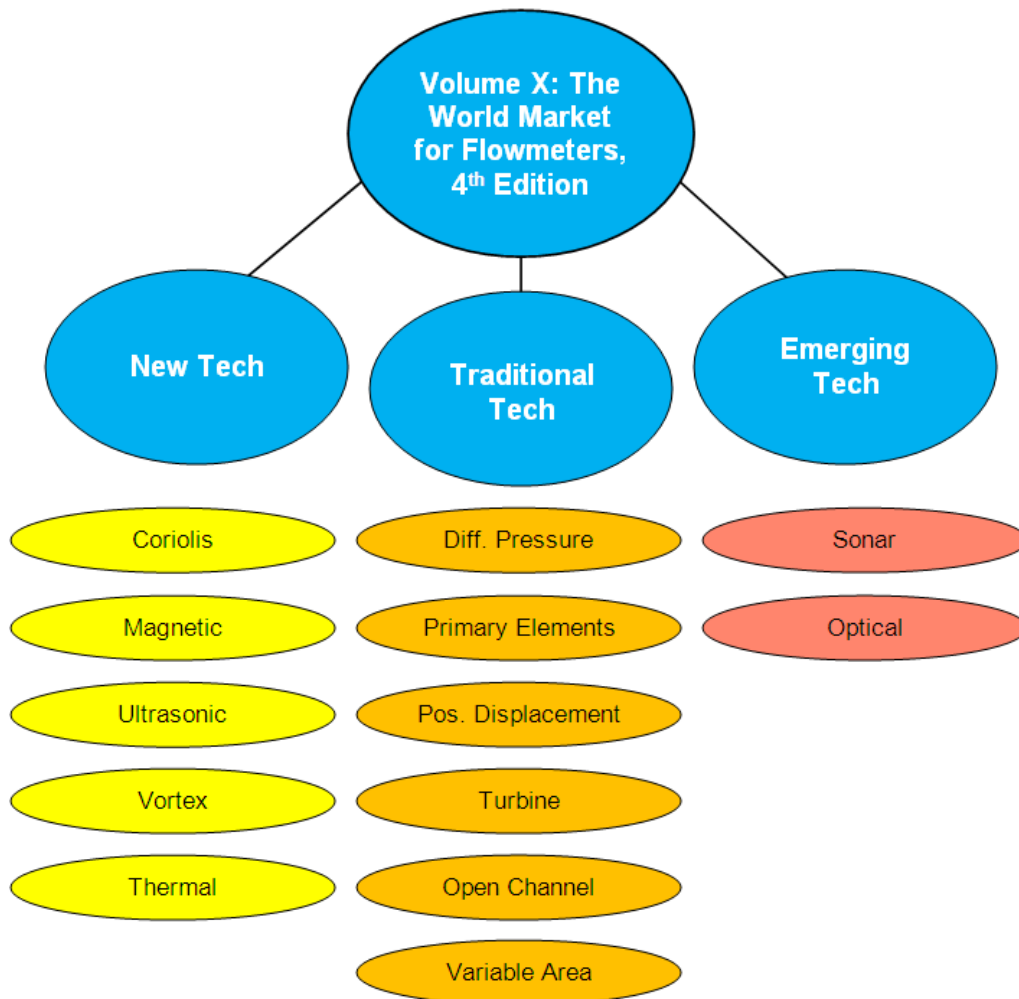




Flow Research, Inc.
27 Water Street
Wakefield, MA 01880 USA
+1 781-245-3200
+1 781-224-7552 (fax)
www.flowresearch.com

Volume X: The World Market for Flowmeters, 4th Edition

Overview



Publication date: January 2013

www.floweverything.com



Flow Research, Inc.
 27 Water Street
 Wakefield, MA 01880
 United States
 +1 781 245-3200
 +1 781 224-7552 (fax)
www.flowresearch.com

Another 'instant classic' from Flow Research

Volume X: The World Market for Flowmeters, 4th Edition

Now you can profit from comprehensive market research on the worldwide flowmeter market – all in one place. *The World Market for Flowmeters, 4th Edition*, is the most complete picture ever presented of the worldwide flowmeter market. This new study includes both new-technology and traditional technology flowmeters, as well as the emerging flow technologies of sonar and optical. This full-color study includes:



