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

An Overview of a Market Research Study on the Worldwide Coriolis Flowmeter Market

Flow Research has completed a new market study on the worldwide Coriolis flowmeter market. The primary goal is to determine the size of the Coriolis flowmeter market in 2007, with forecasts included through 2012. The study will be called **The World Market for Coriolis Flowmeters, 3rd Edition**.

The study has multiple purposes:

- To provide the 2007 market size in US dollars and unit volume for Coriolis flowmeters worldwide
- To provide market shares of the leading suppliers of Coriolis flowmeters worldwide
- To provide a detailed forecast of the market for Coriolis flowmeters in dollars and unit volumes through 2012
- To provide a technology and product analysis for Coriolis flowmeters
- To provide market and product strategies for suppliers of Coriolis flowmeters worldwide
- To provide market and product strategies for suppliers of Coriolis flowmeters worldwide
- To provide company profiles of the significant suppliers of Coriolis flowmeters worldwide

Background of Study

The French mathematician Gustave Coriolis formulated the principle that underlies Coriolis flowmeters. Coriolis showed in 1835 that an inertial force needs to be taken into account when

the motion of bodies in a rotating frame of reference is described. The earth is often used as an example of the Coriolis force. A hypothetical object thrown from the North Pole to the equator appears to vary from its intended path, due to the earth's rotation.

Operating Principle. Coriolis flowmeters contain one or more vibrating tubes. These tubes are usually bent, although straight-tube meters are also available. The fluid to be measured passes through the vibrating tubes. It accelerates as it flows toward the maximum vibration point, and slows down as it leaves that point. This causes the tubes to twist. The amount of twisting is directly proportional to mass flow. Position sensors detect tube positions.

While the roots of today's Coriolis flowmeters can be traced back to the 1950s, it was not until 1977 that 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 30 years. Another important development is the use of Coriolis flowmeters for multiphase flow measurement.

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

While Coriolis flowmeters are loved by many end-users, price is often an issue. Coriolis flowmeters are the most expensive meters made, in terms of average selling price. The average selling price of Coriolis flowmeters is between $5,000 and $6,000. Some suppliers have introduced low-cost Coriolis flowmeters in the $3,000 range. Performance specifications for the lower-cost flowmeters are not at the same level as those of the higher-priced meters. However, these lower-cost meters help satisfy the needs of users who want the essential benefits of Coriolis technology but prefer not to pay the higher price.

Rationale for Study

Flow Research published the second edition of our worldwide Coriolis flowmeter study in February 2003. We have been following the Coriolis flowmeter market regularly since then, providing quarterly updates in our **Market Barometer** (www.worldflow.com). User interviews showed that the interest in Coriolis flowmeters remains at a very high level. We anticipated that some of the growth in this market is no doubt due to growth in the oil and gas and other energy markets. We believed that this was an optimal time to quantify this growth, and to take another in-depth look at what appeared to be a rapidly expanding market.

Key Issues Addressed

This study addresses the key issues in the Coriolis flowmeter market, including:

- Growth in the use of smart Coriolis flowmeters
- The relative merits of straight tube vs. bent tube meters
- The growing use of Coriolis flowmeters to measure gas flow
- The emerging market for Coriolis in steam flow measurement
- Growth in the market for large line size Coriolis meters
- Low cost Coriolis meters
- The use of Coriolis flowmeters for multiphase flow measurement

Segmentation

The segmentation for this study is as follows:

Geographic Segmentation:

- North America (United States and Canada)
- Europe (Western Europe, Eastern Europe, Russia, and the Commonwealth of Independent States)
- Middle East/Africa
- Japan
- China
- Asia without Japan/China (including countries of the Far East, Southeast Asia, Pakistan, Australia and the South Pacific, the Indian subcontinent, and all other Asian countries)
- Latin America

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.
- The best information creates the best decisions.

Coriolis Flowmeters by Flowtube Type

This study distinguishes between flowtube types as follows:

- Single bent tube
- Dual bent tube
- Single straight tube
- Dual straight tube

Coriolis Flowmeters by Mounting Type

Coriolis flowmeters are segmented in this study according to mounting type:

- Integral
- Remote

Coriolis Flowmeters by Fluid Type

Coriolis flowmeters are segmented in this study according to fluid type:

- Liquid
- Gas
- Steam

Coriolis Flowmeters by Intelligence Level

There are two kinds of Coriolis flowmeters:

- Smart (digital output, remotely configurable)
- Conventional (analog only)

Smart Coriolis Flowmeters by Communication Protocol

Coriolis flowmeters are segmented by the following protocols:

