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APRIL 2024

A NOTE ON THIS ISSUE:

J. Campbell, Editor
Modern Pumping Today

Welcome to another issue of MPT! As longtime readers know, our April issue traditionally includes our annual Products & Services Guide (pg. 29). Whether you're seeking the latest innovations you're unfamiliar with or stalwart brands you already know, this issue showcases the pump industry's best and brightest.

Also, in our Case Studies section, Robert Malabar of Pilbara Clean Fuels shares the progress being made on an innovated method of converting pipeline natural gas to LNG (pg. 10). The balance between commercial interests and emissions reductions presents a challenge for many industries, so this piece will be of interest to many readers.

Next up, Börger's David Brown explains how his company's new jet-mixing pump system has significantly reduced capital, installation, maintenance, and energy costs for a leading global lubricants manufacturer and distributor (pg. 14). You'll want to take a close look at how this all-in-one solution hit the ground running, reaping immediate benefits. Enjoy!

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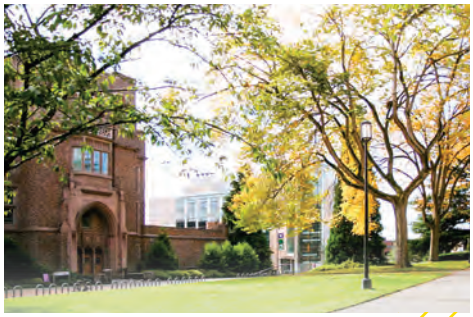
CONTENTS

14

16



20

24

29

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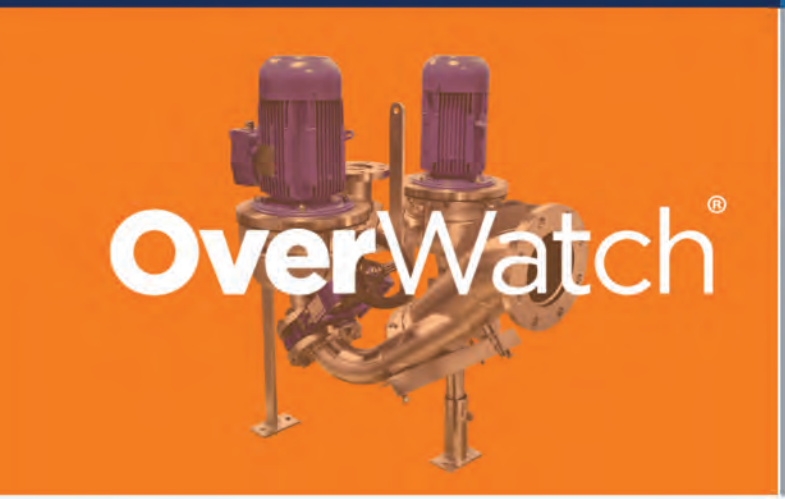

www.flowsolutions.com

SULZER INAUGURATES NEW HIGH-PERFORMANCE PUMP FACILITY

Sulzer recently celebrated the official launch of a brand-new test and assembly center built alongside its existing pump manufacturing facility in Mexico City. The new state-of-the-art facility features a hydraulics test bed for large pumps, a digital monitoring system, and a dedicated packaging area. With this expansion, Sulzer Mexico's pump facility enhances production capacity for its range of large pumps to help meet growing demand for infrastructure in the Americas.

Sulzer has expanded its footprint in Cuautitlan Izcalli, an area within metropolitan Mexico City, to accommodate testing and assembly of high-performance flow equipment from its integrated service location and better support the current proliferation of infrastructure projects across America. The new facility's test center boasts innovative hydraulics test infrastructure that will support rigorous testing and validation of the pumps' performance to ensure maximum reliability and efficiency.

Sulzer offers flow equipment, chemtech, and service solutions from Mexico City. Employees from all three corporate divisions, including Sulzer Executive Chairwoman Suzanne Thoma, joined esteemed customers, suppliers, and special guest Yves Reymond, deputy head of mission at the Swiss embassy in Mexico, to celebrate the milestone launch.

LUCAS OIL PROMOTES KEY EXECUTIVES TO DRIVE GLOBAL DEVELOPMENT

Lucas Oil Products announces the promotions of three executives to key roles. These advancements are designed to strengthen the company's leadership team and better position Lucas Oil for future growth.

Deidra Colvin takes the role of chief revenue and strategy officer, advancing from her previous role as chief strategy officer. In her new capacity, Colvin will oversee revenue operations, identifying and seizing growth opportunities, and ensuring that Lucas Oil positions the right people in pivotal roles to foster innovation, efficiency, and profitability.

Shane Burns is promoted to senior vice president of global sales, previously serving as vice president of national sales. Burns will now have a greater focus on Lucas Oil's sales activity internationally including the company's recently announced expansion into Brazil.

Andy McMillian is elevated to vice president of national sales, previously serving as national sales director. McMillian's new role will see him managing domestic sales operations within the United States and Canada. He is tasked with strengthening Lucas Oil's market presence across North America, optimizing sales performance and retail partnerships.

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OPW LAUNCHES OF CLEAN ENERGY SOLUTIONS WEBSITE

OPW launches its new website for its OPW Clean Energy Solutions (CES) business unit. Found at www.opwces.com, the new website will be the digital home for the following OPW CES product brands, RegO Products and Acme Cryogenics.

The new site gives operators in this market space a one-stop location to learn all about the standard-setting product offerings offered by the OPW CES brands. The ability to easily navigate the site is driven by an intuitive interface that enables faster access to a wider range of product and solution options.

On the site, visitors will discover a vast selection of hydrogen, industrial gas, and LNG solutions curated to meet specific end-user needs. Product offerings are categorized by twelve different markets, three distinct industries, and an array of applications, with a fully optimized product-search feature that instantly takes visitors where they need to go.

In addition, the current RegO Products website will remain active and serve as the central hub for RegO propane energy products, including LPG and NH3. The site will continue to host comprehensive product information and resources, ensuring uninterrupted access for customers.

ENERGY SYSTEMS INTEGRATION GROUP ANNOUNCES 2024 EXCELLENCE AWARDS

The Energy Systems Integration Group (ESIG) announces the recipients of its 2024 Excellence Awards. These awards recognize energy professionals from around the world for their contributions and accomplishments toward the planning and operation of energy systems across multiple pathways and geographical scales in ways that are reliable, economic, and sustainable. More than thirty individuals received Excellence Awards, including one Lifetime Excellence Award winner, for their sustained contributions and dedication to the energy industry.

"ESIG's annual awards program recognizes the energy industry's achievements, and we're seeing significant momentum on transformative projects in 2024," says Mark Ahlstrom, ESIG board of directors president. "Announcing this year's recipients truly demonstrates the innovation occurring among energy systems integration and operations leaders, and we are proud to celebrate them all."

The Lifetime Excellence Award was presented to Benjamin Hobbs of Johns Hopkins University for leadership and contributions to system planning and market design and operation. Excellence Award recipients included Sonia Aggarwal of Energy Innovation, Lingling Fan of the University of South Florida, and Gordon van Welie of ISO New England.

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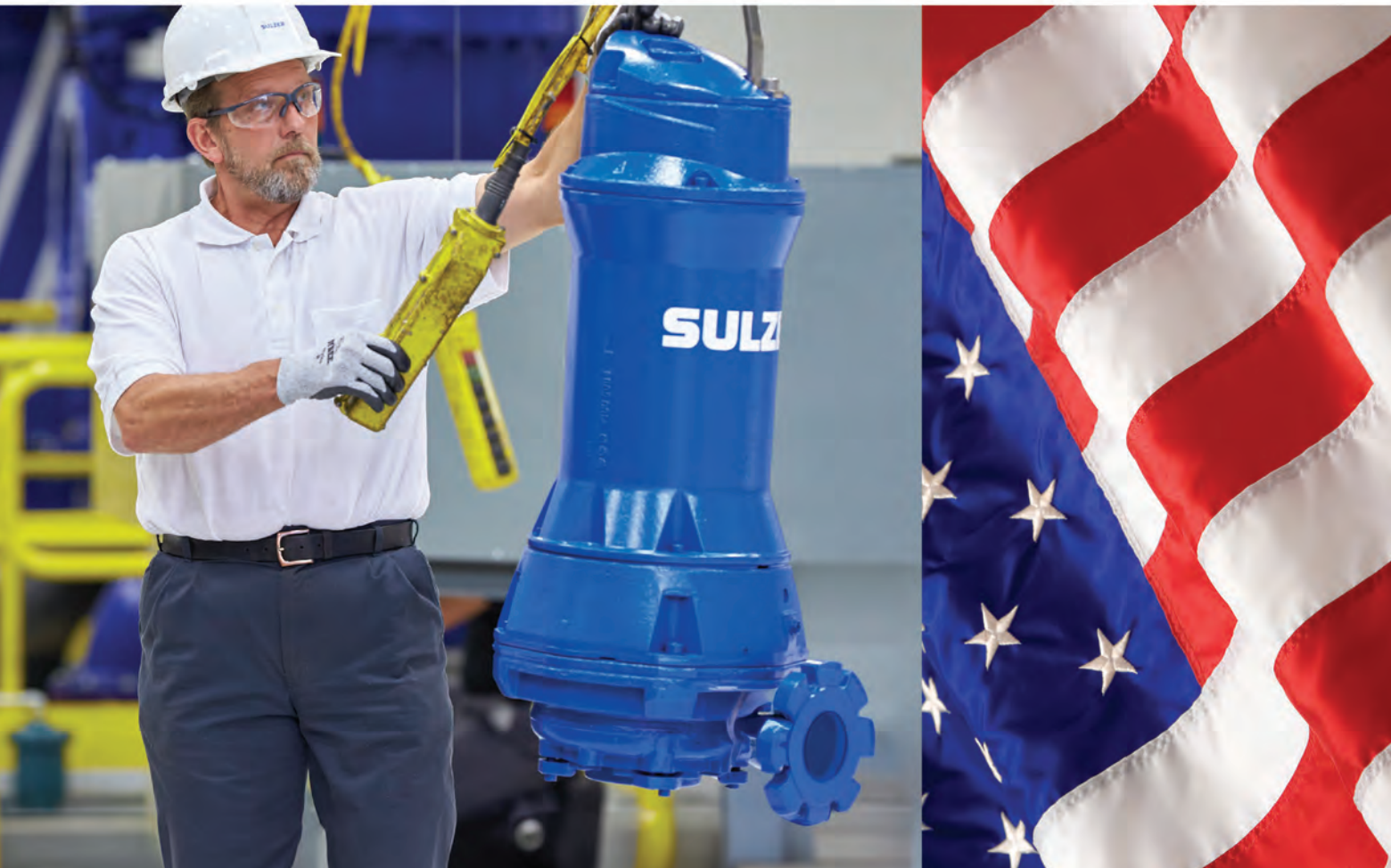


PATHWAY TO ZERO-EMISSIONS THROUGH ONBOARD HYDROGEN PRODUCTION

Collaboration brings benefits to marine shipping and LNG industries BY ROBERT MALABAR, PILBARA CLEAN FUELS

The balance between commercial interests and emissions reductions presents a challenge for many industries. However, this challenge can also lead to innovation. For example, Pilbara Clean Fuels is progressing a development concept for a new, mid-scale, low carbon footprint LNG plant to be located at Port Hedland in Western Australia, the world's largest iron ore export port. In a three-way collaboration, PCF, Oceania, and RINA will facilitate the effort. The three companies plan to undertake studies to define the commercial and emissions reduction benefits the combined concepts could deliver to ship owners and charterers for the Pilbara to Asia dry-bulk minerals export trade route.

COLLABORATOR PROFILE: OCEANIA MARINE ENERGY

Oceania Marine Energy is a Perth-based company formed to develop and operate an LNG and marine fuels bunkering business at major ports in Northwest Australian. Oceania will charter and operate purpose-built LNG bunker vessels. Oceania has a collaboration agreement with Kanfer Shipping (Norwegian shipowner) for the development, supply, and charter of the bunker vessels.

Oceania Marine Energy is developing a marine fuel bunkering business using a purpose-designed LNG re-fueling vessels to be chartered from Kanfer Shipping, Norway.

For more information, visit **www.oceania.energy**.

AIDING FUEL SUPPLY

The project will provide an Australian LNG fuel supply capability through a new facility for the conversion of pipeline natural gas to LNG, responding to market demand for cleaner marine bunker fuel for dry-bulk iron ore carriers operating round-trip voyages between the Pilbara and Asia.

