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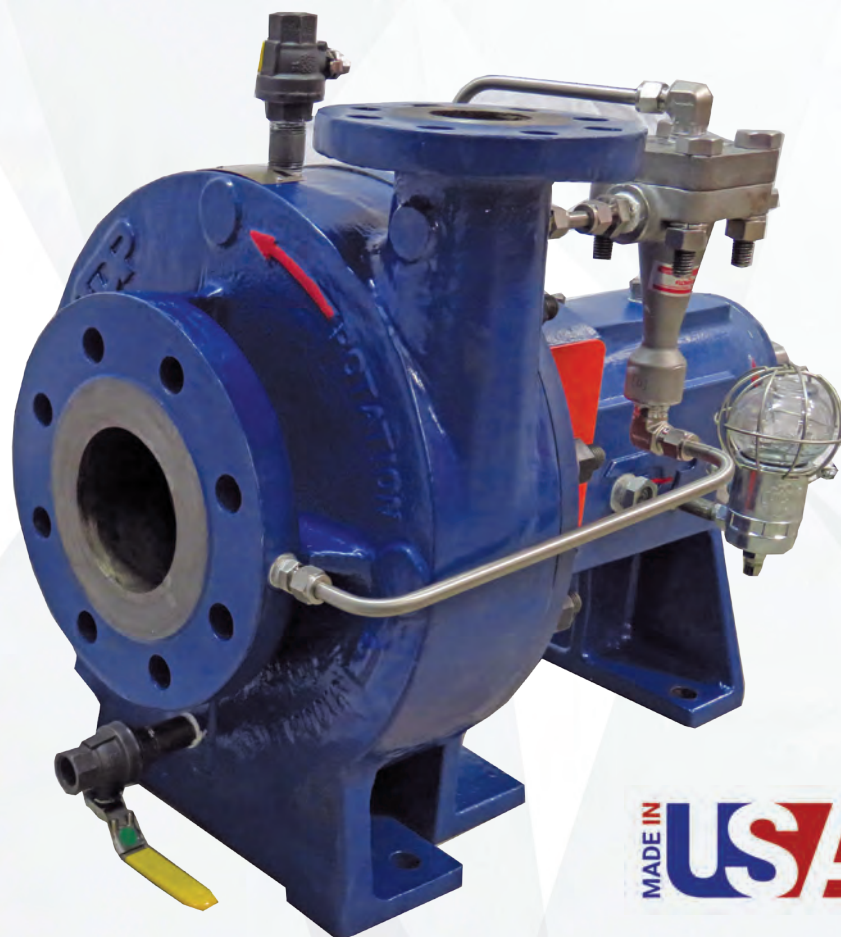
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WORLDWIDE ELECTRIC CORPORATION ACQUIRES NORTH AMERICAN ELECTRIC

WorldWide Electric Corporation announces the acquisition of North American Electric, Inc. The synergies created by this landmark acquisition places WorldWide Electric among the top-tier companies within its markets. It also reinforces WorldWide Electric's priority of providing its customers the industry's best service along with adding world-class in-house motor control panel manufacturing capability.

Both companies embrace customer-centricity as a substantial competitive advantage—each provides high-touch, accessible sales support and application expertise, in-stock inventory, excellent distribution channels, and a broad offering of industrial products. WorldWide Electric President and CEO James Taylor describes the acquisition as a significant win for the customers of both organizations.

"We are thrilled to welcome North American Electric's Team into the WorldWide Electric family. Our shared sense of customer service and the similarities between our two companies will improve the buying experience," Taylor adds. "We will adopt best practices across our business to continue to provide the highest level of service and the same high-quality products."

North American Electric operates a world-class UL508A certified facility for motor controls production at their headquarters in Hernando, Mississippi.

NATIONAL HISPANIC ENERGY COUNCIL TAPS NEW TRUSTEE

The National Hispanic Energy Council (NHEC) announces that Carlos Aldazabal, vice president of energy supply for Tampa Electric, has joined the NHEC's Board of Trustees. The organization was founded to fill the void of Hispanic voices in energy advocacy and driven by the urgent need to reduce the 20 percent higher energy burden Hispanic households pay.

"In our quest to advocate for energy policies that empower Hispanic communities, Carlos Aldazabal's presence on our board is a pivotal addition of vision and expertise that will greatly aid our efforts to voice the energy needs and aspirations of Hispanic Americans," notes NHEC Chairman Julio Fuentes, who is also president and CEO of the Florida State Hispanic Chamber of Commerce. "Carlos's diverse experience in the energy sector, including his significant roles in regulatory affairs and storm protection, positions him as a key contributor to our mission."

Aldazabal's career at Tampa Electric, encompassing leadership positions in accounting, regulatory affairs, investor relations, and transmission engineering and operations, has equipped him with a comprehensive understanding of the energy industry.

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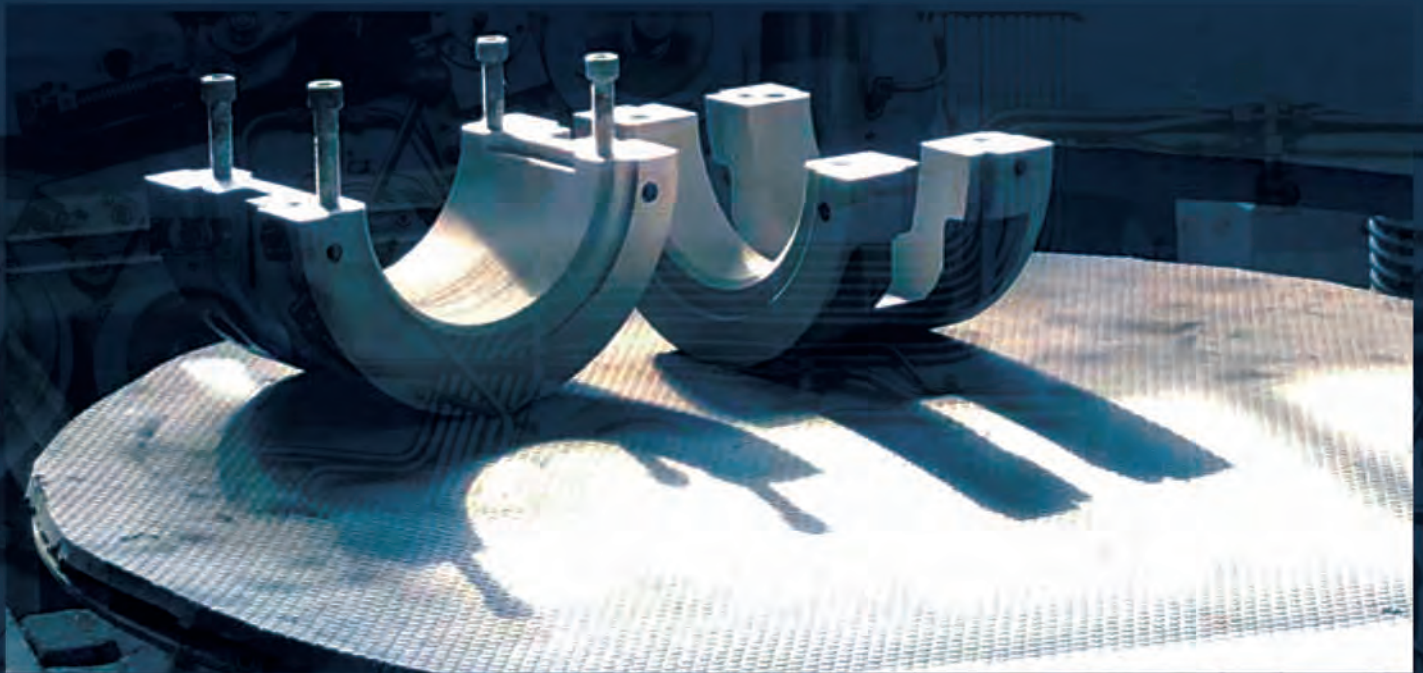
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TSURUMI TO DISPLAY TOP SELLERS AT WORLD OF CONCRETE

At the 2023 World of Concrete show, Tsurumi will display its popular HS Series trash pumps and LB Slimline Series dewatering pumps, along with engine pumps, generators and other specialty electric submersible pumps for the construction market.

The golden anniversary edition of World of Concrete will be held from January 23 through 25 at the Las Vegas Convention Center in Las Vegas. Tsurumi will be at booth N2969.

World of Concrete is the largest annual international event for concrete and masonry professionals. Tsurumi's presence at the event serves as a testament to the company's dedication to the construction industry and its ongoing mission to support and provide for contractors who depend on high-quality pumping solutions.

