



## IWU PHYSICAL PLANT SAFETY PROGRAM

Revision: 1

### HOT WORK PLAN

Section: 9

## STANDARDS

*Welding, Cutting and Brazing/General Requirements OSHA 1910.252,*

### 1. Purpose

Hot work is any temporary or permanent operation involving open flames or producing heat and/or sparks. This includes but is not limited to brazing, cutting, grinding, soldering, torch-applied roofing and welding. The definition of hot work can be applied to activities on a campus such as periodic/planned maintenance activities, new construction work and emergency repairs.

Cutting, welding or other “hot work” introduce ignition sources that require special measures to control the associated fire potential. Many fires have been caused by cutting and welding operations, primarily with portable equipment, in areas that are not specifically designed or approved for such work.

Therefore, it is important that each institution develop a cutting and welding policy to control the potential for hot work fires. Hot work procedures should follow the guidance of good standard practices such as NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, FM Global Data Sheet 10-3, *Hot Work Management*, as well as the requirements of.

### 2. Procedure

Adequate precautions and control over cutting and welding operations is of paramount importance. There are two types of cutting and welding operations: permanent and portable. Permanent cutting and welding is routinely conducted in a designated location, such as a maintenance shop. Portable cutting and welding can occur anywhere on campus and is usually limited to single, non-repetitive occasions.

Hot work should be prohibited in areas where the hot work cannot be conducted safely under any conditions or where extensive preparation and planning are required to make the area/equipment fire-safe. When these conditions exist, designate the area and/or equipment involved as a “No Hot Work Area” and prominently post this restriction.

Examples of a “No Hot Work Area” can include:

- Areas/equipment that contain/handle flammable liquids, flammable gases, combustible dusts or combustible metals

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- Partitions, walls, ceilings or roofs with combustible plastic coverings or cores (e.g., expanded plastic insulation, sandwich panels)
- Rubber lined equipment
- Oxygen enriched atmospheres
- Storage and handling of oxidizer materials
- Storage and handling of explosives

When hot work must be conducted in areas or equipment containing hazardous processes as described above, follow the specific precautions outlined below.

- a. When possible, relocate hot work to a suitably arranged and isolated fixed hot work station as described in this section.

***Avoid performing hot work on roofs or in attics whenever possible.***

- b. If the materials or equipment cannot be relocated to a fixed hot work station and hot work is unavoidable, use the least hazardous form of hot work that will get the job done (e.g., electric iron or heat gun vs. propane torch).

***Note: These options still require hot work management.***

### **3. The following precautions must be taken during cutting and welding operations:**

#### **a. General Procedures**

- i. Designate approved areas for cutting and welding. These are typically shop areas, where suitable equipment is permanently located. It is suggested that these areas be located in noncombustible buildings or combustible-building areas with secured and sealed 1-hour fire rated noncombustible barriers over combustible floors, walls and ceilings and taking care to cover any floor or wall openings. Maintain the fixed hot work station free of combustible materials and isolate it from surrounding combustible occupancies with physical non-combustible enclosures or open space of at least 35 feet (11 meters). Provide manual fire extinguishers throughout the fixed hot workstation.
- ii. Establish procedures utilizing a cutting and welding permit system for approving cutting and welding outside of a designated area.
- iii. Designate an individual to be responsible for authorizing cutting and welding operations in areas not specifically designed or approved for such processes.
- iv. Establish an institution policy that requires all cutting and welding equipment to be approved for use.
- v. Establish an ongoing training program, covering the safe operation of equipment, safe practices and emergency procedures.



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- vi. Establish policy for all contractors to be apprised of the institution's hot work procedure and about flammable materials or hazardous conditions of which they may not be aware.

#### **b. Permanent Cutting and Welding Procedures**

- i. The work areas should be constructed of noncombustible materials. Remove all combustibles for a distance of at least 35 feet (11 meters). If separation is not possible, use noncombustible partitions or curtains. Prohibit hot work in or on vessels containing flammable or combustible materials, including residues, until they have been completely cleaned and purged or inert. Prohibit hot work until surrounding floors have been swept clean and, if combustible (e.g., boards on joist, plank on steel, wood block), wet down or protected by welding blankets.
- ii. Prohibit hot work until all wall and floor openings within 35 feet (11 meters) of the operations have been tightly covered or otherwise protected with metal guards or flameproof tarpaulins. Seal ductwork and duct openings with metal covers or cover them with fire-resistive tarpaulins. Close all doors and fire doors to prevent sparks from escaping.
- iii. Protect combustibles that cannot be moved with fire resistive tarpaulins or metal shields. This includes all storage or machinery with grease or lint deposits. Hot work blankets used to cover combustible materials or construction that cannot be relocated from the hot work area should always be "tented".
- iv. Remove any flammable liquids (paints, oils and lacquers) from the hot work area.
- v. Check the condition of welding equipment daily before use. This includes valves, regulators, hoses and torches.
- vi. Prohibit welding or cutting when the sprinkler system is out of service.

