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BEFORE



AFTER



**A NOTE ON THIS ISSUE:**

Welcome to another issue of MPT! We start off with a piece from Jim McMahon highlighting Gorman-Rupp's successful streamlining of municipal lift station performance for Gainesville, Georgia (pg. 10). In regions throughout the American Southeast, population growth, resulting in new housing and neighborhoods, is continually driving the need for new pipelines and lift stations. See how Gorman-Rupp incorporates not just new equipment but also a new way of thinking.

Kevin Schoeters of Atlas Copco tackles ten total cost of ownership myths for mobile air compressors in our Maintenance & Reliability section (pg. 16). Discovering the true value in a higher purchase price for these rugged and reliable machines requires a shift in perspective away from the sticker shock and taking advantage of long-term savings.

Lastly, operators often select regenerative turbine and side-channel pumps for difficult liquid transfer or processing jobs. However, in our Pump Solutions section, Stephen Basclain of Ebsray lays out why one option may be the better choice (pg. 24). While both pumps function exceptionally well in the field, he illustrates why regenerative turbine pumps hold an edge. Enjoy!



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### BIO-UV GROUP AND PINNACLE PARTNER UP ON OZONE

BIO-UV Group has agreed to enter into an exclusive partnership agreement with Pinnacle Ozone Solutions to leverage the company's QUADBLOCK ozone water treatment products in Europe, Middle East, Africa, and Asia. Florida-based Pinnacle is one of the largest suppliers of ozone technology in the North American municipal, aquaculture, and industrial markets. Pinnacle's patented advanced ozone technology will increase BIO-UV Group's ozone product capacity, which will open a much larger market opportunity worldwide. Pinnacle will support BIO-UV Group's strategy to establish its range of water treatment solutions across the North American continent.

France-based BIO-UV Group will market, manufacture under license, and supply Pinnacle's proprietary QUADBLOCK advanced ozone technology across Europe, the Middle East, Africa, and Asia Pacific. The partnership will also provide system training, installation, and maintenance services as part of its expanding "Customer First" aftermarket business program.

"We are delighted to have partnered with Pinnacle to further establish the company's brand and ozone technology in the global marketplace," says Simon Marshall BIO-UV Group's deputy general manager and head of group sales.

### HARGROVE CONTROLS AND AUTOMATION AWARDED FOR SAFETY

Hargrove Controls and Automation, a subsidiary of global EPC firm Hargrove Engineers and Constructors, announces that Process Safety Leader Chet Barton has been awarded the highest level of certificate from TÜV Rheinland, a Functional Safety Expert Certification. This designation is only available to professionals who meet TÜV Rheinland's top global standards to be able to call themselves a process safety expert.

"We are incredibly proud of Chet's achievement," says Karen Griffin, vice president of Hargrove Controls and Automation.

Barton has been certified as a FS Engineer with TÜV Rheinland since 2010. After gaining years of experience, submitting the required documentation, and fulfilling all requirements such as participating in standard committees, submitting technical papers, presenting at technical symposiums, and obtaining two letters of recommendation, Barton has now achieved the FS Expert (TÜV Rheinland) certificate in Safety Instrumented Systems.

"I am deeply honored to receive the FS Expert certificate from TÜV Rheinland, the most recognized testing service provider in the world in the process safety field," says Barton. "This marks a significant milestone in my career."

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## LIBERTY REACH INC. ANNOUNCES REBRANDING

Liberty Reach Inc., a supplier of 3D volumetric vision guidance systems for robot applications, announces its rebranding to Liberty Robotics Inc. This change aims to better represent the company's increased focus on advancements in machine vision and robotic guidance technologies. Accompanied by a new tagline, "Machine Vision AI," the new name marks a strategic shift towards broader applications in robotics, beyond the company's established base in the automotive sector.

Liberty Robotics is a key player in providing robotic guidance solutions utilizing 3D vision volumetric sensors and proprietary software within the automotive industry, offering technologies for applications such as body sealing and material handling. With the rebranding, Liberty Robotics intends to maintain its presence in the automotive market while expanding into warehousing and logistics.

"Our commitment to the automotive arena remains strong, yet we see significant opportunities in the warehouse and logistics sector," says Bob Berry, president and CEO of Liberty Robotics Inc. "Our technologies are designed to advance automation across various fields and while our current focus is on optimizing goods packing and mixed-case pallet retrieval."

## OIL DYNAMICS GROWS ELECTRIC SUBMERSIBLE PUMP BUSINESS

Earlier this year, Romania's largest oil and gas company and Oil Dynamics signed two additional five-year supply and service contracts for over 180 electric submersible pumps (ESP) to Romania. Along with complete standard and slim-line pumps (ESP), the contract includes the supply of variable frequency drives (VFD) as well as transformers, sensors, cables and other accessories.

Service is provided from the company's new branch in the Bucharest area: Oil Dynamics Service S.R.L. Fully equipped and stocked, it serves as base for the experienced local field service teams and pump shop. The Romanian subsidiary receives engineering support from the headquarters in Heidelberg, Germany, while technical assistance is supplied by the Testing and Logistics Center in Hockenheim, Germany.

The two new contracts follow an earlier agreement signed in 2023 for the supply of over fifty electric submersible progressive cavity pump (ESP/PCP) systems for the same customer. In the meantime, several ESP and ESPSP have been delivered, installed, and are in productive operation. Oil Dynamics is a German artificial lift specialist, founded by a group of experienced professionals with extensive, background in the oil and pump industries. ■



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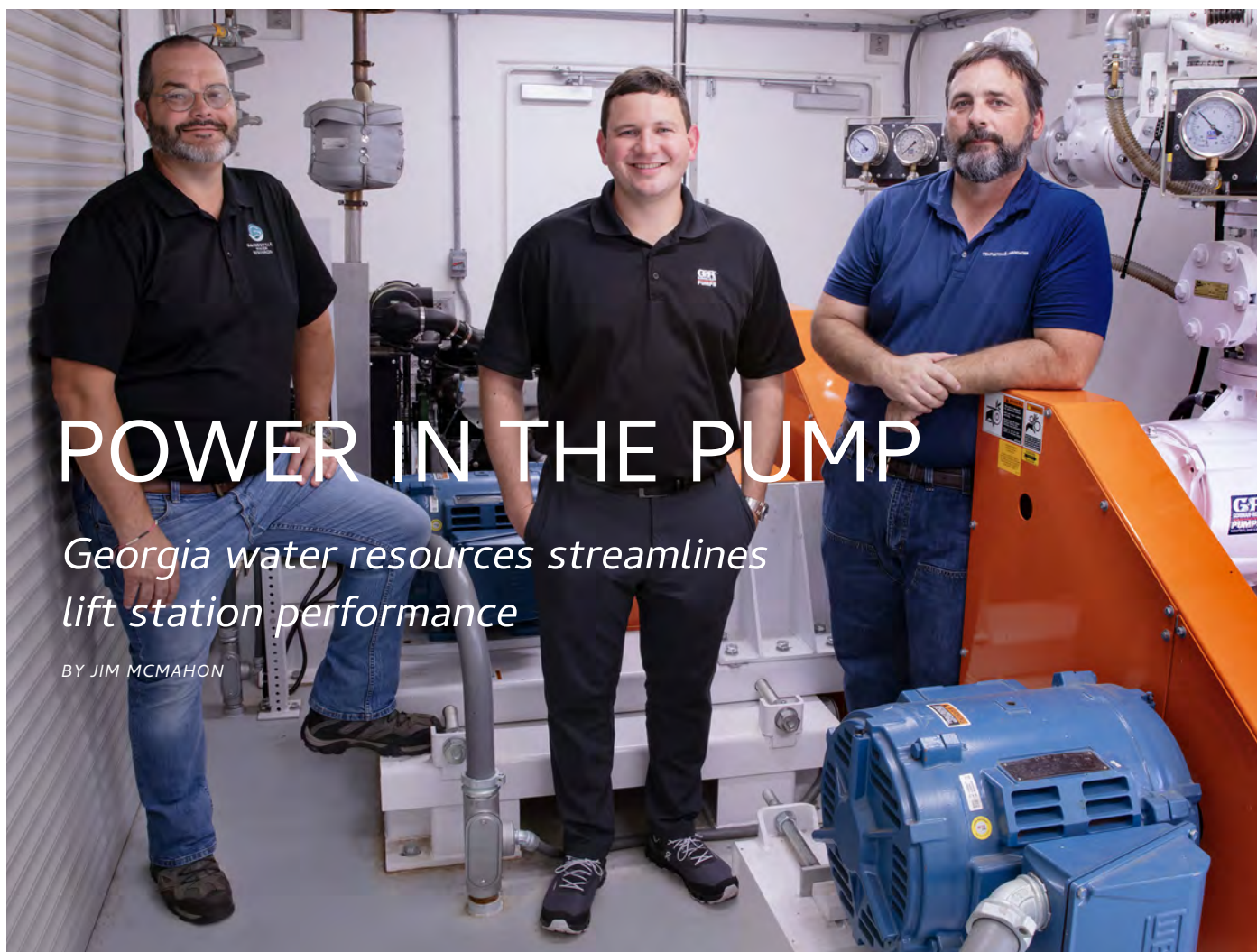
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# POWER IN THE PUMP

*Georgia water resources streamlines lift station performance*

BY JIM MCMAHON

From left to right: Chris Thornhill, Maintenance Superintendent – Gainesville, Georgia, Department of Water Resources, Jimmy Murphy, Southeast District Manager – Gorman-Rupp Pumps Engineered Systems and Jarrett Nash, Sales Representative – Templeton & Associates worked closely in developing custom Auto-Start solutions for the city.