"World of Concrete is an iconic event, drawing concrete and masonry professionals from around the world. Tsurumi recognizes that many of our dealer's customers attend this show, and we are proud to be there to show our support and elevate brand awareness within the industry," adds Mike Grant, portable product and rental market manager at Tsurumi America.

WOOD WINS DETAILED ENGINEERING DESIGN FOR GULF OF MEXICO PROJECT

Wood, a global leader in consulting and engineering, has secured a contract from HD Hyundai Heavy Industries for detailed engineering of the topsides facilities on Woodside Energy's Trion Floating Production Unit (FPU) in Mexican waters of the Gulf of Mexico. When complete, Trion will have a production capacity of 100,000 barrels per day and connect to a 950,000-barrel capacity floating storage and offloading vessel.

John Day, president of oil, gas, and power at Wood, comments, "We are pleased to have been selected as the topsides engineering provider for Trion by Woodside Energy and the project's EPC Contractor, HD Hyundai Heavy Industries. Wood's innovative design process on the pre-FEED and FEED work positioned us well for the detailed engineering scope on Trion.

"Applying a practical approach to decarbonization in the design process has been an important part of this project, while ensuring safety and quality. Our team has a proven history with Woodside, having worked together for two decades, and our experience designing and delivering solutions for Trion will improve productivity, reduce emissions, and maximize the return on investment for our client."



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MOTION NAMES NEW LEAD FOR STRATEGY AND MARKETS

Motion Industries, Inc., a leading distributor of maintenance, repair, and operation replacement parts, and a premier provider of industrial technology solutions, named Chris Cleland to senior vice president of strategy and markets.

Cleland's career spans over twenty-five years in consulting, strategy, marketing, branding, e-commerce, business development, and transformation. In his previous role as principal consultant at Cummings Creative Group (CCG), for the past twenty years, he led multiple successful initiatives across several industry verticals, driving growth and innovation for clients. In his new role, Cleland will lead the company's strategy development for its business groups, plus the e-commerce and digital teams.

"Chris brings a wealth of experience and expertise to our team," says James Howe, Motion's executive vice president and chief commercial officer/chief technology officer. "His impressive track record in innovation and transformation makes him a perfect fit for guiding our companywide strategic planning process and shaping our future growth and success. We look forward to an exciting journey ahead."

With annual sales of over \$8 billion, Motion is a leading industrial distributor of more than nineteen million parts and supplies.

NN, INC. REPORTS \$62.6 MILLION OF NEW BUSINESS

NN, Inc., a global diversified industrial company that engineers and manufactures high-precision components and assemblies, reports a record-breaking 2023, with \$62.6 million in new business wins. Ending with a strong second half, this acceleration in new business awards is a direct result of the company's new transformational business strategy. NN continues to gain traction with wins in desirable and diversified markets through better focus, targeting and harnessing its collective strengths.

"Part of our transformation plan is to improve how we engage our customers and the marketplace. Our new business wins in 2023 are validation that its working and that's great news," says Harold Bevis, CEO of NN, Inc. "This opens the door for our team to partner with customers and suppliers to create unique and breakthrough value-added solutions. We are capitalizing on our highly technical process capabilities, our existing footprint and know-how. The goal is to win business, grow sales and profits."

Precision components supplied by NN are proving valuable in supporting advancements in noise reduction, vibration reduction and harshness performance (NVH) requirements by manufacturers. ■

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FIGHT SCALE AND DOWNTIME, TOO

Ice company maintains quality and improves efficiency

BY JAN DE BAAT DOELMAN, SCALEWATCHER

Around the world and in a variety of industries, applications dealing with water processing and handling have been seeking an environmentally friendly device for protection against lime scale deposits. The priority would be to implement a maintenance- and chemical-free process, which protects against mineral deposits and improves the cleaning properties of water—one that can be installed in both the private and industrial sector.

That was the mission behind Scalewatcher's innovative and environmentally friendly approach developed in the 1980s and still used

today. Scalewatcher achieves this and many more positive effects confirmed by countless customers worldwide—one such success story helped an ice company meet high quality standards while also reducing maintenance and cleaning costs associated with shutdowns.

SEEKING A SOLUTION

York Ice Company located in York, Pennsylvania, was experiencing a large amount of downtime due to scale build up in their commercial ice factory. As they are not permitted to use any chemicals to remove the scale build up, they had to shut down for maintenance on the ice machines,

reducing sales and increasing maintenance costs.

After seeing an ad for Scalewatcher products in a trade magazine, York Ice contacted Scalewatcher North America.

"York Ice has battled scale build-up for years on our icemakers, water lines, and evaporative condensers," says Dave Neuman, vice president of York Ice Co., Inc. "In November 2013, York Ice Co., Inc. installed a Scalewatcher from Scalewatcher North America, Inc. on two of our three incoming water lines to our ice makers."

Pam McDowell from Scalewatcher went to the factory to assess the situation and quoted an IE8 unit to be



installed on the water intake line 30 feet ahead of the ice makers.

EMBRACING A NEW APPROACH

Customers can sometimes be understandably skeptical of Scalewatcher's claims to fight scale build up with environmentally friendly techniques—but results speak for themselves, and it doesn't take long to convince them otherwise.

"Our facility manager and maintenance staff were all skeptical that the Scalewatcher would work," continues Neuman. "After multiple conversations with the team at Scalewatcher and a six-month money back guarantee, York Ice gave it a try. The Scalewatcher is simple to install and environmentally friendly. York Ice no longer has to use harsh chemicals to clean the scale off our ice makers plus there is also no down time during our busy summer months."

EASY INSTALL FOR QUICK RESULTS

Installation of the IE8 unit was completed by the maintenance personnel of York Ice as there was no plumbing required and the install only took twenty minutes.

"The Scalewatcher has been amazing as it has not only kept our systems from scaling up but also has reduced the scale build-up that had accumulated for years on our systems," adds Neuman. "After a year of use, we were so impressed that we ordered another Scalewatcher for our other incoming water lines."

BUILDING FOR THE FUTURE

Better water meant better product for York Ice while cutting their maintenance costs. The IE8 unit softened and removed the existing scale build up without down time and also increased the ice output for York Ice. Since the initial unit install in 2013 to the expansion in 2015, York Ice has continued to reap the benefits of higher quality with lower costs.

"Every ice company should be using this amazing tool," concludes Neuman.

From its development over twenty-five years ago to today, the Scalewatcher technology expanded from its origins in The Netherlands to assisting customers worldwide. A variety of offices in Europe, the United States, the Middle East, Asia, and Australia ensures sales and service for the most varied applications. ■

JAN DE BAAT DOELMAN is president of Scalewatcher. The Scalewatcher is an environmentally friendly alternative to chemical and mechanical descaling. Launched in the 1980s it has successfully treated hard water problems for industrial manufacturers as well as water companies, oil producers, farmers, horticulturists, shipping companies, shopping centers, school, universities, and government establishments. For more information, call 610.932.6888, email sales@scalewatcher.com, or visit www.scalewatcher.com.



FOR MORE INFORMATION:
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A new 4.5 million gallon per day lift station in Northglenn, Colorado, started operations late last year.

COLORADO COMMUNITY DIGS DEEP FOR NEW LIFT STATION

Northglenn replaces aging system with \$10 million structure

BY THOMAS RENNER

Construction delays are never good news for a community's residents. The problems only intensify if those delays are related to wastewater lift stations, as a community in South Carolina discovered. The city of Conway received a \$6 million grant from the

Economic Development Administration in February 2021 for wastewater infrastructure upgrades. Supply chain issues delayed the start of the project, which included increasing the size of the lift station – for two years. Wastewater flooding along a major thoroughfare, Highway 501, left

raw sewage floating through some neighborhoods close to the highway.

"One of the worst parts of not only experiencing flooding like that is having raw sewage floating through your yards and homes that you love so dearly," city spokesperson June Wood told local WMBF News.

Lift station failures are common. In the past two years, communities ranging from Pennsylvania and New York to Louisiana and Texas are among those who have faced problems with failed lift stations. Construction delays—whether they are related to supply chain issues, weather, or unforeseen difficulties—place further stress on already compromised systems.

The community of Northglenn, Colorado, recognized one of its lift stations, called Lift Station A, needed to be replaced. Delays could have led to sewage backups within the community. “The biggest driver on this project was to replace the existing lift station,” says David Campbell, the construction manager on the project for Filanc Construction. “It was old and pretty much at the end of its anticipated service life.”