Market studies show increasing worldwide adoption of LNG as a marine fuel, with supply availability one of the key drivers. The base-case plant capacity is 0.5 Mtpa, with market analysis for Port Hedland alone (not counting other major Pilbara ports) indicating potential demand of 1.0 Mtpa by 2030.

A key feature of the project is an electrified plant with outsourced power supplied predominantly from renewable sources. The design intent is to significantly reduce Scope 1 and Scope 2 emissions compared to conventional LNG plants—thereby providing an ability for round-trip voyages bunkering in Port Hedland to achieve substantially lower overall GHG life-cycle emissions than other options.

INNOVATION AT SEA

The LNG re-fueling concept is based on ship-to-ship bunkering of vessels while at anchor off Port Hedland. PCF knows the maritime community is happy with LNG as a marine fuel. We believe the outcome of the studies should provide compelling argument in support of the Western Australian Government's announcement to create an international LNG fueling hub in the Pilbara.

Oceania Marine Energy is developing an LNG marine fuel bunkering service capability based on the charter, ship management and operation of purpose-designed

LNG bunker vessels. The vessels are to be provided by Norwegian ship-owner Kanfer Shipping.

"The Oceania and PCF collaboration is aimed at providing a supply capability for low-carbon footprint LNG, for the first time available on-route to the Australia-Asia iron ore shipping fleets. RINA adds to that with new ship and fuel system design enabling LNG to be viewed as a potential future zero-emissions marine fuel," notes Oceania Managing Director Nick Bentley.

RINA is developing a concept for a new 209,000 DWT Newcastlemax dry-bulk ship design with an innovative LNG marine fuel system involving pre-combustion carbon removal and hydrogen production, with the objective of meeting and exceeding IMO 2050 emissions reduction marine vessel Carbon Intensity Index (CII) objectives.

Along with PCF's existing partners Oceania, we are delighted to have formed the new collaborative relationship with RINA. The partnership has the ability to demonstrate an attractive commercial development strategy to meet not only the immediate needs of IMO 2030 emissions compliance, but the engineering step-change needed to create a practical path to IMO 2050 net-zero emissions objectives.

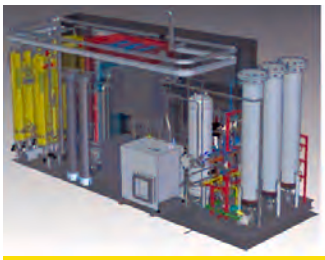
ZERO EMISSIONS ON THE HORIZON

The RINA fuel system concept involves the capture, onboard storage, and offloading of liquefied carbon dioxide or solid carbon at loading or discharge ports for onshore handling, monetization, or disposal. The concept provides a credible line-of-sight pathway to zero emissions for the application of LNG as a marine fuel.

RINA Marine Consulting Executive Vice President Massimo Volta adds, "The combined knowledge and expertise of PCF, Oceania, and RINA will allow a comprehensive approach to the project, rather than to the single phases, that will actually maximize the emissions reduction effort. The shipping industry is living a time of uncertainty that still requires immediate investments. Port Hedland is the world's biggest iron ore export point and providing such system with a solution that allows a more flexible transition while achieving IMO 2050 targets with an existing fuel will be a massive contribution to the path to West Australia green corridor."

By solving the historic criticism of LNG as being only a transition fuel, rather than having a long-term future as a zero emissions fuel, this solution is likely to be welcomed by the marine engineering community due to the extensive maritime operational experience of LNG and its known safe handling characteristics.

Bentley adds, "Together we are excited to participate in developing Australia's primary green corridor for shipping, supporting significant emission reductions in



COLLABORATOR PROFILE: RINA

RINA, leading certification company and engineering company in Italy, provides a wide range of services across the energy, marine, certification, infrastructure and mobility, real estate, and industry sectors. With revenues in 2022 of 725 million euros, 5,300 employees, and 200 offices in seventy countries worldwide, RINA is a member of key international organizations and an important contributor to the development of new legislative standards.

RINA is developing an innovative concept for an LNG-fueled 209,000 DWT Newcastlemax ship design incorporating pre-combustion carbon removal and hydrogen production to meet IMO 2050 Carbon Intensity Index (CII) requirements over the ship's operating life.

For more information, visit **www.rina.org**.

the short term, and in the future, for a maritime trade route critically important to Western Australia's economy."

LEADING INTO THE FUTURE

The Pilbara to Asia dry-bulk trade route is particularly suited for early adoption of the pre-combustion carbon removal and hydrogen production onboard concept due to proposed availability of low carbon intensity LNG bunkering at Port Hedland, along with an ability for offloading carbon dioxide or solid carbon and a variety of monetization or disposal options.

Recognizing the complementary aspects of their respective project interests and business objectives, PCF, Oceania, and RINA have agreed to collaborate to develop an end-to-end low-carbon profile LNG production and marine vessel bunkering capability concept for the port of Port Hedland. Furthermore, RINA's 209,000 DWT Newcastlemax dry-bulk vessel design and fuel system design concept provides a path to 'zero emissions' for the adoption of LNG as a marine fuel on a 2050 timeframe.

"Oceania, PCF, and now collaboration with RINA, heralds the beginning of a new decarbonization initiative in Western Australia, enabling a much-needed lower-carbon fuel source for shipping," says Bentley.

ROBERT MALABAR is managing director of Pilbara Clean Fuels. PCF is an early-stage project development company formed to progress the development of clean fuels production opportunities at Port Hedland, Western Australia; a location notable for substantial energy/fuel demand and import. The current focus is a base case 0.5 Mtpa low carbon emissions profile pipeline gas to liquefied natural gas (LNG) production plant.

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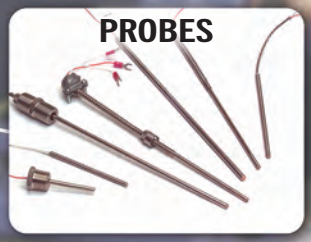

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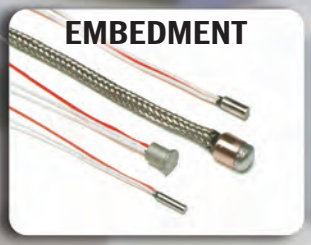

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SMOOTH OPERATOR

Global lubricants manufacturer chooses new Borger pump

BY DAVID BROWN, BÖRGER

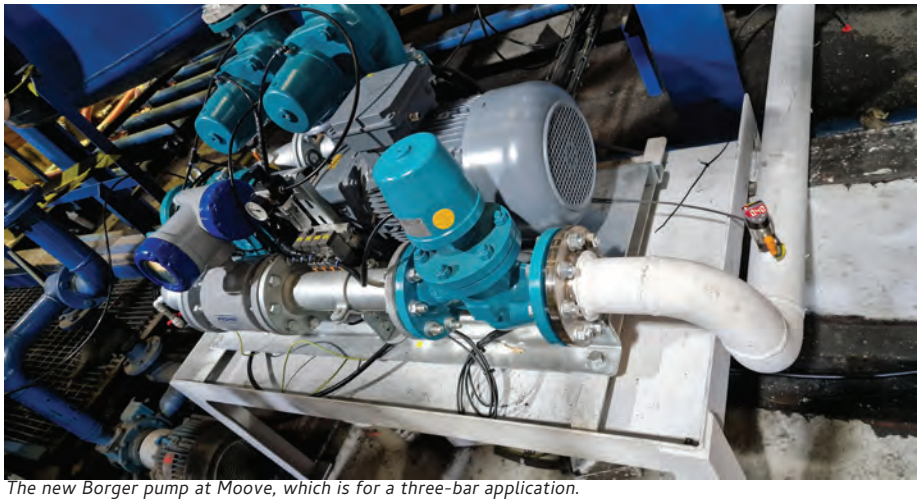
A new jet-mixing pump system has significantly reduced capital, installation, maintenance and energy costs at Moove, the leading global lubricants manufacturer and distributor, in the United Kingdom.

IMPROVED QUALITY AND A BETTER BACK-UP

For a closed-top 13,000-gallon tank used in the manufacturing process of quality lubricating, engine, hydraulic, and gear oils, Moove wanted to trial a set-up that would not only be better economically, but also provide more redundancy.

Ian Lowe, Moove's manufacturing general manager, explains, "A motor failure on a blender could mean as much as four days impact on production, so it was important for us to take the opportunity to prove a different technology."

At Moove, Borger carried out a full site test, running different configurations to determine the best operating modes.



The new Borger pump at Moove, which is for a three-bar application.

PROVIDING THE BEST OPTION

"The performance of our existing paddle mixers has been good," Lowe adds, "but Borger were recommended as a company that would work with us to provide a better option; one that could be easily replicated."

The team at Moove drew up a logic for Borger to examine, outlining their objectives, which ultimately resulted in a pump (plus two nozzles), for a three-bar application with a flow-rate of up to 15,850 gallons per hour. To meet the space requirement at the Gravesend site in Kent, Borger also provided the system as a skid-mounted unit, working closely with Moove to supply a customized control panel with a specially written program.

"The fact that Borger were able to deliver a complete, all-in-one package was a real bonus," continues Lowe.

"It was also a big advantage to go to Borger for a site test, running different configurations to determine the best operating modes for us. This clearly worked very well, because apart from one very minor tweak, we haven't had to make any changes since the pump was installed.

SO SIMPLE TO MAINTAIN

"With a 9kW motor (compared to 12kW for the paddle mixers), we are automatically saving on energy, but one of the other main benefits is that the Borger equipment is so simple to look after," says Lowe. "There's easy access to the pump-head, and no special tools required. Retrofit to an existing tank is also very straightforward.

"We're very pleased with solutions provided by Borger that allowed us to achieve the goals of our project."

Börger designs, produces, and sells pumps, chopping units, and entry technology for pumping low to highly viscous and abrasive media—including its core component, the patented Rotary Lobe Pump. Börger's guiding principle has always been to make things better. In the meantime, Börger manufactures many other products. For more information, visit **www.boerger.com**.

The twofold nature of wastewater-treatment facilities—treating fouled wastewater and providing clean water—require pumps that can handle a variety of fluids.

THE FIRST CHOICE FOR TREATMENT OPERATORS

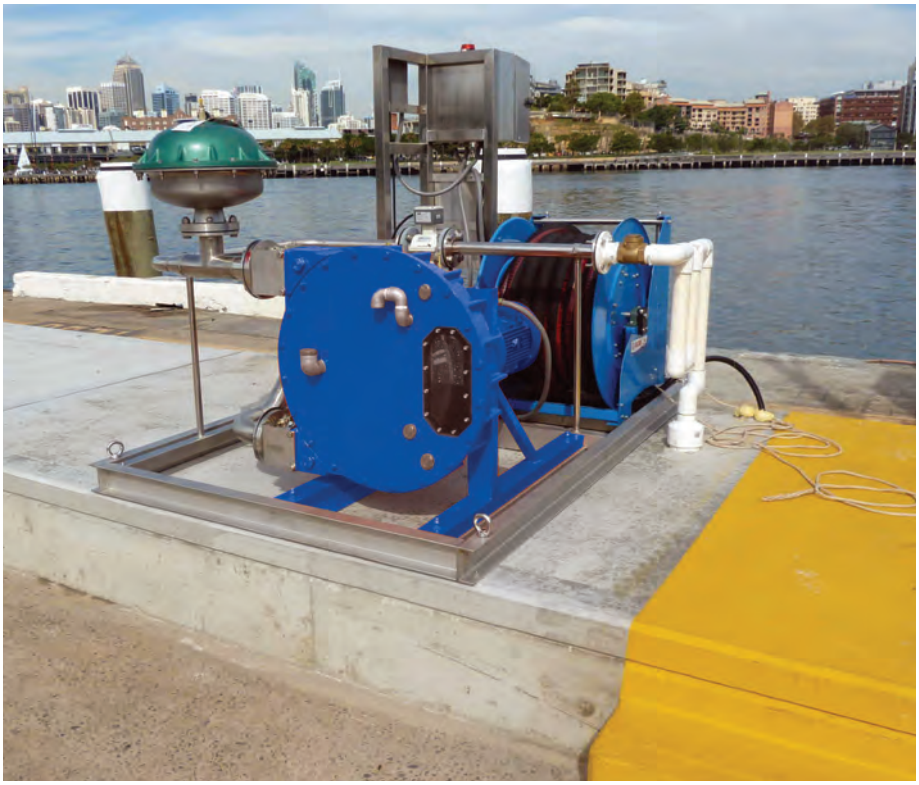
Why peristaltic pumps excel in wastewater handling

BY SEBASTIEN BROSSE, ABAQUE

No life form, whether it be human, animal or plant, can survive without water. That makes the reliable supply of clean water to homes, businesses, hospitals and industrial-manufacturing facilities, among many others, of paramount importance. It also elevates the importance of a properly functioning municipal water-treatment facility.

