

Summary of Process Safety Management (PSM) of Highly Hazardous Chemicals (29 CFR 1910.119)

This standard applies to manufacturing industries including those pertaining to chemicals. The term process in PSM means any activity involving a highly hazardous chemical including using, storing, manufacturing, handling or moving such chemicals at the site, or any combination of these activities.

The parts relevant to management of fire and explosion hazards are briefly outlined below.

1.1 1910.119(a): Application

The PSM applies to a process which involves a chemical at or above specified threshold quantities as listed in the Appendix to the standard. It also includes flammable liquids and gases in quantities of 10,000 pounds (4,535.9 kg) or more.

1.2 1910.119(d): Process Safety Information

The Regulations state that the employer shall complete a compilation of written process safety information before conducting any process hazard analysis required by the standard. The compilation will enable the employer to identify and understand the hazards posed by those processes involving highly hazardous chemicals.

Process safety information must include information on:

- a) hazards of the highly hazardous chemicals used or produced by the process (e.g. toxicity, physical data, reactivity data, corrosivity data)
- b) the technology of the process (e.g. block flow diagram, maximum intended inventory, evaluation of consequences of deviations) and
- c) the equipment in the process (e.g. materials of construction, piping and instrument diagrams, design codes and standards employed).

1.3 1910.119(e): Process Hazard Analysis

The Regulations require the employer to perform an initial process hazard analysis on processes covered by the standard. The methodology selected must be appropriate to the complexity of the process and must identify, evaluate, and control the hazards involved in the process. Methods to determine and evaluate the hazards of the process are specified in the standard and include What-if analysis, Checklist, Hazard and Operability study (HAZOP) and Failure Mode and Effects Analysis (FMEA).

The process hazard analysis must address the following:

- The hazards of the process
- Identification of any previous incident which had a likely potential for catastrophic consequences in the workplace

- Engineering and administrative controls applicable to hazards, their interrelationships and consequences of failure
- Facility siting
- Human factors
- Evaluation of effect of failure of controls

The regulations also state that the analysis shall be performed by a team with the necessary expertise both of the process and the analysis method.

In addition, the PHA shall be updated and revalidated every 5 years by a team with similar expertise.

1.4 1910.119(f): Operating procedures

The Regulations require the employer to develop and implement written operating procedures, consistent with the process safety information, that provide clear instructions for safely conducting activities involved in each covered process.

The procedures shall include the steps for each operating phase (e.g. initial start-up, normal operations, emergency shutdown etc.), the operating limits (e.g. consequences of deviation) and safety and health considerations.

The procedures must be available to all employees who work in or maintain a process and shall be reviewed as often as necessary to ensure that they reflect current operating practice.

The employer is required to certify annually that the operating procedures are current and accurate.

1.5 1910.119(i): Pre-startup safety review

A pre-startup safety review shall be performed for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information.

The review shall confirm that

- Construction and equipment are in accordance with design specifications;
- Safety, operating, maintenance, and emergency procedures are in place and are adequate;
- A process hazard analysis has been performed for new facilities and recommendations have been resolved or implemented before startup, and modified facilities meet the management of change requirements; and
- Training of each employee involved in operating a process has been completed.

1.6 1910.119(j): Mechanical integrity

The employer must establish and implement written procedures to maintain the ongoing integrity of process equipment. Inspection and testing must be performed on process

equipment, using procedures that follow recognized and generally accepted good engineering practices.

PSM mechanical integrity requirements apply to the following equipment:

- Pressure vessels and storage tanks;
- Piping systems (including piping components such as valves);
- Relief and vent systems and devices;
- Emergency shutdown systems;
- Controls (including monitoring devices and sensors, alarms, and interlocks); and
- Pumps.

1.7 1910.119(l): Management of Change

Written procedures to manage changes (except for “replacements in kind”) to process chemicals, technology, equipment, and procedures, and change to facilities that affect a covered process, must be established and implemented. These written procedures must ensure that the following considerations are addressed prior to any change:

- The technical basis for the proposed change,
- Impact of the change on employee safety and health,
- Modifications to operating procedures,
- Necessary time period for the change, and
- Authorization requirements for the proposed change.

1.8 1910.119(m): Incident investigation

The Regulations state that each incident which resulted in, or could reasonably have resulted in a catastrophic release of highly hazardous chemical in the workplace shall be investigated.

Such an incident investigation must be initiated as promptly as possible, but not later than 48 hours following the incident. A system must be established to promptly address and resolve the incident report findings and recommendations. Resolutions and corrective actions must be documented and the report reviewed by all affected personnel whose job tasks are relevant to the incident findings. The employer must keep these incident investigation reports for 5 years.

1.9 1910.119(n): Emergency planning and response

An emergency action plan for the entire plant must be developed and implemented in accordance with the provisions of other OSHA rules (29 CFR 1910.38(a)). In addition, the emergency action plan must include procedures for handling small releases of hazardous chemicals.