



FLOW RESEARCH

27 Water Street  
Wakefield, MA 01880

(781) 245-3200  
(781) 224-7552 (fax)

*A STEADY STREAM OF DATA IS COMING YOUR WAY*

## *worldflow barometer*



*Osborne Reynolds, creator of  
the Reynolds Number*



Worldflow Barometer is the component of Worldflow that focuses on the flowmeter industry. Every quarter, the Barometer shines its spotlight on the flowmeter industry, looking for important events to discuss or highlight.

We find the events, report them, and place them in the context of the flow industry. The Barometer explains and interprets the importance of new products, new technologies, mergers, and acquisitions. We give you the information and ideas you need to generate forecasts, make budget decisions, and implement winning strategies.

# *Worldflow Barometer*

## **Overview**

If you're already a subscriber, you know how Worldflow Barometer keeps you up-to-date on recent developments in the flowmeter industry. If you're not, we urge you to consider becoming part of this valuable flow of insight and information.

Every quarter Worldflow Barometer arrives on your desk and desktop to keep you on top of trends and technologies – and interpret them in light of our extensive data on the flowmeter industry. The Barometer not only tells you what happens, it also tells you what these events mean to the industry – so you can make informed choices for your product and marketing planning.

We created Worldflow three years ago because we felt our customers needed up-to-the-minute information to supplement our market research reports. With volatile oil prices and even more volatile world affairs changing the scene sometimes daily, we feel this is even more true today. We invite you to use this information in a variety of ways:

- To make decisions about product development
- To formulate growth strategies
- To better understand how to market your products
- To find companies you can potentially form an alliance with
- To better understand the products and technologies on the market and their application
- For end-users to make a more informed decision about what kind of flowmeter to buy

## **Methodology**

With Worldflow Barometer you profit from our on-going industry research and extensive network of flow contacts. Because we research flow every day of the year, we pick up trends, questions, and developments and gain a keen sense of the pulse of the industry. We also check in quarterly with leading flowmeter suppliers to find out the latest developments. And we regularly monitor economic conditions and current events from a flow perspective. Then we draw on our first-hand knowledge of end-users as well as our extensive industry data and experience to digest and analyze this information for you. We provide both electronic and color hard-copy documents so you can enjoy the Barometer in the way that suits you best. In addition, for hot news items we feel can't wait until the next issue, we email Flash Reports to our subscribers.

## Scope

Each quarter updates technology and industry developments in both new-technology and traditional technology flowmeters – every type of meter in every issue. The approximately 40-50 page quarterly publication examines the following areas:

- New flowmeters that have been introduced
- Mergers and acquisitions
- In-depth looks at flowmeter companies
- New technologies under development
- Marketing strategies for flowmeter suppliers
- Important results from Interkama, ISA, and other flow-related conferences
- Profiles on some of the pioneers of flow

## Flash Reports

In addition to the quarterly Barometer, subscribers receive Flash *Reports* via email of particularly important late-breaking news – as it happens – with analysis about its significance. Past Flash Reports include:

- Aalborg and Racine Federated Enter the Vortex Flowmeter Marketplace
- GE Updates DigitalFlow™ Clamp-On Gas Flowmeter
- Isco and Teledyne Combine to Create Instrumentation Growth Platform
- A Wave of Acquisitions Sweeps through the Flow and Instrumentation Business
- GE Acquires Global Field Measurement Technology Company, Panametrics

## Segments

Worldflow Barometer features a wide range of topics, as illustrated in the categories and a sampling of the articles we've run over the past in the three years.

The *State of the Industry Report* analyzes the driving forces behind the flowmeter market to give you an up-to-the-minute picture of the industry. The State of the Industry Report highlights growth areas, puts new product developments into perspective, and focuses on new and

### Worldflow Barometer Table of Contents

**State of the Industry Report . . . 5**

**Worldflow Special Reports . . . 9**

**In the News . . . 15**

**Company Korner . . . 19**

**Products & Technologies:**

***New-Technology Flowmeters . . . 23***

*Coriolis: 23*

*Magnetic . . . 27*

*Ultrasonic . . . 28*

*Vortex . . . 30*

*Thermal . . . 31*

***Traditional Technology Flowmeters . . . 32***

*DP Flow . . . 32*

*Positive Displacement . . . 35*

*Turbine . . . 37*

*Open Channel . . . 38*

*Variable Area . . . 40*

**Pioneers of Instrumentation . . . 42**

emerging companies. This section puts it all together into a single picture you can count on to make you think and help you plan. Some of the headlines from past issues:

