

## 9.2: Fire Prevention

### Fire hazards

When practical, objects to be welded, cut, or heated shall be moved to a designated safe location or, if the objects to be welded, cut, or heated cannot be readily moved, all movable fire hazards in the vicinity shall be taken to a safe place, or otherwise protected.

If the object to be welded, cut, or heated cannot be moved and if all the fire hazards cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.

No welding, cutting, or heating shall be done where the application of flammable paints or the presence of other flammable compounds, or heavy dust concentrations creates a hazard.

### Fire extinguishing equipment

Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use. When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire while the actual welding, cutting, or heating

operation is being performed, and for a sufficient period of time after completion of the work to ensure that no possibility of fire exists. Such personnel shall be instructed as to the specific anticipated fire hazards and how the firefighting equipment provided is to be used.

When welding, cutting, or heating is performed on walls, floors, and ceilings, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent area, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

### Confined Space

For the elimination of possible fire in enclosed spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the enclosed space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch period. Overnight and at the change of shifts, the torch and hose shall be removed from the confined space. Open-end fuel gas and oxygen hoses shall be immediately removed from enclosed spaces when they are disconnected from the torch or other gas-consuming device.

### Containers

Except when the contents are being removed or transferred, drums, pails and other containers, which contain or have contained flammable liquids, shall be kept closed. Empty containers shall be removed to a safe area separate from hot work operations or open flames.

Drums, containers, or hollow structures which have contained toxic or flammable substances shall, before welding, cutting, or heating is undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested.

Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any built-up pressure during the application of heat.

## Ventilation and Protection in Welding, Cutting and Heating

### Mechanical ventilation

Either general mechanical or local exhaust ventilation shall be provided whenever welding, cutting, or heating is performed in a confined space.

Mechanical ventilation shall meet the following requirements:

1. Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.
2. General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits, as defined in Subpart D.
3. Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source

and keep the concentration of them in the breathing zone within safe limits as defined in Subpart D.

4. Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.
5. All air replacing that withdrawn shall be clean and breathable.
6. Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust from clothing, or for cleaning the work area.

### Confined Spaces

General or local exhaust ventilation is not required when sufficient ventilation cannot be obtained without blocking the means of access to the confined space. In these cases, employees in the confined space shall be protected by air line respirators in accordance with the requirements of Subpart E, and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

When a welder must enter a confined space through a manhole or other small opening, means shall be provided for quickly removing him in case of emergency. When safety belts and lifelines are used for this purpose they shall be attached to the welder's body so that his body cannot be jammed in a small exit opening. An attendant with a pre-planned rescue procedure shall be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.

### Materials of toxic significance

Welding, cutting, or heating in any enclosed spaces involving the following metals shall be performed with either general mechanical or local exhaust ventilation:

1. Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.
2. Lead base metals.
3. Cadmium-bearing filler materials.
4. Chromium-bearing metals or metals coated with chromium-bearing materials.

Welding, cutting, or heating in any enclosed spaces involving the following metals shall be performed with local exhaust ventilation or employees shall be protected by air line respirators in accordance with the requirements of Subpart E of this part:

1. Metals containing Lead or metals coated with Lead-bearing materials.
2. Cadmium-bearing or cadmium-coated base metals.
3. Metals coated with mercury-bearing metals.
4. Beryllium-containing base or filler metals. Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.

Employees performing such operations in the open air shall be protected by filter-type respirators in accordance with the requirements of Subpart E except that employees performing such operations on beryllium-containing base or filler metals shall be protected by air line respirators in accordance with the requirements of Subpart E.

Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

### General Provisions for Welding, Cutting and Heating

Welding, cutting, and heating, which does not involve confined spaces, or materials which might present a toxic hazard, may normally be done without mechanical ventilation or respiratory protective equipment, but where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.

Employees performing any type of welding, cutting, or heating shall be protected by suitable eye protective equipment in accordance with the requirements of Subpart E.

### Welding, Cutting and Heating of Preservative Coatings

Before welding, cutting, or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.

Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable, they shall be stripped from the area to be heated to prevent ignition.

In enclosed spaces, all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application, or the employees shall be protected by air line respirators, meeting the requirements of Subpart E of this part.

In the open air, employees shall be protected by a respirator, in accordance with requirements of Subpart E.

The preservative coatings shall be removed a sufficient distance from the area to be heated to ensure that the temperature of the unstripped metal will not be appreciably raised. Artificial cooling of the metal surrounding the heating area may be used to limit the size of the area required to be cleaned.

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