



2006 Flowmeter User Study Results

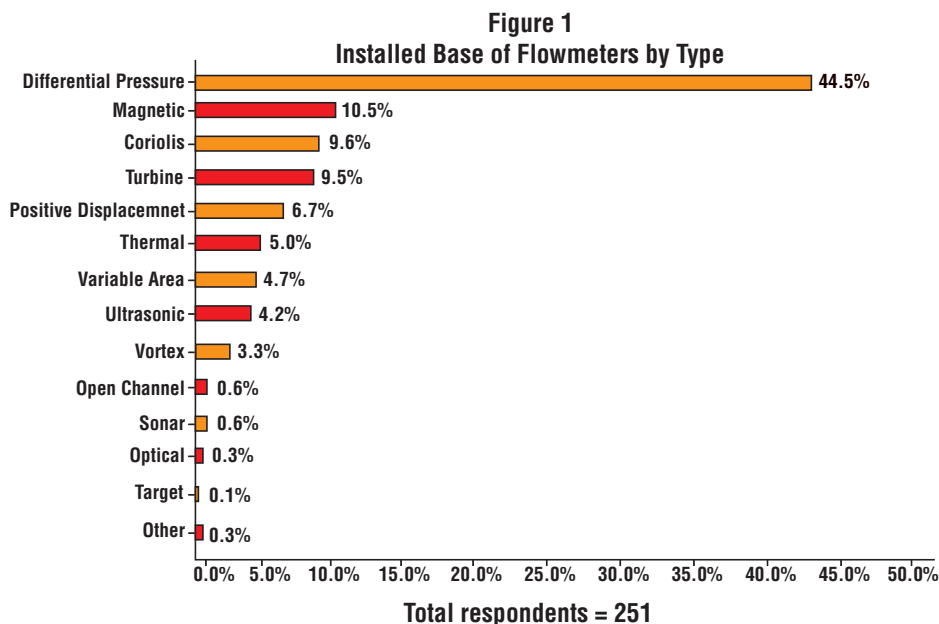
DP Remains Dominant, But New Technologies Are Catching On

In an effort to answer some important questions about the state of the flowmeter market today, Flow Research (www.flowresearch.com) recently conducted a six-month survey of the flowmeter user community. The survey, which was undertaken in cooperation with Venture Development Corporation (www.vdc-corp.com) and *Flow Control* magazine, was conducted in the second half of 2005 via an Internet-based questionnaire and one-on-one phone conversations with suppliers and users of flowmeter technology. While the majority of respondents were from the United States, regions including Europe, Latin America, the Middle East, Asia-Pacific, and Canada were also represented. More than 500 users and specifiers of flowmeters took part in the survey. Most were from the process industries, including chemical, food processing, oil & gas, refining, and other industries.

In examining this market, two of the more interesting questions Flow Research sought to answer were:

- Do differential-pressure flowmeters still dominate the market? If so, to what extent?
- Is there really a shift from traditional technology types to newer methods of flowmetering?

To answer these questions, Flow Research talked to suppliers to find out more about the technologies they are manufacturing and what their projections are for the future. More importantly, Flow Research also talked to end-users and the purchasing agents who actually make buying decisions. The decision making of flowmeter users is one of the best barometers of the flowmeter industry. The customers who decide which flowmeter to buy, and with what features, actually determine the fate of flowmeter products on the market, and it is the responses Flow



Research received from the end-user community that yielded the more complete answers to the aforementioned questions.

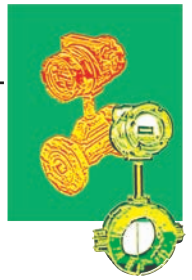
DP Flowmeters Still Dominate Installed Base

The difference between the installed base of flowmeters and those currently being sold is an important one. Market research studies on this subject typically focus on the number of products sold in a current or recent year. They then project future sales by looking at a variety of factors, including economic indicators, product trends, and user perspectives. The installed base, on the other hand, reflects the number of flowmeters currently in use, whether they were purchased this year, last year, or 10 years ago. For this reason, installed-base numbers do not show changes in flowmeter trends as quickly as current sales figures.

Users were asked in the survey how many flowmeters are in use at their location, and what percentage of the total each flowmeter type represents.

The results are shown in Figure 1. According to this figure, differential-pressure (DP) flowmeters represent almost 45 percent of the total flowmeters in use at end-user plants. The second most popular type is magnetic, followed by Coriolis and turbine. Each of these three types represents about 10 percent of total installed base.

