By Jesse Yoder, Ph.D.

4 Key Flowmeter Applications to Watch

The worldwide flowmeter market today is extremely diverse, with at least fourteen different flow technologies competing in many different applications. For some technologies, such as differential-pressure, turbine and positive-displacement, the installed base is large and the applications fairly stable. For other technologies, such as ultrasonic and Coriolis, new applications are emerging and there is a steady stream of new products from the suppliers.

When it comes to applications, certain applications stand out either because they are unique, they are fast-growing, or because different technologies are competing for them. Four applications that stand out in this way are multiphase flow, custody-transfer of natural gas, stack gas measurement, and fuel delivery.

1 Multiphase Flowmeters

Most applications measure one type of flow – either liquid, gas or steam. This is called single-phase flow measurement. However, the need to measure fluids with more than one phase is growing. Multiphase flow primarily occurs in the oil & gas industry. When fluid initially comes out of a well, it often consists of a mixture of oil, gas and water. While these different fluids are typically separated into their individual components at separators near the wellhead, it is also sometimes advantageous to measure the fluid before it is separated. As such, a group of flowmeters, called multiphase flowmeters, has been developed to perform this task.

Multiphase flowmeters are used for multiple purposes, including custody transfer, well testing, and allocation metering. One disadvantage of these meters is that they are extremely expensive, so they tend to be used mainly on high-producing wells. Not all wells produce enough oil or natural gas to justify the expense of a multiphase meter. While there are still a limited number of suppliers, this is an area that bears watching, especially considering the high price of oil and the continually expanding search for sources of energy.

2 Custody Transfer of Natural Gas

Once natural gas comes out of the ground, it goes through a long series of transitions and hand-off points until it reaches consumers. In many cases, ownership of the gas is transferred from one company or party to another, and this is called custody transfer.

Gas is almost always measured using some type of flowmeter when this transfer occurs. In the past, this measurement was made by either differential-pressure or turbine flowmeters. Since 1998, when the American Gas Association (AGA, *www.aga.org*) approved the use of ultrasonic flowmeters for custody transfer of natural gas, ultrasonic systems have come to be more widely used for this purpose.

One issue with the use of ultrasonic flowmeters for custody transfer is how often they should be calibrated. Calibration typically involves pulling a flowmeter out of service and shipping it to a calibration facility. While some companies always have backup meters in place for their ultrasonic meters, this is not always the case. And depending on the location of the calibration facility, a flowmeter can be out of service for as long as four weeks to several months. This is especially true for companies in regions such as the Middle East and Africa that may be a long way from a flowmeter calibration facility. Despite these problems, look for continued growth in the ultrasonic market for custody transfer of natural gas.

3 Stack Gas Measurement

The need for stack flow measurement accelerated in the 1990s when the Environmental Protection Association (EPA, *www.epa.gov*) developed continuous emissions monitoring (CEM) requirements. In response to this need, thermal flowmeter suppliers developed multipoint flowmeters that could measure flow at as many as 16 points in the stack. This provides for much greater accuracy than single-point thermal flowmeters.

Other types of flowmeters used for stack gas measurement include differential-pressure and ultrasonic. Differential-pressure flowmeters typically use averaging Pitot tubes as a primary element for this application. Because ultrasonic flowmeters send a signal back and forth across a pipe and measure the difference in transit time to compute flow, they can also handle the large diameters of the pipes that discharge flue gases.

4 Fuel Delivery

Another area of growing importance is in petroleum liquids. At the end of the distribution chain, where petroleum liquids are delivered from trucks to businesses, homes, and airplanes and ships, several technologies are competing for dominance. Positive-displacement flowmeters are the traditional technology used for this purpose. However, Coriolis flowmeters are making inroads into this market, as end-users select them for their reliability and high accuracy. Coriolis meters are also receiving the needed industry approvals, mainly from the American Petroleum Institute (API, *www.api.org*), to make a run at this market.

Other Important Growth Areas

While the above identifies four "hot spots" for growth in the flowmeter market, these are not the only areas of promise. Other important segments where technologies feverishly compete for market share include steam flow measurement, district energy, residential metering, boiler inlet measurement, flare gas measurement, and open channel measurement. The world of flowmeter applications is even more diverse than the world of flowmeter technology, and new applications are developing as technology evolves. Stay tuned for more interesting developments as the world of flow measurement continues to turn. FC

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