

PERMIT REQUIRED CONFINED SPACES

Program Statement

UNA employees will be protected from the hazards that may arise during the entry into confined spaces.

Objectives

The objectives of this chapter are to ensure that:

- permit required confined spaces in the UNA campus are identified,
- the entry into these spaces is conducted according to an entry plan,
- physical and human resources established in the entry plan are provided,
- employees participating in any activity related to confined space entry receive proper training.

Definitions

Confined Space

A confined space (CS) is any space that:

- √ it is large enough that an employee can bodily enter and perform assigned work,
- √ it has limited or restricted means of entry or exit, and
- √ it is not designed for continuous human occupancy.

Permit Required Confined Space

A permit required confined space (PRCS) is a confined space that has one or more of the following characteristics:

- √ it contains or has the potential to contain a hazardous atmosphere*,
- √ it contains materials that can engulf the entrant,
- √ it has an internal configuration that can trap or asphyxiate the entrant, or

- √ it contains any other recognized serious safety or health hazard.

(*) Hazardous atmosphere means an atmosphere that can cause death, incapacitation, injury, illness, or impaired physical or mental ability. Causing agents include:

- √ flammable gas, vapors, or mist in excess of 10% of the lower flammable limit (LFL),
- √ airborne combustible dust at a concentration that exceeds the LFL,
- √ atmospheric oxygen concentration below 19.5% or above 23.5% by volume,
- √ atmospheric concentration of a substance at or above the permissible exposure limits (OSHA), the threshold limit values (ACGIH), the recommended exposure limits (NIOSH) or any other accepted occupational standard,
- √ other atmospheric conditions that are considered immediately dangerous to life and health (IDLH) conditions.

General requirements

With the help of the audit provided in Appendix A of this chapter, supervisors will inspect the workplace to identify permit required confined spaces.

Specific entry plans will be established for those PRCS that must be entered by UNA employees or University contractors.

The safety officer will assist in the identification of PRCS and in the creation of specific plans.

A sign reading "*Danger-Permit Required Confined Space, Do Not Enter*" will be posted at the location of each space.

Entry Plan

The entry plan will be specific for each PRCS and will:

- √ provide instructions and procedures for safe entry,
- √ establish the locations for the placement of placards and signs,

- √ identify and assign responsibilities of those employees who will be participating in the effort (entry supervisors, attendants and entry personnel),
- √ list potential hazards expected during the entry. This list shall include:
 - sources of hazardous energy such as pneumatic and hydraulic pressure, high or low temperature, mechanical stress, and electrical energy;
 - physical hazards such as noise, vibration, heat stress, ionizing and non-ionizing radiation, fire, potential for falls, entangling and trapping;
 - toxic chemicals and biological materials;
 - ergonomics hazards such as forceful exertions, heavy lifting or pulling, awkward postures, lack of visibility;
- √ describe the techniques used for energy isolation and control (control of hazardous energy sources shall comply with 29CFR1910.147),
- √ list the techniques used for purging, flushing, cleaning and ventilating confined spaces that contain toxic chemicals,
- √ establish safe conditions for entry,
- √ identify testing and air monitoring equipment needed during the entry,
- √ identify additional equipment needed for the entry such as blowers, radios, PPE, retrieval systems, and fall protection.

Entry

Before entering the space, supervisors will complete a permit that authorizes the entry. The permit shall be posted at the entry of the PRCS for as long as the entry operation lasts.

The entry permit format will be as specific as possible for the PRCS. An example of a generic permit is given in Appendix B of this chapter.

The entry permit will be cancelled at the conclusion of the operation or at any other time when a hazardous condition not accepted in the entry plan, develops.

Cancelled permits shall be retained for at least one year.

Frequent tests of the space will ensure that conditions are maintained safe during entry.

In case of oxygen deficiency, the space will be ventilated prior and during entry.

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

Provide at least one attendant outside the permit space.

Duties of the attendant are listed in Appendix C of this chapter.

Establish a contract with a rescue team so that it will be readily available in case of emergency.

Identify the emergency rescue provider in the entry permit.

Protect the entrance to a confined space.

Guard any vertical opening to a confined space by standard railing or a temporary barrier when the permanent cover is removed.

Training

All personnel entering or participating in any activity related to confined space entry shall receive training.