The view from 20,000 feet

- **Market size** of the worldwide market for 13 flowmeter technologies
- Market size **forecasts** for each flowmeter type through 2016
- **Market shares** for each flowmeter type in 2011 with annual forecasts through 2016
- Both **worldwide** and **regional** market size and market share data
- A **technology description and analysis** for each flowmeter type, including major competitive strengths and weaknesses
- A **product line analysis** for the major manufacturers of each technology type
- **Company profiles** with product information for easy comparison

Why we published this study

We completed our first *Volume X* study in 2003, and published subsequent editions in 2008 and 2010. We have closely followed the growth in the markets of all the flowmeter types during this time. The main goal of this study was to determine the size of the worldwide flowmeter market, including all technologies, and to see if the trend towards new-technology flowmeters has continued over the past several years. This study contains revenue, unit, and average selling price data for all flow technologies, segmented by region. It provides the tools you need to compare market size, market shares, and growth rates for all the flow technologies. It also provides product analysis and growth factors for each flowmeter type. *Volume X* enables you to assess your competitive position in the flowmeters you supply and the ones you compete against. Market forecasts through 2016 are included.

Segmentation covers what our clients want

Our research shows that the 2011 global market for flowmeters was nearly US\$5.7 billion. That's a big market! In order to make this market more understandable, we have divided it into three flowmeter groups. From there, we've looked at each of the flowmeter technologies individually. Then we've built up the total market from the individual flowmeter types.



Taking a closer look

The study provides the following worldwide geographic breakouts for each flowmeter technology:

- North America
- Europe (including Central Europe and the FSU)
- Mideast/Africa
- Japan
- China
- Asia/Pacific
- Latin America

The following market segments are common to each flowmeter technology chapter:

- Market size in dollars and units
- Manufacturer market shares
- Average selling prices by technology by region
- Technology analysis
- Product summaries by major manufacturer

Individual Flowmeter Technologies included in this study:

New-Technology

Coriolis Flowmeters
Magnetic Flowmeters
Ultrasonic Flowmeters
Vortex Flowmeters
Thermal Flowmeters

Traditional Technology

Differential Pressure Transmitters
Primary Elements
Positive Displacement Flowmeters
Turbine Flowmeters
Open Channel Flowmeters
Variable Area Flowmeters

Emerging Technology

Sonar
Optical

An overview chapter on each of the flowmeter groups includes valuable summary data

For example, the **New-Technology Flowmeters** overview chapter provides technology descriptions, compares new-technology flowmeters to the DP standard, describes the paradigm case method and its several criteria, and details new-technology flowmeter shipments on a worldwide and regional basis. Our paradigm case method of analysis determines the most suitable applications for each flowmeter type – and is backed up with our customer survey results, extensive supplier questionnaires, and other elements of our longterm involvement in the instrumentation field.

The **Traditional Technology Flowmeters** and **Emerging Technology Flowmeters** overview chapters are equally as detailed.

There are also individual chapters for each of the new-technology and traditional technology flowmeter types.

The World Market for Flowmeters, 4th Edition contains updated 2011 data for each flowmeter type from individual studies Flow Research has conducted over the years. Our method has always been to use a bottom-up approach when analyzing any market. In this way, we are able to both confirm what we believe we already know as well as discover important new trends. Our success is based upon identifying what is new and comparing this information with our longterm knowledge of the market under study. We report all of our findings to you.

Key issues addressed in this study

- The effect of large line size meters on the Coriolis flowmeter market
- Continued expansion of magnetic and vortex flowmeter opportunities and markets
- Growth in the ultrasonic market, especially in custody transfer applications
- Comparison of DP flowmeters and primary elements to other flowmeter markets
- Impact of new-technology flowmeters on the turbine and positive displacement markets
- Mergers and acquisitions in the worldwide flowmeter market
- Impact of the expanding oil & gas industries on the flowmeter markets
- Effects of growth in China, India, and other developing countries on global markets
- Impact of new standards, such as the API standard for vortex in custody transfer
- A comparison of the new-technology and traditional technology flowmeter markets
- A list of suppliers for each flowmeter type along with the features carried by each supplier
- Growth rates for each flowmeter type in the rapidly expanding China and Asia-Pacific regions

Supplier information helps you compare manufacturer offerings

Detailed company profile information of all major suppliers into each of the individual flowmeter markets includes a product analysis – manufacturer by manufacturer – that allows you to quickly compare the product lines of all major suppliers. There is no other report available today with this critical information combined into a single comprehensive view of the market.

