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Europe

processing & control news



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Dear Reader,

Last week I read on a webpage that Cristiano Ronaldo was queuing for gas for one of his luxurious cars for nearly seven hours. Uncharacteristically for our time, there were no pictures available in social media for this "event". If you look a bit deeper into it, you can learn that it was not him personally, but somebody working for him who was waiting for fuel – finally unsuccessful.



What can we learn from this? A supply chain working properly and uninterrupted is important on both sides, not only getting raw materials to the plant but also distributing your final product to your customers.

We are focusing in this issue, as usual, on the production and are introducing products and solutions that help to streamline different aspects in modern production and keep it economically competitive, fulfill regulations and reach other goals, e.g. for sustainability.

The editorial in the **Oil & Gas Special on page 14** will show you how a valve can help to use steam, generated at a solar thermal facility, in the oil recovery process. On page 26 you can learn about the activities in a Spanish tannery to reduce wastewater with the help of an efficient ZLD-system (Zero Liquid Discharge) based on heat exchangers.

I wish you an interesting read and look forward to your feedback.

Editor of PCN Europe

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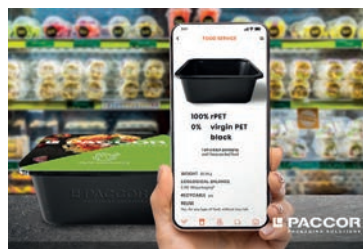
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Cloud Solution for Easier Recycling of Plastic Packaging

Plastic packaging allows food to travel further distances, stay longer on the shelves, and ensures that large amounts of food do not become waste. For PACCOR educating people about the value of plastic and making it easier for consumers to recycle it is one of its main missions. For this reason, PACCOR is introducing a technical solution that will provide all participants in the value chain with worldwide access to PACCOR's product data. PACCOR Cloud Solutions (PCS) is a database which enables recycling. The company's packaging solutions with digital watermarking can be scanned, and specific product information can be read anywhere by using intelligent identification systems. Such a solution offers advantages for all stakeholders involved. Food producers can add food specific information such as filling date and location, nutritional values, etc. Retailers can scan the new, full-surface watermarks faster at the cash registers. Waste management companies can differentiate between food and non-food packaging in the sorting process. End consumers who want to purchase a packaged food product can see the exact characteristics of the packaging and its content by scanning the watermark, which informs not only about the correct recycling route, but also about the food product itself.



Leading-edge Robotics Technology for the Inspection of Petrochemical Storage Tanks



Electrocomponents plc, a global omni-channel provider of product and service solutions, announced that Project nautilUS has entered the validation phase of its highly innovative inspection robotic platform

developed for non-destructive testing (NDT) on storage tanks used in the petrochemical industry. nautilUS 2 is a 12-month extension to the three-year project, enabling it to move forward from the initial phase of development and testing to the delivery of a commercially viable product based on the underlying technology. Field trials are now taking place on 10 water tanks in the United Arab Emirates (UAE) conducted by project partner Sonomatic, a leading oil and gas exploration service provider, which is supplying the NDT sensor and service. Two further consortium partners are providing remote support during this second phase, with project lead Electrocomponents responsible for fulfilling delivery, and InnoTecUK providing the robotics platform. Existing inspection methods often result in storage tanks being taken out of service to be drained and inspected for corrosion, which is hazardous, time consuming and costly work that can be avoided in the future with the new technology.

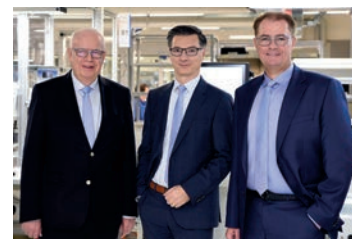
Expansion of Expertise for Smart Mobile Devices

Finland based Aava Mobile Oy joins German based Pepperl+Fuchs Group. All shares of Oulu/Finland based Aava Mobile Oy – specialist for the Design and Manufacturing of latest technology industrial ruggedized smartphones and tablet computers – were sold to Mannheim/Germany based Pepperl+Fuchs Group. "We are delighted to bring our strength in designing next generation industrial smartphones and tablet computers into Pepperl+Fuchs Group and we expect numerous synergies out of this new set-up" said Markus Appel, CEO of Aava Mobile Oy. "Aava competence in designing enterprise mobile devices fits nicely to our Ecom Mobile Communication and Computing Business Unit and gives us access to leading edge design competence" states Dr. Gunther Kegel, CEO of Pepperl+Fuchs SE. Founded in 2009 by wireless experts in Oulu, Finland, Aava Mobile has become a key player in the global enterprise tablet market, holding a leading position in retail services and mobile POS technology.



Confidence Despite Corona

"2021 was a year of restrictions, and even this year we have not yet reached the end of the tunnel with regard to the Corona pandemic," said Managing Director and Partner Bernhard Juchheim, summarizing the situation. He added that JUMO has so far come through the crisis generally unscathed: "The most important message is that although there have been some serious bouts of illness, there have been no fatalities among our approximately 2,400 employees." According to Managing Director Dimitrios Charisiadis, JUMO implemented a consistent hygiene and protection concept worldwide at an early stage, with employee health as the top priority. "But at the same time, since many of our products are needed in critical infrastructures such as the food industry or the pharmaceutical sector, we did everything we could to maintain our ability to deliver." Economically, the Corona pandemic nevertheless left a clear mark: "We ended 2020 with a drop in sales of around 6 percent compared to the previous year. In 2021, we were able to start a race to catch up with above-average order intake and sales figures, but we are currently feeling the global material shortage all the more." Overall, the forecast for the current year is nevertheless positive, he said.



ETHERNET SWITCHES FOR THE FIELD

IP69k protected for temperatures from -25 to 70°C



The new unmanaged 6-port Ethernet switches from **ifm** are suited for TCP/IP-based IIoT applications as well as for all common automation protocols and support the 10Base-T and 100Base-TX transmission standards. Their ports feature M12 connectors, which are much more robust than the commonly used RJ45 and thus

better suited for direct use in the field. The voltage supply is also based on M12 connectors - a daisy-chain version allows several field components to be connected one after another. ifm's IO-Link masters and IO-Link modules, which feature the same housings and connection technologies, can also be daisy-chained. The protection rating of the switches corresponds to IP 67 or IP 69K depending on the design. The units with the higher protection rating feature stainless steel sockets and are also suitable for the food industry, where they can for example withstand daily high-pressure cleaning. With their operating temperature range of -25 °C to 70 °C, a voltage range of DC 8 V to 32 V as well as their high shock and vibration resistance, they can also be used in mobile applications such as mobile machinery. The E20 approval means that they are even suited for use on the outside of vehicles.

▶▶ 61195 at www.pcne.eu

ACCESS POINTS AND WI-FI 6 CLIENT MODULE

Reliable and high-performance wireless connectivity



With a view to the increasing demands posed by digitalization, **Siemens** is expanding its offerings for network components for industrial WLAN solutions: The new Scalance WUM766-1 Client Module is the

first industrial client module on the market that satisfies the latest Wireless LAN Standard IEEE 802.11ax ("Wi-Fi 6"), enabling reliable and high-performance wireless connectivity. At gross data transmission rates of 1201 Mbit/s, the Access Points can link a large number of mobile devices in confined spaces, for example shuttle systems in intra-logistics. The network components can also be used outside of control cabinets, in rail applications and in hazardous areas, thanks to their industry-specific approvals and their compact and robust design with IP65 degree of protection. Specific mobile devices in networks can also be deactivated using a sleep mode function combined with a digital input/output interface. This helps save energy and extend the service life and maintenance cycles of battery powered mobile devices connected via WLAN. The new components will also be equipped with an additional function especially for industry called "iPRP" ("industrial Parallel Redundancy Protocol") for redundant data communication via WLAN, providing highly available wireless communication and maximum availability for critical services.

▶▶ 60826 at www.pcne.eu

ATEX CERTIFIED RUGGED PYROMETERS

Temperature measurement from -40 °C to 2300 °C



Fluke Process Instruments expands its Thermalert 4.0 pyrometer series, adding intrinsically safe models and HART protocol as an additional interface option. The rugged, intelligent and compact infrared

temperature sensors in an IP65-rated stainless-steel housing are easy to connect via 2-wire installation. The series provides a future-proof, Industry-4.0-ready solution for non-contact, automatic, real-time temperature monitoring. Various spectral models cover a large measured temperature range from -40 °C to 2300 °C and all kinds of industrial applications, such as primary and secondary metals, glass and plastics manufacturing. The new intrinsically safe models rated Ex ib now add infrared thermometer options for use in hazardous environments with potentially explosive gas or dust atmospheres (zones 1 and 21). Accordingly, all models are optionally available with an ATEX/IECEx/CCC-IS certification, with the only exception of sensors with plastic lenses. The IR temperature sensors feature galvanically isolated analog and RS485 interfaces. Up to 32 devices can be connected within an RS485 network. All models are also available with connectivity options for Ethernet, EtherNet/IP, PROFINET IO and HART protocol as the latest addition. Voltage can be supplied via Power over Ethernet (PoE).

▶▶ 61018 at www.pcne.eu

PRESSURE GAUGE WITH 4...20 MA OUTPUT

Remote electronic transmission with 2-wire technology



The varied product range of measuring device manufacturer **Lobom** offers the right solution for every challenge - with a wide variety of mechanical and electronic devices for measuring pressure and temperature, as well as a large number of process connections and alternative designs that can be combined as

required. The latest combination option is the mechanical pressure gauge, type series BA44, which can now be used together with the electrical angle-of-rotation sensor, type series PL11. The BA44 with Bourdon tube is a pressure gauge for gaseous, liquid or aggressive media. The case with bayonet ring in nominal size 63 is small and therefore well suited for particularly compact installations or narrow spaces. The case and measuring element are made of stainless steel. Safety features of the case include a blow-out back and solid baffle wall per EN 837-1 S3. Combining the pressure gauge with a PL11 angle-of-rotation sensor enables remote electronic transmission of the measured values via a 4...20 mA output signal with 2-wire technology. The angle-of-rotation sensor can in principle be installed in all our mechanical pressure and temperature gauges. The PL11 has a non-contact and wear-free electronic scanning system with fully encapsulated electronics.

▶▶ 61072 at www.pcne.eu



FLOW METERS WITH REAL-TIME ETHERNET

Versatile interface options for a broad range of markets



Bronkhorst is pleased to present **POWERLINK** as their tenth on-board fieldbus interface option. This strengthens the versatility of their digital flow and pressure meters and controllers, available in both IP40 and IP65 versions. Ethernet **POWERLINK (EPL)** is a patent-free, manufacturer-

independent and completely software-based communication system that delivers real-time performance. Since the fieldbus is based on Ethernet communication, it can be applied with standard Ethernet cabling and support an unlimited number of nodes. With their "multi-bus" concept, the company offers their customers an extensive choice of fieldbus interface options.