The Gainesville, Georgia Department of Water Resources has been systematically upgrading the performance of its seventy lift stations to state-of-the-art custom-engineered, manufactured and assembled ReliaSource® Auto-Start lift stations. The plug-and-play lift stations, from Gorman-Rupp, minimize installation time and costs by matching pumps, motors, controls, valves, pipes and accessories for maximum compatibility and performance. The lift stations eliminate the need for an engine/generator set by utilizing a modular combination of pump, electric motor, and engine to minimize maintenance and improve uptime reliability.

Located approximately fifty miles northeast of Atlanta in the foothills of the Blue Ridge Mountains, the city of Gainesville, Georgia, sports a population of nearly 45,000 residents. The city's Department of Water Resources is responsible for managing the quality and distribution of drinking water and treatment of wastewater for the community. To service these needs, the department operates more than 1,600 miles of underground water and sewer pipelines, and seventy lift stations, scattered throughout Gainesville and its surroundings in Hall County, to move wastewater from users to its wastewater treatment plant.

Population growth, resulting in new housing and neighborhoods, is continually driving the need for new pipelines and lift stations. Because Gainesville is so close to the mountains, new lift stations are required to manage elevation changes of 50 to 200 feet. This results in the need for additional lift stations to handle the increase in wastewater.

“All the flat land in the county is gone, so if a contractor wants to build it usually means cutting into a mountain,” says Chris Thornhill, maintenance superintendent with the Gainesville, Georgia Department of Water Resources. “This new building requires additional lift stations to move wastewater though

the elevation changes and into our wastewater treatment plant. We have seventy lift stations in operation, with another eight in progress and expected to come online by the end of the year."

### LOOKING FOR A MORE EFFICIENT LIFT STATION SOLUTION

"With this rate of growth, we needed to look at how to operate our lift stations with better efficiency," adds Thornhill. "Keeping the lift station generators serviced, and everything that goes along with maintenance has been challenging. Particularly when a storm comes through and knocks out the power, adverse weather and road conditions make it difficult to bring diesel out to the stations daily to keep the generators running."

For many years Gainesville has relied on Templeton and Associates Engineering Sales to provide water and wastewater treatment solutions. Templeton works with more than

fifty top manufacturers to deliver a complete selection of the best equipment in the wastewater and water industry, along with aftermarket parts and service throughout the life of the equipment.

"Early on in Gainesville's water treatment evolution, they used a variety of Gorman-Rupp lift station styles," says Jarrett Nash, sales representative at Templeton and Associates. "Increasingly, the city's focus with its lift stations has been to minimize maintenance requirements and move from diesel to a cleaner energy source."

"The Department of Water Resources also wanted to standardize its lift stations to optimally manage installations, servicing and parts replacement," adds Nash. "One of the early lift stations adopted by the city was manufactured by Gorman-Rupp, installed as early as 1979. It was the reliability of their lift stations and the service support the company has provided that prompted Gainesville

to select Gorman-Rupp as their sole provider of lift stations in residential developments."

Gorman-Rupp has manufactured more than 17,000 lift stations over the last fifty-six years for thousands of municipalities worldwide.

### RELIASOURCE AUTO-START LIFT STATIONS—PLUG-AND-PLAY INSTALLATION

Effective wastewater handling requires lift stations with valves, controls, pipes and pumps that all work together to meet sewage handling needs. If any one of these components fails, it can put the lift station's operation at risk.

This is the central theme behind Gainesville's selection of Gorman-Rupp's lift stations. Specifically, the company's ReliaSource Auto-Start lift stations, which are custom-engineered, manufactured, assembled and tested at Gorman-Rupp's facilities. Precision-matched pumps, motors, valves, pipes,

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Gorman-Rupp ReliaSource Modular Above-Ground Auto-Start lift stations are available in a variety of visually pleasing enclosure options to blend in with the surrounding environment.

NEMA-rated controls, enclosures and accessories are integrated for maximum compatibility and performance. The lift stations are ready for installation on location, plug-and-play.

"These lift stations come from Gorman-Rupp as a complete unit, basically plug-and-play," continues Nash. "They are set in place at the site within in a fiberglass enclosure, minimal connections are needed, and

the lift station is in service. It really simplifies the installation process for the contractor."

### ELIMINATES NEED FOR AN ENGINE-GENERATOR SET

The Auto-Start lift station incorporates a modular combination of two pumps. Each is driven by an electric motor with one coupled to a natural gas- or propane-driven engine, thus eliminating the need for an engine generator set.



In the event of a power outage, Auto-Start stations can be driven by alternative, cleaner fuel solutions. This eliminates the delivery of diesel fuels commonly associated with traditional generators.

If power fails, liquid levels rise, triggering a control that automatically converts the system to 12-volt DC, which starts the standby engine and runs one of the pumps during the power failure, and AC motor operation is automatically restored when the power resumes. The lift station meets all standby requirements and can utilize a variety of fuels.

"The engine can run on propane or natural gas, cleaner fuel sources instead of diesel," continued Thornhill. "With seventy lift stations, should the power go out because of a storm, diesel fuel does not have to be supplied to the newer stations. The maintenance required to keep the generators serviced is no longer a factor with the Auto-Start stations."

### SELF-PRIMING PUMPS

"Gainesville's lift stations are equipped with self-priming centrifugal solids-handling pumps specifically designed for sewage and industrial wastewater handling applications," explains Nash. "The heavy-duty line of Super T Series, from Gorman-Rupp is not submersible. The self-priming, suction-lift design of the pumps allows the design engineer to physically locate the pumps where access is a non-issue and routine maintenance can be completed quickly and easily."

The large volute design of Super T Series pumps allows for automatic repriming in a completely open system without the need for suction check valves, even with the pump casing only partially filled with liquid and a completely dry suction line. The pump's two-vane, semi-open solids handling impellers handle up to 3-inch diameter solids. Pump out vanes on the impeller shroud reduce foreign material buildup behind the impeller and reduce pressure on seals and bearings.

"With Super T Series pumps, the incidence of clogging is reduced compared to most other heavy-duty solids-handling pumps," says Nash.



The enlarged size of modular enclosures provides added space for performing routine pump maintenance while shielding operators from external conditions. Oversized roll-up doors allow access to station components should heavier-duty lifting equipment be required.

“The unique impeller design and the ability to adjust clearances between the impeller and the wearplate help to reduce clogging. If a clog does occur, the maintenance time is much less—the front cover plate can easily be opened to remove the jammed debris.”

### LIQUID-LEVEL CONTROLS

The lift stations are integrated with Integrinex® liquid level controls, designed to handle basic pump station requirements such as pump alternation and level alarming.

The controller comes installed with four normally-open mechanical relay outputs, analog input capability for either 0-5 VDC or 4-20mA, air bubbler, submersible transducer or radar input and operating voltage requirements of either 12 or 24 VDC. The option of assigning an output for a non-alternating pump allows the user to set an individual pump to operate at the same level settings every time it runs.

Gorman-Rupp programmed the control panels for job specifications and was available to assist the customer with SCADA integration.

### COLLABORATION

“The concept of these prepackaged lift stations, and the fact that each station is similar, has made the ReliaSource Auto-Start lift station a very attractive solution for the city of Gainesville,” says Thornhill. “We now have six Auto-Start lift stations, one Auto-Start pressure booster station and a variety (fifty-four) of other Gorman-Rupp lift stations in operation, from our total of seventy lift station installations.”

The Gorman-Rupp team of electrical, mechanical, and hydraulic engineers have worked closely throughout the development of Gainesville’s lift systems to ensure that the entire hydro-electrical system worked in harmony to meet the system requirements.