The company profiles include important data such as contact information, revenues, product lines, company history, recent acquisition activity, and sales strategies. Each company's flowmeter product line is summarized in easy-to-read charts which include Series and Model names and designations.

The accompanying *Module A* includes sales strategies, descriptions of operating geographies, and the strengths and weaknesses of the firm's product offering within the context of their market. *Module A* is described later in this overview.

Company Profiles

The following are some of the leading companies profiled in this study:

- ABB
- azbil (Yamatake)
- Badger Meter: Cox Flow Meas., Racine (RFI)
- Bopp & Reuther Messtechnik GmbH
- Brooks Instrument
- Cameron Measurement Systems: Caldon
- Danaher: Anderson Instrument, Hach, McCrometer, Venture Meas. Co.
- Elster Group: Elster-Instromet
- Emerson Process Management: Daniel, Micro Motion, Rosemount
- Endress+Hauser
- Fluid Components International (FCI)
- FMC Technologies
- Fuji Electric
- GE Measurement & Control: Dresser
- Honeywell: RMG
- IDEX: Accusonic, Faure Herman, Liquid Controls Group (LCG)
- Invensys/Foxboro
- Itron
- KROHNE
- OVAL Corporation
- Roper Industries: Neptune Technology Group, FTI (Flow Technology Inc.)
- Sensus
- SICK
- Siemens
- Sierra Instruments
- Spirax-Sarco
- Thermo Fisher Scientific
- Tokyo Keiki
- Tokyo Keiso Co., Ltd.
- Toshiba
- Veris, Inc.
- Yokogawa

Make great decisions with our data

As you know, having the best information available on a subject helps you make the best decisions. Flow Research has always been a source of reliable, accurate data that companies can trust. This study will quickly bring you up-to-speed on the global flowmeter market and its many components.

A few of the ways businesses tell us they use our studies to succeed:

- Compare growth rates and market sizes of different flow technologies
- Gain a worldwide perspective of competing suppliers in an industry, market, or technology
- Make an informed choice when considering a product purchase
- Use as a training or educational document
- Quickly survey and assess merger and/or acquisition opportunities
- Accurately forecast market demand for the many flowmeter technologies
- Understand the technical differences between new, traditional, and emerging technologies
- Have a reference standard of competitive technologies and models



Dr. Jesse Yoder

Table of Contents: The World Market for Flowmeters, 4th Edition

<i>Chapter One:</i> Executive Summary	<i>Chapter Thirteen:</i> Primary Elements
<i>Chapter Two:</i> Scope and Method	<i>Chapter Fourteen:</i> Positive Displacement Flowmeters
<i>Chapter Three:</i> Paradigm Case Analysis	<i>Chapter Fifteen:</i> Turbine Flowmeters
<i>Chapter Four:</i> Worldwide Flowmeter Market	<i>Chapter Sixteen:</i> Open Channel Flowmeters
<i>Chapter Five:</i> New-Technology Flowmeters	<i>Chapter Seventeen:</i> Variable Area Flowmeters
<i>Chapter Six:</i> Coriolis Flowmeters	<i>Chapter Eighteen:</i> Emerging Technology Flowmeters – Sonar and Optical
<i>Chapter Seven:</i> Magnetic Flowmeters	<i>Chapter Nineteen:</i> Flowmeter Supplier Market Shares
<i>Chapter Eight:</i> Ultrasonic Flowmeters	<i>Chapter Twenty:</i> Company Profiles
<i>Chapter Nine:</i> Vortex Flowmeters	
<i>Chapter Ten:</i> Thermal Flowmeters	
<i>Chapter Eleven:</i> Traditional Technology Flowmeters	
<i>Chapter Twelve:</i> Differential Pressure Flow Transmitters	

