

CONFINED SPACE ENTRY PROCEDURES

The Dangers of Working in Confined Spaces

Work in confined spaces can be extremely dangerous due to the potential for buildup of hazardous gases or dust, or due to concentrations of oxygen that can result in the immediate life threatening hazards of suffocation, fire or explosion.

Definition

A confined space or vessel may be classified as being one of the following:

An enclosure with a limited access opening for personnel such as closed storage tanks, mixing tanks, septic tanks, boilers, sawdust cyclones, cisterns, wells and any other enclosed spaces.

A Confined Space Entry Procedure prescribes **minimum** specific measures that must be taken to ensure safety of all personnel entering a confined space, vessel or other enclosed spaces.

Identification of Potential Hazards

There are two distinct categories of hazards found in confined spaces, Physical Hazards and Dangerous Atmospheres. Some examples of these hazards are,

- Residual Chemicals
- Oxygen Enrichment
- Oxygen Deficiency
- Flammable Atmosphere
- Electric Shock
- Psychological Factors
- Toxic Gases and Vapours
- Fuel and Explosives
- Restricted Entry and Exit
- Temperature Extremes
- Noise
- Poor visibility
- Shifting or Collapse of Material
- Mechanical Equipment Movement
- Contents of Supply Lines and Pipes

Responsibilities

Supervisors. Must be familiar with the requirements of this program and ensure that employees or contractors under his/her supervision and understand the general and specific procedures and know how to conduct their confined space tasks safely.

Employees. Who are required to enter and perform work in confined spaces shall work in accordance with the Keewatin-Patricia District School Board confined space procedures.

Contractors: Individuals contracted to enter and perform work in confined spaces shall work in accordance with the Keewatin-Patricia District School Board confined space procedures.

Protective Equipment and Clothing Requirements

The worker shall be equipped with all safety apparatus, testing and monitoring equipment relative to the hazards in the confined space. Depending upon the conditions, work, and nature of exposure in each situation the following personal protective equipment may be required:

- self contained breathing apparatus (SCBA)
- respirators
- eye protection
- gloves
- hard hat
- body coverings
- boots
- flashlight
- full body harness with recovery D-rings, Tripod and recovery winch system
- personal gas alarm
- barricades
- ventilator/exhaust unit
- 10-minute respiratory escape pack

Safety Measures and Procedures

1. Education of Workers and Supervisors

All workers, and supervisors whose work may necessitate confined space entry shall receive instruction in hazard/risk assessment, entry, exit and rescue procedures. Evaluation of the workers competency will take place. Training should take place on a regular basis based upon employee evaluation and changes in the workplace. All contractors of the Keewatin-Patricia District School Board who are contracted to perform work in confined spaces at the Board must be familiar with the requirements of the confined space program.

2. Atmospheric Testing

Before entry into confined spaces in which toxic or combustible gases, vapours, mists, fumes, dust or any oxygen deficiency or enrichment is likely to be present, (as in a septic tank) air testing by a trained and competent person shall be carried out. All monitoring equipment must be serviced, maintained and calibrated to ensure proper working order before use. Equipment service logs books should be maintained for each piece of confined entry monitoring equipment. Records must be kept of all tests results.

3. Ventilation and Purging/Inerting

The confined space shall be pressure-ventilated by mechanical means by the provision of clean air where there is likely to be dangerous gases, vapours, mists, fumes, dusts, oxygen deficiency or extremes of temperature. Re-testing must be

carried out after ventilating the space for an appropriate time, and before any worker enters.

After leaving the space for breaks, lunch, to get tools etc. it is necessary to retest prior to re-entry into the space. If conditions have changed, rendering the space unfit for human occupancy, the space must be ventilated and re-tested until the atmosphere is acceptable. Ensure nearby vehicle or equipment exhaust does not enter the space.

Purging – A method of removing contaminants from a confined space by using liquids (water) or by non-flammable gases (carbon dioxide or nitrogen).

Inerting – The process of introducing substance, using a gas to make the contaminates unreactive.

4. Fire and Explosion Safety

All electrical equipment to be used shall conform to Ontario Hydro Electrical Safety Code's requirements for hazardous locations.

Cylinders of oxygen or other gases shall not be taken into confined spaces. This does not apply to breathing equipment.

Welding and cutting torches shall not be left in confined spaces when not in use. Adequate fire fighting equipment shall be readily available. Special non-sparking (non-ferrous) tools should be used where necessary.

