



GUIDELINE FOR PROCESS SAFETY MANAGEMENT

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As part of a programme of harmonisation of industry standards, the European Industrial Gases Association, (EIGA) has published EIGA Doc 186, *Guideline for Process Safety Management*, jointly produced by members of the International Harmonisation Council and originally published by the Compressed Gas Association as CGA P.86, *Guideline for Process Safety Management*.

This publication is intended as an international harmonised standard for the worldwide use and application of all members of the Asia Industrial Gases Association (AIGA), Compressed Gas Association (CGA), European Industrial Gases Association, and Japan Industrial and Medical Gases Association (JIMGA). Each association's technical content is identical, except for regional regulatory requirements and minor changes in formatting and spelling.

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Amendments to 186/14

Section	Change
	Editorial to align style with EIGA style manual
	Change of publication title
1	Revision of Introduction section for basis of guideline and references
2.1	Addition of some processes
2.2	Suggested phased introduction approach where appropriate
5	Change of section title from 'requirements' to 'guidelines' to match publication title, and change of 'shall' to 'should' to match publication purpose (guidance). Other minor changes to guidelines

NOTE Technical changes from the previous edition are underlined

1 Introduction

Process safety management is of interest to many organisations looking to adopt a holistic and systematic approach to assuring the integrity of their operations.

This publication was adapted from the Energy Institute's document *High Level Framework for Process Safety Management* to be more specific to the industrial gases industry [1].¹

The reader may choose to follow other process safety management systems such as the one developed by the American Institute of Chemical Engineers' (AIChE) Center for Chemical Process Safety (CCPS) [2]. For sites that are required to follow the requirements of the Seveso directives, those rules take precedence [3].

For the purpose of this publication, process safety management refers to providing guidance to improve process safety in industrial gas facilities. It is not meant to refer to the OSHA Process Safety Management regulations.

Appendix A lists other publications that are relevant to process safety management.

2 Scope and purpose

2.1 Scope

The process safety management framework may be applied to all processes within the industrial and medical gases industry. It is designed to address process safety hazards and be equally suitable for the processes that are found in the industry including:

- air separation units (ASU) and nitrogen generator facilities;
- hydrogen and carbon monoxide (HYCO) production facilities including electrolysis facilities;
- hydrogen purification units;
- acetylene production facilities;
- nitrous oxide production facilities;
- carbon dioxide production facilities;
- cylinder and container filling facilities;
- specialty gas production, package filling, and storage facilities;
- chemical handling and transport facilities;
- pipelines;
- transportation; and
- customer installations.

A facility may include not just the main production plant but all other ancillary equipment that has process hazards.

The decision to apply various process safety management elements to a given process needs to be made by evaluating the tolerance of risk and agreeing on the management approach. For example,

¹ References are shown by bracketed numbers and are listed in order of appearance in the reference section.

transportation and pipeline risks may be managed by applying national and international codes and might not require all the elements of the [process safety management](#) framework to be applied.

In some countries, there can be existing regulatory requirements for process safety management systems. This framework is not intended to replace these requirements but may be used to supplement them for all industry regardless of regulatory requirements.

2.2 Purpose

The [process safety management](#) framework is intended to provide a design basis for the development of a process safety management system where an organisation does not have one. It also may be used as a common basis for benchmarking existing process safety management systems.

Where an organisation has a process safety management system or an integrated management system incorporating health, safety, and environmental and process safety management, they may carry out a gap assessment versus the requirements of each element in order to identify any aspects of the system that need to be enhanced.

When the initial assessment has been completed, the significance of the gaps should be determined, and a prioritised plan developed to address the identified issues. In some cases, there can be a significant programme of work needed to upgrade the management system to contain all of the elements of the [process safety management](#) framework. In these cases, it should be recognised that this upgrade work can take many years to complete effectively.

If an organisation does not have a process safety management system in place, a phased approach may be utilised. The following is a recommendation for a phased approach, but the needs of each organisation can vary:

Phase 1:

- [Leadership commitment and responsibility \(Element 1\);](#)
- [Compliance with legislation and industry standards \(Element 2\);](#)
- [Workforce involvement \(Element 4\);](#)
- [Operating procedures \(Element 9\);](#)
- [Management of change \(Element 12\);](#)
- [Emergency management \(Element 14\); and](#)
- [Work control, permit to work, and task risk management \(Element 17\).](#)

Phase 2:

- [Employee selection, training, and competency \(Element 3\);](#)
- [Hazard identification and risk assessment \(Element 6\);](#)
- [Documentation, records, and knowledge management \(Element 7\);](#)
- [Operational readiness and process start-up \(Element 13\);](#)
- [Inspection and maintenance \(Element 15\); and](#)
- [Management of safety critical devices \(Element 16\).](#)

Phase 3:

- Communication with stakeholders (Element 5);
- Process and operational status monitoring and handover (Element 8);
- Management of operational interfaces (Element 10);
- Standards and practices (Element 11);
- Contractors and suppliers—selection and management (Element 18);
- Incident investigation (Element 19);
- Audit, management review, and intervention (Element 20); and
- Measures and metrics (Element 21).

3 Definitions

For the purpose of this publication, the following definitions apply.

3.1 Publication terminology

3.1.1 Shall

Indicates that the procedure is mandatory. It is used wherever the criterion for conformance to specific recommendations allows no deviation.

3.1.2 Should

Indicates that a procedure is recommended.

3.1.3 May

Indicates that the procedure is optional.

3.1.4 Will

Is used only to indicate the future, not a degree of requirement.

