

City & County of Broomfield

Operational Procedures for Confined Space Entry

I. Purpose:

To provide an outline of operations, procedures, responsibilities, and minimum safety requirements to be followed while entering, exiting, and working in confined spaces at normal atmospheric pressure.

II. Classifications:

1. Class "A" - an environment that is immediately dangerous to life of health. (Entry by permit only shall have a posted sign.)
2. Class "B" - an environment that has the potential for causing injury and illness if preventative measure are not used, but is not immediately dangerous to life and health.
3. Class "C" - an environment that has potential hazards, which would not require any special modifications of the work procedures.

III. Definitions:

A. Confined Space

1. One large enough and so configured that a person can enter and perform work
2. One that has limited or restricted means of entry and exit
3. One that is not designated for continuous occupancy.

B. Permit required Confined Space

1. Contains or has the potential to contain a hazardous atmosphere; or
2. Contains material that has the potential of engulfing and entrant; or
3. Contains an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section
4. Contains any other recognized serious safety or health hazard.

C. Lock out/Tag out

1. The placement of a lock or tag on the energy isolation device in accordance with an established procedure, indicating that the device shall not be operated until the removal of the lock or tag.

D. Hazardous Atmosphere

1. Any atmosphere which may cause immediate or delayed death, injury or disease and exposures are toxic, poisonous, corrosive, flammable, or has the ability to be physically incapacitating or dangerous.
2. Hazardous atmospheres include; levels of flammability of 10% of the lower explosive limit (L.E.L.), oxygen deficient atmospheres with levels below 19.5%, or enriched atmospheres above 23.5%, or airborne combustible dust greater than it's L.E.L.

E. Qualified Person(s)

1. One who is capable of identifying hazards in the work area, or working conditions that are hazardous or dangerous to personnel, and is authorized to take corrective measures to eliminate them; one who is trained and is familiar with accepted confined space standards and requirements.

F. Attendant

1. An individual stationed outside the confined space that is trained to monitor conditions. i.e., controls the entrance and or exit of authorized entrants, monitors atmospheric conditions and documents same, communicates with authorized entrants.

G. Authorized Entrant(s)

1. An individual trained to the level of an attendant with the addition of understanding the hazards faced, proper use of personal protective equipment.

H. Entry Supervisor

1. An individual trained to the level of an authorized entrant. He/she may have additional training on signs and symptoms indicative of exposure to potential hazards. The entry Supervisor is in charge of authorizing entry into the confined space, and prepares and signs the entry permit ensuring that operations are consistent with applicable standards.

IV. Confined Space Descriptions:

A. Open Topped Enclosures

1. Spaces with depths that restrict the natural movement of air. (pits, selected types of tanks, excavations)

B. Enclosures with Limited Openings

1. Spaces with extremely limited openings for entry or exit. (sewers, casings, tanks, manholes, vaults, tunnels)

V. Precautions:

- A. A major cause of confined space injuries and or fatalities is the failure to recognize the incident for what it is...A Confined Space Incident.

B. Do not underestimate the seriousness of confined space incidents. More than half of the casualties in confined space rescues are to the rescuers themselves.

V. Hazard Identification:

Hazards shall be identified for each confined space. The hazard identification process shall include, but not be limited to, a review of the following:

1. The past and current uses of the confined space which may adversely affect the atmosphere of the confined space.
2. The physical characteristics, configuration, and location of the confined space.
3. Biological hazards.
4. Mechanical or physical hazards.
5. Existing or potential hazards in the confined space such as:

Flammable and toxic environments. (FATE)

a. Four distinct categories of hazardous atmospheres.

1. Flammable
2. Toxic
3. Irritant and or corrosives
4. Asphyxiating

b. Common gases found in below grade or confined space operations

1. Carbon dioxide
2. Carbon monoxide
3. Hydrogen sulfide
4. Methane
5. Sulfur dioxide

Note #1 - A group of gases may stratify within a confined space. This is one reason why a person may survive exposure to a gas on one level, while another dies from exposure to the same or a different gas at another level.

Note #2 - Physical & mechanical hazards may also be encountered. Areas of concern are utility installations, certain types of machinery, areas offering extremely limited working areas, etc.

H. Monitoring the Atmosphere

1. Before an Authorized Entrant enters a confined space, and before ventilation takes place, the internal atmosphere shall be tested by the Attendant with a calibrated direct reading instrument. Testing shall be for the following conditions, in the order given:

A. Oxygen content

B. Flammable gases and vapors

C. Potential toxic air contaminants

2. Testing shall be done at all levels (every 4 feet) of the confined space, and shall continue periodically throughout the rescue operations with sufficient frequency. The results will be documented with sampling times indicated. If the space cannot be isolated, the space must be continuously monitored. When the monitoring is being done continuously, log the results on the permit every 2 hours.

VI. Ventilation

1. The confined space should be ventilated before the Authorized Entrant enters the space. Positive ventilation will be maintained during the operation if possible. Caution should be used when ventilating a confined space so as not to place the atmosphere within the lower and higher explosive limits.

2. When using mechanical ventilation, keep the fan(s) and ventilator(s) away from vehicle exhaust.

3. If the work inside the space can affect the quality of the air within the space, ventilation must be continuous throughout the entry operations.

VII. Communications

1. Voice or eye contact is preferred, although in many cases this is not practical. (Consider relay people if the distance is excessive.)

K. Entry Permit

1. The entry permit shall contain the following information:

a. The specific space to be entered.

b. The purpose of the entry.

c. The date of the entry.

d. The duration of the entry.

- e. Name of the authorized entrants.
- f. Name of the Attendant.
- g. Name of Entry Supervisor.
- h. Any known or expected hazards within the confined space.
- i. The measures to isolate the permitted space.
- j. The measures to be used to remove or control potential hazards such as lockout/tagout, purging, inerting, or ventilating.
- k. The minimum environmental conditions which are acceptable for entry and working in the confined space.
- l. The results of the testing and monitoring (include the initials of the tester and the time the tests were performed).
- m. Communication procedures to be used to maintain contact between the entrants and attendant.
- n. List of equipment necessary for entry such as the PPE equipment to be used.
- o. Any other permits necessary for entry and work to be performed.