These facilities have a twofold purpose: provide clean water to the masses and treat the fouled wastewater that they receive in return. Pumps play a significant role in wastewater-treatment operations, and over the years, many different styles and types have been used to handle impure, particulate-laden water, along with the various abrasive, corrosive, and toxic chemicals that are used to clean it. There is one type of pump technology—the peristaltic (hose) pump—that often outshines the others, especially when addressing the plant operator's concerns regarding whether or not the pump is robust enough to handle the demands of a wastewater-treatment operation.

The hose serves as the only wear part on a peristaltic pump, which has minimal components compared to other positive displacement pumps.



Peristaltic pumps can transfer solids and soft particles, as well as handle water-like viscosities as high as 352,000 SSU (70,000 cSt), making them suitable for industrial wastewater and municipal water treatment facilities.

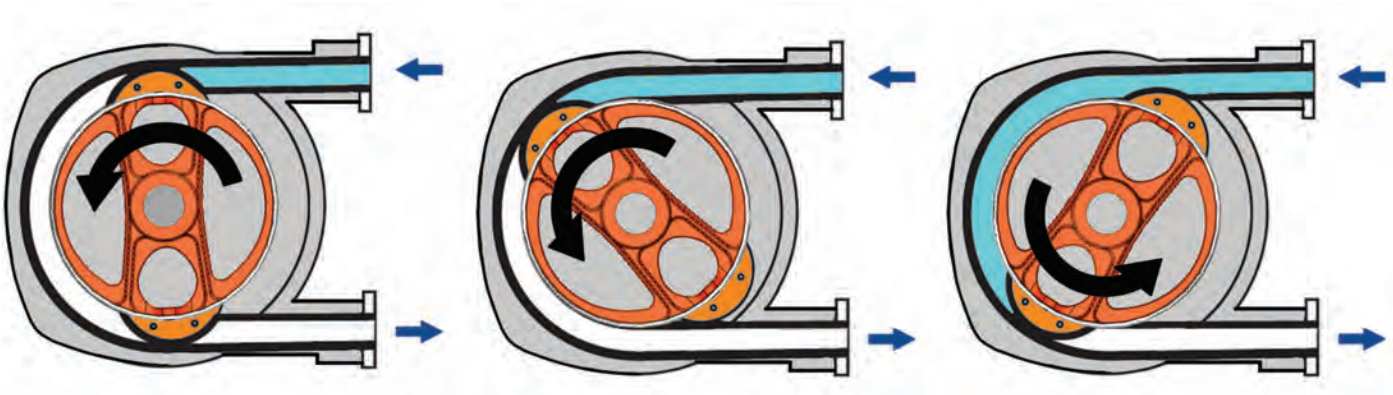
THE KEY TO SUCCESSFUL PERISTALTIC PUMPING

For more than twenty years, peristaltic (hose) pumps from Abaque™, a product brand of PSG, a Dover company, have set the standard in transferring difficult-to-handle chemicals and fluids. The key to the success of the Abaque pumps in handling these diverse fluid characteristics and operating conditions is the peristaltic pumping principle:

- **HIGH PERFORMANCE:** The pump's seal-less design eliminates leaks and the possibility of product contamination, while providing the ability for continuous dry-run operation without adversely affecting the pump's performance, pressure and dosing accuracy.
- **RELIABILITY:** Peristaltic (hose) pump design requires none of the seats, valves, and mechanical seals that can fail on other pump styles; the pump hose is its only replacement part.
- **VERSATILITY:** The peristaltic pump can successfully handle extremely abrasive and aggressive fluids, solid-laden slurries and water-thin, shear-sensitive, and viscous materials.

MAKING THE CASE

Peristaltic (hose) pumps stand out because their operation is based



Peristaltic pumps use a hose and an internal revolving mechanism (rollers or shoes). The fluid flows through the hose, with the revolving shoes compressing it to push the fluid forward. When the shoes finish their rotation, the hose returns to its original shape and the process starts over.

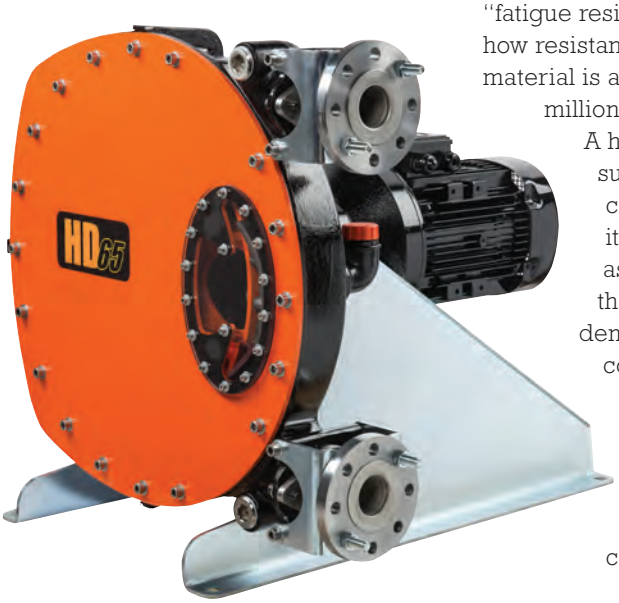
on the alternating contraction and relaxation of the hose, which forces the contents to move through the pump and into the discharge piping. The smooth-wall, flexible hose is squeezed between shoes on the rotor and the inside of the pump casing. This rotation moves the product through the hose at a constant displacement rate. The hose restitution after the squeeze produces an almost full vacuum that draws more product into the hose from the intake piping. The pumped product only contacts the hose and inserts, making this pumping technology very suitable for abrasive and corrosive applications.

Peristaltic (hose) pumps also maintain excellent volumetric consistency, making them ideal for the strict dosing and 24/7 operating cycles that can be required in wastewater-treatment applications. Peristaltic (hose) pumps are also easy to operate and maintain, and their reversible operation allows for pumping in both directions, if needed.

In order to successfully handle the challenges of wastewater treatment, the pump's hose and inserts need to offer the highest level of material compatibility, while also being able to reliably deliver the millions of pumping cycles that are required during their lifetimes.

OVERCOMING FATIGUE

A critical consideration when selecting the hose material is its "fatigue resistance." This trait defines how resistant to failure the hose material is as it runs through its millions of pumping cycles. A hose material that is susceptible to developing cracks and holes early in its operational life is not as desirable as a material that can reliably handle the demands of the repeated contraction and relaxation of the hose, especially when particulate-laden liquids are being pumped. The reinforced construction of the peristaltic hose and its use of rubber compositions (natural rubber, EPDM, Buna-N, etc.) that have been specially designed for the stresses within the peristaltic hose allow for the optimum life cycle and performance.



Abaque's peristaltic pumps feature a seal-free design and robust construction, allowing them to eliminate leaks and contamination and reduce maintenance and repairs.

CONCLUSION

For more than two decades, peristaltic (hose) pump technology—as epitomized by the standard-setting operation of the Abaque peristaltic (hose) pump family—has proven to offer the performance and reliability that can make it a first-choice pumping option for wastewater treaters who crave highly reliable, environmentally friendly, low-maintenance pump operation.

SEBASTIEN BROSSE is a team leader at Abaque®, a leading brand of peristaltic (hose) pumps for the transfer of difficult chemicals and fluids in the toughest applications, from abrasive and aggressive to shear-sensitive and viscous. He can be reached at sebastien.brosse@psgdover.com. Abaque is a brand of PSG®, a Dover company. PSG is comprised of several leading pump brands, including Abaque, All-Flo™, Almatec®, Blackmer®, Ebsray®, em-tec, Griswold®, Hydro™, Malema, Mouvex®, Neptune®, PSG® Biotech, Quantex™, Quattroflow®, RedScrew™, and Wilden®. For more information, visit **www.psgdover.com/abaque**.

A Warren Controls ILEA Globe Valve with Electric Actuator was installed as a PRV after it was determined that a pilot operated pressure reducing valve would suffer poor downstream pressure control and potentially choke steam flow to the heating hot water set when in the late spring/early summer. Also, there was insufficient space for a pilot-operated PRV and insufficient straight run to accommodate a traditional flow meter.

WHY ARE ELECTRIC PRVS REPLACING SELF-PILOTING STEAM REGULATORS?

What to do when traditional flow meters are not the best option

BY ROBERT WORKOSKY, WARREN CONTROLS

A trend has been gaining steam. Electric modulating pressure-reducing valves (PRV) are increasingly replacing traditional self-piloted regulators in steam systems.

The adoption of this "smart" technology is part of the overall trend of digitally connecting all components to building automation systems (BAS) for greater visibility and control and for lower energy consumption.

Sometimes the shift to electric PRVs is driven by more basic considerations. For example, PRVs with electric actuators can be more compact, allowing them to fit in spaces too confined to install—and maintain—a pilot-operated steam regulator.

Moreover, an electric PRV can be set up to automatically calculate the downstream steam flow rate, without the need to install a traditional flow meter. This is an important benefit in locations that lack a sufficient straight run of pipe to accommodate a traditional flow meter.

PRESSURE REDUCTION INCREASES EFFICIENCY

Steam is usually produced at high pressure by a steam boiler, to avoid the production of wet steam among other reasons, and then distributed to one or more points of use that require lower pressure for safe and efficient operation. Steam pressure-reducing stations perform the critical function of reducing the pressure to a desired set point. The control of pressure can also be an effective means of

controlling temperature because the temperature of saturated steam is closely related to its pressure.

A single facility may have several pressure reducing stations. Hospitals, for example, require PRVs to deliver steam for many different uses, including heating, humidification, hot water, sterilization, kitchen, and laundry functions, with varying steam usage requirements based upon the process, the time of day, weather, etc.

Pressure reducing stations also facilitate cost-effective distribution. Significantly smaller pipe diameter can be used where the steam is under high pressure. Therefore, on university campuses where the steam plant serves many buildings spread over a large area, the pressure reducing stations may be located close to the points of use to save on the installation cost of piping and fittings. This benefit needs to be weighed against the energy savings achieved from reducing radiant heat loss when distributing steam at lower temperatures.

The goal is not only to deliver steam below the maximum allowable working pressure (MAWP) of each piece of equipment, but to maximize energy efficiency for financial saving and environmental sustainability. The most significant energy savings from pressure reduction comes from delivering the optimal pressure at the point of use. Lower pressure results in increased enthalpy of steam and the availability of more latent heat. In other words, more BTUs can be delivered per pound of steam when the pressure is reduced.

TRADITIONAL PILOT-OPERATED REGULATORS

Originally invented in the 1880s, pilot-operated steam regulators are a tried-and-true method of reducing steam pressure and flow. The main advantage is that they operate as self-contained devices that do not require electrical power or a pneumatic air supply. The operating principle is relatively straightforward: the valve operates by continuously balancing the downstream pressure (via a pressure-sending pipe) against a mechanical spring that operates in conjunction with a bellows or diaphragm. The pressure set point is adjusted by tightening or loosening bolts to increase or decrease the spring force.

Pilot-operated PRVs have several disadvantages inherent in their design. They provide a limited turndown ratio, typically 10:1. Therefore, it is quite common that multiple pilot-operated valves are installed in series, often in a 1/3 and 2/3 configuration, to produce the net pressure reduction required.

These devices are also prone to failure due to clogging by moisture and dirt in the small-diameter pressure sensing pipe and in the valve itself. Steam is used both as the sensing mechanism and as the force for moving the diaphragm.