Northglenn replaced its lift station and in a separate project, replaced the city’s biggest sewer line. The combined cost of the projects reached \$26 million, including \$10 million for the new lift station.

ESTABLISHING WET WELLS

One of the biggest challenges for the Northglenn project was a 54-foot vertical excavation for the wet well on a very tight geographical footprint.

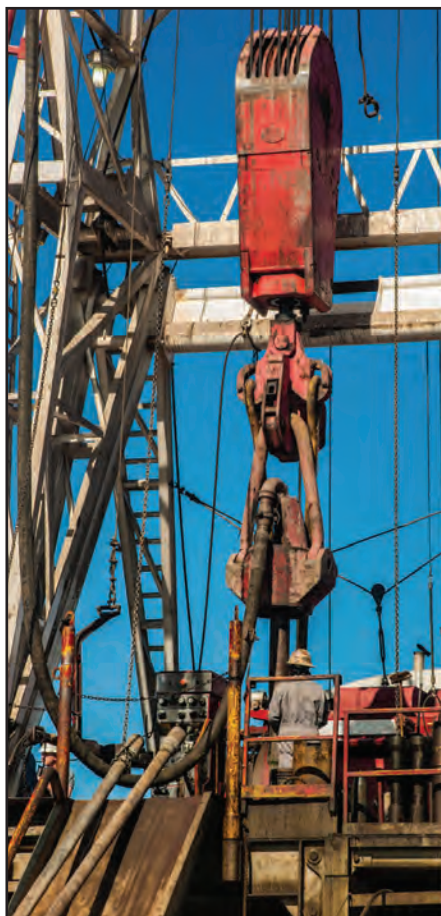
Lift stations require deep excavation to establish wet wells, which are a holding zone for the wastewater collection system. The lift station pump continuously lifts the sewage through a pressurized sewer force main. The force main elevates the wastewater to a higher elevation and pushes it along to the treatment plant.

“Shoring up the excavation and the excavation itself was difficult on this project,” Campbell says. “Then we had to complete extensive ground de-watering. Otherwise, it was a straightforward project.”

Filanc has extensive experience in constructing and expanding wastewater facilities. Since its founding in 1952, the company has completed more than 300 projects in California and the Southwest.



The \$10 Million project required about 18 months to complete.



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PROJECT AT A GLANCE

WHAT: A new \$10 million, 4.5 million gallon per day lift station in Northglenn, Colorado.

WHY: The existing lift station that served the community of about 38,000 residents reached the end of its useful life.

THE CHALLENGE: Workers excavated 54-feet on a tight geographical footprint to establish a wet well.

EQUIPMENT ACCESS: Fourteen corrosion-resistant, stainless steel floor doors from BILCO were included in the project. The doors provide safe access to pumps, process pipes and grinders for routine service and maintenance.

DID YOU KNOW? A separate project that ran in conjunction with construction of the lift station was the installation of a sewer line to help convey wastewater to a water treatment plant.

PROJECT SCOPE

Construction of the 4.5 million gallon per day (MGD) station included four submersible pumps located in a dual chamber, cast-in-place concrete wet well. A prefabricated electrical and controls building houses switch gears, VFDs and controls. An emergency backup generator—a must-have for any lift station—can provide full

electrical loads. Valve and metering vaults, 8- to 24-inch ductile iron pipes, buried site piping and fittings and surge/transient mitigation equipment were also included in Filanc's scope of work.

"Lift Station A was replaced with a newer, more efficient and easier to maintain model," Northglenn adds in a message to residents.



The \$10 Million project required about 18 months to complete.

ESSENTIAL EQUIPMENT

One essential piece of lift station construction requires access doors to maintain equipment. The Northglenn project includes 14 doors made by BILCO, the manufacturer of specialty access products. Filanc installed fourteen doors that provide safe access to pumps, process pipes and grinders for routine service and maintenance.

"They met the specifications for this project," Campbell says. "BILCO doors are the industry standard are used frequently in projects of this scope."

The doors, purchased with support from Dalco Industries, feature stainless steel construction and are constructed with a channel frame. They are commonly used in exterior applications where there is concern of water or other liquids entering the access opening. The doors include engineered lift assistance for one-hand operation. They also have a twenty-five-year warranty, which is the approximate service life of most lift stations.

The doors are also made with corrosion-resistant materials, an important distinction in the corrosive nature of the wastewater environment. The pumps must be inspected a minimum of four times a year and are the lifeblood of the system.

Grinders have also become increasingly important for inspection and servicing. Flushable and sanitary wipes have become a major issue for wastewater treatment plants. Grinders reduce pump clogging, improve sludge processing and protect downstream equipment.

DENVER SUBURB

Northglenn sits about 9 miles north of Denver, includes approximately 38,000 residents and more than 500 acres of park systems, hiking trails and magnificent lakeside vistas. The city encompasses about 7.5 square miles and includes more than 37,000 residents. The first residential development in Northglenn was established in 1959 and the city is



The new station includes four new pumps, process pipes and grinders.



The community's existing lift station had reached the end of its useful life.

known for its recreation offerings. The amenities include parks, trails and Croke Reservoir, a top spot for nature lovers to fish, stroll around the lake and observe wildlife is one of the community's most popular attractions.

Like many communities, however, Northglenn is facing issues with its aging infrastructure. Each year, the town sets funds aside to replace sections of water distribution lines throughout the community. Much of the city infrastructure was installed

in the 1960s, and proactive measures will reduce the number of water line breaks, emergency repairs and interrupted water service.

The town is in the midst of a three-year, \$6 million project to improvement its handling of solids. About 40 to 60 million gallons of water per year at the Northglenn Water Treatment Facility is transferred to the Wastewater Treatment Plant for processing and return to the watershed.

MUCH-NEEDED PROJECT

The second piece to the project was the installation of a 27-inch force main that runs 11 miles from Force Main A to the wastewater treatment plant. BT Construction completed the project in about ten months. While a temporary inconvenience to the community, the improvements were much needed. No one wants the upheaval that is associated with lift station and sewer line replacement. The alternative, however, is far worse.

"Big infrastructure replacements are messy and disruptive ... and also important," civil engineer Michael Roman says in a message to the community. "Frequent sewer line breaks due to aging sewer lines are a lot more disruptive, though, so we really need to get this replacement done." 🟡

THOMAS RENNER writes on building, engineering and other trade industry topics for publications throughout the United States. The BILCO Company has served the building industry since 1926. During these years it has built a reputation among architects, engineers, specifiers, and the construction trades for dependability and for products that are unequalled in design and workmanship. For more information, visit www.bilco.com.

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SUBMERSIBLE MOTORS FOR USE IN WASTEWATER TREATMENT FACILITIES

Careful design promotes durability in harsh conditions

BY BOB PERDUE, ABB

Safe, clean, accessible drinking water is one of our most basic human needs in the communities where we live and around the world. The wastewater treatment industry plays a significant role in this process, tasked with returning water back to lakes, rivers, and streams, having removed pollutants, broken down organic matter, and restored the oxygen content to the treated water. Municipal water treatment plants rely on pump and motor systems to move water efficiently and effectively through the treatment process. These systems typically handle wastewater flow in one of two ways.

Dry pit pumping uses a centrifugal pump and motor system that is not submerged in water. The system is housed in a pump room, which is attached or located adjacent to a wastewater sump. From there, the pump pulls water and other waste materials from the wet pit. Since dry pit systems are not submerged into the wastewater, they are easier to access, maintain, and repair; however, since they are typically below ground level, they are highly susceptible to flooding.

