

Hot Work Permit Program
California State University, San Bernardino
Revised 3-2016

Authorities and Industry Standards

Title 8, CCR, §4850 – 4853 Electric Welding, Cutting and Heating

Title 8, CCR, §1743 Oxygen, Acetylene, and Fuel Gas

Title 8, CCR, §4821 Gas Systems for Welding and Cutting

Title 8, CCR, §1536 Ventilation Requirements for Welding, Brazing, and Cutting

Title 8, CCR, §5150 Ventilation and Personal Protective Equipment Requirements for Welding, Brazing and Cutting Title 8, CCR, §5155 Airborne Contaminants

Title 8, CCR, § 4846 – 4848 Fire Prevention in Welding and Cutting Operations

NFPA 51, Standard for the Design and Installation of Oxygen Fuel Gas Systems for Welding, Cutting and Allied Processes

NFPA 51B, Standard for Fire Prevention in Use of Cutting and Welding Processes

ANSI Z491, American National Standard Safety in Welding and Cutting API 2201, Procedures for Welding or Hot Tapping on Equipment Containing Flammables

Regulatory Agency in Authority

California Department of Industrial Relations, Division of Occupational Safety and Health (DOSH)

Background

Scope

The provisions of this policy are meant to apply to all persons performing non-exempt hot work on the CSUSB and Palm Desert campuses. This includes CSUSB employees, private contractors, inspectors, and all other persons who wish to perform hot work on CSUSB property. This policy is also meant to apply to all CSUSB employees who perform hot work during their employment activities at locations off CSUSB campus unless such work requires specialized or more detailed policies, in which case the most stringent policy is the one to be followed.

Policy

It is the policy of CSUSB to establish and maintain effective safety programs to eliminate or control, in so far as reasonable and practical, work hazards.

Compliance with provisions of this program is mandatory. Deviation from this program is grounds for disciplinary action.

Objectives

This program will establish guidelines and requirements for conducting hot work.

This program is written to help protect employees and others on campus from hot work hazards, ensure compliance with federal and state regulations, and reduced the liability of CSUSB by controlling hazards associated with hot work.

Responsibility

University Administration

The campus President has ultimate responsibility for establishing and maintaining effective policies regarding environmental health and safety. Policies which govern the activities and responsibilities of environmental health and safety programs are thereby established under the final authority of the President.

Environmental Health and Safety Department

The EH&S Department is responsible for developing and updating this program when necessary. At the invitation of supervisors of people who perform hot work the EH&S Department will assist in ensuring University, departmental, and employee compliance.

Departments

Deans, Directors, Chairs, Supervisors of people who perform hot work are responsible for implementing this program and ensuring that employees maintain compliance with this program.

Employees

Employees are responsible for complying with all aspects of this program which is written to enhance the safety of employees who perform hot work.

Definitions

HOT WORK: Work that may generate heat, flames, or sparks; this may include, but is not limited to, welding, torch cutting, brazing, soldering, and grinding.

Welding/Hot Works Procedures: Any work activity which results in sparks, fire, molten slag, or hot material which has the potential to cause fires or explosions.

Special Hazard Occupancies: Any area containing Flammable Liquids, Dust Accumulation, Gases, Plastics, Rubber and Paper Products.

Exceptions to written permit requirement

The following activities do not require a written Hot Work Permit: Welding, cutting, and hot work operations carried out in pre- established maintenance shop areas or academic department shop areas. Soldering operations carried out by employees performing plumbing maintenance activities on water pipes outside of buildings.

Posting

All entrances to areas in which hot work is being conducted shall be posted (Sign is part of the Hot Work Permit in Appendix A).

Signs shall include, but not limited to, the following information:

WARNING
HOT WORK IN PROGRESS
WATCH FOR FIRE

Location Inspection

The individual issuing and/or working under the permit must personally examine the location where the work is to be done and insure that all safety precautions have been met. Specific fire requirements are outlined on the Hot Work Permit (Appendix A).

The permit will be issued to one person who will be responsible for the work to be accomplished. The Hot Work Permit and Warning Sign must be displayed at the job site, preferably attached to or near the welding or cutting equipment. These requirements apply to all contract work on campus. After completion of the job, a copy of the Hot Work Permit must be sent to the campus EHS Department for retention.