▶▶ 61226 at www.pcne.eu

COMPACT DEHUMIDIFICATION SYSTEM

Versatile and energy-efficient system in 20 sizes



The **DSS Pro** from **Munters** represents an evolutionary leap forward from the Munters **DSS** system, with performance upgrades that make a real difference. It will provide users the right climate more

efficiently than ever before. It is suitable for indoor or outdoor installation. Equipped with the Munters custom configured control system, the **DSS Pro** offers full function integration, delivering the perfect climate whenever and wherever it's needed. It comes in twenty configurable sizes with three different desiccant rotor types. The **DSS Pro** consumes up to 30% less energy with its **Green PowerPurge™** and when it's time to transition to renewable energy the **DSS Pro** is ready for a seamless switch.

▶▶ 61008 at www.pcne.eu

HIGH EFFICIENCY ROTARY LOBE PUMP

Almost pulsation-free pumping with rates up to 110 m³/h



This new high-tech **Nova** range from **Börger** work at pressures up to 12 bar and can also be supplied without casing for **CIP** (Cleaning in Place) and **SIP** (Sterilisation in Place)

applications - or with casing for the pumping of abrasive media containing solids. The newly developed **DIUS** rotors in the flow-optimized pump chamber combined with an optimized pump gear unit ensure perfectly smooth running even at high pressures. The wide sealing surfaces of the screw-profile rotor prevent any backflow of the medium. Whether for quenching, flushing or buffering - the sealing system is adjusted perfectly to the requirements of the pumped medium. This ensures the longest service life and highest productivity.

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SAFE HYGIENIC PRESSURE MEASUREMENT

Digitalised safety with new diaphragm seal system



WIKA developed a new diaphragm seal system that meets the requirements of digitalised sterile processes. The model **DMSU21SA** consists of process transmitter, diaphragm monitoring and works with **HART®7**

protocol. It has approvals for all common hygiene standards and is available in a version with explosion protection. The communication protocol transmits the measured values as well as the alarm signal from the diaphragm monitoring. The patented safety function is based on a double diaphragm with evacuated intermediate space and a pressure switch. In the event of a rupture of the process-side diaphragm, the switch sends an immediate damage message while the second diaphragm continues monitoring.

▶▶ 61012 at www.pcne.eu

WIRELESS TRANSDUCERS FOR PACKAGING

Torque measurement assures correct capping of bottles



Sensor Technology Ltd, which makes **TorqSense** transducers, has worked with many OEMs to develop high precision, high speed capping machines for use in pharmaceutical plants and a range of other applications. One

of these, **Cap Coder**, an Oxfordshire neighbour of **Sensor Technology**, incorporates **TorqSense** units in its **CC1440** and **CC1440T** Bench top **Cap Coder** machines. **TorqSense** is wireless in that it does not need to physically contact the bottle caps or shaft of the torque head it is monitoring. Instead sensing is achieved through a radio frequency link. When in use, if a torque value outside the acceptable range is encountered, an alarm will trigger the capping machine to identify unacceptable product for immediate rejection.

▶▶ 61067 at www.pcne.eu

CANOPEN PRESSURE TRANSMITTER

Communication update for more measurement flexibility



The new digital **23SXc KELLER** pressure transmitter is a version of the tried-and-tested **23SX**, upgraded with the **CANopen** interface.

The performance, robustness and media compatibility of the **23SX** paired with the **CANopen** interface

offers users greater flexibility. **CANopen** is a communication protocol based on **CAN (Controller Area Network)** which is perfect for integrating into a wide range of automation solutions. **CANopen** is defined and standardised in European standard **EN-50325-4**, meaning that there is no longer any need for users to worry about **CAN-specific** details. The transmitter provides a >1,8 kHz sampling rate, all **CiA** transmission rates are supported, they are available with multiple pressure and temperature units.

▶▶ 61121 at www.pcne.eu

Automation With Robotics Increases Chocolate Production

Fixed robots reduce workforce requirements by 20% in a business area with fluctuating production levels.

Formed in 1992, BOLÇI Bolu Chocolate produces over 200 tons of chocolate items each month, with over 800 product varieties and 300 employees. The BOLÇI Bolu factory covers an area of 20,000 square metres, half of which is the production area, warehouses and additional departments.

BOLÇI needed to meet its promise of delivering chocolate products that are 'untouched by human hands'. Omron and Innovas joined forces to commission a line of three Omron robots in the packaging section of the factory's production line, with the aim of enhancing production quality and reducing labour costs.

THE CHALLENGE: IMPROVING PRODUCTION CAPACITY AND EFFICIENCY

Currently exporting to 13 countries, BOLÇI wanted to increase their production capacity

and efficiency, improve its infrastructure and minimise production errors.

Prior to introducing the Omron robots, the chocolates were placed manually into dividers in the packaging area. However, the company faces seasonal variations in demand and as a result, sales fluctuate on a daily basis and production levels need to adjust accordingly. Innovas is one of the leading integrators in the food industry and the system integrator for the project. Before the robots were commissioned, Innovas analysed the filling time for the different dividers that would be used when the line of robots was established. The company also carried out feasibility studies on issues such as whether robots would be a suitable solution for picking and placing the chocolates.

Innovas looked at the production capacity re-

quired and the range of products to be used. Based on the results, the firm developed the robot application in conjunction with Omron while also embracing the importance of BOLÇI developing a culture of working alongside the robots.

OPTING FOR THE IDEAL SOLUTION

The integrator looked for a compact solution for this project with the aim to supply everything from a single channel. Innovas has been using Omron products for many applications over the years, including programmable logic controllers and servo systems, and knew that it could meet the criteria for the project. Omron also has considerable experience in pick and place applications for food products.

The type of products on the production line vary and BOLÇI required the variations to be arranged rapidly in the same style of box. Omron therefore suggested its four-arm Quattro robot, which is compact and has a unique kinematic structure. This model was selected as it due to its speed and flexibility, as well as its ability to cope with the variety of products. Omron subsequently recommended its Pack-Xpert programme, which utilises a wizard-based user interface and meets the needs of applications in the packaging sector.

Omron has brought its innovations, including its robots, together in the form of i-Automation! – a concept based on developing the intelligent, integrated and interactive automation systems of the future. These systems will help manufacturers to achieve higher levels of efficiency, flexibility, safety, integration, quality and connectivity.

The robots pick and place the chocolates into the dividers, saving time and minimising the



Omron also has considerable experience in pick and place applications for food products.





BOLÇI chose the four-arm Quattro robot due to its speed and flexibility, as well as its ability to cope with the variety of products.



As chocolate is a very delicate material, positioning and a precise handling of the product is a must to ensure the shape doesn't deteriorate during the process.

amount of labour required. The three robots work in sync with each other as part of an integrated system that includes visual inspection, safety and the robotic systems. Because chocolate is a very delicate material, it's important that its shape doesn't deteriorate during the process. This requires accurate positioning and a precise handling of the product. The robots determine how many pieces will be put into the system each day and enable a repeatable quality and standard to be achieved. Omron's PackXpert solution is user-friendly, allowing faster and more efficient production to be achieved by providing tasks to personnel that are simple to carry out - even if they have no experience with robotics.

THE BENEFITS: PUTTING THE SOLUTION INTO PRACTICE

How does the new system work in practice? One person places the dividers on the conveyor and another feeds chocolates through the 12 feed channels. There is also a final visual check on the output of chocolates before they are sent to packaging.

The chocolates are brought to the robots via conveyors and a camera system checks their arrangement. If the products are in the wrong position, the robots capture them using a vacuum system and arranges them accordingly. In the packaging area, the three robots place the chocolates into boxes and dividers. BOLÇI has approximately 40 boxes of different sizes

and types. On a user-friendly screen, the operator chooses the boxes to be filled and the appropriate mechanical adjustments are made. The system has four different chocolate feeding entry points for each robot, where up to 12 different chocolates can be stacked in four boxes at the same time.

The new robots have resulted in a 40% increase in production capacity and a 20% workforce saving. They have also enabled BOLÇI to provide shorter deadlines to its customers. In addition, the company has been able to re-route the savings in manpower to non-automated areas of the factory. Ultimately, the system has helped BOLÇI to reach its required production quality standards by minimising production errors and enabling the company to provide quality, hygienic products that are untouched by human hands to its customers.

THE FUTURE: MOVING TOWARDS INDUSTRY 4.0

In the future, BOLÇI plans to increase its production capacity by extending the number of Omron robots it uses on the existing line. The company aims to complete its automation processes by implementing similar projects, with the ultimate objective of becoming a smart factory that can comply with Industry 4.0 principles.

BOLÇI Chocolate Vice Chairman, Deniz Aksoy, comments: "Innovas and the Omron robots met all of our expectations. Due to their meticulous approach during the analysis, we

have increased the efficiency of the line in a short period of time.

"This investment is an important step towards our goal of the transition of our factory to Industry 4.0. Through this project, we have transformed one of our business processes by automating it. This has provided a good start that will help us to apply concepts such as the Internet of Things and Industry 4.0 as we move towards the full automation of all our processes in the future."

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N° 11 - NOVEMBER 2021

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Ruggedised Lenses for Industrial Processes

An interview with Mark Pontin, Managing Director at Resolve Optics Ltd. The company specialises in design, development and manufacture of custom lenses and optical modules.

PCN Europe: What environmental factors require an industrial customer to use a ruggedised rather than a standard lens to monitor a process, and what can happen if they don't?

M. Pontin: Any application that is subject to adverse conditions such as vibration, shock, temperature, pressure, radiation, fluid ingress or a combination of several of these conditions would benefit from a ruggedised lens. Failure to account for the environment and operating conditions in which an optical system is required to work in can result in the system failing or at the very least, severely reduced performance.

PCN Europe: What industrial areas have benefitted from the application-optimised ruggedised lenses you develop?

M. Pontin: In recent years - Resolve Optics has developed several ruggedised lenses for material sorting applications where the lenses have to withstand constant vibration and airborne particulates. In the Nuclear industry we

are a leading supplier of radiation resistant fixed focus and zoom lens for remote inspection of power plant and reprocessing areas. These lenses not only need to withstand high levels of radiation but also at times heat. In a military scenario – operators demand much higher reliability than for commercial products. Resolve Optics MIL-SPEC lenses have much higher life expectancy than regular commercial grade lenses. The defective rate is also extremely low. producing a lens or lens system for military use requires careful consideration of its resistance to vibration, shock, temperature and water ingress in addition to ensuring high reliability and top performance.

