

ENVIRONMENTAL HEALTH & SAFETY
THE UNIVERSITY OF TEXAS AT TYLER



CONFINED SPACE
PROGRAM

2023

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Confined Space Program

Introduction:

The University of Texas at Tyler Environmental Health and Safety department has developed this Confined Space Program to ensure a safe work environment and to protect the health and safety of University Staff and any contractors or vendors working on University property. This program was written with guidance from OSHA guidelines, the University of Texas System Construction Safety Program, and on-site Job Hazards Analyses.

Purpose:

This program establishes written procedures to be followed when entering a confined space on UT Tyler campus to protect all entrants from hazards. This document contains requirement for practices and procedures in how to properly enter permit-required confined spaces.

Application:

This program applies to work performed by any UT Tyler employee, student, or contractor performing work in locations where confined spaces may occur include, but are not limited to, the following: Bins; boilers; pits (such as elevator, escalator, pump, valve or other equipment); manholes (such as sewer, storm drain, electrical, communication, or other utility); tanks (such as fuel, chemical, water, or other liquid, solid or gas); incinerators; scrubbers; concrete pier columns; sewers; transformer vaults; heating, ventilation, and air-conditioning (HVAC) ducts; storm drains; water mains; precast concrete and other pre-formed manhole units; drilled shafts; enclosed beams; vessels; digesters; lift stations; cesspools; silos; air receivers; sludge gates; air preheaters; step up transformers; turbines; chillers; bag houses; and/or mixers/reactors. It is enforced by the Department of Environmental Health and Safety (EH&S).

Notice:

Employees and outside contractors shall not enter a confined space until the following requirements have been met:

- Hazards are identified and evaluated by EH&S
- Workers entering the space are trained on confined space hazards and entry procedures
- Workers entering the space are identified and made aware of all possible hazards that may be encountered on that particular job
- Appropriate danger signs have been posted
- Proper personal protective equipment (PPE) has been selected and issued to affected employees

If a confined space is not entered because one of the conditions mentioned above has not been met, the confined space will be restricted to employees and others by erecting barriers, installing locks, and/or posting warning signs until requirements have been met.

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 4

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 (flow able) 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 5 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, and 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 21.5%;
- 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 workday 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 workday 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 than 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.

Definition of Confined Space:

1. The space is large enough and configured that an employee can bodily enter it.
2. A space has limited or restricted access for entry and exit.
3. The space is not designed for continuous occupancy.

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

Definition of Permit-Required Confined Space:

1. Contains or has potential to contain a hazardous atmosphere.
2. Contains a material that has potential for engulfment
3. Has an internal configuration that could trap or suffocate by inwardly converging walls or by a floor which slopes downward
4. Contains any other recognized safety or health hazard

Confined Space Hazardous Atmosphere:

Hazardous atmosphere means an atmosphere that may expose workers to the risk of death, injury, incapacitation, impairment, or acute illness caused from one or more of the following causes:

Oxygen Deficiency (19.5% or less)	Combustible Dusts
Oxygen Enrichment (above 21.5%)	Toxic Substances
Flammable Gases/Vapors in excess of 10% of its Lower flammable limit (LFL)	IDLH Atmospheres
Engulfment	Physical Hazards

Confined Space Physical Hazards:

Explosives	Hydraulic Energy
Mechanical Energy	Pneumatic Energy
Electrical Energy	Radiation
Extreme Temperatures	Chemicals that cause death or physical damage
Engulfment and Inward Converging Surfaces	
Noise	

General Requirements

1. Before work can begin, each employee must ensure that a member of EH&S identifies all confined spaces in which one or more employees may work, and identifies each space that is a permit-required space, and evaluates all the elements of that space, including testing if necessary.
2. Each permit-required confined space must inform exposed employees by posting a sign reading "DANGER – PERMIT – REQUIRED CONFINED SPACE" or other equally effective sign within close existence of the permitted space.
3. No personnel are allowed to enter a permit-required confined space without the permission of EH&S. If Permission is granted a written program must be posted on site and made available prior to and during entry operations for inspections by employees and their authorized representatives.
4. All entrants working in non-permit-required spaces shall wear appropriate personal protective equipment (PPE).
5. An entrant may use alternate procedures specified in the "alternative Entry" category for entering a permit space only if it meets the conditions listed.