- The Wave of Mergers & Acquisitions: What does it all mean?
- Making Good Use of an Industry-Based Analysis of the Worldwide Flowmeter Market
- My Tour of the European Flow Companies
- Eleven days in May: A trip to the oil patch
- The Next Buzzword: “Feature-Rich” Products
- Company Strength Softens the Impact of the Economic Downturn on Instrument Sales
- Reflections on Dick’s Last Retort at ISA 2002
- Traditional Tech — A Whole New Group of Players
- Some Up, Some Down: Economy’s Impact on Flow Varies
- Is that a flowmeter, or do we have blinders on?
- Flowmeters Approved by the Fieldbus Foundation

***Worldflow Special Reports*** draw on our unpublished research and interviews to create analytical pieces on issues and events influencing the flowmeter industry. Articles include:

- Racine Federated and Aalborg shake up the vortex market
- Advances in Thermal Dispersion Mass Flowmeter Accuracy
- What’s in the DP flowmeter market?
- A comparison of different types of primary elements
- An Industry Based Analysis of the Worldwide Flowmeter Market
- A New Perspective on Traditional Technology Flowmeters
- How Best-in-Class Suppliers Support their VARs
- Why Do Firms Acquire Other Firms? Does it Work?
- Users Flow to New-Technology Flowmeters
- Customers Still Loyal to Traditional Technology Flowmeters
- Growth Factors for New-Technology Flowmeters
- The World Gasflow Measurement Market

***In the News*** reports on news about the flowmeter industry, including new products, new regulations, mergers and acquisitions, and other breaking news. We follow announcements of approvals from the oversight groups such as the American Gas Association (AGA) and American Petroleum Institute (API). Headlines include:

- Siemens Completes Acquisition of Danfoss
- Honeywell, Itron and Badger to Equip Akron with Advanced Meter Technology
- Krohne keeps Azerbaijan oil project flowing
- Yokogawa building new Houston office to strengthen its presence in petroleum markets

- Invensys implements major fieldbus-based automation solution for Shell Canada at the Athabasca
- Rapid Growth Makes Expansion in Cernay (FR) Necessary for Endress+Hauser
- Isco Releases a Multi-Parameter Sensor for in Situ Wastewater Analysis
- CiDRA Develops New Sonar Flow Technology
- Photon Control Enters Agreement with Husky Energy for Optical Flowmeter Development
- Emerson Lands Flow Measurement Project in China for One of World's Largest Pipelines
- Yokogawa Awarded FED for First Phase of Shell Norco Chemical Reinstrumentation Program;
- Shell Chemical LP Sees Fieldbus as a Strategic Technology
- ABB Sells Structured Finance Business to GE Commercial Finance for US\$ 2.3 billion
- Honeywell to Acquire Sensor Systems Business from Invensys for \$415 million
- Actaris Acquires Schlumberger Metering Interests
- Endress+Hauser and Smar Announce Technology Alliance
- Rosemount launches the 3051S, a "next generation" pressure transmitter
- Honeywell introduces new pressure transmitter models for high-pressure applications
- Invensys offers Pressure Transmitters for \$375



The ***Company Korner*** profiles companies of interest to our readers. It includes reports on alliances, partnerships, reorganizations, annual reports, and other events of importance. Past companies featured include:

- The Chicago to Milwaukee Corridor, Part I: Liquid Controls, Racine Federated, AW Instruments
- FMC Energy Systems: A Global Supplier of Equipment for Oil & Gas Production
- Danaher: A Very Large but Swift Flowing Company
- Krohne Continues to Deliver Innovative Products
- Aquametro: Supplier of PD and Turbine Meters for the Oil, Water, and Energy Markets
- Elster-Amoco Diversifies Into Water Measurement

