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# ***THE GLOBAL MARKET FOR DIFFERENTIAL PRESSURE (DP) FLOWMETERS AND PRIMARY ELEMENTS***

***VOLUME I: DP AND PRIMARY ELEMENT MARKET ANALYSIS***

***VOLUME II: USER REQUIREMENTS, PREFERENCES, AND  
TRENDS FOR NEW AND TRADITIONAL FLOWMETER  
TECHNOLOGIES***

***OCTOBER 2005***

## Study Summary

This study combines research into the differential pressure (DP) flowmeter market with research into the primary element market. One main purpose of doing a DP flow study is to find out the true value of the DP flowmeter market. This true value is hidden away due to uncertainties in market definition. These uncertainties are due to the way in which DP flowmeters are sold, and due to some ambiguities in the term “DP flowmeter” itself.

What is a DP flowmeter? The short answer is that it is a flowmeter that uses the differential pressure measuring principle to determine flow. This involves a device that combines a DP transmitter together with a primary element to measure flow. The primary element creates a pressure drop, and the DP transmitter calculates flow based on the differential pressure produced. The calculation is performed using Bernoulli’s equation. For orifice plate meters, the differential pressure is proportional to square of the flow through the orifice plate.

## DP Transmitters and Primary Elements

One complication in determining the size of the DP flowmeter market is that, in many cases, the DP transmitter is sold separately from the primary element that creates the pressure drop. While some of the DP transmitter manufacturers also sell primary elements, such as orifice plates and venturis, there are many primary element suppliers who do not sell DP transmitters. And end-users often order the DP transmitter and primary element from different sources. This means that accurately determining the value of DP flowmeter market requires talking to both pressure transmitter and primary element suppliers.

In this respect, DP flowmeters are different from most other types of flowmeters. While most flowmeters consist of a sensor element and a transmitter element, the two elements are usually sold together. For example, the flowtube of a magnetic flowmeter is generally sold along with a magnetic flow transmitter. Ultrasonic flowmeters have a device that sends and receives a signal, and this device is typically sold along with a transmitter that uses differences in transit time to compute flow. Vortex meters have a bluff body that generates vortices, and a method of sensing them, along with a transmitter that computes flow based on the number of vortices generated. Similar comments apply to turbine, positive displacement, and Coriolis flowmeters.

DP flowmeters are somewhat like open channel flowmeters. Some open channel flowmeters use a weir or flume for measuring flow. A weir is an obstruction placed across an open channel to create a dam-like structure. A flume is a manufactured channel placed in a flowstream to control and measure the flow. Weirs and flumes may be sold separately from the open channel transmitters used to compute flow based on input from them.

There is a trend towards incorporating primary elements with the DP transmitter to create a true DP flowmeter. Emerson Rosemount’s ProBar and ProPlate flowmeters, both

volumetric and mass, are examples of this. Even though this is an important trend, these devices still represent a relatively small percentage of the total number of DP flowmeters sold.

## **Associated Instrumentation**

In addition to the primary elements involved in DP flow, some DP flow measurements also make use of temperature transmitters, absolute or gage pressure transmitters, and flow computers. This is mainly the case when mass flow is being measured. This associated instrumentation is also part of the total picture of DP flow.

## **Goals of Study**

One main goal of the DP portion of this study is to arrive at the true value of the DP flowmeter market by taking into account the value of DP transmitters, primary elements, and associated instrumentation. In the past, Flow Research and some other research companies have identified the value of the DP flowmeter market with the value of the market for DP transmitters used for flow. While this is a major part of the total picture, it is not the total picture. By including the value of primary elements and associated instrumentation, we hope to determine the true value of the DP flowmeter market.

Another goal of this study is to determine to what extent DP flowmeters are holding their own with respect to other flow technologies. DP flowmeters still have a very large installed base, and are still inclined to replace like with like unless they've had a problem with the meters. DP flowmeter manufacturers are responding to market changes with innovations like the ProBar and ProPlate, with multivariable transmitters, and with high-tier pressure transmitters with enhanced stability and accuracy. These innovations will help DP flow technology hold its own against the onslaught of new-technology flowmeters.

