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## **Policy**

Entry into confined spaces by workers is necessary at times for the operation of facilities. It is well known that entry into such confined spaces present a potential hazard to the worker, therefore, this policy shall be adhered to when any person enters a confined space.

In addition to the preparations and precautions taken prior to entry into a confined space, the worker shall also conduct a thorough hazard assessment using the SLAM Risks procedure to identify and manage other hazards that may be present in the work area.

A confined space is a space which:

- a) Is large enough and so configured that an employee can enter;
- b) Has limited or restricted means for ingress (entry) or egress (exit); and
- c) Is not designed for continuous occupancy.

All bins, hoppers, silos, material handling equipment, or other spaces that meet the confined space defining criteria above shall be labeled with signage identifying them as confined spaces. Example Signage:

**Danger – Confined Space – No Unauthorized Entry**

## **Exhibits**

- Exhibit H1-1: Confined Space Permit
- Exhibit H1-2: Confined Space Matrix
- Exhibit H1-3: Confined Space Survey
- Exhibit H1-4: Confined Space Rescue Evaluation

## **References**

- United States:** OSHA 29 CFR 1910. 146  
MSHA 30 CFR 56/57.15005  
National Fire Protection Association (NFPA) standard 70E
- Canada:** Ontario – Occupational Health and Safety Act, R.S.O. 1990, c. O.1; R.R.O. 1990  
Ontario – O. Reg. 632/05: Confined Spaces  
Quebec – S-2.1 Act respecting occupational health and safety
- Mexico:** The Mexican Federal Labor Law

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## Procedures

### **1.0 Responsibility**

- 1.1** Each facility manager or their designee is responsible for developing and implementing site-specific procedures consistent with the requirements of Confined Space Program.
- 1.2** A survey of all confined spaces shall be documented using Exhibit H1-3 and maintained as part of the site-specific confined space program.
- 1.3** All contractors who are required to enter confined spaces on property shall be approved for such work through Contractor Management Program. All contractors shall be advised of all hazards associated with the site-specific confined space program and shall comply with all other requirements of safety and health policies and procedures.

### **2.0 Mandatory Entry Requirements for Typical Entries**

- 2.1 Permits** - Prior to entering any confined space, authority shall be obtained from supervision by means of a signed entry permit. Entry permits should be maintained for one year. See Exhibit H1-1.
- 2.2** Permits shall be cancelled by the issuing supervisor at the end of the entry or the end of the shift in which the permit was issued. If the entry is required to extend beyond the end of the initial shift, a new permit will be issued by the on-coming shift supervisor.
- 2.3** Entry permits will be posted at the confined space.
- 2.4** Entry permits will be terminated if hazardous atmospheric conditions develop or if any incident indicates hazards have not been adequately addressed. Workers will be ordered to evacuate. The reasons for termination will be documented on the permit. A new permit will be issued to authorize entry when the hazardous condition is corrected, and acceptable entry conditions can be maintained for the duration of the work.
- 2.5 Pre-Entry**
  - 2.5.1** A pre-job briefing covering the requirements of this procedure shall be performed by the supervisor in charge of the job before each confined space entry. Potential hazards to include, but not limited to: physical, electrical, chemical, mechanical, oxygen deficiency, explosive limits, entrapment, engulfment, etc. shall be assessed during the pre-job briefing.
  - 2.5.2** Supervisors are responsible;
    - 2.5.2.1** For knowing the hazards of the space and the potential outcomes of those hazards and control measures to ensure safe entry;
    - 2.5.2.2** For emergency plans and procedures specific to the space;
    - 2.5.2.3** For terminating and canceling permits when the entry is completed, or conditions change;
    - 2.5.2.4** To verify rescue services are available;
    - 2.5.2.5** To ensure the entry proceeds within allowable conditions, and stop the entry if conditions warrant.
- 2.6** When permission has been obtained from supervision and the pre-job briefing has been completed, a signed entry permit listing all authorized entrants and authorized attendants shall be posted at the opening to the space. It may be possible at times that authorized entrants and

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authorized attendants switch duties during the task(s) being conducted in the confined space. When this situation is planned or anticipated the entry permit shall contain the names of all competent and authorized workers involved.