- Two Approaches to Measuring Gas at Low Flowrates: Alicat Scientific and Flow Matrix
- Emerson Process Management: Integration Out of Fragmentation

From time to time we also share special interviews with some of the *Pioneers of Instrumentation*, including:

- Dr. John Olin, founder of Sierra Instruments
- Floyd McCall, founder of McCrometer
- FCI: The Early Years, as told by co-founder Mac McQueen

The *Products & Technologies* section looks at the flowmeter market from the perspective of flowmeter types. It highlights any important developments in each flowmeter type, including new products introduced, mergers and acquisitions, alliances, and other developments that apply to a specific type of flowmeter. This section is divided into two parts: new-technology flowmeters (Coriolis, magnetic, ultrasonic, vortex, and thermal) and traditional-technology flowmeters (differential pressure, positive displacement, turbine, open channel, and variable area). We cover every flow technology each quarter. Sample articles include:

#### *Coriolis*

- Emerson introduces Micro Motion low flow meters
- Announcing a mass Coriolis flowmeter by AW Company
- Foxboro Coriolis mass flowmeter now certified for international custody transfer
- Micro Motion Elite Coriolis flowmeter approved for custody transfer of natural gas
- Coriolis Mass Flowmeter FCM2000 with Smallest Nominal Sizes
- Applications for Foxboro's CFT50 Coriolis Flowmeter
- Foxboro Introduces Digital Coriolis Mass Flowmeter that Eliminates Measurement Interruptions from Two-Phase Flow
- Why users gravitate to Coriolis flowmeters

#### *Magnetic*

- Battery-driven electronic water meter
- Advanced Flow Technology: AC Mags in a World of Pulsed DC Flowmeters
- Krohne Sets Up New Calibration Rig in India
- Emerson's New Sanitary Magnetic Flowmeter Extends Proven Reliability to Hygienic Applications
- Siemens Positions Itself to Become One of the Top Instrumentation Suppliers in the U.S
- Flowmeters Manufactured by Magnetic Flowmeter Suppliers
- Recent advances in magnetic flowmeter technology



## *Ultrasonic*

- Caldon sues Westinghouse over ultrasonic flowmeter
- GE introduces Sentinel custody-transfer natural gas flowmeter
- Emerson announces enhancements for Daniel ultrasonic flowmeters
- Krohne Technology Replaces an Old Friend
- Controlotron Introduces new Low Cost Clamp-On Transit Time Flowmeter
- Too Soon to Tell the Impact on Panametrics' Ultrasonic Line
- Panametrics breaks through the gas flow measurement barrier
- Ultrasonic: Where's the growth?
- Will the ultrasonic flowmeter market consolidate?

## *Vortex*

- Technological Improvements in Vortex Flowmeters
- E+H Releases New Line of Vortex Flowmeters
- Vortex: The Unloved Flowmeter
- Innova-Mass Steam Custody Transfer Meter Features Built-in Flow Computer and Modem
- Multivariable: The Hot New Trend in Vortex Flowmeters

## *Thermal*

- Thermal Flowmeters: New-Tech, Traditional Tech, or On the Cusp?
- Thermal Flowmeters: New-Tech or Traditional Tech? Suppliers Respond
- Using the Wind Chill Factor for Gas Flow Measurement
- New ST75 air/gas flowmeter for small line sizes now features wireless IR link
- Suppliers of Thermal Flowmeters
- Getting Excited About Thermal Flowmeters
- FCI Mass Flow Instruments Now Available with HART, Ethernet, Profibus, MODBUS and ASI
- Sierra Instruments introduces smart thermal mass flowmeter for gas application

## *Differential Pressure*

- Effective monitoring of steam improves efficiency for global energy supplier
- Pressure transmitter for the pharmaceutical, food and beverage industries
- American Sigma Introduces Advanced Spectrum Ultrasonic Flow System
- Bristol Babcock Announces 3808 MVT Transmitter
- McCrometer and READ join forces in new flow measurement system for the oil & gas market
- Pressure Transmitters vs. Pressure Transducers: What's the Difference?
- Emerson's New Rosemount Model 4600 High Pressure Transmitter Targets Oil & Gas Applications