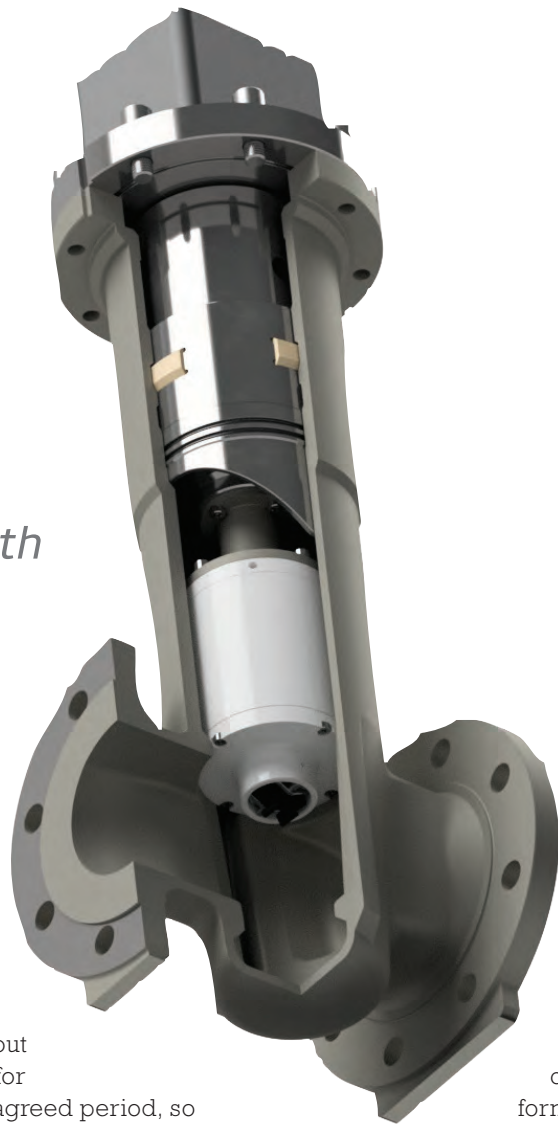
“Both Templeton and Gorman-Rupp have done a really good job of matching the pumps to the different elevation conditions we have encountered,” adds Thornhill. “Anything we have asked they have been able to provide a solution to ensure we have the most optimum performing lift stations in place.”

Founded in 1933, The Gorman-Rupp Company is a leading designer, manufacturer, and international marketer of pumps and pump systems for use in diverse water, wastewater, construction, dewatering, industrial, petroleum, original equipment, agriculture, fire suppression, heating, ventilating and air conditioning (HVAC), military and other liquid-handling applications. For more information, visit [www.grpumps.com](http://www.grpumps.com).

# SCORING HIGH MARKS

*Smart solution proving its worth at testing facility*

BY SIMON HUMPHREYS, IVAPPS



Water distribution system operators need to identify issues within their networks efficiently and accurately. They also need to be able to fix them when they occur most efficiently. In many cases, this means the creation of control points so a certain section of the network can be isolated without shutting off the flow to large groups of water users.

## THE CHALLENGE TO WATER UTILITIES

For example, water utilities in the United Kingdom face substantial

fines, or are told to reduce water bills, should they leave customers without a water supply for longer than an agreed period, so the ability to negatively affect their customers is vital.

On top of this challenge, operators also set themselves the challenge of delivering a net zero water supply for customers by 2030—twenty years ahead of the U.K. government's legally binding target of 2050.

## THE SOLUTION TO WATER UTILITIES

iVapps has engineered a system which enables water system operators to use their redesigned standard valve body (Portal) that can hold rapidly interchangeable cartridges loaded with sensors or an isolation valve.

The interchangeable smart cartridge houses whatever sensors the customer chooses to identify when and where there is an issue in the line as and when required, the

smart cartridge is removed and replaced with the valve cartridge to form a control point. This stays in

place for the period required to carry out the necessary work on the line, after which it is replaced with the smart cartridge.

The iVapps Portal is a recognizable body meaning no specialist training is required to install it, and it has also been proven to assist in the drive to reduce carbon production. An independent report by Tunley Engineering found that "Incorporating iVapps products in water utility networks provides a substantial advantage in facilitating water utility companies' transition towards Carbon Neutrality (Net Zero)."

Assuming fifty systems are installed in a network, the following savings are made over the life of the product: driving 233,180 miles in an average diesel vehicle, burning

## KEY TAKEAWAYS

- iVapps working with world-renown test facility WRc
- Three systems in place on the WRc flow loop
- Able to demonstrate how the system works in the field



50 tons of coal of charging 11.06 million smartphones.

## THE CHALLENGE TO iVAPPS

iVapps engineers have been perfecting their system for the past five years and are in the process of bringing their solution to market.

The company is faced with the challenge of introducing a new and disruptive technology to an industry that has changed very little over the decades it has been in operation. Across much of the water industry, there is an ethos that is anti-change with many operators reluctant to try new technologies as they focus on their immediate challenges.

iVapps needed to find a way to get its solution in front of water system operators.



## THE SOLUTION TO iVAPPS

The WRc is a globally recognized organization that is at the forefront of introducing new technologies to the water industry. It delivers a range of services from drone pipeline inspection to waste lab services.

iVapps leaders knew they needed to test and showcase their solution and approached WRc to form a partnership. We carried out extensive research when developing our solution and have the Portal and smart cartridge in place at several test locations around the world. But we knew we also needed to have the system up and running at a location where we could bring industry leaders to witness it working.

iVapps worked with WRc's Andy Godley and arranged for three Portals to be mounted on its flow loop, an above-ground pipeline that runs for 131 feet and simulates a real-life water network thanks to its fluctuating pipe size and range of valves and metering equipment installed on the loop.

The three portals have been in place



for six months and enable iVapps to bring industry professionals to the Swindon site where they can see first-hand how the iVapps solution works.

## THE RESULTS

Having a permanent installation of the system is vital for us as we understand that professionals need to see the system in place to truly understand how it works. So far, we have held three demonstration days at the WRc and been able to use the loop to simulate leaks and breaks, which has enabled us to show our customers just how our sensors accurately identify, and measure flow drop and water loss. We have also been able to demonstrate the simple process of removing a smart cartridge and installing a valve cartridge to form a control point exactly where it is needed.

Godley adds, "The WRc is here to discover and deliver new and exciting solutions that enable the water industry to meet its challenges. We have not seen anything like the iVapps solution before so we're keen to assist in showcasing its potential to the water industry." ■

iVapps has the world's first smart and sustainable engineering system that provides digital monitoring, immediate sensor access and valve functionality at one easy access point in a pipeline network. For more information, visit [www.ivappstech.com](http://www.ivappstech.com)

# 10 TOTAL COST OF OWNERSHIP MYTHS DEBUNKED

*Think beyond the sticker shock to achieve real savings*

BY KEVIN SCHOETERS, ATLAS COPCO

Discovering the true value in a higher purchase price for your mobile air compressor requires a shift in perspective. It's not just about the upfront cost, but rather when total cost of ownership (TCO) proves to be more economical than cheaper alternatives. Here, we flip the script and debunk the most common misconceptions related to TCO, helping you make more savvy purchase decisions.

## 1 INITIAL PURCHASE PRICE DICTATES TOTAL EXPENDITURE

In reality, total cost of ownership

(TCO) goes beyond the upfront cost and encompasses ongoing expenses such as maintenance, energy costs, and operational costs. In many cases, these recurring expenses prove to be far more significant than the initial purchase price. Understanding and factoring in these elements are crucial for accurate financial planning and decision-making.

## 2 ENERGY EFFICIENCY A MINOR FACTOR

Energy expenses, particularly in industrial settings with continuous operations, are in most cases the most substantial portion

of TCO. Investing in energy-efficient portable air compressors doesn't just align with sustainability goals; it can also lead to significant long-term savings, making it a critical factor in comprehensive TCO evaluations.

## 3 ONE SIZE FITS ALL

In truth, TCO varies significantly across different industries and applications. Tailoring portable air solutions to specific needs and operational dynamics is essential for achieving accurate and optimized TCO assessments. Generic solutions may not adequately address the unique requirements of each business, potentially leading to higher overall costs.

## 4 MAINTENANCE AND UPGRADES ARE MINOR CONSIDERATIONS

The after-installation costs of maintenance or system upgrade can vary greatly depending on the quality of the original components. Regular maintenance and timely upgrades play a vital role in influencing TCO; preventing downtime, reducing repair costs, and ensuring operational efficiency. Acknowledging the importance of proactive maintenance is integral to your comprehensive cost saving strategy.

## 5 DOWNTIME COSTS ARE NEGLIGIBLE

Downtime spells financial fiasco, leading to lost productivity, missed opportunities, and an inherent reduction in profits. Factoring in the



true cost of downtime provides a more realistic picture of the overall financial impact. Choosing a high-quality portable air compressor and keeping up with effective maintenance simultaneously minimizes downtime and TCO; as does support from a knowledgeable, trusted, and easy-to-reach service network.