**2.7 Duties of Attendants** - At least one attendant will be stationed outside the confined space for the duration of entry.

2.7.1 Attendant duties are as follows:

2.7.1.1 Knows the hazards of the confined space and the signs and symptoms of exposure.

2.7.1.2 Knows the behavioral effects of exposure.

2.7.1.3 Keeps an accurate count and identifies who is in the space.

2.7.1.4 Remains outside the space until relieved by another attendant.

2.7.1.5 Communicates with authorized entrants as necessary, monitors status, gives exit order.

2.7.1.6 Monitors activities inside and outside the space to determine if it is safe to remain inside.

2.7.2 Issues evacuation orders:

2.7.2.1 If behavioral effects of exposure are observed.

2.7.2.2 If a condition outside can endanger entrants in the space.

2.7.2.3 If attendant cannot effectively and safely perform all the assigned duties.

2.7.3 Summons rescue and emergency services if entrant(s) need help in escaping.

2.7.4 Takes the following actions if unauthorized persons approach or enter:

2.7.4.1 Issues warning to stay away.

2.7.4.2 Tells unauthorized person to exit if the space has been entered.

2.7.4.3 Informs the authorized entrants and supervisor of unauthorized entry.

2.7.5 Performs non-entry rescues as specified in the rescue plan.

2.7.6 Performs no duties that might interfere with the primary duty to monitor and protect.

2.7.7 Never enters a confined space to make a rescue unless relieved by another attendant and has the necessary PPE to perform the rescue safely.

2.7.8 Keeps equipment available to make a rescue even though it may never be needed.

**2.8 Duties of Entrants** - The duties of persons entering confined spaces are as follows:

2.8.1 Know the hazards faced during entry including signs, symptoms and effects of exposure.

2.8.2 Use equipment properly and obey all entry procedures.

2.8.3 Communicate with attendant so status will be known.

2.8.4 Alert attendant if recognized symptoms or signs of exposure or if danger is detected.

2.8.5 Exit space if danger is detected or if ordered by attendant or entry supervisor.

2.8.6 Exit if evacuation alarm is sounded.

**2.9 Elimination of Physical Hazards**

2.9.1 All openings that offer potential for falls into confined spaces will be properly barricaded. Barriers will also protect against tools and materials dropping into confined spaces.

