

# € TRAINING

Fluid Flow Control in the Process Industry



# Fluid Flow Control in the Process Industry

## Introduction:

Modern fluid flow control techniques in fluid systems that are encountered in the process and chemical industry, involve the control of flow rate; measurements of pressure and temperature; and, other quantities at upstream and downstream locations. They also involve a means for enabling the passing of maximum flow rate in case of emergencies. Fluid movers such as pumps and compressors of various designs have their own flow control devices for regulating flow rates, pressures, and in some cases, motor loads variable speed motors or variable speed couplings. Control valves play a major role in fluid flow control. They are used for pressure reduction, control of delivery flow rates, back pressure control, pressure relief, etc.

Fluid flow measurement is the most important process variable in the operation and control of fluid transport in piping systems and pipelines. Flow control data are monitored and computerized; and line flow balances are used to check for discrepancies on an hourly, daily, or weekly bases. Flow measurements are done using some suitable flow meters: differential pressure meters, volumetric flow meters, or mass flow meters. The conference will cover all practical aspects of industrial fluid flow measurements, analysis of results, and relevant aspects of accuracy

## Conference Objectives:

At the end of this conference the participants will be able to:

- Recognize the physical characteristics of fluids that are to be measured by one of the flow measuring techniques
- Learn about the measuring techniques and their capabilities and limitations
- Understand of principles of existing world standards and codes related to fluid flow measurement
- Select the right measurement techniques: an estimate of the accuracy and uncertainty of results
- Recommend guidelines for diagnosing the problems in the operation of the entire system based on flow monitoring

## Targeted Audience:

- Engineers and technicians in oil & gas, chemical and process industries
- Process, mechanical and chemical engineers
- Engineers and technicians who deal with reactors and piping systems
- Design engineers, project engineers
- Control, automation and instrumentation engineers

## Conference Outlines:

### Unit 1: Fluid Flow Control in the Process Industry:

- Importance of fluid flow control in the process industry
- Classification of fluid flow measurement techniques
- Types of fluid flow measurements
- World standards related to fluid flow measurement
- Physical properties of liquids, gases, and multiphase fluids
- Gas laws and expansion of liquids

## Unit 2: Basic Principles of Fluid Flow in Pipes and Other Geometries:

- Relationship between pressure and velocity
- Complexities of flow of two-phase fluids
- Specifics related to measurements of velocity, pressure
- Flow-meters based on differential pressure
- Volumetric flowmeters
- Mass flow-meters, probes, and tracers

## Unit 3: Other Issues Related to Measurements:

- Probes and tracers
- Readouts and related devices
- Proving systems
- Fluid balance study
- Auditing

## Unit 4: Installation of Instruments:

- Effect of instrument installation on the accuracy of results
- Accuracy requirements and related issues
- Uncertainty and statistics
- Calibration of measuring instruments
- Maintenance of meter equipment
- Recent developments and likely future trends

## Unit 5: Flow Control of Pumps, Compressors and Fans:

- Control valve application
- Flow control system in pumps stations
- Flow control system in compressor stations
- Flow control in pipelines
- Pipeline monitoring systems