

Meet the Flow Freshmen

New Flowmeters Highlight Important Industry Trends

The flowmeter market is ever changing, and this year's group of freshman products showcases several important trends in the industry: increased attention to mass flow, improvements in sensor technology, designs for specific applications, improved performance, and more communication protocols.

Most mass flow measurement is done by Coriolis, thermal, and multivariable flowmeters. A volumetric flowmeter can measure mass flow if density can be calculated. This is sometimes done based on measurements of pressure and temperature, and is considered an inferred method of determining mass. Controlotron's SonicMass meter is in this category.

Especially noteworthy is the number of new thermal flowmeters. Along with Fox Thermal Instruments' product, three companies are bringing out improved mass flow controllers.

After much energy was expended on communication protocols and Y2K in the late 1990s, suppliers are taking seriously the challenge to improve sensor technology. Highlights include improvements in paddlewheel, DP transmitter, and thermal mass sensors.

With mergers and acquisitions continuing, it seems the flowmeter market must be consolidating. But while end users are looking at a reduced number of suppliers, they are also demanding products that are more tailored to their application. This trend is aided by the certifications and standards that meters have to meet in certain industries such as food & beverage and chemical.

Both Endress+Hauser and Micro Motion are releasing Coriolis flowmeters with 3-A authorization designed for the sanitary and food markets. Asahi/America's thermoplastic vortex flowmeter is designed for aggressive wet chemical applications.

Another clear trend is improved performance. Suppliers are con-

tinuing to push back the performance boundaries. One example is Foxboro's new CFT50 Coriolis flowmeter, which addresses the problem of measuring two-phase flow, one of the most difficult of measurements. It specifically minimizes the impact of entrained air by means of dual digital processing for flowtube control and signal.

"The digital flowtube control allows for uninterrupted flow tube operation in the presence of two-phase flow as well as a factor of 10 improvement in dynamic response to changing flow conditions," says Michael Jost, vice president of Foxboro's Measurement & Instrumentation Div. "The high-speed digital signal processing offered by the new transmitter provides more precise Coriolis measurements with far better zero stability."

Other products that push the performance barriers include Marsh-McBirney's Multi-Mag insertion meter and the Vector positive displacement flowmeter from Flow Technology.

Communication protocols continue to be important, especially for traditional technology flowmeters. Magnetrol offers a thermal flowmeter with HART. Siemens also is releasing a magnetic flow transmitter with HART and Profibus-PA. Burkert's mass flow controller includes Profibus-DP and DeviceNet. Last year, Fluid Components announced the release of HART, Profibus, Ethernet, Modbus, and AS-i with its thermal mass flowmeters.

These trends can be seen throughout the following selection of flow instrumentation. For more, see www.controlmag.com.

Jesse Yoder is president of Flow Research (www.flowresearch.com), a market research firm specializing in flowmeters and other field devices including level, pressure, and temperature instrumentation. He may be reached at 781/224-7550 or jesse@flowresearch.com.

ULTRASONIC VORTEX

This thermoplastic FloSonex flowmeter is available in sizes from 1/2-4 in., works in aggressive wet chemical applications, and has replaceable external



sensors. Electronic signal processing deals with a high percentage of bubbles, provides a

fast response time, and can handle rapid temperature changes without erratic or erroneous signals. Output is 4-20 mA with 0.75% accuracy, 0.25% repeatability, and a 25:1 turndown.

Asahi/America
781/321-5409

Circle 430
www.asahi-america.com

CLAMP-ON MEASURES MASS

The SonicMass ultrasonic flowmeter measures mass flow in pipe sizes from 3/8-48 in. It measures flow, sonic velocity, and temperature of the fluid; determines the density of the liquid; and converts volumetric

flow to mass flow. Accuracy is 0.25% for mass flow and 0.15%



for volumetric flow. Applications include gas blending, refinery volume balancing, and mass flow of feedstocks.

Controlotron
800/275-9479

Circle 431
www.controlotron.com

SANITARY CORIOLIS

The Proline Promass 80E measures mass, volume, density, and temperature, and meets 3-A sanitary standards. It has mass



flow accuracy of 0.35% in liquids and 0.75% in gas. The two-line backlit display shows two

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variables and has pushbutton operation, guided setup to make configuration quick and easy, and a self-diagnostic function with clear text messages that simplify troubleshooting.

Endress+Hauser **Circle 432**
800/428-4344 www.us.endress.com

MASS FLOW OF AIR AND GAS

The Model 10A thermal mass flowmeter measures SCFM without the need for pressure and temperature compensation. It is FM and CSA approved for Class I, Div. 1, Groups B, C, and D hazardous areas. The sensor is constructed of 316 SS and is all-welded to ensure safe and reliable operation.



In-line and insertion models are available. The flowmeter's calibration is traceable to NIST standards.

Fox Thermal Instruments **Circle 433**
408/847-2090 www.foxthermalinstruments.com

TURBINE FLOWMETER

The Star Series turbine flowmeter is available in 11 sizes to



measure liquid flow over a range of 0.35-650 GPM with 1.0% accuracy, repeatable to 0.1% of reading. Industrial flow applications include fuel metering, well water, gasoline, etc. Options include flow rate indicators/totalizers and other electronic support equipment.

