THE UNIVERSITY OF TEXAS AT TYLER

Confined Space

Program

2016
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The University of Texas at Tyler  
CONFINED SPACE PROGRAM

INTRODUCTION

The OSHA standard for Permit Required Confined Spaces, 29CFR 1910.146, outlines the practices and procedures to protect employees from the hazards of entry into confined spaces. The standard requires employer's to establish a confined space program, if permit-required confined spaces exist in the workplace, and properly train its employees regarding these spaces. The University of Texas at Tyler has developed this program to comply with the OSHA standard and implement procedures to protect its employees.

SCOPE

This program specifically outlines the purpose, authorization, and procedures to be utilized by UT Tyler employees and on-site contractors to enter and/or work in confined spaces on University owned property.

PURPOSE

The purpose of this program is to establish confined space entry procedures. These procedures include identifying and marking permit-required confined spaces, controlling access to confined spaces, and protecting personnel that enter and/or work in confined spaces.

DEFINITIONS

Acceptable Entry Conditions means the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attendant means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant’s duties assigned in the employer’s permit space program.

Authorized Entrant means an employee who is authorized by the employer to enter a permit space.

Blanking or Blinding 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.
**Confined Space** is a space defined by the concurrent existence of all of the following conditions:

- Large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit.
- Is not designed for continuous employee occupancy.

Examples of confined spaces at UT Tyler include manholes, boilers, tanks, vats, sewer pipelines, and vaults without existing general ventilation.

**NOTE:** Trenches are considered a permit-required confined space if the depth is equal to or greater than 4 feet.

**Non-Permit Confined Space** is a confined space is any space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

**Permit-Required Confined Space** is a confined space that has one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant; 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; or
- Contains any other recognized serious safety or health hazard.

**NOTE:** Permit procedures are not required where existing ventilation is sufficient to remove potential dangerous air contamination.

**Enclosed Space** is a space that does not meet the definition of a confined space, but may require precautionary measures upon entering are defined as enclosed space. Examples of enclosed spaces at UT Tyler are crawl spaces and service tunnels with existing general ventilation.

**Engulfment** means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

**Entry** means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is
considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

**Entry Permit** means the written or printed document that is provided by the employer to allow and control entry into a permit-required confined space.

**Entry Supervisor** means the person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required.

NOTE: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

**Hazardous Atmosphere** means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL);

- Airborne combustible dust at a concentration that meets or exceeds its LFL;

  NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.

- Atmospheric oxygen concentration below 19.5% or above 23.5%;

- Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this Part and which could result in employee exposure in excess of its dose or permissible exposure limit;

- Any other atmospheric condition that is immediately dangerous to life or health.

**Hot Work Permit** means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

**Immediately Dangerous to Life or Health (IDLH)** is an atmosphere that poses an immediate threat of loss of life: May result in irreversible or immediate severe health effects; may result in eye damage/irritation; or other condition that could impair escape from a confined space.

**Inerting** means the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.
**Oxygen Deficient/Oxygen Enriched Atmosphere** is an oxygen deficient/enriched atmosphere is defined as containing less than 19.5% or greater than 23.5% oxygen by volume.

**Permissible Exposure Level (PEL)** is the total exposure to a toxic substance that an employee is allowed to receive in any 8-hour work day as defined by OSHA.

**Permit System** means the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

**Prohibited Condition** means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

**Retrieval System** means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

**Testing** means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

NOTE: Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during entry.

**Threshold Limit Value-Ceiling (TLV-C)** is the ceiling limit or concentration that must not be exceeded during any part of the working exposure.

**Threshold Limit Value-Short Term Exposure Limit (TLV-STEL)** is the concentration to which workers can be exposed continuously for 15 minutes without suffering from irritation, chronic or irreversible tissue damage, narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue, or materially reduce work efficiency, provided that the daily TLV-TWA is not exceeded. Each 15 minute excursion is followed by a one-hour rest period in clean air and only four (4) excursions are allowed per day.

**Threshold Limit Value-Time Weighted Average (TLV-TWA)** is established by the American Conference of Government Industrial Hygienists; the time weighted average concentration for a normal eight hour work day and a forty hour work week, to which all workers may be repeatedly exposed, day after day, without adverse effect.

**Lower Explosive Limit (LEL)** is the lowest concentration of a vapor that produces a flash of fire when an ignition source (heat, arc, or flame) is present. At concentrations lower that the LEL, the mixture is too "lean" to burn.

**Upper Explosive Limit (UEL)** is the highest concentration of a vapor in air that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At concentrations higher than the UEL, the mixture is too "rich" to burn.
PROGRAM REQUIREMENTS

Confined Space Entry
A person should never enter a confined space prior to contacting EH&S. The department maintains an inventory of the confined spaces on each campus which includes the locations, hazards, and permit requirements. EH&S is also responsible for all confined space testing, signage, and permit processing.

