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Volume X: The World Market for Flowmeters, 8th Edition

Overview



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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, 8th Edition

You can profit from comprehensive market research on the worldw one place. *The World Market for Flowmeters, 8th Edition,* prese worldwide flowmeter market. This study includes both new-1 technology flowmeters, as well as the emerging flow technologies of

This full-color, two volume study includes:

- Market size of the worldwide markets for 11 flowmeter ted "normal" year before the coronavirus pandemic
- Market size data for **2020** shows effects of pandemic
- Market size forecasts for each flowmeter type through 2024
- Market shares worldwide and by each flowmeter type in 2019
- 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
- **Growth factors** for each flowmeter technology
- **Company profiles** with product information for easy comparison

Why we are publishing this study

We completed our first *Volume X* study in 2003, and published subsequent editions in 2008, 2010, January 2013, August 2014, January 2017, and May 2019. We have closely followed the growth in the markets of all the flowmeter types during this time.

The main goals of this study are to determine the size of the worldwide flowmeter market, including all technologies, assess effects of the pandemic and signs of recovery, and to see if the trend towards new-technology flowmeters continues. 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 flowmeter markets you supply and the markets you compete against. Market forecasts through 2024 are included.



The view from 20,000 feet

Segmentation covers what our clients want

When we published our first *Volume X* study, we found that the worldwide flowmeter market equaled US\$3.1 billion in 2002. It has continued to grow from this time. In order to make this market more understandable, we divide it into three flowmeter groups: New-Technology, Conventional Technology, and Emerging Technology. From there, we look at each of the flowmeter technologies individually. Then we build up the total market from the individual flowmeter types. This technique gives you a comprehensive view of the parts and the whole.



Taking a closer look

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

- North America (United States and Canada)
- Western Europe
- Eastern Europe/FSU (Former Soviet Union)
- Mideast/Africa
- Japan
- China
- Asia/Pacific
- Latin America (Mexico, Caribbean, Central and South 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

Conventional Technology

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

Emerging Technology

Sonar and Optical

Overview chapters for each flowmeter group include valuable summary data

The New-Technology Flowmeters overview chapter provides technology descriptions, compares new-technology flowmeters to the differential pressure (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 long-term involvement in the instrumentation field. The Conventional Flowmeters and Emerging Technology Flowmeters overview chapters are equally as detailed.

We also include **individual chapters for each of the flowmeter types** in the new-technology and conventional technology groups.

Flow Research has conducted individual studies of each flowmeter type over the years, with periodic updates. *The World Market for Flowmeters*, 8th *Edition* brings our research on these individual flowmeter markets together into a comprehensive overview, with data updated to 2019, with a significant amount of real data already included in 2020 forecast. Our method has always been to use a bottom-up approach when analyzing any market. In this way, we are able to both confirm data accumulated and trends we have been tracking as well as discover important new trends. Our success is based upon identifying what is new and comparing this information with our long-term knowledge of the market under study. We report our findings to you.

Focus on key issues affecting the market

As always, we will take a look at the key issues affecting flowmeter markets. Here are some examples:

Key issues addressed in the 8th Edition of this study

- Impact of the coronavirus pandemic on the flowmeter markets
- Impact of the oil & gas industries on the flowmeter markets
- Factors affecting growth of markets
- Growth rates for each flowmeter type in each of the geographic regions
- 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
- 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 conventional technology flowmeter markets
- A list of suppliers for each flowmeter type

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 will allow 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 and organization, recent acquisition activity, and sales strategies. Each company's flowmeter product line is summarized in easy-to-read tables which include Series names and designations.

Module A, the companion study to *Volume X*, includes sales strategies, descriptions of operating geographies, and the strengths and weaknesses of the firm's product offerings within the context of their market. *Module A* is described later in this overview.

