

# Flow Measurement and Custody Transfer

## INTRODUCTION

- Custody Transfer defines the point at which ownership changes hands for the process product being measured. This transfer is unique among flow-meter applications since money changes hands and accuracy requirements are higher than they are for most other applications. The custody transfer system must generate detailed and indisputable cargo reports, based on accurate flow measurements and calculations.
- In this intensive and highly practical Flow Measurement and Custody Transfer training seminar, participants will gain sound and practical understanding and extend their knowledge of Custody Transfer and Flow Measurement systems, principles and types, and how to assess their impact on the strategic and tactical aspirations of the company.

This training seminar will highlight:

- The laws governing fluids and gases
- Important principles of flow-metering including accuracy and repeatability
- Main types and applications of Flowmeters with emphasis on custody transfer
- Flowmeter proving and calibration techniques
- Custody transfer principles and applications

## OBJECTIVES

- This Flow Measurement and Custody Transfer training seminar introduces participants to a variety of flow measurement technologies and systems that are used custody transfer applications, and gain an understanding about how measurement systems can work properly and accurately.

At the end of this training seminar, the participants will:

- Have a sound understanding of relevant fluid and gas Laws that are needed for the use of flow measurement devices
- Understand the main requirements of custody transfer systems
- Appreciate the main requirements of flow measurements including accuracy and repeatability
- Be knowledgeable about up-to-date flow measurement meters including Differential Pressure (DP) measurement, turbine meters, positive displacement meters, Coriolis flow measurement, Magnetic and ultrasonic flow measurement
- Gain the ability to determine if a metering system is adequate for the purpose, select appropriate custody transfer metering systems and identify potential problems
- Learn about the principles and applications of Multiple meters / meter runs, Flow computers, Quality systems, Calibration, Meter Runs, Proving and Supporting Automation

## TRAINING METHODOLOGY

- This Flow Measurement and Custody Transfer training seminar combines structured and focused presentations and discussions of topics covered with relevant examples and question & answer sessions to maximise the benefits to the participants. Relevant computer simulations and videos will be used to emphasise the main topics.
- Participants will be provided with comprehensive hard and soft copies of the training seminar notes and soft copies of all presentation material. These will be very valuable for detailed study and future reference.

## ORGANISATIONAL IMPACT

- The company will achieve improved and optimised control of its custody Transfer and flow measurement operations
- Optimised process selection criteria will increase efficiency and Financial Performance and result in Fiscal Savings. This will be brought about by more accurate measurement techniques and more robust Custody Transfer operations
- Improved competencies will result in higher staff productivity and effectiveness
- The organisation will be able to generate detailed and indisputable cargo reports, based on accurate flow measurements and calculations

## PERSONAL IMPACT

- Participants will gain sound and practical understanding and extend their knowledge of Custody Transfer and Flow Measurement systems, principles and types, and how to assess their impact on the strategic and tactical aspirations of the company
- Participants will have the necessary information and confidence to conduct reviews of flow measurement systems and the ability to report to management on the status of the custody transfer systems in place and methods of improvement

## WHO SHOULD ATTEND?

- This Flow Measurement and Custody Transfer training seminar is highly relevant to 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

### Introduction – Basic Fluid and Gas Laws

- Custody Transfer Principles and Requirements
- Pressure, Viscosity, Flow Volume, Continuity Principle, Energy Law (Bernoulli's)
- Flow Configurations (Flow Profiles), Laminar Flow, Turbulent Flow
- Reynold's Number, Flow Losses (Friction Losses)
- Ideal and Real Gases, Gas Laws, Boyle's Law, Charles's Law, Gay-Lussac's Law

### General Characteristics and Performance of Flow Meters

- System Characteristics and Flow Range
- Performance, Accuracy, Stability and Repeatability, Sensitivity, Noise, Linearity, Reliability
- Flow Modification and Meter Runs
- Applications and Usage, Sizing

## Types and Applications of Flow Meters

- Differential Pressure (DP) Flow Meters, Orifice, Venturi, Nozzles, Pitot Tubes
- Positive Displacement (PD) Flow Meters, Rotor, Oscillating Piston, Oval Gear
- Turbine Flow Meters, Conventional and Helical
- Problems with Erosion, Corrosion, Cavitation and Obstructions
- Uses and Applications, Installation Requirements and Standards

## Types and Applications of Flow Meters (continued)

- Ultrasonic Flow Meters
- Magnetic Flow Meters
- Coriolis Flow Meters
- Uses and Applications, Installation Requirements and Standards
- Straight Run Requirement

## Flow Measurement Systems and Custody Transfer Considerations

- Custody Transfer Requirements
- Meter Factor
- Proving Systems: Direct, Indirect, Master Meter, Volume, Displacement
- Custody Transfer Skids
- Flow Computers and Communication
- Temperature and Pressure Measurements