Procedures and Requirements

- 1) Where practical all combustibles must be relocated at least 35 feet from the work site.
- 2) Where relocation is impractical, combustibles must be protected with flameproof covers, shielded with metal, guards, curtains or wet down to help prevent ignition of material.
- 3) Ducts, conveyor systems, and augers that might carry sparks to distant combustibles must be protected or shut down.

- 4) Where cutting welding is done near walls, partitions, ceilings, a roof of combustible construction, fire-resistant shield or guards will be provided to prevent ignition.
- 5) If welding is to be done on a metal wall, partitions, ceiling, or proof, precautions must be taken to prevent ignition of combustibles on the other side, due to conduction or radiation of heat.
- 6) Where combustibles cannot be relocated on the opposite side of work, a fire watch person will be provided on the opposite side the work.
- 7) Welding will not be attempted on a metal partition, wall, ceiling, or roof having a covering or on walls having combustible sandwich panel construction.
- 8) Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceiling, or roofs will not be undertaken if the work is close enough to cause ignition by combustion.
- 9) In areas where there is dust accumulation of greater than 1/16 inch within 35 feet of the area where welding/hot works will be conducted, all dust accumulation will be cleaned up following the housekeeping program of the facility before welding/hot works are permitted.
- 10) Suitable fire extinguishers must be provided and maintained ready for instant use.
- 11) A fire watch person will be provided during and for two hours past the completion of the welding project.
- 12) A cutting/welding permit will be issued on all welding or cutting outside of designated welding areas.
- 13) Cutting or welding will not be permitted in the following situations:
 - In areas not authorized by management

- In sprinklered building while such protection is impaired.
- In the presence of potentially explosive atmospheres.
- In areas near the storage of large quantities of exposed, ready readily ignitable materials.

Welding & Hot Work Fire Prevention Measures Article 88. Fire Prevention in Welding and Cutting Operations (Sections 4846 - 4848)

A designated welding area should be established to meet the following requirements:

- 1) Floors swept and clean combustibles within 35 feet of work area.
- 2) Flammable and combustible liquids and material will be kept 35 feet from work area.
- 3) Adequate ventilation providing 20 air changes per hour, such as suction hood system should be provided to the work area.
- 4) At least one 10-lb dry chemical fire extinguisher should be within access of the 35 feet of work area.
- 5) Protective dividers such as welding curtains or non-combustible walls will be provided to contain sparks and slag to the combustible free area.

Requirements for Welding Outside Designated Areas

- 1) Portable welding curtains or shields must be used to protect other workers in the welding area.
- 2) A hot works permit must be completed and complied with prior to welding operation.
- 3) Respiratory protection is mandatory unless and adequate monitored airflow away from the welder and others present can be established and maintained.

- 4) Plastic materials must be covered with welding tarps during welding procedures.
- 5) Fire watch must be provided for all hot work operations.

Welding Standard Operation Procedures

The Following lists Welding Standard Operating Procedures (SOP) and are applicable for all electric and gas welding. These SOP are to be reviewed prior to each job in which hot work is required.

Electric Welding (Title 8 CCR - Article 90. Electric Welding, Cutting and Heating (Sections 4850 - 4853))

- 1) Perform Safety Check on all equipment.
- 2) Ensure fire extinguisher is charged and available.
- 3) Ensure electrical cord, electrode holder and cables are free from defects (no cable splices are allowed within 10 feet of the electrode holder).
- 4) Ensure PPE (welding hood, gloves, rubber boots/soled shoes, and aprons) are available and have no defects.
- 5) Ensure the welding unit is properly grounded
- 6) All defective equipment must be repaired or replaced before use.
- 7) Remove flammables and combustibles.
- 8) No welding is permitted on or near containers of flammable material, combustible material or unprotected flammable structures.
- 9) Place welding screen or suitable barricade around work area to provide a fire safety zone and prevent injuries to passersby (do not block emergency exits or restrict ventilation).
- 10) Ensure adequate ventilation and lighting.
- 11) Execute Hot Work Permit procedures.
- 12) Set Voltage Regulator to manufacturer's recommendations.

13) Uncoil and spread out welding cable.

14) To avoid overheating, ensure proper contact of work leads and connections, remove any metal fragments from magnetic work clamps (to avoid electric shock do not warp welding cables around a body part and avoid welding in wet conditions).

15) Fire watch must be initiated for one hour after welding and until all welds have cooled.

16) Perform final inspection of area and terminate permit.

SOP- Gas Welding 1910.253 - Oxygen-fuel gas welding and cutting 1926.350 - Gas welding and cutting.