Company Profiles

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

- ABB
- Armstrong Veris
- azbil Vortek
- Badger Meter: Blancett, Cox, Dynasonics, Flo-tech, Hedland, Recordall, Vision
- Baker Hughes
- Bopp & Reuther Messtechnik IMI
- Brooks Instrument ITW
- Canalta Flow Measurement
- Dalian Energas RMG Messtechnik
- Danaher Hach, McCrometer
- Emerson Process Solutions Daniel, Micro Motion, Rosemount
- Endress+Hauser
- Fluid Components International (FCI)
- Fuji Electric

- Honeywell International Honeywell Elster Group
- IDEX: Accusonic, Liquid Controls
- KROHNE
- Neptune, Flow Technology Roper
- OVAL Corporation
- Primary Flow Signal
- Schlumberger Sensia Cameron
- Schneider Electric Foxboro
- SICK
- Siemens
- TASI Group Sierra Instruments
- TechnipFMC
- Tokyo Keiso
- Toshiba
- 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-, Conventional, and Emerging technologies
- Have a reference standard of competitive technologies and models

Table of Contents: The World Market for Flowmeters, 7th Edition

Chapter One: Executive Summary Chapter Two: Scope and Method Chapter Three: Paradigm Case Analysis Chapter Four: Worldwide Flowmeter Market Chapter Five: New-Technology Flowmeters Chapter Six: Coriolis Flowmeters Chapter Seven: Magnetic Flowmeters Chapter Seven: Magnetic Flowmeters Chapter Eight: Ultrasonic Flowmeters Chapter Nine: Vortex Flowmeters Chapter Ten: Thermal Flowmeters Chapter Ten: Conventional Technology Flowmeters Chapter Twelve: Multivariable and Differential Pressure Transmitters

Chapter Thirteen: Primary Elements Chapter Fourteen: Positive Displacement Flowmeters Chapter Fifteen: Turbine Flowmeters Chapter Sixteen: Open Channel Flowmeters Chapter Seventeen: Variable Area Flowmeters Chapter Eighteen: Emerging Technology Flowmeters – Sonar and Optical Chapter Nineteen: Flowmeter Supplier Market Shares Chapter Twenty: Company Profiles



Dr. Jesse Yoder

Why you must have this study

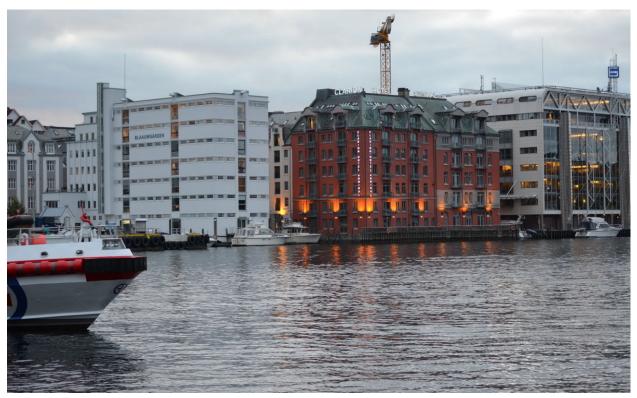
- Stay current with data on flowmeter shipments
- Understand how the 13 flow technologies stack up against each other
- Benefit from knowledge gleaned from 23+ years of data and 280+ studies
- Be among the first to own an 'instant classic' at a price you can afford
- Capitalize on insights from our onsite 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 tables like this one, plus many color charts illustrating the data:

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

Technology	2019	2020	2021	2022	2023	2024	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 8th Edition