**6 ONLY DIRECT COSTS MATTER**

Soft costs—including service, training, and downtime—play a substantial role in your total cost of ownership, particularly in industries where quality and efficiency are paramount. Don't make the mistake of ignoring these underhand costs and underestimating the impact they have on your portable air compressor's TCO. Rather, opt for a tested and high-quality mobile air compressor, built with long lasting and durable materials to future-proof your investment.

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**9 ADVANCED REGULATION SYSTEMS ARE UNNECESSARY**

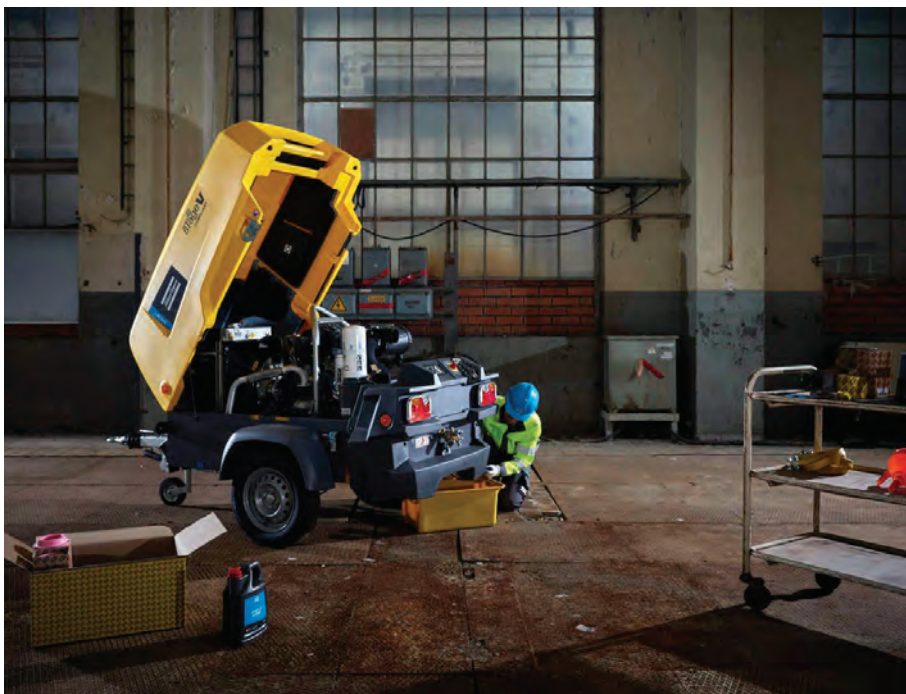
Modern regulation systems like central controllers and safety measures aren't just fancy add-ons. They're here to optimize performance, save energy, and keep downtime in check. Integrating advanced systems positively influences the lifetime of your portable air compressor by enhancing overall operational efficiency; and—you guessed it—minimize unnecessary expenditures.

**10 ALL COMPONENTS CONTRIBUTE EQUALLY TO TCO**

The choice of components in your portable air compressor have varying impacts on your total cost of ownership. Selecting the right components tailored for specific applications and industries is crucial for achieving efficient and cost-effective operations. A one-size-fits-all solution is often not the best option for getting the maximum out of your investment. Understanding the differential contributions and quality of each component is essential for making informed decisions in buying a portable air compressor. ■

**7 TCO IS STATIC**  
Total cost of ownership is dynamic and subject to change based on market conditions, technological advancements, and operational shifts. Continuous reassessment and adaptation to these variables are essential for maintaining accurate financial projections and optimizing TCO over time.

**8 OPPORTUNITY COSTS ARE IRRELEVANT**  
Opportunity costs, such as the potential efficiencies lost due to outdated technology or systems, can silently slice through your budget. Therefore, ignoring them is a big mistake. Assessing the long-term benefits and drawbacks associated with different choices is essential for



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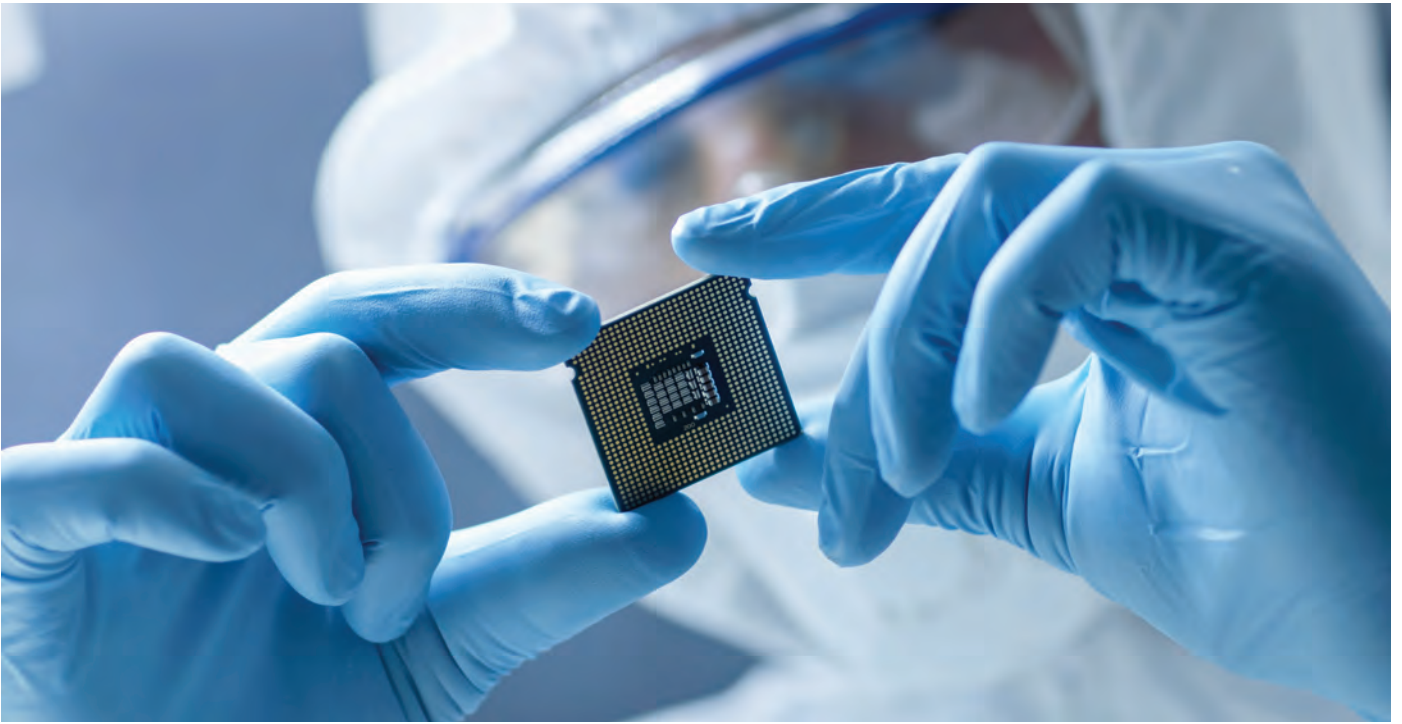
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# HOW TO SOURCE ELECTRONIC CHIPS ON THE OPEN MARKET

*With help, manufacturers can confidently purchase quality parts*

BY DEL WILLIAMS

Electronic chips are at the heart of virtually all sophisticated equipment today from automobiles and medical equipment to consumer electronics like smartphones. So, when manufacturers must purchase electronic parts that are no longer available from authorized distributors, are obsolete, out-of-production, or only available from overseas sources, they often face a moment of reckoning as to how much risk to assume.

The challenge is that most manufacturers rely almost exclusively on chips sourced from authorized distributors and so are unprepared – even out of their depth – when these

components must be purchased on the open market.

Purchasing agents often search the internet for electronic component suppliers, many of whom are located overseas. However, it is important to navigate this market cautiously, as it can be filled with risks. Inexperienced purchasers may unknowingly engage with unfamiliar or disreputable sources.

## MANAGING RISK SOURCING AN OPEN MARKET

For many companies this introduces a level of risk that, at a minimum, makes them uncomfortable. For others, it is simply unacceptable.

“Sourcing electronic chips online without knowing who you are buying from is as naive as trying to buy a genuine Rolex watch in a back alley,” says Mike Thomas, president and global general manager at Classic Components, a premier independent distributor based in Torrance, California. “I have heard of suppliers disappearing after the manufacturer wires over the money [without delivering the parts], and some purchase bad parts they ultimately cannot use.”