Permit Procedures
Employees must have a confined space entry permit signed by an EH&S representative prior to entering a permit-required confined space. Permits will be completed by the department conducting the work or sponsoring a contractor and may be found on the Forms page of the EH&S website at http://www.uttyler.edu/safety/. No permit shall be valid for more than 24 hours after the time of issue. Contact EH&S for additional information regarding the permit process.

Non-Permit Required Confined Space
1. Employees working in non-permit confined spaces shall wear appropriate personal protective equipment appropriate for the hazards expected in the space.

2. Air testing shall be conducted periodically to monitor the pre-existing atmospheric environment and to detect any atmospheric changes that might occur. All testing data obtained shall be recorded on the confined space entry permit.

3. If air-sampling instruments indicate a developing adverse atmospheric change (e.g. steadily rising hydrogen sulfide or carbon monoxide levels, or steadily increasing or decreasing oxygen concentration), the supervisor will immediately pull all entrants from the confined space and reassess the area for its new hazard.

Permit-Required Confined Space
1. Each permit-required confined space shall be appropriately labeled: "Danger – Permit Required Confined Space – Do Not Enter."

2. Employees working in an approved safety belt with an attached line shall be used. The free end of the line will be secured outside the entry opening. The line shall be a 900 kg test (2,000 pound) and 11 mm in diameter.

3. Exception: Where an entry supervisor determines that a safety belt and line would further endanger the life of the employee. Under these circumstances, the harness should remain attached to the employee to facilitate rescue in the event of an emergency.

4. Where air contaminants persist or begin to appear after ventilating a confined space, continuous air monitoring will be performed. Data will be entered on the confined space entry permit every 15 minutes by the confined space supervisor.
5. Top Opening: When entry must be made through a top opening, the following requirements also apply:

- A safety belt shall be of the harness type that suspends a person in an upright position will be worn by any person entering the space.
- A hoisting device (tripod) or other effective means shall be provided for lifting employees out of the space.

**After Hours and Priority Entry**

1. Under no circumstances is an employee to enter a permit-required confined space at UT Tyler without following the procedures outlined in this section.

2. In the event that a permit-required confined space must be entered after regular working hours, it must be verbally approved by the department supervisor and an EH&S representative. If an authorized confined space entry supervisor is not available, entry may proceed if at least three trained confined space personnel are present and all of the confined space entry procedures are followed.

3. Contact UT Tyler Police to obtain access to the EH&S confined space equipment.

**Emergency Procedures**

1. If an entrant becomes disabled or trapped while in a confined or enclosed space, the attendant will immediately call 9-1-1 to request emergency assistance. It is important to communicate to the dispatchers that a "confined space rescue" is necessary.

2. Only personnel trained in confined space rescue procedures and who have the necessary equipment to perform the rescue, shall make rescue attempts.

**Equipment and Materials**

The following equipment and materials will be made available to employees by EH&S as determined appropriate:

1. Air Monitor; ALTAIR 5X Multi-gas Detector, MSA.
2. Fire Extinguisher
3. Two-Way Communication Device (Walki-Talkie)
4. PPE
5. Tripod and cables/rescue lines
6. Lockout Devices
PROGRAM RESPONSIBILITIES

Environmental Health and Safety Department
Develop, implement, and maintain the Confined Space program. Identify confined spaces on University property and implement procedures to prevent unauthorized entry. Coordinate Confined Space Entry Permits with UT Tyler personnel and contractors requiring entry to permit-required confined spaces. Provide centralized monitoring and certification of confined spaces and maintain monitoring records. Maintain all confined space entry equipment and calibrate gas detectors as necessary. Conduct training of designated confined space entry team members.

Deans, Directors, and Department Heads
Ensure that each supervisor adheres to these procedures. Contact EH&S prior to initiating contracts with off-campus contractors that will involve confined space entry. Specific contract language is required to ensure that contractors provide an adequate level of protection to their employees while working at UT Tyler.

Department Supervisors
Ensure that UT Tyler employees understand and adhere to adopted procedures during confined space entry operations. Ensure employees receive the necessary education and training prior to being assigned to work in a confine space. Contact EH&S with as much advance notice as possible prior to performing confined space work. Notification should be made 24 hours in advance although immediate entry supervision is available during regular work hours. Maintain copies of all Confined Space Entry Permits.

Contractors
EH&S will inform contractors needing to conduct work in permit required confined spaces of the identified hazards in the space. Contractors will be required to implement a permit space program and coordinate entry operations with EH&S.

