



CONFINED SPACE ENTRY PROGRAM

In order to be in compliance with the proposed OSHA General Industry Standard 29CFR1910.146, Permit required Confined Spaces, it is necessary that Climate Engineers Inc. has a written Confined Space Entry Program. This program is to establish a Confined Space Entry Program in order to protect employees who are required to enter confined spaces from hazards that could cause accidental injury or illness.

Each site shall select an employee to serve as the coordinator of the Confined Space Entry Program. Please see tab 1 in the Safety Handbook for your locations current Safety Manager.

The CSE (Confined Space Entry) Program Coordinator's responsibility shall include the implementation, administration, and evaluation of the Confined Space Entry Program. These responsibilities shall include, but are not limited to, the following:

1. Identify all possible or potential Confined Spaces at the facility that could at any time be entered by an employee.
2. Identify Known hazards such as:
 - Mechanical
 - Hot materials
 - Toxic materials
 - Build up on wall side or roof
 - Oxygen depleted atmosphere
 - Flammable/combustible materials, liquids, or vapors
 - Weather – hot, cold, icy, lightening
3. Determine the Best Method of entering and performing the work.
4. Check the following for personal safety:
 - If there is Appropriate Lighting
 - If Brass tools are required for repair or cleaning
 - If Head, hand, eye, hearing protection and rubber boots are required
 - If safety belts, harness, life lines are required and checked
 - If wristlets, chest harness, winch/hoist are required and checked
 - If standby person is provided
 - If periodic atmospheric monitoring has been done
 - If fire extinguisher is required and checked
 - If hot work permit is required
 - If alternative communication system is required and checked
 - If emergency egress procedures have been explained
 - If a confined space entry sign is posted
 - If confined space atmosphere temperature (of)
 - If escape plan is reviewed and understood
 - If you have an emergency Phone #
5. Make sure that anyone entering, working in, or involved in a Confined Space Operation has been trained in Confined Spaces.
6. Use a Confined Space Permit and fill out completely. See sample permit with this program.

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7. Record all Confined Space permits – once the Confined Space Operation is over, turn into the Safety Manager.
8. Periodically inspect the Confined Space program with the employees that are using this. Make sure they are following procedures and understand them.

POLICY:

It is the policy of Climate Engineers, when work is being performed in a confined space, standard safety procedures shall be followed to prevent accidental injury or death to an employee.

PURPOSE:

It is the purpose of the Confined Space Entry Program to establish minimum requirements and procedures for the safety and health of employees who may enter, work in, and in connection with, and confined spaces.

SCOPE:

Occasionally confined spaces may be entered for purposes of inspection, cleaning, and/or maintenance. This procedure is mandatory for the protection of individuals from injury due to an unsafe atmosphere, mechanical/electrical equipment or limited means of escape. Therefore, all Climate Engineers employees, visitors, vendors and contractors are applicable to the Confined Space Entry Standard and shall comply with the duties, restrictions, and limitations imposed upon them.

DEFINITIONS:

- **Attendant:** A person who is assigned as standby to monitor a confined space process operation and provide support or react as required. This person does not retrieve.
- **Blinding/Blanking:** Inserting a solid barrier across the open end of a pipe leading into or out of the confined space, and securing the barrier in such a way to prevent leakage of material into the confined space.
- **Confined Space:** An enclosed area that has the following characteristics:
 1. Its primary function is something other than human occupancy. Examples include but are not limited to: tanks, silos, vessels, pits, sewers, pipelines, tank cars, boilers, septic tanks, utility vaults, vats, ducts, and pipelines.
 2. Has restricted entry and exit.
 3. May contain potential or known hazards.
- **Double Block and Bleed:** A method used to isolate a confined space from a line, duct or pipe by physically closing two in-line valves on a piping system and opening a “vented-to-atmosphere” valve between them.
- **Engulfment:** The surrounding, capturing, or both, of a person by divided particulate matter of liquid or flowable solid-like sand or grain.
- **Entrant:** A person authorized to enter a confined space. The duties of the authorized entrant are: they must know hazards that may be faced during entry, including signs, symptoms, and consequences of exposure; they must properly use equipment (ie. Testing and monitoring, ventilating communication, rescue, etc.); they must communicate with the attendant as necessary to enable the attendant to monitor their status and to enable the attendant to alert entrants of the need to evacuate the space. In addition, the entrant must alert the attendant whenever the entrant recognizes any

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warning sign or symptom of exposure to a dangerous situation; if the entrant detects a prohibited condition. The entrant must evacuate the area as quickly as is practical whenever:

