

10 More Technologies You Shouldn't Miss

Don't stop reading even if you're getting a feeling of déjà vu! We presented a special report in the July issue titled "10 Technologies You Shouldn't Miss," but this is different. This article highlights 10 *more* technologies that we believe you'll want to know about. Each one has an important feature in common with all the others – innovation. These products are cutting-edge technologies that are helping chemical process engineers solve real problems. We hope they'll help at your plant, too.

Hybrid Wiped-Film & Fractionation Systems



This hybrid still technology can safely and efficiently separate extremely heat-sensitive fine chemicals and other substances. The systems combine the gentle evaporating principle of dynamically mixed and transported wiped thin films with the efficient separation capability of fractional columns. The vertical high vacuum, short residence time wiped-film evaporator unit with diagonally slotted rotating wipers allows vaporization of high molecular weight compounds without thermal degradation, while the fractional packed column section provides multiple theoretical equilibrium stages for separation of compounds close in boiling point. Typical examples include purification of edible and essential oils, esters, pharmaceuticals, foods, flavors, polymers, extracts, vitamins, waxes, silicones, specialty fine chemicals, and many others. Systems are available from 1 kg/hr lab bench-top units to pilot and processing plants with feed rates to 1,000 kg/hr. Complete multi-stage turnkey skid-mounted systems are a specialty, and partial systems and components are also available. Short residence time and high vacuum operation provide the highest quality and lowest degradation, plus the process scale-up not possible with other equipment. The systems' versatile design allows configuration for molecular (short-path) distillation, evaporation, or fractionation, plus choice of glass, 316L SS, Hastelloy, or other materials.

Pope Scientific Inc., 262-268-9300, www.popeinc.com

Multi-Variable Level Sensor for Difficult-to-Measure Materials

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The 7230 HT Series digital level sensor provides total level, interface level, up to five temperature readings and a diagnostic function from a single sensor. The unit was designed to measure multiple layers of oil products and gas condensates including water layers and such difficult-to-measure materials as mixed hydrocarbons and low dielectric liquids. The sensor requires no calibration and only one process connection. It uses magnetostrictive position sensing technology with all measurement circuits integrated into a 5/8-in. diameter sensing tube, which eliminates the need for a bulky electronics enclosure and offers a greater number of options for insertion and mounting on tanks or inside vessels. Accuracy is 0.01 percent of measured span, and a reflector increases signal resolution and repeatability to 0.0001 in. The probe's performance is unaffected by changes in the process material's electrical characteristics or densities. The probe and floats are made from 316 stainless steel and mount in a 2-in. NPT process connection using either a flange or adapter bushing. The sensor has an explosion-proof approval rating from FM and CSA for Class 1, Div 1, Group A, B, C, D hazardous locations. Output is Modbus RTU or optional analog.

**Ametek Automation & Process Technologies, 248-435-0700,
www.ametekapt.com**

Gas-Lubricated Universal Vessel Seal for Mixing & Agitating Equipment



Featuring a modular cartridge design, the heavy-duty gas-lubricated 7800 Series universal vessel seal is useful in a wide variety of mixing and agitating equipment as well as other top-entry mixer applications. The unit uses modular hardware,

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allowing for maximum interchangeability and efficiency. This convertible format will support contacting dry, contacting wet, non-contacting, or a combination of non-contacting and dry contacting seal technologies without the need to change any adaptive hardware. The patented grooved rotor allows equal lift in the presence of up to 0.125-in. radial run-out, while the primary ring shape responds under pressure, further enhancing very low speed face separation. Lift-off and the double cartridge use common springs, allowing for seal adjustment to axial motion, and the optimized drive minimizes seal-face-to-seal-cartridge hardware interaction, eliminating low-speed hang-up. Conventional seals wear and therefore deposit debris in the vessel; however, through the elimination of seal lubrication liquid, this series can be configured to avoid wear and debris and, as a result, presents zero potential for batch contamination.