Why you must have this study

- Stay current with data on flowmeter shipments
- Understand how the 13 flow technologies stack up against each other
- Benefit from knowledge gleaned from 20 years of data and 150+ studies
- Be among the first to own an “instant classic” – at a price you can afford
- Capitalize on insights from our onsite visits to suppliers and end-users in the Middle East, Europe, the United States, and Australia
- Learn strategies to help you build your product line
- Assess your competitive positions with detailed company profiles

Plus over 150 informative charts and tables like this one:

**Shipments of All Flowmeters Worldwide by Technology
(Millions of Dollars)**

Technology	2011	2012	2013	2014	2015	2016	CAGR
Coriolis	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Magnetic	xxx.x	xxx.x	xxx.x	x,xxx.x	x,xxx.x	x,xxx.x	x.x%
Ultrasonic	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Vortex	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Thermal	xx.x	xx.x	xx.x	xx.x	xx.x	xxx.x	x.x%
Diff. Pressure	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Primary Elements	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Pos. Displacement	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Turbine	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Open Channel	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Variable Area	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x	x.x%
Total	x,xxx.x	x,xxx.x	x,xxx.x	x,xxx.x	x,xxx.x	x,xxx.x	x.x%

Volume X: The World Market for Flowmeters 4th Edition



Downtown Sydney, Australia – photo by Flow Research



Flow Research, Inc.
27 Water Street
Wakefield, MA 01880
United States
+1 781 245-3200
+1 781 224-7552 (fax)
www.flowresearch.com
www.floweverything.com

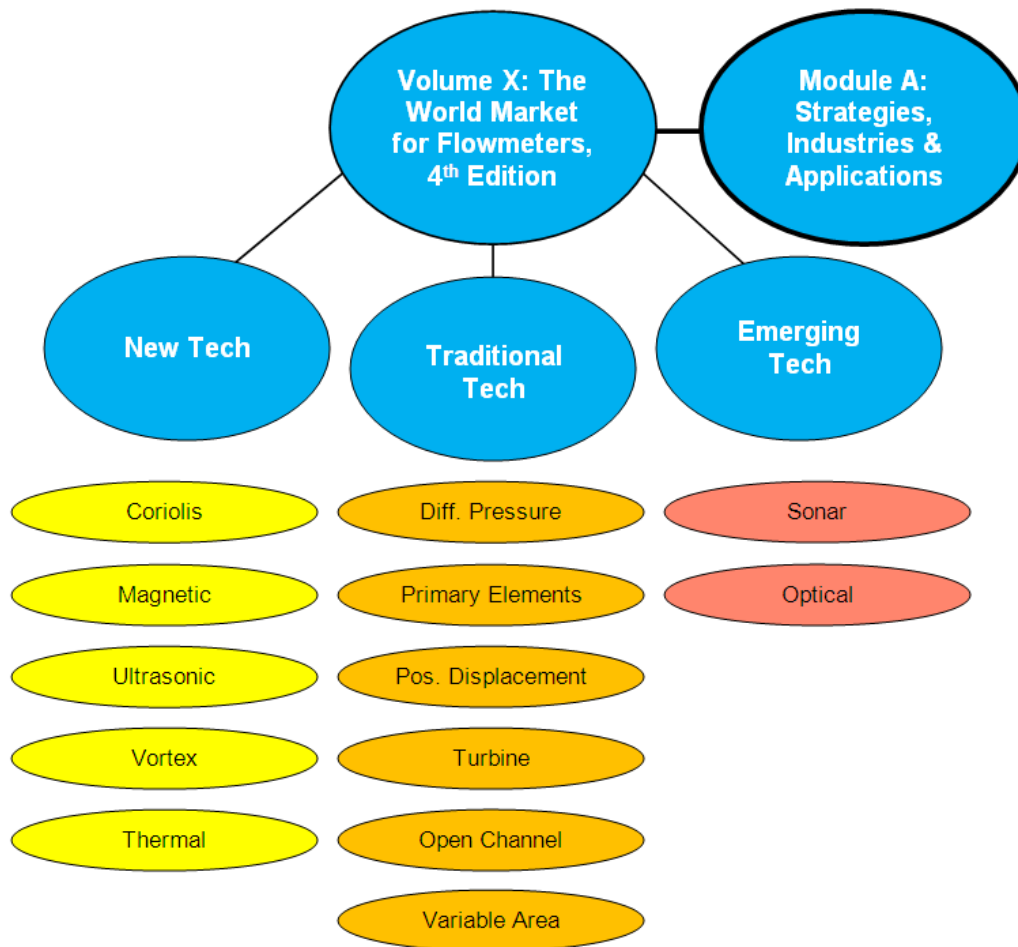
Why Flow Research?