Hoffer Flow Controls **Circle 434**
800/628-4584 www.hofferflow.com

MASS FLOW WITH HART

The Thermoel TA2 for air and gas flow applications has a



compact, integral explosion-proof enclosure, HART communications, and a display that shows measurements of mass flow, temperature, and totalized flow. The display also allows easy configuration and operation of the unit.

Magnetrol **Circle 435**
630/969-4000 www.magnetrol.com

BATTERY-POWERED FLOWMETER

The FlexMASter ST98-12VDC thermal mass flowmeter comes with a standard 12 VDC power supply that can be powered from an automotive battery or from a field battery pack, making it suitable for monitoring gas flow levels in remote pipelines or storage facilities. It measures

flow from 2.0-3,183 SCFM with accuracy of 1% of reading plus



0.5% FS and repeatability of 0.5% of reading.

Fluid Components Intl. **Circle 436**
800/854-1993 www.fluidcomponents.com

DIGITAL VORTEX GOES LOW

For stable measurements, Yewflo has a digital signal-processing amplifier to analyze



vortex waveform spectral components and filter noise from signals. It also has an adaptive noise-suppression function and provides vibration immunity for stable, accurate measurements at low flows without any need for start-up tuning.

Yokogawa **Circle 437**
678/423-2438 www.yokogawa.com

FLOW COMPUTER HANDLES GASES

The Model 1540 quad stream gas flow computer monitors,

routes, and reports data on up to four gas streams. It calculates gas flow volume, energy, mass, and rate by time. The computer can be used with turbine, orifice, ultrasonic, venturi, and V-cone flowmeters.



Communications include HART, 4-20 mA analog, pulse, and digital Modbus.

Solartron Mobrey **Circle 438**
281/398-7890 www.solartronusa.com

MANIFOLD DESTINATION

V Series manifolds are available in two, three, and five-valve configurations with a choice of tube fittings, NPT connections, ISO/R228 process connections, and DIN 19213-B3 or MSS SP-99 flange instrument con-



nections. All metal components are made of 316 stainless steel.

Swagelok **Circle 439**
440/349-5934 www.swagelok.com

MAGMETER MEASURES BIG PIPES

The Multi-Mag insertable magmeter probe works on pipe sizes from 36-120 in. An array

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of electromagnetic sensors, strategically placed on the probe, span the entire pipe diameter to



detect and compensate for shifting profiles. The streamlined sensor shape minimizes flow disturbances, thus providing minimal pressure drop, even at high velocities. Accuracy is 1% of reading.

Marsh-McBirney
800/368-2723

Circle 440
www.marsh-mcbrney.com

CORIOLIS FOR FOOD

The Hygienic Coriolis flowmeter has 3-A authorization and EHEDG certification, making it suitable for measuring liquids, gases, and slurries in the food, dairy, beverage, pharmaceutical, and biotech industries. It has a



self-draining stainless steel body with a standard 32 Ra internal surface finish that is easy to

clean in place. Options include integral transmitter or four-wire remote transmitter mounting.

Micro Motion **Circle 441**
303/530-8339 www.emersonprocess.com

MASS FLOW CONTROLLER

Alta Series digital mass flow controllers have multi-gas and multi-range capability, so a single unit can be used with multiple gases over a wide control range. Applications include manufacturing of ICs, flat-panel displays, compound semiconductor devices, optoelectronics, and



vacuum coatings. Units are available with metal seals, high flow rates, digital or analog I/O, and DeviceNet.

MKS Instruments **Circle 442**
978/975-2350 www.mksinst.com

FIBEROPTIC FOR PADDLEWHEEL SENSORS

The Model FLSC90-A fiberoptic signal conditioner interfaces with FP-9000 and FP-9000A



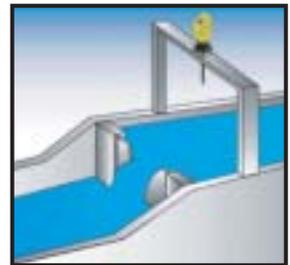
series Lightspeed paddlewheel flow sensors. It provides a high-

intensity light source to the paddlewheel sensor through a semi-flexible duplex fiberoptic cable, then converts returning light pulses to a scalable 4-20 mA or 1-5 VDC analog output proportional to the flow rate. The fiberoptic cable link lets the flow sensor operate in harsh and heavy electrical noise environments.

Omega Engineering **Circle 443**
203/359-7815 www.omega.com

RADAR DOES OPEN CHANNELS

The most common instrument for non-contact open channel flow is an ultrasonic gauge, but pulse radar's microwave energy, unlike sound waves used in ultrasonic measurement, is not affected by steam, mist, or foam generated by the combination of heat and chemicals that exists in some industrial open-channel measurements. A pulse radar



gauge can be programmed to output the flow for any type of flume or weir, making it as adaptable as any other technology on the market.