2.9.2 If ladders are used for entry and exit, they will be secured to prevent movement and falls.

2.9.3 Tripping hazards inside confined spaces and at entry and exit points will be eliminated.

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- 2.9.4 Pumps, generators and compressors, which have potential to generate carbon monoxide, will be located sufficient distance and downwind from confined spaces to prevent atmospheric hazards.
- 2.9.5 Confined spaces will be cleaned by washing, neutralizing and purging to eliminate harmful, toxic or flammable materials, gases, and vapors. Spaces containing flammable vapors or gases will not be entered for any reason. Because inert gas purging can create oxygen deficiency, oxygen level testing and forced ventilation must be used afterpurging to ensure the space is safe for entry.
  - 2.9.5.1 Piping will be isolated by one of these methods:
    - 2.9.5.1.1 A blank is inserted in the line.
    - 2.9.5.1.2 Use of a double block and bleed.
    - 2.9.5.1.3 Lines disconnected and misalign to prevent entry of liquids, vapors or gases.
- 2.9.6 Energy Isolation (Lockout/Tagout/Tryout) procedures will be observed to prevent the inadvertent start-up of affected equipment and machinery and a zero-energy state must be achieved with the chosen method of lockout and according to site-specific Energy Isolation Plans.
- 2.9.7 Entrants shall blank (if possible) and lock-out (mandatory) all feed and discharge equipment, lines, etc. associated with the confined space.
- 2.9.8 All electrically supplied equipment entering the space (lighting, tools, etc.) shall be equipped with Ground Fault Circuit Interrupters (GFCI) unless they are double insulated. Portable lights should have bulbs enclosed to prevent bulb exposure. Low voltage lighting systems will be used as needed.
- 2.9.9 Only explosion proof electrical equipment including exhaust blowers and portable lights will be used in confined areas when there is potential for flammable vapors or gases.
- 2.9.10 Non-sparking tools will be used to open covers of tanks that have potential to contain flammable vapors and gases.
- 2.10** Authorized entrants shall be provided appropriate respiratory protection for use depending on site-specific conditions.
- 2.11** Adequate lighting shall be provided within the space for the duration of the entry.
- 2.12 Ventilation and Atmospheric Testing**
  - 2.12.1 Proper ventilation and an air supply free of contaminants must be maintained for the duration of entry operations.
  - 2.12.2 Mechanical ventilation systems will be set up to provide outside air.
  - 2.12.3 Atmospheric testing using a calibrated direct-reading instrument for oxygen deficiency, Lower Explosive Limits (LEL) or other applicable toxin shall be performed by a competent person before entry and during occupancy of the space.
    - 2.12.3.1 The proper order of testing is (1) Oxygen, (2) explosive gases (LEL), and (3) applicable toxins (e.g., solvent or adhesive vapors).
    - 2.12.3.2 Employees are prohibited to enter a confined space if the oxygen content is determined to be less than 19.5 percent or greater than 22.0 percent.
    - 2.12.3.3 During welding or cutting tasks inside a confined space, the atmosphere will be continuously monitored.

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2.12.3.4 Plants will determine the frequency of the additional periodic tests and results of pre-entry atmospheric and subsequent monitoring shall be recorded on the entry-permit.

2.12.4 Entry will be prohibited until hazards are eliminated and re-testing verifies it is safe.

2.12.5 Persons conducting tests must be trained and competent in the use and calibration of test instruments and in the documentation of calibration and tests results.

2.12.5.1 Atmospheric testing equipment shall be calibrated according to OEM recommendations.

2.12.5.2 Atmospheric testing equipment shall be “bump” tested prior to each use. A bump test requires the testing equipment to be exposed to a known concentration of gas to ensure sensors are working properly.

2.12.6 Any reading above or below the normal levels during a confined space entry will terminate the permit.

2.12.7 The authorized entrant or that employee’s authorized representative shall be allowed to observe any monitoring or testing of confined spaces and shall immediately be provided with the results. They may also request a re-evaluation of that space.

**2.13** A simplified matrix identifying common confined spaces encountered throughout is attached as Exhibit H1-2 and helps to quickly identify confined space entry requirements for specific entry types.

### **3.0 Mandatory Entry Requirements for Welding and Cutting**

**3.1** The following specifications are applicable to situations in which welding is to be performed inside the confined space.

**3.2** All requirements specified in Section 2.0 shall be adhered to, as well as:

3.2.1 Fire extinguishers shall be located in the space.

3.2.2 Temporary ventilation shall be provided to the space.

3.2.3 All authorized entrants shall utilize powered-air purifying respirators (PAPR) or full-face respirators unless engineering or administrative controls have been implemented and verified to adequately control exposure to metals contained within welding fume.

**3.3** Welding or cutting will not be performed in or on vessels that have contained flammable or combustible products unless performed by qualified outside contractors.

**3.4** Methods to make vessels safe must address the potential for products to release flammable vapors, and the danger of residue releasing flammable vapors when the vessel is heated by welding or cutting.

**3.5** Torches and hoses will be removed from confined spaces when not actually being used. Keep them outside the confined space whenever possible.

**3.6** Inert gas welding will not be done in or near confined spaces since the gases used in these welding processes are heavier than air and can displace it to create oxygen deficiency.

