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Confined Space Entry

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Confined Spaces in Residential Construction

OSHA has developed a standard for Confined Spaces in Construction (29 CFR 1926 Subpart AA) that applies to spaces such as attics, basements, and crawl spaces. This Fact Sheet, developed after consultation with the National Association of Home Builders (NAHB), and a detailed [Frequently Asked Questions \(FAQs\)](#) document, clarify some of the standard's provisions and their application to residential construction work.

OSHA has developed a construction standard for Confined Spaces (29 CFR 1926 Subpart AA) — that applies to any space that meets the following three criteria:

- Is large enough for a worker to enter it;
- Has limited or restricted means of entry or exit; and
- Is not designed for continuous occupancy.

A confined space that contains certain hazardous conditions may be considered a **permit-required** confined space under the standard. **Permit-required** confined spaces can be immediately dangerous to workers' lives if not properly identified, evaluated, tested and controlled. A **permit-required** confined space means a confined space that has one or more of the following characteristics:

- Contains or has the 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;
- Contains any other recognized serious safety or health hazard.

How Employers Can Determine if Confined Spaces or Permit-required Confined Spaces Exist

Before beginning work on a residential homebuilding project, each employer must ensure that a competent person identifies all confined spaces in which one or more employees it directs may work, and identifies

each space that is a permit-required confined space. The competent person does not have to physically examine each attic, basement or crawl space, provided that the competent person can reliably determine whether the spaces with the same or similar configuration contain a hazard or potential hazard that would require the permit-space classification. The initial evaluation may be done using existing experience and knowledge of the space by the competent person and does not need to be documented. For example, a competent person responsible for inspecting new homes being built to identical specifications with the same materials need not physically inspect each attic separately to determine if it is a permit-required confined space.

How Common Spaces in Residential Construction are Impacted by the Standard

Spaces in a residential home may be considered confined spaces or permit-required confined spaces during the construction or remodeling process. However, the vast majority of the standard's requirements only apply to **permit-required** confined spaces, and attics, basements, and crawl spaces in a residential home — three common spaces — will not typically trigger these requirements.

Attics: In many instances, an attic will not be considered a confined space because there is not limited or restricted means for entry and exit. For example, an attic that can be accessed via pull down stairs that resemble the structure of a stationary stairway and do not require an employee to ascend /descend hand-over-hand would not be considered a confined space if there are no impediments to egress.

Attics that are determined to be confined spaces would generally not be **permit-required** confined spaces because they typically do not contain the types of hazards or potential hazards that make a confined space a permit-required confined space (those that could impair an entrant's ability to exist the space without assistance).

However, extreme heat in an attic can be considered a serious physical hazard such that the attic could be considered permit-required confined space. OSHA has not quantified how hot it must be to trigger the permit-required confined spaces requirements. However, heat that is extreme enough to cause heat exhaustion (e.g., dizziness, headaches, severe sweating, cramps) may impede an entrant's ability to exit the attic without assistance and would make a confined space permit-required.

Basements: Basements in a residential home that are designed for continuous occupancy by a homeowner are not considered confined spaces under the standard, provided the basement is configured as designed (e.g., has permanent stairs, a walk-out entry/exit, or an egress window installed).

Crawl Spaces: Crawl spaces in a residential home will not typically trigger the majority of the requirements of the standard unless they contain a physical hazard such as an exposed active electric wire.

For Employers

Regardless of the area, the competent person needs to pay particular attention to acute health hazards that may be present when assessing confined spaces, such as toxic (carbon monoxide), flammable, or explosive atmospheres. Safety Data Sheets (SDSs) must be maintained and reviewed to fully assess potential hazards prior to worker entry into a confined space to determine whether it is a permit-required space.

Employers' obligations under the standard will depend, in part, on what "type" of employer they are. However, most of the obligations in the standard apply to **entry** employers.

Host employer: The employer who owns or manages the property where the construction work is taking place.