3.1.5 Can

Indicates a possibility or ability.

3.2 Technical definitions

3.2.1 Work control

Recognition of potential hazards prior to beginning work, including the limits of the permitted work and defined barriers.

4 Overview of process safety management elements

The elements set out the key aspects to assure the integrity of operations. Each element contains an overview which states its intent and a number of guidelines which define what organisations should address. The elements can be grouped as in the following sections.

4.1 Process safety leadership

There are five elements that set out how organisations should define and communicate the level of performance they are prepared to accept and how they should ensure that they put in place the necessary resources to achieve the required level of performance:

- Leadership commitment and responsibility ([Element 1](#));
- Compliance with legislation and industry standards ([Element 2](#));
- Employee selection, training, and competency ([Element 3](#));
- Workforce involvement ([Element 4](#)); and
- Communication with stakeholders ([Element 5](#)).

4.2 Risk identification and assessment

There are two elements that set out what organisations should do to identify and assess the risks that they need to manage in order to assure the integrity of their operations. The two elements identify the necessary control measures and how organisations should record and maintain the process safety knowledge developed from the risk identification and assessment activities:

- Hazard identification and risk assessment ([Element 6](#)); and
- Documentation, records, and knowledge management ([Element 7](#)).

4.3 Risk management

There are eleven elements that set out the control measures that organisations should use to manage key areas of risk:

- Process and operational status monitoring and handover ([Element 8](#));
- Operating procedures ([Element 9](#));
- Management of operational interfaces ([Element 10](#));
- Standards and practices ([Element 11](#));
- Management of change ([Element 12](#));
- Operational readiness and process start-up ([Element 13](#));
- Emergency management ([Element 14](#));
- Inspection and maintenance ([Element 15](#));
- Management of safety critical devices ([Element 16](#));
- Work control, permit to work, and task risk management ([Element 17](#)); and
- Contractors and suppliers—selection and management ([Element 18](#)).

4.4 Review and improvement

There are three elements within the review and improvement area that set out how organisations should measure and review their compliance with the process safety management framework and how they should ensure that they learn from these measurements and the findings from investigations:

- Incident investigation (Element 19);
- Audit, management review, and intervention (Element 20); and
- Measures and metrics (Element 21).

5 Process safety management elements

This section lists all of the elements in detail. Each element commences with an overview and contains a number of guidelines which set out a more detailed definition of what organisations should ideally address.

5.1 Element 1—Leadership commitment and responsibility

5.1.1 Overview

Assurance of the integrity of an organisation's operations requires visible leadership commitment and accountability at all levels of the organisation. Management should establish a process safety policy, provide perspective, set process safety performance targets, and provide the structure and resources to achieve them.

5.1.2 Guidelines

The following is a list of guidelines for Element 1:

- Documented process safety policy, which may be a part of a general safety policy, is in place and signed by a senior company executive such as the chief executive officer (CEO) or the responsible unit managing director (MD). These are living systems which are regularly reviewed and updated and communicated to all employees to reflect the needs of the organisation;
- Process safety risk management system is in place which meets applicable legislation, the process safety management framework guidelines, and any other guidelines to which the organisation subscribes with regard to its process safety activities;
- Management establishes the scope, priority, and schedule for the process safety risk management system implementation, considering the complexity and risks involved with their operations and products;
- Roles, responsibilities, authorities, and accountabilities for the management of process safety are known and exercised. Sufficient competencies and resources are made available to meet the desired process safety plan;
- Clear process safety objectives, performance targets, and action plans are established and performance is periodically evaluated;
- Directors and managers:
 - Visibly demonstrate personal commitment and accountability for process safety, leading by example and upholding core values and standards of the organisation; and
 - Recognise and reward positive process safety behaviours and performance and intervene to correct deviations from required performance at all levels in the organisation; and

- Leadership responsible for sites operated by others, (for example, joint venture companies), encourage the adoption of a process safety management framework.

For more information, see:

- Guidelines for Managing Process Safety Risks During Organizational Change, AIChE CCPS [4]; and
- EIGA Info HF 11, *Organisation - "Safety Culture"* [5].

5.2 Element 2—Compliance with legislation and industry standards

5.2.1 Overview

Compliance with legislation is a fundamental requirement for organisations. Management should ensure that the requirements of applicable legislation are identified, understood, and complied with.

5.2.2 Guidelines

The following is a list of guidelines for Element 2:

- Requirements of current and forthcoming applicable legislation, regulations, licenses, permits, codes, industry standards, and other governmental requirements are identified, documented, kept current, and communicated to those affected; and
- Compliance with legislation and mandatory or applicable industry standards is systematically verified.

For more information, see EIGA Doc 60, *Seveso Documents - Guidance on Applicability, Assessment and Legal Documents for Demonstrating Compliance of Industrial Gases Facilities with Seveso Directive(s)* [6].

5.3 Element 3—Employee selection, training, and competency

5.3.1 Overview

Control of processes depends upon having competent people in position. Management should ensure that existing and new personnel have the required competencies.

5.3.2 Guidelines

The following is a list of guidelines for Element 3:

- Required process safety competencies and requirements are defined for all roles in the organisation;
- Process is in place for evaluation, selection, and training of employees which confirms their competency with the specified requirements for the role;
- When organisational changes are made, ensure that knowledge transfer occurs to maintain continuity of critical activities;
- Roles and responsibilities should take into account human capabilities and limitations as well as human and organisational factors;
- Appropriate training is carried out for personnel taking up a new or revised position;
- Training plans are in place for all positions that impact process safety;