Manufacturers who prioritize risk management can greatly benefit from collaborating with an independent distributor. By

doing so, they can safeguard their production and reputation through the acquisition of dependable supplies of high-quality chips.

### EXPERIENCE COUNTS

In contrast to authorized dealers, experienced independent distributors can utilize their extensive expertise and long-standing strategic relationships to explore alternative sources. These sources may include regional authorized/franchised distributors, direct connections with manufacturers, or access to surplus/excess inventories from other customers.

"Experienced independent distributors play a crucial role in safeguarding manufacturers from the inherent risks associated with buying electronic chips on the open market. By acting as a buffer, these distributors help reduce the burden and potential liabilities that manufacturers may face when making these critical purchases," says Thomas.

The initial step involves conducting a comprehensive survey with the manufacturer to gain a thorough comprehension of their unique specifications, which include chip age and the ability to trace it back to the factory. Subsequently, all potential suppliers undergo meticulous assessment, taking into careful consideration the reputation of their parts within the industry.

Should any red flags or other concerns emerge throughout this process, the independent distributor reserves the right to elevate the level of scrutiny to even greater heights, including implementing sophisticated product inspection procedures.

"A professional [independent distributor] has the resources and experience to assess the risk and evaluate the sources. Depending on the level of risk, they can take different mitigating actions, particularly when hard-to-get, older, or obsolete parts are required," says Thomas.

Manufacturers can then proceed with confidence, knowing that the

parts are of high quality. The risk mitigation and quality assurance steps are meticulously documented, including detailed photographs and measurements. As a result of this comprehensive process, independent distributors frequently offer long-term warranties on these parts.

### PROTECTION FROM OPEN MARKET RISKS

According to Thomas, the mantra in his industry to eliminate risk is "know your source."

Over decades, independent distributors have developed a very sophisticated method of

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identifying and eliminating risk. To achieve this goal, industry-leading independent distributors such as Classic Components make substantial investments in managing global supply networks, evaluating and prioritizing suppliers, establishing preferred supplier relationships, implementing efficient Quality Management Systems (QMS), and procuring state-of-the-art inspection equipment.

The process begins with vendor qualification and management to ensure the independent distributor is collaborating solely with a reliable and approved supplier. A tiered Supplier Selection and Approval System is used to assess vendors against rigorous standards. Each supplier is categorized, thoroughly documented, regularly reviewed, and subject to tier-reclassification based on events and patterns observed by Classic Components or reported by third-party sources.

These sources include instances of supplier non-conformance to product reliability and integrity, changes in quality status relative to industry standards, industry reports

regarding overall vendor quality, alterations in financial conditions such as outstanding payments or accounting issues, shipping of substandard products, or repeated occurrences of product quality issues. In response to any of these factors, indefinite suspension may be imposed.

"Internally, our vendors are evaluated and assigned a grade and ranking using an alphanumeric system, which depends on their distributor type. This encompasses original chip manufacturers (OCMs), authorized distributors, along with other traders and alternative sources," says Thomas.

#### **IT'S OK TO ASK QUESTIONS**

According to Thomas, when a manufacturer requests a part, an agent asks a series of questions and completes a flow-down risk profile form developed by the company. These questions determine the intended application of the chip, manufacturing date restrictions (day code), and material traceability requirements, which include proof of direct sourcing from the factory.

The systematic evaluation conducted by Classic Components to identify any concerns linked to specific parts, commodities, brands, or vendors. The company's supply chain and purchasing teams are some of the most experienced professionals in the industry and regularly undergo training to effectively utilize their system to detect potentially risky parts, identifying any discrepancies or other related issues. The company also adheres to established international quality standards such as IPC, ISO, JEDEC, AS, and others when selecting and managing their suppliers.

"If there are any known issues associated with the part, a warning will be displayed," says Thomas.

At this point, the independent distributor's buyers will begin sourcing from vendors ranked by reputation and will negotiate the terms.

#### **RELATIONSHIPS MATTER**

Classic Components also takes advantage of its regional relationships across the globe, whether through local distributors, manufacturing



partners with excess inventory, or authorized distributors.

Compliance verification, which includes visual inspection, testing, and physical analysis of parts, serves as an additional layer of protection. Only parts that have undergone rigorous QA control, in accordance with internal controls and established international quality standards are shipped.

As part of routine quality checkpoints, technicians conduct inspections of external packaging. During these inspections, they carefully examine the packaging for various elements, such as original and sealed packaging, correct labeling, proper QC markings, accurate lot codes, consistent colors and fonts, and potential bar code discrepancies.

During the inspection process, technicians carefully examine the internal packaging for various authenticating elements. These include but are not limited to the appropriate logo, labels, bar code, as well as desiccant, dry pack, moisture barrier bags, and vacuum sealed antistatic bags.

## INSPECTION IS CRUCIAL

The chip is scrutinized as well. This includes inspection for physical arrangement in packaging, surface-mount packaging damage, pin orientation, coplanarity, surface scratches, cut or bent leads, lead blemishes, discoloration, rust, tarnish, evidence of remarking, lot codes and country of origin, as well as evidence of sandblasting or blacktopping.

"To ensure the legitimacy and high quality of chips, the authentication process is considerably more comprehensive for items with higher risk profiles," says Thomas.

"When it comes to products like medical devices, for example, there are numerous necessary steps involved that can be both costly and time-consuming," adds Thomas. "However, these steps are crucial in ensuring the safety and effectiveness of the final product. So, we perform in-house inspection and testing, and

we may call on a third-party partner to conduct additional testing."

Upon completion of the process, Classic Components offers a comprehensive five-year warranty and flexible net terms for payment, which are not due until the manufacturer receives and assembles the parts. Furthermore, the distributor provides substantial insurance coverage for the chips, including \$10 million for general liability to cover costs related to physical injury or property damage, \$5 million for technology errors and omissions to address expenses arising from sub-standard material issues, and \$5 million for employee crime and dishonesty to cover costs due to part failures resulting from employee misrepresentation, forgery, fraud, or counterfeits.

When manufacturers have an urgent need for quality chips but cannot easily acquire them or risk substandard electronic components, working with an experienced

independent distributor that will fully mitigate the risk is a safe, cost-effective option. ■

**DEL WILLIAMS** is a technical writer based in Torrance, California. Classic Components, an independent distributor based in Torrance, California. Classic offers unrivaled flexibility and reliable material management solutions to many of the world's largest engineering companies and electronics manufacturers. Classic continues to set the industry standard through our tireless commitment to customer service, high quality standards, and industry-leading counterfeit detection methods. For more information, call 310.539.5500, email [info@class-ic.com](mailto:info@class-ic.com), or visit [www.class-ic.com](http://www.class-ic.com).

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# ON THE WRONG SIDE

## *Why regenerative turbine pumps outperform side-channel pumps*

BY STEPHEN BASCLAIN, EBSRAY

Operators often select regenerative turbine and side-channel pumps for difficult liquid transfer or processing jobs. While different in their construction and capabilities, both technologies can be commonly found in applications dealing with liquids near their vaporizing point.

These liquids prove challenging for other process pump technologies because of their near gas-like state, leaving some pumps struggling to reach and maintain prime or generate pressure when pumping these low-viscosity, high vapor pressure substances. These types of challenging substances include

Autogas, liquified petroleum gas (LPG), carbon dioxide, ammonia, refrigerants, blowing agents (such as DME), solvents, propane, butane, and other hydrocarbons.

Regenerative turbine and side-channel pumps are designed specifically to move these near-gas liquids from one place to another

without difficulty. It is, however, the differences between these two technologies that separate them from being a good process pump for these applications to being an exceptional option.

While operators will still get strong performance out of either solution, regenerative turbine pumps have clear advantages over side-channel pumps in these applications. This article will explore all the facets of these two pump technologies to show why regenerative turbine pumps have a significant edge when processing near-gas liquids.

### UP CLOSE WITH REGENERATIVE TURBINE PUMPS

Regenerative turbine pumps are rotodynamic, operating via a rotating, non-contacting, free-wheeling disc with several small cells on its periphery that function as an impeller. About fifty to sixty cells on each side of the impeller capture the liquid as it enters through

the suction port. The impeller then accelerates the liquid within the cells around a narrow hydraulic channel. This motion creates the pump's differential-pressure capability, which enables it to consistently transfer the sometimes near-gas liquid at the required flow rate.

This technology excels at transferring a variety of substances that many other pumps struggle with. Regenerative turbine pumps can effectively process liquids at or near their boiling point, while also handling entrained vapors and liquids at high pressure and low flow. Other pumps run into problems with these fluids because they are not engineered to properly handle the range between liquids and vapors. The consequences of running those fluids through other pump technologies include cavitation, vibration, noise, and unreliable performance, which all reduce the life of the pump and can cause damage to workers and other equipment.

