

MASS FLOWMETER SERIES

The World Market for Coriolis Flowmeters, 7th Edition

— PROPOSAL —



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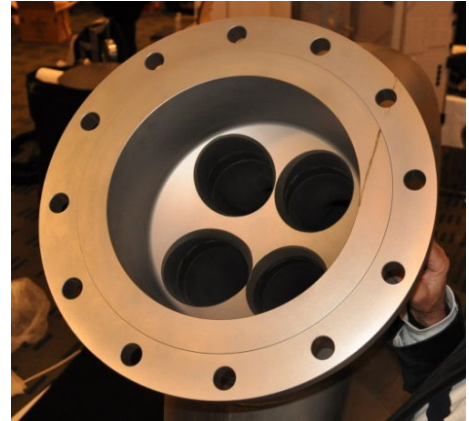
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The World Market for Coriolis Flowmeters, 7th Edition

Flow Research is proposing a new study on the worldwide Coriolis flowmeter market, one of the fastest growing flowmeter markets. The study, *The World Market for Coriolis Flowmeters, 7th Edition*, will part of a *Mass Flowmeter Series* also including *The World Market for Mass Flow Measurement (core study)*; *The World Market for Thermal Flowmeters, 3rd Edition*; and *The World Market for Mass Flow Controllers, 4th Edition*.

The Coriolis study will reveal the size of the 2022 worldwide market, including the market shares of all major suppliers and forecasts for the market through 2027.



This study aims to achieve multiple goals:

- Determine worldwide market size for the Coriolis flowmeter market in 2022
- Determine worldwide market shares for the Coriolis flowmeter market in 2022
- Forecast market growth for all types of Coriolis flowmeters through 2027
- Segment data both on a worldwide basis and for each of eight global regions
- Identify the industries and applications where Coriolis flowmeters are used, and market growth sectors
- Analyze products for the main companies selling into the Coriolis flowmeter market
- Provide company profiles of the main suppliers of Coriolis flowmeters
- Provide strategies to manufacturers that sell into the Coriolis flowmeter market

Rationale for Study

Our interactions with end users indicate that the interest in Coriolis flowmeters remains at a very high level, and that customer needs have become more complex and demanding.

Coriolis flowmeters are the most accurate flowmeter made, and this high accuracy – up to 0.05 percent – is one of the major reasons for their continued growth. Companies that need flowmeters for custody transfer, or want highly accurate measurements in terms of mass, have good reasons to select Coriolis flowmeters. They find that despite a relatively high price tag, Coriolis flowmeters can provide a good return on investment.

Even though Coriolis meters have a higher purchase cost than many other flowmeters, they may cost less over the lifetime of the meter due to reduced maintenance costs – and most users today distinguish between purchase cost and cost of ownership. Aside from the vibrating tube, Coriolis meters do not have any moving parts subject to wear. With many companies reducing their engineering and maintenance staffs, having a meter that does not require a great deal of maintenance can be a major advantage.

We believe that significant growth in the Coriolis market is due to growth in the oil & gas and other energy markets. When oil prices began dropping years ago and many oil and gas exploration projects were postponed or cancelled, associated instrumentation industries experienced a ripple effect. This downturn especially impacted the Coriolis, ultrasonic, differential pressure, positive displacement, and turbine flowmeter markets. Fortunately, when oil prices began recovering in early 2016, the worldwide flowmeter market got back on a healthy upward track. More recently, Coriolis meters rebounded after the 2020 Corona virus pandemic slowdown. This study will discover just how much the Coriolis market is rising, especially in light of the war in Ukraine, sanctions on Russia, and changes in global oil and gas supplies. We expect that Coriolis flowmeters, which are industry-approved for custody transfer of both gas and liquids, will continue to experience strong market growth rates over the next five years.

