technologies include: air compressors, compressor automation software, compressed air dryers, filtration, aluminum piping & storage, flow/pressure/dew point meters, leak detectors, motors & drives, nitrogen generation, chillers, water treatment, cooling towers, blowers and vacuum pumps.

#1. New Technology EXPO

**#2. New Technology EXPO
Classroom**

**#3. Daily EXPO \$1,000 Energy
Treasure Hunt RAFFLE!**

**#4. Two Catered Networking
Events**

Register at cabpexpo.com

Exhibition Booth Inquiries: bill@airbestpractices.com

Sponsored by



Blower & Vacuum Technology News

FIPA Presents FSG Series Area Gripper Series

Grip and move products or product layers dynamically and reliably without changing grippers. The FIPA area grippers of the FSG series can be used almost anywhere where the handling of larger parts is required. Typical applications can be found in the packaging industry.

Thanks to construction from an extruded aluminum profile, customers benefit from an optimal price-performance ratio. Compared to steel designs, grippers made of aluminum have a lower weight and thus score with a higher net payload – an advantage in robot applications. Lightweight aluminum components save operating costs and ensure a high level of energy efficiency. A transfer line for compressed air or vacuum is built into the new area grippers. When connecting several area grippers together, this built-in line eliminates the need for compressed air or vacuum lines on the housing.

A reliable vacuum supply is indispensable for the automated handling of goods. Depending on the installation environment and application, area grippers FSG are available either with integral ejectors or with a connection to the

central vacuum supply. Integrated ejectors reduce noise emissions and thus help ensure a pleasant working environment in the packaging area. Since the selection of the appropriate vacuum generator is determined by several factors, FIPA will of course support you in customizing the vacuum system. This will see you benefit from our technical expertise and many years of experience in project management.

Variants with flow reduction or check valves reduce leakage if, for example, cardboard does not completely cover the gripper surface. These variants prevent too much air from being sucked in and the vacuum from collapsing. Variants with check valves can grip goods securely during swiveling and tilting movements of up to 90 degrees.

FIPA can optimally adapt the area grippers to the customer's application through further customized modifications.

About FIPA

FIPA specializes in vacuum, gripper, and lifting technology. The international company develops and sells high-quality products and innovative system solutions for the material flow sector. FIPA GmbH was founded in 1985 and employs around 70 members

of staff at its headquarters in Ismaning, near Munich. FIPA also has an international presence, with its own subsidiaries in the USA and Thailand, and representative offices in Hungary and China. For further information on FIPA, see www.fipa.com.

EXAIR Offers Custom Air Knives for Unique Applications

EXAIR's Air Knives are an efficient and highly effective tool for blowoff, cooling, cleaning and drying in a myriad of manufacturing processes. To accommodate the wide variety of unique problems manufacturers face, EXAIR can customize and tailor Air Knives to different specifications. These Air Knife customizations can range from size, to shape, to material, custom mounting holes and dimensions. They are created to solve distinct manufacturing problems not already solved by the industry's largest selection of Air Knives.

For customers with space limitations, smaller lengths or skinnier profiles can be created. In situations where the knife may need to be installed in a very defined spot, special mounting brackets, or additional/custom sized air inlets can be provided to fit a current system. For applications where stock aluminum, stainless steel or PVDF won't work, other material options have been used. Special marking requirements for tying knives to specific machines or critical processes can be accommodated. Unique shapes and profiles, such as double sided or curved Air Knives, can also be the solution to certain specialized processes.

Air Knives are available in Super, Standard and Full-Flow styles, and all versions are able to be customized to a customer's specific needs. For



FIPA has expanded its End-of-Arm-Tooling range with the FSG area grippers.



Air Knives are available in Super, Standard and Full-Flow styles, and all versions can be customized to a customer's specific needs.

help solving any specific blowoff problems, please contact an Application Engineer. All Air Knives are CE compliant, and prices start at \$141.

For more information, visit <https://exair.co/akspec>.

Piab Launches piSOFTGRIP® 100-4

The piSOFTGRIP® 100-4 has four gripping fingers and a vacuum cavity allowing it to hold objects up to 100mm [3.93 inch] in width. Like all other members of the piSOFTGRIP® family, it is made in one piece, resulting in a simple and robust product. Made in detectable silicone approved for direct contact with food, the vacuum gripper can be

used to automate the handling of all sorts of fresh, unpackaged, and delicate food items, without the risk of crushing it.

