



**Chemical, Mechanical Engineering**



**SCANDINAVIAN ACADEMY**  
Training and Development

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# Course: Fluid Flow Control in the Process Industry

Code	City	hotel	Start	End	price	Hours
139	Madrid (Spain)	Hotel Meeting Room	2024-07-08	2024-07-12	5450 €	25

## The Course

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 emergency situations. 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 hourly, daily or weekly bases. Flow measurements are done by means of some suitable flow meters: differential pressure meters, volumetric flow meters or mass flow meters. The course will cover all practical aspects of industrial fluid flow measurements, analysis of results and relevant aspects of accuracy.

### Highlights of the course include:

- Principles of selecting the most appropriate fluid flow measurement for the given industrial application
- Guidance for optimum setup of measurements and obtaining accurate results
- Practical real-life examples of application of the most effective instruments for flow measurements of gases and liquids and multi-phase mixtures
- Influence of fluid properties on final results of flow measurements
- Economical issues: cost and benefit analysis in the light of monitoring a system

## The Goals

### This course will enable the participants to achieve the following:

- Proficiency in physical characteristics of fluids that are to be measured by one of the flow measuring techniques
- Familiarity with flow measuring techniques and their capabilities and limitations
- Understanding of principles of existing world standards and codes related to fluid flow measurement
- Skill in selecting the right measurement techniques: estimate of the accuracy and uncertainty of results
- Recommended guidelines for diagnosing the problems in operation of the entire system on the basis of flow monitoring



## The Process

The course is focused on lectures and active contribution by all delegates during discussions and team work. The emphasis of the course will be on physical principles and justified and clear technical reasoning. Real-life examples will illustrate the procedure of setting up flow control measurements with calculations and analysis of results explained and discussed. An open forum discussion will be held daily aimed to solidify the knowledge gained and exchange viewpoints and professional experiences.

## The Benefits

**This course will benefit the delegates through:**

- Expertise with the main characteristics of measuring techniques and their correct implementation
- Understanding how to make the best selection of measuring method for the given engineering application with regard to type of fluid and range of operating conditions
- Enhanced knowledge on how to make sound estimates on the accuracy of the results they are obtaining and to look for the ways of the overall improvement
- Acceptance of guidelines for adequate installation of measuring instruments
- Clear vision about the best practices for application of control valves

## The Results

**The course will benefit the company through:**

- Adequate control of fluid flow systems will result in energy saving in the overall technological process
- Efficiently operated process plant piping system by skilled personnel will result in saving and in the reduction of costs of the overall technological process
- Performance of the company in the long run will be improved by an adequate selection of monitoring method and flow measurement technique
- Personnel in the maintenance department will be able to follow the best practices for continuous monitoring of the process
- Well maintained process equipment will prolong the life of the plant and significantly reduce overall costs, by reducing the costs of unnecessary downtime

## The Programme Content

### Day One

#### 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

## **Day Two**

### **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 flow meters
- Mass flow-meters, probes and tracers

## **Day Three**

### **Other Issues Related to Measurements**

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

## **Day Four**

### **Installation of Instruments**

- Effect of instrument installation on 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

## **Day Five**

### **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



**The Scandinavian Academy employs modern methods in training and skills development, enhancing the efficiency of human resource development. We follow these practices:**

- **Theoretical Lectures:**
  - We deliver knowledge through advanced presentations such as PowerPoint and visual materials, including videos and short films.
- **Scientific Assessment:**
  - We evaluate trainees skills before and after the course to ensure their progress.
- **Brainstorming and Interaction:**
  - We encourage active participation through brainstorming sessions and applying concepts through role play.
- **Practical Cases:**
  - We provide practical cases that align with the scientific content and the participants specific needs.
- **Examinations:**
  - Tests are conducted at the end of the program to assess knowledge retention.
- **Educational Materials:**
  - We provide both printed and digital scientific and practical materials to participants.
- **Attendance and Final Result Reports:**
  - We prepare detailed attendance reports for participants and offer a comprehensive program evaluation.
- **Professionals and Experts:**
  - The programs scientific content is prepared by the best professors and trainers in various fields.
- **Professional Completion Certificate:**
  - Participants receive a professional completion certificate issued by the Scandinavian Academy for Training and Development in the Kingdom of Sweden, with the option for international authentication.
- **Program Timings:**
  - Training programs are held from 10:00 AM to 2:00 PM and include buffet sessions for light meals during lectures.