

CONFINED SPACE ENTRY SAFETY PROCEDURE

Purpose

The purpose of this procedure is to establish minimum standards for identification and classification of confined spaces and entry into those confined spaces.

Scope

This procedure applies to all personnel who are required to work in or near any confined space. This procedure is to be used by employees of the City of Great Bend to enter permit-required confined spaces. For the purposes of this procedure:

Confined Space is defined as any space that:

Is large enough and so configured that an employee can bodily enter and perform assigned work; and

Has limited or restricted means for entry or exit; and

Is not designed for continuous employee occupancy.

Confined spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults and manholes, pipelines and open top spaces more than four (4) feet in depth such as pits, tubs, vaults, and vessels.

NOTE: The following areas are covered by OSHA 1926.800 Sub-part S: Tunnels and shafts, caissons, cofferdams and compressed air work places.

Permit-required confined spaces are defined as any confined space that:

Contains or has a potential to contain a hazardous atmosphere.

Contains a material that has the potential for engulfing an entrant.

Has 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.

Non-permit confined spaces are defined as any space that does not contain any of the hazards listed above in the definition for a permit-required confined space. Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards.

ANSI Z117.1 is the applicable standard for confined spaces in construction. Certain provisions of OSHA 1910.119 and 1910.146 will apply to contractors in a general industry facility.

Other Definitions

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.

Other definitions required for this procedure can be found in OSHA Standard 1910.146(b) and 1926.21(b)(6).

Identification of Confined Spaces

The preceding definitions were used to identify the confined spaces within control of the City of Great Bend. Locations identified as confined spaces can be found at our department offices.

Those spaces identified as permit-required confined spaces have been posted with the following warning "**DANGER-PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER.**" These signs will remain in place at all times.

A permit-required confined space will only be reclassified as a non-permit space if there is no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space. The permit space will be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated.

When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrant, the City of Great Bend shall reevaluate that space and, if necessary, reclassify it as a permit-required confined space.

Whenever a confined space is permanently reclassified as a non-permit or permit confined space it will be recorded in the confined space listing.

Pre-Entry Procedures

An entry permit (see attachment) will be obtained to evaluate the hazards of the permit space and the means, procedures, and practices necessary for a safe entry.

Implement the measures necessary to prevent unauthorized entry.

When entrance covers are removed, the opening will be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.

Before an employee enters the space, the internal atmosphere will be tested (entrants or their authorized representatives will be offered the opportunity to witness the tests), with a calibrated direct-reading instrument, for the following conditions in the order given:

Oxygen content

Flammable gases and vapors, and

Potential toxic air contaminants

All readings will be recorded and posted at the confined space for the length of the entry.

If no hazardous atmosphere was detected, one is not anticipated, and all non-atmospheric hazards are controlled in the confined space then the alternate entry procedures will be utilized. However, if a hazardous atmosphere was detected, one is anticipated, or a non-atmospheric hazard exists in the confined space then the following entry procedures will be implemented.

Entry Procedures

The entry supervisor identified on the permit shall review and sign the entry permit to authorize entry.

The completed permit shall be made available at the time of entry to all authorized entrants, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that pre-entry preparations have been completed.

The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit.

The entry supervisor shall terminate entry and cancel the entry permit when:

The entry operations covered by the entry permit have been completed; or

A condition that is not allowed under the entry permit arises in or near the permit space.

The following equipment will be provided at no cost to employees, maintained, and ensured that employees use it properly:

Testing and monitoring equipment.

Ventilating equipment needed to obtain acceptable entry conditions.

Communications equipment.

Personal protective equipment insofar as feasible engineering and work practice controls do not adequately protect employees.

Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency.

Barriers and shields.

Equipment, such as ladders, needed for safe ingress and egress by authorized entrants.

Rescue and emergency equipment, except to the extent that the equipment is provided by rescue services.

Any other equipment necessary for safe entry into and rescue from permit spaces.

The atmosphere within the space will be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

There will be at least one attendant outside the permit space into which entry is authorized for the duration of entry operations.

Note: Attendants may be assigned to monitor more than one permit space provided their duties can be effectively performed for each permit space that is monitored. Likewise, attendants may be stationed at any location outside the permit space to be monitored as long as their duties can be effectively performed for each permit space that is monitored.

All employees who are to have active roles in the entry operation will be designated, their duties identified, and proper training provided.

If an emergency arises the rescue procedures (as attached) will be followed.

Each employee who enters a confined space will use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, or above the entrant's head. Wristlets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 (1.52m) feet deep.

When employees are working simultaneously as with other authorized entrants in a permit space, constant communication will be kept between the parties.

When entry is complete all covers will be replaced, and guard rails, temporary covers, or other temporary barriers to prevent an accidental fall through the opening will be removed.

Measures necessary to prevent unauthorized entry will be verified and reinstalled if found to be inferior.