Initial training will be offered at the time of assignment. Retraining will be offered when:

- √ assign duties change;
- √ the configuration of the space is modified;
- √ standard procedures are not observed.

Upon request, training will be provided by the UNA Safety Officer.

**APPENDIX A
AUDITING A PERMIT REQUIRED CONFINED SPACE**

IS THIS A CONFINED SPACE?

- | | YES | NO |
|--|--------------------------|--------------------------|
| 1. Can a person bodily enter and perform work? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Does the space have limited or restricted means for entry or exit? | <input type="checkbox"/> | <input type="checkbox"/> |
| <div style="border: 1px solid black; padding: 5px;"><p><i>Note: The size of the opening is not the only characteristic making the access or egress difficult. Some confined spaces with very large openings must be accessed by using portable ladders, hoists or other devices.</i></p></div> | | |
| 3. Is the space designed for continuous employee occupancy? | <input type="checkbox"/> | <input type="checkbox"/> |

IF THE ANSWER WAS YES TO THE FIRST TWO QUESTIONS AND THE ANSWER WAS NO TO THE THIRD QUESTION, THEN YOU ARE DEALING WITH A CONFINED SPACE.

IF YOU ARE DEALING WITH A CONFINED SPACE GO TO THE NEXT SECTION. OTHERWISE, STOP HERE.

IS THIS CONFINED SPACE A PERMIT REQUIRED CONFINED SPACE?

1. Does it contain or have the potential to contain a hazardous atmosphere?

A hazardous atmosphere is an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self rescue, injury, or acute illness from one of the following causes:

- (i) Flammable gas, vapor, or mist in excess of ten percent of the lower flammable limit.*
- (ii) Airborne combustible dust at a concentration that exceeds its lower flammable limit.*
- (iii) Atmospheric oxygen concentration below 19.5% or above 23.5%.*
- (iii) Atmospheric concentration of any substance in excess of its permissible exposure limit.*

2. Does it contain a material that has the potential for engulfing an entrant?

Engulfment means the surrounding and effective capture of a person by a liquid or a finely divided substance that can cause death by asphyxiation or they can exert enough force on the body to cause death by strangulation, constriction, or crushing.

3. Does it have an internal configuration such that a person who enters could be trapped or asphyxiated

4. Does it contain any other recognized serious safety Or health hazards?

IF THE ANSWER TO ANY OF THE QUESTIONS 1 TO 4 WAS YES, THEN THE CONFINED SPACE IS A PERMIT REQUIRED CONFINED SPACE.

**APPENDIX B
ENTRY PERMIT**

Permit valid for 8 hours only. All copies of permit will remain at job site until job is completed.

DATE:
DEPARTMENT:
PERMIT SPACE DESIGNATION:
PURPOSE OF ENTRY:

SUPERVISOR

Name:
SS# (optional):

ATTENDANT

Name:
SS# (optional)

ENTRY TEAM

Name:
SS# (optional)

Name:
SS# (optional)

Name:
SS# (optional)

Name:
SS# (optional)

Name:
SS# (optional)

Requirements to be completed and reviewed prior to entry

- _____ Lock Out/De-energize/Try-out
- _____ Line(s) Broken-Capped-Blanked
- _____ Purge-Flush and Vent
- _____ Ventilation
- _____ Secure Area (Post and Flag)
- _____ Standby Safety Personnel
- _____ Full Body Harness w/"D" ring
- _____ Emergency Escape Retrieval Equip
- _____ Lifelines
- _____ Fire Extinguishers
- _____ Lighting (Explosive Proof)

- _____ Protective Clothing
- _____ Respirator(s) (Air Purifying)
- _____ Burning and Welding Permit

Note: Items that do not apply enter N/A in the blank space.

Monitoring Results

Frequency of monitoring:

- Continuous
- Periodical: Every _____ minutes

Percent of Oxygen (19.5% to 23.5%) _____

Lower Flammable limit (<10%) _____

Carbon monoxide (*35 ppm) _____

Aromatic Hydrocarbons _____

(*1ppm, **5ppm)

Hydrogen Cyanide (Skin) (**4ppm) _____

Hydrogen Sulfide (*10 ppm, **15ppm) _____

Sulfur Dioxide (*2 ppm,** 5ppm) _____

Ammonia (**35ppm) _____

* Time Weighted Average for eight hour exposures.

