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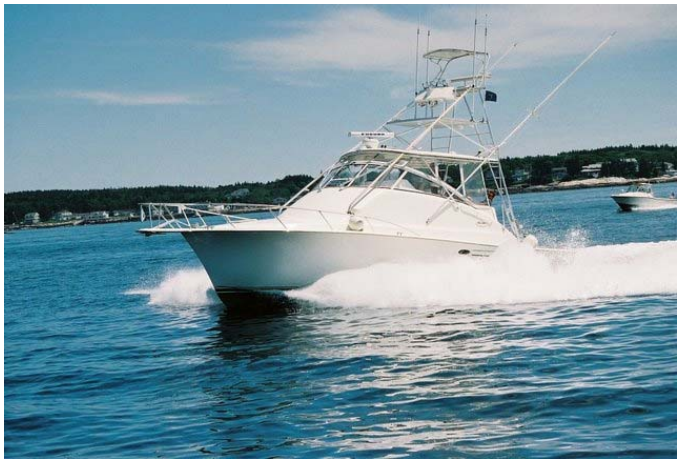
Ultrasonic Flowmeter Study Overview

Flow Research has completed a new market study on the worldwide ultrasonic flowmeter market. The study was conducted by Flow Research. One goal of the study was to determine the size of the ultrasonic flowmeter market in 2007, and to forecast market size through 2012. The study is called **The World Market for Ultrasonic Flowmeters, 3rd Edition**.

The study includes the following global elements:

- Worldwide market size and market shares for ultrasonic flowmeters in 2007
- Market growth for all types of ultrasonic flowmeters through 2012
- Industries and applications where ultrasonic flowmeters are used, with market growth areas
- A product analysis for the main companies selling into the ultrasonic flowmeter market
- Strategies to manufacturers for selling into the ultrasonic flowmeter market
- Company profiles of the main suppliers of ultrasonic flowmeters.



The ultrasonic flowmeter market continues to be one of the fastest growing flowmeter markets. One driving force behind this market are the expanding markets for custody transfer of natural gas and petroleum liquids.

One important issue is the growth in the contrast between **transit time and Doppler flowmeters**. While Doppler flowmeters remain one of the best solutions for dirty liquids, transit time flowmeters have been showing faster growth in recent years. Much

of the new product development is going into transit time meters. Transit time flowmeters are typically more accurate than Doppler meters, and multipath transit time meters are used for custody transfer of petroleum liquids. This study also looks at growth in the hybrid flowmeter market.

This study also examines the growing use of **ultrasonic flowmeters for gas flow measurement**. Custody transfer of natural gas is a fast growing market, especially with the increased popularity of natural gas as an energy source, and due to the rising price of both oil and natural gas. Custody transfer is one of a number of gas applications that are boosting sales of ultrasonic flowmeters.

Steam flow measurement is a new frontier for ultrasonic flowmeters. Currently, this market is dominated by differential pressure (DP) and vortex flowmeters. However, as the technology improves, this is becoming a growth area for ultrasonic flowmeters. Steam flow measurement is growing in importance as companies look to increase energy efficiency and cut energy costs. The high accuracy and reliability of ultrasonic meters make this an attractive option for some steam flow applications.

Background of Study

There are two main types of ultrasonic flowmeters: transit time and Doppler. A transit time ultrasonic flowmeter has both a sender and a receiver. It sends two ultrasonic signals across a pipe at an angle: one with the flow, and one against the flow. The meter then measures the "transit time" of each signal. When the ultrasonic signal travels with the flow, it travels faster than when it travels against the flow. The difference between the two transit times is proportional to flowrate.

Doppler flowmeters also send an ultrasonic signal across a pipe. Instead of tracking the time the signal takes to cross to the other side, a Doppler flowmeter relies on having the signal deflected by particles in the flowstream. These particles are traveling at the same speed as the flow. As the signal passes through the stream, its frequency shifts in proportion to the mean velocity of the fluid. A receiver detects the reflected signal and measures its frequency. The meter calculates flow by comparing the generated and detected frequencies. Doppler ultrasonic flowmeters are used with dirty liquids or slurries. They are not used to measure gas or steam flow.

Ultrasonic flowmeters were first introduced for industrial use in 1963 by Tokyo Keiki (which later became Tokimec) in Japan. Tokimec is located in Tokyo, Japan. In 1972, Controlotron

(Hauppauge, New York) became the first U.S. manufacturer to market ultrasonic flowmeters in the United States. In the late 1970s and early 1980s, both Panametrics (Waltham, Massachusetts) and Ultraflux (Poissy Cedex, France) experimented with the use of ultrasonic flowmeters to measure gas flow. Initially, ultrasonic flowmeters were not well understood, and were sometimes misapplied. Many technological improvements have been made in the past 10 years, and the limitations of ultrasonic meters are better understood. Advances in transit time technology have broadened the types of liquids that transit time flowmeters can be used on. Many transit time meters today can handle liquids containing some impurities.

