



British Columbia Institute of Technology

BCIT Safety Manual

CONFINED SPACE PROGRAM



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1. Purpose

This document describes the BCIT Confined Space Program. The goal of this program is to ensure the safety of worker's performing confined space entries at BCIT. The information in this document must be adhered to whenever entry into a confined space is required in order to protect the safety of the worker and to ensure compliance with legislative requirements.

2. Definitions

2.1 *Confined Space*

WorkSafeBC defines a confined space as:

Except as otherwise determined by the Board, an area, other than an underground working, that

- (a) is enclosed or partially enclosed,
- (b) is not designed or intended for continuous human occupancy,
- (c) has limited or restricted means for entry or exit that may complicate the provision of first aid, evacuation, rescue or other emergency response service, and
- (d) is large enough and so configured that a worker could enter to perform assigned work.

Exceptions are included in the [WorkSafeBC guidelines](#).

2.2 *Confined Space Entry*

The action by which a person passes through an opening into a confined space. Entry is considered to have occurred as soon as the entrant's breathing zone crosses the plane of the confined space access.

2.3 *Clean Respirable Air*

An atmosphere which is equivalent to clean, outdoor air and which contains

- (a) about 20.9% oxygen by volume,
- (b) no measurable flammable gas or vapour as determined using a combustible gas measuring instrument, and
- (c) no air contaminant in concentrations exceeding 10% of its applicable exposure limit

2.4 *Low Hazard Atmosphere*

An atmosphere which is shown by pre-entry testing or otherwise known to contain clean respirable air immediately prior to entry into a confined space and which is not likely to change during the work activity, as determined by a qualified person after consideration of the design, construction and use of the confined space, the work activities to be performed, and all appropriate engineering controls

2.5 *Moderate Hazard Atmosphere*

An atmosphere that is not clean respirable air but is not likely to impair the ability of the worker to escape unaided from a confined space, in the event of a failure of the ventilation system or respirator



2.6 High Hazard Atmosphere

An atmosphere that may expose a worker to risk of death, incapacitation, injury, acute illness or otherwise impair the ability of the worker to escape unaided from a confined space, in the event of a failure of the ventilation system or respirator

2.7 Hazard

A thing or condition that may expose a person to a risk of injury or occupational disease

2.8 Qualified Person

A person who has adequate training and experience in the recognition, evaluation and control of confined space hazards. Evidence of adequate training and experience include:

- Certified industrial hygienist (CIH), registered occupational hygienist (ROH), certified safety professional (CSP), Canadian Registered Safety Professional (CRSP) or professional engineer (P. Eng.), provided that the holders of these qualifications have experience in the recognition, evaluation and control of confined space hazards, or
- Other combination of education, training and experience acceptable to the WorkSafeBC

3. Reference Materials & Applicable Legislation

BCIT Safety Manual Part 2 Section 15 – Contractor Safety

WorkSafeBC [Regulation Part 9](#) – Confined Spaces

WorkSafeBC [Confined Space Entry Program](#) – A Reference Manual

4. Roles and Responsibilities

4.1 Confined Space Program Administrator (Manager OHS)

The Confined Space Program Administrator (Manager, Occupational Health and Safety) is responsible for ensuring that all confined spaces in the inventory have the appropriate hazard assessment and associated work procedures performed by a qualified person prior to any entries occurring.

In addition, the Confined Space Program Administrator is responsible for assessing confined space entry requests, issuing Confined Space Entry Permits when required, and for maintaining copies of Confined Space Entry Permits. The availability of rescue services must be ensured by the Confined Space Program Administrator.

4.2 Facilities

The Facilities Manager must keep an up to date inventory of confined spaces on BCIT campuses, keep records of confined space entries, and ensure that all foremen and project coordinators are trained on this procedure.



4.3 Supervisors

Supervisors are required to ensure the health and safety of all workers under their direct supervision. This includes providing to the employees the information, instruction, training and supervision necessary to ensure their health and safety in carrying out their work and to ensure the health and safety of others at the workplace that may be affected by the work. Supervisors are responsible for ensuring that the employees under their supervision are trained in confined space entry and work procedures. Supervisors need to provide the appropriate tools and equipment for the assigned work.

The supervisor assigning work within a confined space must submit a Confined Space Entry Request (Appendix A) to the Confined Space Program Administrator. The Confined Space Program Administrator will produce the confined space Hazard Assessment, Work Procedures and Entry Permits (when required). The supervisor is responsible to ensure that all of the required precautions and controls from the work procedures have been completed prior to allowing entry into the space.