- We specialize in flowmeter markets and technologies
- We have researched all flowmeter types
- We study suppliers, distributors, *and* end-users
- Our worldwide network of contacts provides a unique perspective
- Our mission is to supply the data to help your business succeed



Flow Research, Inc.
27 Water Street
Wakefield, MA 01880, USA
+1 781-245-3200
+1 781-224-7552 (fax)
www.flowresearch.com

Volume X: Module A: Strategies, Industries, & Applications Overview



Publication Date: Q1 2013
www.floweverything.com



Module A: Strategies, Industries, & Applications

The in-depth research in *Module A: Strategies, Industries, & Applications* complements and builds on the results of *Volume X: The World Market for Flowmeters, 4th Edition*. The module can be ordered as a standalone report or as an add-on to the main study.



This content-rich module provides strategies for companies already in the flowmeter market as well as for companies considering joining the market.

Company strategies apply to the entire flowmeter market, as well as to individual product lines.



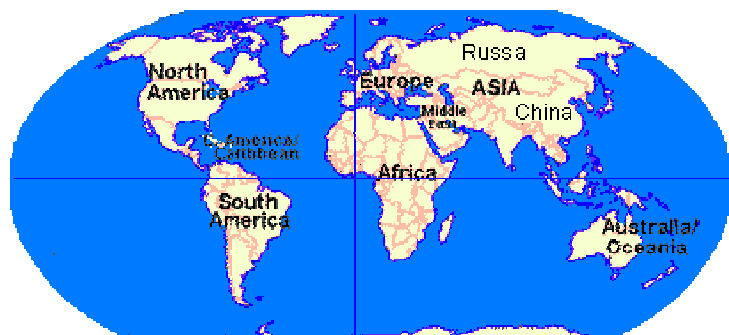
The module includes tactical and strategic recommendations for suppliers in each market segment. A world view of the market forecasts the best areas for future growth.

Module A provides focused insights into industry trends, explaining product improvements, and advantages and disadvantages inherent to each flowmeter type. It also provides shipments by application and industry in dollars and percentages

for the following new technology and traditional technology flowmeters: **Coriolis, magnetic, ultrasonic, vortex, thermal, differential pressure, primary elements, positive displacement, and turbine flowmeters.**

For each technology, the module provides worldwide **shipments by industry and application** for the following geographic breakouts:

- North America
- Europe (including Central Europe and the FSU)
- Mideast/Africa
- Japan
- China
- Asia/Pacific
- Latin America



Data includes **dollars and percentages of shipments by flowmeter type** in 2011 and forecasted for 2016 in the following industries:

- Oil and Gas
- Refining Industry
- Chemical Manufacturing
- Pharmaceutical Manufacturing
- Semiconductor Production
- Food and Beverage
- Pulp and Paper
- Metals and Mining
- Water and Wastewater
- Power and Energy



In *Module A* you will find:

- Shipments by industry and application in dollars and percentages, broken out by flowmeter type
- Forecasted growth rates by both application and industry through 2016
- Essential information on market outlook and industry trends by flowmeter type
- Realistic strategies for success for those entering or already in the flowmeter market.

Applications are specific to flowmeter type, but include:

- Oil and Gas
- Custody Transfer
- Process Measurement
- Compressed Natural Gas
- Slurries
- Sanitary/Hygienic
- Water Flow
- Water-based Chemicals
- Other

Key topics addressed in Module A

- Tactical and strategic recommendations for suppliers in each market segment
- Discussion of market forces at work
- Best areas for future growth
- Strategic action perspectives
- Real world success stories

Applications by Flowmeter Type

New-Technology Flowmeter Applications

Coriolis

- Custody Transfer of Natural Gas (CTNG)
- Custody Transfer of Liquids
- Process Measurement
- Compressed Natural Gas (CNG)
- Other

Magnetic

- Water Flow
- Water-Based Chemicals
- Slurries
- Sanitary/Hygienic
- Process Control
- Custody Transfer
- Filling Machines
- Other