So far most of the innovations seem to be on the side of the transmitter rather than on the side of the primary elements. However, there are companies such as Primary Flow Signal and Preso Meter (now part of Racine Federated) that have developed proprietary versions of Venturi and Pitot tube meters. Many different types of orifice plates have been developed, and perhaps there is room for more research here. This study will attempt to identify any areas of research in developing and improving primary elements.

This study includes market size in dollars and units for DP flowmeters worldwide and by geographic region. DP flowmeters are divided into the following components:

- Multivariable pressure transmitters
- DP transmitters used to measure flow
- Gage pressure transmitters used to measure flow
- Absolute pressure transmitters used to measure flow
- Flow computers used to measure flow

Other segmentation includes the following:

- DP flowmeter sales by geographic region
- Volumetric vs. mass flow
- DP flowmeters by industry
- DP flowmeters by distribution channels (Direct vs. Independent Reps vs. Distributors vs. E-Business)
- DP flowmeters by customer types (End-users vs. OEMs vs. Systems Integrators vs. Engineers/Consultants)

Primary elements will be segmented as follows:

- Orifice plates
- Venturi tubes
- Flow nozzles
- Pitot tubes/Averaging Pitot tubes
- Other

## **Scope**

The data developed in this study includes total revenues and unit sales by geographic region, and average selling prices for DP flowmeters. Other data includes the following:

- Market shares for the leading suppliers of DP flowmeters by geographic region
- Market size and growth forecasts for DP flowmeters by component type (extending through 2009)
- Market size and growth forecasts for DP flowmeters by industry
- Detailed product descriptions by supplier
- DP flowmeter sales by distribution channel
- DP flowmeter sales by customer type
- Strategies for success
- Profiles of all significant supplier companies

## **Key Issues in this Study**

- What are the causes of growth in the DP flowmeter market?
- What is the growth outlook for DP flowmeters for the next several years?
- How severe is the price pressure for DP flowmeters? What are the sources of the pricing pressure? How are suppliers responding to pricing pressures?
- Will multivariable DP flowmeters show any growth in the next several years?
- Are integrated DP flowmeters, with a DP transmitter and an integrated primary element, catching on with end-users? Is this a growing trend?
- Are accuracy levels for DP flowmeters increasing or remaining stable?
- Are orifice plates being displaced by other primary elements?
- What improvements are occurring to primary elements?
- To what extent are low cost suppliers from China, India, and elsewhere penetrating the DP flowmeter market and influencing prices?
- How quickly is e-business growing as a distribution channel?
- What features are end-users looking for in DP flowmeters?
- Are end-users switching from one type of primary element to another, and why?
- How effecting are the technological improvements in DP flowmeters in preventing the erosion of the DP flowmeter market?
- What types of flowmeters are displacing DP flowmeters and why?

## **DP Transmitter Suppliers**

The following are the DP transmitter manufacturers that have been identified:

ABB  
Anderson Instrument  
Bristol Babcock  
Delta Controls  
Emerson Rosemount  
Endress+Hauser  
Foxboro  
Fiji Electric  
Hitachi  
Honeywell  
Orange Research  
Siemens  
Smar  
Solartron Mobrey  
Thermo Electron  
Yamatake  
Yokogawa

## **Primary Element Suppliers**

The following two tables give a listing of primary element suppliers worldwide, and includes the type of primary elements they manufacture. The following two tables after that give the website addresses for these companies.

We have already identified a significant number of primary element suppliers in the United States and some internationally. We anticipate identifying some additional international primary element suppliers.