Key issues we plan to address

- Frontiers of research
- Coriolis force vs. Coriolis meters
- Growth in the popularity of low-cost Coriolis flowmeters to reduce sticker shock
- Relative merits of straight tube vs. bent tube meters
- Size of the 2-wire Coriolis market
- Growing use for gas flow, including custody transfer
- Why large line size Coriolis meters are becoming more feasible
- Technological improvements in Coriolis flowmeters

We will also explore improvements in Coriolis technology contributing to growth. Coriolis meters now come in larger line sizes that are much better able to measure gases. Straight tube meters – which reduce fluid build-up and pressure drop – have become more accurate and reliable, thereby addressing some of the drawbacks of bent tube meters. Some suppliers also offer two-wire, loop-powered meters for cost and energy savings and use in hazardous environments.

To sweeten the pot further, some suppliers have broken price barriers by offering Coriolis meters at considerably lower price points. Although the lower-cost flowmeters do not offer the same level of performance, they do provide many of the same technology benefits.

Flow Research published the sixth edition of our worldwide Coriolis flowmeter study in September 2020. We have continued to follow the Coriolis flowmeter market regularly since then, and have been providing technical, corporate, and marketing updates in our *Market Barometer* publications.

The World Market for Coriolis Flowmeters, 7th Edition will analyze overall market size and market growth forecasts in depth from 2022 to 2027, worldwide and regionally. We will explore a range of growth factors as we research the market.

Background of the Study

Flow Research has been following the Coriolis flowmeter market since we published the first edition of our worldwide Coriolis flowmeter study in 2001. We published subsequent editions in 2003, 2008, 2013, 2016, and 2020. We also include the Coriolis market in every edition of *Volume X: The World Market for Flowmeters*, our market study that includes all types of flowmeters.

In conducting this study, we are contacting all known manufacturers of Coriolis flowmeters worldwide to assemble a picture of the total Coriolis flowmeter market. We will ask suppliers to provide detailed information about geographic segmentation, industries sold into, types of Coriolis flowmeters sold, and many other product segments. As a result, the study identifies where growth is occurring in the market, and the underlying factors driving that growth.

When analyzing target markets, Flow Research uses the perspective of all three segments – manufacturer, distributor/representative, and end user. We maintain regular communication with all three of these groups in order to be best positioned to note both subtle and significant shifts in technologies or buying patterns.

Segmentation

Geographic Segmentation

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

Shipments of Coriolis Flowmeters Worldwide and by Region

Technology

- Single Bent Tube
- Dual Bent Tube
- Single Straight Tube
- Dual Straight Tube
- Four-tube (bent)

Average Selling Prices by Technology

- Worldwide
- By Region

Fluid Type

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

What's in this for my company?

- See the emerging applications and where the growth is
- Understand world and regional markets
- Get to know your real competition
- Learn what other suppliers manufacture, where, and for whom
- Make more informed decisions

Shipments of Coriolis Flowmeters Worldwide and by Region (*continued*)

Mounting Type

- Integral (compact)
- Remote

Sensor Tube Material

- Stainless Steel
- Hastelloy C[®]
- Titanium
- Duplex/Super Duplex
- Zirconium
- Tantalum

Gas Applications

- Custody Transfer of Natural Gas
- Allocation Metering
- Process Measurement
- Industrial Gases (not in Process Measurement)
- CNG (Compressed Natural Gas)
- Hydrogen Dispensing
- Utility Metering
- Other

Petroleum Liquids Applications:

- Custody Transfer: Upstream/Mid-stream
- Custody Transfer: Downstream
- Allocation Metering
- LNG (Liquefied Natural Gas)
- Batch Filling
- In-Plant Process Measurement
- Other

Non-petroleum Liquids Applications:

- Custody Transfer of Non-petroleum Liquids
- Process Measurement
- Batch/Filling
- Other

Flow Research Gold Partner Program

Your input, please

Make sure this study meets your needs by telling us what you think about our scope and segmentation. By becoming a Gold Partner, you can also enjoy a significant discount on the regular price of the study.

Being a Gold Partner requires making an early commitment to purchase the study, but you can make payments 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 more details, please contact Jesse Yoder at +1 781 245-3200, or jesse@flowresearch.com.