Entry Supervisors
Determine if acceptable entry conditions are present at a permit space where entry is planned. Verify that all permit requirements are met prior to endorsing the Confined Space Entry Permit. Oversee entry operations for the duration of assigned work and terminate entry when conditions are determined to be unsafe.

Authorized Entrants
Because of the number of potential hazards that may exist or develop in the work environment, confined space entrants are required to use extreme caution at all times. Disregard for established safety practices will be brought to the attention of appropriate supervisors. Authorized confined space entrants are responsible for reading and complying with procedures and guidelines provided by their supervisors and EH&S. Ensure that his/her confined space entry training is up to date.

Attendants
Assist entry supervisor and authorized entrant(s) as directed by the entry supervisor. Attendants may have other duties assigned in the area, but duties must not interfere with primary duties to monitor and protect the authorized entrant(s).
PROGRAM PROCEDURES

Minimum Number of Employees
A minimum of three employees will be immediately available during all confined space entries. A minimum of two trained employees will be within line sight and verbal communication distance of one another outside of the confined space. A typical confined space team consists of an entry supervisor, an attendant, and entry personnel.

Ventilation
Adequate ventilation will be provided to protect employees from dangerous working conditions resulting from accumulations of hazardous concentrations of flammable vapors, toxic gases, or an oxygen deficient or enriched environment in all buildings, pits, rooms, vaults or other enclosed areas.

If any detection of atmospheric hazard exists, the confined space will not be entered.

Pre-Entry Procedures

1. A Confined Space Entry Permit will be completed by the department requesting entry and signed by an EH&S representative to ensure requirements are properly met. The original permit will be kept in the EH&S department. A copy of the permit will be provided to Facilities Management to ensure other operations do not occur, endangering University employees or contractors. A copy of the permit will be forwarded to the department where any confined space entry occurs. A copy of the permit must also be posted at the entry portal so entrants can confirm the pre-entry preparations were competed.

2. The persons who are to have active roles (authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations will be designated, their duties identified, and they will receive applicable training from EH&S.

3. Lines which may convey flammable, injurious or incapacitating substances into the space shall be disconnected, blinded or blocked off by other positive means to prevent the development of dangerous air contamination and/or oxygen deficiency within the space (Consult Lockout-Tagout Policy & Procedures for specific information). The method used shall prevent inadvertent reconnection or disabling of the line.

EXCEPTION: This does not apply to public utility gas distribution systems.

NOTE: This section does not require blocking of all laterals to sewers or storm drains. Where experience or knowledge of industrial use indicates materials resulting in dangerous air contamination may be dumped into an occupied sewer, all such laterals shall be blocked.

4. Confined space shall be emptied, flushed or otherwise purged of flammable, injurious or incapacitating substances to the extent feasible.
5. If air contamination exists, spaces shall be ventilated for at least 15 minutes prior to entry using the most effective method (e.g. blowing air into or drawing air from space).

6. Where interconnected spaces are blinded off as a unit, each space shall be tested and the results recorded, and the most hazardous condition so found shall govern procedures to be followed.

7. All exterior confined space entry points shall be barricaded to provide protection from vehicle, cycle, or pedestrian traffic.

8. At least one (1) attendant must be continually present while workers are inside an enclosed or confined space and may be assigned additional responsibilities.

9. The authorized entrant(s) and the attendant must understand the communication procedures to maintain contact during entry.

10. To the extent feasible, all exits and entries shall be readily accessible.

11. All tanks, vessels or other confined spaces will be entered from the side whenever possible.

**Pre-Entry Testing Requirements**

1. Testing should be performed without disturbing the space, if possible.

2. Employees shall refrain from leaning over the area to be tested; instead, the air-testing device should be placed over or into the opening of the area.

3. The air shall be tested with an appropriate device or method to determine whether dangerous air contamination and/or oxygen deficiency exists and a written record of the testing results shall be made and kept at the work site for the duration of the work.

4. When testing for atmospheric hazards; test first for oxygen levels, then combustible gases and vapors, and then for toxic gases and vapors.

5. Testing of the oxygen content and for flammability (DEL, LEL) shall be documented with sufficient frequency to ensure conformance with this section.

6. Affected employees and/or their representative shall be afforded an opportunity to review and record the testing results.

7. After long breaks (more than 20 minutes) such as lunch, complete testing for permit-required confined spaces shall be performed again to determine if any atmospheric changes have taken place inside the confined space.
Special Precautions

1. Work involving the use of flame, arc, spark or other source of ignition is prohibited within a confined space (or any adjacent space having common walls, floor or ceiling with the confined space), which contains, or is likely to develop, dangerous air contamination due to flammable and/or explosive substances.

