

## Confined Space (general)

*This task may only be performed by trained and authorized personnel.*

Hazards Present:	Personal Protective Equipment (PPE) or Devices Required: <small>(CSA or ANSI Standards required as per regional legislation)</small>	Additional Training Requirements:
<ul style="list-style-type: none"> <li>• Suffocation</li> <li>• Asphyxia</li> <li>• Drowning</li> <li>• Musculoskeletal Injuries</li> <li>• Electrocution</li> <li>• Crushing</li> <li>• Illness/Disease (biological hazards such as mould, animal droppings, insects, etc.)</li> <li>• Explosions / Fire</li> <li>• Poisoning (hydrogen sulphide, H<sub>2</sub>S, nitrogen, etc.)</li> <li>• Noise</li> <li>• Exposure (inhalation, absorption through the skin or eyes, ingestion and injection)</li> <li>• Extreme temperatures</li> </ul>	<ul style="list-style-type: none"> <li>• Safety Eyewear/Face shield</li> <li>• Protective Gloves</li> <li>• Safety Footwear</li> <li>• Hard Hat</li> <li>• Respirator/Self Contained Breathing Apparatus (SCBA)</li> <li>• Full Body Harness</li> <li>• Atmosphere Monitoring Equipment</li> <li>• Retrieval Equipment</li> <li>• First Aid Kit</li> <li>• Communication Device</li> </ul>	<ul style="list-style-type: none"> <li>• First Aid and CPR Training</li> <li>• WHMIS Training</li> <li>• Respirator/SCBA Use and Care</li> <li>• Atmosphere Monitoring Equipment</li> <li>• Rescue/Retrieval Equipment</li> <li>• Hazard/Risk Assessment</li> <li>• Lockout/Blanking Off Procedures</li> <li>• Emergency Entry/Exit (Rescue) Procedures</li> <li>• Communications</li> <li>• Safe Work Practices and Procedures</li> <li>• Fire Protection</li> <li>• Review – MB Codes of Practice for Confined Space Work</li> </ul>

***NOTE: Workers must be trained in a way that demonstrates they are competent. JUST READING a SWP is NOT training. Workers must demonstrate they can safely perform task and trainer/supervisor must follow up regularly to ensure workers are performing task in a safe manner. Document each occurrence in the employee’s training record.***

***NOTE: All procedures obtained from mySafetyAssistant™, operator manuals or other samples must have the consultation of workers and be thoroughly reviewed to ensure they are accurate for your workplace and your jobs!***

** DANGER: Failure to follow this Safe Work Practice may result in SERIOUS INJURY or DEATH.**

Many workers are injured and killed each year while working in confined spaces. An estimated 60% of the fatalities have been among the would-be rescuers.

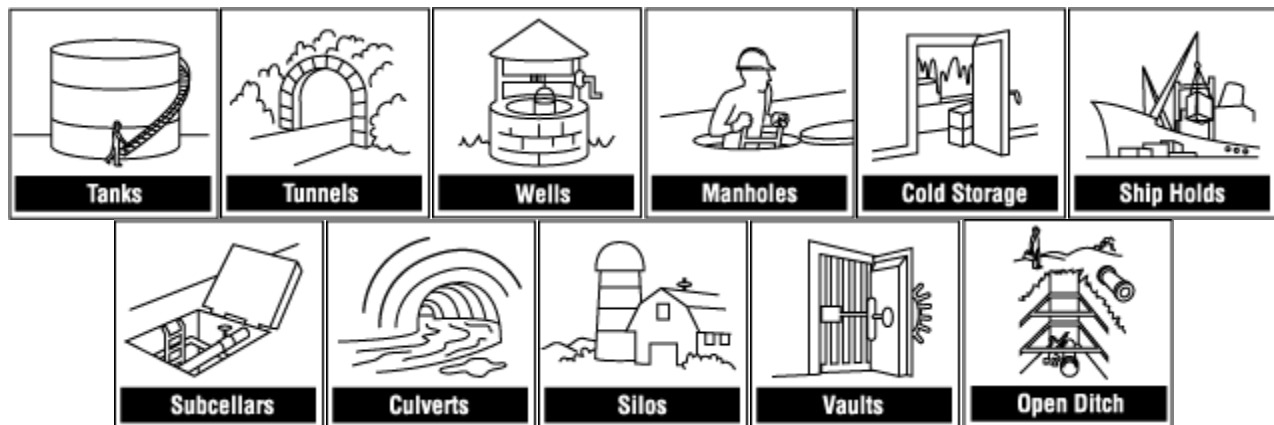
If the confined space cannot be made safe for the worker by taking precautions, then workers must NOT enter the confined space until it is made safe to enter by additional means.