#### **c. Portable Cutting and Welding Operations**

- i. In addition to the above precautions for permanent cutting and welding operations, the following apply to portable cutting and welding operations:
- ii. A fire watch is to be established.
- iii. The permit system is to be used for all portable cutting and welding operations.



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- iv. For elevated hot work, combustible materials is to be either relocated a minimum of 50 feet from the hot work area; or properly protected with fire retardant welding blankets; or the hot work operation isolated with welding screens.
- v. Suspend fire-resistive welding blankets under hot work conducted near the ceiling. Place noncombustible screens around hot work at the floor to trap sparks.
- vi. Every elevated hot work operation needs to be evaluated on a case-by-case basis to determine a reasonable safe distance from hot work to combustible occupancies or construction. The physical conditions involved may dictate relocation of combustible materials beyond 50 feet.

#### d. Fire Watches

Fire watches are required by the individual responsible for authorizing hot work whenever hot work is performed in locations where any of the following conditions exist:

- i. Appreciable combustible material in building construction.— Combustible materials are located closer than 35 feet (11 meters) to the point of operation.
- ii. Appreciable combustible materials are more than 35 feet (11 meters) away, but are easily ignited by sparks.
- iii. Wall or floor openings within a 35-foot (11-meter) radius expose combustible material in adjacent areas, including concealed spaces in walls or floors.
- iv. 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 of heat from the cutting or welding operations.
- v. Automatic sprinkler protection is not provided.

A fire watch is to be posted and maintained in the immediate area of the hot work and in any adjacent areas that may be exposed by this operation. Some examples are floors above and below the area that the work is being performed, that may be exposed to smoke or falling sparks.

For any hot work operations on a building roof or adjacent to building walls where a combustible occupancy exists within the structure or the building has any combustible



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construction, a second fire watch is to be posted in the exposed adjacent areas. For roof level hot work, a second fire watch is to be posted on the floor immediately below for roof hot work. Where suspended ceilings are present between the building occupancy and the underside of the structural roof, this space is to be inspected periodically during the hot work operation.

Hot work conducted on any building floors/walls or adjacent to building walls with unprotected openings where a combustible occupancy or construction exists on the opposite side, is to include assignment of a second fire watch on the opposite side of the wall. This same approach is to apply when hot work is conducted on pipe/building shafts, HVAC ductwork, etc.

Fire watches must:

- i. have portable fire extinguishers readily available. The extinguisher is to be suitable for the type of fire that could be expected.
- ii. be trained in the use of portable fire extinguishers.
- iii. be familiar with facilities and procedures for sounding an alarm in the event of a fire.
- iv. maintain a fire watch for at all times during the hot work activity, including breaks and lunch periods and least 60 minutes after the completion of cutting or welding operations, to detect and extinguish smoldering fires. This inspection extends to floors above and below the work and adjacent rooms. The fire watch then signs the hot work permit and leaves it posted and informs the person that issued the permit.
- v. the hot work area is to be monitored for up to an additional three hours. This can be performed either by the fire watch or another responsible group on campus, such as Security.

The fire watch duties can be assigned to anyone who understands the hazard of the hot work being performed and the limitations placed on that hot work operation by the person issuing the hot work permit. The fire watch has responsibility to make sure the hot work area is maintained in a fire-safe condition throughout this work and has the authority to stop the hot work if unsafe conditions are observed.

The fire watch must understand the basic hazards of any combustible construction involved with the hot work area, the fire exposure hazard that the hot work creates to occupancies adjacent to and below the hot work operation, the hazards associated with the occupancy



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and the need to maintain proper isolation of all hot work operations from combustible or flammable materials.

The fire watch also must be properly trained in use of portable fire extinguishers and emergency notification procedures within the facility. The fire watch is not a replacement for proper planning to prevent conditions that will allow a fire to develop, regardless of the fire-fighting equipment available and capabilities of the individuals involved.

#### **4. Permit System**

Managers will administer the hot work permits. The permit system ensures that the responsible individual is aware of the hazard associated with the work being performed and also ensures that proper precautions are taken during and after the work.

The individual issuing permits must cover all precautions with the individuals performing the work. In addition, periodic checks must be made during hot work operations to ensure that all safety procedures are in place.

The permit is to be completed, signed and provided to the welder for posting. If hot work continues for more than one shift, a new permit is to be issued. After the work is completed, record the date and time completed on the permit and maintain a file of the permits for at least one year for review by the business officer and loss prevention consultants.