

Section 19: CONFINED SPACE ENTRY PROGRAM

INTRODUCTION

A confined space, by legal definition, is a space that meets all of the following conditions: is large enough for a person to fully enter and perform work, has a limited means of entry or exit and is not designed or equipped for continuous occupancy.

A permit required confined space is one that has one or more of the following hazards or characteristics:

- Contains or has a potential for a hazardous atmosphere
- Contains a material that could drown or cover an entrant
- Has an internal configuration that could trap or asphyxiate an entrant by inwardly converging walls of a floor that slopes downward to a smaller cross section
- Contains any physical hazard, including engulfment, electrical shock, or moving parts
- Contains any other recognized serious safety or health hazard

Confined spaces with these hazards can cause serious injuries or death for the entrant and people who may try to rescue the entrant. Rescuers who are not trained to recognize potential confined space hazards commonly succumb to the same hazard upon entry, such as a deadly atmosphere.

APPLICABILITY

It is mandatory that employees enter a confined space only after they have been trained, the space has been evaluated, a confined space entry permit or alternate method documentation has been completed (for permit required confined spaces), and all other safety and health considerations have been met.

RESPONSIBILITIES

Each division or department that has employees who enter confined spaces must develop a written document identifying all of the confined spaces and determine if the confined spaces have hazards that make them permit spaces, and specifying the required entry procedures. Otherwise, the permit-required confined space procedure in this section shall be followed when entering any confined space.

Each division or department that has employees who may inadvertently enter confined spaces must identify those employees and train them to recognize the spaces, the potential hazards, and not to enter those spaces. These employees may include utility workers, construction project managers, environmental inspectors, sheriffs, and building construction inspectors.

The Safety and Claims Management office shall:

- Provide technical assistance to the departments in implementing this procedure
- Review addenda to this policy
- Assist each department in annual program evaluation

Each Department shall:

- Designate a Confined Space Program Administrator
- Develop a Written Program (customizing this Section 19 on Confined Space Entry is acceptable). See attachment #1 to ensure all required elements of the written program are included in the written program.
- Develop and implement the means, procedures and practices necessary for safe entry into permit spaces
- Submit a copy of their program to the Safety and Claims Management office for review
- Have the primary responsibility to identify and evaluate all confined spaces in workplaces under their control and to determine which are to be permit required
- Be responsible for implementing this policy and procedure
- Ensure that employees receive the training necessary to have the knowledge, skills and understanding to carry out the duties associated with their role in permit space entry
- Conduct required evaluations of program effectiveness

Supervisors shall:

- Ensure no unauthorized entry into permit spaces
- Ensure that their employees are aware of the permit spaces they may encounter and the precautions that must be followed

Employees shall:

- Be aware of the permit spaces they may encounter
- Perform only authorized entries
- Follow all procedures precisely

TRAINING

All workers who may have occupational responsibility to enter confined spaces, their supervisors, and all other workers who may by chance enter a confined space must receive training.

In-depth training is required for workers who enter confined spaces (entrants), workers who assist entrants (attendants), and their supervisors. Workers who may by chance enter confined spaces need training to recognize confined spaces, the potential hazards of those spaces, and that they are not to enter those spaces.

DEFINITIONS

Confined Space - Any location that has all of the following characteristics.

1. Is large enough and arranged so an employee could fully enter the space and work.
2. Has a limited or restricted means for entry or exit.
3. Is not primarily designed for continuous employee occupancy.

Permit Required Confined Space (permit space) - A confined space that has one or more of the following characteristics.

1. Contains or has a potential to contain a hazardous atmosphere.
2. Contains a material with the potential for engulfing (drowning or covering) someone who enters.
3. Has an internal configuration that could allow someone entering to 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 physical hazard. This includes any recognized health or safety hazards including engulfment in solid or liquid material, electrical shock, or moving parts.
5. Contains any other recognized serious safety or health hazard.
6. Includes, but is not limited to storage tanks, process vessels, pits, vats, wells, sanitary sewers, storm water sewers, sumps, boilers, ventilation and exhaust ducts, tunnels, underground utility vaults and pipelines.