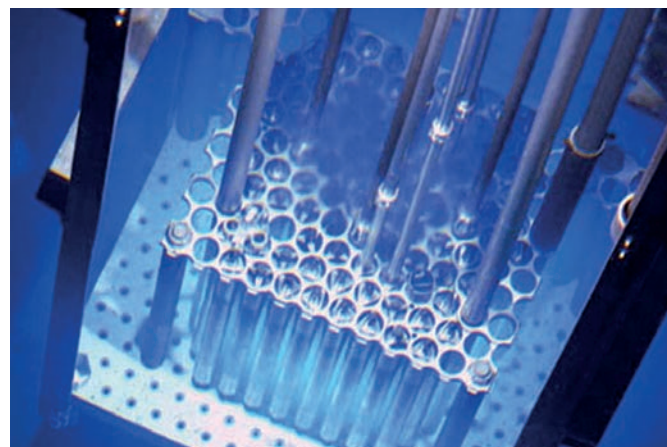
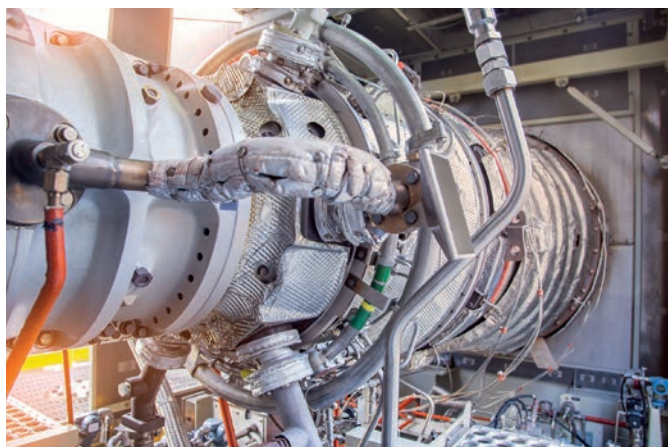
PCN Europe: Can you describe the challenges you were asked to solve in developing an optimised lens for a specific industrial project?

M. Pontin: Resolve Optics has supplied several high temperature Short Wavelength Infra-red (SWIR) endoscopic viewing systems to enable inspection of the blades in a gas turbine



Mark Pontin, Managing Director at Resolve Optics Ltd.

while in operation. For this application we were asked to design an endoscope that could withstand high frequency vibration, heat and pressure. Consequently, we had to develop





Aerial surveillance HD camera incorporating 3 rugged lenses (courtesy: Resolve Optics)

a method of holding the optical elements in place. The securing method had to account for extreme vibration and cope with material expansion due to the high temperatures. The solution used bi-metallic clamp rings that expanded and contracted at an equal rate to the optics and metal housing. This ruggedised construction method has enabled the endoscope to withstand the environment it was required to operate in.

PCN Europe: What are the typical reasons - industrial users choose to move from an off-the-shelf solution to a custom optical design?

M. Pontin: Increasingly we are approached by camera, optical instrument and sensor companies who want to switch to a custom design to ensure their security of supply. Off-the-shelf lenses are a commodity where changes in the market beyond your control can result in the optical component becoming difficult to find or even made obsolete. A custom design lens from Resolve Optics will be available to the

customer for as long as they require the lens. In fact, we have just received and supplied a batch of specialist lenses to a customer who received an order for a 'heritage product' 10 years after receiving their previous order. Other common reasons for adopting a custom design is to achieve better performance and or a longer life cycle as afforded by a lens designed to withstand the harsh environment it is used in.

PCN Europe: You work in a large range of industries but are a market leader in the nuclear industry. What experiences can you bring from this demanding market to help develop optimised optics for other industrial sectors?

M. Pontin: The nuclear market is a highly regulated market where systems integrators and users demand that the lenses they choose are able to work effectively and survive the harsh radioactive conditions. The last thing a nuclear customer wants is for a lens to fail mid-inspection as this would lead to delays and

the significant costs of replacing items that are now contaminated. The nuclear industry requires lenses and optical systems that can withstand cumulative exposure to high levels of radiation and sometimes endure extreme temperatures. Resolve Optics Ltd has decades of experience of developing lenses and optical systems for applications in hazardous or difficult-access nuclear environments. Our team has worked with leading companies in the nuclear industry to provide radiation-resistant, high-performance solutions including fixed focus and zoom non-browning lenses, through-wall endoscopes as well as vision and remote inspection camera systems. Resolve strives to ensure that all our lenses are designed for the environment they must work in and that every lens is manufactured and tested in accordance to our strict assembly instructions.

PCN Europe: As a specialist company, in the market for a long time, what do you see as key optical design trends for improving industrial process measurements in the coming years?

M. Pontin: I see the demand for higher and higher resolution as being the main challenge for improving industrial process measurements in the coming years. To fulfil this trend - sensors have to become larger and the pixels are getting smaller and smaller. I see this as good for the custom design business as commercially available off-the-shelf lenses matched to these demanding optical requirements are extremely limited.

PCN Europe: Thank you for your insights!



SWIR endoscope manufacture by Resolve Optics



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FDT 3.0 and OPC UA

Enabling IT/OT Interoperability in the New Age of Automation

Industrial manufacturing operations are in the early phase of the Fourth Industrial Revolution. This era will be driven not just by data, but also by the intelligence that can be derived from it and applied across the operational landscape of equipment, processes, facilities, and people. Integrating OT and IT systems is an important first step along the path.

By unifying OT and IT systems and practices in a converged system architecture, business-

es can eliminate inefficiencies and barriers to interoperability, improve automation, and accelerate innovation.

FDT'S ROLE IN UNIFYING DATA VISUALIZATION

FDT® technology has long been recognized as a key solution for industrial data integration and interoperability. The recently released FDT 3.0 standard is a completely platform-independent, single-server, cloud-based solution offering the freedom to use innovation to support new and existing manufacturing infrastructure through a smart, connected ecosystem of integrated machines and devices. It is focused on IT/OT integration and interoperability, harmonizing technologies, solutions, and people for today's infrastructure and tomorrow's intelligent enterprise.

FDT 3.0 leverages the power of OPC UA to unify IT/OT data access and visualization for the process, hybrid, and discrete manufacturing markets in an open, standardized, and non-proprietary manner. Its server-based distributed architecture employs a built-in, "pre-wired" OPC UA Server to seamlessly allow access to all device and network information and metadata via any authenticated OPC UA Client or application.

model, from any vendor, and communicate on any network while the FDT Server transparently unifies all the device information and pushes the data to the enterprise for any OPC UA Client. In addition, FDT 3.0's optional support for a Publish-Subscribe (Pub-Sub) communication environment allows for efficient, real-time data monitoring and exchange. FDT Group and OPC Foundation recently updated their collaborative OPC UA companion specification, which merges the IT and OT domains within a universal, server-level Device Information (DI) model and unifies FDT's strength as the standardized, protocol-agnostic, data-centric IIoT platform serving uniform IT/OT device-data to the enterprise.

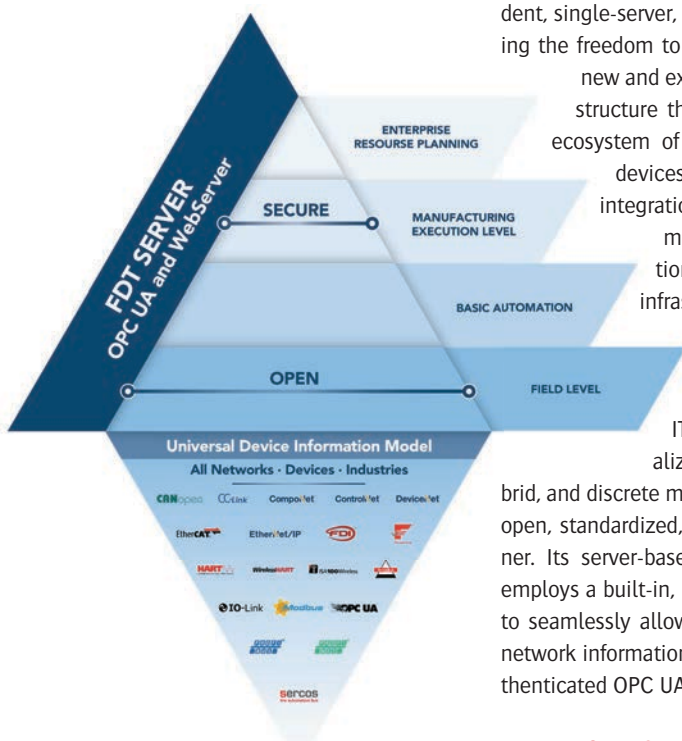
With FDT 3.0, vendors can expose customized parameters of their choosing through FDT's versatile Device Type Manager™ (DTM™) interface. FDT 3.0 DTMs are out-of-the-box OPC UA capable; the DTMs auto-enable OPC UA integration with no additional coding required.

CONCLUSION

Data visualization capabilities with FDT 3.0 technology are closely aligned with the requirements of major end user associations and their recommendations for an open, interoperable automation architecture. Collaborative efforts supporting new FDT 3.0 architectures are another example of technologies, solutions, and people working together to help achieve a brighter future in industrial manufacturing.

www.fdtgroup.org/innovation

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Universal device information model for monitoring and optimization supporting both brownfield and greenfield applications as outlined in the FDT OPC UA companion specification.

ENABLING AN OPEN, INTEROPERABLE ARCHITECTURE

With the FDT 3.0 distributed architecture, automation end users benefit from utmost interoperability – they can freely mix and match any device with any device information





Open Standard for Sensor-to-Cloud Integration



Did you know that all networked devices can be FDT-enabled? It's true. There are millions of them in service around the world. FDT offers secure, seamless, standardized integration and information exchange for the intelligent enterprise.

Now, with FDT 3.0 all that device data is available in a universal, single FDT IIoT Server solution. Imagine an integrated web server mobilizing field device management and a natively integrated OPC UA Server for enterprise real-time device data access.

Empower Innovative Business Models: fdtgroup.org/innovation



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Safe Use in Extreme Applications

AS-Schneider valves are being successfully used at the Amal oilfield in Oman which uses steam generated at the Miraaah solar thermal facility. Steam injection is a common enhanced oil recovery method.

Mature oil fields use enhanced oil recovery (EOR) to boost production. Steam injection is an EOR technique widely used in the Middle East. High temperature steam is injected into the well to heat up the subsurface oil. The oil production from a heated well increases due to the effects of lower viscosity, vaporization and thermal expansion.

Metal-to-metal seated ball valves have traditionally been used for this high temperature application. These valves can be difficult to procure as they are made from special alloys and require a specialized coating process. AS-Schneider offers Double Block and Bleed valves with a bigger bore globe type needle valve. These DBB valves are faster to produce as they do not require special third-party components. AS-Schneider valves are being suc-

cessfully used at the Amal oilfield in Oman, which uses steam generated at the Miraaah solar thermal facility.