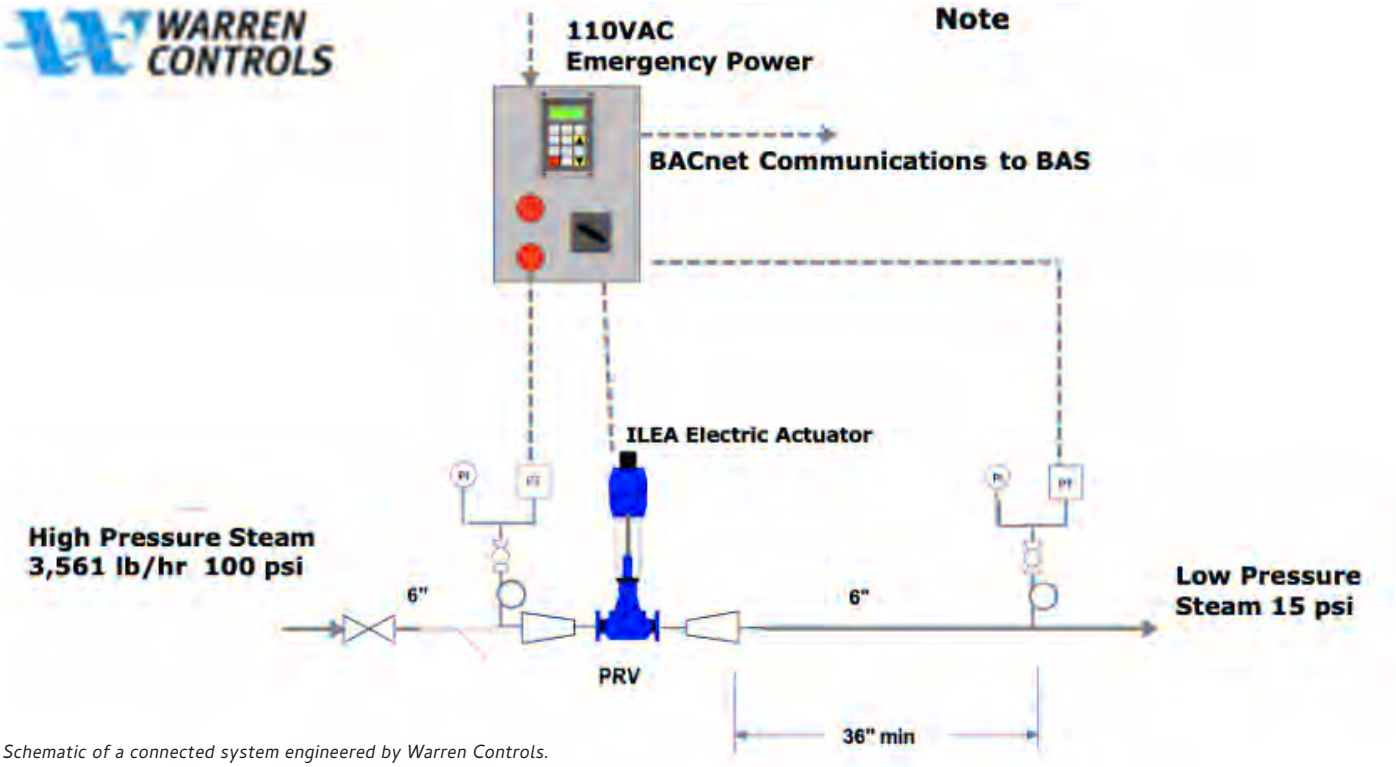
The greatest advantage of pilot-operated valves—operation as a self-contained, isolated device—also serves as an important disadvantage. The "set-it-and-forget-it" adjustments provide stable downstream pressure, but the pressure cannot be flexibly modulated based on changing load, weather, and other conditions.

Pilot-operated valves not only lack the ability to be intelligently controlled, but they are also unable to remotely communicate alerts of problem conditions or data on usage. In fact, a pilot-operated valve provides no visibility of its internal settings and operating condition even when you are standing in front of it.

ELECTRIC MODULATING PRVS

Electric modulating PRVs employ an electric actuator to open and close the valve. Instead of the steam in a pressure-sending pipe used by a pilot-operated system, electronic PRVs utilize electrical signals. A controller

A globe valve with an electric actuator, such as the Warren Controls ILEA 5800E Series, provides a large turndown ratio and precise modulating control for steam PRV applications.



Schematic of a connected system engineered by Warren Controls.

continuously reads the downstream pressure and temperature from a sensor and uses this information to control the valve's electric actuator.

Globe valves with electric actuators provide much more precise control than pilot-operated valves. They have a turndown ratio of 50:1 that supports low loads without the need for 1/3 2/3 configurations. The systems are more reliable and require less maintenance because the electrical connections eliminate the clogging problems of pilot sensing pipes. Globe valves are also more compact than pilot-operated regulators, making them suitable for confined spaces.

A SMARTER SOLUTION

As a connected system, electric modulating PRVs are fundamentally different from standalone pilot-operated valves. In conjunction with sensors, controllers, and building automation systems (BAS), they offer new capabilities of visibility and control.

VISIBILITY

The controller has constant visibility of the exact position of the valve. This information is useful in several ways. The pressure reduction station can be monitored remotely, generating alerts of fault conditions.

Steam usage data can be captured. The downstream flow rate can be calculated, using the orifice plate method, without installing a flow meter.

CONTROL

The PRV can be precisely modulated, and automatically controlled by logic programmed into the local controller or the building automation system to optimize the system for energy efficiency or performance, and in emergencies, the PRVs can be controlled by personnel accessing the BAS remotely.

The ability to remotely monitor and control PRVs is especially useful when pressure-reducing stations are widely distributed at points of use through a large campus or facility and when the steam is used for several different processes.

BRINGING STEAM IN LINE WITH OTHER SYSTEMS

As building automation systems become more commonplace, steam pressure-reducing stations are sometimes one of the last components to be integrated, long after chillers and boilers have been connected.

Electric modulating PRVs have proven to be highly reliable and easy to maintain while providing dramatically improved visibility and control that enables significant energy savings.

Based in Bethlehem, Pennsylvania, Warren Controls, Inc. provided dependable, rugged, precision control valves and accessories for product applications where reliable performance is a must. Warren Controls products can be found in everything from commercial buildings to chemical processing. For more information, visit **www.warrencontrols.com**.

The pumps used at a sea port in northeast Brazil for moving heavy oil from a tank farm to road tankers or vessels are primarily needed during dry periods. Less energy is generated with hydropower during those months which increases the demand for heavy oil.

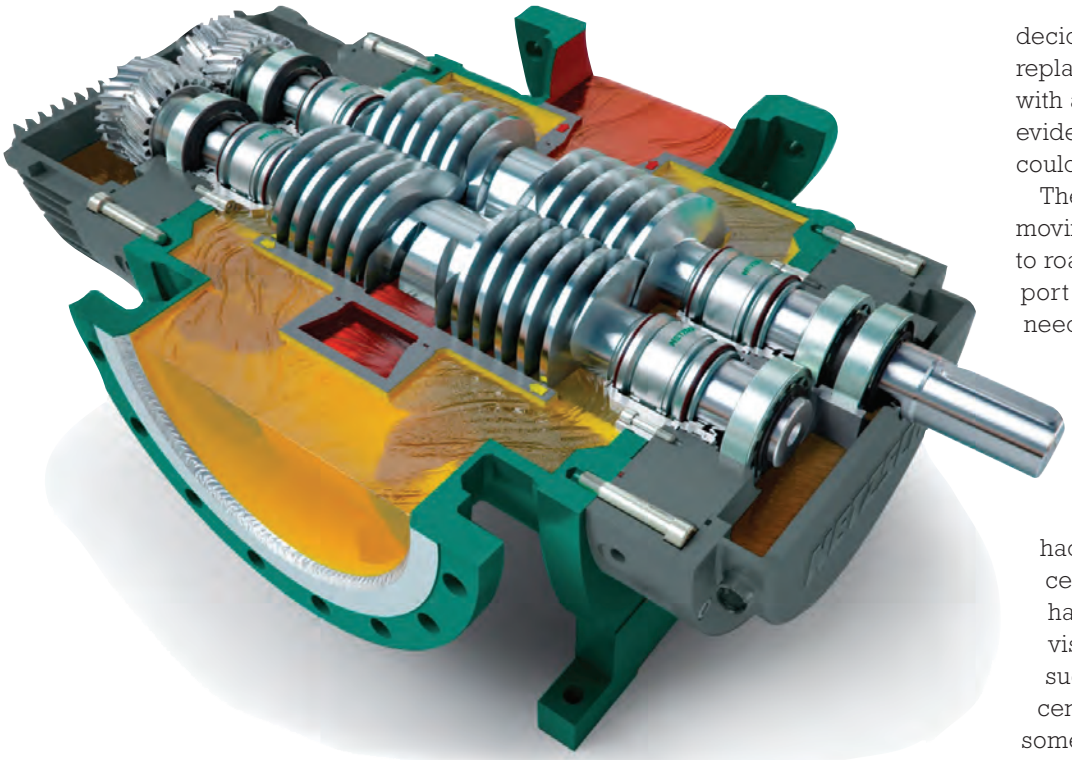
SIGNIFICANT SAVINGS FROM TANK TO TRUCKS

Multi screw pump moves highly viscous heavy oil at low NPSHa

BY VITOR ASSMANN, NETZSCH

At a tank farm in a Brazilian sea port, two centrifugal pumps were used for transferring heavy oil from storage tanks to road tankers or vessels until February 2020. This required the high viscosity of the medium to be reduced by means of diesel injection, costing the owner at least $2,000 each day. In addition, the centrifugal pumps regularly broke down due to cavitation damage. The owners decided to initially replace one of the two centrifugal pumps with a NOTOS® multi screw pump from Netzsch.

Due to its very good suction capabilities, the selected four-screw 4NS is also suitable for highly viscous media with up to 200,000 cSt, achieving a flow rate of up to 792,500 gallons per hour. After commissioning, it became evident that—in contrast to the remaining centrifugal pump—the multi screw pump was running without cavitation even at significantly higher flow rates. Another benefit was that the extensive addition of diesel was no longer required. Based on this positive experience, the customer



The pumping concept is based on the interaction between the screws and the housing. It forms conveying chambers in which the medium is continuously moved from the inlet side to the discharge side at stable pressure—almost independently of medium consistency or viscosity. The delivery volume is influenced by pump speed, screw diameter and screw pitch. It is consequently directly proportional to the speed and can be variably adjusted through it.

decided in February 2020 to also replace the second centrifugal pump with a NOTOS. Moreover, it became evident that the power consumption could be reduced significantly.

The pumps, which are used for moving heavy oil from a tank farm to road tankers or vessels at a sea port in northeast Brazil, are primarily needed during dry periods. That is because the hydropower plants in this country produce less energy during those periods, which increases the demand for heavy oil. Until February 2020, this transfer had been implemented with two centrifugal pumps, which, however, had struggled with the high viscosity of the medium. The poor suction capability of conventional centrifugal pumps means that some of the oil remains in the tank and cannot be used. In addition to this, unsuitable technology can lead to cavitation, which will cause the pumps to fail in the long run.

As the 4NS can handle highly viscous media, no diesel injection was required, which in turn resulted in a significant cost reduction.

Cavitation was also an issue on the two centrifugal pumps at the Brazilian tank farm. Due to the high viscosity, the system had a lower NPSHa value, particularly at night, which made it necessary to add expensive diesel to the heavy oil in order to reduce the viscosity. Around 792 gallons had to be added each day, at a cost of at least $2,000 per day. To increase the reliability and efficiency of the process and to lower energy costs, the owners decided to replace one of the two centrifugal pumps with a NOTOS® multi screw pump from Netzsch and to compare the performance of the two units.

The 4NS offers a maximum flow rate of 792,500 gallons per hour and is suitable for highly viscous media with up to 200,000 cSt. At the same time, the pump has a highly robust design, from the contact free screws to the physical separated synchronization gearbox.

ROBUST PUMP FOR MEDIA WITH UP TO 200,000 CST

The NOTOS series generally comprises multi screw pumps with two (2NS), three (3NS), or four (4NS) screws that can be used flexibly for different viscosities,

The overall energy costs were lowered significantly, in particular because the second existing centrifugal pump was also replaced with a 4NS after the successful test phase in February 2020.

even for large flow rates. The tank farm in Brazil required a pump that could transport up to 52,834 gallons per hour of heavy oil with a pressure of 18 bar, a temperature of 50 to 122 degrees Fahrenheit and a viscosity of up to 9,000 cSt. The owner of the tank farm selected a 4NS twin-screw pump, which is available for flow rates of up to 792,500 gallons per hour and is suitable for highly viscous media with up to 200,000 cSt.

The pump stands out on account of its high level of robustness, it is resistant to dry running and can be manufactured from materials that are specially selected for the application at hand. State-of-the-art production technologies enable narrow tolerances between the dynamic and static components, reducing the return flow. In combination with the flow optimized shape of the pump chamber, this results in a high level of efficiency.

