

OBJECTIVES

To provide technical knowledge of metering in Oil & gas industry: involved equipment, measurement principle, and industrial application.

On completion of the course, participants know:

- the different metering types and are aware of the crucial importance of metering accuracy,
- the operating principle and technology of single-phase metering equipment,
- the standards relative to transactional metering of liquids and gases, as well as operation, maintenance and calibration techniques of metering installations,
- the advantages of multiphase metering, the operating principle and technology of multiphase flow meters, and the alternative techniques to the use of multiphase meters.

COURSE CONTENT

DIFFERENT TYPES OF METERING - IMPORTANCE OF METERING 0.25 day

Types of metering: technical, transactional, allocation, fiscal
Importance of metering accuracy

DATA TREATMENT 0.25 day

Technical material balances, data reconciliation, data architecture, architecture of DCS, data recording

IMPLEMENTATION OF A METERING INSTALLATION - INFLUENCE ON PROCESS 0.25 day

Friction losses, introduction of a cold spot, intrusivity, leakage risks...

SINGLE-PHASE METERING: Operating principle and equipment 0.50 day

Standards

Fluids and their flow (laminar and turbulent flow)

Different types of single-phase meters:

Meters based on kinetic energy ($\rho \cdot V^2$): orifice plate meters, Pitot tubes, Rotameters

Meters based on velocity: direct meters (turbines, volumetric meters) or Indirect meters (Ultrasounds, Electromagnetic, Vortex, thermal, Turbines)

Derived meters: use of centrifugal pump characteristic curve, use of rotation speed of a positive displacement pump...

Tracers: chemical, radioactive, inter-correlation

TRANSACTIONAL METERING OF LIQUIDS 0.50 day

Standards

Static transactional metering or Pseudo-transactional metering (tank being filled...)

Metering bench ; turbines, volumetric, ultrasounds

Calibration of metering installations on test bench in manufacturing facilities or on site

Operation of metering installations: **maintenance**, calibration

Calculators: corrections, **conversion into standard volumes**

Sampling, online analysis and lab analysis

TRANSACTIONAL METERING OF GASES 0.50 day

Standards

Metering bench ; turbines, volumetric, ultrasounds

Calibration of metering installations on test bench in manufacturing facilities or on site

Operation of metering installations: **maintenance**, calibration

Calculators: corrections, **conversion into standard volumes**

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MULTI-PHASE METERING: Operating principle and equipment 0.50 day

Advantages of multiphase metering

Fluids: flow modes, composition

Concepts and vocabulary

Principle of multiphase measurement:

gamma-metric measurement, volume measurement, passive noise analysis

use of dielectric, of Venturi, of Inter-correlation

Use of Optic Fibers: inter-correlation, sound velocity

Description of some equipment available for multi-phase measurement: 3D, Roxar, Agar, Haimo, MPM, Weatherford...

Installation of multi-phase measurement – Impact on process: fluid conditioning, intrusivity

Subsea and downhole multiphase meters

Calibration at manufacturer facilities

Operation and maintenance of multi-phase meters

ALTERNATIVES TO THE USE OF MULTI-PHASE METERS 0.25 day

4D seismic

Use of natural or introduced tracers

Estimation of the contribution of each reservoir (allocation)

▲ Who should attend?

Anyone looking for a technical knowledge of metering methods and equipment used in the petroleum industry: operation staff of Oil & Gas field treatment plants and terminals, instrumentation specialists, architects, project engineers, reservoir engineers, well performance specialists, completion specialists, personnel from engineering companies...

▲ Duration

3 days

▲ Dates & Location

May 05-07, 2009

Rueil-Malmaison (Paris)

French session: F-615

▲ Registration

Fees: € 1,580

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▲ Course Coordinator

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Ref. I&R / METER