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Calibration Issues Bedevil the Fast-Growing Ultrasonic Flowmeter Market



Dr. Jesse Yoder
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Much has happened in the ultrasonic flowmeter market in the past ten years. The market has seen acquisitions, new product development, new entrants into the market, and continued expansion. Especially active is the fast-growing market for custody transfer of natural gas. Once the exclusive province of Emerson Daniel and Instromet, new companies have entered this market. These include FMC Technologies, Sick Mahak, and most recently KROHNE. What is the secret behind the activity in this market?

I recently gained a new perspective on the ultrasonic flowmeter market. This year I was privileged to make several trips to the Middle East to interview end-user companies in the oil and gas industry. The main purpose of the interviews was to better understand the perspective of these companies on gas flow measurement, and to find out what factors are influencing their purchasing decisions. The companies I visited are in the United Arab Emirates, Saudi Arabia, Qatar and Oman. These are the large companies that supply oil and natural gas to the region.

One series of questions had to do with installed base. Many companies are currently using differential pressure (DP) and turbine flowmeters to measure natural gas flow. However, many of them are in the process of transitioning to ultrasonic flowmeters, especially for custody transfer applications. While these companies will continue to purchase DP and turbine meters for replacement purposes, most made it clear that they are standardizing on ultrasonic flowmeters for new applications. These companies are beginning to put traditional DP and turbine meters in the rear view mirror and are looking to the future with ultrasonic flowmeters.

Why the broad-based switch to ultrasonic meters? The reasons should be familiar to anyone who follows the flowmeter market. Ultrasonic meters do not have moving parts, cause minimal pressure drop, require limited maintenance, and are highly accurate. Turbine meters, by contrast, depend on a spinning rotor to determine flowrate. DP flowmeters require a primary element such as an orifice plate to create a pressure differential. Orifice plates are subject to wear and can also be knocked out of position in the flowstream, and the accuracy level of DP flowmeters is not as high as that of ultrasonic flowmeters.

Of course, there are also issues and concerns with the use of ultrasonic flowmeters. They require calibration before being installed, and there are a limited number of facilities worldwide where this calibration can be performed. Most facilities are in North America and Europe, and there is currently no such facility in the Middle East. Some calibration facilities have a six-month waiting list to perform calibrations. In addition, ultrasonic

Shipments of Ultrasonic Flowmeters Worldwide by Technology in 2008 (Percent of Dollars)



Source: The World Market for Ultrasonic Flowmeters, 3rd Edition, published by Flow Research (January 2008)

flowmeters for custody transfer applications need to be recalibrated periodically. To do this, they typically have to be pulled out of service and shipped to a calibration facility. Examples of such facilities include the Dutch Metrology Institute (NMI) and Colorado Engineering and Experimental Station Inc. (CEESI).

An added complication is that there is currently no commonly accepted standard for how often ultrasonic flowmeters need to be recalibrated. The consensus among the companies visited was that this should be done every five to seven years, though some suggested as often as every three years or as infrequently as every ten years. While organizations such as the American Gas Association (AGA) and American Petroleum Institute (API) have issued standards for the use of ultrasonic flowmeters for custody transfer applications, they have so far not tackled the question of calibration frequency. Companies in the Middle East are dependent on US and European standards, since they have not yet developed standards of their own when it comes to flow measurement.

However the calibration issue is resolved, the growing number of ultrasonic flowmeters worldwide requires that it be addressed. The increasingly high value of natural gas and petroleum liquids make accurate measurement of their flow more important than ever. This includes pipeline measurement, but it also applies to measurement upstream at oil wells and downstream at delivery points. Coriolis flowmeters are increasingly used for custody transfer of petroleum liquids, where they are displacing positive displacement meters in some cases.

Another certainty is that more companies will enter this market. Recent entrants include Cameron, Sierra Instruments, Blue-White, and Titan Enterprises. The pace of product development is increasing to keep up with expanding demand. Once limited to gas and liquids, ultrasonic meters are now being developed for steam applications. While ultrasonic meters used to be associated with clamp-on meters, many new meters are in-line for higher accuracy and greater reliability. Multi-path ultrasonic flowmeters, with anywhere from three to eighteen paths, offer very highly accurate and stable measurements. Stay tuned for further developments.

Jesse Yoder, PhD, is president of Flow Research, Inc. in Wakefield, Massachusetts, a company he founded in 1998. He has 20 years of experience as an analyst and writer in process control. Dr. Yoder specializes in flowmeters and

other field devices, including pressure, level, and temperature products. He has written over 70 market research studies in industrial automation and process control, and has published numerous journal articles.

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