Controlling contractor: The employer who has overall responsibility for construction at the worksite (note that if the controlling contractor

owns or manages the property, then it is both a controlling employer and a host employer).

Entry employer (Sub Contractor): Any employer who decides that an employee it directs will enter a **permit-required** confined space.

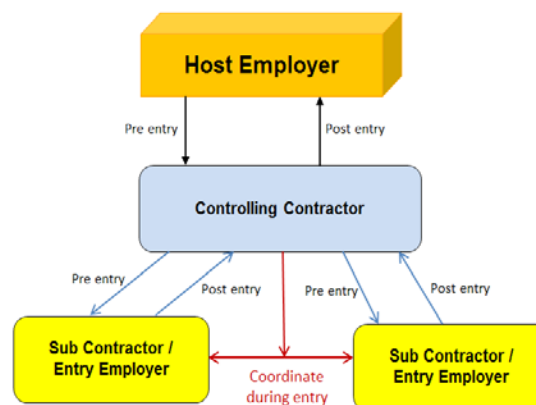
The standard makes the controlling contractor the primary point of contact for information about permit-required confined spaces at the work site. The controlling contractor passes information it has about permit-required confined spaces at the work site on to the employers whose workers will enter the spaces (entry employers).

Likewise, entry employers must give the controlling contractor information about their entry program and hazards they encounter in the space, and the controlling contractor passes that information on to other entry employers. The controlling contractor is also responsible for making sure that employers outside a space know not to create hazards in the space, and that workers from different entry employers working in a space at the same time do not create hazards for each other.

Host/Controlling Employer Obligations

Before entry operations begin, a host employer with the following information must provide it to the controlling contractor:

- Location of each known permit-required confined space;
- Hazards or potential hazards in each space or the reason it is a permit-required confined space; and
- Any precautions that the host employer or any previous controlling contractor/entry employer implemented for the protection of workers in the permit-required confined space.



Note: The above diagram shows the information flow and coordination between these employers

The multi-employer communication requirements only apply to host employers with employees who work at the worksite, regardless of when those workers are at the site and only apply to **permit-required** confined spaces. In addition, beyond this duties discussed above, host employers and controlling contractors are not responsible for compliance with the **permit-required** confined space program provisions of the standard if they have no reason to anticipate that the employees they direct will enter a permit-required confined space.

Entry Employer Obligations

Inform employees: If a workplace contains a permit-required confined space, the entry employer must inform workers in the vicinity of each space of the location and danger posed by that space. This can be done by posting and positioning warning signs at each possible point of entry, or by other equally effective means. The employer must also either take steps to prevent its employees from entering that space or ensure that entry only occurs through a permit program or as otherwise allowed by the standard (alternative entry procedures).

Personal Protective Equipment: Entry employers allowing an employee to enter a permit space must attempt to eliminate or isolate the hazards in the space. When engineering and work-practice controls do not adequately protect employees, they must assess the space to determine what personal protective equipment (PPE) is needed to protect workers. Entry employers must provide workers with the required PPE and proper training on its use and about any related hazards before the work starts.

Training: The standard requires employers to ensure that their workers know about the existence and location of, and dangers posed by, each permit-required confined space, and that they may not enter such spaces without authorization. Entry employers must train workers involved in permit-required confined space operations so that they can perform their duties safely and understand the hazards in permit spaces and the methods used to isolate, control or protect workers. Workers not authorized to perform entry rescues must be trained on the dangers of attempting such rescues.

Written permit-required confined space entry program: The permit-required confined space program must establish a system for preparing, using, and canceling entry permits, which are written or printed documents that allow and control entry into permit spaces.

Rescue: Entry employers must ensure that properly trained rescue and emergency services are available before entry into permit-required confined spaces. For a full discussion of an entry employer's obligations to provide rescue, see OSHA's Fact Sheet entitled: [Is 911 your Confined Space Rescue Plan?](#)

Resources

For additional information see OSHA's Confined Spaces in Construction webpage at www.osha.gov/confinedspaces.