LOW NPSHR VALUE PREVENTS CAVITATION

Apart from efficiency, however, the flexibility of this pump in terms of the viscosity of the pumped medium was particularly crucial for the owner of the Brazilian tank farm. While centrifugal pumps have a narrow operating range and their efficiency reduces drastically as the viscosity increases, NOTOS multi screw pumps work across the entire viscosity spectrum with very good efficiency. This pumping concept is based on the interaction between the screws and the housing. It forms conveying chambers in which the medium is continuously moved from the intake side to the discharge side at stable pressure—almost independent of medium consistency or viscosity. The flow rate is influenced by pump speed, screw diameter and screw pitch. It is consequently directly proportional to the speed and can be variably adjusted through it.

SAVING ENERGY COSTS WITH MORE EFFICIENT PUMP TECHNOLOGY

The pumps are adapted to the application at hand in order to achieve the best possible performance. This mainly applies to the pump size and its tolerances, but also to the accessories. Overpressure valves, a variety of different sealing systems and bearing monitoring devices using temperature and vibration sensors are available, for example. For the application in Brazil, the viscosity of the medium in combination with the pump speed required a double seal with an external sealing system. At the customer's request, this was designed to be API compliant.

As the 4NS can run with highly viscous media, no diesel injection was required. This in turn resulted in a cost reduction of $2,000 per day. In addition, this pump runs much more efficiently with such viscous media, which reduced the power consumption by over 40 percent to 65 kW. This saved even more energy costs—in particular because the second existing centrifugal pump was also replaced with a 4NS after the successful test phase in February 2020.

VITOR ASSMANN is senior sales manager at Netzsch do Brasil. The Netzsch Group is an owner-managed, international technology company with headquarters in Germany. The Netzsch business units Analyzing & Testing, Grinding & Dispersing, and Pumps & Systems represent customized solutions at the highest level. More than 4,000 employees in thirty-six countries and a worldwide sales and service network ensure customer proximity and competent service. For more information, visit **www.netzsch.com**.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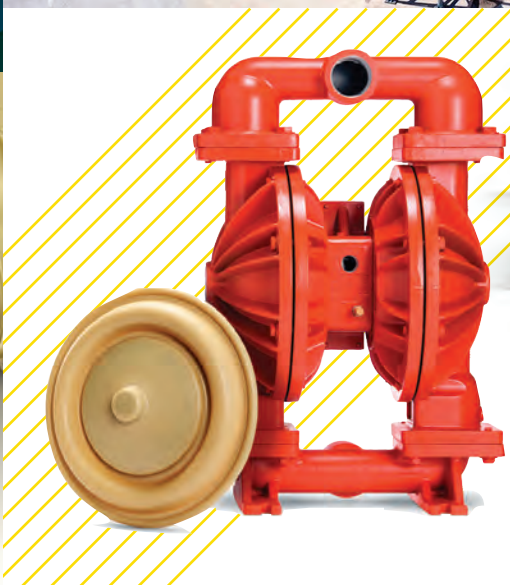
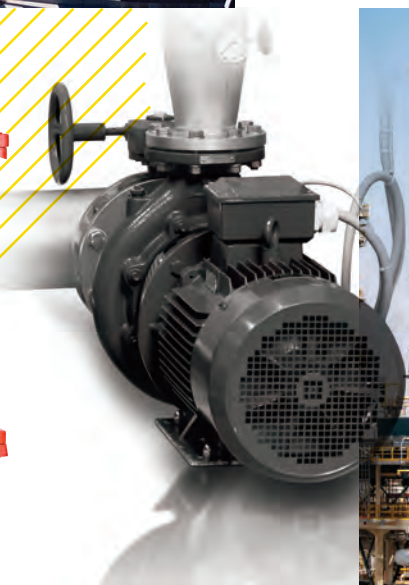
PROVIDING SOLUTIONS FOR THE WORLDWIDE PUMP INDUSTRY





Crane Pumps & Systems

The Barnes family of pump products from Crane Pumps & Systems provides versatility, high performance, and unequaled value. For more than a century municipalities, engineers, plumbing contractors, builders, and developers have relied on Barnes wastewater pumps and pressure sewer systems for reliability and durability. From fractional horsepower sump pumps to robust grinder and chopper pumps, Barnes delivers innovative, cost-effective Solids Handling Pump solutions.

BARNES SH NON-CLOG AND SITHE CHOPPER PRODUCTS

One of the main issues plaguing customers has been and will continue to be the changing waste stream's capability to handle solids. This led to the development of the Barnes SH Non-Clog and SITHE Chopper products. The SITHE chopper features a patented open center cutter design, field replaceable heat-treated stainless-steel blades, and plug-n-play cord, making it the preferred pump of choice in municipal wastewater applications, especially those with clogging issues. Furthermore, Barnes understood the rising demand for a more efficient submersible pump that could attain premium efficient, IE3, motor ratings. Utilizing their proven non-clog and chopper technologies, they introduced the envie3 motor line. These pumps took Barnes' proven non-clog and chopper wet ends and outfitted them with a premium efficient motor that can run in both wet applications and dry pits, as well as in horizontal or vertical configurations. The development of this platform expanded the portfolio and pushed the envelope on one solution solving a variety of needs.

RAZOR GRINDER PUMPS

Don't have a ton of flow or need a lot of head at your waste station? Still focusing on this clogging issue, Barnes has also launched a new and improved grinder platform. The Razor grinder pump is the ideal 2-hoursepower pump for light commercial and residential solids handling applications. With the Razor's thoughtfully designed innovative axial cutting technology, it is engineered to efficiently reduce solids like flushable wipes, diapers, and other non-biodegradable items. This grinder product is especially useful in pressure sewer systems. The Barnes' pressure sewer system with the Razor grinder can reduce installation costs, increase system flexibility, and limit the overall environmental impact of the sanitary sewer system. Its flexible capabilities allow it to be a turnkey solution or easily integrated into existing systems.

SEWAGE EJECTORS AND SUMP PUMPS

Barnes' innovation doesn't stop there. Their offering expands to sewage ejectors and sump pumps that are used in smaller applications as well. Designed for long operational life, quiet operation, and dependable service, Barnes has your residential needs covered.

YOUR TRUSTED PARTNER IN INNOVATION

The Barnes brand from Crane Pumps & Systems is a leader in the design and manufacture of advanced pump solutions for wastewater applications of all sizes. They are your trusted partner in wastewater transportation and management, setting the bar higher with each innovation. From larger applications that require chopper pumps down to residential sumps, the customer's needs are always at the forefront. Barnes is dedicated to solving the problems of the modern waste stream and will continue to be a leader in the development of new technologies.

Elgin Separation Solutions

As a leading turn-key solutions provider for liquid/solids separation, dewatering, and waste management operations, Elgin Separation Solutions recognizes the need for reliable and efficient slurry pumps when managing abrasive solids-laden fluids. Whether you are looking for high quality centrifugal, positive displacement, self-priming, or submersible pumps, Elgin can provide customized solutions with in-house engineering and design services tailored to your operations. Additionally, Elgin's global field service team is available to commission, train, and service your pumping process to ensure smooth operations.

DUROLAST RB/NE™ PUMP

Elgin's DuroLast RB/NE™ abrasion-resistant slurry pumps are designed specifically to handle abrasive materials encountered in water-based or oil-based pumping operations. Whether used independently, as a stand-alone unit, or as part of Elgin's turn-key solutions, these pumps enhance performance and prolong pump life compared to traditional models.

The DuroLast RB/NE™ is built for durability and features several innovations to ensure superior performance in various environments, including seawater, freshwater, drilling mud, as well as industrial applications like cement and mining dewatering. Each pump is equipped with an HDPE Polyurethane or Nitrile Rubber liner to protect against extended wear from abrasive and corrosive materials. Moreover, a premium heavy-duty mechanical seal prevents fluid leakage and improves efficiency when handling high temperatures and highly abrasive substances. Our onboard thermal siphon technology safeguards the pump from run-dry conditions and maintains optimal temperatures within the mechanical seal.

PROGRESSIVE CAVITY PUMP

For consistent feed pressure and balanced operations, Elgin offers custom-configured progressive-cavity feed pumps (PC pumps). These pumps can optimize centrifuge performance, extend their lifespan, and reduce overall operational and maintenance costs when properly operated.

Elgin's PC pumps are paired with high-quality gearboxes and energy-efficient, explosion-proof motors designed for continuous duty. The split coupling body allows quick and easy maintenance without disconnecting the pump, significantly reducing downtime.

Elgin PC pump packages can be supplied in a variety of skid configurations (i.e., wide field skid and narrow plant skid), as a mechanically-variable gearbox or a direct gearbox with inverter-duty, VFD-driven motor, and a variety of motor installation configurations (i.e., in-line, offset, and "piggy-back").

SELF-PRIMING PUMP

Elgin's self-priming, solids-handling pumps are engineered to handle solids-laden fluids with minimal maintenance requirements. These pumps feature a large volute that automatically re-primes in an open system without complex plumbing.

Depending on the application, Elgin's self-priming pumps feature cast iron casing and bearing housing, ductile iron impeller and wear plate, and heavy-duty mechanical seal. Maintenance can be performed on-site without special tools or disconnecting plumbing, thanks to accessible components like the dual-vane impeller, seal, wear plate, and flap valve.

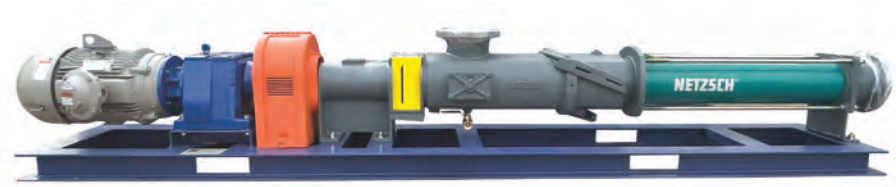
PITBULL SUBMERSIBLE™ PUMP

Elgin's line of solids-handling submersible pumps are designed for reliable performance with minimal maintenance for today's trenchless and hydrovac operations. These pumps feature a non-clogging design and top discharge port for heavy-duty applications, making them ideal for various industries. The PitBull Submersible™ pumps are built with durability in mind, featuring a cast iron housing, high chrome alloy impeller, steel striner, easy access oil maintenance port, and safety chain coupling for the power cable. Safety features include "circle thermal protector" and "motor coil protection" that protects the pump in event of motor overheating.

Inquire today about Elgin Submersible Pump Trade-In and Core-Exchange Program that allows customers to trade-in old pumps for credit or exchange them for refurbished replacements at a discounted price.

Depending on your pumping operational needs, Elgin Separation Solutions has the turn-key solution to maximize operations with full engineering support, field service, and OEM parts.

Contact Elgin today or visit our website to discover how our innovative solutions can enhance your pumping and solids separation operations. For more information, visit **www.elginseparationsolutions.com**.



500 GPM Progressive Cavity Pump

Gorman-Rupp Pumps

Gorman-Rupp has been revolutionizing the pumping industry since 1933. Many of the innovations introduced by Gorman-Rupp over the past ninety years have become industry standards.

We continue to update our machinery, processes, research and development, and engineering to ensure that our pumps and systems are among the most reliable and efficient on the market. With nearly one million square feet under roof, our facilities house some of the most modern manufacturing, testing, and warehousing facilities in the world. Our experienced engineers take advantage of the latest technologies and innovations to custom-design, manufacture, and assemble our products.

With over one million Gorman-Rupp pumps installed to date, we have the knowledge and experience understand your specific application. We provide solids- and clean-fluid handling pumping solutions for municipalities, industrial plants, construction and rental businesses, refineries and petroleum plants, mining sites, agricultural operations, and a variety of original equipment manufacturers.

One of our most successful and innovative lines of pumps has been our self-priming models. Gorman-Rupp also manufactures complete lines of submersible, priming-assisted (dry-prime), standard centrifugal, horizontal end suction centrifugal, and rotary gear products built for the most aggressive pumping applications. In addition, our ReliaSource® pump packages that incorporate these products are designed, manufactured, and tested and include pumps, motors, piping, and controls to ensure superior operation and easy installation.

We perform rigorous testing based on Hydraulic Institute Standards and test to customers' actual operating conditions in our one-of-a-kind testing facility guaranteeing innovative, superior-quality products that are ready to tackle your toughest jobs. To ensure you get the right equipment for your requirements, Gorman-Rupp partners with a worldwide network of distribution and provides them with the most extensive training. Gorman-Rupp distributors will work hand-in-hand with you to recommend, customize, and specify equipment. And Gorman-Rupp is always available should you ever require any assistance.