We look forward to working with you!

Shipments of Coriolis Flowmeters Worldwide and by Region (*continued*)

Communication Protocol

- HART (wired)
- Ethernet IP
- Foundation Fieldbus™
- Modbus
- PROFINET®
- Profibus®DP
- Profibus®PA
- Wireless (shipped with WirelessHART, Bluetooth, or other)
- Other

Power Type

- 2-wire
- 4-wire

Line Size

- $\leq \frac{1}{8}$ inch
- $> \frac{1}{8} - \frac{1}{4}$ inch
- $> \frac{1}{4} - \frac{1}{2}$ inch
- $> \frac{1}{2}$ inch – 1 inch
- > 1 inch – 2 inches
- $> 2 - 4$ inches
- $> 4 - 6$ inches
- $> 6 - 10$ inches
- $> 10 - 16$ inches

Accuracy Level by Fluid Type

- | <i>Gas</i> | – | <i>Liquids</i> |
|--------------------|---|--------------------|
| • $\leq .15\%$ | | • $\leq .15\%$ |
| • $> .15\% - .5\%$ | | • $> .15\% - .5\%$ |
| • $> .5\% - 1.0\%$ | | • $> .5\% - 1.0\%$ |
| • $> 1.0\%$ | | • $> 1.0\%$ |

Industry

- Upstream Oil & Gas (exploration & production)
- Midstream Oil & Gas (from upstream to refining/processing facility)
- Downstream Oil & Gas (refined product transportation and distribution)
- Refining
- Chemical
- Food & Beverage
- Pharmaceutical
- Pulp & Paper
- Metals & Mining
- Power
- Water/Wastewater
- Marine
- Other

History and Application of Coriolis Flowmeters

Coriolis flowmeters are a relatively recent entrant into the market. In 1977, Micro Motion introduced a commercially viable Coriolis flowmeter for industrial applications. Since that time, a number of other suppliers have entered the market, including Endress+Hauser and KROHNE.

Coriolis suppliers have introduced a wide variety of models and types of Coriolis flowmeters in the past 40 years. Endress+Hauser, KROHNE, and Micro Motion have all introduced large four-tube Coriolis meter for oil, gas, and other fluids in the last several years. The use of Coriolis flowmeters in multiphase flow measurement is another recently developed application.

Coriolis suppliers differentiate themselves in a number of ways. One is by the proprietary design of the bent tubes in their Coriolis flowmeters. Another is by the different types of straight tube Coriolis flowmeters that they offer.

Suppliers also compete by bringing out Coriolis flowmeters for particular industries and applications, such as water, food & beverage, and pharmaceutical. Accuracy and other performance specifications are other areas of supplier differentiation.

Shipments of Coriolis Flowmeters Worldwide and by Region (*continued*)

Distribution Channel

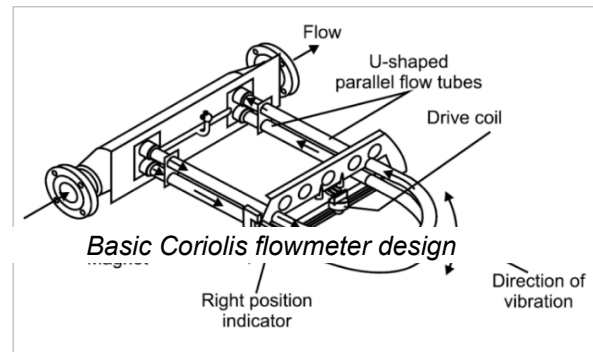
- Direct Sales
- Independent Representatives
- Distributors
- E-Business

Customer Type

- End users
- Original equipment manufacturers (OEMs)
- Systems integrators
- Engineering companies

Market Shares of Coriolis Flowmeter Manufacturers

- Worldwide
- Each geographic region



Strategies for Success

- Competitive points of product emphasis
- Strategies for being competitive in the Coriolis flowmeter market
- Pursuing new applications
- Customer education and other market strategies and tactics