Bergen, Norway – photo by Flow Research



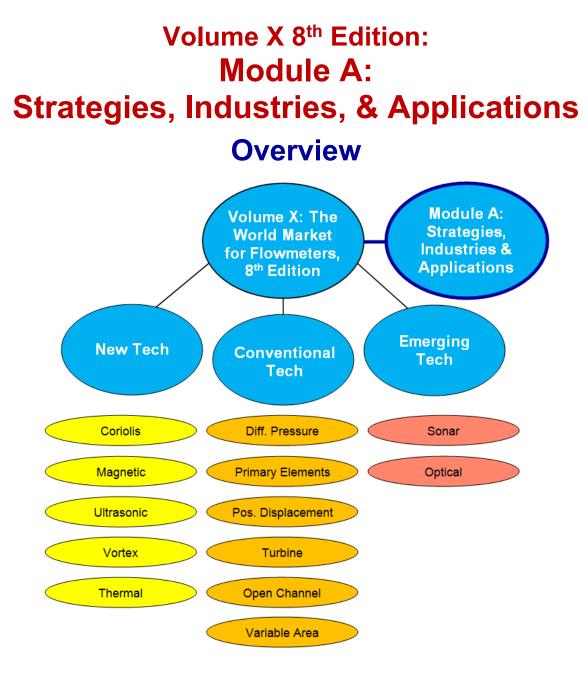
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Why Flow Research?

- 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



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Module A: Strategies, Industries, & Applications, 8th Edition

A world view of the market forecasts the best areas for future growth. The in-depth research in *Module A: Strategies, Industries, & Applications* complements and builds on the results of *Volume X: The World Market for Flowmeters, 8th Edition.* The module can be ordered as a standalone report or as an add-on to the main study.



Module A is designed to provide room to discuss strategies, industries and

applications in depth. In this edition, we have expanded the industries discussions even further with three additional chapters. The strategies section has also been expanded. Charts illustrate the worldwide market data for each the nine major flow measurement technologies.

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. Tactical and strategic recommendations for suppliers in each market segment are included in the Module.

Module A provides focused insights into industry trends, explaining product improvements, and advantages and disadvantages inherent to each flowmeter type. Also provided are shipments by application

and industry in dollars and percentages for the following new-technology and traditional technology flow measurement technologies: 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 (United States and Canada)
- Western Europe
- Eastern Europe/FSU (Former Soviet Union)
- Mideast/Africa
- Japan
- China
- Asia/Pacific
- Latin America (Mexico, Caribbean, Central and South America)



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In *Module A* you will find:

- Shipments by industry and application in dollars and percentages, broken out by flowmeter type for base year 2019 last whole normal year before coronavirus pandemic
- Forecasted growth rates by both application and industry through 2024 including a substantial amount of data for 2020.
- Essential information on market outlook and industry trends by flowmeter type
- Realistic strategies for success for those entering or already in the flowmeter market.

Data includes **dollars and percentages of shipments by flowmeter type** in 2019, and forecasts through 2024 – with 2020 based on a significant amount of data to reveal what actually happened ti these markets in 2020. Module A includes the following **Industries** common to all the flowmeter types:

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

Applications are specific to flowmeter type. Includes the following and many more:

- Custody Transfer
- Process Measurement
- Compressed Natural Gas
- LNG
- 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



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Applications by Flowmeter Type

New-Technology Flowmeter Applications

Coriolis

- Custody Transfer of Petroleum Liquids
- Custody Transfer of Natural Gas
- Allocation Metering
- Liquefied Natural Gas (LNG)
- Compressed Natural Gas (CNG)
- Dosing / Blending
- Process Measurement
- Other

Magnetic

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

Ultrasonic

- Custody Transfer of Natural Gas
- Custody Transfer of Petroleum Liquids
- Custody Transfer of Non-petroleum Liquids
- Check Metering
- Leak Detection
- Liquefied Natural Gas (LNG)
- Process Measurement
- Water Treatment
- Other

Vortex

- Custody Transfer of Petroleum Liquids
- Custody Transfer of Natural Gas
- Custody Transfer of Steam
- Non-custody Transfer of Petroleum Liquids
- Non-custody Transfer of Natural Gas
- Non-custody Transfer of Steam
- Non-petroleum Liquids
- Slurries
- Water
- Other

Thermal

- Continuous Emissions Monitoring (CEM)
- Flare Gas/Stack Gas
- Landfill Gas
- Biogas
- Biomass
- Coal Mine Methane
- Boiler Inlet
- Wastewater Treatment
- Air/Compressed Air
- Sanitary/Hygienic
- Submetering
- Other

Conventional Technology Flowmeter Applications

Differential Pressure Transmitters — See applications for primary elements.

