

May 11, 2006

TABLE OF CONTENTS

PART 2 - CONFINED SPACES

	Page
DEFINITIONS.....	2-1
GENERAL	2-2
RESPONSIBILITIES.....	2-2
HAZARD ASSESSMENT AND WORK PROCEDURES.....	2-3
IDENTIFICATION AND ENTRY PERMITS	2-3
ISOLATION AND LOCKOUT OF CONFINED SPACE	2-4
VERIFICATION AND TESTING	2-5
CLEANING, PURGING, VENTING, INERTING	2-6
VENTILATION OF CONFINED SPACE	2-6
STANDBY PERSONS	2-7
RESCUE.....	2-8

PART 2 – CONFINED SPACES

DEFINITIONS

2.01 In this part, the following definitions apply:

“adjacent piping”

means a device such as a pipe, line, duct or conduit, which is connected to a confined space or is so located as to allow a substance from within the device to enter the confined space;

“blank”

means a solid plate installed through the cross-section of a pipe, usually at a flanged connection;

“blanking or blinding”

means the absolute closure of adjacent piping by fastening a solid plate or cap across its bore, that completely covers the bore and is capable of withstanding the maximum pressure of the adjacent piping;

“blind”

means a solid plate installed at the end of a pipe that has been physically disconnected from a piping system;

“clean respirable air”

means an atmosphere which is equivalent to clean, outdoor air that contains

- (a) approximately 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 in the *Occupational Health Regulations*;

“confined space”

means an area, other than an underground mine, that

- (a) is enclosed or partially enclosed,
- (b) is not designed or intended for 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 services, and
- (d) is large enough and so configured that a worker could enter to perform assigned work;

“double block and bleed”

means the closure of adjacent piping by locking out a drain or vent in the open position in the line between two locked out valves in the closed position;

“high hazard atmosphere”

means 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;

“inerting”

means intentionally flooding the atmosphere inside a confined space with an inert gas such as nitrogen to eliminate the hazard of ignition of flammable vapours inside the confined space thereby creating an oxygen deficient atmosphere;

“low hazard atmosphere”

means an atmosphere which is shown by pre-entry testing or otherwise known to contain clean, respirable air immediately prior to entry to 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 ventilation, lockout and isolation controls required by the applicable regulations;

“moderate hazard atmosphere”

means 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.

GENERAL

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| Initial determination and control of hazards | 2.02 | All confined spaces shall be identified and assessed to determine <ul style="list-style-type: none">(a) the level of hazards that exist within each confined space,(b) whether the confined space will require entry by a worker either in scheduled work activities or as a result of foreseeable system failure or other emergency, and(c) means of controlling or eliminating hazards to ensure safe performance of work activities. |
| Prohibited entry | 2.03 | If a confined space exists at a workplace but no entry by workers is required, each access to the confined space shall be secured against entry and posted with a sign or other effective means <ul style="list-style-type: none">(a) describing the nature of the hazard and the prohibition of entry, and(b) prohibiting workers from entering. |
| Confined space entry program | 2.04 | Before a worker is required or permitted to enter a confined space a confined space entry program shall be written and implemented and include: <ul style="list-style-type: none">(a) assignment of responsibilities,(b) a list of confined spaces, and a hazard assessment of each confined space, and(c) safe work procedures for entry into and work in the confined space, that address, where applicable,<ul style="list-style-type: none">i. identification and entry permits,ii. lockout and isolation,iii. verification and testing,iv. cleaning, purging, venting or inerting,v. ventilation,vi. standby persons,vii. lifelines, harnesses and lifting equipment,viii. personal protective equipment and other precautions,ix. coordination of work activities, andx. rescue plans. |

RESPONSIBILITIES

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| Administration | 2.05 | The overall responsibility for administration and execution of the confined space entry program shall be assigned to a competent person. |
| Supervision | 2.06 | A supervisor, with training and experience in confined space entry, shall ensure that <ul style="list-style-type: none">(a) pre-entry testing and inspection are conducted based on the written, safe work procedures, |

- (b) precautions identified in the written safe work procedures required by this Part or that are necessary for the health and safety of workers are followed, and
- (c) only authorized workers enter a confined space.

Instruction

2.07 Each person assigned work related to entry into a confined space shall be adequately trained in and use safe work procedures, as written for confined spaces.