Permit Space Entry Procedures - Steps that must be used in a permit space where atmospheric hazards are present or potential, and not entirely and safely controlled, or there are physical hazards not entirely or safely controlled.

Alternative Method Procedures - Procedures that may be used in a permit space where prior to entry all physical hazards have been eliminated and any atmospheric hazards present or potential during the entry can be entirely and safely controlled with the use of forced air ventilation.

GENERAL REQUIREMENTS

Unauthorized entry into permit spaces is forbidden.

Identification and Determination of Permit Required Confined Spaces

Initial evaluation and designation of permit spaces and work procedures shall be performed by a Certified Industrial Hygienist or Certified Safety Professional.

NOTE: King County recognizes that all sanitary sewage and some storm water conveyance systems as permit spaces requiring full permit procedures.

All underground manholes and utility vaults shall be considered permit-required spaces but may be entered using alternative methods if certain specified (see Confined Spaces and Entry Procedures on p.5) conditions are met.

Where feasible, permit spaces must have a label or sign affixed at a conspicuous location near all access points. The wording, "DANGER – PERMIT REQUIRED CONFINED SPACE, DO NOT ENTER", or similar wording will satisfy this requirement. If signage is not feasible, then effective training must be given to employees who may potentially enter these spaces.

Air Monitoring

Air monitoring will be performed by trained and competent personnel prior to and during entry of any confined space.

The checklist forms in this document shall be used to record initial and subsequent supplemental air monitoring results.

Atmospheric testing shall be performed in the following order.

1. Oxygen (O₂ - 19.5% to 23.5%)
2. Flammability (< 10% LEL)
3. Carbon monoxide (CO < 35 ppm)
4. Hydrogen sulfide (H₂S < 10ppm)

Readings shall be allowed to stabilize long enough to account for response time of instrument and length of sample tube.

Pre-entry testing shall be performed before removal of lid if possible, before any ventilation to assess if a hazardous atmosphere exists. Stratification or inaccessible areas must be taken into consideration. If entry is required to assess atmosphere, a full permit entry is required with extreme caution.

Testing records must be retained for at least one year, and audited during the annual program review.

Site calibration and visual inspection of the air monitoring equipment shall be according to the manufacturer's direction on the same day just prior to use. Additional daily calibration or bump tests with calibration gas may be needed or appropriate.

Training

Training shall be provided:

- Before an employee is assigned to duties under this policy
- When there is a change in confined space operation that presents a hazard for which the employee has not been trained
- When deviations from procedures or inadequacies in the program have been identified

Training shall consist of the following, as a minimum:

- The hazards, controls for entry and health symptoms for adverse effects of some of the atmospheric hazards
- The contents of this policy
- Use, requirements and limitations of the alternative method procedures
- Personal protective equipment use
- A review of atmospheric monitoring equipment, including anticipated hazardous conditions and factors which could occur inside or outside the space
- Rescue procedures

Competency Determination and Certification

Each employee shall be determined to be proficient and certified as proficient in their assigned duties (Entrant, Attendant, or Entry Supervisor).

Proficiency Determination: The Confined Space Program Administrator (or their delegate) can determine employee proficiency by:

- Observing employee performance using safe work procedures and equipment to perform job tasks during training exercises that simulate actual confined space conditions;
- A comprehensive written exam; or
- Any other method that is effective

Proficiency Certification: The certification shall contain each employee's name, the trainer's written or electronic signature or initials, and the dates of training. The certification shall be available for inspection by employees, their authorized representatives, and authorized State regulatory representatives.

Contractors

Department representatives shall inform contractors of the following, prior to permitting their entry into confined spaces:

- The workplace contains permit required confined spaces and that entry is allowed only through compliance with a permit required confined space program meeting the requirements of WAC 296-809.
- The elements that make the space a permit required confined space program.
- Any precautions and procedures that the department has implemented for the protection of employees in or near the permit required confined space where contractor personnel will be working.