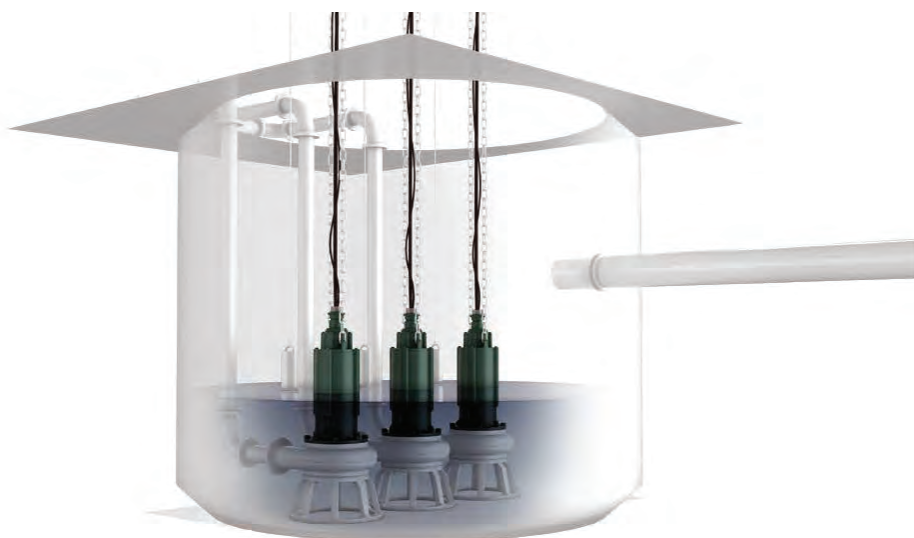
Wet pit pumping uses a pump and motor system that can be partially or fully submerged directly in the wet well. Wet pit systems have a smaller

footprint than dry pit systems and are less costly. They also eliminate the requirement for aboveground construction to house a control center. In addition to operating in a wet pit environment, a submersible motor solution allows the pumping application to operate in areas that are prone to day-to-day (even hour-to-hour) intermittent flooding. Not every motor can function while fully submerged. To do so requires special features to ensure performance in both wet and dry pit applications.

HARSH CONDITIONS

A basic electrical safety rule is that water and electricity do not mix; however, submersible alternating current (AC) induction motors must function in or under water to operate pumps, mixers, and aerators in industrial water and wastewater applications. Submersible motors must be specially designed and manufactured to prevent water from contacting any part of the electrical circuit while providing long life in these harsh applications.

Operating locations of these motors are extremely demanding, and repairs and maintenance can be difficult and time consuming. Applications in areas such as slurry pits with gritty, sandy effluent, storm water drainage systems, and—





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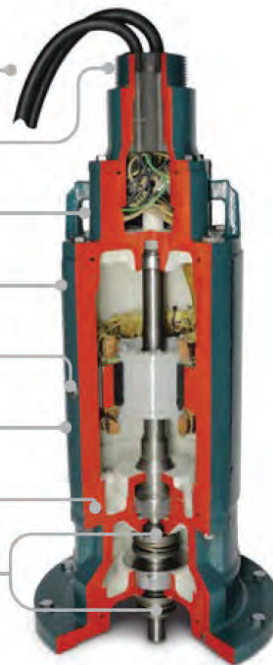
Cast iron construction

SS hardware

2 coat epoxy paint and primer

O-rings in motor joints

Dual mechanical seals with oil chamber



most commonly, clean water and wastewater treatment facilities—demand motors that are designed and built with seals and protective monitoring components to withstand the harshest submerged conditions.

DESIGN AND CONSTRUCTION

A submersible motor is completely enclosed and non-ventilated. It does not have an external shaft-mounted fan to cool and dissipate the heat from the frame. In wet pit applications, the motor relies on the liquid in which it is submerged to dissipate the heat from the frame. Its duty cycle must be continuous in water but must also be

able to withstand extended periods of in-air operation—at least fifteen minutes in most cases. Because the air does not dissipate heat as well as liquids, the frame usually must be oversized so that more surface area is available to move the heat away from the motor.

The potential for the presence of flammable gases or liquids and combustible dusts can also affect the design of motors that operate in water and wastewater applications. Methane gas is formed by decomposing solids. It is potentially explosive and could require a motor to carry a Division 1, Class I, Group D certification.

Users are responsible for specifying the hazardous area certification requirements of the motor. They can reference NFPA 70, National Electrical Code¹, which defines the hazard rating of the space or envelope, or NFPA 820, the Standard for Fire Protection in Wastewater Treatment and Collection Facilities², which defines the hazard and classification for the process areas.

Some may question why the motor must be certified for operation in the gas above the liquid if it is submerged. The reason is associated with the fifteen-minute, in-air duty cycle capability. Because the motor could operate in air in an abnormal situation, it must carry the appropriate certifications for the hazardous environment.

Heavy-duty cast iron frames should be used when constructing submersible motors. Cast iron provides good protection in an industrial environment because it does not dent, deflect, or bend easily, all of which could cause failure of the sealed enclosure. The frames are precision machined for tight fits between parts. All machined fits have grooves and O-rings to prevent water from entering the motor.

SINGLE PHASE	THREE PHASE
0.75 - 5 HORSEPOWER	0.5 - 150 HORSEPOWER DRY PIT (CONTINUOUS IN AIR)
180 AND 210 TY	0.5 - 450 HORSEPOWER WET PIT (15 MIN. IN-AIR)
230 VOLTS	200/400, 230/460 OR 575 VOLTS
UL LISTED, DIVISION 1, CLASS I, GROUPS C&D, T3C	UL LISTED: CLASS 1, GROUPS C&D, T3C UL LISTED: CLASS 1, GROUPS C&D, T2A (INVERTER)

Submersible motors should be designed with a volute, direct-to-pump, mounting configuration, meaning the pumped fluid lubricates the outer seal. The benefit of this configuration is that it makes installation quicker and easier by removing the need for couplings, mounting tables, or safeguards for open shaft-to-shaft coupled connections. By removing the need for these extra components, customers

have a simplified, compact motor and pump package while reducing any unnecessary potential failure points. In this case, less is better.

SEALS, CABLE ENTRIES, AND CABLE CAP ASSEMBLIES

However, as far as protection goes, more is better. To further protect against moisture ingress on the drive end of the motor, seal options should be available to meet the

needs of varied applications. All seal arrangements should utilize an oil chamber with moisture probes for early moisture ingress detection.

A type 21 mechanical shaft seal is often used on submersible motors. This all-purpose seal rotates with the shaft against a stationary mating face and eliminates adhesives by using mechanically crimped components. To securely seal the output shaft and protect the motor, submersible motors have an inner and outer seal arrangement on the drive-end plate.

Typical type 21 seal materials include:

- Carbon ceramic-faced seals, which are general purpose, stainless steel seals typically used in food processing, petrochemical and wastewater applications with relatively clean effluent.
- Tungsten carbide-faced seals, which provide harder seal faces

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- Silicon carbide-faced seals, which are typically used for the most demanding slurry type (highly viscous fluid) applications.

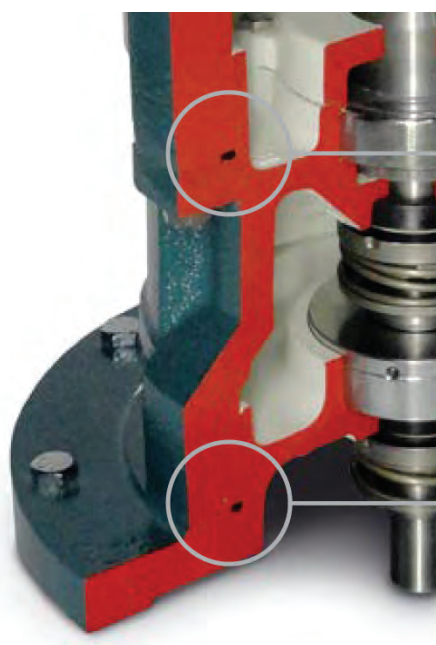
Commonly called cable cap assemblies (CCA), these components are designed for easy installation in the field. A built-in alignment notch makes field installation quick and easy and reduces the chance for incorrecion installation. Certain CCAs use a field-proven, potted-style cable cap with internal non-wicking lead connectors. Should the outer sheath of the power cable become damaged, and moisture were to wick down through the cable, both styles of CCA are constructed in a way that moisture cannot enter the motor, providing further protection from unwanted moisture ingress.

MONITORING

No matter the material of construction, seals are wear devices—or consumables. Surface abrasion on the outer seal could lead to seal failure, allowing fluid to enter the motor. In this situation, oil chamber and moisture probes provide a key safety feature for long motor life. The probes

are set to the resistivity of the oil that fills the chamber. If the outer seal fails and water mixes with the oil, the moisture probes detect the moisture influx and send a signal, via a control module, to a control panel warning alarm. This gives the user time to shut down the pump, change the outer seal and restart the motor.

Submersible motors are not like other induction motors. They are specifically designed to safely operate in and under water. Their rugged construction, secure sealing and protective safety monitoring provide long life and safe operation with pump equipment. ■



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IMPROVING POWER PLANT PERFORMANCE WITH A MODERN CALIBRATION PROCESS

How to overcome the limits of legacy systems and meet today's challenges Part 1 of 2

BY MONA-LISA GRANNAS, BEAMEX

Calibration is an essential activity in power plants and there are various reasons to establish a proper calibration process. Improving power plant efficiency is one obvious reason in order to ensure profitability, while proper calibration is also vitally important for safety. Furthermore, correctly calibrated emission monitoring equipment is essential in regulated areas. Various national and international regulations and

standards require certain calibrations to be performed. Naturally, the reasons may vary in different types of power plants.