How to Contact OSHA

For questions or to get information or advice, to find out how to contact OSHA's free on-site consultation program, order publications, report a fatality or severe injury, or to file a confidential complaint, visit www.osha.gov or call 1-800-321-OSHA (6742).

This fact sheet was developed by OSHA after consultation with NAHB. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: 1-877-889-5627.

For assistance, contact us. We can help. It's confidential.



www.osha.gov (800) 321-OSHA (6742)



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Is 911 your Confined Space Rescue Plan?

Permit-required confined spaces can present conditions that are immediately dangerous to workers' lives or health if not properly identified, evaluated, tested and controlled.

OSHA has developed a standard for Confined Spaces in Construction ([29 CFR 1926 Subpart AA](#)) for any space that meets all of the following criteria:

- Is large enough for a worker to enter;
- Has limited means of entry or exit; and
- Is not designed for continuous occupancy.

One provision of the standard requires employers to develop and implement procedures for summoning rescue or emergency services in permit-required confined spaces. An employer who relies on local emergency services for assistance is required to meet the requirements of [§1926.1211 — Rescue and emergency services](#).

OSHA recognizes that not all rescue services or emergency responders are trained and equipped to conduct confined space rescues. When employers identify an off-site rescue service, it is critical that the rescuers can protect their employees. The emergency services should be familiar with the exact site location, types of permit-required confined spaces and the necessary rescue equipment.

For Employers

Calling emergency responders to provide rescue services can be a suitable way of providing for rescues in a permit-required confined space. Pre-planning will ensure that the emergency service is capable, available and prepared.

Prior to the start of the rescue work operation, employers must evaluate prospective emergency responders and select one that has:

- Adequate equipment for rescues, such as: atmospheric monitors, fall protection, extraction equipment, and self-contained breathing apparatus (SCBA) for the particular permit-required confined spaces.



Photo: Oregon OSHA

Emergency service workers perform a practice rescue inside a manhole.

- The ability to respond and conduct a rescue in a timely manner based on the site conditions and is capable of conducting a rescue if faced with potential hazards specific to the space. Such hazards may include:
 - Atmospheric hazards (e.g., flammable vapors, low oxygen)
 - Electrocutation (e.g., unprotected, energized wires)
 - Flooding or engulfment potential
 - Poor lighting
 - Fall hazards
 - Chemical hazards
- Agreed to notify the employer in the event that the rescue team becomes unavailable.

Employers must also:

- Inform the emergency responders of potential hazards when they are called to perform a rescue at the worksite; and

- Provide emergency responders with access to all permit-required confined spaces. Such access may include:
 - Information on access routes, gates or landmarks
 - A project site plan if necessary
 - GPS coordinates if in a remote location

Additionally, employers should ensure that:

- The most efficient means to contact emergency responders is available;
- Any changes to the project site conditions are communicated to the rescue service; and
- Emergency responders are willing to visit the site and conduct a joint training exercise with the employer.

For Emergency Service Providers

Permit-required confined space emergencies can threaten workers' safety and health. Talking with the employer about the hazards they might encounter will assist in preparing for the situation. The following are some questions responders should be able to answer when an employer requests their services:

- Are you able to respond and conduct a rescue in a timely manner based on the site conditions?
- Do you have the appropriate equipment for response and rescue, such as: atmospheric monitors, fall protection, extraction equipment, and self-contained breathing apparatus (SCBA) for the particular permit-required confined spaces?
- Are you prepared for the hazards the employer has identified?
 - Atmospheric hazards (e.g., flammable vapors, low oxygen)
 - Electrocution (e.g., unprotected, energized wires)
 - Flooding or engulfment potential
 - Poor lighting
 - Fall hazards
 - Chemical hazards

- Are you trained for the hazards identified by the employer?
 - Hazard Communication training (HAZCOM)
 - Respiratory Protection training
 - Hazardous Material training
 - HAZWOPER training
 - Hazard recognition
 - Can you cope with other hazards the company may have identified on the site?
 - Do you need to develop a new procedure for these hazards/conditions?
- Has the employer provided you with the **exact** location of the work site?
 - Information on access routes, gates or landmarks
 - A project site plan if necessary
 - GPS coordinates if in a remote location
- Can you visit the site and hold a practice rescue?
- Does the company know the best way to contact you?
- How would the company communicate any changes to site conditions throughout the project?
- Could other emergencies or group training preclude you from responding and how will that be communicated?

