

PW Welding/Cutting Policy

Purpose:

This standard has been prepared for the guidance of cutters and welders (including persons doing cutting and welding), fire watchers, their supervisors (including outside contractors), and those Building managers on whose property cutting and welding is to be performed.

Scope:

This standard covers provisions to prevent loss of life and property from fire in the use of oxy-fuel gas and electric arc cutting and welding equipment when such equipment is used for cutting and welding.

General

Introduction:

1. Cutting and welding processes using electric arcs or oxy-fuel gas flames are a necessary part of our industrial world. Too often, however, the persons who use, hire, or supervise the use of these processes do not fully appreciate that their improper use can result in loss of life and property by fire and explosion.
2. Approximately 6 percent of fires in industrial properties and many fires in other properties have been caused by cutting and welding, primarily with portable equipment in areas not specifically designed or approved for such work. Cutting and certain arc welding operations produce literally thousands of ignition sources in the form of sparks and hot slag. The electric arc or the oxy-fuel gas flame and the hot work pieces are also inherent ignition sources.
3. A majority of fires in which cutting and welding is a factor have been caused by sparks. These globules of molten metal have scattered horizontally as far as 35 ft (11 m), setting fire to all kinds of combustible materials. They have also fallen through cracks, pipe holes, or other small openings in floors and partitions starting fires that have reached serious proportions before being noticed.
4. Electric arcs or oxy-fuel gas flames, in themselves, have rarely caused fire except where they have overheated combustibles in the vicinity of the work or where they have been used on containers that have held combustibles and that have not been cleaned and purged. In the latter case, an explosion generally resulted.

5. The heat of the metal being welded or cut has caused fires where the hot pieces were permitted to rest or fall upon combustible materials. Fires and explosions have also been caused where this heat was transmitted, as in the case of a container, through the metal to a flammable atmosphere or to combustibles within the container.
6. Anything that is combustible or flammable is susceptible to ignition by the cutting and welding. The most common materials likely to become involved in fire are combustible building construction such as floors, partitions, and roofs; combustible contents such as wood, paper, textiles, plastics, chemicals, and flammable liquids and gases; and combustible ground cover such as grass and brush.
7. Preventing cutting and welding fires can best be achieved by separating the combustibles from ignition sources or by shielding the combustibles.

Responsibility for Cutting and Welding

General

Although the cutter or welder has the best opportunity to avoid fire or injury by proper control of the equipment he is using, there are many circumstances where fires, explosions, or severe injuries would be inevitable if the oxy-fuel gas torch or the electrode were to be used. Such circumstances can arise where the cutter or welder may not be aware of (1) the proximity or the flammable nature of nearby combustible solids, liquids, or dusts; (2) the presence or development of possibly explosive mixtures of flammable gases or vapors and air; or (3) the presence or nature of an oxygen-enriched atmosphere in the location where the work is to be performed. The precautions taken by a cutter or welder will often be governed by the desire of others for speed or economy in his work or by the failure of management to emphasize the possible extent or seriousness of a fire in the work area. Therefore, all three, the cutter or welder, his supervisor, and building managers share responsibility for the safe use of cutting or welding equipment. Specific responsibilities are cited in the remainder of this section.

Management (Building Managers or PW)

Management shall recognize its responsibility for the safe usage of cutting and welding equipment on its property and:

- a) Based on fire potentials, establish approved areas for cutting and welding or establish procedures for approving cutting and welding. (herein)

- b) Designate an individual responsible for authorizing cutting and welding operations in areas not specifically designed or approved for such processes. The individual shall be aware of the fire hazards involved and familiar with the provisions of this standard, and may delegate this responsibility to the supervisor.
- c) Insist that only approved apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used.
- d) Insist that cutters or welders and their supervisors are suitably trained in the safe operation of their equipment, the safe use of the process, and emergency procedures in the event of a fire.
- e) Select contractors to perform cutting and welding who have suitably trained personnel and who have an awareness of the magnitude of the risks involved.
- f) Advise all contractors about flammable materials or hazardous conditions of which they may not be aware.

The Supervisor

The supervisor of cutting or welding operations in areas not designed or approved for such processes may be a foreman or a building manager or other qualified individual. In contract operations he may be the contractor or one of the foremen or supervisors.