Procedures for Permit-Required Confined Space

1. Preventing Unauthorized Entry
 - In order to prevent unauthorized entry, there must be either warning signs, locks or covers installed at entry points, providing information to all UT Tyler employees, or Install barriers around the space.
 - All exterior confined space entry points shall be barricaded to provide protection from vehicle, cycle, or pedestrian traffic.
2. Identifying Permit Space Hazards
 - Each Hazard will be identified and evaluated before entry is granted into confined spaces. The possible hazards are listed above.
3. Developing Safe Entry Practices
 - EH&S will Implement procedures and practices necessary for safe entry into a permit-required space. These include specifying acceptable entry conditions, allowing each authorized entrant to observe any monitoring or testing, isolating the space from hazards, purging, inerting, flushing, or ventilating the space to eliminate or control hazards. Before each entry, a pre-entry briefing should be held.
 - All tanks, vessels or other confined spaces must be entered from the side, if possible.
 - If air contamination exists, spaces shall be ventilated for at least 10 minutes prior to entry using the most effective method (e.g. blowing air into or drawing air from space).
4. Maintaining and Using Equipment Properly
 - All equipment needed will be provided to each worker. The equipment includes testing, ventilating, monitoring, lighting, communication, and personal protective equipment (PPE) will be properly maintained and properly used by the EH&S department.
5. Testing for Acceptable Entry Conditions
 - Permit space evaluation will include all testing conducted before an entry as well as all testing and monitoring activities to ensure that acceptable entry conditions are maintained throughout the entry. Atmospheric testing should be conducted in accordance with The University of Texas Systems.
 - 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
 - When testing for atmospheric hazards; test first for oxygen levels, then combustible gases, and vapors, and then for toxic gases and vapors.
 - Testing of the oxygen content and for flammability (DEL, LEL) shall be documented with sufficient frequency to ensure conformance with this section.

- 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.
 - 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.
6. Providing Permit Space Attendants
- Each department will provide at least one attendant to monitor the permit space for the duration of the entry operations. See “Employee Duties” for specific responsibilities.
7. Providing Emergency Retrieval Systems
- “911” is not a primary emergency service for confined space rescue. If possible, non-entry rescue methods shall be used, if non entry rescue is not possible, then all departments will coordinate a rescue plan.
 - Entry Required Rescue Retrieval Plan.
 - (i) This plan will provide members with all the known hazards they may confront when called on to perform rescues. Each member shall be responsible to equip, train, and conduct it properly.
 - Non-Entry Rescue Retrieval Systems
 - (i) Entrants must wear a retrieval apparatus for permit spaces over five feet deep to enable non-entry rescue in the event of an emergency. The requirement to wear a retrieval apparatus can only be waived if it would interfere with rescue. **EH&S is the only department authorized to waive the wearing of a retrieval apparatus.**
 - Observed Symptoms

% O ₂	Observed Symptoms
19.5	Minimum acceptable oxygen level.
19-15	Decreased ability to work strenuously, Impaired coordination. Early symptoms.
14-12	Respiration increases. Poor judgment
12-10	Respiration increases. Lips blue
10-8	Mental failure, Fainting, Nausea, Unconsciousness. Vomiting.
8-6	8-minute exposure - fatal 6-minute exposure - 50% fatal 4-5-minute exposure - possible recovery
6-4	Coma in 40 seconds. Death

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.

