

# **Process Safety Management Foundations**

Training Standard & Endorsement Guidelines

**Approved Version 1.0**

March 2012



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## Document History

This document is a controlled document maintained by Cogent. Future revisions will be recorded below with revision details and date of revision.

No	Revision Details	Author	Checked	Approved
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## Cogent Industry Training Standard

### Introduction

Process safety is a blend of engineering and management competencies with a clear focus on preventing catastrophic accidents – particularly loss of containment, explosions and fires which are potential risks associated with the use of hazardous substances if these are not properly managed.

Employers in major hazard industries need to provide a clear demonstration of competence in process safety management throughout the organisation.

Cogent Industry Training Standards have been developed with employers to identify the knowledge, understanding, skills and behaviours needed for effective training to take place. The training standards themselves form part of the Gold Standard competency framework, which provides a skills benchmark for world class performance for the process industries.

### Expert Panel Members

The content of this document has been developed by an industry work group co-ordinated by Cogent Sector Skills Council and chaired by the Chemical Industries Association (CIA). Members of the Expert Panel include;

- ABB Engineering Services Ltd
- Chemical Industries Association (CIA)
- Cogent SSC
- Croda International
- Dow Corning
- Health and Safety Executive (HSE)
- HFL Risk Services Ltd
- Hudson Consultancy
- Institution of Chemical Engineers
- Johnson Matthey
- J. Hempseed Ltd
- Pentagon
- Process Industry Consulting
- United Kingdom Petroleum Industry Association (UKPIA)
- Unite the Union



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## Cogent Industry Training Standard

### Process Safety Management Foundations

#### Aim and Purpose

To provide a clear knowledge and understanding of the principles of process safety management across an organisation.

#### Audience

This training standard is aimed at all levels of staff throughout an organisation from site management to operational staff. This training standard is appropriate to all staff who may have an impact on process safety.

#### Process Safety Management

Process safety management is a system for identifying and assessing risks relating to hazardous substances, and the implementation of measures for the prevention, control and mitigation of major accidents.

It requires a clear understanding of major accident risks and the safety critical equipment and systems designed to control them.

#### Learning Objectives

*The learner will;*

1. Understand the importance and key principles of process safety management.
2. Understand how to identify hazards associated with hazardous substances and process plant
3. Understand how to assess the risks associated with hazardous substances and process plant
4. Understand the importance of identifying suitable safety critical equipment, implementing key risk control systems and the importance of sustaining their effectiveness
5. Understand the need for effective measures to limit the consequences of a major accident
6. Understand how to apply learning from incidents and near misses
7. Understand how to monitor performance to achieve continual improvement in process safety performance



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## **Assessment Methodology**

The purpose of assessment is to ensure that effective learning has taken place. Assessment of the candidates' performance will be against the stated learning objectives and will involve structured assessment. An analysis of the candidate's performance will be conducted to help identify areas for further development.

The assessment process will be defined by National Skills Academy who will carry out regular audits to ensure that it is being correctly and fairly administered by each training provider.

The assessment process will:

- Be fair and clear for those undertaking it
- Explain clearly the standards for satisfactory completion of the module
- Be consistent and transparent in its marking
- Be open to audit by the National Skills Academy or its appointed body.

Training providers are required to keep an accurate and detailed record of attendance.

## **Training Delivery Time**

There are no guided learning hours for this standard but it is recommended that the minimum delivery time will be 12 hours over 2 days.



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## Resources

There are no specified resources for this training standard. Providers are expected to use appropriate resources to help deliver the learning objectives. Resources may be made available through the National Skills Academy for Process Industries Approved Providers.

### *Staffing:*

Trainers/ facilitators will be required to demonstrate evidence of the following:

- Appropriate qualifications and competencies to conduct the training
- Relevant experience of working within a process safety management role
- Training in instructional/ lecturing techniques and/or have proven instructing/teaching experience
- Maintenance of professional development keeping awareness and skills up to date.

## Other Details

### *Recommended pre-reading:*

Each provider will specify appropriate pre course reading.