PHILOSOPHY

Gorman-Rupp stands behind the quality of our pumps to ensure they meet your requirements for the long haul. To maintain industry-leading client satisfaction well beyond product installation, we offer a variety of services to meet your needs, including world-class training, service, and industry-leading warranty.

INDUSTRY-LEADING SUPPORT AND WARRANTY

Gorman-Rupp stands behind the quality of our pumps to ensure they meet your requirements for the long haul. To maintain industry-leading client satisfaction well beyond product installation, we offer a variety of services to meet your needs, including:

INDUSTRIAL

If your application deals with abrasive, corrosive fluids, or liquids containing large solids, we have the right pump for the job. Gorman-Rupp pumps are constructed in a variety of materials to move fluids in steel mills, paper mills, underground mines, food processing, automotive and chemical plants, canneries, power plants, tanneries, glue and resin plants, and any other facility where dependability and ease of service are essential.

MUNICIPAL

When you choose Gorman-Rupp, you benefit from one of the largest and highest quality lines of municipal pumps, engine-driven pumps, sewage lift stations and water booster/reuse stations available on the market. Our ReliaSource® packaged lift and booster stations ship complete from the factory with pumps, motors, and controls and are 100 percent tested before they leave the facility to ensure product efficiency and operation.

GORMAN-RUPP PUMPS
P.O. Box 1217
Mansfield, Ohio 44901

ERADICATE CLOGGING

CLOG-PRONE SOLIDS ARE NO MATCH FOR GORMAN-RUPP SUPER T SERIES® PUMPS EQUIPPED WITH THE ERADICATOR® SOLIDS MANAGEMENT SYSTEM RETROFIT KIT.

ERADICATOR®
Solids Management System

GORMAN-RUPP PUMPS
The Pump People®

New sewage, poultry waste, plastic bags, hair, stringy material and other clog-prone materials can wreak havoc on pumps. That's why you need a dependable solution for handling solid waste. Gorman-Rupp's innovative Eradicator® Solids Management System upgrade kit for Super T Series® pumps offers just that. The aggressive self-cleaning wearplate and back cover assembly, incorporating an obstruction-free flow path, are designed to handle clog-prone material, keeping your pump operating at peak efficiency. A lightweight inspection cover allows for easy access to the inside of the pump without affecting wearplate-to-impeller clearance. And, the Eradicator can be easily installed into existing Super T Series pumps in the field.

Trust Gorman-Rupp pumps to keep your operation running smoothly month after month, year after year.

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Mueller Water Products

Mueller Water Products, Inc. is a leading manufacturer and marketer of products and services used in the transmission, distribution, and measurement of water. Since 1857, Mueller has been helping municipalities increase operational efficiencies, improve customer service, and prioritize capital spending, demonstrating why Mueller Water Products is Where Intelligence Meets Infrastructure®.

COMMITTED TO SAFE DRINKING WATER

From life-saving fire protection to data intelligence, we are committed to developing products and solutions that help cities and water utilities deliver clean, safe drinking water. Our broad product and service portfolio includes engineered valves, fire hydrants, pipe connection and repair products, metering products, leak detection, pipe condition assessment, and software that provides critical water data.

When you invest in water infrastructure, quality matters. That is why we select rugged materials and build state-of-the-art software—to provide products and services that are designed and engineered for the long run. When you choose Mueller, you choose a lasting value that can ultimately translate into cost savings.

SERVING ALL YOUR WATER DISTRIBUTION NEEDS

Mueller is one of the only companies that can fulfill your water system needs from end to end – at the source, at the plant, below the ground, on the street, and in the cloud. Built on a legacy of innovation, we have the vision and expertise to provide advanced infrastructure and technology solutions for transmitting, distributing, measuring, and monitoring water more safely and efficiently than ever before.

Mueller brands provide products and solutions for:

FLOW CONTROL SOLUTIONS

Mueller offers a full line of products for controlling water safely and efficiently across your distribution system, including valves and control systems. And for easy and effective maintenance and repair, we offer superior service line connection products and equipment.

Products in this category include:

- **Valves:** resilient wedge gate, metal seated gate, butterfly, check, plug, cone, air release, knife gate, slide gates, and more
- **Water Network Connections:** drilling and tapping machines, service brass, and pipe repair
- **Control Systems:** pressure and flow

FIRE PROTECTION SOLUTIONS

Safety is built into every Mueller® solution. All our fire protection solutions are compliant with Underwriters Laboratories and Factory Mutual requirements.

Products in this category include:

- Valves
- Hydrants
- Hydrant security
- Indicator posts
- Tapping materials

PIPELINE MANAGEMENT TECHNOLOGY

Proven technology that enables utilities to assess and optimize water networks.

Products in this category include:

- Pipe condition assessment
- Pipeline monitoring
- Lead detection
- Leak detection
- Software: utility dashboard, monitoring services, notifications

METERING AND COMMUNICATION TECHNOLOGY

Smart metering paired with the Mi.Net® Advanced Metering Infrastructure (AMI) system and Sentryx™ Water Intelligence Platform provides water network agility and enables utilities to connect meters to their AMI network in specific areas or across the entire distribution system by leveraging existing cellular infrastructure—eliminating the need for maintenance.

Products in this category include:

- **Meters:** residential, commercial, industrial, fire service, registers, valves, setters, and boxes
- **Communications:** endpoints and data loggers
- **Software:** water intelligence platform for water utilities to monitor, control, and monetize water distribution networks. Utility dashboard, billing consumer information software, customer portal, and leak/network operation services
- **Services:** field operations, network operations center, network-as-a-service

THE MUELLER ADVANTAGE

Mueller solutions are born from the collective products, services, and professionals in our family of the most trusted companies in the industry. Together, we are a consultative, dedicated team of engineering, sales, support, and distribution experts working collaboratively toward one goal—your success.

We go above and beyond what's expected to help your water infrastructure system work harder and smarter and last longer, now and in the future. And we continue to invest in innovative ways to help you see insights across your system so you can proactively address concerns, extend the life of your operations, and improve your customer service and bottom line.

Mueller Water Products brands include Mueller®, Echologics®, Hydro Gate®, Hydro-Guard®, HYMAX®, i2O®, Jones®, Krausz®, Mi.Net®, Milliken®, Pratt®, Pratt Industrial®, Sentryx™, Singer®, and U.S. Pipe Valve and Hydrant.

For more information, visit **www.muellerwaterproducts.com**.

Vaughan Chopper Pumps

HOMEGROWN RELIABILITY

Established in 1960, Vaughan Company® is the industry leader in reliable chopper pumps and mechanical hydraulic mixing systems. With more than sixty-four years of experience and four generations of expertise, Vaughan Company remains committed to giving customers around the world outstanding service and the most dependable pumping solutions.

American-made and built to last, our pumps and systems are available in a variety of sizes and configurations to meet the unique needs of any operation. We have your back with a range of durable pumping solutions to eliminate lift station clogging and handle the toughest solids. Vaughan promises you the best in product design, reliability, dependability and availability—plus, superior service and support to bring life cycle costs to the lowest they can be. All while meeting the requirements to receive federal aid under the Build America, Buy America (BABA) act.

To maintain our position as the industry leader, Vaughan Company takes full advantage of cutting-edge technology. We incorporate in-house 3D computer modeling, which allows us to create exact fits and precision castings for all components.

All of this leads to one simple point: when you buy Vaughan, you get the best.

WORLDWIDE LIFT STATION SOLUTIONS THAT GO BEYOND THE BARN

Since the late 1950s, "What could make this better?" was the unwavering motivation Jim Vaughan used to invent the world's first chopper pump. After countless hours of repairing clogged manure pumps for local dairy farmers, he knew there had to be a solution. Jim officially introduced the world's first chopper pump in 1960, and Vaughan Company was born. His brilliant idea met a genuine need that had applications far surpassing the dairy farm.

In the decades since, our operations expanded significantly, providing high-performing and exceptionally reliable pumps across the globe. With over 40 worldwide issued or pending patents, Vaughan company has your back anywhere -from prisons to dairy farms, wastewater treatment plants and more.

We're still motivated by Jim's initial question: "What could make this better?" In the most extreme environments where standard non-clog pumps fail, our lift station solutions provide dependable, clog-free chopping and mixing.

BENEFITS OF BUYING AMERICAN MADE

For federally funded projects, Vaughan pumps and pumping equipment meet all requirements to receive federal aid under the BABA act. Nearly all Vaughan Company materials are produced in the United States and constructed in Vaughan's 140,000-square-foot Washington state-based manufacturing facility. With an extensive $10M inventory and strong relationships with domestic suppliers and foundries, Vaughan ensures reliable quality and fast lead times.

Not to mention, each chopper pump or mixing system is custom-built to meet the end user's specific needs. Even without current supply chain disruptions, global sourcing would not allow for this level of customization within a feasible timeline. In addition to fast builds, our manufacturing facility holds a large surplus of spare parts, so Vaughan products are easily maintained.

Knowing that every pump user faces a unique situation, Vaughan Company also has local sales representatives across the country to provide exceptional customer service when it is needed most—whether that is working closely with customers to tailor pump solutions for an exact situation or providing post-installation support.

PRODUCTS THAT SUPPORT AMERICA

Today, we're still passionate about that original question: "What could make this better?" While Vaughan's locally sourced and American-made chopper pumps keep projects moving, their benefits don't stop there.

The answer to Jim Vaughan's question extends beyond the walls of the manufacturing facility. As a major local employer, we strive to strengthen our community by giving to charities and community organizations. Our scholarship program supports graduates of the Elma and Montesano school districts who are planning to pursue a post-secondary degree or technical certificate in the water and wastewater sector.

Vaughan products are not just made in America, they also support the future of America.

To learn more about American-made Vaughan Chopper Pumps, Rotamix® hydraulic mixing systems, and our other specialty products, contact the company at:

888.249.CHOP (2467)
info@chopperpumps.com
www.chopperpumps.com

Boerger

Boerger designs, manufactures, and sells rotary lobe pumps, macerating technology, separation technology, and feeding technology to convey low to high viscous and abrasive media. Key applications can be found in wastewater and sludge treatment, in the chemical and paint industry, in paper and pulp manufacturing, the petrochemical and oil industries, agriculture and biogas, and many others.

The company's success began in 1975 with a plan to build a low-maintenance pump of the highest quality. Today, Boerger is a market leader in elastomer coated rotary lobe pumps and an expert in macerating technology. It is represented in more than sixty-five countries and remains on course for growth. Not only is it a global player, but it is also an independent, family-owned company. Boerger's guiding principle has always been to make things better. It has remained true to the guiding principle for all its products—combining a long service life with low maintenance. The aim is to keep improving current products and launch new technology.

PRODUCTS

Boerger's core product, the BLUEline rotary lobe pump, is a self-priming, valveless, positive displacement pump delivering flow rates up to 7,000 gallons per minute. This heavy-duty pump has dry-run capabilities and is often used for loading and unloading by reversing the flow direction.

The ONIXline rotary lobe pump is a compact, energy-efficient pump used when other pumping systems reach their limits. At the heart of the ONIXline pump are newly developed rotors that help to ensure gentle and almost pulsation-free operation while achieving maximized efficiencies at high pressures.

Boerger also offers a comprehensive lineup of macerating equipment for grinding coarse materials, solids and stringent debris, including the vertical Multicrusher for confined space conditions.

MIP-DESIGN

Repairs and downtime cost time and money. Working hours should not be spent on maintenance. That's why all the Boerger products are designed with maintenance-in-place (MIP). This allows for all wetted parts to be easily replaced through the front cover without the removal of pipe or drive systems.

Boerger only provides users with high-quality, high-performance products with low maintenance.

Check-All Valve Mfg. Co.

Since 1958, Check-All Valve Mfg. Co. has manufactured a complete line of in-line spring-loaded piston-type check valves. With worldwide service, Check-All Valve serves a wide range of industries including the chemical, petrochemical, pharmaceutical, food and beverage, water treatment, OEM, MRO, and many others. Lightweight, efficient, and rugged, every Check-All valve is designed and built to perform to exact needs and specifications. The company is ISO 9001 certified and manufactures product lines compliant with CE/PED requirements, Canadian Registration Number guidelines, 3A Sanitary Standards, and others.

Check-All valves are engineered for silent operation. They close quickly and smoothly to eliminate hammer noise. They are designed to function equally well in either a vertical or horizontal position, with proper spring selection. They are also designed to reduce installation costs. The insert series check valves easily fit into existing line components, which reduces initial cost and installation time. The seating surfaces are parallel to each other thereby eliminating the excessive wear occurring in plug, cone and ball seats. Check-All valves can also be used as low-pressure relief valves and vacuum breakers.