The reason regenerative turbine pumps do not suffer the same fate comes down to their design and construction. The impeller and its cells provide versatility, with the spiral motion and speed smoothing liquids and collapsing vapor bubbles as they form, which prevents cavitation and pulsation. Having a hydraulically balanced design coupled with smooth flow rates also means that the pump can operate without noise or vibration in most situations.

The capabilities of regenerative turbine pumps can be found not only in their design but also in their fluid-handling capabilities. This technology can handle viscosities of 0.1 to 50 cSt with differential pressures up to 20 bar (300 psi) and a maximum allowable working pressure of up to 34 bar (493 psi). Typical flow rates reach up to 52.8 gallons per minute, with some variants (newer iterations especially) hitting flow rates as high as 158.5 gallons per minute.

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## A LOOK AT SIDE-CHANNEL PUMPS

Like regenerative turbine pumps, side-channel pumps have similar characteristics and processing abilities. How the technology achieves them is the difference, though. Side-channel pumps feature a multistage impeller system and one or two flow paths. The impeller system, which features straight radial vanes, pressurizes low-viscosity fluids, vapors, and near-boiling point substances.

The side-channel design features a small gap between the blades and the casing. It is in this gap that the pump grabs the liquid and sends it to the impeller blades and



through the side channel. This motion moves the substances several times between the side channel and the impellers, creating steadily higher pressures for eventual transfer.

Side-channel pumps are known to have the same characteristics as both positive displacement and centrifugal pumps; the narrow clearance between the casing and the blades has a similar function to the close clearance in a positive displacement pump while the impellers are similar to those found in centrifugal pumps.

Operators select side-channel pumps for their versatile nature. The pump's complex design allows it to generate up to ten times the pressure of a centrifugal pump operating at the same speeds. This makes side-channel pumps ideal in similar applications to those where regenerative turbine pumps excel.

Typical applications for side-channel pumps include refrigerants, fuels, aerosols, butadiene, solvents, hydrocarbons and water, among many similar substances. They also can self-prime, another

feature shared between this technology and regenerative turbine pumps.

## COMPARING THE TWO TECHNOLOGIES

When pitting the two pumps against each other, it might be difficult to spot their differences when it comes to performance. After all,

regenerative turbine and side-channel pumps are exceptional in handling poor suction conditions and both possess the ability to self-prime in the right conditions. They also can handle the same types of fluids without setbacks or performance detriments.

The differences, though, are plentiful. Side-channel pumps require larger frames and space for installation, while the regenerative turbine pump has a more compact footprint. Side-channel pumps can be up to two or more times larger than regenerative turbine pumps and up to three times the weight. Additionally, regenerative turbine pumps also consume less power than side-channel pumps but can still achieve the same flow rates and pressures. They also have a smaller profile and motor, which can also reduce electrical installation costs.

Side-channel pumps are also more complex in their design than regenerative turbine pumps, boasting up to as many as eight impellers in their larger variants, especially those found in LPG applications. Having multiple stages requires larger frames to accommodate them, while regenerative turbine pumps can accomplish similar performance results with single-stage construction in a compact frame.

Like any processing technology, maintenance must occur to keep it functioning as intended. With the complexities of the side-channel pump design, operators have multiple wear parts and functional pieces to account for when performing maintenance. To be precise, side-channel pumps have twenty wear parts, which includes sleeve bushings, a mechanical seal, several impellers, bearings and seal rings among many other components. Keeping track of that many components means maintenance can require multiple hours and more frequent visits given the number of wear parts and the likelihood they all won't need to be replaced at the same time.



Comparatively, regenerative turbine pumps only have one wear part—the mechanical seal. Operators can spend less time maintaining this type of pump because they only need to track the performance and condition of that single wear part. Even with a major rebuild, the replacement parts would be one mechanical seal, two bearings, one impeller, and four to five O-rings.

Regenerative turbine pump maintenance is also much more seamless and streamlined compared with side-channel pumps. Typical repairs on a regenerative turbine pump can be accomplished in one to two hours without disconnecting the motor or even removing the pump from the pipework. Less downtime for maintenance bodes well for the bottom line for each pump and the

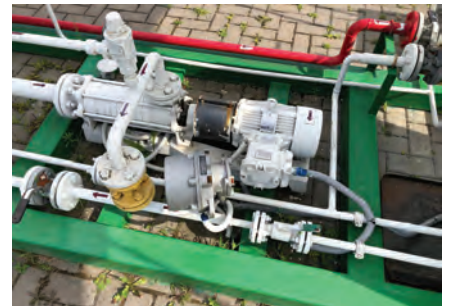
entire operation. Additionally, for some regenerative turbine pumps, an operator only needs three manual tools to disassemble it—a wrench, an Allen wrench, and one pair of snapping pliers.

Side-channel pumps, meanwhile, require operators to remove them from the pipework system and take them to a workshop for maintenance. Add in the complexities of a side-channel pump's construction and operators are faced with extended downtime.

## CONCLUSION

When selecting a process pump for low-viscosity liquids, liquids near their boiling point, or those applications with poor suction conditions, operators have great options with regenerative turbine and side-channel pumps. Both technologies will get the job done effectively and neither will struggle to pump those substances like other pump technologies do.

However, if operators want to get the most efficient and effective pump technology for these types of applications, then the regenerative turbine pump serves as the best choice. It features a simple, single-



impeller design with a compact footprint and low power consumption. Operators can handle all maintenance concerns with minimal tools and without taking the motor or the pump itself offline. Removing the front cover of the pump also provides full access to its interior.

While both pumps function exceptionally well in the field, regenerative turbine pumps hold an edge over side-channel pumps. They can reach the same performance metrics in half the size and complexity, with less downtime for maintenance while also providing power-consumption savings. Operators can get the job done with either pump, but will enjoy more benefits with a regenerative turbine pump, resulting in an optimized pumping system that features difficult-to-handle near-gas liquids or those near their boiling point. ■



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Livetec's RF LiveGEN Generator, with the Watson-Marlow 400RXMD as part of the irrigation pump (left).

# WHEN PRECISION MATTERS MOST

## *400RXMD plays a key role in cardiac ablation system*

BY CLAIRE HUTCHISON, WATSON-MARLOW FLUID TECHNOLOGY SOLUTIONS

Medical device manufacturers Livetec and OSYPKA are using a 400RXMD peristaltic pump from Watson-Marlow Fluid Technology Solutions (WMFTS) as part of a cardiac ablation system for its high reliability and ease of operation.

The OEM pump is specifically designed for surgical ablation systems with simple integration (which reduces time and cost associated with extended installation), low noise levels and precise control. The 400RXMD is

available with DriveSure which integrates motor, mounting and supports Industrial Ethernet as well as analogue protocols.

### RELIABLE AND EASY OPERATION

Livetec's products include temporary cardiac pacemakers, wireless long-term electrocardiogram (ECG) Holter systems, low-level laser devices or a long-term ECG for heart attack and stroke prevention. The Lörrach, Germany-based company's medical technology products are sold either

directly under its own brand name Livetec® or as a white label under the brands of many established manufacturers. Sometimes it is both, as in the case of RF LiveGEN Generator for high-frequency catheter ablation, which is available on the market under both its own brand and as HAT500 RF ablation system from OSYPKA, a pioneer of RF (radiofrequency) ablation and manufacturer of reliable, high quality medical devices.

"This system, a Class IIb medical device, uses our development

experience and the extensive application experience of OSYPKA," explains Michael Schirmeier, managing director of Livetec.

Radiofrequency catheter ablation can be used to efficiently treat cardiac arrhythmias (irregular heartbeat) directly on the heart. During treatment, radiofrequency energy (500 kHz) is transmitted to the treatment site via a catheter inserted through a vein under X-ray control.

### FLUSHING AND COOLING THE CATHETER

The ablation system developed by Livetec and OSYPKA consists of the RF generator, a remote-control unit and an irrigation pump for flushing and cooling the catheter during cooled ablation procedures. Together, they form a comprehensive system for almost all ablation applications on the human heart. In cooled ablation applications, an irrigation pump conveys a saline solution to the electrode at the tip of the catheter for

better treatment results. The solution is dispensed through tiny irrigation holes in the catheter tip.

RF LiveCOOL (1-60 mL/min), from Livetec, is a low-noise irrigation pump for use with high-frequency ablation generators to perform cooled radiofrequency ablation therapies on the human heart. RF LiveCOOL works with the RF LiveGEN generator to control the flush flow depending on the RF energy output.