This series takes a brief look into the most common reasons to implement a modern calibration process in power plants, explores the typical issues of an outdated calibration process, and concludes with a short discussion of a modern calibration process and how to implement it.

COMMON REASONS FOR CALIBRATION

POWER PLANT EFFICIENCY

Power plants have been proven to run more effectively and produce more energy and higher profits if the critical process measurements are more accurate. Regardless of how advanced the control system is, the system is only as good as the quality of the measurement data provided by the process control instrumentation.

Inaccurate measurement data may cause the control system to make adjustments elsewhere in the process, causing additional strain on the assets and directly impacting their life cycle and maintenance costs.

Source fuel is the largest operating cost for a power generation unit and plants that have performance or heat rate improvement programs perform better than those that do not. Many of the initiatives identified to achieve the largest improvements are also capital intensive, requiring considerable time and resources. Addressing instrument calibration can be a much lower cost initiative but can still contribute to improved performance and heat rate.

In order to keep the process measurements accurate, a proper calibration process needs to be established. Calibration should be performed with high quality equipment that ensures proper accuracy and uncertainty. Likewise, the plant should utilize calibration management software to provide

the highest level of traceability. The calibration process itself, commonly referred to as standard operating procedures (SOP), must be well planned to help ensure that the work is performed effectively. Using calibration management software to analyze data and perform history trend analyses helps with instrument prioritization and ensures the usually limited resources are used for the most important calibrations.

So efficacy in this context means being able to run the power plant in a more effective manner in order to produce more energy and earn higher profits. But efficacy also means that the calibration SOPs create the best outcome from normally limited available resources.

PLANT SAFETY

Plant safety is an essential matter for power plants for many obvious reasons. Apart from regulatory requirements, safety is a very high, if not the most important, priority for

plant. The power plant environment is a collection of systems to carry fuel, combustion air, and boiler water. In addition to the high-pressure steam hazards there are a variety of other conventional and chemical/physical hazards that must be controlled. Operating a high-pressure boiler-turbine combination involves a rigorous set of controls to ensure safe operation to prevent the boiler from exceeding pressure limits. Safely managing these risks requires critically accurate pressure and temperature measurement.

Depending on the plant type, there are a number of critical safety measurement points, which most often have redundant measurement circuits. As such, the number of critical safety measurement circuits to calibrate can be very high. Since the calibration of these critical safety circuits is controlled by regulations, it is best to ensure that these are calibrated at suitable intervals with proper uncertainty and also ensure



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that the calibrations are documented and reported in an appropriate way. Failing to do these regulated safety calibrations may in the worst case lead to the plant being fined or even shut down by authorities, or cause a harmful accident.

REGULATIONS, EMISSIONS, AND INVOICING-RELATED MEASUREMENTS

There are regulations for continuous emissions monitoring systems in power plants. Depending on the plant type there may be series of gas analyzers which monitor the flue gas for example for; sulfur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide, hydrogen chloride, airborne particles, and organic compounds, just to mention a few.

In addition to the continuous measurement of these emissions, the measurements must also be calibrated properly. If the power plant fails to perform these measurements or calibrations it may be shut down and/or heavily fined.

Although the actual fiscal metering and custody transfer is most often related to the oil and gas

industries, power plants also have measurements that are used as the basis for invoicing or money transfers. It is obvious that if a large amount of invoicing is based on certain measurements, and its accuracy is of utmost importance. Any error directly affects the invoiced amount; therefore, a great deal of effort must be made to ensure that these measurements are at the highest level possible.

NON-CRITICAL CALIBRATIONS

The previous sections discuss some of the most critical calibrations in a power plant, but of course there are many plant measurements which require calibration. These may not need to be calibrated so often and the uncertainty requirements are not so critical. Even the documentation requirements of these calibrations may not be so stringent. However, they could have a significant effect on power plant performance and safety over time.

A LOOK AHEAD

The most important reasons to implement a modern calibration

process are to improve calibration efficiency, save costs, obtain higher quality calibrations, and be compliant with related regulations. In next month's conclusion of this article, we'll explore the typical challenges faced by today's power plants as well as what a modern calibration process should look like. ■

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TO REPAIR OR TO REPLACE, THAT IS THE QUESTION

The ease of repairing sliding vane pumps should bring an end to the debate

BY CHRIS HORDYK, BLACKMER

There are philosophical choices that have sparked some of the great debates of our time: Star Wars or Star Trek? Thin crust or deep dish? In the world of truck transport of liquid commodities such as motor fuels, heating oil and chemicals, the question that typically divides people into two distinct camps is “repair or replace?” Or more to the point, what is the best pumping technology with which to outfit your transport vehicles, one that can be repaired in the field, or one that should just be scrapped and replaced with a new model once it fails?

While both sides have their strong points—that is, after all, what makes for a good argument—the feeling here is that there is one solution that stands above the rest: Outfitting your truck fleet with sliding vane pumps featuring components that can be quickly, confidently and cost-effectively replaced in the field with no unnecessary vehicle downtime.

SURVEYING THE FIELD

The operators of transport-truck fleets have a basic choice of three customary truck-mounted pump technologies: the aforementioned

sliding vane, along with external gear and centrifugal. Let's take a closer look at all three technologies:

EXTERNAL GEAR

This pump technology uses the meshing of gears to facilitate the flow of liquid through the pump at consistent volumes, which makes them a positive displacement (PD) pumping technology. They will deliver a constant amount of liquid with each revolution of the gears, while their tight clearances and speed of rotation restrict any fluid from moving backward, or “slipping,” during their



operation. Since the gears are rigid, the pumps create a smooth, pulse-free flow, but also one that can handle very high pumping pressures, especially those that are needed to transfer high-viscosity liquids. However, the contact inherent in the meshing of the gears will cause them to wear over time. This wearing of the gears will compromise volumetric consistency and increase the risk that product slip will occur as the pump ages, which

will result in decreased productivity over time. External gear pumps are also generally inexpensive, though they do have a relatively high number of wear parts, which will prompt many of their users to run them to failure and then replace, rather than repair, them. The cost to replace the wear items is a substantial percentage of the entire cost of the pump and directs users to scrap the entire pump for common wear.

CENTRIFUGAL

This technology uses the rotational energy created by an internal impeller to “throw” the liquid to the discharge port. Although less efficient than PD pumps (meaning they require more energy to perform the same amount of work) this method of operation produces a smooth, pulse-free flow. Conversely, to achieve this effect and the resulting operational benefits, by design centrifugal pumps are more complex, which means higher downtime and maintenance costs when they fail. Centrifugal pumps also tend to have a steeper purchase price, which can put the operator between a rock and a hard place when considering the repair-or-replace question. From an operational standpoint, while some manufacturers claim they are self-priming, most centrifugal pump models cannot prime unless they are first pre-primed. Also, they do not have the capability to fully deplete tanks during unloading, cannot strip lines for product recovery



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and spill reduction, and cannot run in reverse for recovery between loads. Lastly, centrifugal pumps must operate at a speed that requires either a hydraulic-drive system or a gearbox to convert typical PTO speeds to the required pump speed.

SLIDING VANE

This PD-pump technology features a rotor with retractable vanes that protrude and retract as the rotor turns. This setup draws liquid into chambers that are created by the spaces between the vanes, from where it is pushed to the discharge port. The self-adjusting vanes sustain the pump's volumetric performance, making it energy efficient while simultaneously preventing product slip. Another feature of sliding vane pumps is a lack of metal-to-metal contact, which reduces the possibility that pump friction and galling will occur. An additional sliding vane attribute is its self-priming ability and suction-lift capabilities, which allows the creation of an internal vacuum that is strong enough to strip lines and tanks. Since there is no metal-on-metal contact inside the pump, sliding vane pumps have a liquid-handling range from ultra-thin liquids (0.2 cP) all the way up to liquids with a thickness of as much as 22,500 cP.

At this point, it makes sense to acknowledge that not all sliding vane pump technologies (the same goes for external gear and centrifugal) are created equal. Knockoff models have entered the market that may look the same as a high-end sliding vane pump (while costing less), but their performance leaves a lot to be desired. Mainly, their components (vanes, shafts, bearings, seals, etc.) fail quicker during normal operation. Because of their reduced purchase cost, these sliding vane pump models will more likely than not be run to failure and then replaced, rather than repaired.