2. Whenever gases such as nitrogen are used to provide an inert atmosphere for preventing the ignition of flammable gases or vapors, no flame, arc, spark or other source of ignition shall be permitted unless the oxygen concentration is maintained at less than 20% of the concentration, which will support combustion.

3. If the existence of dangerous air contamination and/or an oxygen deficiency is determined by the tests performed, existing ventilation shall be supplemented by the appropriate means.

4. Whenever oxygen-consuming equipment is used, arrangements will be made to ensure sufficient venting for all combustion air and exhaust gases.

5. Automatic fire suppression systems employing toxic or oxygen displacing gases or total foam flooding shall be deactivated. If it is not feasible to deactivate these systems, then the use of respiratory protective equipment shall be used during entry into and work within such spaces (SCBA or Supplied Air Respirator with Egress bottle only).

6. Only approved lighting and electrical equipment, in accordance with low voltage electrical safety order, shall be used in confined spaces where dangerous air contamination due to flammable and/or explosive substances exists.

7. Where live electrical work will be performed, the tripod unit will be properly grounded (e.g. welding cable and clamp).

Evacuation and Rescue Procedures

1. The attendant will notify the authorized entrant(s) to immediately evacuate the confined space if any of the following occurs:
   - a prohibited condition is detected;
   - a behavioral effect of hazard exposure is detected;
   - a situation outside the confined space is detected that could endanger the authorized entrant(s); or
   - if the attendant is unable to safely/effectively perform their required duties.
2. The attendant and authorized entrant(s) should be made aware of the symptoms associated with low oxygen levels and immediately alert the entry supervisor when the symptoms are observed.

<table>
<thead>
<tr>
<th>% O&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Observed Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.5</td>
<td>Minimum acceptable oxygen level.</td>
</tr>
<tr>
<td>15–19</td>
<td>Decreased ability to work strenuously. Impaired coordination. Early symptoms.</td>
</tr>
<tr>
<td>12-14</td>
<td>Respiration increases. Poor judgment.</td>
</tr>
<tr>
<td>10-12</td>
<td>Respiration increases. Lips blue.</td>
</tr>
<tr>
<td>8-10</td>
<td>Mental failure, Fainting, Nausea, Unconsciousness. Vomiting.</td>
</tr>
<tr>
<td>6-8</td>
<td>8 minute exposure - fatal 6 minute exposure - 50% fatal 4-5 minute exposure - possible recovery.</td>
</tr>
<tr>
<td>4-6</td>
<td>Coma in 40 seconds. Death</td>
</tr>
</tbody>
</table>

3. If the evacuation was conducted due to an atmospheric hazard, the confined space will be evaluated to determine how the hazardous atmosphere developed and reentry will be denied until measures are implemented to adequately protect employees.

4. If an authorized entrant becomes disabled or trapped while in a confined or enclosed space, the attendant’s role is to implement the rescue plan. The plan will entail:

- Call 9-1-1 to request emergency assistance. It is important to communicate to the dispatchers that a "confined space rescue" is necessary.

- Ventilating the confined space.

- Operating the non-entry mechanical retrieval system.

- Try to maintain contact with the entrant(s) to assure them that help is on the way and gather information that may be helpful to the rescuers.

- Warn unauthorized persons that they must stay away from the permit space and are not authorized to enter the confined space.
5. Only off-campus emergency agencies who are trained in confined space rescue procedures and who have the necessary equipment to perform the rescue without endangering the safety of the personnel involved shall make rescue attempts.

6. The person attempting the rescue shall be protected by use of a self-contained breathing apparatus (SCBA's) or supplied air respirator (SAR). Ideally, SARs should be on a pressure line with a minimum length of 25 feet.

7. For top openings (e.g. manholes, vaults, etc.), a rescue line shall be attached to the rescuer for placement onto the victim for removal from the space. Rescue lines will be affixed to the tripod.

8. An additional positive pressure mask may also be lowered into the space to provide safe air for the victim.

TRAINING

Unless otherwise specified, employees entering confined spaces (entrants), confined space entry supervisors and attendants must have received all of the training outlined below. Training shall be provided to each affected employee prior to assigned duties involving confined space operation.

1. Hazards that may be encountered during entry, including the mode, signs/symptoms, and consequences of the exposure;

2. Proper use of required equipment;

3. Atmospheric monitoring procedures;

4. Communication procedures; and

5. Emergency procedures.

RECORD-KEEPING

A confined space entry permit will be completed, signed and dated by a designated member of the Environmental Health and Safety department. EH&S shall maintain the original permit on file for a minimum of three years. A copy of the confined space entry permit will be forwarded to any department which required a permit.