**3.7** To control toxic exposures, coatings will be cleaned 4” from areas to be welded or heated.

### **4.0 Mandatory Requirements for Chemical or Other Toxins**

**4.1** The following specifications are applicable to situations in which exposure to chemical vapors or other toxins is possible inside the confined space.

**4.2** All requirements specified in Sections 2.0 and 3.0 shall be adhered to as well as:

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- 4.2.1 While a person (s) is occupying the confined space, there shall be at least one attendant outside of the space who shall:
  - 4.2.1.1 Neither leave the opening nor enter the space for any reason, including rescue;
  - 4.2.1.2 Keep in communication with authorized entrants at all times the space is occupied; and
  - 4.2.1.3 Order the evacuation of the space should conditions inside or outside warrant;
- 4.2.2 The attendant shall at all times have a means of summoning assistance (communication system) if an emergency should occur; and
- 4.2.3 Have no assigned duties that interfere with the ability to monitor the space.

**4.3** Substances that can create a hazardous atmosphere should not be used in confined spaces, but where this cannot be avoided; workers must receive training on the hazards and how to avoid them.

## **5.0 Entry into Material/Product Bins, Silos or Tanks**

- 5.1** The following procedure is applicable to entries into raw material or finished product bins, silos or tanks for cleaning, unplugging, or other operations.
- 5.2** Material that offers potential for caving or sliding must be barred down from the top before entry is permitted.
- 5.3** The requirements specified in Section 2.0 shall be adhered to, as well as:
  - 5.3.1 Entrant removal equipment shall be set-up at the opening to the space. This equipment shall be equipped with fall arrest capabilities.
  - 5.3.2 For vertical entries, entrants shall be attached to the removal equipment via full body harness and lifeline of not less than 1/2" minimum thickness that is free of knots, cuts, frays or other defects that may interfere with proper operation of the device.
  - 5.3.3 For horizontal entries the entrant shall be equipped with a lifeline attached via full body harness and lifeline of not less than 1/2" minimum thickness that is free of knots, cuts, frays or other defects that may interfere with proper operation of the device.
- 5.4** While a person (s) is occupying the confined space, there shall be at least one attendant outside of the space who shall;
  - 5.4.1 Not leave the opening, nor enter the space for any reason, including rescue;
  - 5.4.2 Keep in communication with entrants at all times while the space is occupied;
  - 5.4.3 Order the evacuation of the space should conditions inside or outside warrant;
  - 5.4.4 The attendant shall at all times have a means of summoning assistance (communication system) if an emergency should occur.
  - 5.4.5 And, have no assigned duties that interfere with the ability to monitor the space.

## **6.0 Entry into Grinding Mills**

- 6.1** This section governs the entry of personnel into grinding mills for inspection or repairs of linings, cracks, shell thickness deficiencies, etc.
- 6.2** All requirements specified in Section 2.0 shall be adhered to, as well as:
  - 6.2.1 For brick lined mills, bricks and supporting structures immediately above the work area of the entrants shall be shored to prevent collapse of the same.

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## 7.0 Entry into Dryers

- 7.1 This section governs the entry of personnel into dryers for inspection or repair of lifters, liners, cracks, shell thickness deficiencies, etc.
- 7.2 All requirements specified in Sections 2.0 and 4.0, with the possible exception of 2.7 and 4.2 (duties of attendant), shall be adhered to. If site conditions permit exclusion of 2.7 and 4.2 from this section, a schedule of periodic checks (i.e. every 15, 30, 45, etc. minutes) by supervision shall be established with the authorized entrants and recorded on the permit.
- 7.3 Dryers shall be shut down and given adequate time to cool off before entry is attempted.
- 7.4 Dust collection equipment shall be turned on for a minimum of 10 minutes before entry is made to assure adequate purging of the space.
- 7.5 All fuel feed lines to the dryer shall be closed and locked-out.
- 7.6 When entering fluid bed dryers through the plenum, steel grating, liners and supporting structures shall be shored to prevent collapse of the same during the work project.