CONSIDERING THE VARIABLES

Taking all of this into account, we recommend that the best choice for truck transport of liquid commodities is a premium, precision-engineered



sliding vane pump that can be quickly and confidently repaired without the need to remove the pump from the truck or ship it off to a service provider for the installation of replacement parts or general maintenance.

Before making that final decision, though, there are a few variables that must be considered. The first may be the most obvious—purchase price. On principal, a pump that is designed to be repaired will have a higher purchase price than throwaway technologies. Therefore, the developers and manufacturers of pumps that are designed to be repaired take great pains to make the purchase price as palatable as possible, knowing that any excess upfront costs—while potentially off-putting to the buyer—can be recouped on the back end via longer service life and more manageable and bottom-line-friendly repair costs.

For example, it's a fact of life that a sliding vane pump is more expensive to

buy than a competitive truck-mounted external gear pump. Still, if that vane pump can be placed on a truck and only needs to be repaired two or three times over twenty years of service, while the external gear pump needs to be replaced three or four times in that time span, the higher upfront purchase cost is more than worth it.

Secondly, even those fleet operators who prefer to repair their external gear or centrifugal pumps when required can be better served by choosing sliding vane technology. That's because sliding vane pumps have only one major sacrificial component: the plastic vanes that will wear down over time, and when the day for replacement comes, the worn vanes can be swapped out for new ones in a matter of minutes without having to remove the pump from the truck. The pump's other wear components—gaskets, O-rings, seals, bearings, etc.—can also be replaced quickly and easily without taking the truck out of service.

External gear pumps have more wear parts that will need to be repaired or replaced. The quandary that arises here is found in the fact that while the user may replace a worn or broken part, there is no way to know when any of the other wear parts in the pump will fail—it could be in two years or two days. In other words, the more components in the pump that will eventually need to be repaired or replaced, the better the chance something will break at the most inopportune time possible.

Complicated or reoccurring component repair or replacement also brings the potential for a large amount of ancillary costs to be incurred by the fleet owner. The more complicated the pump and its drive system, the less likely that fleet operators—which are quite often lean three to four truck operations with small staffs—will have the expertise on hand to perform repairs or preventive maintenance. In this case, an outside service provider will need

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to be scheduled, or the pump shipped out for repairs, which can mean excessive idle time for the truck, along with significant labor costs.

All of this sounds like an argument to simply replace the failed pump with a new one, but that returns us to the first consideration of purchase cost, acknowledging again that initial cost

may be lower, but over the twenty-year life cycle of a high-quality sliding vane pump, an external gear or centrifugal pump need to be replaced three or four times.

The reliability of premium sliding vane pumps also allows their manufacturers to confidently offer best-in-class warranties and

performance guarantees. In fact, one of the industry's top sliding vane manufacturers offers a five-year warranty for its truck pumps, along with a two-year performance-assurance guarantee, meaning that if any part fails in the first two years of operation, it will be replaced, no questions asked.

CONCLUSION

In general, many people take a sense of pride in keeping a piece of mechanical equipment operating over an extended period of time. Sure, that snow blower may be 30 years old, but by taking care of the impeller, it hasn't failed yet. Or there are instances of fuel-oil suppliers who will re-chassis their transport trucks but install their ten-year-old sliding vane pump on the new chassis. Sliding vane pumps have become the standard for efficient, reliable and cost-effective performance for liquid-handling on transport trucks—and their ease of part repair should put an end to the old repair-or-replace argument: Repair in a knockout! ■



CHRIS HORDYK is a product manager for Blackmer®. He can be reached at chris.hordyk@psgdover.com. Blackmer is the leading global brand of sliding vane, gear, regenerative turbine, and centrifugal pump, and reciprocating compressor technologies for the transfer of liquids and gases. Blackmer is a product brand of PSG®, a Dover company. PSG is the global pump, metering and dispensing-solution expert, enabling the safe and efficient transfer of critical and valuable fluids that require optimal performance and reliability in applications where it matters most. PSG products are manufactured in state-of-the-art facilities that practice lean manufacturing and are ISO-certified. PSG is part of the Pumps & Process Solutions segment of Dover Corporation. For more information, visit www.psgdover.com/blackmer.

The image features several brass plumbing fittings, including elbows, tees, and couplings, arranged on a technical drawing background. The drawing includes various lines, dimensions, and labels such as "Ø50x3.5", "24", "25", "26", "27", "28", "29", "30", "31", "32", "33", "34", "35", "36", "37", "38", "39", "40", "41", "42", "43", "44", "45", "46", "47", "48", "49", "50", "51", "52", "53", "54", "55", "56", "57", "58", "59", "60", "61", "62", "63", "64", "65", "66", "67", "68", "69", "70", "71", "72", "73", "74", "75", "76", "77", "78", "79", "80", "81", "82", "83", "84", "85", "86", "87", "88", "89", "90", "91", "92", "93", "94", "95", "96", "97", "98", "99", "100". The fittings are made of polished brass and have hexagonal bases. One fitting on the left has a white plastic cap. The background drawing is a technical schematic with various lines and dimensions.

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HOSE-DIAPHRAGM PUMPS ARE THE LATEST DESIGN IN DIAPHRAGM PUMPING

New advancement to old style

round diaphragm pumping BY CHUCK MARTIN, FELUWA PUMPS USA INC.

The piston-actuated round diaphragm pump was the standard in pumping higher pressure slurries and flows than other positive displacement pumps for many years. The need for an equally efficient design, but with a more hermetic ability and less parts was needed. Contamination throughout the diaphragm and even the associated air compressors and air/fluid combination valves became known with the old style round diaphragm design.

FIGHTING THE GOOD FIGHT AGAINST RUPTURES

In hose diaphragm pumping, each double hose that could fail would also have a secondary hose, one inside the other. If both hoses rupture, the fluid would only contaminate one cylinder head and not be pumped under pressure throughout the pump. This next generation of reciprocating pumping of heavy, solids-laden and gaseous fluids and slurries would be conveyed by means of a double-

walled hose that is both hermetic and isolated in nature.

During pump disrupt events, hose-diaphragm pump, bolstered by a complement of self-contained air-regulated pulsation dampeners, cone valve, ball valve, double ball valve and various other mechanically actuated check valves and valve monitoring equipment would be a better option than that of a round diaphragm pump which has had no significant design updates in years.

TAKING ON HIGHER PRESSURES

These older style round diaphragm pumps also contain more parts than that of a double hose diaphragm style pump, which makes total cost of ownership and maintenance both harder and more expensive. Unlike the peristaltic hose pump, the double hose-diaphragm pump can achieve higher flows and pressures like the old round style diaphragm pumps. This is possible because of balanced pumping where fluid surrounding the double hose acts upon the hose and provides hydraulic distortion like the human vein instead of a mechanical style actuation, which can damage or excessively wear the elastomer.

The double hose-diaphragm pump reaches peristalsis like a regular hose pump with greater pressure and flow ranges. Unlike the old style round diaphragm pump, the double

hose diaphragm pump does not crimp and deform over time, nor allow pathways of fluid to get behind it during failure. The same elastomer rules for chemical compatibility and operational physics apply. The range of applications for the double hose-diaphragm pump would be mostly the same as any larger round diaphragm pump such as filter press, oil and gas applications, chemical, petrochemical, mining, wastewater, etc.

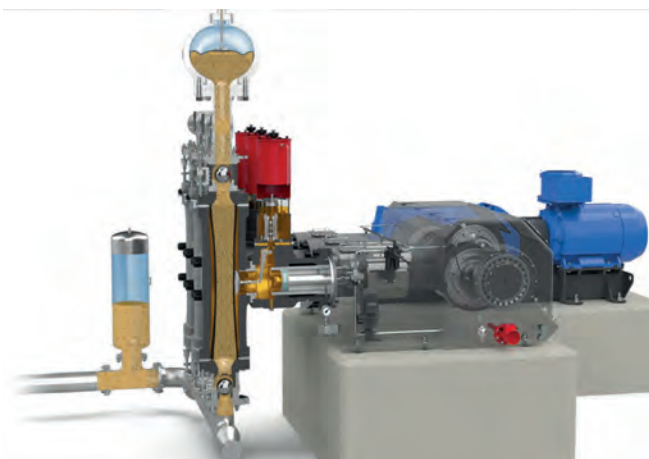
The design of hose diaphragm pumps is more likened to a human vein being elastically distorted or slightly compressed by its own lubricating fluid rather than a plunger pushing back and forth upon the fluid and a sloshing taking place in a valve and round diaphragm housing. The hose diaphragm produces a true hermetic, more linear path for the fluid to travel, thus achieving almost perfect peristalsis pumping. The natural flow of the product continues right through the pump itself.