The irrigation pump, which is usually mounted directly on the infusion stand, transports the saline solution from an infusion bag or bottle to the tip of the catheter. It has a clear user interface with a high-resolution color touch display for easy operation without lengthy training times. As it is absolutely crucial that no air enters the bloodstream during treatment, the irrigation pump offers permanent detection of air bubbles from 2 µl with automatic stop, as well as vital permanent monitoring and display of pressure and flow rate. The 400RXMD

used in the irrigation pump sucks the saline solution from the infusion bag and conveys it into the catheter via a thin tube.

"Ablation treatments usually take several hours and the pump must provide saline solution continuously during this time, so absolute reliability of all components is of course essential," Schirmeier says. During treatment, any malfunction would lead to a discontinuation of treatment.

"The pump must be easy to operate. Above all, however, it has to overcome the high back pressure caused by very narrow catheter channels with a very small diameter (lumen) in the micrometer range. Despite the high back pressure, it must be possible to control the flow rate absolutely precisely at any time, so that the exact volume flow required for the respective treatment step is achieved. The peristaltic pump is one of the central components in the system and must provide absolute

# FLOW OPTIMIZATION SECOND TO NONE

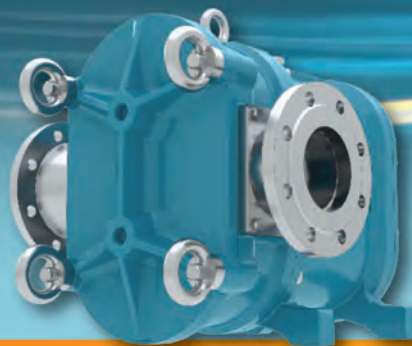
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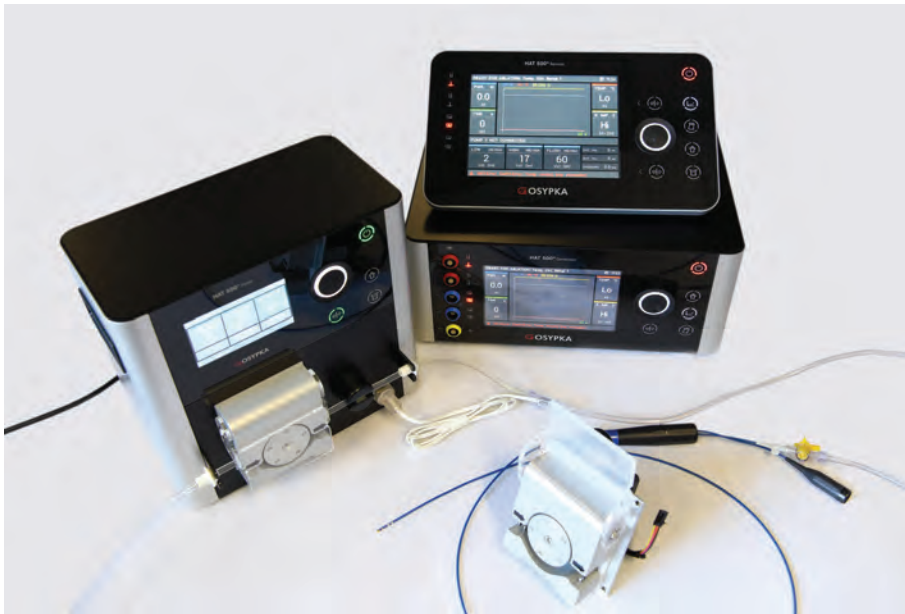
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The HAT500 RF ablation system from OSYPKA, showing the Watson-Marlow 400RXMD from WMFTS in the foreground and as part of the irrigation pump (left).

reliability over several years and many treatments.”

**MINIMIZING RISK**

The 400RXMD OEM pump offers flow rates of up to 500 mL/min and a pressure of up to 9 bar, so it can handle the high back pressure present in ablation applications.

Schirmeier adds, “During operation, the pump has to deliver three different flows. The most challenging is certainly the flush

flow at the start of the treatment, which ensures that there is no more air in the tubes. Depending on the catheter, the pump must perform up to 80 mL/min while the catheter is connected to the tubing-set. This results in high back pressures of up to 5 bar through the narrow catheter channels or irrigation holes. But the pump is easily able to overcome the back pressure without exceeding the pressure limits that could damage the catheter.

“None of the other pumps we tested could deliver similar delivery rates and they were not as good in terms of mechanical compatibility as the Watson-Marlow 400RXMD. The pump and drive can be installed easily in the overall system of the irrigation pump.”

The 400RXMD is designed to meet the needs of catheter, cannula or needle cooling applications and minimizes the risk of human error. Hose clamps in the pump head ensure the tubing is automatically positioned correctly each time the pump head cover is closed.

Depending on the application requirements, the 400RXMD can be customized to the application requirements. For example, the 400RXMD used as part of the irrigation pump system has five rollers. This reduces pulsation, reducing noise and the risk of electrically induced interference on the intracardiac ECG (“ECG noise”) that is transmitted through the catheters, according to Livetec.

Schirmeier adds, “The ablation systems from Livetec and OSYPKA have been on the market for more than five years, with a total of several hundred devices in use. Until now, there have been no complaints due to wear due to a pump. All are still working smoothly!” ■



Irrigation pumps from Livetec and OSYPKA, part of their cardiac ablation system, showing the Watson-Marlow 400RXMD.

Watson-Marlow Fluid Technology Solutions (WMFTS) is a world leader in manufacturing niche peristaltic pumps and associated fluid path technologies for the life sciences and process industries. WMFTS is a wholly owned subsidiary of Spirax-Sarco Engineering plc, with operations in forty-three countries. For more information, visit [www.wmfts.com](http://www.wmfts.com).



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# COMING THROUGH IN THE CLUTCH

*Oil shear technology brakes ideal for incline conveyor applications*

BY TONY STONER, FORCE CONTROL INDUSTRIES



Across a number of markets, for commercial, municipal, or industrial uses, incline and standard conveyors need to perform under demanding conditions with reliability and precision. Any component that can make these conditions more tolerable and predictable is a boon to operators. One such component—Force Control Industries' Posidyne® X-Class clutch brakes—is ideal for incline conveyor applications because they provide precise positioning each cycle, they act as a holding brake so that materials never slide backward on the incline, they are oil filled and sealed so they do not rust, and they do so without maintenance or adjustment.

Posidyne X-Class clutch brakes allow higher cycle rates (as high as 300 cycles per minute), and unparalleled service life (20 to 40 million cycles) to increase production rates with lower downtime. With



improved speed and precision, the value engineered X-Class clutch brakes allow machine designers to run at higher cycle rates and quality levels. In addition to their use on incline and standard conveyors, they are ideal for many OEM applications including packaging machinery, food processing, meat packing, dynamite/gunpowder processing, production machinery, extruder cut-offs, palletizers, feeders, inserters, loaders, cut-offs, fillers, and more.

## WHY DRY CLUTCH BRAKES FAIL

While standard dry clutch brakes use a sacrificial wear surface that abrades and wears over time. That elongates the engagement time, thus requiring maintenance and adjustment to bring the plates closer together. High heat buildup causes the wear plate to glaze and can prevent it from holding the inclined load. When that happens whatever is loaded onto the conveyor slides backward until gravity takes its toll and the material typically ends up on the floor.

The maintenance, adjustments, and replacement of dry clutch brakes causes downtime—and higher scrap rates. Because they are typically not sealed, the high humidity and frequent washdowns required in food and beverage processing applications cause the internal components of dry clutch

brakes to rust, requiring maintenance or replacement.

## WHY OIL SHEAR WORKS

Posidyne X-Class clutch brakes feature oil shear technology, which is the reason that they last up to ten times longer than standard dry friction brakes and do not need maintenance, adjustment, or disc replacement. Unique oil shear technology provides a film of transmission fluid between the brake disc and the drive plate. As the fluid is compressed, the fluid molecules in shear transmit torque to the other side. This torque transmission causes the two components to reach the same relative speed. 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 and maintenance—and prolongs the service life. In addition to transmitting torque, a patented fluid recirculation system helps to dissipate the heat from the friction surface to the housing where it is cooled. The inability of the dry friction units to dissipate the heat out of the friction material is a major cause of wear and friction material breakdown.

Along with heat removal and torque transmission, the fluid serves to continually lubricate all components of the oil shear units, so that they do not rust. This significantly increasing their service life, especially in the

high humidity levels often seen in food processing plants. Nickel-plated components stand up to the caustics used in the frequent pressure washing, to further elongate service life.

### INNOVATIVE DESIGN

The Posidyne X-Class features an innovative Split Clamped Quill feature, which reduces shaft and key/keyway damage to the motor shaft associated with competitive clutch/brakes. The split quill collar tightens the quill 360 degrees around the shaft and key for superior connection.

