



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

# The World Market for Vortex Flowmeters, 5<sup>th</sup> Edition

## Overview



**Publication Date: December 2014**

[www.flowvortex.com](http://www.flowvortex.com)



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## **The World Market for Vortex Flowmeters, 5<sup>th</sup> Edition**

Flow Research has published a new study on the worldwide vortex flowmeter market in December 2014. The primary goal was to determine the size of the vortex flowmeter market in 2013, and to forecast the market through 2018. The study is called **The World Market for Vortex Flowmeters, 5<sup>th</sup> Edition**.

The study has multiple purposes:

- To determine worldwide market size and market shares for all vortex flowmeters in 2013
- To forecast market growth for all types of vortex flowmeters through 2018
- To identify the industries and applications where vortex flowmeters are used, and to identify market growth sectors
- To provide market shares for the leading suppliers
- To provide a product analysis for the main companies selling into the vortex flowmeter market
- To provide strategies to manufacturers for selling into the vortex flowmeter market
- To provide company profiles of the main suppliers of vortex flowmeters.



*Flow Research photo of oil field pumpjack near Houston, TX*

### **Rationale for Study**

Flow Research published the 4<sup>th</sup> edition of our worldwide vortex flowmeter study in July 2010. We have been following the vortex flowmeter market regularly since then, providing quarterly updates in our *Market Barometer* publication ([www.worldflow.com](http://www.worldflow.com)). We have also done user interviews that show that the interest in vortex flowmeters remains at a very high level. One reason for this heightened interest is that in January 2007, the American Petroleum Institute (API) approved a draft standard for the use of vortex flowmeters in custody transfer applications. We believe that this was an optimal time to quantify the growth in this market, and to take another in-depth look at an expanding market for this technology.

## Background of Study

Vortex flowmeters were first introduced to the industrial markets in the early 1970's. Since that time, growth in the vortex flowmeter market has been relatively slow. Vortex flowmeters have never undergone a period of rapid growth that would enable them to catch up to ultrasonic, Coriolis, or magnetic flowmeters in terms of market size. Still, the past several years have seen important changes in the vortex flowmeter market.

In conducting this study, we have contacted all known manufacturers of vortex flowmeters worldwide. Flow Research has identified more than 35 vortex flowmeter manufacturers around the world. By obtaining detailed information about each company, we have assembled a new picture of the total vortex flowmeter market. We asked suppliers to provide detailed information about geographic segmentation, industries sold into, types of vortex flowmeters sold, and many other product segments. As a result, the study accurately identifies where growth is occurring in the market, as well as the underlying factors for that growth.

### Key issues addressed in this study

This study addresses the following key issues in the vortex flowmeter market:

- The factors causing the market to grow
- Growth in the use of multivariable flowmeters
- The effects of the API's adoption of a custody transfer standard on vortex sales
- The use of vortex flowmeters in district heating applications
- The increased number of suppliers in the vortex flowmeter market
- Line sizes for vortex flowmeter applications
- The use of vortex flowmeters in steam applications
- The importance of reducer vortex flowmeters
- New product and technology developments
- Growth strategies for vortex flowmeter suppliers

## Operating Principle

Vortex flowmeters operate on a principle called the von Karman effect. This principle concerns the behavior of fluids when an obstacle is placed in the path of flow. Under the right conditions, the presence of an obstacle generates a series of alternative vortices called the von Karman street. This phenomenon occurs in liquid, gas, and steam, and has been observed in many diverse contexts such as cloud layers passing an island or whitewater rapids.

In vortex flowmeters, the obstacle takes the form of an object with a broad, flat front called a bluff body. The bluff body is mounted at right angles to the flowstream. Flow velocity is proportional to the frequency of the vortices. Flowrate is calculated by multiplying the area of the pipe times the velocity of the flow.

In order to compute the flowrate, vortex flowmeters count the number of vortices generated by the bluff body. They use a variety of techniques for sensing the presence of a vortex. The majority of vortex flowmeters use a piezoelectric sensor. However, some use a capacitive sensor, and still others use an ultrasonic sensor to detect vortices.