The entry permit will be returned to the entry supervisor. The entry supervisor will file the entry permit for a period of one year. These entry permits will be used on an annual basis to evaluate the effectiveness of the system.

Alternate Entry Procedures

The following entry procedures apply to a permit confined space that has all of the potential hazards (engulfment, burns and heat stress, fire and fumes, etc.) controlled. For these procedures atmospheric hazards may be controlled by the use of mechanical ventilation. The entry permit detailing the hazards and controls will be signed by an authorized person and posted at the confined space for the entire length of entry.

There may be no hazardous atmosphere within the space whenever any employee is inside the space.

Continuous forced air ventilation shall be used, as follows:

An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere.

The forced air ventilation will be so directed as to ventilate the immediate areas where an employee is or will be present within the space and will continue until all employees have left the space.

The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

The atmosphere within the space will be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

Hazards and controls will be reevaluated when the confined space is left unattended, during personnel changes, breaks, or if conditions, such as weather, warrant.

If a hazardous atmosphere is detected during entry:

Each employee will leave the space immediately.

The space shall be evaluated to determine how the hazardous atmosphere developed; and

Measures will be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

Training will be given to all affected employees on at least an annual basis and will cover the topics listed in the accompanying attachment.

The entry permit will be filed for a period of one year. These entry permits will be used on an annual basis to evaluate the effectiveness of the system.

Duties Of Authorized Entrants

Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure, and sign permit indicating they were offered opportunity to witness testing of space.

Properly use equipment required to enter the confined space.

Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.

Alert the attendant whenever:

The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.

The entrant detects a prohibited condition.

Exit from the permit space as quickly as possible whenever:

An order to evacuate is given by the attendant or the entry supervisor.

The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.

The entrant detects a prohibited condition.

Duties of Attendants

Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

Be aware of possible behavioral effects of hazard exposure in authorized entrants.

Continuously maintain an accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants accurately identifies who is in the permit space.

Remain outside the permit space during entry operations until relieved by another attendant.

Note: When the employer's permit entry program allows attendant entry for rescue, attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations and if they have been relieved by another attendant.

Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.

Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately under any of the following conditions:

If the attendant detects a prohibited condition.

If the attendant detects the behavioral effects of hazard exposure in an authorized entrant.

If the attendant detects a situation outside the space that could endanger the authorized entrants.

If the attendant cannot effectively and safely perform all the duties.

Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.

Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:

Warn the unauthorized persons that they must stay away from the permit space.

Advise the unauthorized persons that they must exit immediately if they have entered the permit space.

Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.

Perform non-entry rescues as specified by the rescue procedures.

Perform no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Duties of Entry Supervisors

Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

Check that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.

Terminate the entry and cancel the permit as required.

Verify that rescue services are available and that the means for summoning them are operable.

Remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations.

Determine, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

Contractors

When the City of Great Bend has employees of another employer working in or around any confined spaces the following procedures will be followed:

Contractors working on-site will be informed of all spaces requiring confined space entry permits.

If contractors are hired to perform work in confined spaces, they will be trained on the exposures of that confined space.

A copy of the Contractors Confined Space Entry program will be obtained and should meet the requirements set forth in this program.

Note: It is the responsibility of the contractor to determine the safe entry requirements of any confined space that their employees will be entering. It is also the responsibility of the contractor to ensure that their confined space program meets all of OSHA's current requirements.

A copy of this program will be given to contractors to inform them of the precautions and procedures that the City of Great Bend has taken to protect employees in or near permit spaces where the contractor personnel will be working.

When employees of the City of Great Bend are working simultaneously as authorized entrants in a permit space with an outside contractor, constant communication will be kept between the parties.

Copies of all confined space entry permits issued by contractors working in confined spaces under the control of the City of Great Bend will be kept for a period of one year.

A closing meeting with the contractor will be held to document any hazards confronted or created in the permit space during entry operations.

CONFINED SPACE ENTRY PERMIT

COMPANY/LOCATION _____

DEPARTMENT: _____ DATE: _____

CONFINED SPACE TO BE ENTERED: _____

PERMIT EXPIRATION DATE/TIME: _____

DESCRIPTION OF WORK TO BE PERFORMED: _____

NATURE OF HAZARDS IN CONFINED SPACE: (check)

- Oxygen deficiency (Less than 19.5% at sea level)
- Flammable gases or vapors (greater than 10% of the lower flammable limit, or greater than 23.5% oxygen at sea level)
- Toxic gases or vapors (greater than the permissible exposure limit)
- Mechanical hazards
- Electrical shock
- Materials harmful to the skin
- Engulfment
- Configuration hazard
- Other _____

EQUIPMENT REQUIRED FOR ENTRY AND WORK: (check)

