ICTD
المركز العالمي للتدريب والتطوير
International Centre For Training & Development



FLOW METERING
Measurement

Course Introduction:

This course covers principles of fluid flow and how primary devices affect fluid flow. Describes flow measurement using several kinds of secondary devices. The online course goes on to Discuss rotameters and other variable-area instruments. Explains how weirs, flumes, and other arrangements measure open-channel flow. Compares many kinds of positive-displacement meters and explains the operation of several kinds of turbine and magnetic flowmeters. Describes less-common flowmeters (including vortex-precession, mass flow, and ultrasonic devices) and instruments that meter the flow of solids. Provides guidelines for safe installation and maintenance of flow devices.

Course Objectives:

This course is designed to enable the participants:

- How to examine different types of custody transfer
- How to conduct a thorough review of flow measurement devices
- Understand the various level measurement devices
- How to examine flow calibration and proving methods and potential problems with proving systems
- Understand the basic principles of Inventory control
- Discussion on various industry and international standards

Who Should Attend?

This course is design for personnel needing a basic understanding of Custody Transfer concepts and requirements and fluid flow measurement techniques and applications.

This training seminar is suitable to a wide range of professionals but will greatly benefit:

- Engineers and Technicians of all disciplines
- Instrumentation Personnel
- Procurement and quality control personnel
- Inspection and Maintenance engineers

Course Outline:

Day 1:

- **Custody Transfer & Flow Measurement - Introduction and Essential Concepts**
    - Introduction to custody transfer and Best Practice
    - Flow measuring devices - introduction, types, selection, Velocity and Density Measurements
    - Allocation for distributing revenue and expenses
    - Fiscal for payment to regulatory authorities

- Fluid and Gas Laws - Governing equations
- Measurement terminology - Accuracy, Precision, Repeatability, Reliability

Day 2:

- **Flow Measuring Devices – Part I**
  - Flow measuring devices, Specification and selection for Custody Transfer
  - intrusive/ non-intrusive measurement, Flow Modification
  - Volumetric and Mass Measurement
  - Differential Pressure Measurement, Measurement Corrections
  - Positive Displacement Measurement

Day 3:

- **Flow Measuring Devices (cont'd)**
  - Velocity Measurement
  - Inferential, Propeller, Turbine,
  - Magnetic
  - Ultrasonic
  - Oscillatory
  - Mass Measurement, Coriolis

Day 4:

- **Level Measuring Devices**
  - Introduction, Types
  - Top-Entry Measurement, Contact, Non-Contact Measurement
  - Displacement Measurement
  - Buoyancy Measurement
  - Magnetic, Ultrasonic, Radar, Conductive, Capacitance, Bubbles, Vibrating, Nuclear

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Day 5:

- **Calibration / Proving & Custody Transfer Management**
  - Calibration and Proving, Different method of proving flow measuring devices, Master Meter Systems, API Standards
  - Types of proving facilities, Leased and portable proving facilities
  - Problems with the Prover, Impact of faulty proving methods
  - LACT units - introduction and overview, Equipment, Truck custody transfer, OIML recommendation
  - API gravity- definition and importance in custody transfer
  - Inventory Management, Tank Gauging and Calibration, Gravimetric Inventory Control

Course Certificate:

International Center for Training & Development (ICTD) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Methodology:

- Based on case studies (30%); Techniques (30%); Concepts (10%) and Role Play (30%)
- Pre-test and Pro-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionaires
- Small Group Work
- Discussion
- Presentation

Course Timings:

Daily Course Timings:

08:30 - 08:50	Morning Coffee / Tea
08:50 - 10:20	First Session
10:20 –10:40	Coffee / Tea / Snacks
10:40 - 12:20	Second Session
12:20 - 12:40	Coffee / Tea / Snacks
12:40 - 14:30	Last Session

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