## Segmentation

The segmentation for this study is as follows:

### Geographic Segmentation

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



### Vortex Flowmeters by Mounting Type

There are three kinds of vortex flowmeters:

- Wafer
- Flanged
- Insertion

### Multivariable Flowmeters by Type

- With Temperature Sensor only
- With Integrated Temperature and Pressure Sensors
- With Pressure Sensor only

### Vortex Flowmeters by Variable Type

- Multivariable
- Single Variable

### Single and Multivariable Vortex Flowmeters by Fluid Type

Single and multivariable vortex flowmeters are segmented in this study according to fluid type:

- Gas
- Liquid
- Saturated Steam
- Superheated Steam

### Vortex Flowmeters by Pressure Ratings

Vortex flowmeters are segmented in this study according to the following pressure ratings:

- ANSI (ANSI 150 through ANSI 2500)
- PN ( $\leq$  PN40 through PN300)
- JIS
- Other (e.g.: Tri-clamp, Threaded)



### 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



### **Vortex Flowmeters by Configuration**

Inline vortex flowmeters are distinguished by mounting type as follows:

- Compact (Integral)
- Remote

### **Vortex Flowmeters by Bore Type**

Inline vortex flowmeters are distinguished by bore type as follows:

- Single Reduced Bore (reduced one line size)
- Double Reduced Bore (reduced two line sizes)
- Standard bore (no reduction)

### **Vortex Flowmeters by Body Material**

Inline vortex flowmeters are distinguished by material of construction as follows:

- 316 Stainless Steel
- Duplex
- Hastelloy
- Carbon Steel
- Plastic
- Other

### **Vortex Flowmeters by Communication Protocol**

Vortex flowmeters by Smart vs. Conventional signal output. Smart vortex flowmeters are segmented by the following protocols:

- Foundation<sup>®</sup> Fieldbus
- HART
- Profibus DP
- Profibus PA
- Modbus
- Serial
- Other (mainly proprietary protocols)

### **Vortex Flowmeters by Sensing Technology**

Vortex flowmeters are segmented in this study according to sensing type:

- Piezoelectric
- Capacitive
- Ultrasonic
- Other

### **Vortex Flowmeters by Type of Flow Measurement**

- Volumetric Flow
- Mass Flow

### **Vortex Flowmeters by Design Configuration**

- Single Shedder Bar with Single Sensor
- Single Shedder Bar with Two Sensors Downstream
- Dual Vortex Flowmeters Calibrated Together

#### **What makes a Flow Research study so special?**

- Our only focus is flowmeters and process instrumentation.
- We research the big three: manufacturing, distribution, and application.
- Our end-user surveys and perspectives are unique to the industry.
- Our Worldflow Monitoring Service keeps you up-to-date between studies.
- We only succeed when you do.

### Vortex Flowmeters by Line Size

This study distinguishes line sizes for vortex flowmeters as follows:

- >0 - ½ inch
- >½ - 1 inch
- >1 - 2 inches
- >2 - 4 inches
- >4 - 8 inches
- >8 - 12 inches
- >12 inches

### Vortex Flowmeters by Accuracy Levels

Vortex flowmeters are distinguished by accuracy levels as follows:

≤ 0.50%	>0.50% and ≤ .75%	>.75% and ≤ 1.0%	>1.0% and ≤ 1.50%	>1.50%
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### Sanitary Vortex Flowmeters

Vortex flowmeters are segmented in this study as follows:

- Sold with Sanitary Approvals
- Sold without Sanitary Approvals

### Vortex Flowmeters by Industry

Vortex flowmeters are used mainly in the process industries, although some are used for utility applications. We included the following industries in this study:

- Oil and Gas
- Refining
- Chemical
- Pharmaceutical
- Food & Beverage
- Pulp & Paper
- Metals & Mining
- Electric Power
- Water & Wastewater
- Semiconductor
- District Energy
- Other

*Note:* “Oil and Gas” includes production, transportation, and distribution

### We analyze the following applications:

- Custody Transfer: Petroleum Liquids
- Custody Transfer: Natural Gas
- Custody Transfer: Steam
- Non-custody Transfer: Petroleum Liquids
- Non-custody Transfer: Natural Gas
- Non-custody Transfer: Steam
- Non-petroleum Liquids
- Industrial Gases
- Slurries
- Water
- Other