Coordinating Entry Operations

All participants working in or near the confined space must meet with the entry supervisor to be informed of any actual or potential hazards present. This information shall be based on current and past history of the confined space, and the nature of the participants work. Each participant will be assigned a role (authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) their duties will be identified clearly. The entry supervisor must test the confined space to determine if conditions are acceptable, and provide the equipment needed. Entrants are required to fill out the permit that can be found on the Forms page of the EH&S website at <http://www.utt Tyler.edu/safety/>. A copy of the permit must be posted at the entry portal so entrants can confirm the pre-entry preparations were completed. No permit shall be valid for more than 24 hours after the time of issue. All hazards must be either eliminated or controlled with proper equipment before entry. All outside contractors must follow UT Tyler's safety program and stay in accordance with the rules and regulations.

Concluding Entry

The entry supervisor will determine when the operations are completed. The permit-required space will be closed, and the permit will then be canceled. The entry supervisor will write "permit cancelled" along with the date, time, location, and signature at the bottom of the permit-required confined space entry form. After form has been sign, entry into the confined space will be permitted, until they coordinated another entry. (See Coordinating Entry Operations section for proper information)

Employees Duties:

1. Duties of Authorized Entrants:
 - Know the Hazards that may be encountered during entry
 - Recognize the signs and symptoms of exposure to hazards
 - Understand the consequences from being exposed
 - How to use equipment properly
 - Be able to communicate, and alert with the attendant
 - Know the exit plan, in order to be able to escape quickly
2. Duties of the Attendant:
 - Know entry hazards
 - Know behavioral effects of exposure
 - Maintain accurate entrant identification
 - Remain outside the permit space
 - Communicate, and monitor entrants
 - Prevent unauthorized entry
 - Summon rescue and emergency services, and perform non-entry rescues
3. Duties of the Entry Supervisor
 - Know the hazards during entry
 - Determine if entry conditions are acceptable
 - Terminate entry if doesn't follow rules and regulations
 - Verify that rescue services are readily available at the worksite
 - Remove unauthorized individuals who try to enter permitted space
 - Determine that permitted space stays acceptable, and maintain working conditions

Alternative Entry

1. All physical hazards in the space have been eliminated or isolated through engineering controls, so that the only hazard in the space is an actual or potential hazardous atmosphere.
2. If forced air ventilation alone is enough to maintain a safe entry in the permitted space, and in the event that the ventilation stops working, entrants can exit safely.
3. The entry Supervisor develops monitoring and inspections data that supports previous conclusions and documents the data. This data needs to be made available to each entrant.

Reclassification to a Non-Permit Confined Space

A permit-required confined space may be reclassified to a non-permit confined space only if the following conditions are met.

1. The permit space must pose no actual or potential atmospheric hazards
 - Controlling atmospheric hazards through forced air ventilation does count as the hazard being eliminated.
2. All physical hazards must be eliminated from the space.
 - If necessary, to enter space in order to eliminated hazards, such entry shall be performed.
3. After all hazards have been eliminated, through a certification that contains the date, location, and the signature of the competent employee making the determination. The certification must be available to each employee who enters the space.
4. If hazards arise, the space will be declassified until the department reevaluates the space to determine whether it must be reclassified as a permit space or not.

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.

Basic Confined Space Entry and Rescue Equipment

Equipment shall include, but not limited to:

Safety Cones	Tripod or Other Anchoring Point
Safety Vest	Forced Air Ventilation Blower & Hose
Barricades (as required)	Fire Extinguisher
Men Working Signs (as required)	First Aid Kit
Safety Flags	Safety Ladder
Manhole Hook (or pick)	Manhole Access Bracket
Combustible Gas/Oxygen/CO ₂ /Toxic Gas Detector	Self-Contained Air Units
Utility Ropes	Hard Hats
Full Body Harness	Safety Glasses
Retrieval Line	Safety Shoes
Mechanical Retrieval Device	Rescue Telephone Number

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.

Annual Compliance Review

The Safety Organization will review the program annually in light of actual entry, work, and exit experience to determine how the program can be improved.

Revisions

Date	Author/Reviewer	Description/Reason for Change
10/7/2021	T Bay/ P Tate	Changed information about retrieval systems.
3/14/2022	T Bay/ P Tate	Updated logo and date.
7/7/2023	T Bay/ K Stapp	Changed format, date, and correct table of contents.