
Coriolis Meters

(Instructor-Led Training)

Course Description

This course introduces Coriolis flowmeters to technicians new to the natural gas industry. It includes discussions about Coriolis flowmeter measurement theory, standards, and operation.

Course Prerequisites

- GTA Web-Based Training
 - Core WBT
 - Statistics and Uncertainty
 - Gas Properties I
 - Gas Properties II
- GTA Instructor-Led Training
 - Measurement Systems

Course Objectives

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

- Identify and describe the major functional components of a Coriolis flowmeter and how the flowmeter interfaces with its peripherals.
- Explain Coriolis flowmeter theory and how a Coriolis flowmeter measures mass flow, volumetric flow and density.
- Describe different Coriolis flow tube geometrics and explain when a bent tube design is advantageous over a straight tube design. Also, explain the operation of flow detectors and explain why temperature and sensors are used in Coriolis flowmeters.
- Describe installation best practices for Coriolis flowmeters.

Course Outline

1. Coriolis Flowmeter Description
 - a. Flowmeters
 - b. Coriolis Flowmeter Components
 - i. Flow tubes
 - ii. Casing
 - iii. Drive Coil
 - c. Flow Detectors
 - d. Temperature Detector
 - e. Flow Splitter
 - f. Processor/Transmitter
 - g. Flowmeter Peripherals
2. Coriolis Flowmeter Theory
 - a. Coriolis Flowmeter Sensor Theory
 - b. Force
 - c. Tube Vibration
 - d. Flow Detectors
 - e. Signal Generation
 - f. Signal Generation – No Flow
 - g. Coriolis Effect with Fluid Flow
 - h. Flow Calibration Factor
 - i. Density and Mass Relationship
 - j. Mass and Frequency Relationship
 - k. Tube Period
 - l. Coriolis Meters for Use as Densitometers
3. Coriolis Flowmeter Design
 - a. Flow Tube Geometries
 - b. Compact Tube Design
 - c. Bent vs. Straight Tube Design
 - d. Other Design Factors

- e. Dual-Tube Flowmeters
- f. Single-Tube Flowmeters
- g. Flow Detectors
- h. Temperature Sensors
4. Coriolis Flowmeters Installation
 - a. Pre-Installation Checklist
 - b. Flowmeter Installation
 - c. Electrical Installation
 - d. Strainers or Filters
5. Coriolis Flowmeters Proving and Troubleshooting
 - a. Reasons for Proving Coriolis Flow Meters
 - i. Proving Method
 - ii. Equipment Required for Master Meter Method of Proving
 - b. Turbine Meter
 - c. Pressure and Temperature Transmitters
 - d. Piping per AGA 7
 - e. Flow Computer
 - f. Onsite Proving with a Master Meter Placed in Series with the Field Meter
 - g. Procedures for Atmospheric Master Meter Transfer Proving
 - h. Procedures For Onsite Master Meter Proving

Recommended Resources

- GTA Coriolis Meters Participant Guide
- GTA Coriolis Meters Instructor Presentation.
- Internet sites related to Coriolis meters.
- Textbooks or other publications related to Coriolis meters.