John Crane Inc., 847-967-2400, www.johncrane.com

Digital Metering Pumps Without Complicated Calculations



The Digital Dosing DDI Plus 3 metering pumps boast extreme precision with a digital user interface that allows the setting of the desired dosing feed rate directly on the pump — without complicated calculations beforehand. The unit doses, measures, and self-calibrates by itself. This eliminates the need for additional equipment by combining precision dosing, continuous flow measurement, and setpoint monitoring in a single unit. By using a full stroke length (100 percent) through its entire adjustable range, the unit does not sacrifice accuracy at low feed rates and eliminates potential disruptive factors such as gas buildup, making it a good solution to sodium hypochlorite gas locking problems in low capacity applications. The feed rate can be slowed down to 1/100 of the pump's capacity without loss of accuracy, and the unit can dose additive down to 0.001 gph (0.025 l/h) with precision. For viscous fluids, the suction stroke speed can be slowed to reduce friction losses. Available materials include PVC, PVDF, polypropylene, and 316 stainless steel. Applications include sludge dewatering for chemicals such as anti-scalant, hypo, pH control, flocculants, polymers, etc.

Grundfos Pumps Corp., 913-227-3465, www.grundfos.com

Wireless Network for Industrial Sensing

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The SureCross wireless network is purpose-built from the ground up for industrial sensing applications and offers robust communication ability, proprietary bidirectional RF design, and flexible power options for long-lasting operation in remote or difficult-to-access locations. These features, along with rugged construction built to withstand harsh industrial conditions, make it especially suitable for use in the chemical processing industry. The network can provide continuous monitoring of temperature, humidity, media level, and more with a gateway system controller and one or more remotely located nodes deployed throughout a facility. Thanks to its bidirectional Rx/Tx communications with reliable performance capabilities, the network can protect information during communication interruption or failure by reverting to a configured default output condition. The network automatically returns to normal operational status when the RF link is re-established. This makes it suitable for critical system and tank status monitoring, while the self-contained gateway and nodes, with IP67 enclosures, ensure that the network withstands temperature extremes, dust, moisture, and other industrial hazards. Communications reliability is achieved through FHSS communication protocol plus fully acknowledged data transfer capabilities. In addition, plant operations benefit from the system's ability to monitor processing operations continuously and dictate how these systems will respond if optimal temperature, pressure, or humidity is exceeded. The system offers a choice of line power, solar power, or the company's FlexPower battery module. The network is also easily integrated into existing operations and configurable to solve a wide range of chemical processing applications.

Banner Engineering Corp., 800-809-7043, www.bannerengineering.com

Gamma-Radiation-Resistant RFID Tag

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The GammaTag read/write RFID tag can safely be sterilized by gamma radiation. It provides reliable electronic identification for components used in critical process industries such as pharmaceutical, food and beverage, and bioprocess/biomedical. The tag withstands gamma radiation up to 45 kGy (kilograys) and may also be sterilized using CIP processes. Its read/write ability means that data may be written directly on the tag — unlike read-only bar code labels and RFID tags. In conjunction with a handheld tag reader and software, it allows access to the current status of equipment on the spot by simply aiming the reader toward the tag to recall information or to write new data to the tag. One application example is in the pharmaceutical industry for single-use/disposable process systems consisting of sample and production bags, manifolds, tubing and hose, fittings, clamps, and filters. Tags can be integrated into individual components or attached to a complete system using silicone tape, watchband-style holders, pouches, or lamination. RFID tags are used more and more in clean applications because of their advantages over bar codes and traditional paper records and log books. Tags provide a dependable electronic link to certifications, installation instructions, warning notices, and disposal procedures. However, their options for sterilization in these clean applications have been limited, but the GammaTag addresses this issue by being gamma irradiatable.

**AdvantaPure, NewAge Industries, 888-755-4370,
www.newageindustries.com**

Metering Pumps With 'Pulse-Free' Flow



The Hydra-Cell Metering Solutions P Series pumps meet or exceed API 675 performance standards for accuracy (+1 percent), linearity (+3 percent), and repeatability (+3 percent) while providing virtually "pulse-free" linear flow. Although typical metering pumps are noted for accuracy, linearity, and repeatability, there is