Company Profiles

- Business profiles of the many suppliers of Coriolis flowmeters
- Histories, current organization, overall product line summaries
- Company strategies



Beverage processing plant production line

The following are some of the many companies we plan to profile:

- ABB
- Alicat Scientific
- Badger Meter
- Beijing Sincerity Automatic Equipment Co., Ltd.
- Bopp & Reuther Messtechnik
- Bronkhorst High-Tech B.V.
- Emerson – Micro Motion
- Endress+Hauser
- ITW – Brooks Instrument
- KOBOLD – Heinrichs
- KROHNE
- OVAL Corporation
- Red Seal Measurement
- Rheonik
- Schneider Electric – Foxboro
- Sensia
- Shanghai Yinuo Instrument
- Siemens Process Instrumentation
- TASI Group – TRICOR Coriolis Technology: KEM Küppers, AW-Lake, Litre Meter
- Tokyo Keiso
- Walsn Limited
- Xi'an Dongfeng Machinery & Electronic
- Yokogawa

Publication Date: We plan to publish this study in Q2 2023.



Gustave Coriolis

Flow Research, Inc.

Flow Research is the only market research company whose primary mission is to research 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 traditional – as well as pressure transmitters; temperature sensors and transmitters, infrared thermometers and thermal imagers; level devices; analytical instrumentation; selected API-certified valves; and studies specifically focused on certain major markets for flowmeters such as the oil and gas markets. Flow Research also started a working group focusing on flowmeter calibration (FRWG.org) and has completed two studies on flowmeter calibration facilities: one for liquids and one for gas.

Partnerships and Alliances

Flow Research helps flowmeter companies form alliances and partnerships to provide specific solutions or broaden their customer base and distribution channels. These partnerships can include manufacturers of valves, hoses, transmitters, or other flow-related products, as well as other flowmeter manufacturers.

Distributorships

Are expanding your presence in the U.S.? We can help you find distributors for your flowmeters.

Custom Projects

Companies commission us for custom projects when they want more detailed information on a specific subject than is possible in an off-the-shelf report. They may be evaluating the future or expansion of a product line, determining whether to acquire or merge with another company, or seeking to better understand their customer needs.

Consulting

We also work with companies individually to formulate strategies that help them succeed in an increasingly complex world. Dr. Yoder and his team have studied hundreds of companies and have advised most of the top flowmeter suppliers on market and product strategies.

Research Team Background



Dr. Jesse Yoder is President of Flow Research Inc., a company he founded in 1998. Dr. Yoder, the lead analyst for this study, received a PhD in philosophy from the Univ. of Mass. Amherst in 1984. He has been working in process control since 1986 and creating market research studies since 1990. He has 36 years of experience as a writer and analyst in process control and instrumentation beginning as president and founder of Idea Network.

Since 1990, he has written over 280 market research studies, most of them regarding flow and instrumentation. Dr. Yoder has also written over 300 articles on flow and instrumentation for trade journals. Many can be found at www.flowarticles.com.

In addition to the years he has spent writing market studies, Dr. Yoder spent 10 years as a technical writer. Almost four years of this were spent writing technical manuals and training guides for the process control division of Siemens. He also taught technical writing at the graduate level at Northeastern University and the University of Massachusetts Lowell. Dr. Yoder spent 10 years as an adjunct philosophy professor at the University of Massachusetts Lowell and Lafayette College.

Dr. Yoder has received two U.S. patents for the flowtube meter, a new dual tube/dual sensor method of measuring flow, in 2015 and 2017. This meter has two prototypes built and has been tested at CEESI in Nunn, Colorado.

Dr. Yoder wrote a two-book set called *[Advances in Flowmeter Technology](#)* for CRC Press that discusses the history, operating principles, growth factors, representative companies, and frontiers of research for all 10 types of flowmeters. The first volume, *New-Technology Flowmeters*, published September 6, 2022, was followed by the second volume, *Conventional Flowmeters*, on December 16.