5. Access and Egress

Entrants should perform a visual inspection of the confined space to determine whether there are physical hazards of which the entrants should be aware – rusty or missing rungs, deep water, slippery surfaces, trip hazards, etc.

Openings into confined spaces shall be large enough to permit the entry of workers wearing safety equipment.

6. Blanking Off

A work area that cannot be isolated from the possible release of hazardous substances into the confined space shall be physically disconnected and blanked off, where applicable. Material used in construction of the blank must take the line pressure and corrosion properties into consideration. Where it is impractical to employ blank 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.

7. Lock Out

All ancillary equipment housed within the confined space or feeding into the confined space, "i.e." agitators, pumps, etc. must be disconnected from the power source at the disconnect box and the controls "locked out" following the Board's Lock Out Procedures to prevent accidental start-up. Lock out of

equipment includes electrical, mechanical, steam compressed gas, hydraulic, and gravity devices.

8. Electrical Safety

When using electrical tools and equipment in confined spaces ground fault circuit interrupters will be used as additional protection for operators of electrical equipment.

AIR MONITORING

The majority of the atmospheric hazards which may be encountered in a confined space are not visible and because reliance on the sense of smell is far too risky, it is important to conduct air monitoring for OXYGEN, FLAMMABLES and TOXICS (in that order) must be done by a qualified person. This qualified person should fully understand the applications and limitations of air monitoring equipment and be trained in the proper operation, calibration and maintenance of it.

If the confined space presents hazardous atmospheric conditions, steps such as continuous ventilating may be required. In other circumstances, this may not be feasible and supplied air respiratory equipment may be required for entry into the confined space. specific training in the use of supplied air respiratory equipment must be provided to entrants and attendants.

Test all vertical levels of the space – the top, middle, and the bottom. Some contaminants will stratify, particularly if there is little air movement. If any test shows the air to be unsafe, the hazard must be controlled before anyone enters the space. All air monitoring results must be recorded on the confined space entry permit.

Periodic or continuous air monitoring is necessary to make sure that the air stays safe for the occupants of the space. The work performed inside the space may generate potentially hazardous contaminants, for example scraping, scaling, use of solvents and hot work can compromise the air quality in a confined space. If the air in a confined space becomes unsafe after entry, **STOP** all work immediately, get out of the space and evaluate the situation from outside the space. After control measures are taken, the air must be retested prior to re-entry.

RECORD KEEPING

All Board confined space entry permits must be kept on file with the department responsible for the entry for a minimum of three (3) years. This requirement applies for both employee and contractor confined space entry permits.

RESCUE

Confined spaces must be considered to be I.D.L.H. (Immediately Dangerous to Life and Health), unless demonstrated otherwise. emergency rescue procedures must be planned and prepared for all confined space entry work, and must be in place before any work commences. It must be noted that after a very short period of time (approx. 4 minutes) without breathing, a worker can suffer permanent brain damage due to lack of oxygen.

The standby worker must be equipped to immediately effect a rescue and in attendance at all times. The standby worker must be able to communicate while the worker is in the confined space whether visual, verbal or portable radio. **THE STANDBY DOES NOT ENTER THE SPACE – too many confined space rescue attempts claim the lives of unprepared rescuers.**

Only workers properly trained and equipped for the confined space rescue shall attempt the rescue. Rescue personnel must be physically capable of carrying out a rescue, and must be trained in first aid and CPR.

Communications must be available at the work site to emergency response organizations (Fire and Ambulance).

If Self-Contained Breathing Apparatus (SCBA) is required for confined space entry, the worker must be trained and demonstrate competency in using the SCBA.

Harness with Lifelines

An acceptable full body harness that will facilitate rescue through a narrow opening is required. The lifeline cable must be a minimum of 3/16" wire rope or other acceptable rigging. workers must be trained and competent in the use of all fall arrest equipment.

Hoist/Retrieval System

All hoisting components shall be capable of supporting a worker with a four-to-one safety factor. All hoists must be equipped with an adequate brake mechanism that allows for immediate fall arrest. The hoisting mechanism must be capable of immediate retrieval of the worker at all times. Any retrieval system must be capable of removing a worker within two and a half minutes (2½ minutes) or less. Shop fabricated hoists must be engineer approved.