4.4 Employees

BCIT employees must not carry out any work process or operate any tool, appliance or equipment if they have any reasonable cause to believe that to do so would create the potential for undue hazard to their health and safety. BCIT employees must refuse entry into any confined space unless they have read and understood the hazard assessment and the work procedures for the space and all of the pre-entry controls and precautions have been performed.

ONLY AUTHORIZED WORKERS MAY ENTER A CONFINED SPACE.

All BCIT employees must take reasonable care to protect their health and safety and the health and safety of others who may be affected by their acts or omissions at work. Employees must ensure that they are aware of, and follow, the established work procedures in their area and for their tasks. This includes wearing the required protective equipment, devices or clothing.

4.5 Contractors/Prime Contractors

Contractors are responsible for ensuring the safety of their employees as indicated in BCIT Safety Manual Part 2 Section 15 – Contractor Safety. Section 5.3.5 of the BCIT Contractor Safety procedures specifically outlines the responsibilities of the Contractor and the Contractor Contact as they pertain to Confined Space Entries.

4.6 Rescue Personnel

BCIT personnel are prohibited from entering confined spaces for the purpose of rescue activities.

Rescue personnel must be properly equipped and trained to carry out confined space rescue. Rescue personnel must be available to perform rescue activities any time a confined space entry occurs into a permit requiring space at BCIT.

4.7 OH&S Committees

Report any unidentified confined spaces that are found over the course of monthly workplace inspections to the Confined Space Program Administrator.



4.8 BCIT Responsibilities

The Confined Space Management Plan must be reviewed annually.

5. Procedures

BCIT employees and contractors working on BCIT property have the responsibility to observe all of the requirements outlined in this document.

5.1 Inventory

The Confined Space Program Administrator will keep an inventory of all confined spaces and associated risk assessments and entry procedures. All confined spaces must be identified in the inventory system. This inventory will be developed to include:

- name, location of space (electronic, searchable),
- hazard rating and permit requirements,
- spatial mapping of confined space entry points and surroundings,
- risk assessments, &
- work procedures

The facilities manager will also keep a list of all of the confined spaces on BCIT campuses.

The inventory system must be updated annually to reflect changes in the inventory of confined spaces or to changes in the hazards found within confined spaces.

5.2 Identification & Labeling

Signs must be affixed at the entry to all confined spaces where practicable. Confined space entry signs will read:

**DANGER
CONFINED SPACE**

Additional contact information or information pertaining to specific hazards may be included on the signage. Signs must be in red, black and white, in bold lettering, permanently affixed, and clearly visible to workers in the area. Moderate and high hazard confined spaces must also include:

ENTRY BY PERMIT ONLY

Examples of spaces where signage may be deemed impracticable include manholes on roadways or outdoor sump entries. Training of employees and contractors who may be required to perform work within confined spaces must include the identification of such spaces.

Wherever practicable, all high hazard confined spaces must be secured against entry.

5.3 Hazard Assessment

A hazard assessment must be conducted for each:



- a) confined space, or each group of confined spaces which share similar characteristics,
- b) work activity, or group of work activities with similar hazards, to be performed.

The hazard assessment must be prepared written in lay-terms by a qualified person.

All confined spaces at BCIT require a Hazard Assessment, regardless of the need for entry.

Hazard assessments must be updated upon any changes to the hazards within the space.

5.4 Work Procedures

Written work procedures, based on the Hazard Assessment, must be created for all confined spaces that require entry. These work procedures must specify the means to eliminate or minimize the hazards outlined in the hazard assessment including those that could be created by the work being performed in the space. These written work procedures must be prepared by a qualified person and must address, where applicable:

- a) identification and entry permits,
- b) lockout and isolation,
- c) verification and testing,
- d) cleaning, purging, venting or inerting,
- e) ventilation,
- f) standby persons,
- g) rescue,
- h) lifelines, harnesses and lifting equipment,
- i) personal protective equipment and other precautions, and
- j) coordination of work activities.

Work Procedures must be updated upon any changes to the Hazard Assessment.

5.5 Instruction and Training

BCIT employees and contractors who require entry into confined spaces must be fully trained in the following:

- Recognition and identification of potential hazards associated with the confined spaces that will be entered.
- Evaluation and control procedures for the identified or potential hazards.
- All equipment such as ventilation equipment (blowers), harnesses and air quality monitors (e.g., Oxygen/combustible meters) that will be used while in the confined space.
- All personal protective equipment (e.g., respirators) that the worker will be using while in the confined space.
- All procedures for entering the confined space as outlined in the Hazard Assessment and Work Procedures.
- Procedures to follow in the event of a situation developing that could present additional risk to the worker or an emergency.
- The specific work to be done while in the confined space.