Rationale for Study

Since completing our first ultrasonic study in 2001, we have been following this market very closely. We published the 2nd edition of this study in 2003. Many developments have been described in our quarterly report, the *Market Barometer*. Each issue of the *Market Barometer* includes an update on the ultrasonic flowmeter market. This new study builds on the knowledge we have gained over the years since our last full treatment of the subject, but is a completely fresh look since most of the research was done in the second half of 2007. For more information on the *Market Barometer,* go to www.worldflow.com.

Key Issues Addressed

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

- Growth in the ultrasonic transit time flowmeter market
- Shipments of clamp-on, spoolpiece, and insertion meters
- Comparison of portable vs. fixed ultrasonic flowmeters
- The expanding use of ultrasonic flowmeters for custody transfer of natural gas
- The emerging market for ultrasonic flowmeters in steam flow measurement
- The market for Doppler and hybrid ultrasonic flowmeters
- Mergers and acquisitions in the ultrasonic flowmeter market

Segmentation

The segmentation for this study is as follows.

Geographic Segmentation:

- North America
- Europe
- Middle East/Africa
- Japan

- China
- Asia without Japan/China
- Latin America

Average Selling Price of Ultrasonic Flowmeters by Region

- North America
- Europe
- Middle East/Africa
- Japan
- China
- Asia w/o Japan/China
- Latin America

Ultrasonic Flowmeters by Technology Type

There are four kinds of ultrasonic flowmeters:

- Single and dual path transit time
- Multipath transit time
- Doppler
- Hybrid

Single and Dual Path Ultrasonic Flowmeters

Single and dual path ultrasonic flowmeters are segmented by the seven geographic regions (see above), with forecasts to 2012.

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

Multipath Ultrasonic Flowmeters

Multipath ultrasonic flowmeters are segmented by the seven geographic regions (see above), with forecasts to 2012.

Doppler Ultrasonic Flowmeters

Doppler ultrasonic flowmeters are segmented by the seven geographic regions (see above), with forecasts to 2012.

Hybrid Ultrasonic Flowmeters

Hybrid ultrasonic flowmeters are segmented by the seven geographic regions (see above), with forecasts to 2012.

Transit Time Ultrasonic Flowmeters

Transit time flowmeters are distinguished by path type as follows:

- Clamp-On
- Insertion

Ultrasonic Flowmeters by Mounting Type

This study distinguishes between mounting types as follows:

- Clamp-on ultrasonic flowmeters
- Spoolpiece ultrasonic flowmeters
- Insertion ultrasonic flowmeters

Ultrasonic flowmeters are segmented by mounting type by geographic region. Forecasts to 2012 are included.

Clamp-On Flowmeters by Mounting Type

This study distinguishes between mounting types for clamp-on ultrasonic flowmeters as follows:

- Portable clamp-on
- Fixed clamp-on

Portable and fixed clamp-on ultrasonic flowmeters are segmented by geographic region, with forecasts to 2012.

Clamp-On and Insertion Ultrasonic Flowmeters by Fluid Type

- Liquid
- Gas
- Steam

Clamp-on and insertion ultrasonic flowmeters are distinguished by fluid type by geographic region. Forecasts to 2012 by fluid type are included.

Spoolpiece Ultrasonic Flowmeters by Fluid Type

Spoolpiece ultrasonic flowmeters are segmented in this study according to fluid type:

- Liquid
- Gas
- Steam

Spoolpiece ultrasonic flowmeters are distinguished by fluid type by geographic region. Forecasts to 2012 by fluid type are included.

Transit Time Ultrasonic Flowmeters by Signal Type

- Diametral
- Chordal
- Hybrid

Transit time ultrasonic flowmeters are segmented by signal type by geographic region. Forecasts to 2012 are included.

This study distinguishes line sizes for ultrasonic flowmeters as follows:

Clamp-On Ultrasonic Flowmeters

- < 2 inch
- 2 - 4 inches
- > 4 – 8 inches
- > 8 – 12 inches
- > 12 – 20 inches
- > 20 inches

Insertion Ultrasonic Flowmeters

- < 4 inches
- 4 – 8 inches
- > 8 – 12 inches
- > 12 – 20 inches
- > 20 inches

Spoolpiece Ultrasonic Flowmeters

- < 2 inch
- 2 - 4 inches
- > 4 – 8 inches
- > 8 – 12 inches

- > 12 – 20 inches
- > 20 inches

Clamp-on, insertion, and spoolpiece ultrasonic flowmeters are segmented by the seven geographic regions. Forecasts to 2012 are included by line size for all three types of ultrasonic flowmeters.