Department representatives will debrief the contractor after entry tasks are completed to discuss any hazards or unusual conditions experienced.

CONFINED SPACES –ENTRY PROCEDURES

1. Alternative Methods

A permit-required confined space may be entered without a permit using alternative methods when monitoring and inspection data supports the following:

- All hazards have been eliminated; or
- All physical hazards have been eliminated and continuous forced air ventilation controls the actual or potential hazardous atmospheres

Qualifications

1. It must be demonstrated that there are no hazards present other than hazardous atmospheres that continuous forced ventilation alone is sufficient to control the hazardous atmosphere.
2. Physical hazards, such as electrical, mechanical, natural gas, drowning and engulfment must be eliminated by lock out or blank out procedures.
3. Alternative method procedures may only be authorized for a maximum of one work shift. A new authorization must be made for each work shift.
4. If entry into a permit space is required to obtain the documentation needed to characterize and control hazards in the space, the entry shall be done using the full permit space entry procedures.
5. If activities occurring in the confined space introduce atmospheric hazards, they must be carefully assessed to insure no hazard will occur. Some examples of these activities are painting, sand blasting, welding or the use of solvents.
6. This entry procedure is not acceptable if respiratory protection is required for entry or for the work performed.
7. Only trained employees shall be allowed to enter the confined space.

Entry Procedure

1. The alternative method checklist shall be used to document the date, location, duration of entry, procedures, conditions of entry, all conditions that require evacuation of the space, and name, title and signature of entry supervisor. This checklist must be kept available to all entrants.
2. The space to be entered shall be isolated using all appropriate means to prevent the introduction of materials or hazardous energies into the confined space. The space shall be cleaned, purged, flushed or ventilated to eliminate hazardous atmospheres or conditions.

3. Floor or surface openings shall be promptly guarded to prevent accidental falls of persons or materials.
4. Where ventilation controls are applicable
 - a. The internal atmosphere shall be tested and documented in accordance with the air monitoring procedures in Section 4 in General Conditions and Requirements.
 - b. Any re-entry requires new air monitoring. During entry, the atmosphere should be frequently retested or continuously monitored to ensure no hazardous atmosphere.
 - c. Continuous, forced ventilation shall be used throughout the entry into the space. The ventilation shall be directed to ventilate the immediate area where the employee is or will be present.

Safety Equipment

Departments shall supply and maintain the following equipment and any additional equipment necessary for safe entry:

- Continuous forced air ventilation supplied by electric or gas powered blowers of sufficient volume to prevent hazards. Gas powered blowers must have air intakes located away from motor exhaust to prevent any uptake of exhaust. All air intakes must be located in clean air areas.
- Barriers for floor or surface openings
- Personal protective equipment – PPE shall be specified
- Illumination shall be provided to give adequate light to work safely and exit quickly in case of an emergency

Departments shall be responsible for ensuring that all employees are properly trained in using such equipment. Protective clothing and equipment shall be carefully examined to ensure it is in good working order.

ALTERNATIVE METHODS DOCUMENTATION FORM
(For a period not longer than one work shift)

Date: _____

Evaluator/Competent person:

Print Name _____

Print Title _____

Signature _____

Location of work _____

Description of space _____

Purpose of entry _____

Time in / time out _____

Entrant(s) _____

Potential atmospheric hazards _____

Physical hazards

Engulfment Internal configuration Mechanical
 Fire Pneumatic Stored energy
 Electrical Thermal Other _____

Abatement of physical hazards _____

Is forced air ventilation required? _____

If yes, specify ventilation equipment and amount of ventilation

Space fully ventilated? _____

PPE required _____

Atmospheric test results

Equipment model _____ Serial # _____ Calibration date _____

Location	Time	Oxygen (19.5 – 23.5)	LEL (<10%)	H ₂ S (<10%)	CO (<35 ppm)