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## ENDORSEMENT GUIDELINES

Providers wishing to be endorsed against the Process Safety Management Foundations Training Standard are expected to provide evidence to support delivery of the learning objectives.

Outlined below are the guidelines set out as a series of points against each learning objective. Providers are expected to provide evidence as a basic minimum against each of the points stated below.

### **1. Understand the importance and key principles of process safety management**

- Outline the importance of process safety management
- Explain the difference between occupational safety and process safety
- Summarise significant major accident events
- Outline the recurring root cause failures of these accidents that highlight the key issues associated with effective process safety management
- Describe the key requirements of process safety management
- Outline of process safety leadership including the PSLG Principles of Process Safety Leadership
- Summarise relevant health, safety and environmental legislation and other requirements (e.g. COMAH Regulations, guidance and standards)
- Explain the need for an integrated, complete process safety management system to be in place (e.g. CCPS Risk Based Process Safety, Energy Institute High Level Framework for Process Safety Management)
- Explain the implications of process safety management on the complete lifecycle of the plant from design to decommissioning

### **2. Understand how to identify hazards associated with hazardous substances and process plant**

- Describe the types and properties of hazardous substances (including; classification, reaction hazards, toxic, fire, explosion and environmental hazards)



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- Describe the appropriate hazard identification techniques
  - Describe the challenges to plant integrity and the causes of loss of containment (e.g. temperature, pressure, asset integrity, impact, overflow, human factors. etc)
  - Explain the potential impact of major accident hazards on people, environment and the business, both on and off the site
- 3. Understand how to assess the risks associated with hazardous substances and process plant**
- Explain the various quantitative and qualitative risk assessment techniques (including occupied buildings risk assessments)
  - Explain the hierarchy of risk control
  - Explain the concepts of risk reduction and risk tolerability (individual and societal)
  - Define the ALARP principle
  - Explain the importance of periodic re-validation of risk assessments
- 4. Understand the importance of identifying suitable safety critical equipment, implementing key risk control systems and the importance of sustaining their effectiveness**
- Define what is meant by the terms ‘safety critical equipment’ and ‘key risk control systems’ including
    - Plant (e.g. hard wired trips, pressure relief etc)
    - Process (management of change, permit to work, safety critical procedures etc)
    - People (e.g. competency, accountability, supervision, human factors, etc)
  - Explain the need for multiple independent layers of protection
  - Describe the essential elements of inherent safety, prevention, control and mitigation
  - Explain how safety critical equipment and key risk control systems are identified

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- Explain the need for safety critical equipment and key risk control systems to be maintained throughout the lifecycle of the plant
  - Explain the importance of a competency management system in ensuring an organisation has a competent workforce that will perform safety critical tasks reliably and safely
  - Explain the importance of human factors as a key part of a competence management system
  - Explain the integrated nature of process safety management key risk control systems with reference to all the following and with illustrated examples;
    - Hazard identification and risk assessment including periodic re-validation
    - DSEAR and hazardous area classification
    - Operating procedures
    - Safe systems of work
    - Permit to work
    - Control and competency of contractors and third party suppliers
    - Testing and inspection
    - Maintenance
    - Asset integrity
    - Management of change – plant, process, people, organisation
    - Operational readiness
    - Competency assurance
    - Shift handover
    - Incident investigation
    - Emergency response
    - Audit and review

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## **5. Understand the need for effective measures to limit the consequences of a major accident**

- Outline the legislative requirements with regard to effective emergency response (e.g. COMAH)
- Outline the typical mitigation measures taken to limit the consequences of major accidents
- Outline the key elements of an on and off site emergency plan with reference to the following
  - Fires and explosions
  - Toxic releases
  - Releases to the environment
- Outline the issues involved in resourcing effective delivery of the emergency plan
- Explain the importance of realistic exercising of the on and off site emergency plan

## **6. Understand how to apply learning from incidents and near misses**

- Provide an outline of relevant major accidents and investigation reports
- Give examples of key process safety learning points from accidents and near misses
- Give examples of how learning from other organisations and sectors can be used to improve process safety
- Describe the principal inputs to and outputs from an incident investigation to develop and apply learning
- Explain the importance of identifying root causes