STEAM INJECTION AS A COMMON ENHANCED OIL RECOVERY METHOD

Boosting recovery from aging oil fields is a major challenge in oil production. As production starts to taper off, oil companies must employ enhanced oil recovery (EOR) techniques. Using EOR technology, production can be increased to keep the field economically viable. EOR can help extract up to 60% of a reservoir's oil – compared to 40% using primary and secondary extraction methods. In the Middle East, steam injection has been successfully used as an EOR technique for the recovery of heavy viscous oil. Steam is injected into the reservoir to heat up the subsurface oil. The process boosts recovery

due to viscosity reduction, vaporization and thermal expansion of the oil.

TRADITIONAL METHOD OF STEAM GENERATION

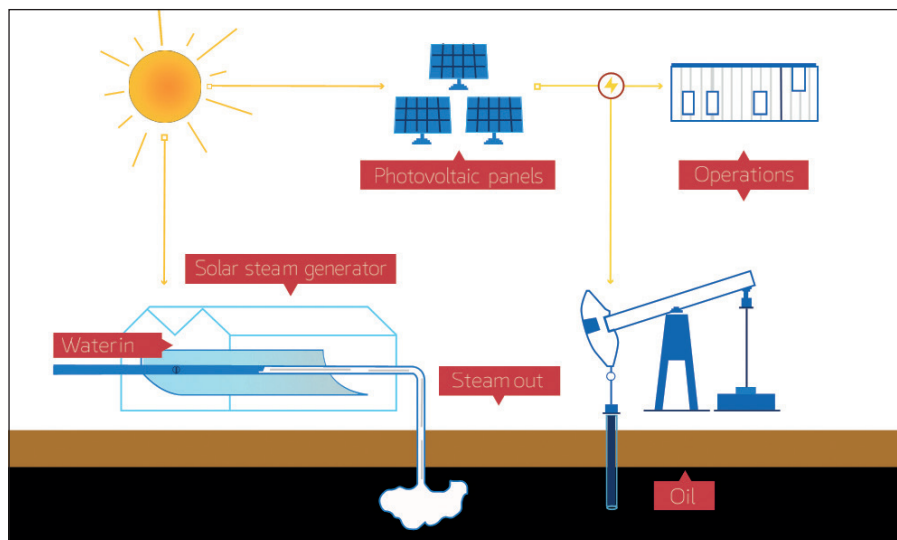
Traditionally, natural gas is burned to produce the EOR process steam. The oil and gas industry, however, is under increasing public and regulatory pressure. Worsening climate change blamed on greenhouse gas emissions from the use of its products. The additional use of fossil fuel, during the extraction process, exacerbates the environmental concerns.

SOLAR THERMAL ENERGY FOR STEAM GENERATION

Solar thermal energy for steam generation is a clean and environment-friendly alternative to burning natural gas. This method uses mirrors to reflect and concentrate solar radiation on to receivers that convert solar energy to heat. The clean energy is then used for the EOR process steam generation. The solar thermal approach not only reduces the carbon footprint of the extraction process but also lowers the cost of extraction. An increasing number of gulf state oil companies are working on replacing natural gas-based steam generation. A solar steam process is part of their environmental agenda.

SOLAR STEAM GENERATOR AT THE MIRAHAH SOLAR PLANT IN OMAN

A prime example is the solar steam generator at the Miraaah Solar Plant in Oman which is one of the largest solar plants in the world. Boasting a solar thermal capacity of 1,021 MW, the plant has a daily steam output of up to 6,000 tons. That translates into annual gas savings of 1.6 TWh and annual CO₂ emission savings of

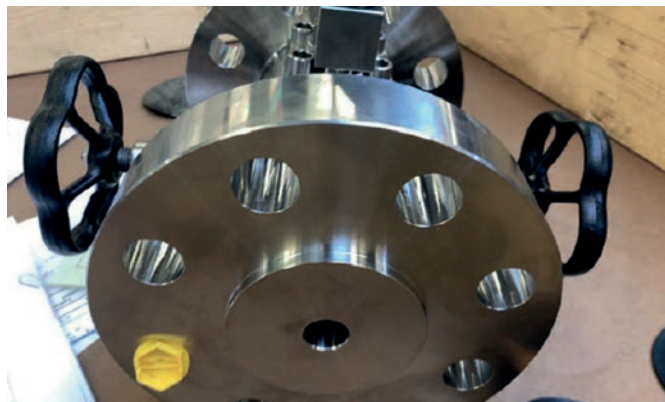


An increasing number of gulf state oil companies are working on replacing natural gas-based steam generation. A solar steam process is part of their environmental agenda.





For high temperature and pressure applications, such as steam EOR, AS-Schneider offers the DCZ series of DBB valves. The valves are designed with a large 14 mm bore, needle type block in DBB configuration that is rated up to 550 C.



The standard rating of AS-Schneider DBB valves is 420 bar but valves can also be produced with a 689 bar rating for high-pressure applications.

300,000 tons. The 6,000 tons of solar steam generated daily at Miraah constitutes a substantial portion of the EOR steam requirements at the Amal oilfield operated by Petroleum Development Oman (PDO). The steam EOR increases the well productivity at Amal by 300%.

HIGH TEMPERATURE REQUIREMENTS FOR STEAM INJECTION

The design temperature for steam injection wells is typically in excess of 400° C. At these high temperatures, the hardness of the valve material is reduced and its fatigue-resistance is compromised. Small cracks may appear which can propagate across the section causing failure. Valves with O-rings and thermoplastic seals are unsuitable for use in this temperature range. High-temperature, high-pressure applications demand that valves have a specialized design and construction.

Metal-to-metal seated ball valves, with a large

bore and fire safe graphite sealing, are generally used as isolation valves in steam EOR application. These valves are constructed from special alloys and are protected with a heat, corrosion and wear-resistant coating/cladding, applied using a specialized process. Some valve manufacturers can take several weeks to supply such valves. A ball-set (ball + seat) must be ordered from third-party suppliers. In the event of an unplanned shutdown, procurement and replacement of these special purpose valves can become a challenge for the maintenance team. The cost of using these valves can be high both, in terms of the procurement cost, and the production loss suffered while waiting for a replacement to arrive.

HIGH TEMPERATURE DOUBLE BLOCK AND BLEED VALVES FOR STEAM INJECTION

Maintenance and safety protocols demand periodic service and replacement of critical

valves. In steam injection wells, pressure transmitter/pressure gauge (PT/PG) isolation valves are of critical importance. Based on customer demand, AS-Schneider has developed a bigger bore globe type needle valve in Double Block and Bleed (DBB) configuration that is ideally suited to this application.

HIGH TEMPERATURE DCZ SERIES OF DBB VALVES

For high temperature and pressure applications, such as steam EOR, AS-Schneider offers the DCZ series of DBB valves. The valves are designed with a large 14 mm bore, needle type block in DBB configuration that is rated up to 550° C. It is a compact and tough design built to last in extreme applications. The innovative design of the valve head allows smooth low-torque operation and gives the valve a long service life. The standard rating of AS-Schneider DBB valves is 420 bar but valves can also be produced with a 689 bar rating for high-pressure applications.

DCZ SERIES CONTAINS MONOFLANGE AND DUAL FLANGE MODELS

The series contains monoflange and dual flange models with specialized process and instrument designs. The valves are readily available from the company as they are faster to produce and do not require special third-party components.

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USAGE OF DBB VALVES

DBB valves are used for controlling process flow to allow for maintenance, sampling, and flow diversion. A DBB valve has two seating surfaces which isolate pressure at each end. It includes a provision for venting/bleeding the cavity between the two seats. In addition to providing safety against pressure at both upstream and downstream ends, DBB valves help isolate instrumentation such as pressure indicators and lever gauges. They help prevent product contamination, allow removal of instruments for calibration, cleaning or repair, and simplify product sampling. The bleed valve is used to relieve pressure which can build up due to thermal expansion of the fluid in the cavity. It helps prevent over pressure which can lead to leakage or rupture.



Delivering the IoT to the Oil and Gas Industry

Keeping a critical infrastructure running – The challenge of covering the last mile to service an oil rig

Oil rigs and platforms are the pinnacle of the IoT: literally everything needs to be monitored - from weather conditions and temperatures to oil pressure, movement of the platform itself as well as the status of the various systems on board. Without all these parameters being meticulously monitored 24/7 it is impossible to keep an oil rig running. Any downtime in the oil and gas industry in general and particularly on an oil rig or platform is extremely expensive. And not only that – it is also life-threatening. Which is why IoT availability is even more essential in this very industry than in others. The loss of turnover per day in case of an average sized oil rig or platform being down amounts to around eight Million US Dollars.

SPECIAL TRAINING AND KNOW-HOW TO KEEP A CRITICAL INFRASTRUCTURE RUNNING

With over 20 years of experience in IT infrastructure service and as an expert for IoT ser-

vice, Hemmersbach delivers last mile IoT services, including particularly difficult settings such as in the oil and gas industry, on a global scale. In Norway for example, Hemmersbach has around 30 specially trained technicians who together comprise a massive amount of experience. Those technicians service approx. 40 oil platforms and 35 rigs off the Norwegian coast, taking care of everything from installing, maintaining, and servicing the various IoT sensors that measure temperatures, pressure, movement, and other critical parameters that are vital for keeping an oil rig or platform running and allowing the staff on board to do their job. They do that on regular shifts, but also ad hoc in case something breaks down. “We can have a technician in place on an oil rig within a day – provided weather conditions allow us to fly the technician from mainland Norway out onto the rig in the North Sea”, said Line Sundet, Area Manager Nordics at Hemmersbach. “Given

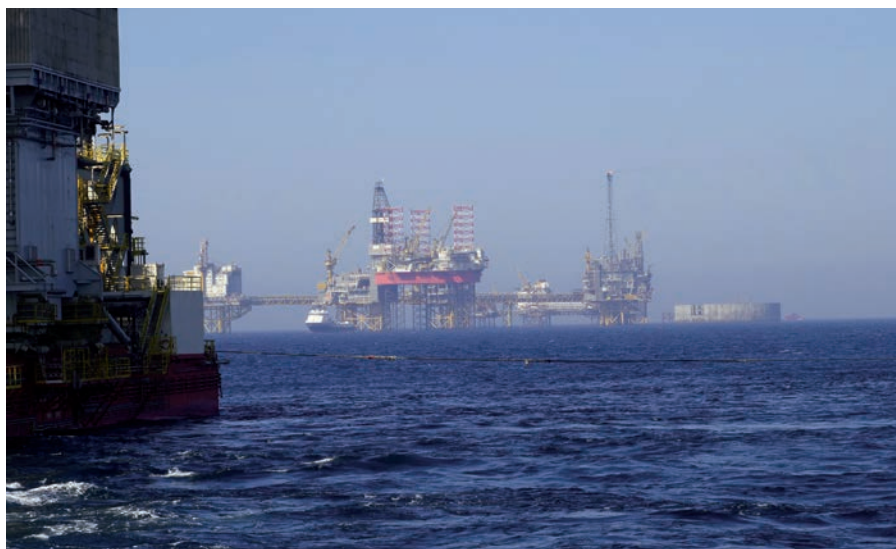
the logistical challenges of having to arrange for a helicopter ride, this is world class.”