OSHA encourages all emergency service providers to work closely with employers who request their services for permit-required confined space rescues. Pre-rescue planning, communication, and effective coordination of rescue activities are critical in the event that a life-threatening incident should occur.

Private sector commercial emergency service providers are covered by Federal OSHA and must comply with the provisions of [§1926.1211](#). Similarly, state and local government emergency service providers in a state with an OSHA approved state plan must comply with these requirements. See www.osha.gov/dcsp/osp for information on state-plan requirements.

For more information on confined spaces in construction, visit OSHA's website at: www.osha.gov/confinedspaces.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.

- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For more information, see [OSHA's Workers page](#).

How to Contact OSHA

For questions or to get information or advice, to report an emergency, fatality, inpatient hospitalization, amputation, or loss of an eye, or to file a confidential complaint, contact your nearest OSHA office, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.



www.osha.gov (800) 321-OSHA (6742)



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Confined spaces are areas large enough for a worker to enter and perform work, have a limited or restricted means of entry or exit; and are not designed for continuous employee occupancy. The purpose of this Fatal Facts is to highlight the importance of identifying confined spaces in agricultural workplaces to prevent another fatality.

The General Duty Clause requires employers to provide employees with workplaces, including confined spaces, which are free from recognized hazards likely to cause death or serious physical harm. Agricultural operations are covered by several Occupational Safety and Health standards including Agriculture ([29 CFR 1928](#)) and parts of General Industry ([29 CFR 1910](#)), as well as the [General Duty Clause](#) of the Occupational Safety and Health Act (section 5(a)(1)). OSHA's confined spaces standard at 29 C.F.R. 1910.146 does not apply to agricultural operations, but serves as a guide for how to prevent these accidents.



Photo courtesy of OSHA

Figure 1: The hole cut into the side of the whey tank was used for the rescue operation.

BRIEF DESCRIPTION OF INCIDENT

A farm maintenance worker died after entering an 8,000-gallon polyethylene storage tank that was not marked to indicate a potential uncontrolled hazardous atmosphere. At the time of the incident, the tank contained liquid whey, known to produce carbon dioxide gas as it decomposes. A broken ball valve inside the tank needed replacement. Using a forklift, a worker was lowered through a 16-inch-diameter hole at the top to fix the valve. The forklift operator had no visual contact or other means to monitor the situation inside the 12-foot-by-12-foot tank. To determine the worker's progress inside the tank, the operator climbed to the top of an adjacent bin where he saw the worker lying face down inside the whey tank. The fire department responded and cut a hole in the tank (see Figure 1) to retrieve the worker who had died from asphyxiation.

LIKELY CAUSES

The high outdoor temperatures and direct sunlight on the tank likely caused the liquid whey in the tank to decompose more rapidly than normal. Decomposition likely released lethal carbon dioxide gas and lowered oxygen levels, resulting in a hazardous atmosphere (oxygen concentrations below 19.5% or above 23.5% create a hazardous atmosphere). The employer failed to recognize that the tank was a confined space containing a hazard, so protective measures were not in place to alert workers to a potential hazardous atmosphere and prevent them from entering the storage tank without recognized controls.

INCIDENT PREVENTION

Employers involved in agricultural operations can take the following actions to reduce worker exposures to confined space hazards:

- **Identify and label all confined spaces.** Examples common in agriculture include:
 - Grain and feed storage facilities
 - Corrugated steel bins
 - Silos

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information, see www.osha.gov/workers.