Tests performed by: _____

Other pertinent information:

2. FULL PERMIT-REQUIRED ENTRY PROCEDURES (HIGH HAZARD ENTRY)

Entry Procedure

1. Prior to entry, the permit space shall be evaluated for potential hazards and the controls necessary to allow safe entry shall be specified.
2. A Confined Space Entry Permit shall be issued prior to entering any high hazard permit required space.
3. Pre-Entry Inspection – Immediately preceding entry to the space, the authorized entrant, attendant and entry supervisor shall thoroughly examine the entry permit and be knowledgeable with the terms, conditions and contents. This shall be done at the entry location.
 - a) The pre-entry inspection shall consist of verifying that all conditions of the permit have been met and all atmospheric monitoring and other testing has demonstrated acceptable entry conditions.
 - b) The entry supervisor shall sign the permit after having completed the pre-entry inspection.
 - c) Review emergency and evacuation signals.
4. The space to be entered shall be isolated using all appropriate means to prevent the introduction of materials or hazardous energies into the confined space. Isolation steps shall be specified on the permit. This shall include lockout/tagout procedures.
5. The permit space shall be cleaned, purged, flushed or ventilated to eliminate or control hazardous atmospheres.
6. Any condition which makes it unsafe to remove an entrance cover, such as pressure or high temperature, shall be eliminated before the cover is removed.
7. The opening shall be promptly guarded to prevent accidental falls of persons or materials into the opening.
8. The atmosphere within the space shall be tested and recorded on the permit in accordance with the Air Monitoring procedures specified previously. The readings shall be recorded on the permit.
9. Continuous forced ventilation shall be used throughout the entry into the confined space. The ventilation shall be directed to ventilate the immediate area where the employee is present.
10. The atmosphere shall be continuously or periodically tested to ensure that ventilation is preventing a hazardous atmosphere. The frequency of

testing shall depend on the initial values measured and expected hazard and documented on the permit.

11. Entry into the confined space shall be prohibited until the entry permit, all necessary tools, equipment, and retrieval systems are available, in place and ready for use.

12. The use of retrieval systems is mandatory for permit space entry.

Duties of Entry Supervisor

The entry supervisor must perform the following:

1. Know all the potential hazards, including the mode, signs or symptoms and consequences of exposure and the methods to control the hazards.
2. Verify that the entry permit has been properly filled out, that atmospheric and other testing has been performed with acceptable results, that the procedures to be used will allow for safe entry and that all necessary equipment is available and in place before authorizing entry.
3. Terminate entry and cancel the permit when the work has been completed or when acceptable entry conditions are not met.
4. Verify that rescue service is available and that the attendant has the means to quickly summon the service.
5. Remove unauthorized individuals who enter or attempt to enter the permit space.
6. Determine, at intervals dictated by the hazard, that acceptable entry conditions are maintained throughout the permit space entry.

Duties of Authorized Entrant

The entrant must perform the following:

1. Know all the potential hazards, including the mode, signs or symptoms and consequences of exposure and the methods to control the hazards.
2. Properly use all equipment required.
3. Communicate with attendant.
4. Alert the attendant whenever:
 - a) Any warning sign or symptom of exposure to dangerous situations is recognized.
 - b) A prohibited condition is detected.
5. Exit from the permit space as quickly as possible whenever:
 - a) Ordered to evacuate by attendant or entry supervisor.
 - b) Any warning sign or symptom of exposure to dangerous situations is recognized.
 - c) A prohibited condition is detected.
 - d) Any other reason which would prevent safe entry or exit is detected.

If the space is evacuated for any of the above reasons, the permit is void and re-entry is not allowed. The conditions which caused the evacuation shall be recorded on the canceled entry permit. Re-entry is not permitted until the

conditions which caused the evacuation are evaluated, the control procedures and acceptable entry conditions are modified and new permit is issued.

