Verification and Calibration (Instructor-Led Training)

Course Description

This course covers how and why keeping a flow metering system within specifications requires a program of calibration and verification.

Course Prerequisites

- GTA Instructor-Led Training
  - Orifice Meters
  - Ultrasonic Meters
  - Turbine Meters
  - PD Meters
  - Coriolis Meters
  - Cone-Type Meters
  - Gas Quality Measurement
  - Gas Flow Computers

Course Objectives

Upon completion of this course, the student will have received instruction designed to assist him/her in the following:

- Define the purpose of verification and calibration, including the importance of traceability.
- Present API 21.1 recommendations for calibration and verification.
- Present cost advantages of calibrations.
- Describe what devices on a meter system are calibrated.
- Describe frequency and the basis for routine calibrations, including calibration history trends.
- Describe why flow meter performance changes over time.
- Describe methods or options for calibration of pressure, temperature, differential pressure, EFM, and gas chromatographs.
- Describe three natural gas calibration facilities and their unique characteristics.
- Describe a typical calibration process for orifice, ultrasonic, and turbine flow meters, and key considerations to be taken into account when calibrating the meters.
- Interpret calibration curves for, ultrasonic, and turbine flow meters.

Course Outline

1. Verification and Calibration
    a. Purpose for Calibration
    b. Cost of Bias
    c. What Gets Calibrated?
    d. Traceability
    e. National Voluntary Laboratory Accreditation Program
    f. UKAS Laboratory Accreditation
2. Frequency of Calibration
    a. Current Calibration Practices
    b. Benefits of Calibration History
    c. Why Flow Meter Performance Changes Over Time
3. Calibration Options
    a. Calibration of Secondary Instrumentation
    b. Electronic Instrumentation
    c. Typical Specifications
    d. Operating Principle
    e. Calibration of EFM Devices
    f. Calibration Procedures
    g. Calibration of Gas Chromatographs
4. Orifice, Ultrasonic, and Turbine Meter Calibration
    a. Ultrasonic Meter
    b. Turbine Meter
    c. AGA Report No. 7, Measurement of Natural Gas by Turbine Meter (2006) has information on installation and performance requirements for gas turbine meters.
    d. Why Flow Calibrate Orifice Meters?
    e. General Considerations for all Meter Calibrations
5. Transfer Proving

Recommended Resources

- GTA Verification and Calibration Participant Guide and Instructor Presentation.
- API MPMS Chapter 21.1.
- Internet sites and textbooks related to flow meter and instrument verification and calibration.