



## **Welding, Cutting, & Hot Work**

University Facilities

Internal Procedure: July 1, 2013

Effective date: July 1, 2013

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Approved by: Bob Wells

### **1.0 Program Objective**

UF has adopted this policy for the prevention of employee exposure to hazards resulting either directly or indirectly from hot work (i.e. welding, cutting, and brazing) in the workplace.

### **2.0 Purpose and Scope**

UF has implemented this policy to ensure that employees are properly trained, aware of hazards associated with hot work, and correctly informed of company policies, practices, and procedures to prevent, or if possible, eliminate these hazards. UF will ensure the following engineering controls, work practices, and safety procedures are enforced:

#### **2.1 Training**

- 2.1.1 UF will ensure that welders, cutters, and their supervisors involved in the performance of hot work operations is properly trained in the safe operations of any equipment required, the safe use of the process, proper PPE, and safety procedures which will be followed.

#### **2.2 Inspections**

- 2.2.1 Before cutting or welding processes are permitted, the area will be inspected and cleared before authorization to proceed is granted. Written hot work permits will be utilized to ensure appropriate safe work practices are observed.
- 2.2.2 UF will be responsible for inspecting work areas prior to any hot work being performed, designate precautions to be followed prior to work commencing, and assign a fire watch where advisable or required when any of the following conditions exist:
  - 2.2.2.1 Locations where other than a minor fire might develop.
  - 2.2.2.2 Appreciable combustible material, in building construction or contents, closer than 35 feet to the point of operation.

- 2.2.2.3 Appreciable combustibles are more than 35 feet away, but are easily ignited by sparks.
- 2.2.2.4 Wall or floor openings within a 35-foot radius that expose combustible material in adjacent areas including concealed spaces in walls or floors.
- 2.2.2.5 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.

- 2.2.3 If the requirements for fire hazards and guarding as stated above cannot be fully met, UF personnel will not perform the welding and cutting operations until hazardous conditions are fully resolved.

### 2.3 Reporting

- 2.3.1 Operators will report any equipment defect or safety hazard to his supervisor and the use of the equipment will be discontinued until its safety has been assured. Repairs will be performed only by qualified personnel.

### 2.4 Procedures

- 2.4.1 Where possible, all hot work operations will be performed outside of buildings or structures, clear of any foreseeable fire hazards. If the object to be welded or cut cannot readily be moved, all moveable fire hazards will be removed.
- 2.4.2 Where hot work must be performed indoors or in the vicinity of fire hazards, the area will be cleared, if possible, of any and all material and equipment which may present a hazard of fire or explosion from flame, sparks, arcs, or slag.
- 2.4.3 Where fire hazards exist in the area of hot work operations which cannot be removed, they will be guarded to prevent fire, and the hot work operation will be shielded to confine the heat sparks and slag and to protect the immovable fire hazards and prevent hot materials from falling to a lower level.
- 2.4.4 Fire watchers will have fire extinguishers readily available. A fire watch will be maintained for at least a half hour after the welding or cutting operation is completed to prevent or extinguish any fire resulting from these operations.
- 2.4.5 The employee(s) assigned to fire watch will be trained in the proper use of fire extinguishers and fire prevention measures, ensure that appropriate firefighting equipment and fire extinguishers are readily available, and be responsible for sounding of fire alarms in the event of a fire which is not readily extinguishable.
- 2.4.6 All arc welding operations in occupied areas will be screened to prevent other personnel from being exposed to flash hazards.

### **3.0 Hot Work**

Any hot work to be performed in confined spaces will conform to permit-required confined space procedures and the following requirements:

- 3.1 Adequate ventilation is a prerequisite to work in confined spaces.
- 3.2 When welding or cutting is being performed in any confined spaces the gas cylinders and welding machines will be kept outside of the space. Before operations are started, gas cylinders will be secured, heavy portable equipment mounted on wheels will be securely blocked to prevent accidental movement, and warning signs will be posted.
- 3.3 Where a welder must enter a confined space through a manhole or other small opening, means will be provided for quickly removing him in case of emergency. When safety belts and lifelines are used for this purpose they will be so attached to the welder's body that his body cannot be jammed in a small exit opening. An attendant with a preplanned rescue procedure will be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.
- 3.4 When arc welding is to be suspended for any substantial period of time, such as during lunch or overnight, all electrodes will be removed from the holders and the holders stored so that accidental contact cannot occur and the machine disconnected from the power source.
- 3.5 In order to eliminate the possibility of gas escaping through leaks of improperly closed valves when gas welding or cutting, the torch valves will be closed and the fuel-gas and oxygen supply to the torch positively shut off at some point outside the confined area, whenever the torch is not to be used for a substantial period of time, such as during lunch hour or overnight. Where practicable, the torch and hose will also be removed from the confined space.

### **4.0 Welding/Brazing**

- 4.1 Any welding or brazing materials used in work which might possibly generate hazardous fumes, gases, or dust to the metals involved will be suitably labeled to indicate the hazard, and appropriate measures for ventilation or respiratory protection provided to ensure that no employee is exposed to higher than permissible levels of hazardous fumes.
- 4.2 Welding, cutting, or burning of metals containing lead, zinc, cadmium, mercury, beryllium, or other exotic metals, paints, coatings, or preservatives will require that regulation ventilation or respiratory protection be utilized.
- 4.3 After welding or cutting operations are completed, the welder will mark the hot metal or provide some other means of warning other workers.
- 4.4 First aid kits and equipment are readily available at all times for employee use during welding and cutting operations. First aid kits are kept in all company vehicles and are regularly inspected to ensure that contents are kept fully stocked and that the appropriate items are available.
- 4.5 Personnel in charge of fuel-gas and oxygen supply equipment (including distribution piping systems and generators) will be fully instructed and determined competent for handling, use, and storage of compressed gas cylinders and related equipment.

- 4.6 The manufacturer's recommendations covering the operation and maintenance of oxygen or fuel-gas supply equipment including generators, and oxygen or fuel-gas distribution piping systems will be followed and readily available to employees.
- 4.7 Fuel gas and oxygen cylinders must be transported, moved, stored, and used in an upright position, secured to prevent tipping, and located to prevent accidental collision with the cylinders. Cylinders must be kept away from any heat or combustion sources, and at least 20 feet from any flammable gases or petroleum products. When not in use, cylinders must have their valves closed, any regulators or attachments removed, and their valve covers in place.
- 4.8 Personnel assigned to operate or maintain arc welding equipment will be properly trained and qualified to operate such equipment and in safety procedures and familiar with OSHA §1910.252 (a)(b) & (c) and §1910.254 requirements for arc welding and equipment handling to include the following areas:
  - 4.8.1 Machine hook up
  - 4.8.2 Grounding
  - 4.8.3 Electric shock
  - 4.8.4 Switches
  - 4.8.5 Manufacturers' instructions
  - 4.8.6 Electrode holders
- 4.9 There shall be no leaks of cooling water, shielding gas or engine fuel.
- 4.10 If gas shielded arc welding operations are being performed, operators will be familiar with the American Welding Society Standards A6-1-1966.
- 4.11 Machines which have become wet will be thoroughly dried and tested before being used.
- 4.12 Cables with damaged insulation or exposed bare conductors will be replaced. Joining lengths of work and electrode cables will be done by the use of connecting means specifically intended for the purpose. The connecting means will have insulation adequate for the service conditions.