Duties of Entry Attendant

The attendant must perform the following:

1. Know all the potential hazards, including the mode, signs or symptoms and consequences of exposure and the methods to control the hazards.
2. Know possible behavioral effects due to hazardous exposure.
3. Maintain an accurate count of authorized entrants in the permit space and ensures that the authorized entrants identified on the entry permit are the only people in the space.
4. Remain at the permit space entry during an entry until relieved by another attendant.
5. Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.
6. Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders entrants to evacuate the permit space if:
 - a) A prohibited condition is detected.
 - b) A behavioral effect of hazard exposure is detected.
 - c) A situation outside the space that could affect entrants is detected.
 - d) The attendant cannot effectively and safely perform all these duties.
7. Know how to contact rescue and emergency services and able to convey detailed directions to the site.
8. Summon rescue and other emergency services as soon as it is determined the entrants may need assistance to escape the space.
9. Take the following actions when unauthorized persons approach or enter a permit space:
 - a) Warn the unauthorized person that they must stay away from the permit space.
 - b) Advise the unauthorized person that they must exit immediately if they have entered the space.
 - c) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the space.
 - d) Document the action on an incident form.
10. Perform non-entry rescue
11. Does not perform any other duty that may interfere with the primary duty to monitor and protect the authorized entrants.

Using a single attendant to monitor entry into multiple spaces is not authorized.

Entry Permit

The entry permit shall be issued prior to entering the permit-required confined space. The entry permit shall be posted at the entrance to the permit space at all times during entry activities if feasible.

The entry permit shall be completely filled out. It shall list:

1. The phone number and any necessary contact information for rescue and emergency response
2. The location, specific description and identification of the space to be entered
3. The anticipated hazards
4. The entry purpose and work to be performed
5. Date, times and duration of the entry. The duration must not be longer than one work shift. A new permit must be completed for each work shift.
6. Atmospheric testing must be completed before any ventilation or disturbance of the space to determine hazard potential
7. Initial and subsequent testing must be recorded on the permit or additional data sheets. Frequency of testing must be determined and recorded on permit
8. Any additional concerns such as lockout locations, isolation procedures or affected departments
9. Entry supervisor's signature, to be added after reviewing the permit with entrants and attendants and ensuring conditions are fulfilled and safe entry can proceed

Other Conditions

Specific atmospheric hazards:

Employees shall not enter or work in any permit space which contains an oxygen deficiency or excess (<19.5% or > 23.5% oxygen), a flammable hazard (>10% LEL) or any other contaminants which would require the use of supplied air respirators.

When exposures may exceed state permissible exposure limits (PEL), and the use of air purifying respirators is legally permitted, then they may be used in conformance with DOSH regulations. Use of air purifying respirators and filters must be approved by an industrial hygienist with Safety and Claims Management (206-477-3350).

Communication Equipment

Communication between entrants and attendant shall be made by voice or radio. A cell phone, at a minimum, must be used by the attendant for possible communication with rescue or emergency services. Entry is prohibited if no form of immediate communication can be made by phone or radio.

Retrieval System – Harness and Retrieval lines

1. A personnel retrieval tripod or other approved personnel lifting device shall be used if the permit space is a vertical type entry greater than 4 feet deep.
2. A full body, fall protection harness shall be worn in vertical type permit spaces. This harness shall be equipped with a quick release device to remove the retrieval line in case of entanglement.
3. Harnesses shall not contain conductive attachments if work is to be performed on electrical utilities.

4. The harness shall be connected to a retrieval line. The retrieval line shall be attached so the non-entry rescue can begin as soon as the attendant becomes aware of an emergency.

Illumination and tools

Illumination shall be provided to give adequate work and emergency exiting light. Temporary lighting shall be equipped with adequate guards to prevent contact with the bulbs.

If there is a potential for flammable vapors or gasses, then all lighting shall be approved for Class 1, Division 1 atmospheres. Tools may also need to be spark resistant and intrinsically safe.