Why are DP flowmeters so dominant in the installed base? DP flowmeters have been used for more than 100 years and are among the most studied type of meter. Magnetic flowmeters were not introduced until the early 1950s, and Coriolis meters got their start in the 1970s. It takes many years for a new flowmeter technology to get established. While industry associations are now writing standards for the use of magnetic, Coriolis, and other new-technology flowmeters, many more approvals have been written for DP meters. DP flowmeters also have a price advantage over magnetic, Coriolis, and ultrasonic flowmeters, which is an important factor in today's price-competitive market.



Why Is Installed Base Important?

Installed base is important for several reasons. When replacing flowmeters, users tend to replace like with like, unless they have a reason to change. There are good reasons for staying with a proven technology. Some facilities keep flowmeters in stock for replacement purposes. There is a learning curve associated with changing to a new technology, and additional engineering time is often required. There is little tolerance for downtime in today's cost-conscious plant environments, and keeping the same type of flowmeter in place is often viewed as the most cost-effective solution.

That said, performance problems are the main reason users cited for changing to a different flowmeter technology. DP transmitters require the use of a primary element to constrict the flow. Orifice plates are the most common type of primary element, and they are subject to wear. DP flowmeters are also typically less accurate than Coriolis and magnetic flowmeters, so users who are seeking higher accuracy may make the switch. And even though they have a higher initial cost, Coriolis and magnetic flowmeters are likely to have fewer maintenance issues over time than DP flowmeters. They also have fewer maintenance issues than turbine and positive-displacement

flowmeters, each of which have moving parts that are subject to wear.

A Shift to New-Technology Flowmeters

While understanding the installed base is important to understanding today's flowmeter market, Flow Research's user survey also shows other interesting characteristics in this technology segment. For example, users appear to be moving away from traditional technology flowmeters, such as DP, positive-displacement, and turbine, and toward new-technology flowmeters, such as Coriolis, magnetic, ultrasonic, vortex, and thermal.

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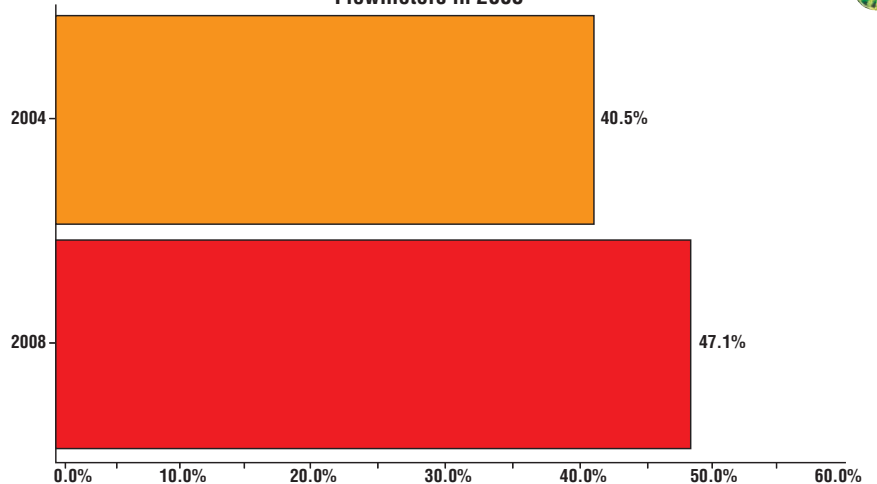
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Figure 2
Percent of Total Respondents Who Purchased or Specified Coriolis Flowmeters in 2004 and Who Expect to Purchase or Specify Coriolis Flowmeters in 2008



Total Coriolis respondents = 197 in 2004 and 222 in 2008

What is the evidence showing such a shift? In the survey, users were asked, for each type of flowmeter, whether they or their firm had purchased or specified that type in 2004. They were also asked, for each flowmeter type, whether they or their firm expect to purchase or specify that type of flowmeter by 2008. In the case of new-technology flowmeters, the percentage of respondents expecting to purchase or specify each of these types is greater in 2008 than it is in 2004. And for traditional-technology flowmeters, the corresponding percentage is either flat or declining between 2004 and 2008.