- HART
- Foundation Fieldbus™
- Profibus®
- Modbus®
- Other

Coriolis Flowmeters by Temperature Range

Coriolis flowmeters are segmented by the following temperature ranges:

- High temperature: >200°C
- Low temperature: <-50°C (Cryogenic)
- Other: 50°C - 200°C

Coriolis Flowmeters by Tube Material Type

Coriolis flowmeters are segmented by the following tube material types:

- Stainless steel
- Hastelloy C®
- Titanium
- Zirconium
- Tantalum

Coriolis Flowmeters by Application

Coriolis flowmeters are segmented in this study by the following applications:

- Custody transfer: natural gas
- Custody transfer: liquids
- Process measurement
- Compressed natural gas
- Other

Coriolis Flowmeters by Industry

Coriolis flowmeters are used mainly in the process industries. We segmented sales revenues by the following industries on both a worldwide and regional basis:

- Oil & Gas (production, transportation, distribution)
- Refining
- Chemical
- Food & Beverage
- Pharmaceutical
- Pulp & Paper
- Metals & Mining
- Power
- Water & Wastewater
- Other (including Cement, Ceramic, Rubber, Paint and other process industries)

Coriolis Flowmeters by Distribution Channel

The Coriolis flowmeter market is segmented according to the following sales channels:

- Direct sales
- Independent representatives
- Distributors
- E-Business

Coriolis flowmeters by Customer Type

The Coriolis flowmeter market is segmented according to the following customer types:

- End-Users
- OEMs
- Systems Integrators
- Engineering Companies

How will the Founding Sponsor Program help me?

- You can have your specific data requirements included in the study
- You help determine the scope and final objectives
- You receive periodic updates as the research progresses
- You are among the first to receive final study results
- You receive favorable pricing and other purchase terms

Publication Date

This study was published in September 2008.

Founding Sponsorship

We offered the opportunity for companies to become Founding Sponsors for this study. Benefits of being a Founding Sponsor include being able to participate in determining study scope and direction, being sent regular updates on study progress, and receiving a favorable discount pricing package. To those who participated, thank you for your input.

Background

Dr. Jesse Yoder is President of Flow Research Inc., a company he founded in 1998. Dr. Yoder has 20 years' experience as a writer and analyst in process control and instrumentation. Since 1990, he has written more than 100 market research studies, most of them in flow and instrumentation.

Dr. Yoder has also written more than 70 articles on flow and instrumentation for trade journals. Links to many of these can be found at http://www.flowresearch.com/articles.htm.

Norm Weeks, 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 management, and product marketing. He is now a fulltime market analyst for Flow Research, and has already completed several studies.

Belinda Burum, Vice President and Editor, has worked in high tech for 16 years as a technical writer and marketing communications manager. She joined the company in 2002, and has since then worked on many projects. She is a very talented writer, and has a strong customer focus. In addition to her work on market studies, Belinda is serving as associate editor of the **Market Barometer** and the **Energy Monitor**.

Some of the recent and scheduled Flow Research studies are as follows:

Volume I: The World Market for Coriolis Flowmeters, 3rd Edition (September 2008)
Volume II: The Global Market for Magnetic Flowmeters, 4th Edition (February 2009)
Volume III: The World Market for Ultrasonic Flowmeters, 3rd Edition (January 2008)
Volume IV: The World Market for Vortex Flowmeters, 3rd Edition (March 2006)
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 (2002)
Volume VIII: The World Market for Turbine Flowmeters (2002)
Volume IX: The World Market for Pressure Transmitters, 2nd Edition (October 2007)
Volume X: The World Market for Flowmeters (includes all flow technologies) (April 2008)
Volume XI: The World Market for Gas Flow Measurement (September 2004)
Volume XII: The World Market for Steam Flow Measurement (March 2008)
Volume XIII: The World Market for Mass Flow Controllers (July 2008)
The Market for Temperature Sensors in the Americas, 2nd Edition (May 2006)
The Market for Temperature Transmitters in the Americas, 2nd Edition (November 2006)

These studies are described at http://www.flowresearch.com/flow.htm

Besides writing and publishing studies of this type, Flow Research specializes in user surveys that include a detailed analysis of customer perceptions. In addition, Flow Research provides quarterly updates on the flow and energy industries in the **Market Barometer** and the **Energy Monitor**. The **Energy Monitor** analyzes the current state of the oil & gas, refining, power, and renewables industries, and the implications for instrumentation supplier. Both reports are part of the Worldflow Monitoring Service; more details are available at www.worldflow.com. For more information on Flow Research, please visit our website at www.flowresearch.com.

The World Market for Coriolis Flowmeters, 3rd Edition

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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.