Emergencies

1. Under no circumstances shall King County employees attempt to enter a confined space to perform rescue operations. If an emergency requires an entry rescue, the attendant shall immediately notify the designated rescue service.
2. It shall be determined that a rescue service is available well before entry.
3. If non-entry rescue can be performed by means of the retrieval line and harness, the attendant shall utilize such equipment for this purpose.
4. If a rescue service is not available, this situation must be discussed with Safety and Claims Management well in advance before any entry is planned.
5. Before designating a rescue service, it must be determined if the service is able to respond in a timely manner and is properly trained and equipped.
6. Inform the rescue service of the hazards they may confront when called upon to perform a rescue.
7. Provide the rescue service with access to all permit spaces so they may develop appropriate rescue plans and practice operations.
8. The rescue service must agree to notify the Confined Space Program Administrator (or their delegate) in the event that the rescue service becomes unavailable.

PERMIT SPACE ENTRY PERMIT

Location of space _____

Description of space _____

Purpose of entry/work _____

Date _____ Time/shift _____

Hazard(s) _____

Emergency/Rescue phone # _____ Name _____

Required PPE/Equipment

- ___ Head protection ___ Respirator ___ Eye protection
- ___ Hearing protection ___ Gloves ___ Boots
- ___ Coveralls ___ Full body harness ___ Tripod/Fall arrester
- ___ Communication tools ___ Blower Others _____

Air Monitor Model _____ Serial # _____

Pre-Entry Monitoring

	O ₂ 19.5% – 23.5%	CO < 35 ppm	LEL < 10%	H ₂ S < 10 ppm	Other
Before entry opening					
After entry opening					
After ventilation					

Blower type/CFM _____

Blower placement/efficiency _____

Other requirements _____

PERMIT-REQUIRED CONFINED SPACE LOCATIONS LIST

NOTE: Each department must identify permit-required confined spaces and their locations if employees may enter either intentionally or non-intentionally. The spaces and locations (if feasible) need to be specifically identified, unless a very similar type of the space exists in many multiple locations. In the case of a very similar type of space (for instance similar size and depth public sewer manhole pits) that type of space can be identified by specific description. Please check with Safety and Claims Management (206-477-3350) for advice and direction for classifying spaces and locations.

Attachment #1. Requirements of a Written Confined Space Program.

WAC 296-809-30002 Develop a written permit-required confined space program

(1) You must develop a written program, before employees enter confined spaces, that describes the means, procedures, and practices you use for the safe entry of permit-required confined spaces as required by this chapter. Include the following:

- (a) Documentation of permit entry procedures¹.
- (b) Designation of employees that have active roles, including: attendants, competent persons, entrants, entry supervisors, rescuers, program administrator, or those who test or monitor the atmosphere in a permit-required space.
- (c) Identification of each designated employee's duties.
- (d) Training employees on their designated roles.
- (e) How to identify and evaluate hazards.
- (f) Use and maintenance of equipment.
- (g) How to prevent unauthorized entry.
- (h) How to coordinate entry with another employer.
- (i) How to rescue entrants.
- (j) If you intend to enter using alternative methods for entry, the procedures must address all measures used before entry to isolate and eliminate hazards from the space and control potential atmospheric hazards.
 - (i) Identify the entry supervisor who authorize the use of the alternative methods and has the responsibility for ensuring safe entry conditions.
 - (ii) The hazards of the space.
 - (iii) The methods used to eliminate hazards including verification.
 - (iv) The methods used to ensure that the hazards are eliminated.
 - (v) The methods used to test and monitor the atmosphere within the space, where applicable, for all atmospheric hazards.
 - (vi) The methods used to determine if unsafe conditions arise before or during entry.
 - (vii) The criteria and conditions for evacuating the space during entry (like monitoring and test data).
 - (viii) Methods for training employees in these procedures.
 - (ix) The methods used to ensure employees follow these procedures.
 - (x) Documentation required. For examples of documentation, see Appendix J Alternative Method Documentation by visiting the labor and industries web site at <http://www.lni.wa.gov/safety/rules/chapter/809/>.