- 1) Perform Safety Check on all equipment.
- 2) Ensure tanks have gas and fitting are tight.
- 3) Ensure fire extinguishers is charged and available.
- 4) Inspect hoses for defects.
- 5) Ensure PPE (welding hood, gloves, rubber boots/soled shoes and aprons) are available and have no defects.
- 6) All defective equipment must be repaired or replaced before use.
- 7) Remove flammables and combustibles.
- 8) No welding is permitted on or near containers of flammable material, combustible material or unprotected flammable structures.
- 9) Place welding screen or suitable barricade around work area to provide a fire safety zone and prevent injuries to passersby (do not block emergency exits or restrict ventilation).
- 10) Use an authorized Air Filtering Respirator, if required.
- 11) Ensure adequate ventilation and lighting.
- 12) Execute Hot Work Permit Procedures.
- 13) Open valves on oxygen and gas tanks to desired flow
- 14) Shut tank valves and relieve hose pressure. Store Hoses.
- 15) Fire watch for one hour after welding and until all welds have cooled.
- 16) Perform final fire watch and terminate permit

Compressed Gas Care, Transporting, Moving and Storage Article 32 - §1740. Storage and Use of Cylinders / §1743. General Precautions.

- 1) Valve caps on cylinders must be in place and secured. Valve caps must not be used for lifting. Do not pry cylinder caps while frozen. Loosen caps with warm water.
- 2) Cylinders must be transported on a secured cradle only, and by tilting or rolling them.
- 3) Cylinders must be moved by tilting and rolling them on their bottom edges. (Avoid dropping cylinders or striking other cylinders).
- 4) Cylinders transported by powered vehicles must be secured in a vertical position.
- 5) Regulators must be removed and caps put in place prior to moving cylinders, unless cylinders are secured on a special carrier.
- 6) Proper steadying devices must be used to keep cylinders from falling over while in use.
- 7) Cylinder valves must be closed when cylinders are empty or when cylinders are moved.
- 8) Oxygen cylinders must be stored separated from fuel gas cylinders or combustible materials a minimum distance of 20 feet or by a five foot high noncombustible barrier with a fire-resistance rating of one-half hour.
- 9) Flammable gas cylinders stored inside building must be stored 20 feet from combustible materials where they were well protected, well ventilated, and dry. Cylinders must not be stored near elevators, stairs or gangways. Assigned storage locations must prevent cylinders from being knocked over or damaged.
- 10) Cylinders must be kept away from welding or cutting operations to prevent sparks, hot slag, or flame from reaching them. Fire resistant shields must be used when this impractical.
- 11) Cylinders must be placed away from electrical circuits. Do not strike electrodes against a cylinder to strike an arc.
- 12) Cylinders containing oxygen, acetylene or other fuel gas must not be used in confined spaces.
- 13) Cylinders must not be used as rollers or supports.
- 14) Only the gas supplier is authorized to mix gases in a cylinder. Only the Supervisor is authorized to have cylinders refilled.
- 15) No damaged or defective cylinder may be used.

Use of Fuel Gas - 1910.253 - Oxygen-fuel gas welding and cutting.

- 1) Employees will be instructed in the safe use of fuel gas by their supervisors.
- 2) Valves must be opened slightly and closed immediately before a regulator is connected to the cylinder. This is called “cracking” which clears the valve of dust and dirt. The employee must stand to the side of the outlet, not in front. Valves must be cracked away from welding work, sparks, flames or other sources of ignition.
- 3) Valves must be opened slowly to prevent damage to the regulator. Valves must not be opened more than 1 ½ turns. If wrench is required it must stay in position in case of emergency for a quick shut off. Manifold or coupled cylinders must have a wrench available for immediate use. Do not place objects on top of cylinders, or damage may occur to the safety device or interfere with the quick closing of the valve.
- 4) Cylinders must be closed and the gas released from the regulator before removing the regulator. If cylinders, valves, regulators, plug, or other safety devices are damaged, they must be tagged out of service and removed from the work area.

Manifolds

- 1) Fuel gas and oxygen manifolds must bear the name of the substance they contain.
- 2) Fuel gas and oxygen manifolds must be placed in safe, well ventilated and accessible locations.
- 3) Hose connections must be made so that they cannot be interchanged between fuel gas and oxygen manifolds and supply header connections. Keep hose connections free of grease and oil, and do not use adapters to interchange hoses.
- 4) Manifold and header hose connections must be capped when not in use.
- 5) Nothing may be placed on manifolds that will damage the manifold or interfere with the quick closing of the valves.

