SAFETY AT WORK

Non-Atmospheric Hazards in Confined Spaces

29 CFR 1910.146

What hazards could be found in a Confined Space?

Confined spaces can have a lot of different hazards in them. The main categories of hazards are:

1. A hazardous atmosphere,
2. Materials that could **engulf** a person,
3. A space that has **an internal configuration** that narrows down to a small area where a person could be trapped or asphyxiated, and
4. A space that contains any other recognized serious **safety or health hazard**.

Engulfment

Engulfment is the entrapment of a person by the contents of a space. The contents surround the entrant(s) and holds them. The substance can be a liquid or flowable solid substance.

Entrants can be captured and die due to:

- Being pressed on by the substance with enough force that they can no longer breathe and are strangled, constricted, or crushed;
- Sinking down into the substance and aspirating it, causing death by filling or plugging the respiratory system.

Engulfment can occur when working in spaces with:

- Liquids;
- Small granular products such as grain;
- Materials that cling to the sides of the space (the material falls);
- Materials that form a "bridge" inside the space (these materials fall also);
- Accidental or deliberate flooding of the space with a liquid;
- Dirt, rocks, ice, etc.

Completely empty the contents of the space before entry begins, if possible!

Use non-entry retrieval and fall arrest equipment to prevent workers from falling or sinking down into the contents of the space.

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Internal configuration that narrows to a small area

If a space has inwardly converging walls or a floor that slopes and tapers to a smaller cross-section, entrants could fall down to the smaller area and be trapped.

Some spaces may have hazards due to the internal configuration of the space caused by:

- Multiple ladders or scaffolds in the space;
- Pits or other uneven flooring in the space;
- Complex layouts, tunnels, or tight corners;
- Sharp edges that can tear protective clothing and other equipment;
- Low or narrow areas that can trap workers.

Know ALL the hazards and quirks of your space.

When you're planning, consider every piece of equipment, every opening, every twist and turn.

Plan for EVERYTHING!

Any other recognized serious safety or health hazard

- **Mechanical hazards**
  - Paddles
  - Blades
  - Shafts and augers
  - Chain or belt drives
  - Hydraulic or pneumatic energy

Lock and tag out <u>everything</u> that could move and injure workers.

- **Electrical**
  - Non-explosion proof lighting
  - Broken lighting or other equipment
  - Electrical sensing devices
  - Limit switches
  - Level indicating devices
  - Hazards from equipment taken into the space

Check all equipment before using it in a potentially explosive atmosphere – make sure it's explosion-proof.

Protect employees from any live electrical hazards by locking and tagging them out.

- **Stability and Portability**
  - Rail cars
  - Concrete trucks
  - Semi-trailers

Chock wheels, secure ignition keys, place signs at 'hitching' positions, put derails in place.

- **Temperature**
  - Heat stroke, stress
  - Severe burns from surfaces
  - Hot surfaces that burn equipment
  - Extremely cold surfaces can freeze to the skin

Do not allow entry until temperatures are within a pre-set range.

- **Noise**
  - Extreme, short-term noise can cause permanent hearing loss
  - Loud environment may interfere with communication and delay rescue or emergency services if needed

Protect workers' ears and pre-plan how you will have effective communication between the entrants and attendants.