Emergency Plan

In the event of a confined space emergency, the attendant will:

1. Verify (without entering the confined Space) the condition of the Entrant.
 - a. If the entrant is unconscious or not breathing, go to Step 2.
2. **Call 911 for emergencies within the City of Dryden, Dinorwic, Eagle Lake First Nations, Ignace, Machin and Area, Oxdrift, Sioux Lookout or Wabigoon or 1-800-281-9275 for an ambulance if outside these areas.**

Call 911 for emergencies within the City of Kenora, including areas of the 467, 468, 547, 548 telephone exchange. For surrounding area emergency calls dial 468-3311 for an ambulance or 1-888-310-1122 for the Ontario Provincial Police. In Sioux Narrows call 226-1021 for an ambulance and 1-888-310-1122 for the Ontario Provincial Police.

For emergencies within the communities of Red Lake and Balmertown call (807) 727-3100 and (807) 222-3400 in the community of Ear Falls. To contact the Ontario Provincial Police for all three areas, call 1-888-310-1122.

3. Enable site access for emergency response personnel.

4. Perform first aid services if entrant is out of confined space and assist in the handover to emergency response personnel.

ENTRY PROCEDURES

1. A confined Space Entry Permit must be obtained from the Facilities Area Supervisor responsible for the Confined Space to be entered. Once completed and signed, the permit must be posted at the entry location to the confined space.
2. All personnel associated with the confined space entry, including the authorized entrant(s), attendant and supervisor, must review and thoroughly understand the correct procedures for safe entry, work and rescue.
3. No one shall enter the confined space without having an attendant stationed outside at all times. The attendant prevents unauthorized entry into the confined space and gives his/her undivided attention to the workers inside the space.
4. A worker with the First Aid/CPR Training must be readily available while an entrant is in a confined space.
5. All required equipment and supplies for confined space entry must be readily available and in good working condition and tested before entry.
6. Establish means of communication between the entrant(s) and the attendant.
7. Establish a safe means of access and egress from the confined space.
8. Perform necessary lockout/tag out procedures to prevent unexpected hazards from entering the confined space.
9. Test the atmosphere before anyone enters the space:
 - a. Oxygen levels between 19% to 22%
 - b. Carbon Monoxide 10 p.p.m.
 - c. Hydrogen Sulfide 5 p.p.m.
 - d. Flammable and combustible gases and vapours 10% of LEL
10. Record the air monitoring results on the entry permit.
11. If air monitoring indicates unacceptable levels of oxygen, flammable or toxic conditions, the space must be ventilated. retest and record the results.
12. Continue to ventilate for the duration of the work in the confined space.
13. Workers entering the space shall wear or carry an air monitoring device with alarm to provide early warning of changing conditions.
14. Once the potential hazards in the space have been identified and the entrants take all necessary steps to protect themselves, the Supervisor signs the permit and the entry can commence. If after hours, it is still necessary to have the entry permit authorized by the Area Supervisor.
15. Post the permit at the entry to the confined space.

CONFINED SPACE ENTRY PERMIT

All copies of permit to remain at job site until job is completed.

GENERAL INFORMATION:						
Location and Description (of confined space) _____						
Date _____		Time _____				
Dept. _____		Expiration _____				
Description of work to be performed _____						
PERSONNEL:						
Person in charge of entry _____						
Person(s) authorized to enter _____						
Attendant(s) _____						
SPECIAL REQUIREMENTS:		Yes	No		Yes	No
Lockout - de-energize				Escape Harness		
Lines broken - capped or blanked				Mechanical escape unit		
Purge - flush & vent				Lifelines		
Ventilation				Fire extinguishers		
Secure area				Lighting		
Breathing apparatus (supplied air)				Protective clothing		
Respirator				Other		
Traffic control						
MONITORING:						
PRIOR TO OPENING	DATE/TIME	RESULTS	INITIALS			
Oxygen levels between 19% to 22%				Monitor Mtg: _____ Model: _____ Date Calibrated: _____ Monitored by: _____ <div style="text-align: right;"><i>(Initials)</i></div>		
Carbon Monoxide 10 p.p.m.						
Hydrogen Sulfide 5 p.p.m.						
Flammable and combustible gases and vapours 10% of LEL						

If an emergency should occur - first summon help. Do not enter a confined space until qualified help arrives and entry can be made safely. If a person is down for no apparent cause, you must assume that toxic gases or oxygen deficiency could exist - do not enter if not trained and without full protective gear and self-contained breathing devices.

ENTRY APPROVED BY:

Signature

Telephone/beeper

Date