### *Positive Displacement*

- Gems Sensors Announces Acquisition of Venture Measurement
- Metroval Seeks to Expand PD Meters into the US Market
- Positive Displacement Flowmeters: Types and Suppliers
- Positive Displacement Flowmeters: Still a Viable Technology
- Go New-Tech or Stick with DP? Users Face the Dilemma
- Positive displacement meters: Technology and analysis
- Kral opens US office-Retools meters for US market

### *Turbine*

- Teledyne Acquires Isco
- Hoffer Insertion Turbine Flowmeters Used for Leak Detection
- Cooper Cameron acquires NuFlo Technologies
- Invensys' Turbine Flowmeters for Gas Applications
- Hoffer Offers Clamp-On Series Turbine Insertion Flowmeters
- Hoffer Mini-Flowmeter Turbine Series
- Turbine Flowmeters: Types and Suppliers
- Turbine Flowmeters Still Widely Used in Gas, Oil, and Industrial Applications
- Markets Sold into by Turbine Flowmeter Suppliers

### *Open Channel*

- New open channel flowmeter helps companies meet environmental standards
- Teledyne Acquires Isco
- ISCO Announces Intrinsically Safe Area Velocity Meters
- Marsh McBirney Announces Flow-Tote 3 Portable Open Channel Flowmeter
- Open Channel Flowmeter Suppliers
- Methods of Open Channel Flow Measurement
- Velocity Sensor Measures Flow Rate and Volume in Open Channels

### *Variable Area*

- Solarton Mobrey launches ATEX EEXD-compliant variable area meter
- Variable Area Suppliers and Products
- Aalborg Releases Model M Industrial Rotameters
- Hedland Expands EZ-View Flowmeter Product Line
- VA Suppliers and Products

## **What's Ahead**

As you can see, we've accomplished a lot in the first three years of publication, but we're not stopping there. The Worldflow Barometer is a living publication, capturing the



changing picture of flow. In future issues we look forward to exploring these exciting topics and more with you:

- Adoption rate for different fieldbus protocols
- Mergers and acquisitions in the flowmeter industry
- Progress in adoption of industry approvals for Coriolis, ultrasonic, vortex, and other types of flowmeters
- Market penetration by sonar and optical flow technologies
- Substitution of one type of primary element for another
- Growth in markets for sanitary applications
- Changes in the mass flow controller market, and introduction of new products
- Impact of products from China and India on the US and European markets

### **About Flow Research, Inc.**

Flow Research Incorporated, founded in 1998 by **Jesse Yoder, PhD**, is an independent research firm – the only market research company whose primary mission is researching flowmeter markets. We have an established reputation for producing highly accurate, unbiased reports, both custom and off-the-shelf, for our domestic and foreign clientele. Our exhaustive analysis of the world flowmeter market includes more than 5000 pages of data and a worldwide survey of flowmeter users. In addition to the quarterly Barometer, our Worldflow products include the Worldflow Energy Monitor, quarterly updates on the oil & gas, power & renewables, and petrochemical industries; and Worldflow User Perspective, periodic updates on customer and end-user needs and requirements.

Dr. Yoder, president, has 18 years of experience as a writer and analyst in process control and instrumentation. Since 1990, he has written 65 market research studies, many of them in the area of flowmeters, valves, and related instrumentation. He has also written more than 60 published articles on flowmeters and related topics in industry journals. Dr. Yoder serves as Contributing Editor to Flow Control magazine.

**Belinda Burum**, vice president and editor, has worked in high tech for 16 years as a technical and marketing writer and manager. Before that she honed her interviewing skills as a newspaper and wire service reporter. In 1990 and 1991 Belinda wrote newsletters and company profiles for Idea Network. She joined Flow Research in 2002. At Flow Research she edits the Worldflow products and has worked on a variety of projects, including end-user surveys and market studies.

**Norman Weeks**, market analyst, spent 24 years in sales, marketing, and technical sales support at Verizon Communications. During this time he introduced new technologies to clients and employees within several training modes. His last assignment at Verizon was as Northeast Region Solutions Manager. Since joining Flow Research, he has worked on a variety of projects, including user surveys, the European energy market, and the API 6A valve market.