



Course Catalog Number: Tfm-3  
Course Track: Flow Measurements  
Course Topic: Uncertainty  
Course Career Level: Advanced

**Sunday, August 25 | 1:00 PM - 5:00 PM | 1/2-Day PM (4 Hours)**

**Course Title: Uncertainty Analysis: Liquid Flow Rig Measurement**

**Instructor:** Richard Fertell, Proteus Industries, Inc.

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**Abstract:** Measurement uncertainty calculations for liquid flow rigs based upon the weigh standard assessment using ISO 9368-1, ISO 4185, NIST Technical Note 1297.

**Learning Objectives:**

1. Concepts and difference of volumetric and mass flow rate.
  2. Concept of air quality and impact on scale/balance measurement.
  3. Concepts and calculation of all error sources for weigh standard liquid flow rigs.
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**Instructor Curriculum Vitae (CV):**

Richard Fertell has presented papers on Liquid Flow Rate at ISFFM, NCSL International, IMEKO, FLOMEKO and CFM as well as been published in magazines: Flow Control, Cal Lab, IEEE Explorer. Conducted workshop tutorials on Flow at the Measurement Science Conference and published many technical videos on YouTube and Vimeo. Like many in the Measurement Field, Richard worked in electronics and calibration while in the military. His career progression is from electronics technician to engineer to manager, professor and scientist.