### Vortex Flowmeters by Sales Channel

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

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

### Vortex Flowmeters by Customer Type

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

- End-Users
- OEMs
- Systems Integrators
- Engineers/Consultants

### How does 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

*See the following pages for more details.*

### Market Shares of the Leading Suppliers

*This study provides company market share data in multiple categories. Worldwide market share data is provided as well as market share data for the following eight geographic regions:*

- North America (United States, Canada)
- Western Europe
- Eastern Europe (including Russia and FSU)
- Mideast/Africa
- Japan
- China
- Asia/Pacific
- Latin America



### Strategies for Success

- Discussion of market forces at work
- Strategic action perspectives
- Forming alliances to enhance product offerings

### Company Profiles

Complete company profiles on the leading vortex flowmeter suppliers are included.

The following is a partial list of the companies profiled in this study:

- ABB
- azbil (formerly Yamatake)
- Bopp & Reuther
- Endress+Hauser
- Emerson Process Management
- Höntzsch GmbH
- Inconel
- Invensys Group (Foxboro)
- J-TEC Associates
- KROHNE
- Metran Industrial Group
- Oval Corporation
- Shanghai Yinuo Instrument Co.
- Sierra Instruments
- Spirax Sarco
- VorTek Instruments
- Yokogawa
- YuYao Yinhuan Flowmeter Co.

**Publication Date**

This study was published in December 2014.

**Founding Sponsorships**

We offered the opportunity for companies to become Founding Sponsors of 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. The Founding Sponsor program is explained for your consideration later in this document.

**Research Team Background**

Dr. Jesse Yoder is President of Flow Research Inc., a company he founded in 1998. Dr. Yoder has 27 years of experience as a writer and an analyst in process control and instrumentation. Since 1990, he has written more than 160 market research studies, most of them regarding flow and instrumentation. Dr. Yoder has also written more than 220 articles on flow and instrumentation for trade journals. Links to many of these can be found at [www.flowarticles.com](http://www.flowarticles.com).

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 management, and product marketing. He is now a fulltime market analyst for Flow Research, has completed several studies, and regularly contributes articles and editorial assistance to our *Market Barometer* and *Energy Monitor* publications.

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 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*.

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

Nicole Riordan, Director of Marketing, joined Flow Research in 2009. She provides valuable assistance with many functions in the office, and heads our marketing and direct outreach efforts.

Vicki Tuck, Administrative Assistant, joined Flow Research in June 2012. She has experience in both the fast-paced law firms of Boston, and in various nonprofit organizations. In addition to administrative support, she also collects news for Flow Research publications.

Christina Glaser, a Research Analyst, is a seasoned software programmer, systems architect, and developer with significant website experience. In addition to her technical talent, she brings significant customer savvy, with clients that have ranged from Staples to Microsoft.



## Recent and Scheduled Flow Research studies:

- I. The World Market for Coriolis Flowmeters, 4<sup>th</sup> Edition [www.flowcoriolis.com](http://www.flowcoriolis.com)
- II. The World Market for Magnetic Flowmeters, 5<sup>th</sup> Edition [www.flowmags.com](http://www.flowmags.com)
- III. The World Market for Ultrasonic Flowmeters, 4<sup>th</sup> Edition [www.flowultrasonic.com](http://www.flowultrasonic.com)
- IV. The World Market for Vortex Flowmeters, 5<sup>th</sup> Edition [www.flowvortex.com](http://www.flowvortex.com)
- V. The World Market for Differential Pressure (DP) Flowmeters and Primary Elements [www.flowdp.com](http://www.flowdp.com)
- VI. Worldwide Survey of Flowmeter Users, 2<sup>nd</sup> Edition
- VII. The World Market for Positive Displacement Flowmeters, 2<sup>nd</sup> Edition [www.flowpd.com](http://www.flowpd.com)
- VIII. The World Market for Turbine Flowmeters, 2<sup>nd</sup> Edition [www.flowturbine.com](http://www.flowturbine.com)
- IX. The World Market for Pressure Transmitters, 4<sup>th</sup> Edition [www.pressureresearch.com](http://www.pressureresearch.com)
- X. The World Market for Flowmeters, 4<sup>th</sup> Edition [www.flowvolumex.com](http://www.flowvolumex.com)
- XI. The World Market for Gas Flow Measurement, 2<sup>nd</sup> Edition [www.gasflows.com](http://www.gasflows.com)
- XII. The World Market for Steam Flow Measurement [www.steamflows.com](http://www.steamflows.com)
- XIII. The World Market for Mass Flow Controllers [www.flowmfc.com](http://www.flowmfc.com)
- XIV. The World Market for Thermal Flowmeters [www.flowthermal.com](http://www.flowthermal.com)
- XV. The World Market for Liquid Analytical Instruments [www.flowanalytical.com](http://www.flowanalytical.com)

