



**Training Program:**  
**Metering & Custody Transfer Program**

# INTRODUCTION:

Metering systems in the Oil & Gas industry have rapidly evolved in terms of sophistication, accuracy and reliability; countless factors have to be taken into account in the design of a metering system, requiring multi-disciplinary specialists with very specific experience and knowledge. The very large amounts of money involved in Custody Transfer of Oil and Gas brings the need for auditable custody transfer, metering and allocation systems which are critical to both sellers and buyers to build trust. This course was developed to create an understanding of custody transfer measurements for personnel involved in hydrocarbon transfer. It provides more insight on custody transfer metering operations. It elaborates all about crude oil fluid flow, flow measuring, metering system, oil transfer meter, types of flow measuring devices, and a lot of other custody transfer operations.

This course is developed for engineers and technicians who need to have a practical knowledge of selection, installation and commissioning of fiscal metering equipment. It is for those primarily involved in achieving effective results in industrial processes. This would involve the design, specification and implementation of control and measurement equipment. The course focuses on practical applications, with special attention to installation considerations and application limitations when selecting or installing different measurement or control instruments for fiscal metering.

## WHO SHOULD ATTEND?

MGC Coordinators and Supervisors, Instrumentation & Metering Engineers & Technicians, Metering Managers and Engineers, Production Operation & Process Engineers, Production Technologists, Design & Mechanical Engineers, Service Staff and Inspectors of Custody Transfer Stations, Design & Process Engineers, Reservoir Engineering & Custody Technicians, Well Testing Group & Chemical Engineers, Valve Technicians & Maintenance Personnel & Supervisors

## COURSE OBJECTIVES:

**By the end of this course delegates will be able to:**

- API's metering technologies
- The proper selection and installation of the right meter for specific applications

- Crude oil fluid flow
- Flow measuring and metering system
- Oil transfer meter and types of flow measuring devices
- Design and operating practices
- Calibration and traceability
- How to meet international standards
- Oil quality measurement
- Calibration of oil meters for high pressure natural gas and flow conditions
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## COURSE OUTLINE

### Basic Fluid and Gas Laws

- Pressure, Flow Volume, Continuity Principle
- Energy Law (Bernoulli's Equation)
- Pressure Change Equation
- Flow Configurations (Flow Profiles)
- Laminar Flow, Turbulent Flow
- Reynold's Number, Flow Losses (Friction Losses)
- Viscosity, Ideal Gases
- Gas Laws, Boyle's Law, Charles's Law, Gay-Lussac's Law

### General Characteristics and Performance of Flow-meters

- System Characteristics
- Flow range and viscosity range
- Performance, Accuracy
- Stability and Repeatability
- Sensitivity, Noise, Linearity, Reliability
- Applications and Usage, Sizing, Calibration

## **Types and Applications of Flow Meters**

- Differential Pressure (DP) Flow Meters
- Positive Displacement (PD) Flow Meters
- Turbine Flow Meters
- Ultrasonic Flow Meters
- Magnetic Flow Meters
- Coriolis Flow Meters

### **Head Flow Meter**

- Orifice, Sizing, Secondary Instrument, Calculation, Standard AGA3

### **Turbine Meter**

- Systems, Properties, Characteristics, Standard AGA7

### **Ultrasonic Flowmeter**

- Ultrasonic Flowmeter, Types, Application, Standard AGA9

### **Oil Transfer Meter**

- Meter Run, Proving Skid, Meter Proving, Meter Factor, Base Prover,
- Proving Run, Prover Pass, Prover Round Trip

### **Metering System**

- Strainer, Deareater, Traps, Filters
- Temperature and pressure transmitters
- Block and bleeds valves
- Venting and drain valves
- Electric valves, Flow control valves

## **Flow Measurement Systems and Other Consideration**

- Meter Factor, Meter Runs
- Proving Systems; Direct, Indirect, Master Meter, Volume, Displacement
- Time Delay, Quality Systems
- Custody Transfer Skids
- Flow Computers and Communication
- Temperature and Pressure Measurements

### **Compressible & Incompressible Flow**

#### **Fluid Flow & Pipe Fluid Flow**

#### **Fluid Flow Measurement**

#### **Calculation of Oil Quantity**

#### **Performance Characteristic of Flow Meter**

#### **Shipping Calculate Volume, Calculate Correction & Calculation Sample**