Convenient options such as foot mounting kits, manifold mounted valves and optical encoders with closed loop positioning controls are available to fit most applications. The totally enclosed Posidyne X-Class is impervious to dust, dirt, chips, and other elements. With a washdown or marine duty option they are resistant to chemicals, coolants, caustic wash down, weather, and more, making

them ideal for hostile environments,

All Posidyne clutch brakes are designed with low inertia cycling components. This makes them even more efficient, requiring less motor horsepower to accelerate the load, and less torque to stop the load. By reducing the motors' high inrush currents and the associated power factor imbalance, these unique clutch/brakes can provide significant energy savings in 24/7 manufacturing demands.

A simple actuation system allows torque in the clutch and brake to be precisely controlled through air. Adjustment for rapid or soft starts and stops is easily accomplished. Manifold mounted control valves reduce response times by eliminating hoses and fittings while providing a space efficient design.

The Posidyne X Class clutch brake is not a servo; however, it can often be used where the highest servo performance or complexity is not

required, but performance beyond that of an ordinary clutch brake is. The Posidyne X-Class cycles faster, stops more accurately, and provides years of trouble-free service—without the need for a servo expert on staff. ■

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](mailto:sales@forcecontrol.com), or visit [www.forcecontrol.com](http://www.forcecontrol.com).

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# ENERGY AUDITS GET RESULTS

## ABB and CERN identify savings in heating and ventilation motors



**A**BB and CERN, the European Laboratory for Particle Physics, have identified significant energy-saving potential through a strategic research partnership focused on the cooling and ventilation system at one of the world's leading laboratories for particle physics institutes, located in Geneva, Switzerland. The study included energy efficiency audits which have helped to identify a savings potential of 17.4 percent across a fleet of 800 motors. Below, Erich Labuda, president of the motion services division at ABB, and Giovanni Anelli, head of the knowledge transfer group at CERN, discuss their findings' implications.

**MPT:** *How did this partnership come about?*

**GIOVANNI ANELLI:** The collaboration with ABB was set up with the aim of optimizing the laboratory's cooling and ventilation infrastructure to reduce its energy consumption and is in line with CERN's commitment to minimize its environmental footprint as well as to share the findings publicly for the greater impact on society.

**ERICH LABUDA:** We are proud to cooperate with CERN and support its ambition to conduct physics research with a low-carbon footprint, by helping them to achieve more energy-efficient operations of their cooling and ventilation systems.

**MPT:** *What made CERN the right place to run this project?*

**ERICH LABUDA:** This research project represents another step in CERN's energy efficiency journey. As an institution with a large installed base of motors, working with CERN is a great example of how we can support in making a big impact in improving energy efficiency as part of the transition to a low-carbon society. Cooling and ventilation systems are a fantastic first place to look for energy efficiency upgrades. This is because they are often oversized, being specified to operate at a maximum load way above the average. In fact, we found one pump motor at CERN with an energy-saving potential of 64 percent. It is also important to not just evaluate motor efficiency, but the system as a whole—including the fans, condensers, and cooling towers. This holistic approach supports the improvement of CERN's overall energy efficiency and reliability.

**MPT:** *What were some of the results you discovered? How did you assess your data?*

**GIOVANNI ANELLI:** The research, conducted between 2022 and 2023, saw the partners developing a roadmap for reducing the energy consumption of the site's cooling and ventilation system via data-driven energy efficiency audits. It has identified potential annual energy savings of up to 31 gigawatt-hours. If achieved, these savings could be enough to power more than 18,000 European households and could avoid 4 kilotons of carbon-dioxide emissions, the same as planting over 420,000 trees.

**ERICH LABUDA:** Energy efficiency audits work by evaluating the performance and efficiency of motors based on their operational data. Audits help large facilities like CERN to identify the most significant energy saving opportunities across whole fleets of motors. CERN and ABB experts assessed a wide variety of data from motors in various cooling and ventilation applications. They combined data from multiple sources, including digitally-connected motors, CERN's SCADA system, and data gathered directly from their pumps, piping, and instrumentation. The experts analyzed the efficiency of the whole system to provide insights to pinpoint the motors with the best business case for energy efficiency upgrades.

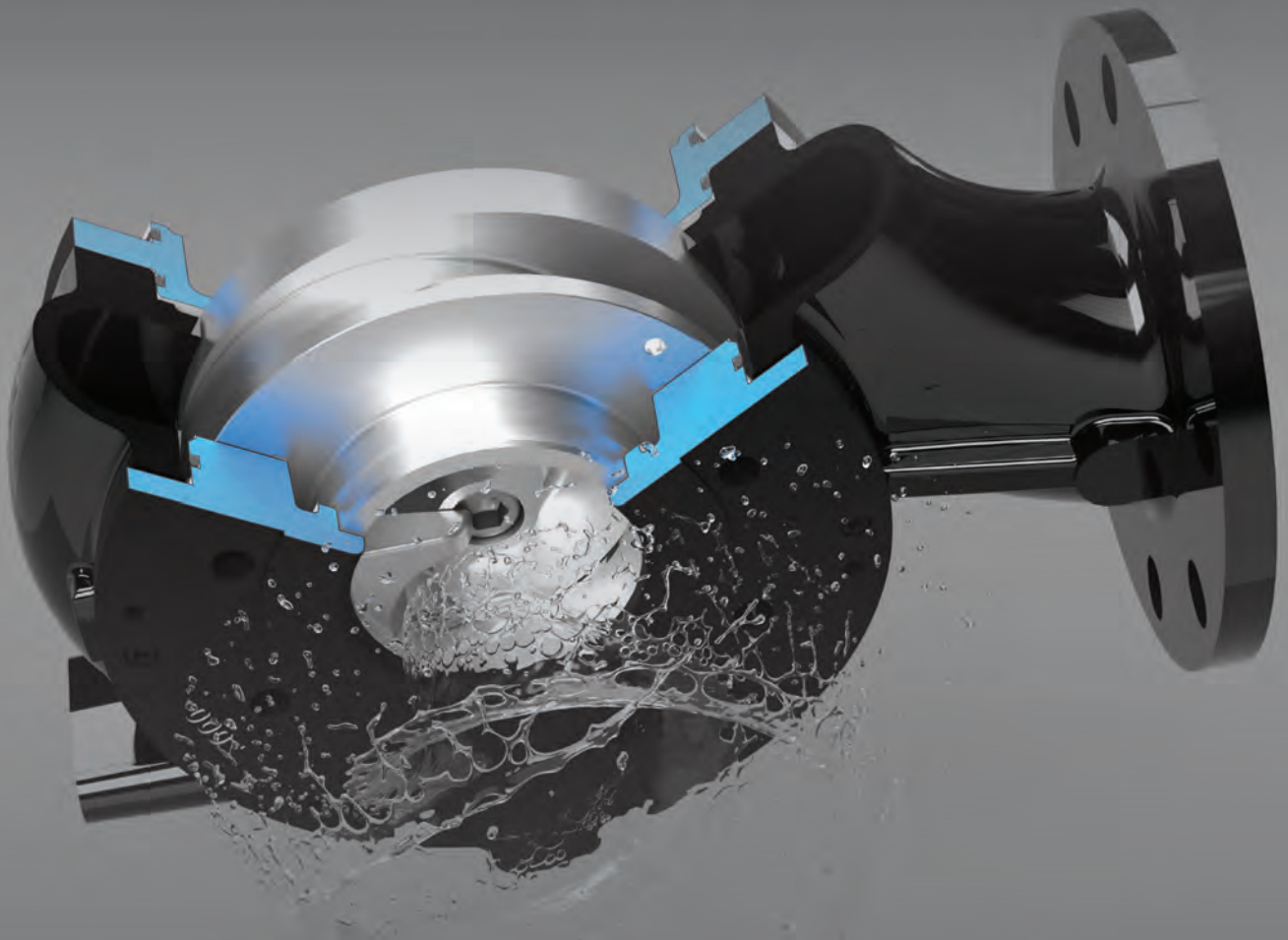
**MPT:** *Are partnerships like this something you'd like to see continue?*

**GIOVANNI ANELLI:** It's a great example of a collaboration where each side brings their own contribution to the table. CERN brings its large-scale infrastructure and ABB contributes with its technology and service expertise. We are very happy with the final result of this research project as we have exceeded our goal of identifying a 10 to 15 percent energy efficiency improvement.

CERN's next step is to create a roadmap for the upgrade of the first motors to the solutions recommended as part of the energy efficiency audit: IE5-rated Synchronous Reluctance Motors (SynRM) operating with variable speed drives (VSDs). These motors will also be digitally connected, enabling condition monitoring solutions to accurately monitor their health and performance to ensure maximum uptime. ■



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