Oil & Gas Processing Flow Measurement

Oil & Gas Engineering
Tunis (Tunisia)
23 - 27 Feb 2025

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Introduction

Accurate flow measurement is essential to today's oil & gas operations. This course aims to provide training to facility operators, technicians, and engineers, which, once delivered, "keep on working". Participants are encouraged to raise queries both during and at any time after attending the seminar. Participants are also encouraged to bring with them any issues that they may have to the course.

Course Objectives of Oil and Gas Processing Flow Measurement

- Understand the Legal and Commercial Metering Requirements
- Appreciate design criteria and the importance of accuracy
- Understand measurement concepts and types of error
- Understand the basic concepts, the principle of operation, and the equipment used for Gas metering, liquid metering, proving, and sampling
- Understand the basic concepts, the principle of operation, and the hardware used for typical flow computers, Prover Control Micro-computers, and Supervisory Systems.
- Understand the typical operations, control functions, and record-keeping requirements
- Evaluate the results of Turbine Meter Calibration and determine the validity by use of a Control Chart

Course Outline of Oil and Gas Processing Flow Measurement

Day 1

Typical Gas System Overview

- Typical Gas Pipeline System
- Role of Operator
- Overview of Typical Gas Sales

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- Contracts

Typical Gas Metering System Overview

- Introduction to Fiscal Metering
- Pipework and Valving
- Flow Measurement
- Secondary Instrumentation

Primary Flow Measurement Instruction

- The Flowmeter
- Meter Tubes and Other Fittings
- Removals/Replacement Procedure

Flow Measurement Accuracy

- Flow Measurement Uncertainty,
- Rangeability and Calibration
- Calculating Uncertainty
- Traceability

Secondary Measurement Instrumentation

- Pressure Measurement
- Temperature Measurement
- Density Measurement

Day 2

Gas Quality Measurement

- The Gas Sampling and Conditioning System
- Relative Density Analyser
- Moisture Analyser

Gas Chromatographs

- Introduction to Gas Chromatography
- Gas Conditioning System
- Gas Chromatograph
- Chromatograph Controller
- Calibration and Maintenance

Computer System Overview

- Hardware

- Software
- Display Formats
- Alarm Handling and Interpretations
- Response to Input Failures

Supervisory Computer System

- Hardware and Software
- Operator Interface
- System Security
- Communications

Metering Panel Auxillary Equipment

- Analogue to Digital Conversion
- Power Supplies

Day 3

Introduction to Primary Flow Measurement Devices

- Introduction

- Basic Principles of Pipe Flow
- Mathematical Developments

PRIMARY FLOW MEASUREMENT DEVICES - Differential Pressure Type

- Simple Theory
- Orifice Meters
- Venturi Meters
- Flow Nozzles
- Low Loss Devices
- Variable Orifice Meters
- Variable Area Meters
- Pitot Tubes and Pitot Static Tubes
- Target Flowmeters

PRIMARY FLOW MEASUREMENT DEVICES - Displacement Flowmeters

- Basic Principles
- Liquid Meters
- Designs for Gases

- Advantages and Disadvantages
- Applications

Day 4

PRIMARY FLOW MEASUREMENT DEVICES - Rotary Inferential Meters

- Turbine Flowmeters
- Miscellaneous Designs
- Advantages and Disadvantages

PRIMARY FLOW MEASUREMENT DEVICES - Fluid Oscillatory Flowmeters

- Principle of Operation
- Vortex Shedders
- Advantages and Disadvantages

PRIMARY FLOW MEASUREMENT DEVICES - Electromagnetic Flowmeters

- Principle of Operation
- AC and Pulsed DC Types
- Applications
- Advantages and Disadvantages

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Day 5

PRIMARY FLOW MEASUREMENT DEVICES - Ultrasonic Flowmeters

- Doppler Type
- Time-of -Flight Type
- Clamp-on Type
- Applications
- Advantages and Disadvantages

PRIMARY FLOW MEASUREMENT DEVICES - Mass Flow Measurement

- Coriolis Flowmeters
- Angular Momentum Devices
- Thermal Meters
- Applications
- Advantages and Disadvantages

PRIMARY FLOW MEASUREMENT DEVICES - Miscellaneous

- Cross-Correlation
- Tracer Methods

- Weighing Methods

- Lasers

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