Ohmart/Vega **Circle 444**
513/272-0131 www.ohmartvega.com

VORTEX LOWERS INSTALLATION COSTS

The Model 8800CR Reducer lowers the cost associated with applying vortex flowmeters by

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eliminating the need for field assembly of reduced piping by



means of reducers built into the flowmeter. The Reducer Vortex uses the same basic meter and sensor design as the standard 8800C Vortex meter.

Rosemount
800/999-9307

Circle 445
www.rosemount.com

VERSATILE MASS FLOW CONTROLLER

The stainless steel Smart-Trak is available in ranges from 0-10 SCCM to 0-50 SLM for any clean gas flow, including toxics



and corrosives. It comes programmed for 10 gases commonly used in biotech, pharmaceutical,

analytical, and research applications; others may be specified. The interface mounts directly on the instrument or remotely up to 50 ft. away, and can be used to change gases and other critical parameters in the field.

Sierra Instruments **Circle 446**
800/866-0200 www.sierrasmarttrak.com

CONDUCTIVITY CONVERTER HAS HART

The Sitrans F M Intermag 2 converter for mag flowmeters operates with a pulsed magnetic DC field. It can be used with electrically conducting liquids, sludges, pastes, and slurries at flow rates from 0.25-12 m/sec. The converter has HART and

Profibus-PA communications, integrated self-monitoring, diagnostic and simulation functions,



two digital outputs, and one optional digital input.

Siemens
800/365-8766

Circle 447
www.sea.siemens.com

VORTEX COUNTS AND TOTALIZES

The Eggs Delta vortex flowmeter measures gas, liquid, and air

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with 1% accuracy on liquids. Accuracy is 3% on gas and air. It is available for line sizes of 1/8-1 in. The sensor has no moving parts, a positionable counter for easy reading, a totalizer,



and a built-in battery. A 4-20 mA output is available.

Sparling Instruments **Circle 448**
800/800-flow www.sparlinginstruments.com

SENSORS SEE LOW FLOWS

D04 and D10 self-contained sensors can detect changes in flow as low as 5 ml/min in liquids



and gases. The solid-state sensors have no moving parts, connect directly into a pipeline with no intrusive probe, and are available with a discrete transistor output or 4-20 mA output. Setup uses adjustment pots on the front of the housing. All wetted parts are 316 stainless steel.

Turck **Circle 449**
763/553-7378 www.turck.com

CORIOLIS HANDLES TWO PHASES

The Model CFT50 Coriolis mass flowmeter operates without interruption during two-phase

liquid/gas flow. Its dual digital processing system lets one



system control the meter drive sequence to provide uninterrupted flow tube operation, while the second system processes measurement data. Made of sanitary stainless steel, it is approved by FM, CSA, and CE, and is rated NEMA 4X.

Invensys/Foxboro **Circle 450**
866/746-6477 www.invensys.com

SOLENOID VALVES STAY PUT

Skinner 71417 and 71477 four-way direct-acting solenoid valves have dual solenoid capability, so they can hold their last position on loss of power or pneumatic pressure. The valves have brass bodies and dual-frequency-rated coils, and require no minimum operating pressure to shift position. Options include Viton seals,



metering, locking manual override, and a manual operator.

Parker Fluid Control **Circle 451**
860/827-2300 www.parker.com

SAME SILICON STABILIZES DP

Sensing and reference capacitance sensors in the XTC 330D differential pressure transmitter come from the same piece of silicon, so they have identical mechanical, thermal, and electrical properties and will react in the same way to changes in



ambient conditions. It has stability of 0.030% for 36 months and reference accuracy of 0.075% of calibrated range.

MycroSensor Technologies **Circle 452**
602/953-7761 www.mycrosensor.com

PD HANDLES OIL TO ASPHALT

The Vector has a double helical, three-lobe impeller with large pockets between the impeller



lobes. This lowers the pressure drop; creates no axial, side, or end loads; and allows the flowmeter to be used with high and low-viscosity liquids from light hydrocarbons to asphalt. Line sizes are 1-4 in., flow rates are up to 700 gpm, and viscosities are up to 10,000 cP.

Flow Technology **Circle 453**
800/356-9328 www.ftimeters.com

MASS FLOW CONTROLLER DOES DUAL GASES

The Type 8712 can measure and control neutral, non-contaminated gases at flow rates of



20 ml/min to 50 l/min. Accuracy is 1% of the reading and 0.5% FS, and linearity is 1% FS. Maximum inlet pressure is 145 psi, depending on valve diameter. Fieldbus communications include Profibus-DP and DeviceNet. The device can be calibrated on two different gases and switched between gases by the user.

Burkert USA **Circle 454**
949/223-3100 www.burkert-usa.com

SAFE SENSOR MEASURES GAS MASS

The Series 454FT single-point insertion thermal convection mass flow transmitter has CENELEC and CSA safety approvals. The sensor head has



a microprocessor, large LCD display, 20-button keypad, and software menus.

Kurz Instruments **Circle 455**
800/424-7356 www.kurz-instruments.com