HAZARD ASSESSMENT AND WORK PROCEDURES

2.08 (1) A qualified person shall conduct a hazard assessment of each confined space and related work activities and prepare written confined space entry procedures.

Factors to consider

- (2) Hazard assessments shall include consideration of
 - (a) conditions that may exist prior to entry due to the design, location or use of the confined space or that may develop during the work activity inside the space,
 - (b) the potential for oxygen deficiency (below 19.5% Oxygen by volume in air) or oxygen enrichment (more than 23.5%), flammable gas, vapour or mist, combustible dust, other hazardous atmospheres, harmful substances requiring lockout and isolation, engulfment and entrapment, and other hazardous conditions.

IDENTIFICATION AND ENTRY PERMITS

Requirement for permit

2.09 (1) An entry permit shall be completed, signed and posted by the responsible supervisor

Contents of permit

- (a) before a worker enters a confined space
 - i. with a high hazard atmosphere,
 - ii. that requires lockout or isolation procedures to be followed, or
 - iii. where there is a hazard of engulfment or entrapment.
- (b) at each entry point to a confined space and any other places considered appropriate specifying
 - i. information about whether the confined space is safe to enter or not,
 - ii. the work activities to which the entry permit applies,
 - iii. the names of the workers who are inside the confined space,
 - iv. the precautions to be taken to eliminate or minimize all hazards which may be present or may develop during the work activity, and
 - v. the time the entry permit expires.

Info update

(2) The entry permit shall be updated and altered only by the responsible supervisor, by the standby worker with the latest information available as regards to the number of workers, and by the tester with the latest atmospheric condition.

Re-authorization

- (3) The entry permit shall be re-authorized and re-signed by the responsible supervisor
 - (a) if there is a change in the work crew,
 - (b) after each shift change, and
 - (c) after a change of the responsible supervisor.

Notification

(4) The entry permit information shall be conveyed to each worker and individuals affected by and related to the confined space activity.

Records

- (5) The entry permit shall be kept for a year in a file.

ISOLATION AND LOCKOUT OF CONFINED SPACE

- Lockout requirement** **2.10** Before a worker enters a confined space
- (a) all potentially hazardous energy sources shall be de-energized and locked out as required by Part 3 – Lockout, and
 - (b) any conveyance equipment that transports material to and from the confined space shall be rendered free of the material if its presence poses a hazard.
- Isolation of hazards** **2.11** Before a worker enters a confined space
- (1) Any adjacent piping, which contains or has contained a harmful substance, shall be controlled by
 - (a) disconnecting, blanking, blinding or an equivalent engineered system, or
 - (b) a double block and bleed system if the adjacent piping contains a harmful substance which is not a gas or a vapour, nor a liquid of sufficient volatility to produce a hazardous concentration of an air contaminant in the discharge of the piping, and
 - (c) meeting the requirements of subsections (a) or (b) or other equally effective system acceptable to the director, where the adjacent piping contains a substance considered hazardous due only to its pressure, temperature or quantity.
 - (2) Where a p-trap is used in the isolation of a confined space from the gases found in a gravity flow municipal or domestic sanitary or storm sewer system, its integrity shall be checked immediately upon entry to the confined space and the atmosphere shall be continuously monitored to ensure the availability of clean respirable air.
 - (3) The closing of one or more valves in a line shall not be used as a means of isolation.
- Alternate procedures** **2.12** (1) Where isolation measures described in section 2.11 are not possible, alternate measures acceptable to the director that ensure equivalent protection to all workers exposed to the hazard shall be implemented.
- (2) All workers affected by these isolation measures shall be informed of the measures taken and instructed in any applicable work procedures.
- Isolation points** **2.13** (1) Before a worker is allowed to enter a confined space, each isolation point shall be checked and verified to ensure the confined space is effectively isolated.
- (2) The location of each isolation point must be recorded and an updated record maintained.
- Blanks and blinds** **2.14** Unless certified by a professional engineer, the blanks and blinds used for isolation shall be properly stamped with their pressure rating, inspected before use and meet the requirements of the following standards or other similar standards acceptable to the director:
- (a) *ANSI/ASME B16.48-1997, Steel Line Blanks,*
 - (b) *ANSI/ASME B16.5, Pipe Flange and Flanged Fitting,*
 - (c) *ANSI /ASME B31.1-2001, Power Piping, or*
 - (d) *ANSI /ASME B31.3-2004, Process Piping.*
- 2.15** When a line is opened for disconnection or to insert a blank or blind
- (a) safe work procedures shall be developed and followed,