The piSOFTGRIP® vacuum grippers are an excellent, cost-effective, and robust solution for sensitive and fragile objects. They have a very small footprint making them ideal for multiple applications even in space restraint machine settings. The piSOFTGRIP® vacuum tools are as simple to control and install as a suction cup. They do not require any specific programming. To ensure the right gripping force for gentle but safe handling of delicate objects, the vacuum level can easily be adjusted.



BEST PRACTICES

2022 EXPO OCTOBER 4-6 ATLANTA
 COMPRESSED AIR / VACUUM / COOLING

ON-SITE UTILITY
 Education, Certification
 and Networking!

Four Reasons to Send the Team to the EXPO!

Projects get done by sales engineers working with engineering firm and manufacturing personnel. Affordably priced at only \$25 per person, the EXPO is designed to motivate the whole team!

Exhibitors present new technologies during EXPO hours. 2021 presentations were from: FS-Curtis/FS-Elliott, Asahi-America, Energair, Kingston Valves, Sauer Compressors, VPIstruments, PneuTech, BOGE America, HydroThrift, Aerzen Rental, SMC, BEKO Technologies, Tamturbo, Fluke, UE Systems, Sullair, Hertz Kompressoren, Van Air Systems

#1. New Technology EXPO

#2. New Technology EXPO Classroom

#3. Daily EXPO \$1,000 Energy Treasure Hunt RAFFLE!

#4. Two Catered Networking Events

Register at cabpexpo.com

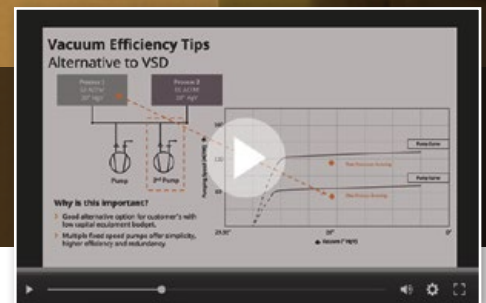
Exhibition Booth Inquiries: bill@airbestpractices.com

Sponsored by



Need More Vacuum Tips and Tutorials?

Learn Industrial Vacuum Best Practices - View Our **FREE* On-Demand Webinars**



Our Extensive Library of Webinars Includes These Titles

- Vacuum Specification Fundamentals: Flow vs. Pressure
- How to Correctly Size Vacuum Pumps
- 5 Tips on Optimizing VSD Vacuum Pumps
- Pros & Cons of Centralized Vacuum Systems

*Included with your free magazine subscription

Get FREE Instant Access* at blowervacuumbestpractices.com/magazine/webinars

Blower & Vacuum Technology News

The intuitive and user-friendly design makes piSOFTGRIP® vacuum grippers easy to integrate into automated procedures, where they can help to secure the quality of products and increase overall productivity. With the wash down fittings, cleaning them is made easy.

The piSOFTGRIP® 100-4 is the largest version in a series of grippers consisting of the three-finger based version piSOFTGRIP® 50-3 and 30-3 for small fruit and pralines picking as well as the two-finger version piSOFTGRIP® 50-2, a great gripping solution for small, sensitive oblong objects like waffle cones or fish cuts. The grippers in the piSOFTGRIP® family can be integrated in applications requiring multiple picks or as a stand-alone tool.

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 almost 500 employees and SEK 1.2 bn in sales 2018, 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 new and largest piSOFTGRIP® 100-4 was developed with food industry automation in mind.



BEST PRACTICES

2022 EXPO OCTOBER 4-6 ATLANTA
 COMPRESSED AIR / VACUUM / COOLING

ON-SITE UTILITY
 Education, Certification
 and Networking!

Four Reasons to Send the Team to the EXPO!

Projects get done by sales engineers working with engineering firm and manufacturing personnel. Affordably priced at only \$25 per person, the EXPO is designed to motivate the whole team!

Designed to reward the people who make Energy Treasure Hunts in manufacturing plants happen! This is why only distributor sales engineers and service technicians, auditors/consultants/engineers and manufacturing plant personnel are eligible to win. Network at the Welcome Reception and the Official Networking Event!

