

# € TRAINING

Pipes and Piping Systems Optimization



17 - 21 November 2024  
Cairo (Egypt)



# Pipes and Piping Systems Optimization

REF: E415 DATE: 17 - 21 November 2024 Venue: Cairo (Egypt) - Fee: 4465 Euro

## Introduction:

This training program provides comprehensive instruction on enhancing the efficiency and performance of piping systems in various industrial applications. Through this program, participants will gain the knowledge and skills necessary to design, analyze, and manage piping systems effectively, improving overall system reliability and productivity.

## Program Objectives:

At the end of this program, the participants will be able to:

- Understand the requirements of industry standards for pipeline inspection.
- Appreciate the technical characteristics of piping systems, their applications in the process and chemical industry.
- Know the methods of the hydraulic and mechanical design of piping systems according to existing world standards and codes.
- Learn the procedures for the selection of best piping systems based on the optimization technique, resulting in pipe diameter and cost of material.
- Use the methods of diagnosing and estimating the degree of deterioration of pipelines.
- Recognize the guidelines for improving the efficiency of the overall piping system.

## Targeted Audience:

- Plant professionals dealing with operation pipeline systems.
- Engineers responsible for the reliability of operation.
- Engineers and technical staff in charge of inspection and condition monitoring.
- Technical professionals involved in technical support and maintenance and repair.
- Engineers in charge of the planning of new pipelines and retrofitting old ones.

## Program Outlines:

### Unit 1:

## Overview of Piping Systems:

- Main features of various types of piping systems.
- Classification of piping systems based on the design and application.
- World standards and codes on design properties of pipes.
- Main steps in the design and construction of piping systems.
- Physical and transport properties of fluids: density, viscosity, particle contents.
- Basics of flow analysis in pipes - laminar and turbulent flow regimes.

## Unit 2:

### Calculation of Pressure and Velocity Distribution in Piping Systems:

- Calculation of pressure losses and horsepower required for fluid transportation.
- Selection and sizing of pipes for different applications: liquids, gases, slurries.
- Calculation of minor losses in the piping system.
- Basics of mechanical design: a selection of pressure class of pipe and stress ratios.
- Hydrostatic testing: allowable operating pressure and hydrostatic test pressure.
- Pipe construction: pipes above-ground and pipes buried.

## Unit 3:

### Pumps and Compressors Used in Pipelines:

- Pump interaction with the system, cavitations: work in series and parallel.
- Multi-pump stations and tanks.
- Pump calculation and selection.
- Compressor interaction with the system, avoiding surge, stall, and choking.
- Multi-compressor stations and gas holders.
- Compressor calculation and selection.
- Pipe networks and pipe branching: problems with transients and their control.

## Unit 4:

### Control Valves in Pipelines:

- Control valves: selection, sizing, and cavitation issues.
- Flow measurements and monitoring instrumentation.
- Pipeline system automation control.
- Guidelines for pipeline installation, operation, and maintenance.
- Inspection, examination, and testing of pipelines.
- The vibration of pipes and pipelines and their mechanical support and anchorage.

## Unit 5:

### Operation and Maintenance of Piping Systems:

- Leak detection and prevention and failure risk analysis.
- Pipeline protection for prevention of corrosion and erosion.
- Environmental concerns: impact of above-ground and buried pipelines.
- Off-shore pipelines: design and operation.
- Special consideration for safety and supervision.
- Pipeline feasibility study and economic analysis: capital and operation costs.