Primary Elements

- Custody Transfer of Oils/Petroleum Liquids
- Custody Transfer of Gas
- Non-custody Transfer of Gas
- Non-custody Transfer of Liquids
- Wet Gas Metering
- Allocation Metering of Gas
 - Gas Gathering Stations
- LNG

•

Steam

- Wellhead Monitoring
- CNG
- In-plant Measurement

• Other

• HVAC

Positive Displacement

- Municipal Water
- Municipal/Industrial Gas
- Petroleum Liquids
- Industrial Liquids

Turbine

- Municipal Water
- Municipal/Industrial Gas
- Oil
- Industrial Liquids

Flow Research, Inc.

Flow Research is the only market research company whose primary mission is to research flowmeter and other process control instrumentation markets. Flow Research market research studies 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 conventional – as well as pressure transmitters; temperature sensors and transmitters, infrared thermometers and thermal imagers; analytical instrumentation; selected API-certified valves; and studies specifically focused on certain major markets for flowmeters such as the oil and gas markets. For more details, go to <u>www.flowstudies.com</u>. Some recent and currently scheduled studies are listed on the next page. Flow Research also started a working group focusing on flowmeter calibration, and has completed two studies on flowmeter calibration facilities.

The lead analyst for this study, **Dr. Jesse Yoder**, President of Flow Research, has 32 years of experience writing about and analyzing process control and instrumentation markets, beginning as president and founder of Idea Network before founding Flow Research. Dr. Yoder has received two patents for new flowmeter designs. Several prototypes of these designs have been built and are currently being tested. He has written over 280 market research studies and published more than 300 articles on flow and instrumentation in industry journals. Many of the articles written by Dr. Yoder can be read by visiting the Flow Research article website at www.flowarticles.com. His latest book, *The Tao of Measurement: A Philosophical View of Flow and Sensors*, with Richard E. Morley as co-contributor, was published in 2015 by the International Society of Automation (ISA). Topics covered include temperature, pressure, flow, time, length, and area. Dr. Yoder is currently writing a two-book set called *Advances in Flowmeter Technology scheduled* to be published in 2022 by CRC Press. The first volume is called *New-technology Flowmeters* and the second volume is called *Conventional Flowmeters*.

Belinda Burum, Vice President, 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 worked on many projects.

Norm Weeks, Senior Market Analyst, joined Flow Research in 2004 after 24-years with Verizon specializing in innovative solutions for major enterprises, introducing new products and lifecycle management strategies, and product marketing. At Flow Research, he contributes greatly to the research, analysis and writing for our studies, White Papers, and other publications. He is also a specialist in custom projects.

Leslie Buchanan, Research Assistant, Publication Production Associate, joined Flow Research in 2010. She took on management of the contacts database, assistance with customer liaison, and developing standards for our publication formats. She has since become increasingly involved with many aspects of the production of our studies, Worldflow and other publications.

Vicki Tuck, Administrative Assistant, joined Flow Research in 2012. She handles a wide variety of office functions – essential to keep any business running – as well as the contacts database. She also does most of the news research for and assists with Worldflow publications.