## WHAT IS A CONFINED SPACE?

Generally speaking, a confined space is an enclosed or partially enclosed space which:

1. is not primarily designed or intended for human occupancy
2. has a restricted entrance or exit by way of location, size or means which may lead to entrapment of the entrant(s)
3. requires a means for immediate rescue
4. can represent a risk to the safety and health of anyone who enters due to one or more of the following factors of the confined space:
  - a. its design, construction, location or atmosphere
  - b. the materials or substances within
  - c. work activities being carried out within
  - d. mechanical, process and safety hazards present

Confined spaces can be below or above ground, and can be found in almost any workplace. A confined space, despite its name, is not necessarily small. Examples of confined spaces include silos, vats, hoppers, utility vaults, tanks, sewers, pipes, access shafts, truck or rail tank cars, aircraft wings, etc. Ditches and trenches may also be confined spaced when access or egress is limited.



All hazards found at a regular worksite can also be found in a confined space, however confined spaces tend to be more dangerous.

## GENERAL DANGERS OF CONFINED SPACES

1. The entrance/exit of the confined space might not allow the worker to get out in time should there be a flood or collapse of free-flowing solid.
2. Self-rescue by the worker is difficult.

3. Rescue of a victim is difficult; the interior configuration of the confined space often does not allow easy movement of people or equipment within it.
4. Natural ventilation alone will often not be sufficient to maintain safe air quality; the interior configuration of the confined space does not allow for easy movement of air within it.
5. Conditions can change very quickly.
6. The space outside the confined space can impact on the conditions inside the confined space and vice versa.
7. Work activities may introduce hazards not initially indicated.

## GENERAL HAZARDS OF CONFINED SPACES

1. *asphyxiation* due to lack of oxygen
2. *poisoning* due to an overabundance of gas (e.g. hydrogen sulphide – H<sub>2</sub>S, nitrogen, etc.)
3. *hazardous materials exposure* due to inhalation, absorption through the skin or eyes, ingestion and injection
4. *flammable/explosive atmosphere* due to the presence of flammable liquids and gases, and of combustible dusts
5. *high noise levels*
6. *musculoskeletal injuries (MSI)* due to physical factors such as, entanglement in moving parts of equipment, slips/trips, falls from heights, pinch points, sharp objects, etc.
7. *high radiation levels*
8. *temperature extremes*
9. *crushing/burial* due to shifting or collapse of bulk materials, or of excavations
10. *drowning/suffocation* due to release of liquid or of free-flowing solid
11. *electrocution*
12. *low visibility* due to darkness, fog, smoke, steam, dust, etc.
13. *illness/disease* due to biological hazards such as mould, animal droppings, insects, etc.

## HAZARD CONTROL

The traditional hazard control methods found in regular worksites can be effective in a confined space. These include engineering controls, administrative controls and personal protective equipment. Engineering controls are designed to remove the hazard while administrative controls and personal protective equipment try to minimize the contact with the hazard.

However, often because of the nature of the confined space and depending on the hazard, special precautions not normally required on a regular worksite may also need to be taken. The engineering control commonly used in confined spaces is mechanical ventilation. The Entry Permit system is an example of an administrative control used in confined spaces. Personal protective equipment (respirators, gloves, ear plugs) is commonly used in confined spaces as well.