Well-trained technicians and a perfect dispatch organization are key. Yet another essential aspect of being able to deliver the IoT to the world’s most remote locations is a standardized, global process to meet specific needs such as those of the oil and gas industry: speed, reliability of service as well as compliance and safety. Hemmersbach technicians play a crucial role in keeping the world’s most critical infrastructures running – day and night.

DELIVERING THE IOT UNDER SPECIAL CONDITIONS

Challenges when it comes to servicing an oil rig’s or platform’s IoT systems are enormous and by far not only of technological nature. The technical staff that are being sent out to oil rigs and platforms in the Norwegian territory of the North Sea (but also to any other oil rig and platform worldwide) need to fulfill strict requirements regarding their health and even their mental conditions. Before going on their first field service operation the technicians also complete a special training preparing them to work under severe conditions on an oil platform, e. g. heavy storms and torrential rain but also for the mental challenges of not being able to leave the rig or platform in time due to bad weather.

“To tell you the truth it takes a certain type of personality to do this job. Because not only physical but also mental strength is very important when working on an oil rig or platform”, Sundet explains. “It starts with the fact that rappelling down from a helicopter is not for everyone. However, this is sometimes necessary because oil rigs – other than platforms – are





Quelle: iStock.com/Igor-Kardasov

their experience and know-how in IoT infrastructure services in not only very remote areas but also in parts of the world that are notorious for their weather or geographical extremes. Standardized processes that are applied in all parts of the world help them fulfill the regulatory and compliance requirements, for example in the oil and gas industry. The longstanding experience in servicing the sector's IoT equipment globally helps to quickly adopt new regulations and compliance requirements regardless of the oil rig or platform being in the North Sea, off the coast of Brazil or Nigeria. On behalf of leading IoT providers, Hemmersbach and its technicians are a key partner for the oil and gas sector – thereby performing a service that is vital to one of the most essential industries globally. However, the technicians at Hemmersbach do not only service the oil and gas sector but also numerous industries globally with their ability to enable the usage of IoT and its vast benefits for any business anywhere in the world.

floating in the sea and therefore have no landing pit. And there is also a quite human aspect to it: Since not only the flight to but also from the rig back depends upon the weather conditions it is not always a certainty for the technicians to get back in time. We've had technicians who were forced to spend Christmas on

one of the oil rigs with their families desperately waiting for them to come home."

STANDARDIZED PROCESSES MEET THE NEEDS OF THE INDUSTRY

Regarding the obvious logistical challenges, Hemmersbach technicians can fully rely on

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TEMPERATURE MEASUREMENT FOR TANKS

Precision for custody transfer and inventory control



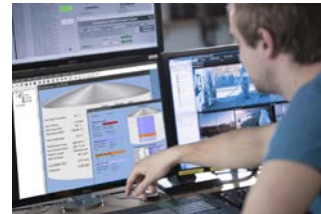
Endress+Hauser is launching a new multi-point average temperature device. Thanks to its increased number of measuring points, it provides a high level of accuracy. The combination of an easy installation and a redundant sensor set up enables a higher process uptime. Measuring the average temperature of a product inside a tank is important for precise asset management. Temperature

compensation largely contributes to volume calculation and correction. Industries like the oil and gas, the petrochemical, or food and beverages utilize average temperature to quantify their products for loss control, overall cost saving, and safe operations. The Prothermo NMT81 offers precise asset management by measuring with up to 24 resistance temperature detectors (RTDs) inside liquids or vapors. Thereby it offers more measuring points than any comparable device on the market. It also provides the possibility to install up to 12 redundant RTDs on measuring points. The combination of this redundancy and an enhanced software algorithm increases productivity as the downtime for maintenance can be reduced greatly. An increased lifetime in wet applications can be achieved through process parts made of the corrosion resistant material SUS316L. With its waterproof and dust-proof housing, the NMT81 is also protected against external influences.

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INVENTORY MANAGEMENT SOFTWARE

Added roll-over prediction in inventory software



Emerson has enhanced its Rosemount™ TankMaster inventory management software package to help optimise tank usage and increase safety in full containment storage tanks for LNG and other liquefied gases.

These tanks are large, complex structures with a typical capacity of up to 200,000 cubic metres, which places specific demands on tank gauging systems. By providing both inventory management and roll-over prediction in a single software solution, TankMaster reduces costs, increases ease-of-use and reduces the risk of a potential accident. Roll-overs are dangerous releases of boil-off vapour that can occur when LNG stratification is left unchecked. The consequences can be severe - including extensive tank damage and the release of large quantities of LNG into the atmosphere. Organisations are therefore required to implement roll-over prediction measures. TankMaster software uses data from level, temperature and density measurement devices incorporated into the Rosemount Tank Gauging System, to detect layering and calculate when a roll-over might occur, enabling operators to take preventative action. This innovation creates various benefits for end users, including lower costs, improved ease-of-use and minimal training needs, which help reduce the risk of an accident due to human error.

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FREE DIGITAL SUBSCRIPTION



Methane Leak Detection System

Reliable leak location for minimization of emissions

Sensirion announced the development of a stationary methane leak detection system – Nubo Sphere. It is designed as a future-proof, end-to-end solution offering high performance at low total cost of ownership, thus changing the state-of-the-art in methane leak detection. It has never been easier to reliably locate and quantify unintended methane emissions across various industries. The deployment of real-time, continuous methane concentration data enables leak detection much earlier than was previously possible through human interaction, ensuring fast, accurate and cost-saving damage control through rapid incident response actions for increased safety and a reduced environmental burden.

REDUCTION OF ANTHROPOGENIC EMISSIONS

Methane (CH_4) concentrations in the atmosphere have increased by more than 150%

since 1750 and are considered a major contributor to global warming. CH_4 has been identified as an even more powerful greenhouse gas than CO_2 , making an immediate reduction of emissions necessary. Given its short-lived nature, there are actionable options that reduce the environmental burden on a short timescale. In the US alone, around 13 million tons of CH_4 are being released into the air each year – enough to heat ten million homes for a year. Studies show, however, that only about 40% of CH_4 in the atmosphere originates from natural sources such as volcanoes or permafrost soils, while the remaining percentage is caused by human activities. Reducing that portion of the total CH_4 emissions has thus become a priority for leading nations across the globe, as only then will it be possible to achieve the goals of climate initiatives like the Paris Agreement. And although anthropogenic

emissions come from a variety of sources, the oil and gas industry represent the energy sector's largest source of emissions, holding the key to responding to the world's climate challenge.

FAST TO INSTALL. EASY TO MAINTAIN

Relying on Sensirion's market-leading environmental and air quality sensing know-how paired with expertise in scaling solutions into high volumes, Sensirion is therefore developing a stationary methane leak detection system, "Nubo Sphere", for use along the whole oil and gas value chain.

It is an end-to-end solution for real-time monitoring of methane emissions, offering high performance at low total cost of ownership.

The compact and robust system design enables reliable and highly accurate data from any natural gas infrastructure at all times via data upload to the Nubo cloud. It is fast to deploy and easy to use, while two exchangeable sensor cartridges ensure low maintenance expenses and provide a future-proof, sustainable set-up. The system follows the concept of plug and play: mount your Nubo Sphere nodes on-site and start measuring within minutes.

"With Nubo Sphere, we enable various industries, including oil and gas, to locate and quantify methane leaks reliably and cost-efficiently. It makes me very proud to provide the oil and gas industry with the right tool to enable its efforts in methane emissions reduction", says Susanne Pianezzi, Sales Director at Sensirion.

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HIGH-PERFORMANCE CONTROLS

Bluetooth remote access with tablet or smartphone



Whether in the water/waste-water or building materials industry, processes can be particularly well monitored and represented with large displays and traffic light warning systems. These help operating staff to quickly grasp even

complex processes and maintain an overview. A new generation of controllers from **VEGA** makes level and pressure measurement and control easier and more efficient. The VEGAMET series are designed to be highly visible and ready to use out of the box. The controllers can be installed inside a switching cabinet, in a front panel or stand-alone in the field. The high-contrast display offers options for a clear, well-arranged visualisation of measurement data. The display is particularly large in relation to the small size of the controller itself, which provides an overview that's really easy to take in - even from a distance and in broad daylight. Via a smartphone or tablet with Bluetooth, users can still access the controller from even further away. In this way, they can parameterise the device remotely and monitor measured values away from hazardous zones. In recent years, the range of tasks controllers have to perform has grown considerably. To meet this challenge, many powerful functions have been packed into the three different housing versions.

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CORROSION-RESISTANT FLOWMETERS

For use with conductive and non-conductive liquids



The new ultrasonic **JUMO** flowTRANS US W01 measures precisely in conductive as well as non-conductive media and is absolutely wear-free. The accuracy is +/- 2 percent of the measured value. An additional temperature sensor is already integrated. Its metal-free housing and the applied

plastic pipe in nominal widths ranging from DN 15 to DN 32 allow it to be used in a flexible manner - even when dealing with corrosive media. The nominal pressures can be up to PN 16 and the medium temperature up to 80 °C. With lower accuracy, even measurements at temperatures of up to 95 °C are possible. It can be easily integrated into existing plants. The IP65 protection type makes the device a flexible partner for a wide variety of processes. Other variants of the JUMO flowTRANS US W offer a significantly extended functional range. Other than the basic features, they have a display and Bluetooth interface. The accuracy is +/- 1 percent of the measured value. Furthermore, pressure can be measured with the more sophisticated versions. An app has also been developed for these devices. One version is available with an IO-Link interface. Another model can be used with the JUMO digiLine system, a smart sensor network for liquid analysis.

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EDGE DAQ SOLUTION FOR IIOT APPLICATIONS

Data acquisition for condition monitoring



ADLINK added new models to the MCM-210 standalone Ethernet DAQ series. MCM-216/218 Ethernet DAQ, based on ARM Cortex-A9 processors with built-in 16 or 8 channel, 16-bit, provide voltage or current input and can function as a standalone edge device without a host PC. The Ethernet DAQ supports edge computing

and includes a built-in web console and RESTful API for periodic machine condition polling. The new models complete the series, which represents a new generation DAQ solution in the market. The ultra-compact models are ideally suited for 24-hour sensor measurement and condition monitoring IIoT (Industrial Internet of Things) applications. Dual daisy-chainable Ethernet ports eliminate additional networking equipment and extend the usable distance, reducing TCO and boosting overall ROI. Successful applications include semiconductor factory digitization, petrochemical plant monitoring, and wafer feeder vacuum pump monitoring. The Ethernet DAQ can perform the tasks of a DAQ system without the complexity and added cost of an embedded system. The MCM-216 /218 models complete the MCM-200 series and provide a full-spectrum solution for factory automation, IIoT, and traditional testing and measurement. The simple, scalable edge device overcomes the challenge of mass deployment for IIoT applications.