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education, and assistance. For more information, visit www.osha.gov.

OSHA Standards and Regulations:

www.osha.gov/law-regs.html

OSHA Publications: www.osha.gov/publications

OSHA-Approved State Plans: www.osha.gov/dcpsp/osp

Free On-Site Consultation Services:

www.osha.gov/consultation

Training Resources: www.osha.gov/dte

Compliance Assistance Services:

www.osha.gov/complianceassistance

- Sumps, tunnels, and pump pits
- Dump pits
- Forage storage
- Manure storage tanks
- Manure/bio-digester units
- Manure transport vehicles (tanks and applicators)
- Bulk transport vehicles
- Sprayer and chemical transport vehicles
- Forage and silage dump wagons
- Feed grinders/mixers
- Feed mixer wagons tanks
- Storage and mixing tanks, bins, and silos
- Fermentation vessels
- Environmentally controlled fruit and vegetable storage units
- Bulk liquid storage tanks
- Containment areas around diked storage tanks
- Wells, cisterns, dry wells, septic tanks
- Grain driers
- Fuel storage tanks
- **Evaluate all confined spaces** to determine if they contain any actual or potential hazards.
- **Train workers** to never enter a confined space before the hazards and the steps to address the hazards to provide for safe entry and exit have been identified.
- **Ensure workers review, understand, and follow the procedures** before entering confined spaces and know how and when to exit. Ensure there is a safe means to enter and exit the space such as using ladders.
- **Consider chemical reactions** that could occur based on the materials in the confined spaces, and potential byproducts that could create a hazardous atmosphere.
 - Ensure air sampling is conducted prior to anyone entering the space.
 - Ensure that sampling equipment can measure potential byproducts.
 - Use an appropriate routine and simple detection approach. A 4-gas meter will only detect oxygen deficiency and three additional hazards (usually flammability, carbon monoxide, and hydrogen sulfide). Detector tubes or a simple hand-held meter such as a photoionization detector may also be needed.
- **Use a written confined space entry system** that covers the following:
 - Before entry, identify any hazards, including physical, within the space.
 - Before and during entry, test and monitor for oxygen content, flammability, toxicity, and explosion hazards.
 - Ensure confined spaces are properly ventilated.
 - Ensure that workers entering confined spaces maintain contact at all times with a trained attendant either visually, by phone, or by two-way radio.
 - Use appropriate equipment (fall protection, rescue, air-monitoring, lighting, and communication) according to entry procedures.
- **Develop an emergency action plan** that includes quick removal of the entrant and procedures for facility operators and local responders. Communicate the plan to workers, and ensure that it is reviewed and updated regularly.

ADDITIONAL RESOURCES:

- Refer to the consensus standard on permit-required confined space: American National Standard ANSI/ASSE Z117.1: Safety Requirements for Entering Confined Spaces.
- OSHA's Safety and Health Topics: [Agricultural Operations](#).
- OSHA's Safety and Health Topics: [Confined Spaces](#).
- [29 CFR 1910.146](#) Permit-required confined spaces.

Note: The described case was selected as an example of improper work practices that likely contributed to a workplace fatality. The incident prevention recommendations do not necessarily reflect the outcome of any legal aspects of this case. OSHA encourages your company or organization to duplicate and share this information.

This Fatal Facts is not an OSHA standard or regulation and it creates no new legal obligations. The recommendations contained herein are advisory in nature and are intended to assist employers in providing safe and healthful workplaces. The Occupational Safety and Health Act of 1970 (OSH Act) requires employers to comply with safety and health standards promulgated by OSHA or by an OSHA-approved state plan. The requirements of OSHA-approved state plans can be reviewed by selecting the state's website at: www.osha.gov/dcsp/osp. The OSH Act's General Duty Clause, Section 5(a)(1), requires employers to provide employees with a workplace free from recognized hazards likely to cause death or serious physical harm.

For assistance, contact us. We can help. It's confidential.



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