## PRE-ENTRY PROCEDURE

1. Hazard Assessment and Control
  - a. All confined spaces must be identified and inventoried.
  - b. A hazard assessment must be completed for each confined space identified prior to any worker entering a confined space. The hazard assessment must take into consideration the atmosphere, all actual and potential safety hazards, the type of work to be performed, and human factors.

- c. Controls and safe work procedures must be developed in writing prior to workers entering a confined space.
2. Work Permit – Work Description
    - a. Workers entering a confined space must complete a work permit to verify that all hazards and protective measures are taken into consideration.
    - b. The completed Permit must be submitted to, and signed by the Supervisor prior to proceeding.
  3. Lockout
    - a. All mechanical equipment in the confined space must be locked out to prevent accidental startup. This includes electrical, mechanical, steam, compressed gas, hydraulic, wind and radiation devices.
  4. Blanking Off: Means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.
    - a. Before a worker enters a confined space:
      - i. piping containing hazardous substances or substances under pressure, or so located to allow hazardous substances to enter such space, shall be disconnected, blanked or blinded off; or
      - ii. where it is impractical to employ blanks or blinds, as in welded piping systems, written work procedures shall be developed and implemented to ensure equivalent protection to all workers exposed to the hazard, and
      - iii. the closing of a valve or any line will not be acceptable as a substitute for blanking or blinding
    - b. When blanking or blinding a piping system, blanks or blinds shall be of sufficient strength and so installed as to provide adequate safety for the particular conditions of anticipated pressure, temperature and service.
    - c. Visual indication that a blank or blind has been installed shall be provided at the point of installation.
    - d. When required, a gasket shall be installed on the pressure side of blanks or blinds and flanges shall be tightened to make the blanks or blinds effective.
    - e. Where threaded lines are used, threaded plugs or caps shall be used to blank the lines.
    - f. Records shall be kept which identify the blanked lines and the locations of blanks and blinds.
      - i. All lines and systems which may permit entry of hazardous materials into a confined space must be blanked off.
      - ii. If blanking off is impractical, written safe work procedures shall be developed and communicated to ensure workers are trained and educated to conduct work safely.
  5. Atmosphere Testing and Monitoring
    - a. Before entering a confined space, the atmosphere must be tested for the presence of hazardous materials such as explosive and toxic gases and oxygen levels.
    - b. The atmosphere within the confined space must be tested *from outside of the confined space*. Care should be taken to ensure that air is tested throughout the confined space – side-to-side and top to bottom. This must be conducted by a worker trained to use the monitoring equipment.
      - i. Training must include instrument calibration, maintenance, interpretation of readings and warning signals.
    - c. Equipment service log books must be maintained for all pieces of monitoring equipment.
    - d. The results of the tests are to be recorded on the Entry Permit, along with the equipment or method(s) that were used in performing the tests. Atmosphere testing may need to be ongoing depending on the nature of the potential hazards and the nature of the work. Conditions can change while workers are inside the

confined space and sometimes a hazardous atmosphere is created by the work activities in the confined space.

- e. When the atmosphere tested indicates the presence of hazardous materials such as explosive and toxic gases and abnormal oxygen levels, workers are prohibited from proceeding with work until further action is taken (see “General Entry Procedures”).

## 6. Work Requirements

- a. Confined spaces will not be entered unless absolutely necessary.
- b. No worker shall enter a confined space if working alone.
- c. No worker shall enter a confined space unless the hazards are identified, safe work procedures are followed, and a qualified worker, experienced and trained in all aspects of confined space work is present to supervise the work.
- d. A standby worker must be available to monitor the worker(s) in the confined space at all times. If the standby worker must leave, even for a few moments, the worker s must leave the confined space unless a competent replacement stand by worker is present.
- e. A communication system must be in place between the worker in the confined space and the standby worker.
- f. A communication system must be provided from the worksite to Emergency Services.

## 7. Safety Equipment

- a. A worker entering a confined space shall be equipped with all safety apparatus, testing and monitoring equipment, relevant to the confined space.

