



Risk Control

Working in Confined Spaces

A “confined space” may be generally defined as any area which has limited means of egress and is subject to oxygen deficient atmosphere or to the accumulation of toxic or flammable vapors. Examples of these are:

Bins	Boilers	Deep Trenches	Hoppers	Pits	Process Vessels
Sewers	Silos	Tanks	Vats	Vaults	

Working in any confined space is a potential killer. The hazards are lack of oxygen and a variety of gases/vapors which may replace the oxygen and/or accumulate to toxic or explosive levels.

A normal atmosphere contains approximately 20% oxygen. Any atmosphere containing less than 19.5% oxygen is considered to be oxygen deficient. Air containing 16% or less oxygen is lethal. An oxygen deficient atmosphere may be produced by consumption or displacement of oxygen by another gas.

The following safety precautions should be taken to avoid death or serious injury when working in confined spaces:

- Don't enter any confined space without knowing what is in it, what was in it and what precautions should be taken.
- If possible, purge the involved space with steam, water, compressed air or fresh air using exhaust and blowing devices. Retest the atmosphere after purging.
- Have competent people test the atmosphere with gas detection equipment to determine if there are any toxic gases and if there is sufficient oxygen to support life.
- Close and lock-out any supply lines, chutes, pipes, etc., to confined space in which work is being done. Continue to monitor the atmosphere in a confined space even if it was “safe” when work began.
- Remove any remaining sludge or other deposits. This must be done carefully since some caustic cleaning solvents can react violently with some residues.
- Where an explosive or flammable atmosphere is present, avoid all possible sources of ignition and use extreme care in purging the contaminated space.

If purging is impossible or impractical:

- Inform employees of the hazards, what they can expect, and what they must do.
- Provide sufficient general ventilation to guarantee fresh air.
- Provide an approved air-supplied respirator and safety harness with a life line if there is a possibility of the atmosphere becoming hazardous.
- Don't contaminate your own air. Avoid use of toxic solvents, leaky acetylene hoses, carbon tetrachloride and other similar lethal materials.

Anyone entering a hazardous atmosphere should be equipped with an air-supplied respirator or self-contained breathing equipment, a safety harness and a life line. He/she should be backed up by a similarly equipped worker to assist in the event of any emergency. A third worker within sight and hearing of this work should be informed that workers are going into the confined space.

If an emergency situation arises in a confined space, the "stand-by" man, before entering the area, should:

- Sound an alarm or summon help via voice communication.
- Put on and properly adjust the life line and respiratory protective equipment.
- Enter confined space only after help has arrived.

Another condition frequently encountered in confined spaces is high temperature. Heat stroke, which can be fatal, or more commonly, heat cramps or heat exhaustion causing only temporary discomfort can result from physical exertion in a hot atmosphere. Methods used to alleviate this condition would include:

- Adequate natural or forced ventilation
- Cooling of air by portable air conditioning units.
- Providing intermittent rest periods in cooler atmosphere outside the confined space.
- Use of salt tablets and ample drinking water to replace liquids and salts lost.
(CAUTION: Persons with heart problems or those on a "Low Sodium" diet or whose intake of salt must be restricted – consult a physician on how to care for persons with these conditions.)
- Get medical help.

For more information, contact your independent agent, CNA risk control consultant or visit [cna.com](https://www.cna.com) today.