2021 Winners: Shawn Anderson, Ring Power Corp. • John Bilsky, Gentex Corp. • Clint Hill, National Compressor Services • Matt Brockman, Atlantic Compressors • Manuel Elizalde, Tunna Industrial • Brian Coder, Tate Engineering

#1. New Technology EXPO

#2. New Technology EXPO Classroom

#3. Daily EXPO \$1,000 Energy Treasure Hunt RAFFLE!

#4. Two Catered Networking Events

Register at cabpexpo.com

Exhibition Booth Inquiries: bill@airbestpractices.com

Sponsored by



THE MARKETPLACE

BLOWER & VACUUM BEST PRACTICES
www.blowervacuumbestpractices.com

ADVERTISER INDEX

Company	Page	Web Site
Atlas Copco	Outside Back Cover	https://www.atlascopco.com/blowers-usa
Best Practices Webinars	Inside Front Cover, 15, 18, 32	https://www.airbestpractices.com/magazine/webinars
Best Practices 2022 Expo & Conference	Inside Back Cover, 6, 8, 10, 29, 31, 33	https://cabpexpo.com
Busch Vacuum Solutions	7	https://www.buschvacuum.com/us/en
Howden	9	https://www.howden.com/en-us
Inovair	19	https://inovair.com
Blower & Vacuum Best Practices Magazine	20, 24, 27, 34	https://blowervacuumbestpractices.com
Aerzen USA	21	https://www.aerzen.com/en-us.html

TECHNOLOGY & JOBS

Job & Product Marketplace Advertising Information

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

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

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



Advertising/Editorial

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

Subscriptions Administration

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

A Publication of

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

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 104, Pittsburgh, PA 15241. Periodicals postage paid at Pittsburgh, PA and additional mailing offices. POSTMASTER: Send address changes to: Compressed Air Best Practices®, 37 McMurray Rd, Suite 104, Pittsburgh, PA 15241.

Compressed Air Best Practices® is a trademark of Smith Onandia Communications, LLC. Publisher cannot be held liable for non-delivery due to circumstances beyond its control. No refunds. SUBSCRIPTIONS: Qualified reader subscriptions are accepted from compressed air professionals, plant managers, plant engineers, service and maintenance managers, operations managers, auditors, and energy engineers in manufacturing plants and engineering/consulting firms in the U.S. Contact Patricia Smith for subscription information at tel: 412-980-9902 or email: patricia@airbestpractices.com. REPRINTS: Reprints are available on a custom basis, contact Patricia Smith for a price quotation at Tel: 412-980-9902 or email: patricia@airbestpractices.com. All rights are reserved. The contents of this publication may not be reproduced in whole or in part without consent of Smith Onandia Communications LLC. Smith Onandia Communications LLC. does not assume and hereby disclaims any liability to any person for any loss or damage caused by errors or omissions in the material contained herein, regardless of whether such errors result from negligence, accident, or any other cause whatsoever. Printed in the U.S.A.

BEST PRACTICES

2022 EXPO OCTOBER 4-6 ATLANTA
COMPRESSED AIR / VACUUM / COOLING



OPTIMIZE ON-SITE UTILITIES

Powering Automation

Research and Identify Innovations
to Enhance the Efficiency and Reliability of Your Systems

Compressed Air

Air Compressors
Air Compressor Controls
Air Purification & Piping
Condensate Management
Pneumatics

Blower & Vacuum

Aeration Blowers
Industrial Blowers
Vacuum Pump Systems
Inlet Filtration/Oil Separators

HVAC & Process Cooling/Steam

Chillers
Heat Exchangers
Cooling Systems
Cooling Towers
Water Treatment
Boilers
Steam Traps

Motors & Drives • Lubricants • Measurement Instruments • IoT Automation & Monitoring

EXPO HOURS

Tuesday, October 4 1:30-6:30PM

Wednesday, October 5 1:30-6:30PM

SAVE THE DATES ON YOUR CALENDAR!
Located at the modern Cobb Galleria Centre just 20 minutes
from Atlanta Hartsfield-Jackson International Airport.

cabpexpo.com

Sponsored by





Atlas Copco



Unlock Your Plant's Potential

We know how important aeration is to wastewater treatment. It plays a critical role in protecting both your processes and your reputation. No matter which of our seven technologies you choose, we design our blowers with you in mind. Boasting long service intervals, 24/7 remote monitoring, leading energy efficiency, and a design focused on ease of service.



866-472-1013



www.atlascopco.com/blowers-usa