



## **INTRODUCTION/DEFINITION**

Many different places require welding, cutting, and heating work. Some of these places lack room and become “confined spaces.” Confined spaces have the following characteristics:

- Limited space, entry, or exit.
- Poor ventilation—lack of safe breathing air and possible buildup of hazardous gases, fumes, and particles.

## **EXAMPLES OF CONFINED SPACES**

- Small rooms.
- Process vessels.
- Pits
- Tunnels.
- Vats.
- Reactor vessels.
- Underground utility vaults.
- Unventilated corners of a room.
- Furnaces.
- Storage tanks.
- Pipelines.
- Sewers.
- Silos.
- Degreasers
- Boilers
- Compartments of ships.
- Ventilation and exhaust ducts.

## **REASONS FOR DEATHS AND SERIOUS INJURIES FROM WELDING IN CONFINED SPACES**

- Fire.
- Electric shock.
- Exposure to hazardous air contaminants.
- Explosion.
- Asphyxiation.

## **ACTIONS REQUIRED BEFORE APPROVING START OF WORK IN A CONFINED SPACE**

- Open all covers and secure them from closing.

- Test confined space atmosphere for (1) suitable oxygen content, (2) no combustibles or reactives, (3) no toxics.

*Note: The testing requires special equipment and training.*

- Isolate lines by capping or double valving and venting, if feasible—keep vents open and valves leak-free.
- Lock out all systems not required during welding, cutting, or heating.
- Provide means for readily turning off power, gas, and other supplies from outside the confined space.
- Protect or remove any hazardous materials or materials which may become a physical or health risk when heated or exposed to an arc.

## **REQUIRED ACTIONS DURING WORK IN A CONFINED SPACE**

- Continuously ventilate and monitor confined space to ensure that fumes and gases do not exceed safe exposure limits as found in OSHA (Occupational Safety and Health Administration) regulations Title 29, CFR Part 1910, 1000.
- Use NIOSH/MSHA (National Institute for Occupational Safety and Health/Mine Safety and Health Administration) approved breathing device when required by code, instruction, or good practice.
- Keep unnecessary persons and equipment out of and away from the confined space.
- Do not allow equipment to block exit or possible rescue efforts.
- Place as much equipment as possible outside the confined space.
- Do not go into a confined space unless a watchperson, properly equipped and trained for rescue, is outside and maintaining continuous communications with worker inside.
- Provide means for turning off power, gases, and fuel from inside the confined space, if feasible, especially if outside turn-off means are not provided, feasible, or certain.

## **INFORMATION SOURCES**

National Institute for Occupational Safety and Health. *Criteria for a Recommended Standard—Working in Confined Spaces*, NIOSH Publication No. 80-106. Cincinnati, Ohio: National Institute for Occupational Safety and Health.

Occupational Safety and Health Administration (OSHA). *Code of Federal Regulations*, Title 29 Labor, Chapter XVII, Parts 1901.1 to 1910.1450, Order No. 869-019-00111-5, available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

De Reamer, R. *Modern Safety and Health Technology*, New York, New York: John Wiley & Sons.

American National Standards Institute (ANSI). *Safety Requirements for Working in Tanks and Other Confined Spaces*, ANSI Z117.1, available from American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

Mine Safety and Health Administration (MSHA). *Code of Federal Regulations*, Title 30 Mineral Resources, Parts 1-199, available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.