- (b) a visual indication that a blank or blind has been installed shall be provided at the point of installation, and
 - (c) gaskets or threaded caps shall be installed to prevent leakage.
- Double block and bleed** **2.16** When a double block and bleed system is used to isolate a confined space
- (a) the diameter of the bleed line shall be larger than the line being isolated, unless certified by a professional engineer,
 - (b) the bleed lines for a liquid system shall be at lower elevation than the block valves and checked as required to ensure the bleed lines remain clear while the confined space is occupied,
 - (c) the valves shall be locked out in their proper open or closed position and the downstream block valves checked to ensure they are capable of safely withstanding the line pressure,
 - (d) the bleed shall be checked to ensure that it remains clear of obstructions while the confined space is occupied, and
 - (e) in the event of discharge from bleed lines, all workers shall immediately exit the confined space and the space shall be re-isolated before a worker enters the space.

- Discharge area** **2.17** The area of potential discharge from an accidental discharge of liquids due to the disconnection of lines or failure of the double block and bleed isolation system shall be controlled to avoid any possible hazard to workers.

VERIFICATION AND TESTING

- Verifying precaution** **2.18** (1) Before a worker enters a confined space, pre-entry testing and inspection shall be conducted to verify that the required precautions have been effective at controlling identified hazards and that it is safe for a worker to enter.
- (2) Testing shall be
- (a) conducted in a safe manner as specified in written work procedures,
 - (b) completed less than 20 minutes before a worker enters a confined space,
 - (c) repeated when all workers have vacated the confined space for more than 20 minutes,
 - (d) carried out by a qualified person, using equipment that is maintained in accordance with the manufacturer's instructions, and
 - (e) recorded and the records shall show the date and time of each test, the initials of the tester and the levels or conditions found.

- (3) Test results, other than continuous monitoring results, shall be posted without delay at all points of entry to the confined space.
- Pre-entry testing** **2.19** Pre-entry testing in a confined space with a low hazard shall be conducted where
- (a) a more hazardous atmosphere could develop,
 - (b) the effectiveness of isolation and pre-entry control is required, and
 - (c) representative sampling has demonstrated that the confined space does not meet the low hazard atmosphere definition.

- Moderate or high hazard** **2.20** (1) While a worker is inside a confined space with a moderate or high hazard atmosphere, additional testing shall be conducted as necessary to ensure the worker's continuing safety.
- (2) Whenever practicable, the atmosphere in the confined space shall be continuously monitored.
- (3) Where a worker enters a confined space with a moderate or high hazard

atmosphere, the atmosphere shall be continuously monitored where a flammable or explosive atmosphere in excess of 20% of the lower explosive limit could develop.

CLEANING, PURGING, VENTING, INERTING

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| Cleaning, purging, venting | 2.21 | Where testing has shown that hazards from a contaminated atmosphere may exist in a confined space <ul style="list-style-type: none">(a) the possible hazards from a contaminated atmosphere inside a confined space and those from a dead end of an isolated line shall be controlled by cleaning, purging or venting, and(b) the atmosphere of the controlled confined space must be re-tested before a worker enters the space. |
| Risk control | 2.22 | Where clean respirable air cannot be assured in a confined space before a worker's entry <ul style="list-style-type: none">(a) workers entering the space shall be provided with and use appropriate personal protective equipment including respirators,(b) the concentration of flammable gases shall be maintained below 20% of the lower explosive limit, and(c) all ignition sources shall be eliminated or adequately controlled where flammable or explosive gas vapours or liquids are present |
| Inerting | 2.23 | Workers may only enter and work in a confined space which has been inerted if |
| Pre-project | | (a) a pre-project meeting has been held between the project supervisor and a safety officer, |
| Procedures | | (b) a comprehensive safe work procedure has been developed and shall be followed, |
| Precautions | | (c) entry precautions meet the requirements of high atmosphere hazards, except for the requirement for continuous ventilation, |
| Protection | | (d) workers are equipped with and use appropriate supplied-air respiratory protective equipment, |
| Ignition | | (e) all ignition sources are controlled, and |
| Atmosphere | | (f) the atmosphere inside the confined space remains inerted while workers are inside. |