Ultrasonic Flowmeters by Intelligence Level:

Ultrasonic flowmeters are segmented in this study according to type:

- Smart
- Conventional

Ultrasonic Flowmeters by Communication Protocol

Ultrasonic flowmeters are segmented by the following protocols:

- HART
- Foundation Fieldbus
- Profibus
- Modbus
- Proprietary Digital
- Other

Shipments of Transit Time Ultrasonic Flowmeters by Number of Paths

- Single Path
- Dual Path
- Three Path
- Four Path
- Five Path
- Six + Paths

Transit time ultrasonic flowmeters are segmented by six paths by geographic region. Forecasts to 2012 are included.

Shipments of Ultrasonic Flowmeters by Application

- Custody Transfer-Natural Gas
- Custody Transfer-Liquids
- Check Metering
- Process Measurement
- Flare/Stack Gas

- District Heating
- Other

Ultrasonic flowmeters are segmented by application by geographic region. Forecasts to 2012 are included.

Clamp-On and Insertion Ultrasonic Flowmeters by Industry

Ultrasonic flowmeters are used mainly in the process industries. The following industries are included in this study:

- Oil & Gas Production, Transportation, and Distribution
- Refining
- Chemical
- Pharmaceutical
- Food & Beverage
- Pulp & Paper
- Metals & Mining
- Power
- Water & Wastewater
- Other

Clamp-on and insertion ultrasonic flowmeters are segmented by industry by each of the seven geographic regions. Forecasts worldwide and by region are included to 2012.

Spoolpiece Ultrasonic Flowmeters by Industry

- Oil and Gas Production, Transportation, and Distribution
- Refining
- Chemical
- Pharmaceutical
- Food & Beverage
- Pulp & Paper
- Metals & Mining
- Power
- Water & Wastewater
- Other

Ultrasonic flowmeters by Sales Channels

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

- Direct Sales
- Independent Representatives

- Distributors
- E-Business

Ultrasonic flowmeters are segmented by sales channels by geographic region. Forecasts to 2012 are included.

Ultrasonic flowmeters by Customer Type

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

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

Ultrasonic flowmeters are segmented by customer type by geographic region. Forecasts to 2012 are included.

Publication Date

The study was published in January 2008.

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 the area of flow and instrumentation. Some of the recent and currently scheduled Flow Research studies are as follows:

Volume I: The World Market for Coriolis Flowmeters, 3rd Edition (February 2008)
Volume II: The Global Market for Magnetic Flowmeters, 3rd Edition (September 2005)
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) (February 2008)
Volume XI: The World Market for Gas Flow Measurement (September 2004)
Volume XII: The World Market for Steam Flow Measurement (March 2007)
Volume XIII: The World Market for Mass Flow Controllers (February 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

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**.

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.

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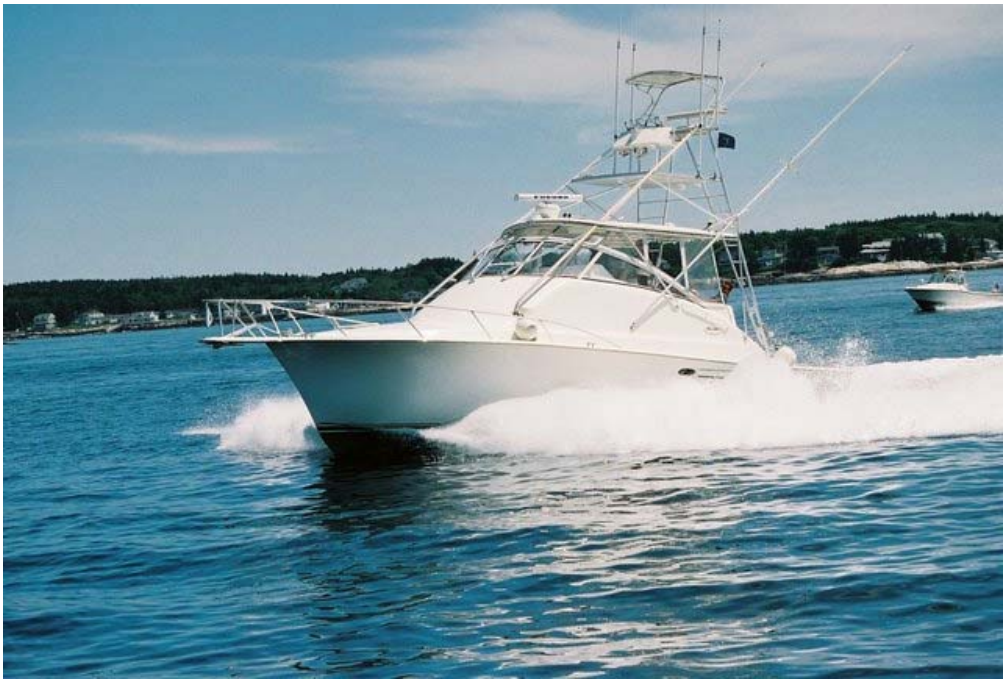
The World Market for Ultrasonic Flowmeters, 3rd Edition



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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