## 8.0 Entry into Hoppers

- 8.1 This section governs the entry of personnel into material hoppers for unplugging, cleaning, repairing, modifying, chute repairs, etc.
- 8.2 All requirements specified in Section 2.0 shall be adhered to.
- 8.3 When the hopper involved is related to ore trucks, loaders, scrapers, etc., the supervisor in charge of the entry work shall advise the operators of the above equipment and assure that access areas to the hopper are physically barricaded by means of signs, ropes, barrels, etc.

## 9.0 Entry into Railcars

- 9.1 This section governs the entry of personnel into railcars.
- 9.2 All requirements of Section 2.0 shall be adhered to in addition to the following:
  - 9.2.1 All top and hatches will be in the open position to maximize ventilation within the interior of the railcar.
  - 9.2.2 Confined space rescue equipment (e.g. Rolgliss or equivalent device) shall be utilized to lower and retrieve an employee into the railcar via a full body harness (safety belts are not permissible for confined space entry purposes).
  - 9.2.3 The handbrake and wheels of the railcar shall be secured and chocked (30 CFR Part 56.9302) respectively prior to entry.
- 9.3 As part of the pre-job briefing, the entrant must advise their supervisor and all department employees that they are going to make entry into the railcar and for what purpose. The identity and location of the railcar to be entered shall also be communicated to the supervisor and department employees in order to take all reasonable precautions.

## 10.0 Emergency and Rescue

- 10.1 **Rescue Planning and Procedures – External:** Rescue and emergency services must be provided, or arrangements made with an outside service. Exhibit H1-4 Confined Space Rescue Evaluation shall be completed to determine external response capabilities and compliance with confined space rescue.
- 10.2 **Rescue Planning and Procedures – Internal:** Rescue and emergency services provided by employees shall take the following measures:

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- 10.2.1 A rescue plan will address summoning rescue and emergency services, the rescue, providing emergency services to rescued workers, and preventing unauthorized workers from attempting a rescue.
- 10.2.2 Personal protective equipment shall be provided, and workers shall be trained in its use.
- 10.2.3 Workers shall be trained in assigned rescue duties.
- 10.2.4 At least one member of the rescue team will hold a current certification in first aid and CPR.
- 10.2.5 Rescue plans, outlining the methods and procedures for getting help and performing rescue operations will be in effect for every confined space entry.
- 10.2.6 Entry will not occur until all required equipment is staged at the entry site, is checked for serviceability, and rescue workers are trained in its use.

**10.3 Emergency and Rescue Equipment** - Equipment for rescue from confined spaces will include:

- 10.3.1 A full body harness and lifeline for each entrant with the free end attached to a mechanical device or fixed point outside the confined space. Lines are attached in the center of the back at shoulder level or above the head. If the vertical retrieval depth is more than 5 feet a mechanical device shall be made available.
- 10.3.2 At least one spare harness and lifeline depending on the number of rescuers.
- 10.3.3 Hoisting system to facilitate vertical removal from the confined space.
- 10.3.4 Clear communication lines (cell phones and/or two-way radios) for attendant to summon help and to communicate with entrants.
- 10.3.5 All Safety Data Sheets for chemicals used in the confined space shall be available

**11.0 Training**

- 11.1 Training must specifically document general Confined Space procedures and Site-Specific Procedures including Site-Specific rescue.
- 11.2 Every worker will be informed about the location and dangers of confined spaces and that unauthorized entry is prohibited.
- 11.3 Workers involved in the Confined Space Program will acquire the understanding, knowledge, and skills necessary for the safe performance of their assigned duties.
- 11.4 Affected workers (entrants, attendees, rescue personnel) will be trained: initially for assigned duties; whenever there is a change in confined space operations that presents a hazard about which a worker has not previously been trained; whenever there is reason to believe there are deviations or inadequacies in procedures; and will receive annual refresher training.
- 11.5 A confined space rescue drill will be completed annually.
- 11.6 The training shall be documented.