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MASS FLOWMETER FOR SMALL QUANTITIES

Accurate measurement of liquids at very low flow rates



The new highly resistant mass flow meters and controllers Type 8756 from **Bürkert** are based on the Coriolis measuring principle, which determines the mass

flow independent of pressure and temperature. Thanks to the extensive measuring/control range and stable zero-point, even the smallest quantities of liquid can be measured, controlled or dosed precisely with highest repeatability. The smallest quantities of substances have to be measured and controlled reliably and precisely for applications in thin film coating technology, test benches, micro reaction technology and the food and beverage industry, for instance when dosing aromas or fragrances. The new mass flow meters and controllers (MFM and MFC Type 8756) are designed for practical application. The measurement is completely independent of the medium and any interference, such as changes to the pressure and temperature. They are characterised by their particularly high flow measuring accuracy of $\pm 0.2\%$ of the measuring range ± 0.0014 kg/h and operate with an extremely high level of repeatability, even at very low flow rates. The sensor is ideal for a flow range up to 25 kg/h for water or media with similar dynamic viscosity and offers an unsurpassed large and fully usable measuring range greater than 1:250. All parts which come into contact with media are made of high-quality stainless steel (AISI 316L).

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Selecting a Gas Detector for Water Treatment Applications

When choosing a gas detector for use in water treatment applications, engineers should focus on simple, efficient, proven products for this challenging marketplace.

As a process, the treatment of wastewater has a number of inherent hazards, namely the generation of flammable and toxic gases such as methane (CH₄) and hydrogen sulphide (H₂S). Furthermore, oxygen (O₂) enrichment and ozone (O₃) can present safety risks if the process requires technologies that use these gases, while for pH control some water treatment plants rely on carbon dioxide (CO₂), which can be toxic and create an oxygen deficiency hazard.

ESSENTIAL PROTECTION

Water treatment plants can protect staff and contractors from the dangers of explosion, intoxication and fire by ensuring portable gas detectors form part of their personal protective equipment (PPE). Indeed, for temporary or mobile use in confined spaces, Teledyne offers a wide range of portable gas detectors designed to meet the requirements of the water/wastewater sector. Of course, many more advantages accrue from combining portable detectors with their fixed counterparts. Fixed gas detectors help deliver the appropriate process automation levels re-

quired to reduce running costs and manage risk with minimal operator intervention.

TECHNOLOGY DECISIONS

Another critical selection decision involves the type of sensor technology, which for gas detection typically centres on electrochemical, semiconductor, infrared (IR) or catalytic.

For water treatment plants that want to monitor O₂ deficiency or enrichment, or the presence of low levels of toxic gases such as H₂S or Cl, electrochemical sensors are the common choice. A popular pick here is the Teledyne DGi-TT7-E intelligent gas detector. This easy-to-use product features an integral daylight-readable alphanumeric display that indicates local status and alarm level.

The selection of semiconductor sensors, which have a longer operating life under harsh operating conditions than their electrochemical counterparts, usually occurs where very high concentrations of H₂S are present, or where ambi-

ent temperature or humidity is high. With its high reactivity, strong signal stability and long operating life, the Teledyne CTX 300 fixed detector for O₂, CO₂ and other toxic gases, is a popular solution.

IR sensors are preferable for the detection of explosive gases such as CH₄ or CO₂, or for very corrosive atmospheres containing high levels of H₂S. Here, detection is based on the fact that each gas absorbs light on a specific wavelength in the infrared spectrum. Notably, the robust nature of IR sensor cells from Teledyne Gas & Flame Detection means they require only one annual maintenance routine. The most common alternative to an IR sensor is a catalytic sensor, which is not as durable but consumes less power. As many water treatment plants are in remote locations and take advantage of solar energy, this factor can prove attractive. Among the Teledyne recommendations here is the DG-TX7 intelligent gas detector, which houses a pair of OXYCOL catalytic sensors.

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ATEX/CID2 CERTIFIED IIOT GATEWAY

DIN-Rail Fanless Device for Hazardous Deployment



Axiomtek is pleased to introduce the IC0300-83M, its ATEX, Class I Division 2 (CID2) certified DIN-rail fanless embedded system for hazardous environments where ignitable concentrations of flammable gases or liquids might exist. It is powered by the Intel Atom® x5-E3930 processor with 8GB DDR3L-1866 RAM. For operation in harsh industrial

environments, the IP40-rated DIN-rail fanless box PC has a wide operating temperature of -40°C to 85°C, 9 to 36 VDC wide voltage input with OVP, UVP, OCP as well as RPP, and up to 3G vibration endurance. The explosion-proof DIN-rail gateway system supports one M.2 Key B 3052 and one full-size PCI Express Mini Card slot for LTE or Wi-Fi modules to ensure superior connectivity for real-time communications. Besides, a half-size PCI Express Mini Card slot and two SIM slots also maximize efficiency. Combining flexible configuration and easy expansion design, the cost-effective IC0300-83M supports an array of functional I/O, including six isolated RS-232/422/485 serial ports, one HDMI port, two USB 3.0 ports, three isolated Gigabit Ethernet ports, one 8-in/8-out DIO port, and five antenna openings for WLAN and WWAN usage. The IC0300-83M is compatible with Windows®10, IoT and Linux.

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HEAVY-DUTY SWITCHES FOR ZONE 1

Switches and belt monitor for safe and reliable shutdown



The **Schmersal Group** have expanded their existing range of switches for heavy industry to include explosion-proof variants that are suitable for use in areas at risk of explosion. The pull-wire emergency switches in the

EX-I-ZQ900 and EX-I-RS655 series as well as the belt misalignment switches in the EX-I-BS655 and EX-T. 454 series can be used in dusty environments in Zone 21 in ignition protection class Ex tb 'Protection by enclosure' or in gas atmospheres in Zone 1 in ignition protection class Ex ib 'Intrinsic safety'. The new versions expand the possible range of applications for these switches: The variants certified for Zone 1 have been designed for applications in which hazardous gases could occur, such as in the chemicals and petrochemical industry as well as in refineries, landfill sites and recycling plants. Switches that are certified for Zone 21 are suitable for areas outside of dust-enclosing containers, such as near to filling and removal points, conveyor belts or HGV dumping points, such as those found in recycling plants, gravel and cement works, thermal power plants and in the metalworking industry. The EX-I-ZQ900 pull-wire emergency switch with single-sided action is used on machines and systems in areas at risk of explosion, where there might be the need to trigger the emergency stop command at any point along the route of the wire.

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FREE DIGITAL SUBSCRIPTION

THE ITALIAN MANUFACTURER OF RUPTURE DISCS



☀ ASME VIII Approved
☀ US Patent Technology
☀ 100% Italian Design



ENSURES THE MAXIMUM PROTECTION AGAINST OVERPRESSURES

☀
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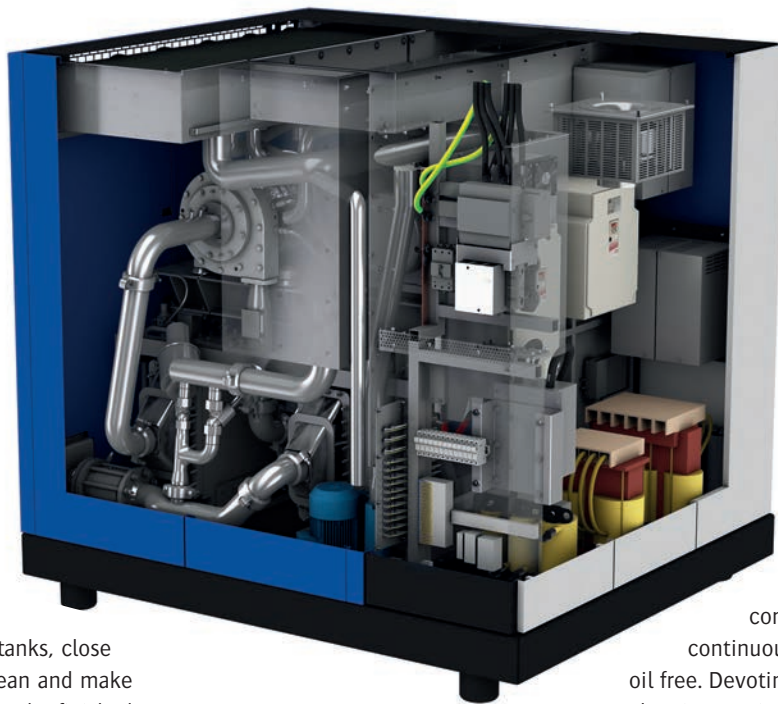
Compressed Air in the Food Industry

Reliable 24/7 access to oil-free compressed air is essential in the food industry. Regardless of the application, all machines must be sanitary to avoid potential contamination.

From the beverage industry to dairy and from eggs to bakeries, a wide variety of food industry companies require access to compressed air for an efficient and product-safe operation. With Sulzer's oil-free turbocompressors, food processing companies can focus on the food, knowing their compressed air is contaminant free for hygienic food products that meet and exceed industry standards.

DAIRY INDUSTRY

The dairy industry relies heavily on compressed air. In addition to clearing out pipes, air is used to agitate raw milk in tanks, close and open pneumatic valves, clean and make product packaging, and palletize the finished products. Because the air interacts heavily with the final product, it is imperative that it is free from contaminants such as oil, water or moisture, bacteria, dust, or other particles. Many of these contaminants can be removed through intensive filtering, and traditional air compressors rely on oil to operate. These types of compressors come with a high risk of oil contamination, regardless of how clean and well maintained they are. Often so called "oil-free" compressors use tens of liters of oil to lubricate the gears, and the only thing protecting the air stream from the oil is a simple seal. This oil seal can leak or deteriorate, resulting in contaminated air and contaminated products. Instead of choosing an oil-injected screw compressor, or even an "oil-free" com-



Sulzer's high-speed HSR turbocompressors do not require oil or any other lubricant because thanks to the active magnetic bearing (AMB) technology, the parts of the machine do not touch.

pressor that requires oil for lubrication, dairy producers may want to consider an entirely oil-free compressor. Sulzer's high-speed HSR turbocompressors do not require oil or any other lubricant because thanks to the active magnetic bearing (AMB) technology, the parts of the machine do not touch.