Ultrasonic

Inline-Gas

- Custody Transfer of Natural Gas (CTNG)
- Check Metering
- Process Measurement
- Flare/Stack Gas Measurement

Inline-Liquid

- Custody Transfer-Petroleum Liquids
- Custody Transfer-Non-Petroleum Liquids
- Check Metering
- Process Measurement
- District Heating

Clamp-on and Insertion

- Petroleum Liquids
- Non-Petroleum Liquids
- Gas
- Steam

Vortex

- Gas
- Liquid
- Steam

Thermal

- Continuous Emissions Monitoring (CEM)
- Flare Gas/Flue Gas
- Landfill Gas Recovery
- Biogas Recovery
- Biomass Fermentation and Recovery
- Coal Mine Methane Recovery
- Boiler Inlet
- Wastewater Treatment
- Compressed Air
- Natural Gas Submetering
- Other

Traditional Tech Flowmeter Applications

Differential Pressure (DP) Transmitters and Primary Elements

- Liquid
- Gas
- Steam
- Air

Positive Displacement (by Fluid Type)

- Water/Wastewater
- Gas
- Oil
- Industrial Liquids

Turbine (by Fluid Type)

- Water/Wastewater
- Gas
- Oil
- Industrial Liquids



Flow Research, Inc.

Volume X: The World Market for Flowmeters, 4th Edition is a publication of Flow Research, Inc. of Wakefield, Massachusetts. Flow Research is the only market research company whose primary mission is to research flowmeter and instrumentation markets.

The lead analyst for this study, **Dr. Jesse Yoder** of Flow Research, has 26 years of experience writing about and analyzing process control and instrumentation markets, beginning as president and founder of Idea Network. He has written over 150 market research studies and published numerous articles on instrumentation in industry journals. To read some of the more than 200 published articles on instrumentation written by Dr. Yoder, visit the Flow Research article website at www.flowarticles.com.

Some of the recent and currently scheduled Flow Research studies are listed on the next page.

Flow Research specializes in instrumentation, and conducts **market research studies** in a wide variety of instrumentation areas that can be purchased by anyone interested in the topics. We create these studies through interviews with suppliers, distributors, and end-users. Topics include all of the flowmeter technologies - both new and traditional - as well as temperature sensors, temperature transmitters, level products, pressure transmitters, liquid analytical instruments, and selected API-certified valves.

Belinda Burum, Vice President and Editor, worked in journalism and advertising before entering high tech 18 years ago as a writer, marketing communications manager, and customer references consultant. She joined Flow Research in 2002, and has since then worked on many projects. In addition to her work on market studies, Belinda is editor of the *Energy Monitor* and the *Market Barometer*.

Norm Weeks, Senior Market Analyst, joined Flow Research in November 2004 after a 24-year stint with Verizon. At Verizon, Norm specialized in creating innovative customer solutions, product introduction and lifecycle management, and product marketing. He is now a fulltime market analyst for Flow Research, has completed many studies, and is an associate editor of our quarterly publications, *Market Barometer* and *Energy Monitor*.

Leslie Buchanan, Research Associate, joined Flow Research in March 2010. She serves as a customer liaison, manages the contacts database, does research and writing for some Flow Research studies and publications, and develops and implements standards for publication formats.

Vicki Tuck joined Flow Research in June, 2012. As an administrative assistant, she has experience in both the fast-paced law firms of Boston, and in various nonprofit organizations.

Christina Glaser, Research Analyst and Programmer, has worked as a software consultant, programmer, and web developer since 1992. She joined Flow Research in October 2010 and took an active role in refreshing our company website.

Flow Research studies contribute to an ongoing view of the flowmeter market

Listed below is a summary of Flow Research studies in process and studies completed during the last few years in the area of process control instrumentation. Conducting these studies has contributed to our understanding of the flowmeter technologies included in *Volume X: The World Market for Flowmeters, 4th Edition*. These studies are further described at www.flowstudies.com.