VERSATILITY BY DESIGN

The double hoses for these pumps are offered in several elastomers to match the fluid for chemical compatibility. They usually have a life span of about 10,000 hours as opposed to 6,000-8,000 hours with that round older style diaphragm pumps. Double ball valves are also common with this type of pump, which most round diaphragm pump



Feluwa acoustic valve sensor.



Feluwa acoustic valve sensor.

manufacturers do not offer. No special valve extraction tools are required and component replacement is done with standard tools by one or two people.

These types of pumps can have a swing-away valve housing that allows one person the ability to change out a valve in under thirty minutes alone, again with no special tools. The monobloc style drive and crank offer a more compact and less horizontal profile with motors that can be placed vertically, which saves space. Since the fluid only comes into contact with the inside of the hose, the need for special construction materials for the pump housing are not usually necessary unless the pump is in a vaporous environment. This saves a significant amount of money or

having to coat the inside of the pump. This adds to the life of the pump since the chances of a chemical attack on the housing exists.

These types of pumps have the ability to reverse the direction of the flow from inlet at the bottom (which is the usual configuration), to inlet at the top to allow thick and abnormally heavy viscous slurries to flow downward and pass through the pump better. These pumps average a life span of more than thirty years and, even with thick slurries. This represents a significant Capex benefit that last throughout the life of the pump. ■

CHUCK MARTIN is the president of Feluwa Pumps USA Inc. in Houston, Texas. He has over thirty-two years of experience in the pump industry in sales and management. Martin has worked both in manufacturing and distribution of pumps. Wherever abrasive, aggressive and toxic media are conveyed, the hermetically sealed, oscillating displacement pumps from Feluwa are used. Feluwa technology offers ideal pump systems to the customers for various applications, even for extreme operating temperatures and heterogeneous mixtures with high solids content. For more information, visit www.feluwa.com.

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PIVOT TO MAXIMUM VERSATILITY

New half-inch air-operated double diaphragm pump gives the market more options

BY ELSA BERNALDO, SAMOA INDUSTRIAL



In any pumping application, friction can spell exponential problems for the entire system. This is especially true for instances where fluid handling focuses on abrasive liquids. However, there is a versatile and reliable solution. The new Samoa UP05 pump combines a universal design with a unique frictionless Pivot-Shaft Air Valve to provide maximum performance and energy efficiency, exceeding market expectations.



The Pivot Series 1/2-inch air-operated double diaphragm (AODD) pumps are available in metallic and non-metallic materials such as aluminum, stainless steel, polypropylene, conductive polypropylene, conductive acetal, and PVDF with an extensive range of diaphragms, seats, and balls. They offer a wide range of applications and fluid compatibility.

MAXIMUM VERSATILITY

These pumps are very suitable for fluids with the presence of abrasives and their availability in both non-metallic and metallic options expands their versatility to meet most any customer's needs.

NON-METALLIC

The non-metallic options of the Pivot Series include threaded polypropylene, conductive polypropylene, acetal, and PVDF pumps with a wide range of diaphragms, seats, and balls options, which offer broad fluid and application compatibility. End-users will find

these pumps suitable for aggressive chemicals with the presence of abrasives.

These pumps offer

- Superior chemical compatibility.
- Increased resistance to corrosive fluids and atmospheres.
- Robust bolted design for longer operation lifetime compared to clamped pumps.

METALLIC

The metallic versions of the Pivot Series are aluminum and stainless-steel pumps with the same wide range of diaphragms, seats, and balls options. These pumps offer a broad fluid and application compatibility that extends to use in the outdoors and general applications with presence of abrasives. Their sturdy construction provides the following benefits:

- Superior abrasion resistance.
- Stainless steel versions for increased resistance to corrosive fluids, harsh atmospheres,

high tensile, and aggressive temperatures.

- Very robust design for longer operation lifetime compared to clamped.

FEATURES THAT MEET TODAY'S DEMANDING APPLICATIONS

Beyond their design options, the Pivot Series pumps also provide users with strong performance features once the job begins, including:

- **Higher efficiency:** Maximum fluid flow with reduced air consumption.
- **Increased reliability:** No stall, no icing, reliable start-up and longer air valve and diaphragms life.
- **Easy servicing:** Simplified maintenance and cleaning. Air valve cartridge easy to replace. The pump is held together by carriage bolts and nuts allowing

to accomplish a much faster tear down and rebuild.

- **Compact design:** Can be configured to connect a smart pump-controller system to actuate, control, and monitor your pumps.
- **Universal pump:** Easy swap-over of main competitive brands.



BUILDING FOR THE FUTURE

This is only the beginning. Samoa stands out for its R & D at the forefront in the development of air operated pumps and systems for fluid measuring, control and management. It also feeds the product development program with innovating technological concepts, hence creating efficient, functional, and durable products. ■

Samoa is a leading manufacturer of equipment for fluid manipulation and management and one of the most important worldwide. All this thanks to the state-of-the-art equipment and technology combined with its highly qualified personnel. Samoa designs, develops, manufactures and distributes its own products. For more information, visit www.samoaindustrial.com.

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THORDON

OIL SHEAR TECHNOLOGY ELIMINATES DOWNTIME

MagnaShear motor brakes cut costs for maintenance and adjustment

BY TONY STONER, FORCE CONTROL INDUSTRIES

For a wide array of industrial applications, the scourge of downtime, whether due to unexpected breakdowns or routine maintenance, can mean significant differences in the bottom line. However, Force Control Industries' MagnaShear™ motor brakes are maintenance-free, and require no-adjustment, so they virtually eliminate motor brake downtime and maintenance costs.

The resulting increase in production time can bolster

productivity, efficiency, and profitability for manufacturing plants of all types. With no adjustment or maintenance required, save for an annual oil change, these dependable motor brakes allow maintenance personnel to be tasked with other projects, thus allowing facilities to

accomplish more work with fewer employees.

THE BENEFITS OF OIL SHEAR TECHNOLOGY

MagnaShear motor brakes employ oil shear technology which allows significantly longer service life in demanding applications like those with frequent start/stop cycles or where the motor is reversed each cycle. This lengthy life eliminates the need to stock spare brakes, friction discs, and other repair components, freeing up maintenance budgets and shelf space. Oil shear technology transmits torque between lubricated surfaces—thereby eliminating wear on friction surfaces. A patented fluid recirculation system dissipates heat—eliminating heat build-up which is the most common problem in dry braking systems. Elimination of the wear significantly increases

service life and virtually eliminates adjustment which also elongates maintenance intervals.

The totally enclosed MagnaShear brakes are impervious to moisture, dirt, and dust that is common in many manufacturing environments. Furthermore, the oil shear technology provides a smooth "cushioned" stop which reduces shock to the drive system, thus extending service life of downstream components.



HOW OIL SHEAR WORKS

Unlike dry brakes, oil shear technology includes a layer of automatic transmission fluid between the brake disc and the drive plate. As the fluid is compressed, the fluid molecules shear—thus imparting torque to the other side. This torque transmission causes the rotating discs to decelerate against the stationary plates bringing them down to stop. Since most of the work is done by the fluid particles in shear, wear is virtually eliminated. Elimination of wear also eliminates the need for adjustments that are common for dry braking systems.

In addition to transmitting torque, a patented fluid recirculation system helps to dissipate heat, which is the major problem with traditional dry brakes. Along with heat removal and torque transmission, the fluid serves to continually lubricate all components of the oil shear brake, elongating their service life. MagnaShear brakes with oil shear

technology provide significantly longer service life, characterized by virtually maintenance-free operations.

SUITABLE FOR A WIDE RANGE OF MOTOR SIZES

These proven motor brakes are available to accommodate a wide range of applications. Spring set torque ratings from 3 to 1,250 foot-pounds are available. MagnaShear motor brakes are available in multiple torques for the same motor frame.

MagnaShear motor brakes feature "quick mount" features for quick and easy mounting to drive motors in NEMA frame sizes 56 to 449. They are shipped ready to install, with no assembly or adjustments required. They are also available pre-mounted on a motor for severe duty applications. MagnaShear motor brakes can be furnished to fit a NEMA or IEC frame motor, as a complete motor and brake assembly, or to mount on a machine frame or other special mounting configuration.