COMMERCIAL BAKERIES

Baked goods, while delicious, leave crumbs everywhere. To ensure that tools and machines remain crumb-free, many bakeries and baked goods factories use compressed air to clean the processing machines. Beyond cleaning, compressed air is used in many process phases. For example, pneumatic pushers that guide material flows are directly in con-

tact with the end product. Regulation (CFR) Title 21 states that any food manufacturing plant, including bakeries, can only use contaminant-free air. Unfortunately, oil-based

compressors require regular, continuous upkeep to ensure the air is oil free. Devoting time and money to regular cleaning can interrupt the workflow and lower the production rate. Oil filtration needs constant maintenance and surveillance to ensure the lowest possible oil content in compressed air. Heavy filtration causes a pressure drop that forces the compressor to be operated at a higher pressure setpoint, which again increases the energy demand. In Sulzer's oil-free HSR turbocompressors the need for maintenance is minimized. Because the metal parts do not touch, no maintenance of critical components is required. The remote monitoring of the compressors gives an alert when there is a potential problem. The constant monitoring means more uptime because potential issues can be solved before they become problems that could cause downtime.



FRUITS AND VEGETABLES PROCESSING

Compressed air is essential in the packaging of fruits and vegetables. Due to the high cleanliness standards in the food industry, all fruits and vegetables are cleaned before packaging. However, once washed, the products need to be dried before being packed in plastic. Too much moisture can result in premature ripening and the development of mold. Many fruit and vegetable companies use compressed air to dry their products before packaging. Compressed air speeds up the drying process and increases efficiency. When using compressed air on fruits and vegetables, the air must be completely contaminant-free. Legacy technology "oil-free" air compressors have Teflon-coated metal screws to allow for smooth rotation. As the screws wear down, the Teflon coating releases into the machine and the airstream. These particles can be dangerous for the consumer, and the wear quickly deteriorates the efficiency of the compressor. Because the HSR turbocompressors are oil

	"Oil-free" screw compressor	Traditional turbo compressor	HSR
Oil systems	1	1	0
Gears	7	3	0
Oil seals	9	4	0
Bearings (mechanical/journal)	20	7	0

Traditional and "oil-free" compressor comparison.

and touch-free, they do not require Teflon or other non-stick coatings, and this eliminates the possibility of contamination. For fruits and vegetables, air compression is one of the last steps before packaging. Using a fully contaminant-free compressor is healthy and safe. Why choose 100% oil-free compressed air for the food industry?

In addition to being more efficient and ensuring less contamination, a 100% oil-free

compressor is more ecofriendly than oil-run machines. Food companies that focus on sustainable production will appreciate the smaller carbon footprint of the HSR turbocompressors when compared to oil-based machines. The HSR turbocompressors offer significant energy saving possibilities in the form of waste energy recovery as well. With the standard liquid cooling system, it is possible to capture over 90% of the used energy into hot water and reuse it in the process for heating or other needs.

Most compressors waste this energy by blowing it into the atmosphere. Sustainability is not only about reusing materials. It also about choosing long-lasting materials that do not require regular replacement. In the HSR, the metal components do not touch. This means there is little to no wear, and only few replacement parts are needed during the lifetime of the machine. Besides saving money spent on replacement costs, saving the environment, ensuring product safety, boosting production uptime, and fulfilling governmental regulations, the customer will receive smaller energy bills. This is because the HSR turbocompressor is controlled by a variable speed drive to ensure the most energy-efficient air production for varying demands, providing excellent efficiency that does not deteriorate.



From the beverage industry to dairy and from eggs to bakeries, a wide variety of food industry companies require access to compressed air for an efficient and product-safe operation. (Image source: shutterstock_1110863063)

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“We Can Provide New or Alternate Perspectives to Solving Known or Unrecognized Challenges”

Anis Zenadji, one of TimGlobal Media’s editors interviewed Craig M. Carroll, Vice President – Global Marketing & Commercial Strategy at Magnetrol about level measurement technology, challenges faced by the chemical industry, and safety in chemical processes.

PCN Europe: Which kind of contribution does Magnetrol bring to level measurement?

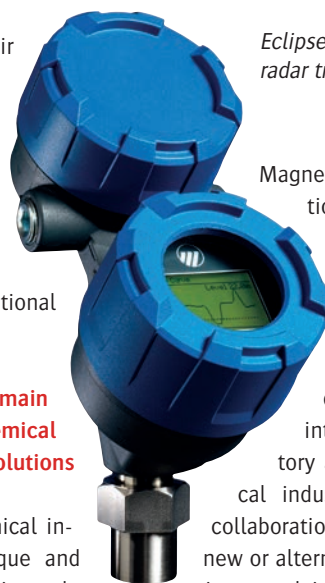
Craig M. Carroll: Magnetrol has been a leader in level measurement and innovation for almost 90 years with industry leading technology in radar level, buoyancy, ultrasonic and thermal dispersion devices. Recognized for industry leading quality and performance, Magnetrol employs a broad portfolio of level technologies along with deep application and process knowledge to help customers find the optimum intersection of technol-

ogy and application for their unique challenges. Trusted globally, engaged locally, Magnetrol’s mission is to provide a world class customer experience by collaborating with customers to provide unique technology insights that drive organizational success.

PCN Europe: What are the main challenges faced in the chemical industry? How can your solutions help confront these issues?

Craig M. Carroll: The Chemical industry is facing some unique and some common challenges in a dynamic and evolving marketplace. Some of these challenges are like many other industries (cost pressures, environmental, governmental, etc.), but the Chemical industry, in particular, is confronting business conditions which are a little more unique. Circular economy pressures, expanded digitalization needs, bespoke manufacturing, feedstock & power price volatility are all driving chemical companies to explore options to optimize their operations. Magnetrol, through best of breed products and technology, can elevate the ability for plants and operators to enhance management of their processes and applications, particularly the most challenging ones such as interface/emulsions.

A Magnetrol service engineer commissioning a Model E3 Modulelevel® displacer level transmitter on site at a petrochemical plant.



Eclipse® Model 706 guided wave radar transmitter

Magnetrol instruments are exceptional in difficult environmental and process conditions, provide great accuracy and measurement in diverse medias and enable better insights through advanced diagnostics and superior user interfaces. Magnetrol’s rich history and experience in the Chemical industry can provide resourceful collaboration with customers by providing new or alternate perspectives to solving known or unrecognized challenges by applying Magnetrol technologies in new and inventive ways.

PCN Europe: What are the main characteristics to take into account when selecting a level measurement technology?

Craig M. Carroll: The reality is that there is not one perfect technology for all level applications. Each and every application, media and process will have individual characteristics which must be considered. Knowing what the end user is trying to understand or



Eclipse® Model 700 guided wave radar transmitter



achieve with the measurement can help provide clarity. Certainly, the big three elements should always be considered: Temperature, Pressure and Media. These alone, in some cases, are enough to allow an informed decision on the right technology.

However, the higher the complexity of the application, the more questions which must be considered and answered in order to arrive at the right instrument. Among many other considerations are the atmosphere at the measurement (agency approvals), the vessel (internal, external, shape, etc.), material compatibility, media reactions (foam, emulsion, turbulence, steam, etc.), measurement range and accuracy. While this is by no means an exhaustive list, Magnetrol, with almost 90 years of experience in providing level instrumentation, has deep application knowledge which we can bring to bear in selecting the best level technology for any given situation.

PCN Europe: What role plays level measurement in the safety and efficiency of chemical processes?

Craig M. Carroll: Level is a critical control function for many batches or automated process operations. Often used in conjunction with other measurements, like temperature, level measurement can minimize the potential for environmental impacts by providing protection of overfills/overflows. This can prevent carry over, which depending on the application, service and media prevent costly and damaging effects. Conversely, ensuring that levels do not get too low in the application is also critical and the correct level device can mitigate that happening, thereby minimizing potential damage to equipment downstream of the vessel. By providing accurate and repeatable level measurements, operators can have processes run more efficiently



Application image of the Eclipse® Model 706. Magnetrol pioneered the first guided wave radar (GWR) level measurement transmitter back in 1998.

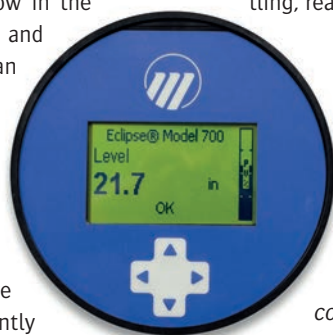
thereby potentially saving power and fuel, which can have significant impact on a plant's profitability as these can be major variable expenses.

Yield is another area where accurate level control can play a part by ensuring that the process is kept at the optimum level for setting, reaction or batching. In addition,

level can be used to control the amount of product that is being introduced into a reaction or application and the accurate control of the amount of media being moved can also impact a plant's financials.

PCN Europe: How can your solutions help comply with the security demands of the end users?

Craig M. Carroll: Magnetrol products can be password protected to ensure that unauthorized access, control and use of the instrument is not possible. Furthermore, by providing precise and reliable level control, the chance of a spill or other unintended event can be mitigated.



Latest guided wave radar (GWR) level transmitter, the Eclipse® Model 700, gives the performance and durability needed to address the biggest challenges in a streamlined, versatile configuration.

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Spanish Tannery Solves Waste Issues With ZLD

Zero liquid discharge (ZLD) is a waste management technique which transforms liquid waste streams from industrial plants into clean water, which can be reused in the process, and a minimal amount of solid residue, which often include valuable by-products. It is particularly useful for industries producing complex wastes which are difficult to treat using traditional techniques.

One such industry is leather processing and tanning where animal skins are transferred into high quality fabric for use in footwear, upholstery, car interiors and other goods. Based in Salinas near Alicante, Boxcapiel is one of Spain's leading leather producers, processing skins from a range of species into high quality leather for a wide variety of end uses. Tightening environmental legislation meant that Boxcapiel's traditional waste disposal techniques were no longer acceptable or economic. The company urgently needed to find a sustainable and alternative waste treat-

ment. Having been made aware of an existing HRS ZLD system in the locality, Boxcapiel asked HRS Heat Exchangers to investigate the feasibility of such a system at its own plant.

STEP ONE: WASTE STREAM ANALYSIS

The effective design of any ZLD system is dependent on the correct analysis of the water/waste stream. It is essential to have accurate estimates of composition, flow rates, chemistry, etc. Without this, any designed solution will fail to deliver the required results. The first step was therefore for HRS to

commission laboratory studies of the waste stream, followed by the use of a pilot plant to test the proposed solution in situ at Boxcapiel.

Using this information, HRS engineers were then able to design the full ZLD evaporation system, based around the proven, patented HRS Unicus Series of reciprocating scraped surface heat exchangers. Traditionally, vapour compression evaporation has been the main method employed for ZLD processing, with evaporation typically recovering around 95 per cent of wastewater as distillate. Any



The HRS ZLD system is based on HRS Unicus Series of scraped surface heat exchangers





The ZLD system installed at Boxcapiel

at a lower boiling point. This way, multiple evaporation stages are combined, and energy savings are obtained.