- *Attendant or supervisor orders so*
 - *Entrant recognizes warning signs/symptoms of hazardous exposure*
 - *Entrant detects prohibited condition*
 - *Evacuation alarm is activated*
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- **Entry:** Ingress by persons into a confined space which occurs upon breaking the plane of the confined space portal with his/her; and all periods of time in which the confined space is occupied.
 - **Hazard Evaluation:** A process to assess the severity of known, real, or potential hazards or all three, at or in the confined space.
 - **Hazardous Atmosphere:** An atmosphere that may be or is injurious to occupants by reason of: oxygen deficiency or enrichment, flammability or explosive; or toxicity.
 - **Hot Work:** Work within a confined space that produces arcs, flames, heat, or other sources of ignition.
 - **Isolation:** A process of physically interrupting or disconnecting, or both, pipes, lines, and energy sources from the confined space.
 - **LEL/LFL and UEL/UFL:** Acronyms for “lower explosive limit”/“lower flammable limit” and “upper explosive limit”/“upper flammable limit”.
 - **Lockout/Tagout:** The placement of a lock/tag on the energy isolating device in accordance with an established procedure. (the term “lockout/tagout” allows the use of a lockout device, a tag, or a combination of both).
 - **Oxygen Deficient Atmosphere:** An atmosphere containing less than 19.5% oxygen by volume.
 - **Oxygen Enriched Atmosphere:** An atmosphere containing more than 23.5% oxygen by volume.
 - **PEL:** An acronym for “permissible exposure limit” which is the allowable air containment level established by the US Dept of Labor, OSHA.
 - **Permit Required Confined Space (PRCS):** A confined Space which after evaluation has actual or potential hazards which have been determined to require written authorization for entry. Examples of these would be: 1) It contains or has the potential to contain a hazardous atmosphere; 2) It contains a material that has the potential for engulfing an entrant; 3) It has converging walls, a floor that slopes downward, or an internal configuration that could trap or asphyxiate an entrant; 4) It contains other recognized serious safety or health hazards (i.e. an electrical hazard that can't be locked out, moving machinery, etc.).
 - **Qualified Person:** A person who by reason of training, education, and experience is knowledgeable in the operation to be performed and is competent to judge the hazards involved.
 - **Toxic Atmosphere:** An atmosphere containing a concentration of a substance above the published or otherwise known safe levels.

RESPONSIBILITIES:

1. Facility Management

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- Conduct initial and follow-up employee training and maintain documentation of such training.
- Utilize a permit system for entry into confined spaces and ensure that all individuals who work in, and in connection with, confined spaces are trained in the use of this system.
- Identify all potential confined spaces and its associated hazards at the facility where an employee, vendor, contractor may enter under normal or unusual conditions.
- Ensure the proper personal protective equipment and devices are available for Confined Space Entry and employees have been trained in its use.
- Conduct periodic inspections of the Confined Space Entry Program to evaluate its effectiveness. This information shall be documented.

2. Employees:

- All employees shall receive initial and follow-up training on provisions and requirements of the Confined Space Entry Program. All training shall occur before the individuals are assigned.
- Each employee shall comply fully with all provisions and requirements of the Confined Space Entry Program. **TEAM INVOLVEMENT IS IMPORTANT!**
- Prior to entering a confined space, the employee shall be knowledgeable in all aspects of the Confined Space Entry procedure including the use of proper protective equipment and devices.
- Employees shall consult with their CSE Coordinator or other knowledgeable personnel whenever there are any questions regarding the Confined Space Entry Program.
- Employees shall be responsible for the care of personal protective equipment and other Confined Space Entry devices assigned for their use.

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PROCEDURES:

- 1. Hazard Determination** (Hazards shall be identified for each confined space to include, but aren't limited to, the following:
 - Past and current use of the confined space which may adversely affect the atmosphere of the confined space.
 - Physical characteristics, configuration and location of the confined space.
 - Existing or potential hazards in the confined space such as: oxygen deficient or enriched atmosphere, Flammable/explosive atmosphere, Toxic atmosphere, Mechanical hazards (i.e.: augers, blender, etc.)
- 2. Hazard Evaluation** (Hazards identified shall be evaluated by the CES Coordinator or other qualified person with respect to:
 - Scope of hazard exposure (i.e.: how many and/or which employees are exposed or may be affected).
 - Magnitude of the hazard (i.e.: how much energy may be released? How toxic are the contents? Quantity of the materials which could be inadvertently introduced? etc.)
 - Likelihood of hazard occurrence.
 - Consequences of the hazard occurrence.
 - Potential for changing conditions/activities that were not identified (i.e.: introduction of hot work of cleaning agents, weather changes, etc.)

