

Book Reviews

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Fluid Mechanics of Flow Metering

Edited by Wolfgang Merzkirch, Springer, New York, 2005, 256 pp., \$99.00

Flow metering is a critical link in the chain of events that anchor our world economies, which depend mightily on the buying and selling of scarce oil and gas resources as well as industrially produced fluids. To optimize industrial productivity and to monitor environmental conditions for public health and safety, we need control systems based on measurement. In the measure-control-optimize sequence, the first step, measurement, is usually the most difficult, especially for fluid flows.

Traditionally, flow measurement technology has been based on calibration data, which, although practically quite useful, intrinsically mask understanding of the fundamental fluid mechanical phenomena and the specific meter responses to these phenomena that underlie the meter's performance and usually dictate the constraints in its performance. Additionally, the limits of calibration facilities restrict the ranges in which meter performance can be reliably assessed. Without better understanding, these limitations and constraints restrain the advance of flow metering technology.

Awareness of pertinent fluid phenomena and the performance capabilities of flow meters enables better comprehension of the intricacies of this measurement field. This book, edited by Wolfgang Merzkirch, presents the work of 12 German academicians at Universitat Essen and Universitat Bochum. It summarizes their effort, started in 1995, to provide a fundamental understanding

of the fluid mechanics of flow metering. The 15 chapters, authored or coauthored by these 12 professors, focus on the fluid mechanics of pipe flow; metering techniques; ultrasonic, turbine, vortex-shedding, and force-based meters; correction methods for nonideal installation conditions; and the very important topic of flow conditioning. The latter is a particularly valuable chapter.

By using this book to provide the fundamentals, flow meter manufacturers can now improve their product capabilities and expand the range of operating conditions by incorporating today's improved materials, sensors, microcircuits, and advances in computing and software. In addition to flow meter manufacturers, flow standards keepers and disseminators are working to improve their laboratory-based and transfer standards, i.e., meters, to assure better flow measurement traceability to national references.

Merzkirch is to be commended not only for compiling the work of his colleagues but also for his own fluid mechanical contributions. This tome is a critical element for the bookshelves of those currently involved in or intending to join the worldwide quest to improve flow measurement.

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