For Coriolis flowmeters, just over 40 percent of respondents said that Coriolis flowmeters were purchased or specified at their plant in 2004. When asked about the future, 47 percent of respondents expect that Coriolis flowmeters will be purchased or specified at their plant in 2008 (Figure 2). The survey finds similar results for magnetic, ultrasonic, vortex, and thermal flowmeters, showing a greater percentage of respondents expect that these types of flowmeters will be purchased or specified at their plant in 2008 than were purchased or specified in 2004.

Traditional-technology flowmeters present a different picture. While 36 percent of respondents say that turbine flowmeters were purchased or specified

at their plant in 2004, less than 32 percent expect this will be the case in 2008 (Figure 3). The survey shows similar results for positive-displacement flowmeters. The results for users of DP and variable-area flowmeters are almost flat, although both show a slight decline in the percentages between 2004 and 2008.

Why the Shift?

Users gave many different reasons for the shift in types and quantities of flowmeters purchased or specified in 2004 as compared to 2008. The three major reasons were:

- Accuracy and reliability
- Lower price/cost
- Technology considerations

New-technology flowmeters are, in general, more accurate and reliable than traditional meters. Coriolis flowmeters, generally speaking, are capable of the highest degree of accuracy, and most magnetic, ultrasonic, and vortex flowmeters are capable of relatively high accuracy as well. These flowmeters do not have moving parts that are subject to wear, and they also exhibit minimal pipe intrusion, resulting in lower pressure loss and fewer sources of maintenance problems over the lifetime of the meter.

Some of those citing lower costs were not talking about buying the cheapest flowmeter. Instead, they said,



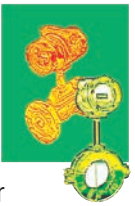
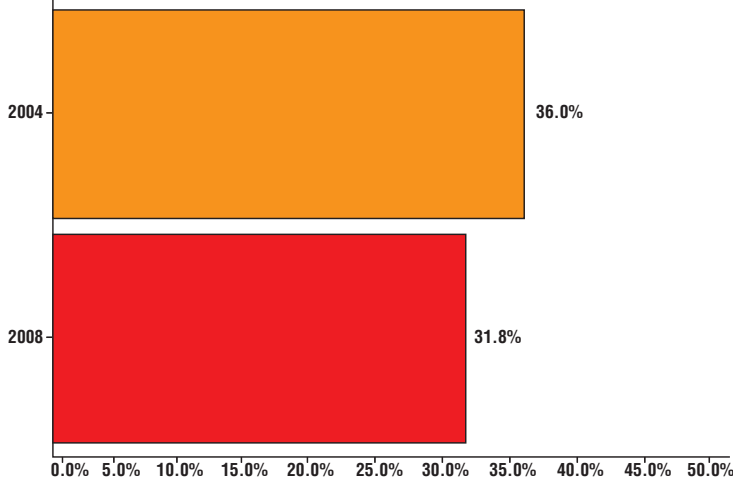


Figure 3
Percent of Total Respondents Who Purchased or Specified Turbine Flowmeters in 2004 and Who Expect to Purchase or Specify Turbine Flowmeters in 2008



Total Turbine respondents = 175 in 2004 and 150 in 2008

for example, "The costs of Coriolis and vortex meters are coming down, and the accuracy is improving." Another response was: "Coriolis technology becomes cheaper and more competitive among manufacturers." Others talk



about lifecycle costs and the ability to obtain "lower costs with good accuracy." While users are very aware of price, they appear also to be measuring price against value, and they are more willing to pay for new-technology flowmeters


when they consider the lifecycle cost savings they can achieve with some of the newer flowmeter types.

Users also said they are looking for new or better technology, specific product improvements, and the ability to measure mass flow. The major flowmeter suppliers are regularly issuing product upgrades and added features to their flowmeters. Some are adding new product lines altogether, such as multi-variable vortex flowmeters, reduced-bore vortex meters, and multipath ultrasonic flowmeters. End-users are aware of these technology upgrades, and they are willing to pay for the improved performance they offer.

In addition to changes to existing flowmetering concepts, entirely new flowmeter types are making an appearance on the market. Sonar and optical flowmeters have been introduced in the past several years, and survey results show substantially increased demand for both flowmeter types in the future. **FC**

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Flow Research published "Worldwide Survey of Flowmeter Users, 2nd Edition" in January 2006. Other studies currently being performed at Flow Research include a worldwide study on DP flowmeters and primary elements, as well as studies on temperature sensors and temperature transmitters. For more information on these and other Flow Research studies, visit www.flowresearch.com/flow.htm.