The HRS ZLD system supplied to Boxcapiel begins by using multi-effect evaporation to concentrate the waste stream, resulting in a solution which containing elevated salt levels very close to the saturation point. This is then cooled to promote the formation of salt crystals. Further crystallisation then occurs in specially designed crystallisation tanks, with separation of the crystals that are formed. A supernatant layer of concentrated solution remains after this stage and is returned to the second evaporator for reprocessing.

Both the evaporation and cooling steps result in a high degree of material fouling on the inside of the equipment, so HRS Unicus Series scraped-surface evaporators are used to maintain thermal efficiency and remove fouling as it occurs in the evaporation process. The result is an efficient process which can work continuously without requiring scheduled downtime.

MEETING STRINGENT REAGULATIONS

The installed ZLD system produces clean water, which is utilised in the tanning process, and a solid residue, which can be disposed of via normal waste management channels, although Boxcapiel are keen to monetise this potentially valuable material.

The use of the HRS ZLD system has enabled Boxcapiel to meet increasingly stringent environmental regulations, improve the sustainability of its operations, and continue to operate profitability as one of the country's leading manufacturers of quality leather materials.

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remaining concentrate is then further treated physically or chemically to produce solid residues (such as crystals) and water. Evaporators used in ZLD systems are often run at lower pressures in order to reduce the boiling point of the liquid being treated.

COMBINED STAGES SAVE ENERGY

Working with a reduced boiling point means that multi-effect evaporation is possible. In multi-effect evaporation, steam from the previous evaporation stage is used as the thermal energy in the next stage which works



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WIRELESS CARBON DIOXIDE MEASUREMENT

Simplified incubator monitoring with compact solution



Vaisala introduces an easy-to-install wireless carbon dioxide measurement solution to simplify incubator monitoring and enable cost savings for customers. The new life science environmental measurement solution combines Vaisala's

carbon dioxide probe GMP251 with Vaisala wireless RFL100 data logger. The new configuration leverages the superior measurement stability and accuracy of the GMP251 probe and provides reliable carbon dioxide percentage measurements for incubators used for example in cell culturing, gene therapy, and vaccine research. The RFL100's CO2 configuration enables a simple, wireless setup that is ideal for incubators in both strictly regulated GxP and less regulated non-GxP applications. Wireless data loggers also eliminate the need for expensive Ethernet connectivity for each data logger. Additionally, the logger has a local display of carbon dioxide data next to the assets. Several measurements can be monitored in a single data logger: CO2 percentage, temperature, and humidity. Along with the GMP251 carbon dioxide probe, other RFL100 compatible probes include Vaisala's TMP115 temperature probe, and the HMP115 and HMP110 temperature and relative humidity probes. All RFL100 data loggers connect to Vaisala's viewLinc software for monitoring, alarms, and reporting.

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DIGITAL SORTERS FOR FOOD PRODUCTS

Different Sensor options for sorting processes



Key Technology introduces their VERYX® 2.0 line of digital sorters. Featuring a new mechanical layout, next-generation LED illumination, enhanced laser scanner technology, new powerful software driven by artificial intelligence (AI) and advances high performance sorting of food products.

VERYX 2.0 eases use, reduces operating costs and improves the accuracy of foreign material (FM) and defect removal to optimize product quality and maximize yield. With the new mechanical layout the belt sorters' architecture houses all utility components within the frame, eliminating the need for an external enclosure. Additional sanitation upgrades further ensure VERYX 2.0 can withstand even the harshest operating environments over long production cycles. Featuring components with up to twice the life expectancy of previous-generation LED lighting, the new LED illumination reduces operating costs and improves sort performance. VERYX 2.0 also introduces Key's enhanced laser scanner technology. New digital receivers produce the highest resolution available while delivering a signal that is more accurate and consistent. As a result the laser scanners create more contrast to better differentiate various types of objects, which enables more precise FM and defect removal while reducing product loss and improving yield.

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PRESERVING THE PURITY OF PROCESS FLUIDS

Flow Meter for Ultra-Pure Water Applications



Designed primarily for ultra-pure water dispensing applications requiring a high degree of cleanliness, clean bore flow measurement devices such as **Titan Enterprises'** Metraflow ultrasonic flowmeter, offer the ideal solution. Ultra-pure water (UPW) systems, require a

selection of technologies and equipment that preserve the purity of materials. It is crucial that any flow measurement device used in UPW systems can cope with low flow rates and are constructed from ultra-pure materials that cannot contaminate the liquids being measured. The Metraflow uses Titan's patented ultrasonic time of flight technology to accurately measure liquid travelling through the clear, single, clean bore measurement flow tube constructed from high performance Perfluoroalkoxy Alkane (PFA) polymer. PFA polymer was chosen specifically as an advanced tubing option for the Metraflow as it offers excellent chemical inertness, is able to withstand damage by dangerous contaminants, prevents accumulation of particles and has an ultra-high grade of purity. Metraflow is non-intrusive with no internal moving parts, designed to precisely monitor process flows at temperatures from 10°C to 60°C (140°F) and pressures up to 27 bar.

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POWER OVER ETHERNET FLOWMETERS

Ethernet connectivity for increased flexibility



ABB has incorporated power supply through Ethernet connectivity on board the latest edition of their electromagnetic flowmeter ProcessMaster and mass flowmeter CoriolisMaster, opening a new chapter in instrumentation and industrial communication. Power over Ethernet (PoE) offers several benefits for process engineers, as it omits the need for a separate DC

power infrastructure, providing power and communications via the same cable. This brings new agility as flowmeters can be installed wherever needed. In addition, ABB 4-wire Ethernet combines classic outputs with future communication protocols. Offering a modular design allows the combination of both worlds and ensures that devices are future-proof, increasing the longevity of the flowmeters. Furthermore, flowmeters with Ethernet connectivity increase simplicity, flexibility and reliability to operations in process automation, while enhancing real-time visibility of data. Previously hidden data in field devices, such as measurement values on density, conductivity or concentration of the medium, can be unlocked. This in turn will help customers across all industries identify redundant measurement points in their plants to achieve savings along the way.

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LABELLING SYSTEM FOR CODES AND RFIDS

Variable labelling for demanding applications



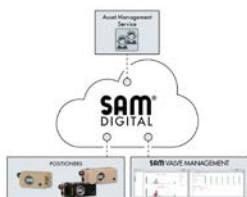
Logopak's labelling system Logomatic 400 T RFID is suitable for 300-dpi direct thermal and thermal transfer printing processes with label widths of between 110 mm and 156 mm. The labels are dispensed cycle-synchronously from rewinding label rolls and thermal transfer ribbons. Even RAIN RFID and hybrid labels can be dispensed from rolls while the labeller's traversing axis system enables variable positioning in X or Y direction. The print data required to

programme and print the labels is transferred in real time via Ethernet, High-Speed-RS232 interface or optionally via a Profibus or Profinet connection. The Logomatic 400 T RFID is available with validation and verification tools, which guarantee the accuracy, safety and readability of printed or programmed data in intralogistics processes and along the supply chain. Different control functions, e.g. error diagnosis, pressure control, indicating maintenance intervals or the end of the label roll (optional function synchronised with the cycle rate), support the user in operating the labelling system. A multilingual touch screen is available upon request. The open design of the main drive allows easy inserting of consumables. The printing units are designed as quick-change systems for uncomplicated and time-saving maintenance or replacement.

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SMART VALVE DIAGNOSTICS

Web-based solution for smart monitoring of control valves



The **SAMSON** software solution **SAM VALVE MANAGEMENT** combines the traditional world of control valves with the digital opportunities made possible by Industry 4.0 and IIoT technologies. For customers, this proves to be true added value. It gives users an overview of all connect-

ed control valves fitted with smart SAMSON positioners in a clearly structured dashboard displaying all relevant operating and diagnostic parameters. Malfunctions can be detected instantly. It also analyzes all data based on an extensive range of algorithms and suggests recommended action with illustrated step-by-step instructions. SAMSON has applied its decade-long expertise in valve engineering and diagnostics to develop rule-based data analytics and web-based support, which also allows maintenance work to be planned in advance. The data in SAM VALVE MANAGEMENT can be synchronized by transferring data from commonly available process control systems or SAMSON's TROVIS-VIEW software. The extensive diagnostic functions provided by the software help increase the availability of control valves by predicting imminent valve failure and maintenance demands and also helps optimize plant profitability. SAMSON's asset management service also provides support in all matters related to SAM VALVE MANAGEMENT.

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MODULAR FEEDING EQUIPMENT

Easy-to-disassemble single- and twin-screw feeders



With ever-smaller lots sizes, faster product changes, and a dense cycle, feeding equipment today must meet many requirements. The developers of the new equipment generation 2.0 at **Brabender Technologie** have taken this into account. The

modular design allows the gearing units on both feeders DSR28 2.0. (single-screw) and DDSR20 2.0 (twin-screw) to be easily and quickly changed and removed and replaced in just a few steps. This flexibility enables the customer to switch between large and small models or from single to twin-screw versions. The screw hopper is located at the front edge of the scale and the screw trough can easily be removed from the front of the feeder to enhance feeder accessibility for cleaning. Screwless connections on the trough, container and lid are helpful here, reinforcing user friendliness. Seal replacement is also much easier - and faster - thanks to the trough, which can be removed from the front of the feeder: a new seal can be inserted within five minutes, with special versions for ATEX, food and pharma, depending on requirements. The newly installed seal change indicator can indicate the need to change seals at an early stage, thus preventing gear and motor damage. In addition, all Generation 2.0 units feature dust-tight vertical outlets made of food-grade, transparent PETG.

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DEEP LEARNING INSPECTION APP

Enabling 2D vision sensors for complex tasks



The **SICK** Intelligent Inspection Deep Learning SensorApp is now available to run directly onboard all InspectorP6xx vision cameras. SICK Intelligent Inspection is available as a

seamless extension to the pre-installed Quality Inspection SensorApp, on all InspectorP6xx cameras. By combining traditional machine vision for quality inspection with a powerful extended Deep Learning capability, Intelligent Inspection opens up opportunities for users to automate challenging inspections that have not been possible previously. Vision classifications using Artificial Intelligence are now simple to set up and run across the entire range of SICK InspectorP6xx vision sensors. The newly launched, ultra-compact InspectorP61x is the smallest vision sensor currently available with Deep Learning running directly onboard, and the Intelligent Inspection capability extends right up to the rugged InspectorP65x with its extra high resolution and extended field of view. Where it has previously been very challenging to achieve consistently robust and repeatable quality inspections, with the SICK Intelligent Inspection SensorApp they can now be mastered with high levels of reliability and availability. Automation is therefore practical and affordable for complex imaging tasks such as classifying objects with slight differences within one class, such as food produce.

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