In 2015, ISA published Dr. Yoder's book, *[The Tao of Measurement](#)*, with Richard E. Morley as co-contributor. Topics included temperature, pressure, flow, time, length, and area.

Belinda Burum, Vice President, has worked as a writer and editor in journalism, advertising, and high tech marketing communications and customer references for 30+ years. Since joining Flow Research in 2002, she has been involved with most of our projects and publications.

Leslie Buchanan, Research and Publication Production Associate, joined Flow Research in 2010 with skills from work and life experiences here and abroad. She assists with research and writing, and handles many publication aspects of Flow Research studies.

Vicki Tuck, Administrative Assistant, joined Flow Research in 2012 with experience in both the fast-paced law firms of Boston and in various nonprofit organizations. She assists with administrative tasks, including database and collecting news for the Worldflow publications.

Kaleigh Flaherty, Director of Marketing, created social media posts for us starting in May 2021 before going back to school to finish her degree in marketing at Coastal Carolina University in Conway, South Carolina. She rejoined us in August 2022 to expand our social media presence and manage other outreach activities.

For more information on Flow Research, please visit our website at www.flowresearch.com. Please follow us on Facebook, LinkedIn, Twitter, and Instagram. We also invite you to join our Flow Research LinkedIn group.

Recent and Currently Scheduled Flow Research Studies

New-Technology Flowmeter Studies

Mass Flowmeter Series

The World Market for Coriolis Flowmeters, 7 th Edition	www.flowcoriolis.com
The World Market for Thermal Flowmeters, 3 rd Edition	www.flowthermal.com
The World Market for Mass Flow Controllers, 4 th Edition	www.flowmfc.com
The World Market for Magnetic Flowmeters, 7 th Edition	www.flowmags.com
The World Market for Ultrasonic Flowmeters, 6 th Edition	www.flowultrasonic.com
The World Market for Vortex Flowmeters, 6 th Edition	www.flowvortex.com
The World Market Update for Mass Flow Controllers	www.flowmfc.com
The World Market for Multiphase Flowmeters, 2 nd Edition	www.flowmultiphase.com
Multiphase: Module A: The World Market for Watercut Meters	www.watercutmeters.com

Conventional Flowmeter Studies

The World Market for Pressure Transmitters, 5 th Edition	www.worldpressure.com
The World Market for Primary Elements, 2 nd Edition	www.flowplate.com
The World Market for Positive Displacement Flowmeters, 3 rd Edition	www.flowpd.com
The World Market for Turbine Flowmeters, 3 rd Edition	www.flowturbine.com
The World Market for Variable Area Flowmeters	www.flowva.com

Cross-Technology Flowmeter Studies

Volume X: The World Market for Flowmeters, 8 th Edition	www.flowvolumex.com
Volume X: Module A: Strategies, Industries, and Applications	www.flowvolumex.com
The World Market for Gas Flow Measurement, 4 th Edition	www.gasflows.com
Gas Module A: Applications and Strategies for Gas Flow Measurement	www.gasflows.com
Gas Module B: Natural Gas Production, Consumption, and Flow Measurement in the Oil & Gas Industry	www.gasflows.com
Flowmeters in the Oil & Gas Industry	www.oilflows.com

Flow Calibration Studies

Core Study: Worldwide Gas Flow Calibration Facilities and Markets	www.flowcalibration.org
Module A: Worldwide Liquid Flow Calibration Facilities and Markets	www.flowcalibration.org

Temperature

Market for Temperature Sensors in the Americas, 3 rd Edition	www.tempresearch.com
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We further describe these studies at www.FlowStudies.com.

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Why Flow Research? Because we . . .

- Are the only company whose sole focus is the flowmeter instrumentation market
- Research all new-technology and conventional flowmeters
- Contact every known supplier
- Offer our studies in both electronic and color-printed hardcopy versions
- Draw on flowmeter data dating back to 1992, when we began actively following the market