## **7. Understand how to achieve continual improvement in process safety performance**

- Explain how to develop and utilise leading and lagging process safety performance indicators
- Explain the importance of workforce involvement and management commitment to a positive safety culture

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- Explain the importance of auditing process safety management systems
  - Explain the need for management review
  - Explain the importance of periodic evaluation of compliance with applicable legal requirements
  - Describe how to formulate process safety improvement plans
  - Explain the importance of process safety leadership practices at every level in an organisation

### Glossary of Abbreviations

- **PSLG** – Process Safety Leadership Group
- **COMAH** – Control of Major Accident Hazards
- **CCPS** – Center for Chemical Process Safety
- **ALARP** – As Low As Reasonably Practicable
- **DSEAR** - Dangerous Substances and Explosive Atmospheres Regulations

## Summary Table

<b>Title</b>	Process Safety Management Foundations Training Standard
<b>Learning objectives</b>	
<b><i>The learner will;</i></b>	
1.	Understand the importance and key principles of process safety management.
2.	Understand how to identify hazards associated with hazardous substances and process plant
3.	Understand how to assess the risks associated with hazardous substances and process plant
4.	Understand the importance of identifying suitable safety critical equipment, implementing key risk control systems and the importance of sustaining their effectiveness
5.	Understand the need for effective measures to limit the consequences of a major accident
6.	Understand how to apply learning from incidents and near misses
7.	Understand how to monitor performance to achieve continual improvement in process safety performance
<b>Additional information about this standard</b>	
<b>Aim &amp; Purpose</b>	<p>To provide a clear knowledge and understanding of the principles of process safety management across an organisation.</p> <p>This training standard is aimed at all levels of staff throughout an organisation from site management to operational staff. This training standard is appropriate to all staff who may have an impact on process safety.</p>
<b>Assessment methodology</b>	<p>The purpose of assessment is to ensure that effective learning has taken place. Assessment of the candidates' performance will be against the stated learning objectives and will involve structured assessment.</p> <p>A common criterion for success should be applied to the assessment of the standard. The agreed criterion for success applies with the following conditions:</p> <ul style="list-style-type: none"> <li>• Candidates achieving 100% on the assessment are considered to have met the Process Safety Management Foundations Training Standard in full.</li> <li>• Candidates achieving 80% or more are considered to have met the Process Safety Management Foundations Training Standard only after appropriate coaching or reassessment of the areas not yet achieved.</li> <li>• Candidates achieving less than 80% are considered not to have met the Process Safety Management Foundations Training Standard and may require additional continuous professional development.</li> </ul> <p>The assessment process will:</p> <ul style="list-style-type: none"> <li>• Be fair and clear for those undertaking it</li> <li>• Explain clearly the standards for satisfactory completion of the module</li> </ul>

	<ul style="list-style-type: none"> <li>• Be consistent and transparent in its marking</li> <li>• Be open to audit by the National Skills Academy or its appointed body.</li> </ul> <p>Training providers are required to keep an accurate and detailed record of attendance.</p>
<b>Training delivery time</b>	<p>There are no guided learning hours for this standard but it is recommended that the minimum delivery time will be 12 hours over 2 days.</p>
<b>Resources</b>	<p><i>Videos/ DVDs of major hazard accidents: (suggested resources)</i></p> <p>There are no specified resources for this training standard. Providers are expected to use appropriate resources to help deliver the learning objectives.</p> <p><i>Staffing:</i></p> <p>Trainers/ facilitators will be required to demonstrate evidence of the following:</p> <ul style="list-style-type: none"> <li>- Appropriate qualifications and competencies to conduct the training</li> <li>- Relevant experience of working within a process safety management role</li> <li>- Training in instructional/ lecturing techniques and/or have proven instructing/teaching experience</li> <li>- Maintenance of professional development keeping awareness and skills up to date.</li> </ul>
<b>Other Details</b>	<p><i>Recommended pre-reading:</i></p>