

# Confined spaces—Dangerous atmospheres

## Explain dangers

Dangerous atmospheres have killed those working in confined spaces as well as those attempting rescue. Dangerous types of atmospheres include

- Flammable and explosive
- Toxic
- Oxygen-deficient
- Oxygen-enriched.

**Flammable and explosive atmospheres** include

- Natural gas from leaking gas lines or natural sources
- Methane from decaying sewage
- Propane gas from leaking cylinders or equipment
- Gasoline vapour from leaking tanks and spills
- Vapour from solvents used for painting, cleaning, refinishing, etc.

**Toxic atmospheres** include

- Vapour from solvents
- Hydrogen sulfide from decaying sewage or raw petroleum
- Carbon monoxide from engine exhaust.

**Oxygen-deficient atmospheres** contain less than 19.5% oxygen. Breathing oxygen-deficient air can make you lose judgment, coordination, and consciousness. In a confined space, oxygen can be displaced by other gases or used up by rusting metal, combustion, or bacteria digesting sewage.

**Oxygen-enriched atmospheres** contain more than 23% oxygen. They are rare and are usually caused by leaking oxygen hoses or cylinders.

## Identify controls

Check for atmospheric hazards before entering any confined space. Use properly calibrated gas detection equipment. Many dangerous atmospheres cannot be detected by smell or taste.

Make sure the equipment is able to detect what you suspect. Some detectors have sensors that check for oxygen content, explosive gases or vapours, and a range of toxic gases. Some have only one or two sensors and may not detect certain types of hazards. You may need a selection of detectors—one detector can't test for everything.

Check all levels of the space. Some contaminants are lighter than air and accumulate near the top of the space. Others are heavier than air and settle at the bottom.

If you leave the space for a break or lunch, test before you go back in. Dangerous atmospheres can develop without warning.

If tests indicate a dangerous atmosphere, you must NOT enter the space until it is thoroughly ventilated and subsequent tests indicate the air is safe to breathe.

Ventilation and testing must be continued as long as you are in the space.

If the space can't be adequately ventilated, you can only enter if

- you wear suitable respiratory protection and a full-body harness attached to a rope anchored outside the space and held by a worker with an alarm
- you have a means of communication with the worker outside
- a person trained and equipped in artificial respiration and emergency rescue is available outside the space.

Never try to rescue a worker overcome in a confined space unless you are trained and equipped for it.

Many workers trying to save their buddies have become victims themselves. Get emergency help.

## Demonstrate

Review the types of confined spaces and atmospheric hazards that your crew may encounter. Demonstrate how to use gas detection equipment.