These proven motor brakes are totally enclosed from outside contaminants, with seal integrity for harsh and washdown environments. A modular design /assembly allows for ease of servicing and maintenance. ■

Headquartered in Fairfield, Ohio, Force Control Industries is the world leader in oil shear technology, offering a full line of clutches, brakes, and clutch brakes for OEMs in diverse applications. Their manufacturing campus includes three manufacturing facilities with over 100,000 square feet of manufacturing space along with engineering, design, customer support, and administrative offices. For more information, call 513.868.0900, email sales@forcecontrol.com, or visit www.forcecontrol.com.



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THE PERFECT MATCH

How to evaluate chemical resistance and fluid compatibility of materials

BY SEEMA GANGATIRKAR, GREENE TWEED

Matching the right elastomer to an application is key to ensuring an O-ring's optimal performance and mitigating premature failure. One critical factor to consider is resistance to process fluids. Different types of elastomers have differing resistance to various fluids, making material selection crucial to seal design. If the seal material is incompatible with a particular media, a seal could swell or experience other effects such as a change in hardness or deterioration of physical properties such as tensile strength and elongation, which could lead to a premature failure of the seal.

EFFECTS OF TEMPERATURE

Temperature also impacts the ability of an elastomer to resist chemical attack. As temperatures rise, it's possible that an elastomer's ability to maintain its properties within a process fluid may deteriorate. An elastomer that may exhibit excellent chemical resistance at a lower temperature may not perform as well at a higher temperature. So, it's important to consider the effect of temperature when selecting a material to ensure that it can maintain its properties within the fluid.

Immersion tests at specific temperatures and durations are used to evaluate how resistant a particular material is to a family of fluids. An example test procedure to understand how a particular material performs in a hot water environment could be as follows:

Take the physical properties of a -214 O-ring and immerse it in distilled water at 250 degrees Fahrenheit (121 degrees Celsius) for three days. After retrieving from the vessel, O-ring measurements are taken to understand how the material has changed during its exposure to hot water. The change in the following properties is generally measured:

1. Hardness
2. Tensile strength
3. Elongation
4. Volume change

ASSESSING CHEMICAL RESISTANCE

One convention of assessing the chemical resistance of an elastomer is to determine the percent volume change and then assign a rating based on that change. In this methodology, if the volume change is measured at 10 percent or less after exposure, the material is considered suitable for use in that fluid at that temperature.



Volume swell measuring between 10 to 20 percent is generally suitable. A material measuring between 20 to 40 percent may still be suitable in certain situations but it is better to discuss with an applications engineer before selecting a material. An elastomer swelling of 40 percent or more would not be considered a good material candidate in that fluid.

Another method of determining chemical resistance takes the change in tensile strength into consideration in addition to volume swell. In this case, an elastomer with less than 15 percent volume swell and 15 percent change in tensile strength would be judged to have excellent compatibility with the fluid in which it was tested.

Between 15 and 30 percent change in volume and tensile strength would indicate that the elastomer has experienced mild chemical reactivity with immersion fluid. Greater than 30 percent change in either volume or tensile would indicate that moderate chemical attack has occurred.

CONCLUSION

By reviewing the change in physical properties of an elastomer in specific process fluids, including the effect of temperatures, the right material can be recommended to ensure optimal seal performance. ■



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FEATURED PRODUCT

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EVERLAST SERIES 4000 PUMP STATION



Smith & Loveless Inc. highlights the EVERLAST Series 4000 Pump Station, an above-ground wastewater pump station that continues the S&L tradition of high efficiency, long service life, operator ease and safety, and low operation and maintenance costs.

The EV Series 4000 pump station comes as a complete, factory-built and tested system that is fast and simple to install in both new installations and replacements of submersible pumps. This state-of-the-art packaged pump station incorporates premium efficiency motors designed for wastewater, resulting in reduced energy consumption costs and a smaller carbon footprint.

Unlike submersible pump stations, all mechanical equipment is safely located and easily accessible above ground and outside the wet well, eliminating confined space hazards during routine maintenance and operation. Moreover, the EV Series 4000 features a two-piece split, rolling UV-coated fiberglass enclosure that provides easy 360-degree access to all components.

The EV Series 4000 pump station is equipped with S&L STAR ONE Non-Clog Pumps, which are centrifugal solids-handling pumps that last three to five times longer than a typical submersible pump. These pumps also offer higher efficiencies across the range of pumping conditions. ■

For more information, visit

WWW.SMITHANDLOVELESS.COM

NOVATECH AUTOMATION

W3TS TEST SWITCH

NovaTech Automation has recently acquired the the TestSwitch LLC line of products, including the flagship, W3TS Test Switch. With the addition of TestSwitch's products, NovaTech Automation reinforces its commitment to delivering innovative and comprehensive solutions for critical infrastructure. The W3TS Test Switch and other TestSwitch products will be seamlessly integrated into NovaTech Automation's portfolio. For more information, visit www.novatechautomation.com or www.testswitch.com.



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EMERSON

FISHER FIELDVUE 4400

The Fisher FIELDVUE 4400 position transmitter from Emerson is for use in critical isolation valve applications, including chemical reactor feed shutdown, pressure swing absorption, mineral pressure oxidation isolation, steam generator shutdown, and others. HART-enabled FIELDVUE 4400 valve position transmitters offer a cost-effective and are very easy to calibrate. As compared to limit switches, it provides much higher reliability, along with valve diagnostics and Safety Integrity Level (SIL) 2 capabilities. For more information, visit www.emerson.com/fisher4400.



PSG BIOTECH

QUATTROFLOW QB2-SD SINGLE-USE MICROPUMP

PSG Biotech, a provider of pump, flow-sensor and flow-measurement technologies for use in life science and biopharmaceutical process applications, and a brand of PSG, releases the new Quattroflow QB2-Standard (QB2-SD) Single-Use Precision Micropump. The Quattroflow QB2-SD works on the positive displacement principle where fixed cavities of liquid are transferred from inlet to outlet around a rotor. This creates high vacuum levels of -0.6 bar (-9 psi) and exhibits back-pressure capabilities up to 0.2 bar (2.9 psi). For more information, visit www.psgdover.com/biotech.

WHO'S LEADING IN SUSTAINABLE MANUFACTURING?

Omdia's Alex West on where business leaders see opportunity for growth



Alex West

As sustainability topics rise on the agenda for many manufacturing CEOs, more companies are sharing their approach to environmentally sustainable practices alongside standard fare of production targets and profit/loss statements. But how well are companies doing, what else can be done, and who's setting the example? Below, Alex West, senior principal analyst in research

at Omdia's manufacturing technology practice, takes a closer look at sustainable manufacturing.

MPT: *How would you describe the current landscape of sustainable manufacturing?*

ALEX WEST: According to a recent Omdia survey 30 percent of manufacturers describe themselves as having implemented an environmental strategy with a long-term road map, and this is estimated to increase to 42 percent over the next twelve months. Companies are allocating additional budget to support these such projects. Target setting is also on the up. In the first six months of 2023, the number of manufacturers having committed to science-based targets (SBTis) for emissions reduction increased by 40 percent.

However, while the focus is fixed and intentions are intensifying, the reality of the size of the challenge is only becoming more apparent. Decarbonization of the manufacturing sector is proving more challenging than many expected.

MPT: *Could you explain some of those challenges?*

ALEX WEST: According to Omdia, more than 40 percent of companies are slightly or significantly behind target when it comes to reductions in greenhouse gas emissions. The delay is even more significant in transitioning to renewable

energy, with 47 percent not expecting to meet the targets that have been set. Over the last year the proportion of companies falling behind has only increased.

The focus on the availability of near limitless renewable energy has been misinterpreted to reflect availability by some. And with challenges in not just the intermittency of the energy source, but also the limitations around infrastructure readiness and integration capacity, companies cannot simply rely on decarbonizing their energy source and must look internally at how to improve their usage of energy.

MPT: *Where do you see the path forward?*

ALEX WEST: A combination of existing and new technologies will be central to facilitating these improvements, with industrial automation vendors playing a key role in offering solutions across hardware, software, and services they can provide.

Beyond this, the range of solutions, including energy management and emissions monitoring systems, as well as analytics tools to optimize process control, improve waste management, coordinate across a vendor ecosystem and consider and balance the needs for sustainable operations with business profitability.

Per our survey, leaders in the statistics of energy intensity, owned emissions, and renewable energy were Rockwell Automation, Siemens, and Schneider Electric respectively, with these companies also scoring significantly better than their peers in aggregate as well. ■

To read more of Alex West's outlook on sustainable manufacturing, sign up to receive his reports on Omdia's website. Omdia is a global research leader that helps business leaders connect the dots across the technology ecosystem.

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