** Short-term exposure limit established for up to 15 minutes exposures.

Remarks: _____

Instrument brand, model, and serial number:

- Instrument 1:
- Instrument 2:
- Instrument 3:
- Instrument 4:

Emergency Response Team

- Name of contact:
- Telephone number:

Supervisor Authorizing – All conditions satisfied

Signature:

Date:

APPENDIX C DUTIES IN PERMIT REQUIRED CONFINED SPACES

Duties of Authorized Entrants

Know the hazards, including information on the mode, signs or symptoms, and consequences of the exposure.

Properly use of equipment including energy controlling devices, ventilation systems, air monitoring equipment, and personal protective equipment.

Communicate continually with attendant.

Alert attendant in case of signs or symptoms of exposure, or detection of a prohibited condition.

Exit from the space if an order of evacuation is given, or a dangerous or prohibited condition is detected.

Duties of Attendants

Know the hazards, including information on the mode, signs or symptoms, and consequences of the exposure.

Be aware of possible behavioral effects of exposures.

Monitors and maintain contact with entrants.

Remain outside the confined space for as long as the operation lasts.

Evacuate in case a prohibited or dangerous condition develops, or in case behavioral effects of exposure are noticed.

Summon rescue if the authorized entrants need assistance to escape from the permit space.

Warn unauthorized persons to stay away from the permit space.

Perform non-entry rescue as specified in standard procedures.

Duties of Entry Supervisors

Know the hazards, including information on the mode, signs or symptoms, and consequences of the exposure.

Verify that the permit is complete, and that all the procedures for safe entry have been followed.

Authorize and cancel entry permits.

Verify that rescue services are available.

Remove unauthorized personnel from confined spaces.

Verify that operations are consistent with procedures defined on the entry permit.

APPENDIX D PERMIT REQUIRED CONFINED SPACES AT UNA

The campus of the University of North Alabama contains at least two permit required confined spaces (according to 29 CFR 1910.146). These spaces are the steam boilers and the underground service tunnels.

Steam Boilers.

Steam boilers are serviced annually by university employees who must access the different internal sections of these units. One particular area of concern is the mid-section of the shell that encloses the fire tubes. Entrance into this section is particularly difficult because of its physical configuration (the person must crawl between horizontal tubes) and the very limited free space, representing a clear entrapment hazard. In addition to this physical hazard, the use of chemicals may bring about a toxicity problem. Morpholine, cyclohexylamine and hydrochloric acid are used as cleaning and corrosion treatment agents. Sodium nitrite and sodium hydroxide are used as water treatment additives. In addition to specific toxic effects, manufacturers of these chemicals caution about the generation of toxic decomposition products such as carbon monoxide (from morpholine) and nitrogen oxide (from sodium nitrite).

Service Tunnels

Welding, metal cutting, brazing or soldering operations conducted in service tunnels may create hazardous conditions due to the presence of metal fumes, welding gases and oxygen consumption. The sudden release of steam can produce burns and displace air, creating an asphyxiating atmosphere.

Specific Procedures

In addition to the general procedures presented in the main body of this chapter, the following specific procedures shall be adopted:

- √ placards will be posted by or on the manhole of steam boilers and service tunnels identifying these spaces as permit required confined spaces.
- √ Boilers will be cleaned thoroughly to remove chemical residues before entry.
- √ Valves of feeding pipes to boilers will remain locked and tagged in the close position during entry.
- √ Pressure of steam pipes will be relieved before repair work takes place. The segment of the pipe under repair will remain isolated by closing adjacent valves (valves will be locked and tagged).

- √ The atmosphere within the space will be tested periodically to ensure that oxygen levels, flammable concentration and carbon monoxide levels are acceptable.
- √ Welding operations in confined space will require a special permit (hot work permit) and one of the following control options:
 - dilution ventilation (2,000 cfm per welder),
 - local exhaust ventilation,
 - supply air respirators.

When contractors perform work in UNA PRCS, the supervisor shall:

- √ Inform the contractor that the space is a PRCS and that the entry to this space must comply with 29 CFR 1910.146.
- √ Provide the contractor with a list of hazards of the PRCS and the precautions that must be taken for a safe entry.