VENTILATION OF CONFINED SPACE

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| Continuous ventilation | 2.24 | Each confined space shall be ventilated continuously while a worker is inside the space, except in <ul style="list-style-type: none">(a) an atmosphere intentionally inerted in accordance with section 2.23,(b) a low hazard atmosphere controlled in accordance with section 2.25, or(c) an emergency rescue, where ventilation is not practicable. |
| Low hazard atmosphere | 2.25 | Each worker inside a confined space with a low hazard atmosphere shall be supplied with a minimum of 85m ³ /hr (50 cfm) of clean respirable air, except where <ul style="list-style-type: none">(a) the atmosphere is continuously monitored and shown to contain clean respirable air, or(b) the space has an internal volume greater than 1.8 cubic metres (64 cu. ft.) per occupant, is occupied for less than 15 minutes, and the work inside the space generates no contaminants other than exhaled air. |
| Mechanical ventilation | 2.26 | (1) Concentrations of airborne contaminants in a confined space shall be controlled and maintained below the applicable exposure limits by mechanical ventilation systems. |

- (2) Mechanical ventilation systems shall be designed, installed and maintained in accordance with established engineering principles and as specified in the written procedures.
- (3) Ventilation equipment shall be located and arranged to ensure adequate ventilation inside the confined space.
- (4) Where a contaminant is produced in a confined space, it shall be controlled at the source by a local exhaust ventilation system if practicable, by general (dilution) ventilation, or by a combination of both.
- (5) Where practicable, mechanical ventilation systems shall maintain concentrations of airborne contaminants below the applicable exposure limits.

Natural ventilation

2.27

- (1) Concentrations of airborne contaminants in a confined space may be controlled by natural ventilation systems.
- (2) Where natural ventilation is used in a confined space, the rate of airflow through the space shall be monitored to ensure that it is sufficient to maintain concentrations of airborne contaminants below the applicable exposure limits.
- (3) Natural ventilation shall not be used
 - (a) to ventilate a confined space that has a high hazard atmosphere, or
 - (b) where such ventilation could draw air other than clean respirable air into the confined space.

STANDBY PERSONS

2.28

- (1) Where a worker enters a confined space with a low or moderate hazard atmosphere, another worker(s) shall be assigned as a standby person(s).
- (2) The standby person shall
 - (a) be stationed at or near the entrance to the space,
 - (b) check on the well-being of workers inside the space at least every 20 minutes,
 - (c) have a means to immediately summon rescue personnel, and
 - (d) be available to be summoned by the worker or others at any time.

High hazard atmosphere, engulfment or entrapment

2.29

- (1) Where a worker enters a confined space with a high hazard atmosphere, a risk of engulfment or entrapment, or with any other recognized serious health or safety hazard, another worker or workers shall be assigned as the standby person (s).
- (2) A standby person shall
 - (a) be stationed at the entrance to the space and continuously attend to the standby duties,
 - (b) visually observe or otherwise continuously monitor the well-being of the worker(s) inside the space,
 - (c) be equipped and capable of immediately effecting rescue using lifting equipment if required,
 - (d) be available to be summoned by the workers or others at any time, and
 - (e) prevent the entanglement of lifelines and other equipment.