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- Methods for controlling the hazards.

3. Hazard Re-Evaluation

- The CSE Coordinator shall determine the need for periodic identification and re-evaluation of the hazards based on possible changes in activities in the confined space or other physical and/or environmental conditions that could adversely affect the space.

4. Confined Space Entry Permit

- An entry permit shall be utilized for all entries and shall include the following information:
 - Date of entry, location of entry, and type of work that will be done in the confined space.
 - Hazards to be controlled or eliminated prior to proceeding with the entry.
 - Safety equipment required to perform the entry and job duties in the confined space.
 - Safety precautions required to perform the job.
 - Type of atmospheric tests required and the results of those tests.
 - Type of equipment necessary for rescue and how aid is summoned in the event of an emergency.
 - Duration for the permit.
 - Signature spaces for employees entering the space stand by personnel, and CSE Coordinator authorization.
- Before each entry into a confined space an entry permit shall be completed by the CSE Coordinator or qualified person and communicated to the entrants, or posted, or both.
- The permit shall remain in effect until the task is completed for the group of employees entering the Confined space.
- Before each re-entry into the Confined Space, the following steps are recommended:
 - Ensure atmospheric test results are within acceptable Permissible Exposure Limits (PEL).
 - Verify that all precautions and other measures called for on the permit are still in effect.
 - Ensure that only operations or work originally approved on the permit are conducted in the confined space.
- The permit shall be immediately revoked when conditions or work activities are different than those Specified on the permit and could introduce a new hazard to the confined space.
- A new permit shall be issued whenever changing conditions or work activities introduce new Hazards into the confined space.

5. Atmospheric Testing

- Before entry into a confined space, testing shall be conducted for hazardous atmospheres by the CSE Coordinator or qualified person.
- Initial testing of atmospheric conditions shall be done with the ventilation system shut down.
- Further testing shall be conducted with the ventilation systems turned on to ensure that the contaminants are removed.
- If the confined space is vacated for any significant period of time, the atmosphere shall be re-tested before re-entry is permitted.

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- The atmosphere of the confined space shall be considered within acceptable limits when the following conditions are maintained:
 - Oxygen content – oxygen must be between 19.5% to 23.5%
 - Explosive /Flammability – flammable gases or vapors must be less than 10% of the Lower Explosive Limit (LEL).
 - Toxic gases – must be less than the recognized OSHA Permissible Exposure Limit (PEL).
 - Testing must be representative of the entire confined space. Use extension probes to safely sample several layers of the confined space.

6. Stand-by Person/Attendant

- Under no circumstances shall any individual enter a confined space without having a stand-by person posted outside. This person shall remain outside the confined space unless relieved by another stand-by.
- Stand-by personnel shall have the following duties that do not conflict with his/her primary responsibilities, including, but not limited to, the following:
 - Know the space hazards, including information on the mode of exposure, signs, symptoms, and consequences of exposure.
 - Provide assistance to occupants entering the confined space (i.e.: handling tools and equipment).
 - Initiate evacuation and emergency procedures.
 - Maintain communication with occupants of the confined space.
 - Monitor for any conditions of changes that could adversely affect the entry.
 - Handle lifelines if required.
- If more than one confined space is to be monitored by a single attendant, the Safety Manager must be made aware and determine the method to enable the attendant to respond to emergencies in one or more permit spaces that he/she is monitoring without distraction from all responsibilities.
- This person does not retrieve occupants but emergency personnel.

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7. Isolation and Lockout/Tagout

- All energy sources must be controlled to prevent the unexpected energization, start-up, or release of stored energy which may cause injury to workers. Energy sources may include:
 - Electrical
 - Mechanical
 - Hydraulic
 - Pneumatic (air)
 - Chemical
 - Thermal
- Methods and means shall be selected to prevent accidental introduction of material into the confined space such as blinding, disconnection, removal, or double block and bleed of lines.
- Equipment or processes shall be locked out and tagged.
 - Any removal of locks, tags, or other protective measures shall be done in accordance with the lockout/tagout procedure.

8. Ventilating the Confined Space

- Gases that may leak into or otherwise enter the confined space during work or where an oxygen

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- Deficient atmosphere may be created, either natural or forced air ventilation, must be continued as
- Long as workers are in the confined space.
- Safety precautions are necessary when using mechanical ventilation:
 - Prevent re-circulation of contaminated air.
 - Prevent contaminating other areas with concentrations of flammable or toxic materials, which have been removed from the confined space.
 - Be aware of possible pockets of trapped contaminants remaining in the confined space.
- Natural Ventilation is permitted if all atmospheric tests are within acceptable limits.