Hoses

- 1) Fuel gas hose and oxygen hose must be distinguishable from each other, and not be interchangeable. Contrast may be made by different colors or by surface characteristics

distinguishable by the sense of touch • Employees will inspect all hoses in use at the beginning of each work shift. Defective hoses must be tagged and removed from service.

- 2) Hoses subjected to flashback, or which show severe wear or damage must be tested at twice that normal pressure from the hose, but not less than 300 p.s.i. if defective, hose must not be used.
- 3) Hose couplings must be disconnected by rotary motion only.
- 4) Hoses stored in boxes must be well ventilated.
- 5) Hoses, cables, and other equipment must be kept clear of passageways, ladders and stairs

Torches

- 1) Torches must be inspected at the beginning of each working shift for leaving shutoff valves, hose coupling, and tip connections. Defective torches may not be used.
- 2) Clogged torch tip openings must be cleaned.
- 3) Torches may be lit by friction lighters or other approved devices only Regulators and

Gauges

- 1) Pressure and regulators and related gauges, must work properly while in use oil and grease hazards.
- 2) Oxygen cylinders and fittings must be kept away from oil or grease. Cylinders and fittings must be kept free from oil or greasy substances and may not be handled with oily hands or gloves. Oxygen must not be directed at oily surfaces, greasy clothes, or within a fuel oil or other storage tank or vessel.

Fire Protection

- 1) Objects to be welded, cut or heated must be moved to a designated safe location. If the object cannot be easily moved all moveable fire hazards will be moved protected.
- 2) If the object to be welded, cut or heated cannot be moved and if all the fire sparks, and slag, and to protect the immovable fire hazards from them.

- 3) Welding, cutting, or heating must not be performed in the presence of flammable paints, flammable compounds or heavy dust concentrations.
- 4) Fire extinguishers must be immediately available in the work area, free of obstruction, and maintained for instant use.
- 5) When normal fire prevention precautions are not sufficient for the welding, cutting, or heating operation supervisor will assign a fire watch. Sufficient amount of time must be allowed after completion of work to ensure that the possibility of fire does not exist. The designated fire watch, must be trained in firefighting equipment.
- 6) Gas supplies must be shut off during lunch breaks, overnight, or during shift breaks. Hoses and torches must be removed from confined spaces.

Training

Employees are required to become familiar with and understand the guidelines regarding welding and cutting operations. Designated welders and cutters must receive annual training and must demonstrate their understanding of these guidelines to the supervisor.

Training should include:

1. Review of requirements listed in TITLE 8 CCR Sections 4794-4799, and articles 82,83,87,88, & 90, also, OSHA 1910.252,
2. Use of Hot Work Permit System
3. Supervisor responsibilities
4. Fire watch responsibilities
5. Operator responsibilities
6. Contractor's responsibilities
7. Documentation requirements
8. Respirator usage requirements
9. Fire Extinguisher training

Additional California Regulatory References:

Subchapter 7. General Industry Safety Orders Group 10. Gas Systems for Welding and Cutting

- Article 80. Purpose and Definitions (Sections 4794 - 4795)
- Article 81. General (Sections 4797 - 4799)
- Article 82. Stationary Automatic Acetylene Generators (Sections 4803 - 4813)
- Article 83. Portable Automatic Acetylene Generators (Sections 4815 - 4816)
- Article 84. Calcium Carbide (Sections 4818 - 4819)
- Article 85. Service Piping for All Gases (Sections 4821 - 4829)
- Article 86. Manifolding of Cylinders to Headers for Shop Pipe Line Supply Systems and Pressure

Reducing Regulators and Hose (Sections 4835 - 4840)

- Article 87. Operating Procedure (Section 4845)
- Article 88. Fire Prevention in Welding and Cutting Operations (Sections 4846 - 4848)

Group 11. Electric Welding

- Article 90. Electric Welding, Cutting and Heating (Sections 4850 - 4853)

Construction; Subchapter 4. Construction Safety Orders

Article 32. Oxygen, Acetylene, and Fuel Gas

- §1739.
- §1740. Storage and Use of Cylinders.
- §1741. Pressure Regulators.
- §1742. Hose and Connections.
- §1743. General Precautions.