

Confined Spaces in Construction: Sewer Systems

Confined spaces can present conditions that are immediately dangerous to workers if such conditions are not properly identified, evaluated, tested, and controlled. This fact sheet highlights many of the confined space hazards associated with sewer systems and how employers can protect workers in these environments.

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

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

A space may also be a **permit-required** confined space if it has a hazardous atmosphere, the potential for engulfment or suffocation, a layout that might trap a worker through converging walls or a sloped floor, or any other serious safety or health hazard.

Fatal Incidents

Confined space hazards in sewer systems have led to worker deaths. Several tragic incidents in sewers have included:

- A worker who lost consciousness and died when he climbed into a sewer vault to retrieve a tool. His co-worker also died when he attempted a rescue.
- While repairing a natural gas leak, a worker entered a drainage pipe to retrieve survey equipment. The natural gas ignited, killing the worker.

Training

The new Confined Spaces standard requires employers to ensure that their workers know about the existence, location, and dangers posed by each permit-required confined space, and that they may not enter such spaces without authorization.

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.

Safe Entry Requirements

The new Confined Spaces standard includes several requirements for safe entry.

Preparation: Before workers can enter a confined space, employers must provide pre-entry planning. This includes:

- Having a competent person evaluate the work site for the presence of confined spaces, including permit-required confined spaces.
- Once the space is classified as a permit-required confined space, identifying the means of entry and exit, proper ventilation methods, and elimination or control of all potential hazards in the space.
- Ensuring that the air in a confined space is tested, before workers enter, for oxygen levels, flammable and toxic substances, and stratified atmospheres.
- If a permit is required for the space, removing or controlling hazards in the space and determining rescue procedures and necessary equipment.
- If the air in a space is not safe for workers, ventilating or using whatever controls or protections are necessary so that employees can safely work in the space.

Ongoing practices: After pre-entry planning, employers must ensure that the space is monitored for hazards, especially atmospheric hazards. Effective communication is important because there can be multiple contractors operating on a site, each with its own workers needing to enter the confined space. Attendants outside confined spaces must make sure that unauthorized workers do not enter them. Rescue attempts by untrained personnel can lead to multiple deaths.

Confined Spaces in Sewer Systems

Types of sewer systems include sanitary (domestic sewage), storm (runoff), and combined (domestic sewage and runoff). Sewer systems are extensive

and include many different components that are considered confined spaces, including pipelines, manholes, wet wells, dry well vaults, and lift/pump stations. Therefore, employers conducting work in sewer systems will likely have workers who will encounter confined spaces.

Sewer systems also consist of wastewater treatment plants, where confined spaces include digestion and sedimentation tanks, floating covers over tanks, sodium hypochlorite tanks, and wastewater holding tanks, among others. Many of these components may also qualify as permit-required confined spaces.

Employers must take all necessary steps to keep workers safe in confined spaces, including following the OSHA Construction Confined Spaces standard. This standard applies to both new construction within an existing sewer and alterations and/or upgrades. For example:

- Installing or upgrading a manhole.
- Altering or upgrading sewer lines.
- Making nonstructural upgrades to joints, pipes, or manholes.
- Demolition work.
- Installing new or upgraded pump equipment, cables, wires, or junction boxes.

Construction work can create confined spaces, even if there are none at the start of a project. Changes to the entry/exit, the ease of exit, and air flow could produce a confined space or cause one to become permit-required.

Hazards Associated with Sewer Systems

Sewer systems can present a host of confined space hazards, including:

- Atmospheric hazards (low oxygen, toxic or flammable gases).
- Chemicals in piping and from roadway runoff (may harm lungs, skin, or eyes).
- Engulfment and drowning.

- Electrocution (e.g., using electrical equipment in wet working conditions).
- Slips, trips, and falls.
- Falling objects.
- High noise levels, low visibility, limits to communication, and long distances to exits.

Personal protective equipment: Employers should assess the work site to determine what personal protective equipment (PPE) is needed to protect workers. Employers should provide workers with the required PPE and proper training on its use and about any related hazards before the work starts.

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).

Additional Information

[OSHA's Confined Spaces in Construction standard \(29 CFR 1926 Subpart AA\)](#)

[Confined Spaces: OSHA Construction Industry Topics by Standard](#)

[OSHA Fact Sheet: Procedures for Atmospheric Testing in Confined Spaces](#)

[Confined Spaces: NIOSH Workplace Safety and Health Topics Page](#)

[State Plan Guidance:](#) States with OSHA-approved state plans may have additional requirements for confined space safety.

[Help for Small and Medium-Sized Employers:](#) OSHA's On-site Consultation Program offers free and confidential advice to businesses nationwide.

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: 1-877-889-5627.