The World Market for Turbine Flowmeters, 3rd Editionwww.flowturbine.commCross-Technology Flowmeter StudiesVolume X: The World Market for Flowmeters, 8th Editionwww.flowvolumex.comVolume X: Module A: Strategies, Industries, and Applicationswww.flowvolumex.comwww.flowvolumex.comFlowmeters in the Oil & Gas Industrywww.oilflows.com

The World Market for Custody Transfer of Natural Gaswww.custodytransfer.comThe World Market for Gas Flow Measurement, 4th Editionwww.gasflows.comGas Module A: Applications and Strategies for Gas Flow Measurementwww.gasflows.comGas Module B: Natural Gas Production, Consumption, and Flow Measurementwww.gasflows.comin the Oil & Gas Industrywww.gasflows.com

Flow Calibration

Core Study: Worldwide Gas Flow Calibration Facilities and Marketswww.flowcalibration.orgModule A: Worldwide Liquid Flow Calibration Facilities and Marketswww.flowcalibration.org

Temperature

The Market for Temperature Sensors in the Americas, 3rd Edition <u>www.tempresearch.com</u> Level

The World market for Level Measurement Devices

In addition to off-the-shelf studies like those, Flow Research specializes in **custom projects** for companies who want more detailed information on a specific subject. In most cases, the type of information required in a custom project is too specific and narrow to be available in an off-the-shelf report. We also work with companies individually to **formulate strategies** that will help them succeed in an increasingly complex world. Dr. Yoder has been working in process control since 1986 and creating market research studies since 1990. He and his team have studied hundreds of companies during this time and have advised most of the top flowmeter suppliers on market and product strategies. We also conduct **user surveys** that include a detailed analysis of customer perceptions. User surveys can be useful to reveal hidden problems, emerging applications, and new product requirements. Flow Research also offers the **Worldflow Monitoring Service** that provides subscribers with quarterly updates on the flow and energy

The World Market for Coriolis Flowmeters, 6th Edition

The World Market for Vortex Flowmeters, 6th Edition

The World Market for Thermal Flowmeters, 2nd Edition

The World Market for Mass Flow Controllers, 3rd Edition

The World Market for Multiphase Flowmeters, 2nd Edition

The World Market for Pressure Transmitters, 5th Edition

The World Market for Primary Elements, 2nd Edition

Multiphase: Module A: The World Market for Watercut Meters

The World Market for Positive Displacement Flowmeters, 3rd Edition

The World Market for Magnetic Flowmeters, 6th Edition

The World Market for Ultrasonic Flowmeters, 6th Edition

New-Technology Flowmeter Studies

Market Update for Mass Flow Controllers

Conventional Technology Flowmeter Studies

Websites

www.flowcoriolis.com

www.flowultrasonic.com

www.flowmultiphase.com

www.watercutmeters.com

www.worldpressure.com

www.flowplate.com

www.flowpd.com

www.flowmags.com

www.flowvortex.com

www.flowmfc.com

www.flowmfc.com

www.flowthermal.com

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www.levelresearch.com

industries in the *Market Barometer* and the *Energy Monitor*, plus Flash Reports and other information.

What are New-Technology Flowmeters?

New-Technology flowmeters include Coriolis, magnetic, ultrasonic, vortex, thermal, and multiphase. 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 Conventional Technology meters on a standard basis.

Conventional Technology flowmeters include differential pressure, (primary elements used with DP), positive displacement, turbine, open channel, and variable area.

Emerging Technology flowmeters include sonar and optical.

The Flow Research Gold Partner Program

To produce studies that most closely match our clients' needs, Flow Research instituted the Gold Partner Program. 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, Gold Partners receive regular updates from Flow Research on study progress, and receive a significant discount on the standard retail price of the study.

Procedure: Early in the planning phase of a study, Gold Partners receive a proposal that includes the proposed segmentation. Gold Partners 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 send reports to Gold Partners, 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, Gold Partners 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 Gold Partner Program applies to any particular study, please contact Flow Research at $+1\,781\,245-3200$, or norm@flowresearch.com.

We look forward to working with you!

Volume X 8th Edition: Module A: Strategies, Industries, & Applications Overview



Burj Khalifa, Dubai, United Arab Emirates – Photo by Flow Research



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