## 8. Fire and Explosion Prevention

- a. Work where a flame is used or source of ignition may be produced (hot work) should not normally be performed in a confined space.
- b. All flammable gasses, liquids, and vapours should be removed prior to starting work within the confined space. Mechanical ventilation maybe required if they cannot be removed from the confined space to keep their concentration levels low.
- c. Do not bring fuel and fuel containers into the confined space if possible. Ensure welding equipment is in good repair.
- d. If possible, use spark resistant tools and make sure all equipment is bonded or grounded properly.

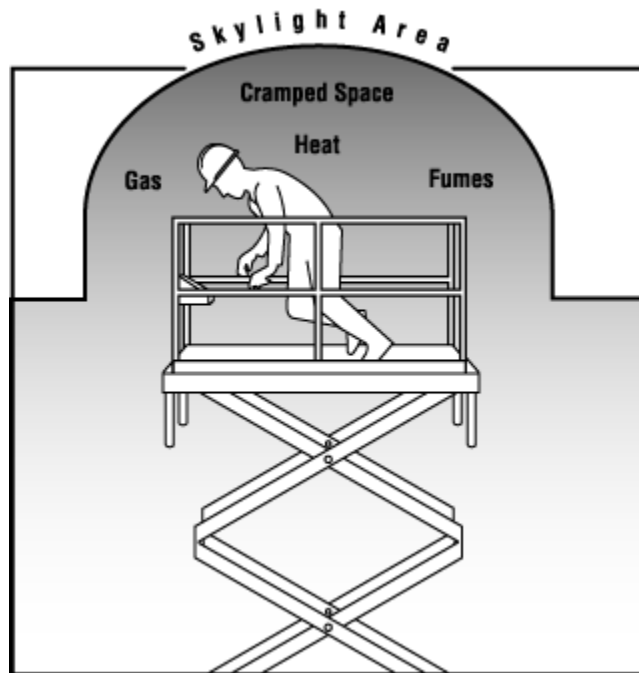
## 9. Rescue

- a. Confined spaces must be considered Immediately Hazardous to Life and Health unless demonstrated otherwise.
- b. Emergency rescue procedures must be planned and prepared prior to confined entry work.
- c. No employee shall attempt a rescue of another person in a confined space unless they have been trained to do so and all safety measures and precautions are taken.

## 10. Training

- a. Workers required to enter confined spaces must be trained in the associated hazards, control measures, and emergency procedures.

- b. Training of workers entering and working in confined spaces is critical. To ensure safety of workers, training shall be designed specifically for the type of confined space involved and shall cover the following, where applicable:
  - i. fundamentals of hazard/risk assessment
  - ii. lockout/blanking off procedures
  - iii. monitoring equipment and use
  - iv. safety equipment use
  - v. emergency entry/exit (rescue) procedures
  - vi. communications
  - vii. first aid and CPR
  - viii. safe work practices and procedures
  - ix. fire protection
  - x. rescue drills
- c. Workers should receive periodic reassessment (at least annually) to ensure workers remain competent to perform the tasks required for confined spaces. Refresher training should be conducted as required.



## GENERAL ENTRY PROCEDURE

1. Where the atmosphere testing and/or monitoring results indicate unsafe conditions, the confined space shall be ventilated and/or cleaned and re-tested to ensure that all parameters meet acceptable levels prior to a worker entering the confined space.
2. Access and egress into the confined space must be identified and appropriate to the confined space. For example, if a ladder is required to enter the confined space, ensure it is the right length and that it extends 1m above the working surface.
3. Where test results indicate unsafe conditions and it is not possible to provide a safe, respirable atmosphere, then:
  - a. the worker entering the confined space shall wear respiratory protection equipment