- Volume I: The World Market for Coriolis Flowmeters, 4th Edition* (January 2013)
- Volume II: The World Market for Magnetic Flowmeters, 5th Edition* (Q2 2013)
- Volume III: The World Market for Ultrasonic Flowmeters, 4th Ed.* (3 vol.) (Q2 2012–Q1 2013)
- Volume IV: The World Market for Vortex Flowmeters, 4th Edition* (July 2010)
- Volume V: The World Market for DP Flowmeters and Primary Elements* (January 2007)
- Volume VI: Worldwide Survey of Flowmeter Users, 2nd Edition* (January 2006)
- Volume VII: The World Market for Positive Displacement Flowmeters, 2nd Edit.* (March 2012)
- Volume VIII: The World Market for Turbine Flowmeters, 2nd Edition* (January 2012)
- Volume IX: The World Market for Pressure Transmitters, 2nd Edition* (August 2011)
- Volume X: The World Market for Flowmeters, 4th Edit.* (includes all flow tech.) (January 2013)
- Volume XI: The World Market for Gas Flow Measurement, 2nd Edit.* (6 volumes, Q3–Q4 2011)
- Volume XII: The World Market for Steam Flow Measurement* (March 2008)
- Volume XIII: The World Market for Mass Flow Controllers, 2nd Edition* (May 2012)
- Volume IV: The World Market for Thermal Flowmeters* (October 2009)
- Volume XV: The World Market for Liquid Analytical Instruments* (February 2011)
- Volume XVI: The World Market for Oil Flow Measurement* (six volumes) (Q4 2012–Q1 2013)

What are New-Technology Flowmeters?

New-Technology flowmeters include Coriolis, magnetic, ultrasonic, vortex, and thermal technologies. They share four features:

1. They have been introduced since 1950.
2. They incorporate technological advances that avoid some of the problems inherent in earlier flowmeters.
3. They are the focus of more of the product development efforts undertaken by the major manufacturers.
4. Their measured performance, especially accuracy, is superior to that of Traditional Technology meters on a standard basis.

New-Technology meters have enhanced features, including self-diagnostics, and will make use of up-to-date communication protocols such as HART, Foundation Fieldbus™, and Profibus. New-Technology meters have other advantages as well, including few or no moving parts, and reduced pressure drop.

Traditional Technology flowmeters include differential pressure, open channel, positive displacement, target, turbine, and variable area technologies.

Emerging Technology flowmeters include sonar, optical, and multiphase.

The Flow Research *Founding Sponsor* Program



*Blaise Pascal – philosopher,
inventor, mathematician, writer*

Flow Research instituted the Founding Sponsor Program to produce studies that most closely match our clients' needs. This program enables companies who wish to participate at a high level in a study's research to influence its scope and segmentation. In addition, Founding Sponsors receive regular updates from Flow Research on study progress, and receive a significant discount on the regular price of the study.

Procedure: Early in the planning phase of a study, Founding Sponsors receive a proposal that includes the proposed segmentation. Founding Sponsors can propose additional segmentation, and can also suggest changes to the proposed segmentation. While the decision to adopt particular segmentation ultimately lies with Flow Research, and is based on input from all contributors, we will do our best to accommodate the specific needs of each of our clients.

During the research phase of a study, Flow Research will issue regular reports that provide updates on the progress of the research. These reports will be sent to Founding Sponsors, who are then invited to provide any additional input or comments into the study.

Being a Founding Sponsor requires making an early commitment to purchase the study. However, in return, Founding Sponsors receive a significant discount off the regular price of the study. Payment can be made either in one amount at the beginning of the study, or split into two, with the second payment due upon delivery of the study.

For additional details, or to find out how the Founding Sponsor program applies to any particular study, please contact Flow Research. We look forward to working with you!

If you have any questions about the Founding Sponsor program, please contact Jesse Yoder at (781) 245-3200, or jesse@flowresearch.com.

Volume X: Module A: Strategies, Industries, & Applications



Downtown Sydney, Australia – photo by Flow Research



Flow Research, Inc.
27 Water Street
Wakefield, MA 01880
United States
+1 781 245-3200
+1 781 224-7552 (fax)
www.flowresearch.com
www.floweverything.com

Why Flow Research?

- We specialize in flowmeter markets and technologies
- We have researched all flowmeter types
- We study suppliers, distributors, *and* end-users
- Our worldwide network of contacts provides a unique perspective
- Our mission is to supply the data to help your business succeed