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the potential for leakage, lost motion, and pumping inaccuracies during stroke adjustments. In addition, the intermittent, pulsating flow of metering pumps places a strain on the system. By incorporating electronic flow control and a multiple-diaphragm design, P Series pumps overcome these operational drawbacks. The flow rate of a metering pump can only be adjusted by varying the stroke length or speed. Pneumatic and electronic actuators attached to the stroke adjustment mechanism for both amplitude modulated and lost motion metering pumps can result in pumping inaccuracies due to the slow rate of change (typically 1 second per 1 percent of stroke length). These pumps use variable-speed drive motors to change stroke speed instead of stroke length. AC and DC drives can respond more quickly with approximate speeds of 0 to maximum rpm in 0.5 and 1.3 seconds, respectively. Faster flow correction results in greater long-term accuracy. Many of these drives are available with turn-down ratios of 1000:1, as good or better than those that can be achieved using the electronic actuator in conjunction with the manual stroke adjuster. Multiple-diaphragm pumps reduce acceleration losses and pipe strain, providing virtually "pulse-free" liner flow. This can eliminate the need for expensive pulsation dampeners and can broaden the range of application opportunities for the pumps.

Wanner Engineering Inc., 612-332-5681, www.Hydra-Cell.com/metering

Shaft Seals for Vapor Containment



These recently patented MECO outside face seal (OFS) shaft seals are particularly suited for the containment of vapors, VOCs, and HAPs in vertical-shaft vessels where long, cantilevered shafts can exhibit high run-out (6 mm+) and misalignment. These seals will also permit significant axial shaft motion, making them suitable for applications where there is end float or thermal expansion of the shaft. The seals are especially useful in vacuum environments, often cutting process times in half by containing a high degree of vacuum. They are available un-split or fully split in a wide variety of materials combinations for maximum compatibility with acids, bases, and aromatic hydrocarbons. The seals operate without a purge or flush system and can be built with no elastomers, making them impervious to

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aggressive chemistries. These single-face seals were originally designed for high-temperature and high-speed applications where double-face seals can overheat and fail. Simple to install, they use external springs to maintain constant seal face pressure as components wear. All seals are custom-engineered to suit individual applications, providing an effective alternative to packed glands for sealing solids, liquids, vapors, and gases on rotating equipment in many process industries.

MECO Seals Division, Woodex Bearing Co., 800-526-8800, www.woodex-meco.com

Modular Analyzer & Sample-Handling Platform



New modular platform components, together with new configurator software, make it easy to develop and assemble complete process analyzer and sample-handling systems using an ANSI/ISA 76.00.02-compliant miniature modular design. This new approach enables system designers to reduce the size, weight, and flow path volume of their process analysis and sampling systems, while reducing the costs to design, build, and maintain them. Modular platform components consist of surface mounts, including shut-off, needle, metering, toggle, and check valves, as well as filters, substrates, and manifolds. The system meets all requirements of the ANSI/ISA 76.00.02 specification for the 1.5 in. (38.2 mm) footprint. The configurator software lets the user place, define, and connect surface-mount components on a computerized layout grid. The configurator identifies all additional flow connectors necessary to build the fluid system and generates a bill of materials and assembly diagram to simplify ordering and final assembly. Automated online process analyzer systems provide a real-time view of a process and help users make rapid adjustments for better process control. Analyzer systems can be relatively simple, such as a system that monitors moisture in a single hydrocarbon gas stream, or complex, such as an extensive multi-stream system that monitors process fluid composition at numerous points in the process. In either case, sampling systems are required to extract, collect, and possibly precondition a sample; transport the sample to the analyzer; condition it for introduction into the analyzer; and dispose of spent samples or return them to the process line.

Swagelok Co., 440-349-5934, www.swagelok.com

Centrifuge With Direct Contact Drying Capability

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The HF model centrifuge incorporates standard inverting filter and thin cake processing technologies with PAC (pressure added centrifugation) technology for direct contact drying. The result is direct contact drying of the centrifuged material while it is still inside the centrifuge; other types of centrifuging equipment, such as horizontal peelers or vertical baskets, cannot provide this benefit. The HF model with PAC technology provides the capability to achieve pre-drying or final drying of the product, thereby reducing or eliminating the need for drying or further process steps in other equipment after the centrifuge. Other benefits of the centrifuge include no operator assistance necessary, high productivity rates, better product quality, no vibration, no hydraulics, optimal washing, CIP systems, and a totally enclosed and gas-tight system. The company is prepared to demonstrate the technology at its laboratory.

Heinkel USA, 856-467-3399, www.heinkelusa.com

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