# ***The World Market for Differential Pressure (DP) Flowmeters and Primary Elements***

*A New Market Study from Flow Research, Inc.*

## **TABLE OF CONTENTS** (abbreviated)

<b><u>CHAPTER</u></b>	<b><u>SUBJECT</u></b>
<b>1</b>	<b>Executive Summary</b> <ul style="list-style-type: none"><li>• Overview</li><li>• Methodology</li><li>• Growth Factors</li><li>• DP Flowmeter Market Size and Forecast</li><li>• Market Shares for DP Flowmeters</li><li>• A Strategic Perspective</li></ul>
<b>2</b>	<b>Introduction</b> <ul style="list-style-type: none"><li>• Study Objectives</li><li>• Methodology</li><li>• Geographic Regions</li><li>• Types of DP Flowmeters</li><li>• Types of Primary Elements</li><li>• End-User Industries</li><li>• DP Flowmeter Industry Structure</li></ul>
<b>3</b>	<b>DP and Vortex Flowmeter Product and Technology Analysis</b> <ul style="list-style-type: none"><li>• New-Technology Flowmeters</li><li>• Coriolis Flowmeters</li><li>• Magnetic Flowmeters</li><li>• Ultrasonic Flowmeters</li><li>• Vortex Flowmeters</li><li>• Thermal Flowmeters</li><li>• Paradigm Case Selection Method</li><li>• DP Flowmeter Product Analysis</li><li>• Primary Element Product Analysis</li></ul>

# *The World Market for Differential Pressure (DP) Flowmeters and Primary Elements*

## **CHAPTER SUBJECT (continued)**

### **4 DP Flowmeter Market Size and Forecast**

- Growth Factors for the DP Flowmeter Market
- Market Size and Growth Forecasts
- Shipments of DP Flowmeters Worldwide by Geographic Region
- Shipments of DP Flowmeters Worldwide by Component Type
- Average Selling Prices of DP Flowmeters by Region
- Shipments of Multivariable DP Flowmeters Worldwide and by Region
- Shipments of Single Variable DP Flowmeters Worldwide and by Region
- Shipments of DP Flowmeters by Fluid Type Worldwide and by Region
- Shipments of DP Flowmeters by Volumetric vs. Mass Flow Measurement
- Shipments of Primary Elements by Type Worldwide and by Region
- Shipments of DP Flowmeters by Industry Worldwide and by Region
- Shipments of DP Flowmeters by Distribution Channel Worldwide and by Region
- Shipments of DP Flowmeters by Customer Type Worldwide and by Region

### **5 DP Flowmeter Supplier Market Shares**

- Market Shares for DP Flowmeters Worldwide and by Region
- Market Shares for DP Flowmeters by Geographic Region
- Market Shares for Multivariable DP Flowmeters by Region
- Market Shares for Primary Elements Worldwide

### **6 Strategies for Success**

- Overview
- Guidelines for Applying the Strategies

*The World Market for Differential Pressure (DP)  
Flowmeters and Primary Elements*

**CHAPTER   SUBJECT (continued)**

**7          DP Flow and Primary Element Supplier Company Profiles**

- DP Flow and Primary Element Supplier Contact Information
- DP Flow and Primary Element Supplier Product Lines

**8          Exhibits**

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<b>2</b>	<b>Introduction</b> <ul style="list-style-type: none"><li>• Study Objectives</li><li>• Methodology</li><li>• Geographic Regions</li><li>• Types of DP Flowmeters</li><li>• Types of Primary Elements</li><li>• End-User Industries</li><li>• DP Flowmeter Industry Structure</li></ul>
<b>3</b>	<b>DP and Vortex Flowmeter Product and Technology Analysis</b> <ul style="list-style-type: none"><li>• New-Technology Flowmeters</li><li>• Coriolis Flowmeters</li><li>• Magnetic Flowmeters</li><li>• Ultrasonic Flowmeters</li><li>• Vortex Flowmeters</li><li>• Thermal Flowmeters</li><li>• Paradigm Case Selection Method</li><li>• DP Flowmeter Product Analysis</li><li>• Primary Element Product Analysis</li></ul>

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- Shipments of Single Variable DP Flowmeters Worldwide and by Region
- Shipments of DP Flowmeters by Fluid Type Worldwide and by Region
- Shipments of DP Flowmeters by Volumetric vs. Mass Flow Measurement
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- Shipments of DP Flowmeters by Industry Worldwide and by Region
- Shipments of DP Flowmeters by Distribution Channel Worldwide and by Region
- Shipments of DP Flowmeters by Customer Type Worldwide and by Region

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