RESCUE

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| Provision, training and equipment of rescue services | 2.30 | <ol style="list-style-type: none">(1) The services of rescue personnel shall be available when a worker enters a confined space.(2) Written safe rescue procedures shall be prepared and followed in a rescue operation of a worker from a confined space.(3) Rescue personnel shall be appropriately equipped and trained, and a practice drill held at least annually.(4) A record shall be maintained regarding the training and drill provided to rescue personnel. |
| Notification | 2.31 | The responsible supervisor or standby person shall notify rescue personnel when workers are commencing work, completing work and exiting from a confined space. |
| Rescue procedures | 2.32 | A supervisor with training and experience in rescue operations shall <ol style="list-style-type: none">(a) direct rescue operations,(b) ensure effective voice communication is maintained at all times between workers engaged in the rescue or evacuation and the person directing the rescue,(c) ensure that a rescue person does not enter a confined space unless there is a standby person available at the entrance to the confined space, and(d) ensure that self-contained breathing apparatus or air supplied respirators with escape bottles are used in an unknown or an IDLH atmosphere. |
| Lifelines, harness and lifting equipment (for confined space) | 2.33 | <ol style="list-style-type: none">(1) Lines, harnesses and lifting equipment shall be provided to workers described in subsection (2) unless a risk assessment identifies obstructions or other conditions that make its use unsafe or not practicable.(2) A worker entering a confined space with a high hazard atmosphere, a risk of entrapment or engulfment, or other health and safety hazard shall wear a harness of a type that will keep the worker in a position to permit rescue.(3) A lifeline shall be attached to the harness and tended at all times by a standby person stationed outside the entrance to the confined space.(4) The standby person shall be provided with appropriate lifting equipment to permit the rescue operation.(5) Lifelines, harness and lifting equipment shall meet the requirements of Part 1 – General.(6) Where a rescue operation cannot be effected by standby person(s) using the lifeline, harness and lifting equipment, one or more additional persons who are equipped and capable shall be stationed outside the entrance to effect the rescue operation. |
| Personal protective equipment and other precautions | 2.34 | <ol style="list-style-type: none">(1) A worker entering a confined space with a high hazard atmosphere, a risk of entrapment or engulfment, or other health and safety hazard shall be provided with and use personal protective clothing and equipment in accordance with Part 1 – General.(2) Emergency escape air supplying respirators with sufficient capacity shall be carried by the worker, placed on his or her body and easily accessible or available within his or her arm's reach to permit an escape from a high hazard atmosphere confined space without any assistance.(3) Except for compressed air supplied to a respirator, medical resuscitation equipment and handheld aerosol containers, no other cylinders of compressed gases shall be permitted in a confined space. |

- (4) Torches and hoses used in welding, brazing or cutting shall be removed from a confined space when not in use and when the confined space is vacated.
- (5) Electrical tools and equipment used in a confined space shall be
 - (a) properly grounded or double insulated and accordingly marked,
 - (b) protected by an approved ground fault circuit interrupter if the confined space is wet or damp, and
 - (c) Canadian Standards Association approved for hazardous locations when used in a confined space where flammable or explosive gases, vapours or liquids are present.
- (6) Only non-sparking tools shall be used in a confined space where flammable or explosive gases, vapours or liquids are present

INDEX

PART 2 – CONFINED SPACES

	Page
CLEANING, PURGING, VENTING, INERTING	2-6
Atmosphere	2-6
Cleaning, purging, venting	2-6
Ignition	2-6
Inerting	2-6
Precautions	2-6
Pre-project	2-6
Procedures	2-6
Protection	2-6
Risk control	2-6
DEFINITIONS	2-1
GENERAL	2-2
Confined space entry program	2-2
Initial determination and control of hazards	2-2
Prohibited entry	2-2
HAZARD ASSESSMENT AND WORK PROCEDURES	2-3
Factors to consider	2-3
IDENTIFICATION AND ENTRY PERMITS	2-3
Contents of permit	2-3
Info update	2-3
Notification	2-3
Re-authorization	2-3
Records	2-4
ISOLATION AND LOCKOUT OF CONFINED SPACE	2-4
Alternate procedures	2-4
Blanks and blinds	2-4
Discharge area	2-5
Double block and bleed	2-5
Isolation of hazards	2-4
Isolation points	2-4
Lockout requirement	2-4
RESCUE	2-8
Lifelines, harness and lifting equipment (for confined space)	2-8
Notification	2-8
Personal protective equipment and other precautions	2-8
Provision, training and equipment of rescue services	2-8
Rescue procedures	2-8
RESPONSIBILITIES	2-2
Administration	2-2
Instruction	2-3
Supervision	2-2
STANDBY PERSONS	2-7
High hazard atmosphere, engulfment or entrapment	2-7
VENTILATION OF CONFINED SPACE	2-6
Continuous ventilation	2-6
Low hazard atmosphere	2-6
Mechanical ventilation	2-6
Natural ventilation	2-7

VERIFICATION AND TESTING	2-5
Moderate or high hazard	2-5
Pre-entry testing	2-5
Verifying precaution	2-5