With many styles available, Check-All Valve provides check valves for practically every service application. Valves are offered with metal-to-metal or soft seats in sizes ranging from 1/8-inch NPT to 20-inch flange connections. Pressure ratings are available from full vacuum to 10,000 PSI. Standard or exotic materials are available and you can choose from a wide variety of spring settings and seat materials for any valve. Most options are available with fast delivery. Specially designed valves are another option that Check-All Valve performs on a regular basis. Check-All Valve Mfg. Co. is staffed to supply you with a quality product as well as personal technical services.

CHECK-ALL VALVE MFG. CO.

Contact us for a complete catalog or see us at **www.checkall.com**.

Electro Static Technology

Electro Static Technology, an ITW Company, is proud to lead the charge in creating innovative solutions for the challenges facing manufacturers and users of rotating equipment and pumping systems worldwide. Our AEGIS® Shaft Grounding Rings represent a breakthrough in protecting electric motors, pumps, and their vital components from electrical damage caused by stray voltage, particularly from variable frequency drives (VFDs).

AEGIS® Shaft Grounding Rings surround rotating equipment shafts with hundreds of thousands of conductive microfibers, safely discharging stray voltage before it builds up enough to arc through and damage the equipment's bearings. Motors, pumps, and other rotating equipment are protected against premature failure, and equipment users are protected from the expense of unplanned downtime and headaches of equipment repair or replacement.

Our dedication to reliability and performance has made AEGIS® Shaft Grounding Rings the solution for safeguarding pumps and pumping systems. Whether you're dealing with a small-scale pump or a large industrial system, AEGIS® offers a range of ring and mounting options to suit your specific needs. Our rings can be mounted internally or externally, on brackets or press-fit into bearing caps. They are also available factory-installed in a wide array of motor lines from major manufacturers.

What sets AEGIS® rings apart from other shaft grounding products is their minimal need for maintenance, virtually frictionless operation, and long wear life (up to 200,000 hours, according to lab testing). They are also installable in, and available factory-installed in, explosion proof (XP) motors, per approved UL procedures.

Join pump users around the world who have made AEGIS® Shaft Grounding Rings a part of their reliability plan to help keep their operations running smoothly. To download the handbook and discover how AEGIS® can increase the reliability of your pumping systems, visit **www.est-aegis.com/handbook**.

Fuji Electric

REACH THE PINNACLE OF PERFORMANCE AND RELIABILITY

For 100 years, Fuji Electric's quality products and world-class applications expertise has supported businesses to reach new levels of success. We deliver high-performance and energy saving AC Drives and HMI products. Our goal is to manufacture the highest quality, superbly engineered, innovative products, which have been incorporated into the company since the beginning. Learn more about our dedication as a manufacturer of quality power devices!

Fuji Electric offers high-performance AC Drives with automatically controlled motor operations and operating speeds for a wide variety of drive applications in irrigation, oil and gas, manufacturing, food and beverage, and much more. Ideal for OEMs, the **FRENIC-Ace** is a high-performance, full-featured drive designed to suit a wide variety of applications. The FRENIC-Ace offers advanced integration capabilities including applied power ratings, sensorless dynamic torque vector control, PM synchronous motor control, two-channel on-board RS485 communication port, and customer customizable logic.

Fuji Electric's compact inverter, **FRENIC-Mini (C2)** Series, provides excellent performance for both single-phase and three-phase applications and is available in multiple configurations to support 1/8 horsepower up to 20 horsepower AC drives / variable frequency drives (VFD) / v/ Hz vector drives. With an expanded range of rated voltages, the new FRENIC-Mini (C2) strikes an optimal balance between price and performance.

Fuji Electric has raised the bar for inverter performance with the **FRENIC-MEGA** variable drive. Offering expanded power ratings and flexible configurations that support 1/2 horsepower up to 1,000 horsepower AC drive/variable frequency drive (VFD) / v/ Hz vector drive applications—these inverters are designed for long lifecycles and improved maintenance functions.

The **MONITOUCH V10** Series is the new standard for **high-speed HMI**. Focusing on the six basic performance aspects of HMI: rendering, operation, communication, startup, transfer, and custom code, the V10 series was developed with the aim of stress-free operation. Industry-leading performance is achieved by adopting quad-core CPUs and optimizing applications.

Greasezilla FOG Separation Systems

BY DOWNEY RIDGE ENVIRONMENTAL COMPANY

Greasezilla's℠ patented separation technology solves fats, oils and grease (FOG) treatment and disposal challenges worldwide. Developed by Downey Ridge Environmental Company, the turnkey system repurposes FOG to produce a high-quality, low-moisture advanced biofuel (ABF) commodity, offering an eco-friendly and profitable alternative to chemically treating, lagooning, landfilling, incinerating, or dumping FOG waste.

Greasezilla℠ leaves almost nothing to be landfilled and has a total operating cost of 1 to 2 cents per gallon, making it the ideal front-end pretreatment system for FOG waste. Greasezilla℠ eases the financial sting of ever-increasing disposal fees and labor costs while generating revenue.

SIMPLE TO INTEGRATE

- Allen Bradley® Programmable Logic Controller with SCADA integration for remote monitoring
- Scalable to meet changing needs
- Available in modular or cylindrical formats to accommodate interior or exterior placement

ECO-FRIENDLY

- Diverts the FOG waste stream from landfills
- No chemicals, polymers, or additives
- Recovers a low carbon intensity (CI), brown grease ABF feedstock

COST-EFFECTIVE

- Reduces costs associated with FOG treatment and disposal
- High EBITA / Quick ROI
- Assured revenue from sale of brown grease ABF commodity
- Promotes best practices that protect sewer infrastructures

By recovering and repurposing fuel resources from a nuisance waste, Greasezilla℠ is helping the industry transform a negative value waste stream into a useful biofuel commodity for a more sustainable world. To learn more about Greasezilla, contact us at 304.658.4778 or visit **www.greasezilla.com**.

SealRyt

Introducing the DuraPack™ System from SealRyt®—a game-changer in industrial sealing solutions. Crafted custom for your application, this hybrid system merges the reliable bearing support of PackRyt® with SealRyt's patented Structural Lantern Ring (SLR™) System, offering unparalleled performance in sealing applications.

Each DuraPack™ System is custom-made to suit individual applications, ensuring a perfect fit every time. Gone are the days of wastage and errors—with DuraPack™, you get what you need, eliminating unnecessary expenses and minimizing downtime.

SealRyt®'s commitment to excellence is evident in every aspect of the DuraPack™ System. Developed bearing compounds, rigorously tried and tested, guarantee durability and reliability in the most demanding environments. The system also incorporates SealRyt® developed braided textiles, ensuring optimal performance under various operating conditions.

Thanks to pre-cut, die-formed components, installation is a breeze, saving valuable time and resources. The DuraPack™ System features a bearing with a separate lantern ring, offering versatility and ease of maintenance. Its non-collapsible design ensures stability within the stuffing box, even in worn equipment.

With multiple bearings, lantern rings, and packing configurations available, the DuraPack™ System adapts to diverse sealing requirements with ease. Experience improved flow and pressure equalization, minimizing flow turbulence and enhancing operational efficiency.

The innovative SLR™ design not only provides shaft stability but also boasts excellent flush capacity, maintaining optimal sealing performance without crushing or shifting. Additionally, the SLR™s unique construction resists clogging and is easily removable for hassle-free cleaning and maintenance.

Whether you're dealing with new pumps or worn equipment, the DuraPack™ System delivers unmatched sealing performance. Say goodbye to down-time and hello to seamless operations with SealRyt®'s DuraPack™ System—the ultimate solution for your sealing needs.

Trillium Flow Technologies

Trillium Flow Technologies™ is a global designer, manufacturer, and service provider of engineered pumps and valves for critical infrastructure, energy, and industrial applications. Our product portfolio serves our customers in the water and wastewater, power generation, oil and gas, mining, and general process industries.

In the United States, our pumps business boasts more than 220 years of combined experience providing reliable and efficient solutions that perform in the most demanding environments. We design, manufacture, and test our entire U.S. pump brand portfolio from our state-of-the-art facility in Fresno, California.

Floway® Pumps are an industry-leading vertical turbine pump in the water and wastewater, oil and gas, mining, energy, and industrial markets. Floway® pumps can be manufactured to API, HI, and NSF requirements, using the most durable wear and corrosion-resistant materials.

Our Roto-Jet® brand encompasses high-pressure, single-stage centrifugal pumps with Pitot tube technology for low-flow, high-head applications and can be manufactured to API requirements. The Pitot tube's simple design and performance have earned the Roto-Jet® brand a reputation as the reliable and robust "go-to" solution for low-flow, high-pressure challenges.

WEMCO® is known for reliable centrifugal screw and vortex pumps with an international distribution network. WEMCO® pumps have served municipal and industrial customers in markets as diverse as water and wastewater, agri-food, solid bulk and sand applications, chemicals, and general industry for over fifty years.

The WSP® brand serves the global food and beverage processing, waste management, and material processing industries, and are designed to be rugged and dependable while simplifying maintenance and reducing life cycle costs. Our WSP® line can be manufactured according to strict API, HI, and NSF requirements.

Also included in our global pump portfolio are Begemann®, Gabbioneta Pumps®, and Termomeccanica Pompe, manufactured at our facilities in Italy. Trillium Flow Technologies™ provides complete international support, starting with highly engineered, reliable products for your industry and continuing with a unique level of support and service. Learn more about the performance engineered difference at **www.trilliumflow.com**.

WEMCO® is a registered trademark of FLSmidth.

Valmet

Valmet is a leading global developer and supplier of process technologies, automation and services for the pulp, paper, and energy industries. With our automation systems and flow control solutions we serve an even wider base of process industries. Our more than 19,000 professionals around the world work close to our customers and are committed to moving our customers' performance forward.

Valmet's Flow Control business line is focused on delivering mission-critical flow control technologies and services for the continuously evolving process industries. We help our customers to improve their process performance and environmental efficiency, and to ensure the safe flow of materials. We drive profitable growth and sustainable productivity across our customer industries.

Our extensive portfolio consists of industry leading valves, valve automation, pumps, and related services, including the renowned Flowrox™, Neles™, Jamesbury™ ja Neles Easyflow™, Stonel™, and Valvcon™ solutions. Our pumps, valves, and valve automation technologies are known for quality, reliability, and highest safety. We serve variety of process industries, including pulp, paper and bioproducts industry, renewable energy, oil and gas refining, mining and metals processing, chemicals, and other process industries.

Flowrox pumps serve a wide range of process industries. Flowrox LPP-T transfer pumps incorporate advanced single roller design which eliminates friction and lowers energy consumption. They are ideal for pumping various slurries and dosing a wide range of abrasive, corrosive, viscous, or crystallizing media. Energy efficiency, long hose life, and low maintenance generates substantial savings during the life-cycle of peristaltic pumps. Lifetime of Flowrox pumps' hoses is 3 to 5 times longer than conventional hose pumps. The LPP-T100 is one of the world's largest hose pumps, with a maximum continuous flow of 100 cubic meters per hour.

For chemical dosing applications that require accurate metering we provide FXM tube pumps, and for thick paste pumping applications with high viscous, corrosive, or sensitive media we recommend Flowrox progressive cavity pumps.

For more information, visit **www.valmet.com/flowcontrol/pump**.

WorldWide Electric Corporation

WorldWide Electric is a leading manufacturer of dependable electric motors, motor controls, gear reducers, and generators. Offering fast, often same-day, shipping from eight regional warehouses, WorldWide Electric takes pride in providing a competitive edge to our customers by responding to their requirements with urgency, technical expertise, and professionalism. In January of 2024, WorldWide Electric added to its overall capabilities and market presence with the strategic acquisition of North American Electric, Inc. For twenty-five years, WorldWide Electric has been a leading provider of electric motors, motor controls, and gear reducers. This is WorldWide Electric's fourth acquisition in as many years, including: Louis Allis, a company with a rich history and over 100 years of experience manufacturing and servicing large, custom AC and DC electric motors, Georator Corporation frequency convertors and generators, and Gleason-Avery, a manufacturer of quality fractional and sub-fractional gear motors. As WorldWide Electric continues to evolve, these strategic acquisitions underscore its commitment to growth while maintaining customer centricity in a competitive landscape and offering a comprehensive suite of products and services that meet the diverse needs of its customers.

