

## Fundamentals of Process Safety

4 days  
Overview

FUNDPSM-EN-P

### LEVEL

Knowledge

### PURPOSE

To understand and describe the objectives of the elements of process safety management.

### LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:  
describe standards and participate in the deterministic methods of safety engineering in Oil & Gas processing,  
explain the different elements of process safety management and to identify strategies for implementation,  
explain the most relevant elements of asset integrity for the design of process plants,  
establish operating procedures for a safe operation.

### WAYS AND MEANS

Several applications and illustrations.  
Several case studies and teamwork sessions.

### LEARNING ASSESSMENT

Continuous assessments all-along the program

### PREREQUISITES

Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

## Agenda

### FUNDAMENTALS OF PROCESS SAFETY

0.5 d

Concept of process safety. Historical approach. Main recognized standards.  
Safe design principles. Introduction to inherently safer design.  
Fundamentals of flammability and fluid behavior.

### PROCESS HAZARD ANALYSIS

1.5 d

Process safety information: products, technology, equipment and human intervention.  
Methodology for carrying out a HAZID.  
HAZID exercise.  
Introduction to HAZOP methodology. Node identification. Guidewords.  
HAZOP exercise.  
Major accident hazards. Introduction to bowtie diagram representation.  
Consequence of loss of containment. Introduction to consequence analysis.  
Principles of plant layout. Exercise.

### ASSET INTEGRITY

1.5 d

Safe containment of hydrocarbons. Storage tanks and pressurized vessels.

Safe design and operation of thermal equipment.  
Control of ignition sources. Electrical equipment regulations.  
Control of hydrocarbon inventory. Pressure safety valves technology. Rupture disks.  
Flares and vents. Emergency depressurization systems. Standards API 520 & API 521.  
Introduction to safety instrumented systems: ESD, HIPS, Fire & Gas.  
SIL level definition and requisitions.  
Maintenance inspection and testing. Methodologies and planning. Introduction to reliability analysis.  
Material failure modes.  
Introduction to corrosion. Origin and prevention.

## OPERATING PROCEDURES

1.5 d

Process monitoring. Process control system elements.  
Pre-startup safety review. Operational readiness.  
Safe isolation of equipment.  
Safe work practices. Permit to work system.  
Management of change. Downgraded situation.  
Human factors in process control. Human error in process plants.