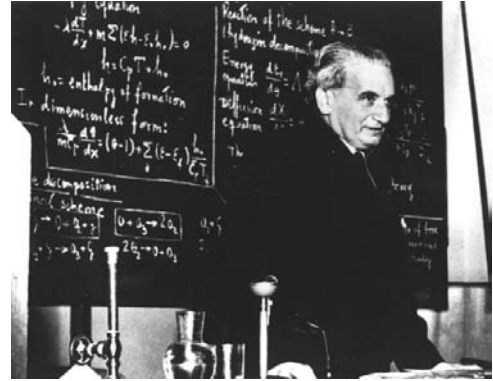
These studies are described at [www.flowstudies.com](http://www.flowstudies.com)

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](http://www.worldflow.com).

For more information on Flow Research, please visit our website at [www.flowresearch.com](http://www.flowresearch.com).



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Theodore von Karman

## The Flow Research *Founding Sponsor Program*

To produce studies that most closely match our clients' needs, Flow Research instituted the Founding Sponsor 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, 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 do our best to accommodate the specific needs of each of our clients.

During the research phase, Flow Research issues regular reports that provide updates on the progress of the research. These reports are 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 Norm Weeks at +1 781 245-3200, or [norm@flowresearch.com](mailto:norm@flowresearch.com).

You're welcome to visit

[www.FlowVortex.com](http://www.FlowVortex.com)

A Worldflow™ Knowledge website

that is dedicated to vortex flowmeter technology and products.

During your visit to [www.FlowVortex.com](http://www.FlowVortex.com), be sure to click on and take a look at some of the articles we've published on this subject. Below is a sampling of articles we've contributed over the last five years that reference vortex flowmeter technology from several perspectives:

[Part I: Flow Trend Watch. A Look at Recent Developments in New-Technology Flowmeters](#)  
*Flow Control*, May 2013

[A Decade Dominated by the Rise of New-Technology Flowmeters - Processing](#), April 2013

[Vortex Flowmeters - Positioned Well for More Widespread Use Going Forward](#)  
*Flow Control*, December 2012

[Vortex: A Growing Market in Need of More Research & Development](#)  
*Flow Control*, December 2011

[The Exclusive Large Line Size Meter Club - Processing](#), November 2011

[Part I: Pros and Cons of Gas Flowmeters - Flow Control](#), August 2011

[Vortex Flowmeters: Versatile Flowmeter to See Growth Due to Industry Approvals](#)  
*Flow Control*, December 2010

[Accuracy Matters - The Where and Why of Flowmeter Calibration](#)  
*FlowControlNetwork.com*, July 2010

[Measuring Gas Flows - Flowmeter Suppliers Jockey for Position in Critical Applications](#)  
*Flow Control*, June 2010

[A Difficult Year - Flowmeter Markets Emerge from the Recession of 2009](#)  
*Flow Control*, May 2010

[A Hot Technology for Steam & Gas Flows - Flow Control](#), March 2010

[What's so Great about Vortex Flowmeters? - Proven Technology Struggles to Differentiate in a Competitive Market - Flow Control](#), June 2009

[New-Technology Flowmeters: A Growing Trend - Processing](#), May 2009

[Measuring the World's Water Supply - Flowmeters for Water & Wastewater Applications](#)  
*Flow Control*, February 2009

[Pioneers of Flow Measurement - Founding the Technologies of Today](#)  
*Flow Control*, January 2009

[Vortex Flowmeters: When the Steam Clears - Flow Control](#), December 2008

[Market Outlook for Flowmeters by Technology - Flow Control](#), December 2008

[New Realities Bring New Measurements - Processing](#), July 2008

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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

[www.flowvortex.com](http://www.flowvortex.com)