INDUSTRIAL USERS DEPEND ON WORLDWIDE ELECTRIC

Many of WorldWide's customers are electrical equipment or power transmission distributors that operate local supply and repair businesses throughout the United States. Others are original equipment manufacturers (OEM) or solution packagers that build heavy equipment for demanding applications. They call WorldWide because their customers—industrial end-users—have an issue: maybe a motor has failed, or their plant, machinery, or process is down. No matter what industry—agriculture, construction, aggregate, material handling, oil and gas, irrigation, wastewater, food processing, or manufacturing—WorldWide knows every moment of downtime reduces productivity and impacts the bottom line. WorldWide's business is setup to deliver with urgency—providing quality products, a large selection of in-stock inventory, and fast shipping, all backed by exceptional customer support.

LOUIS ALLIS

For over a century, Louis Allis has been one of the only companies that can offer drop-in replacements for large and unique electric motors. Many are old, legacy motors that an original manufacturer no longer supports. The manufacturing facility is in Warrior, Alabama, and is certified to ISO 9001:2015. They also can factory recertify, service, rebuild, or repair motors to MIL-SPEC, NEMA MG, IEEE, EASA-AR100, or UL Standards.

NORTH AMERICAN ELECTRIC

The newest member of the WorldWide Electric family of brands, North American Electric has grown its business and reputation since 1993 by offering its customers competitively priced electric motors, motor controls, and gearing. North American Electric operates a world-class UL508A-certified production facility at its Hernando, Mississippi headquarters.

Cla-Val

Since 1936, Cla-Val has produced the world's highest quality automatic control valves for a diverse array of industries. Cla-Val has continued to strengthen its operational and customer service capabilities around the world by enhancing product lines and building state-of-the-art production facilities and warehouses in Canada, Switzerland, France, the United Kingdom, and New Zealand.

With all our major locations having dedicated training centers, our team of sales personnel and factory authorized sales agents are able to provide exceptional industry expertise throughout the world. Our aggressive research and development programs have resulted in the design and production of technologically advanced electronic and hydraulic control systems that consistently meet the challenges of increasingly complex and diverse applications.

CLA-VAL
800.942.6326
info@cla-val.com • www.cla-val.com

FELUWA Pumps USA

FELUWA Pumps USA is a 122-year-old—and only—worldwide manufacturer of double hose diaphragm and smaller high pressure flat diaphragm pumps with sales offices around the world and now in the United States. Our name: FE LU WA was created from the German words: FE-Feuer, meaning fire; LU-Luft, meaning air; and WA-Wasser, meaning water. As a member of the Arca Flow Group, we developed our new double-hose diaphragm pumps into the MultiSafe and EcoSafe product lines. These cover the range from lower pressures and higher heads, to very high flow of up to 4,300 gallons per minute and pressures to 5,000 psi, but with the same design features as the MultiSafe. There are no other pumps of this kind in the market with a double redundancy and monitoring abilities. Our products are ATEX mine certified as well as ISO 14001:2015.

Feluwa Pumps are used worldwide in many industries such as: mining, oil and gas, chemical, petrochemical, autoclave feed, tailings, backfill, tank bottoms, filter press, and municipal applications. With a new U.S. division based in Houston, we continue to serve U.S. customers with direct interaction and support.

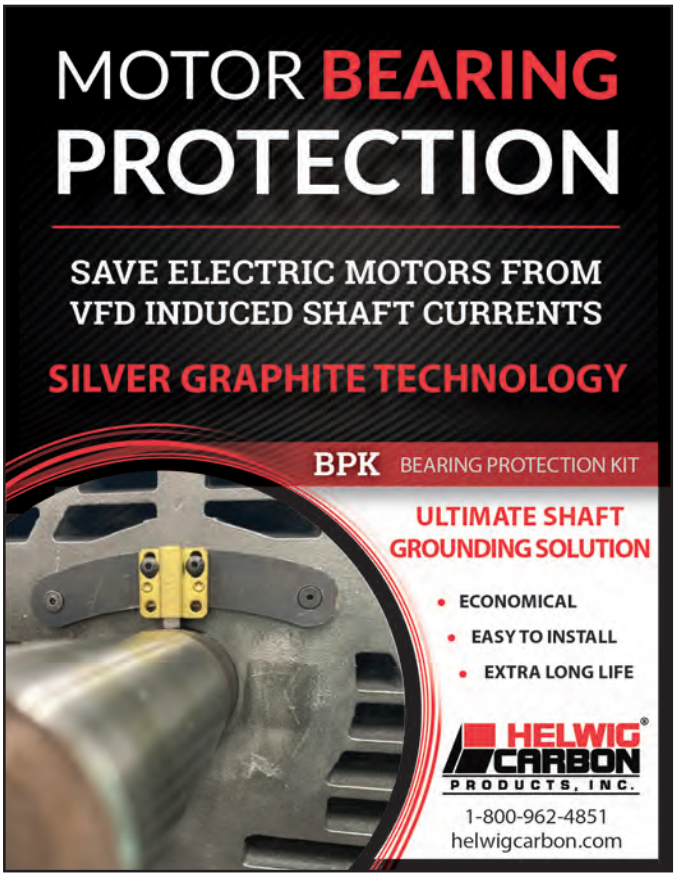
Helwig Carbon Products

SHAFT GROUNDING - CARBON GRAPHITE SEALS-BUSHINGS-VANES

Helwig Carbon is the premier manufacturer of the industry's best shaft grounding solution as well as precision-machined carbon graphite seals, bushings, bearings, rotors, and vanes. As one of the last American-owned carbon companies, we take pride that our products are made in the USA.

Helwig's BPK (Bearing Protection Kit) is the industry leading shaft grounding solution. Our proven silver graphite brush technology is unlike other grounding systems because it eliminates the need for maintenance and will keep the bearing protected year-after-year. Helwig's BPKs come available with EZ mounting brackets for hassle-less field installation or can be ordered preinstalled by the motor OEM.

Our carbon graphite line is self-lubricating and ideal for food processing, chemical, refinery, vacuum pumps, and more. These products are backed by fast, reliable service, high-quality workmanship, and on-time delivery of over 98 percent. With our CNC equipment we can accurately manufacture a wide variety of shapes and sizes and routinely hold tolerances of 0.0005 inches (0.013 millimeters) and 2 HE light bands flatness for seal face surface finishes. All processing is done at our ISO 9001:2015 certified facility in Milwaukee, Wisconsin.



Sun-Star Electric, Inc.

Sun-Star Electric, Inc. is a Texas corporation established in 1977 and is the principal worldwide distributor for Hitachi submersible motors.

Sun-Star Electric, Inc. designs and manufactures its own Sun-Star branded oil-filled and wet-wound submersible motors for standard and special applications along with the deep-ocean-capable Aqua Star motor.

Sun-Star Electric is an expert for rapid service and repair of the power generation industry's critical, high-pressure water-filled boiler water circulating pump motors.

Sun-Star Electric, Inc. maintains a 75,000-square-foot manufacturing facility, which is fully equipped for the manufacture and repair of submersible electric motors and includes full fabrication, machining, winding, and in-house testing capabilities. In 2011, Sun-Star Electric, Inc. transitioned to an employee-owned company (ESOP).

SUN-STAR ELECTRIC, INC.
7722 W. 34TH STREET
LUBBOCK, TEXAS 79407
SUNSTARUSA.COM
PHONE: 806.793.2812
800.782.9675
FAX: 806.793.1989

Thordon Bearings Inc.

Thordon is the world's leading manufacturer of long-lasting non-metallic bearings that require no oil or grease. They are easy to design, safely machined and install quickly. Specifically engineered for vertical pumps, these bearings offer extended wear life, exceptional abrasion resistance, and the ability for dry start-up. Thordon's proven performance in vertical pumps, power plants, sewage and wastewater treatment, refineries, mining, agriculture, and any industry moving water has lowered operating costs.

Our polymer bearings can also be used in aerators, flocculators, screens, butterfly valves, or virtually all applications where greased bronze bearings are currently installed. ThorPlas-White is the newest material in the Thordon bearing family, specifically developed to operate as a drinking water system component used in the treatment and distribution of potable water. It has international certification for NSF/ANSI 61 Drinking Water System Components and NSF/ANSI 51 Food Equipment Materials, as well as WRAS.

By delivering tailored, adaptable solutions, these bearings enhance efficiency, offering cost and time savings through the elimination of grease, reduced life-cycle costs, decreased equipment downtime, and increased mean time between failure (MTBF). Thordon bearing are available and supported globally by its worldwide network of factory trained authorized distributors.

Vertiflo Pump Company

Vertiflo Pump Company, Inc. was established in 1979 to design, sell, and build packaged lift stations. Since 1981, Vertiflo has concentrated on manufacturing industrial pumps including vertical process pumps, sump pumps, end suction pumps, and self-priming pumps in cast iron, stainless steel, and special alloys.

Vertiflo pumps are designed for industrial applications and currently over 30,000 are operating successfully worldwide. As specialists in the design and manufacture of vertical and horizontal industrial quality pumps, Vertiflo is recognized as a quality manufacturer of dependable pumps and continues to grow and encompass new applications in the pump industry.

VERTIFLO PUMP COMPANY

513.530.0888

sales@vertilfopump.com • www.vertiflopump.com

MEGalert™

Safety By Choice
Reliability By Design

Save Money, Save Time, and Increase Safety

with the One and Only Automatic Inline Megging/Monitoring Systems

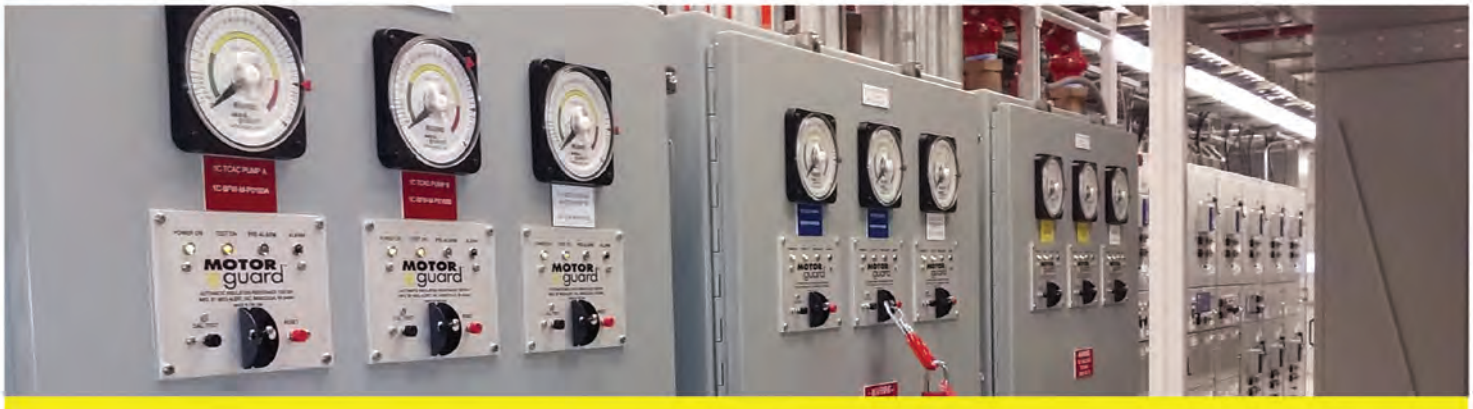
BEFORE

AFTER

GP2500-MU-AS
GP5000-MU-AS
GP5000-MU-HV-AS

MEGALERT manufacturers the MotorGuard and GenGuard patented testing and protection systems designed to detect insulation breakdown in critical motors and generators. The system senses when the motor or generator is offline and then performs a continuous dielectric I/R test on the winding insulation until the equipment is started again and will provide an early warning signal in time for corrective action to be taken to prevent a failure. **Our new Digital megohm meter has an optional 4-20 mA output for remote trending and tracking the I/R readings.**

- Eliminate Arc Flash Exposure
- Reduce Repair costs
- Prevent Unexpected Downtime
- Tests Equipment up to 15KV
- 500-5000 VDC Test Outputs



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PENTAIR

LIFECYCLE CARE FOR YOUR PUMP

Connect with a Pentair® Authorized Distributor to get your Pentair municipal, HVAC or industrial pumps back to full strength with genuine OEM parts and expert service.

Our extensive distribution network can provide you with trusted, high-performing parts, or complete repair services to get your pumps back in the green.

Find your nearest distributor or get connected to our service department today at **pentair.com/pumpcare.**

PRIVACY.FLOWCODE.COM

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P24015 (02-29-24)