9. Personal Protective Equipment (PPE)

- Employees shall wear PPE selected in accordance with the requirements of the job to be performed.
 - Head Protection
 - Eye and face protection
 - Hand Protection
 - Foot Protection
 - Protective Clothing
 - Respiratory Clothing
 - Fall Protection – where a potential exists for person or objects falling into a confined space, warning systems, or barricades shall be employed at the entrance.
- Individuals entering a confined space from a vertical access opening shall wear a full body harness
With a lifeline attached.
- Appropriate retrieval equipment methods shall be used when a person enters a confined space.

10. Cutting/Welding (Hot Work)

- Any hot work requires assurance that fire hazards and explosive atmospheres are controlled.
- Hot work permits are required prior to entry.
- When hot work involves the generation of toxic gases, vapors, or fumes, local exhaust blowers shall be used in conjunction with proper respiratory protection.
- Compress gas cylinders are not allowed in a confined space and gas lines should be protected from rupture or damage.
- The stand-by person shall attend compressed gas cylinders and electrical generators. Sources of compressed gases or arc welding power should be turned off immediately when an emergency arises or when work is interrupted or completed.

11. Use of Hazardous and/or Flammable Materials

- Quantities of hazardous or flammable materials brought into the confined space shall be limited to to the smallest amount consistent with efficient use.
- Containers used should be designed to minimize evaporation or spillage. Safety cans or small squeeze bottles are recommended.
- When using flammable materials, all sources of ignition shall be eliminated.

12. Tools

- All tools, extension cords and air hoses must be in good operating condition.

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- All electrical equipment brought into a confined space must be equipped with ground-fault circuit-Interrupters (GFCI). Electrical tools must be grounded or double insulated.
- It is recommended that spark-resistant tools be used when working in a confined space (i.e.: shovels, picks, etc.), where an explosive atmosphere may be present..

13. Illumination

- When portable lamps are used they shall be equipped with a handle, lamp holder, hook and substantial guard attached to the lamp holder or handle.
- Where temporary lighting is carried inside the confined space it shall be equipped with a handle, lamp holder, hook and substantial guard attached to the lamp holder or handle.
- Cords should be kept clear of working spaces and walkways.
- Temporary lighting shall be properly grounded.
- Battery, low voltage (12 volts), or lighting systems with properly installed ground-fault circuit interrupters shall be used.

14. Emergency Response

- Emergency situations that may occur during confined space entry include but are not limited to the following:
 - High concentrations of toxic gas
 - Oxygen deficient or enriched atmospheres
 - Mechanical or physical hazards within the confined space.
- During an emergency situation the following steps shall be followed:
 - Notify emergency response personnel and agencies - in most cases this will be the local fire department. They will handle retrieval. **DO NOT RETRIEVE/RESCUE THE OCCUPANT. KNOW THE PLANT EMERGENCY RESPONSE NUMBER BEFORE STARTING WORK.**
 - If the emergency involves conditions with high concentrations of toxic gas or oxygen deficient or enriched atmospheres, entrance into the confined space shall be performed only with the use of a self-contained breathing apparatus (SCBA). Also, individuals entering under these conditions must wear a full body harness with a lifeline attached. It is absolutely certain that the cause of the emergency is not a hazardous atmosphere, SCBA's are not required.
- Other rescue equipment that may be necessary include, but are not limited to, the following:
 - Mechanical lifting devices
 - First Aid Equipment
 - Communication Devices
 - Lighting etc.

15. Training

- Training shall include:
 - General hazards associated with confined spaces.
 - Reason for, proper use, and limitations of PPE and other safety equipment
 - Explanation of the permit system.
 - How to respond to emergencies.
 - Duties and responsibilities as an entrant of the confined space.

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- How to recognize probably air contaminant overexposure symptoms to themselves and co-workers, and methods for alerting stand-bys.
- Proper use of atmospheric instruments including field calibration, basic knowledge of the work being performed, and the anticipated hazardous contaminants.
- Use of Emergency rescue equipment.
- Training shall be conducted annually or re-training will be conducted when periodic assessments reveal that refresher training is needed.
- Training sessions will be conducted for all employees covering the same topics given new employees.
- All training shall be documented and maintained.

Examples:

SAMPLE OF A CONFINED SPACE PERMIT IS INCLUDED WITH THIS PROGRAM.