



PCE209

High Accuracy Oil & Gas Flow Measurement and Process Control

Course Introduction:

Accurate flow measurement is essential to today's oil & gas operations. Our fiscal metering and process control training aims to provide training to facility operators, technicians and engineers where once delivered, **"keep on working"**. Delegates are encouraged to raise queries both during and at any time after attending the seminar. Delegates are also encouraged to bring with them any issues that they may have to the seminar. High quality multi-media is used to supplement traditional methods throughout the presentation, (**based on our interactive training** software) which has proven to be more useful in explaining and understanding the topic than actually seeing a system in operation.

Course Objectives:

At the end of the course, participants will be able to:

- ✓ Understand the legal and commercial metering requirements
- ✓ Appreciate design criteria and importance of accuracy
- ✓ Understand measurement concepts and types of error
- ✓ Understand the basic concepts, principle of operation and equipment used for gas metering, liquid metering, proving and sampling
- ✓ Understand the basic concepts, principle of operation and 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 control chart

Who Should Attend?

This course is designed to satisfy the information required of any one concerned with the operation, maintenance and readings from oil & gas flow metering systems and process control. This includes; operations engineers, instrumentation engineers, design engineers, maintenance engineers, section heads, supervisors, team leaders, operators, and metering specialist/technicians.

Course Outline:

Day 1:

INTRODUCTION

- Typical gas development overview
- Typical gas pipeline system

- Role of operator
- Overview of typical gas sales
- Contracts

TYPICAL GAS METERING SYSTEM OVERVIEW

- Introduction to fiscal metering
- Dynamic measurement accuracy
- Pipework and valving
- Flow measurement
- Instrumentation
- Orifice plates
- Gas turbine meters
- Ultrasonic meters
- Vortex meters

PRIMARY FLOW MEASUREMENT INSTRUMENTATION

- The orifice plate
- Meter tubes and orifice fittings
- Details
- Orifice plate
- Removals/replacement procedure

FLOW MEASUREMENT INSTRUMENTATION

- Flow measurement uncertainty,
- Rangeability and calibration
- Dual range & smart dp
- Transmitter

SECONDARY MEASUREMENT INSTRUMENTS

- Pressure measurement - general
- Temperature measurement - general
- Density measurement - general

Day 2:

GAS QUALITY MEASUREMENT

- The gas sampling and conditioning system
- Relative density analyzer

- Moisture analyzer

GAS CHROMATOGRAPHS

- Introduction to gas chromatography
- Gas conditioning system
- Gas chromatograph
- Chromatograph controller
- Calibration and maintenance

COMPUTER SYSTEM OVERVIEW

- System functional description
- User access security
- System operation

STREAM FLOW COMPUTERS HARDWARE

- Software overview
- Display formats
- Alarm handling and interpretations
- Flow computer calculations
- Response to input failures
- Calibration mode (maintenance mode)

SUPERVISORY COMPUTER SYSTEM

- Hardware and software
- Operator interface
- System security
- Communications
- Calculations

METERING PANEL AUXILIARY EQUIPMENT

- Analogue to digital conversion
- Power supplies
- System operation

Day 3:

DOCUMENTATION, RECORD KEEPING AND REPORTING

- Production logs

- Reporting formats
- Rules for logbook entries

CALIBRATION AND MAINTENANCE

- Test equipment
- Types of standards
- Orifice plate
- Differential pressure transmitters
- Static pressure transmitters
- Temperature measurement loops
- Gas densitometers
- Relative density analyzers
- Moisture analyzers

HIGH ACCURACY OIL & GAS FLOW MEASUREMENT

- Typical oil development overview
- Typical oil pipeline system
- Role of operator
- Overview of pipeline
- Transportation agreement

TYPICAL OIL METERING OVERVIEW

- Introduction to fiscal metering
- Dynamic measurement accuracy
- Pipework and valving
- Prover loop
- Flow measurement instrumentation

DESIGN CRITERIA AND REGULATIONS

- Authorities: Hierarchy of importance
- Dti gas and oil measurement branch
- British, American and International Standards

PRIMARY FLOW MEASUREMENT DEVICE

- The turbine meter
- Meter tubes and valving details

Day 4:

PROVER LOOP AND ASSOCIATED COMPONENTS

- Pipe provers
- Pipe spheres
- Prover components
- Prover calibration
- Prover operation

SECONDARY MEASUREMENT INSTRUMENTS

- Pressure management
- Temperature measurement
- Density measurement

OIL QUALITY MEASUREMENT

- The oil sampling and densitometer fast loop
- Water-in-oil monitor

SAMPLING AND ANALYSIS

- Continuous on-line automatic samples
- Sample receivers
- Pipeline conditions
- Sample analysis

SUPERVISORY COMPUTER SYSTEM

- Hardware and software
- Operator interface
- Systems security
- Communications
- Calculators

COMPUTER SYSTEMS OVERVIEW

- User access security
- System operation

STREAM FLOW COMPUTERS

- Hardware

- Software overview
- Display formats
- Alarm handling and interpretations
- Flow computer calculations
- Response to input failures
- Calibration mode (maintenance mode)

PROVER CONTROL MICROCOMPUTER

- Functions
- Response to input failures
- Calculations

METERING PANEL AUXILIARY EQUIPMENT

- Analogue to digital conversion power supplies
- System operation

Day 5:

DOCUMENTATION - RECORDS KEEPING

- Production logs
- Reporting formats
- Rules for logbook entries

CALIBRATION AND MAINTENANCE

- Test equipment
- Types of standards
- Turbine meters
- Static pressure transmitter
- Temperature measurement loops
- Liquid densitometers
- Water in oil analyzer

Course Certificate:

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

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

Course Fees:

To be advised as per course location. This rate includes participant's manual, and-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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International Centre For Training & Development

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee / Tea
08:20 - 10:00	First Session
10:00 - 10:20	Coffee / Tea / Snacks
10:20 - 12:20	Second Session
12:20 - 13:30	Lunch Break & Prayer Break
13:30 - 15:00	Last Session