Upon request contractors will be provided with confined space hazard assessments and work procedures, when available. Contractors are required to create written Work Procedures for the specific tasks being performed as outlined in the BCIT Safety Manual- Contractor Safety Program. These written Work Procedures must be created by a qualified person and submitted to the Confined Space Program Administrator and Facilities Manager for review prior to the entry occurring.

5.6 Entry Permits

Three days notice must be given to the Confined Space Program Administrator prior to any entry into a moderate or high hazard confined space. After reviewing the proposed entry the Confined Space Program Administrator will provide a Confined Space Entry Permit to the supervisor of the confined space entry worker. The Confined Space Entry Permit must be posted at the entry to the confined space for the duration of the entry. The Confined Space Entry Permit template can be found in Appendix A. The Confined Space Program Administrator maintains a copy of the Confined Space Entry Permit and maintains the information in the safety data management database.

6. Documentation

All documentation that is related to the training and instruction must be maintained for a minimum of 3 years as indicated in section 23 of the BCIT Safety Manual- Training and Orientation. All confined space hazard assessments and work procedures will be maintained by the Confined Space Program Administrator for a minimum of 3 years following the creation of updated documents. The Confined Space Program Administrator is required to maintain copies of all Confined Space Entry Permits for a minimum of 3 years.

7. Program Review

The Confined Space Entry Program must be reviewed annually for the following:

- The effectiveness of the program as it applies to ensuring employee and contractor safety
- Document control

The annual review will be done in consultation with the Joint Occupational Health and Safety Committee.



Appendix A- Confined Space Entry Permit



BCIT Confined Space Entry Permit

Name of the space: _____	Location of the space: _____
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ATMOSPHERE
 HIGH HAZARD
 MODERATE HAZARD
 LOW HAZARD

Date of entry: _____	Time entry begins: _____
Date expires: _____	Time permit expires: _____

Supervisor/Prime Contractor: _____

I have been advised and will ensure consistency with BCIT Confined Space Program and other relevant Occupational Health and Safety Laws/Regulations.

Name (Print): _____ Signature: _____ Date: _____ Time: _____

Person(s) seeking authorization to enter

Name (Print) _____ Signature: _____ Date: _____ Time: _____

Name of standby person #1: _____ Time start: _____ Time stop: _____ Cell: _____

Name of standby person #2: _____ Time start: _____ Time stop: _____ Cell: _____

Description of the entrance(s)^[1]: _____

Description of the space: _____

Description of work to be done: _____

VENTILATION

For HIGH or MODERATE Atmosphere	Ventilation is required to maintain 20 air changes per hour (show cfm and name of ventilator). Ventilator with green lamicaid tag from stores rated for 700 cfm with yellow 15' hose attached to outlet side, attach 10' hose on inlet side
For LOW HAZARD Atmosphere	Natural ventilation <input type="radio"/> YES ^[2] <input type="radio"/> NO



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	If No, Air flow to be achieved: _____ cfm ^[3]
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GAS TESTING – MONITORING ^[4]

Initials	Location	Time	Contaminant – Reading from the Monitor								
			Oxygen (min 19.5% - max 23%)		Flammable/Explosive (max 10% of LEL)		Carbon monoxide (8-hr TWA 25 ppm)		Hydrogen sulfide (Ceiling limit 10 ppm)		Other
			O YES	O NO	O YES	O NO	O YES	O NO	O YES	O NO	
Pre-purge reading ^[5]											
Post-purge reading											

CONTINUOUS MONITOR TEST RESULTS are written accurately:

Date of calibration:	Name of tester(s):
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SIGNATURE OF STANDBY PERSON(S)

I certify that my sole duty at this worksite in the time period specified on the front of this permit is standby person. I will be documenting the continuous monitor readings and ensuring the check-in/check-out sheet is completed as well as the duties required of me as standby person.	
Standby person #1's signature	Standby person #2's signature
Date:	Date:
Time:	Time:

ENTRY/EXIT CHECKLIST

Legend: Standby person to write an “ / ” each time the named worker enters the confined space (/) and write a “ \ ” each time the named worker exits (\) forming an “X” for a completed entry/exit (X).

