Flowmeter Applications to Watch in 2012

The worldwide flowmeter market is very diverse, with multiple technologies competing in different industries. In addition, there are a number of applications and product areas that are worthy of special attention, either because they are fast-growth areas, or because a lot of research and development activity is going into them. Here are a few of the many applications that bear watching in 2012.

Large-Line Flowmeters

Traditionally, ultrasonic, magnetic and turbine flowmeters have been the main types of meters designed for large line sizes (above 20 inches). Differential-pressure flowmeters can also handle large line sizes, but because they require a primary element used with a DP transmitter, it is only the primary element that is large.

Magnetic flowmeters can have diameters that exceed 110 inches. These large-line magmeters are typically used for measuring the flow of process water, treated and untreated sewage, pulp and paper, slurries, and many other liquid applications.

Large ultrasonic and turbine flowmeters are used in pipelines to measure the custody transfer of natural gas. Many of these range in size from 20 to 42 inches, although some are larger.

The newest member of the large-line club is Coriolis meters. However, they don't quite qualify, since the largest Coriolis meter currently made is for a 14-inch line. Even so, Coriolis meters are worth mentioning because they are much larger than they used to be. It remains to be seen how large the line sizes will be that Coriolis meters can handle. Certainly the meters themselves are very large, and that is currently a limiting factor for these meters.

Insertion Flowmeters

Insertion flowmeters are a natural complement to large line size meters, because they are designed to handle large line sizes when cost is an issue and accuracy requirements are not as high. The large line size meters described above are inline meters, but insertion meters are designed to be installed into an existing pipe. For this reason, insertion meters do not have a meter body. Instead, they are installed into an existing pipe using a hot tap or cold tap method.

Some of the best known types of insertion meters are insertion thermal meters that are used for stack gas monitoring and flare gas metering, as well as many other applications. Both single-point and multipoint meters are used; the multipoint meters are more accurate because they measure flow at as many as 16 points. Other types of insertion meters include magnetic, ultrasonic, turbine, and vortex.

All these meters can handle a wide range of line sizes, generally at significantly lower cost than their inline counterparts. While they are not used for custody-transfer applications, and would not likely be used for billing or utility applications, these meters serve an important niche in the flowmeter market.

Low-Flow Measurement

Low-flow measurement can be difficult for some flow technologies. For example, vortex meters shut down at a certain low flowrate because the velocity of the flowstream is not sufficient to generate measureable vortices. Some turbine meters are designed to measure low flows, but in general turbine meters perform better at medium- to high-speed flows.

Probably the flowmeters that best handle low flows are positive-displacement and thermal flowmeters, along with mass flow controllers. Some Coriolis meters are also designed to handle low-flow measurement. Positive-displacement meters capture the flow in a compartment and count how many times this occurs. Thermal flowmeters are used almost exclusively to measure gas flow, but they can accurately measure low gas flows. Mass flow controllers use either a thermal or differential pressure principle with a bypass, and they are also equipped for low-flow measurement. Mass flow controllers also have a controlling valve, so they can both measure and control the flow of liquids and gases.

Multivariable Measurement

Attention to multivariable measurement has increased in the past five years along with the increased need to measure steam and gas flow. While multivariable measurement is sometimes associated with differential-pressure (DP) flowmeters, a variety of flowmeter types offer multivariable measurement.

A number of companies have also come out with multivariable vortex flowmeters. Vortex meters already have an advantage in measuring steam flow because they can handle the high temperatures and pressures associated with steam. Multivariable vortex meters measure volumetric flow, then use a temperature and pressure measurement to compute mass flow of steam or gas. While DP and vortex meters are the best-known types of multivariable meters, almost any volumetric meter can be turned into a mass flowmeter by adding pressure and temperature measurements.

Other Important Growth Areas

These are only a few of the many exciting development areas in flowmeters today. Others include multiphase flow, multipath ultrasonic meters, large-line vortex meters, shale gas measurement, new types of primary elements, and district energy. The world of flowmeter applications is even more diverse than the world of flowmeter technology, and companies are developing more application-specific products. Stay tuned to these pages for more innovative developments in the world of flow in the months to come. FC

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Jesse Yoder is a guest "Viewpoint" columnist for this issue of Flow Control magazine. Matt Migliore will return to this page in the Jan. 2012 issue of Flow Control. Best wishes for a happy and healthy holiday season and a prosperous and productive new year.