1. The supervisor shall be responsible for the safe handling of the cutting or welding equipment and for the safe use of the cutting or welding process.
2. The supervisor shall determine the combustible materials and hazardous areas present or likely to be present in the work location.
3. The supervisor shall protect combustibles from ignition by the following:
 - a) Have the work moved to a location free from dangerous combustibles.
 - b) If the work cannot be moved, have the combustibles moved to a safe distance from the work or have the combustibles properly shielded against ignition.
 - c) See that cutting and welding are scheduled that operations that might expose combustibles to ignition are not started during cutting or welding.
4. The supervisor shall secure authorization for the cutting or welding operation from the designated management representative.
5. The supervisor shall determine that the cutter or welder secures approval that conditions are safe before going ahead.

6. The supervisor shall determine that fire protection and extinguishing equipment are properly located at the site.
7. Where fire watchers are required, the supervisor shall see that they are available at the site.
8. Where a fire watcher is not required, a final check-up shall be made by the supervisor one-half hour after the completion of cutting or welding operations to detect and extinguish possible smoldering fires.
9. Shall notify the building manager and Fire Department Headquarters (239-4257) before the operation begins and when completed.

The Cutter or Welder

The cutter or welder shall handle the equipment safely and use it so as not to endanger lives and property, as follows:

- a) Have approval by the supervisor before starting to cut or weld.
- b) Cut or weld only where conditions are safe.
- c) Continue to cut or weld only so long as conditions are unchanged from those under which approval was granted.

Fire Prevention Precautions

Permissible Areas

1. Cutting or welding shall be performed only in areas that are or have been made fire-safe. Within the confines of an operating plant or building, cutting and welding shall be done in either (1) a specific area designed or approved for such work, such as a maintenance shop or a detached outside location that shall be of noncombustible or fire-resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent area; or (2) when work cannot be moved practically, as in most construction work, the area shall be made fire-safe by removing combustibles or protecting combustibles from ignition sources.
2. Cutting or welding shall not be permitted in the following situations:
 - a) In areas not authorized by Public Works.
 - b) In sprinklered buildings while such protection is impaired.
 - c) In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids, or dusts with air) or explosive atmospheres that may develop

inside un-cleaned or improperly prepared drums, tanks, or other containers and equipment that have previously contained such materials or that may develop in area with an accumulation of combustible dusts.

- d) In areas near the storage of large quantities of exposed, readily ignitable materials such as bulk sulfur, baled paper, or cotton.

Permit

Before cutting or welding is permitted a permit must be obtained from Fire Headquarters on Fort Riley and the area shall be inspected by the individual responsible for cutting and welding operations (see "Management," (b) to ensure that it is a fire-safe area. This individual shall sign the permit, and shall verify the following:

1. Cutting and welding equipment to be used shall be in satisfactory operating condition and in good repair.
2. Where combustible materials such as paper clippings, wood shavings, or textile fibers are on the floor, the floor shall be swept clean for a radius of 35 ft (11 m). Combustible floors (except wood on concrete) shall be kept wet, covered with damp sand, or protected with fire-resistant shields. Where floors have been wet down, personnel operating arc welding or cutting equipment shall be protected from possible shock.
3. Where practical, all combustibles shall be relocated at least 35 ft (11 m) horizontally from the work site. Where relocation is impracticable, combustibles shall be protected with flame proofed covers or otherwise shielded with metal or fire-resistant guards or curtains. Edges of covers at the floor shall be tight to prevent sparks from going under them. This precaution is also important at overlaps where several covers are used to protect a large pile.
4. Openings or cracks in walls, floors, or ducts within 35 ft (11 m) of the site shall be tightly covered to prevent the passage of sparks to adjacent areas.
5. Conveyor systems that might carry sparks to distant combustibles shall be suitably protected.
6. Where cutting or welding is done near walls, partitions, ceiling, or roof of combustible construction, fire-resistant shields or guards shall be provided to prevent ignition. If welding is to be done on a metal wall, partition, ceiling, or roof, precautions shall be taken to prevent ignition of combustibles on the other side, due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, a fire watch on the opposite side from the work shall be provided. Welding shall not be attempted on a metal partition, wall, ceiling, or roof having a

combustible covering, nor on walls or partitions of combustible sandwich-type panel construction.

7. Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceilings, or roofs shall not be undertaken if the work is close enough to cause ignition by conduction.
8. Fully charged and operable fire extinguishers, appropriate for the type of possible fire, shall be available at the work area. Where hose lines are available, they shall be connected and ready for service.
9. When welding or cutting is done in close proximity to a sprinkler head, a wet rag shall be laid over the head and then removed at the conclusion of the welding or cutting operation. Special precautions shall be taken to avoid accidental operation of automatic fire detection or suppression systems - e.g., special extinguishing systems.
10. Nearby personnel shall be suitably protected against heat, sparks, slag, etc.

Fire Watchers

Fire watchers shall be required by the individual responsible for cutting and welding (see "Management," (b) whenever cutting or welding is performed in locations where other than a minor fire might develop, or any of the following conditions exist:

- a) Appreciable combustible material in building construction or contents closer than 35 ft (11 m) to the point of operation.
 - b) Appreciable combustibles are more than 35 ft (11 m) away but are easily ignited by sparks.
 - c) Wall or floor openings within a 35-ft (11-m) radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
 - d) Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.
1. Fire watchers shall have fire extinguishing equipment readily available and be trained in its use, including practice on test fires.
 2. Fire watchers shall be familiar with facilities and procedures for sounding an alarm in the event of a fire.
 3. Fire watchers shall watch for fires in all exposed areas, and try to extinguish them first only when obviously within the capacity of the equipment available, or otherwise sound the alarm immediately.

4. A fire watch shall be maintained for at least a half hour after completion of cutting or welding operations to detect and extinguish smoldering fires.

Hot Tapping

“Hot tapping” or other cutting and welding on a flammable gas or liquid transmission or distribution utility pipeline shall be performed by a crew qualified to make hot taps.

Public Exhibitions and Demonstrations

Scope

The following provisions apply to oxy-fuel gas welding and cutting operations at public exhibitions, demonstrations, displays, and trade shows (referred to hereinafter as the “site”) in order to promote the safe usage of compressed gases in public gatherings.

Supervision

Installation and operation of welding, cutting, and related equipment shall be done by, or under the supervision of, a competent operator to ensure the personal protection of viewers and demonstrators as well as the protection from fire of materials in and around the site and building itself.

Site

1. **Site Location.** Sites involving the use and storage of compressed gases shall be located so as not to interfere with the egress of people during an emergency.
2. **Site Design.** The site shall be constructed, equipped, and operated in such a manner that the demonstration will be carried out so as to minimize the possibility of injury to viewers.

Fire Protection

1. **Fire Extinguishers.** Each site shall be provide with a portable fire extinguisher of appropriate size and type and with a pail of water.

2. **Shielding.** The public, combustible materials, and compressed gas cylinders at the site shall be protected from flames, sparks, and molten metal.
3. **Fire Department Notification.** The fire department shall be notified in advance of such use of the site.

Cylinders

1. **Gas Capacity Limitation.** Cylinders containing compressed gases for use at the site shall not be charged in excess of one-half hour their maximum permissible content. Cylinders of nonliquefied gases and acetylene shall be charged to not more than one-half their maximum permissible charged gauge pressure (psi or kPa). Cylinders of liquefied gases shall be charged to not more than one-half the maximum permissible capacity in pounds (kilograms).
2. **Storage.** Cylinders located at the site shall be connected for use except that enough additional cylinders may be stored at the site to furnish approximately one day's consumption of each as used. Other cylinders shall be stored in an approved storage area, preferably outdoors, but not near a building exit.
3. **Transporting Cylinders.** Cylinders in excess of 40 lb (18 kg) total weight being transported to or from the site shall be carried on a hand or motorized truck.
4. **Process Hoses.** Hoses shall be located and protected so that they will not be physically damaged.
5. **Cylinder Valves.** Cylinder valves shall be closed when equipment is unattended.
6. **Valve Caps.** Where caps are provided for valve protection, such caps shall be in place except when the cylinders are in service or connected ready for service.
7. **Cylinder Protection.** Cylinders shall be secured so that they cannot be knocked over.