Name of worker	Status																

HAZARD IDENTIFICATION

Hazards ^[6]	Controls



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PERSONAL PROTECTIVE EQUIPMENT REQUIRED

<input type="checkbox"/> Hardhats	<input type="checkbox"/> Eye protection	<input type="checkbox"/> Footwear
<input type="checkbox"/> Gloves	<input type="checkbox"/> Respiratory protection: <input type="checkbox"/> Mask <input type="checkbox"/> Respirator <input type="checkbox"/> SCBA	<input type="checkbox"/> Full body harness

RESCUE PROTOCOL & EQUIPMENT

TO CALL HELP in an EMERGENCY	Security: 604 451 6826	First Aid: 604 432 8872	Police: 9-1-1
DO NOT ENTER THE SPACE TO RENDER ASSISTANCE			

PERMIT AUTHORIZATION

BCIT CONFINED SPACE ADMINISTRATOR			
NAME (Print):	Signature:	Date: / /	(dd/mm/yyyy)

NOTES

[1] Confined Space Entry Permit must be completed, signed, and posted at the primary entrance when any of the following occurs:

- Lockout is required prior to entry
- Blanking or blinding is required to isolate the space prior to entry
- The space has piping coming into it that cannot be blanked or blinded
- There is risk of entrapment or of being buried or drowned
- Air quality would prevent self-rescue if ventilation or other equipment failed
- Mechanical ventilation is not provided
- Ventilation cannot keep contaminants below permissible concentrations

[2] If natural ventilation is chosen, then

- Space must be over 64 ft³ per occupant AND
- Space must be a LOW Hazard AND
- Continuous monitoring must be in place AND
- Air flow in space must be continuously measured

[3] The minimum ventilation required for any space is 50 cfm per person. The ventilation must be adequate to provide good clean respirable air to workers inside the space. Providing 20 ac/hr will maximize mixing and will generally provide a good supply of air. Place ventilator hose close to the area where workers are working. Long ducts, ducts with interior roughness, tight bends and numerous bends all increase resistance and decrease air flow.

[4] Depending on use, the monitor may need calibration on a weekly or daily basis.

- No entry allowed if: Flammables greater than 20% of lower explosive limit (LEL)
- No entry without high hazard precautions if:
 - oxygen level is less than 19.5% or greater than 23 %, or
 - hydrogen sulphide greater than 5 ppm, or



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- carbon monoxide greater than 12.5 ppm, or
 - flammables greater than 10% of LEL, or
 - risk of entrapment, or
 - being buried/drowned, or
 - confined space is an extension of an excavation (with potential for offgassing of contaminated soil)
- Monitoring must be continuous
 - Standby person must enter gas test results whenever the space has been vacated for more than 20 minutes
 - If initial test results indicate contaminants or lack of oxygen, fully purging is required

[5] Ensure air travelling through hose has enough time to reach sensors.

[6] Consider the following:

1. Small access point (restricts access)
2. Sloped floor (risk of slipping)
3. Material placement (restricts access)
4. Equipment placement (restricts access)
5. Equipment in space (requires lockout)
6. Internal baffles (restricts access)
7. Heights or depths (risk of falling)
8. Near power lines (risk of electrocution)
9. Stacking or bridging of materials (risk of engulfment or being buried)
10. Presence of pinch points (risk of being caught between)
11. Upstream fluids (risk of drowning)
12. Upstream solids (risk of engulfment)
13. Slippery flooring (risk of slipping)
14. Laser measurement devices are present (risk of eye injury)
15. Dust in space (irritation or restricted vision)
16. Power tools (risk of electrocution — ground fault interrupter required)
17. Hot work being done (risk of fire)
18. Use of irritant or corrosive chemicals
19. Rusting substances using up oxygen
20. Internal baffles restricting ventilation
21. Equipment placement restricting ventilation
22. Below grade potential for gases to sink into space
23. Near contaminant sources that may affect atmosphere
24. Risk of upstream gases (risk of being overcome)
25. Near spill sources that may require coordination with other agencies
26. Radiation — isotope measuring devices
27. Flammable dust — non-flammable dust
28. Temperature extremes — too hot, too cold
29. 26a. Use of steam to clean (risk of inhalation of mists)
30. Compressed gas
31. Excessive noise
32. Hot work or use of chemicals causing exposure above
33. WorkSafeBC limit
34. Materials being used to clean the space are toxic (risk of being overcome or becoming ill)
35. Contaminants existing inside the space that cannot be cleaned or purged prior to entry