- b. the concentration of flammable substances shall be maintained safely below the lower explosive limit (LEL) of that substance or substances, and determined by repeated testing
- c. where flammable or explosive gases or liquids are present, all sources of ignition shall be eliminated or controlled
4. A worker who is required and permitted to enter a confined space in which a harmful condition exists, may develop or where the worker may become trapped by material shall, in addition to the above:
  - a. wear a safety harness of a type which will keep the worker in a position to permit rescue
  - b. have a life-line attached to the harness which is tended at all times by the trained standby worker, stationed outside the entrance to the confined space, who shall be equipped for, and capable of effecting rescue
5. Where one or more workers enter a confined space, provision shall be made to prevent the entanglement of life-lines and other equipment.
6. A worker entering a confined space shall be:
  - a. attended by, and in communication with a trained standby worker who is stationed at or near the entrance, or
  - b. provided with a means of continuous communication with the standby worker outside, and
  - c. visually checked by the standby person at intervals as often as may be required by the nature of the work to be performed
6. Where work is carried out in any confined space:
  - a. the confined space shall be ventilated continuously
  - b. tests for harmful or explosive substances, and for oxygen deficiency shall be made and recorded immediately prior to entry, after any interruption in the work, and at regular intervals to ensure the continuing safety of the workers in the confined space.
- Unauthorized entry into the confined space must be prevented as much as reasonably practicable. Only required or permitted workers are allowed entry into a confined space.

## GENERAL EXIT PROCEDURE

1. Try to ensure all work materials such as tools and equipment is removed from the confined space once completed work.
2. After exiting the confined space, ensure that all safeguards, barriers and signage is re-installed to prevent unauthorized entry into the confined space.

## PROHIBITION

No person shall enter a confined space in which a harmful atmosphere exists, may exist or may develop, until:

1. a confined entry permit has been completed
2. tests have been undertaken and recorded to determine the type and quantity of vapours, gases, fumes, mists, dusts and oxygen levels
3. written work procedures have been established to ensure a safe environment for the worker





**In case of emergency or equipment malfunction:  
Engage emergency stop and follow the lock out procedures.**

Guidance Documents / Standards / Applicable Legislation / Other	This Safe Work Practice will be reviewed any time the task, equipment, or materials change and at a minimum every three years.
<p><b>Guidance Documents:</b></p> <ul style="list-style-type: none"> <li>• Operator’s Manual</li> <li>• Code of Practice for Confined Space Entry Work</li> </ul> <p><b>CSA Standards</b></p> <ul style="list-style-type: none"> <li>• CSA Z94.2-02 Selection, Use and Care of Respirators</li> <li>• CSA Z259.10-06 Full Body Harnesses</li> <li>• CSA Z180.1-00 Compressed Breathing Air and Systems</li> </ul> <p><b>Manitoba Workplace Safety and Health Regulation, MR 217/2006:</b></p> <ul style="list-style-type: none"> <li>• Part 2.1 Eliminating or Control of Risks</li> <li>• Part 2.2 Consultation Required (SWP)</li> <li>• Part 4.4 Arrangement of Work Areas</li> <li>• Part 5 First Aid</li> <li>• Part 6 Personal Protective Equipment</li> <li>• Part 7 Storage of Materials, Equipment, Machines and Tools</li> <li>• Part 8 Musculoskeletal Injuries</li> <li>• Part 9 Working Alone or in Isolation</li> <li>• Part 12 Hearing Conservation and Noise Control</li> <li>• Part 13 Entrances, Exits, Stairways and Ladders</li> <li>• Part 14 Fall Protection</li> <li>• Part 15 Confined Spaces</li> <li>• Part 16 Machines, Tools and Robots</li> <li>• Part 19 Fire and Explosive Hazards</li> <li>• Part 20 Vehicular and Pedestrian Traffic</li> <li>• Part 23 Cranes and Hoists</li> <li>• Part 35 Workplace Hazardous Information Systems</li> <li>• Part 36 Chemical and Biological Substances</li> </ul>	<p><b>Completed / Approved by:</b></p> <hr/> <p><b>Date Completed:</b></p> <hr/> <p><b>Reviewed / Revised by:</b></p> <hr/> <p><b>Date Reviewed:</b></p> <hr/> <p><i>Disclaimer: Any references to legislation such as the Manitoba Workplace Safety and Health Act or Regulation or Standards, Codes of Practices or Guidelines are for convenience sake only. The original text must be consulted for all intents and purposes of applying and interpreting the law.</i></p>

**This Safe Work Practice has had the consultation of the following workers:**

Name	Signature	Position	Date