- Respirator
 - Lifeline and safety harness
 - Protective clothing
 - Hearing protection
 - Other _____
 - Lighting (Explosive Proof)
 - Fire Extinguishers
 - Emergency Escape Retrieval Equipment
 - Resuscitators — Inhalator
- Electrical equipment/tools:
- Low voltage
 - Ground-fault current interrupters
 - Approved for hazardous locations
- Respiratory protection (specify) _____
- Communication aid (specify) _____
- Rescue equipment (specify) _____

PREPARATION: (check)

- Notify affected departments of service interruption
- Isolate - blanked or double valve, with lock and tag.
- Zero energy state (Lock Out all energy sources)
- Cleaned, drained, washed and purged
- Ventilation to provide fresh air
- Emergency response team available
- Employees informed of specific confined space hazards
- Secure area (post, sign and flag)
- Procedures reviewed with each employee.
- Atmospheric test in compliance.
- Attach hot work permit
- Other _____

AUTHORIZED ENTRANTS:

AUTHORIZED ATTENDANTS:

STAND BY SAFETY PERSONNEL:

TEST	Allowable Limits	Check (✓) if Required	Result		Result		Result		Result		Result	
			:	AM PM	:	AM PM	:	AM PM	:	AM PM	:	AM PM
Time												
Oxygen-min.	19.5%											
Oxygen-max.	23.5%											
Flammability	10% LEL											
H ₂ S	10 ppm											
Toxic (specify)												
Cl ₂	.5 ppm											
ClO ₂	.1 ppm											
SO ₂	.2 ppm											
Heat	°F/°C											
Other												
Other												

Name of employee conducting atmospheric monitoring: _____ Instrument(s) used: _____

Statement of acceptable entry conditions _____

AUTHORIZATION:

I certify that all required precautions have been taken and necessary equipment is provided for safe entry and work in this confined space

Name (Print) _____

Time: _____ Date: _____

Signature _____

Training Agenda

1. The identification and evaluation of permit-required confined spaces.
2. Method of obtaining a permit.
3. Explain how to calibrate and use atmospheric testing equipment.
4. Explain how to set up required ventilation.
5. Demonstrate how to use SCBA's to enter oxygen deficient or unknown atmospheres. (Check with supplier for training, maintenance, and fit testing).
6. Explain the acceptable ranges for oxygen, flammable and toxic chemicals.
7. Explain the rescue provision to retrieve an employee.
8. Have the rescuers take first aid and CPR training.
9. Show employees how to wear the safety harness.
10. Review types of hazards and causes of fatalities in a confined space.
11. Demonstrate communication methods/devices.
12. Contractor/Operator interfacing.

Rescue Procedures

1. Call for help.
2. Attempt rescue (using entrant retrieval system) without entering the space.
3. Employee(s) entering for rescue shall be provided with and wear a self-contained breathing apparatus, life line, harness, and other necessary equipment before entering the confined space.
4. Upon reaching the injured entrant, assess injury and the nature of the accident.
5. Administer first aid (if conditions allow) and prepare the injured entrant victim for extrication.
6. Remove injured entrant with care.
7. There must always be an attendant (top person, person outside confined space monitoring entrants, etc.) even during rescue attempts.
8. Transport any applicable MSDS (should be at confined space) to the medical facility with the injured entrant.

Procedures for Atmospheric Testing in Confined Spaces¹

Atmospheric testing is required for two distinct purposes: evaluation of the hazards of the permit space and verification that acceptable conditions exist for entry into that space.

- 1) **Evaluation Testing.** The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres that may exist or arise, so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space. Evaluation and interpretation of these data, and development of the entry procedure, should be done by, or reviewed by, a technically qualified professional (e.g., OSHA consultation service, or certified industrial hygienist, registered safety engineer, certified safety professional, certified marine chemist, etc.) based on evaluation of all serious hazards.
- 2) **Verification testing.** The atmosphere of a permit space which may contain a hazardous atmosphere should be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentrations at the same time of testing and entry are within the range of acceptable entry conditions. Results of testing (i.e., actual concentrations, etc.) should be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition.
- 3) **Duration of testing.** Measurement of values for each atmospheric parameter should be made for at least the minimum response time of the test instrument specified by the manufacturer.
- 4) **Testing stratified atmospheres.** When monitoring for entries involving a descent into atmospheres that may be stratified, the atmospheric envelope should be tested a distance of approximately four feet (1.22 m) in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.
- 5) **Order of testing.** A test for oxygen is performed first because most combustible gas meters are oxygen dependent and will not provide reliable readings in an oxygen deficient atmosphere. Combustible gases are tested for next because the threat of fire or explosion is both more immediate and more life threatening, in most cases, than exposure to toxic gases and vapors. If tests for toxic gases and vapors are necessary, they are performed last.

¹Title 29 Code of Federal Regulations 1910.146, Appendix B.