

Hot Work Program



California State University, Chico

Department of Environmental Health and Safety

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Hot Work Program Record of Revisions

Revision	By	Date	Description of Revision
I	YS	12-10-2018	Improved definition of Special Hazard Occupancies

Legend:

YS: Yvette Streeter, Emergency Preparedness and Occupational Safety Manager

1.0

INTRODUCTION

The purpose of this program is to provide specific standards regarding Hot Work and to ensure that each employee is adequately trained and fully aware of safety procedures associated with all Hot Work.

California State University, Chico (CSU, Chico) is dedicated to the protection of our employees from occupational injuries and illnesses. CSU, Chico is responsible for providing a safe working environment.

Welding and other Hot Work, such as brazing, cutting or grinding presents a significant opportunity for fire and injury. University employees and contractors must apply all precautions of this program prior to commencing any welding or hot work.

Employees are required to comply with the guidelines set forth, and to comply with the instructions of their Supervisor. In the event an unsafe condition arises in the absence of the supervisor, employees should alert the lead persons on the jobsite and, as needed, notify the Department of Environmental Health and Safety. Employees should also immediately alert co-workers of any unsafe conditions that arise.

References: California Code of Regulations, (Title 8 Cal/OSHA), Code of Federal Regulations, Occupational Safety & Health Administration (OSHA), National Fire Protection Agency (NFPA), and the California Fire Code (CFC).

2.0

DEFINITIONS

Fire Watch: A qualified individual who has been designated by a Supervisor or Manager to be responsible for inspecting the hot work area for signs of spot fires or ignition during and after all hot work has been completed. This individual must be trained in the proper use of a fire extinguisher and be capable of communicating an alarm if needed.

Hot Work: Operations including cutting, welding, brazing, soldering, grinding, thermal spraying, thawing pipe, torch applied roofing, or any other similar activity which creates sparks, fire, molten slag, or generates other hot materials that have the potential to cause fires or explosions.

Hot Work Area: The area exposed to sparks, hot slag, radiant heat, or convective heat as a result of the hot work.

Hot Work Permits: Permits issued by the responsible person at the facility under the hot work permit program permitting welding and other hot work to be performed in locations meeting the requirements of this program.

Lock Out/Tag Out (LOTO): The Control of Hazardous Energy; procedures as outlined in the Universities written program must be implemented as needed prior to and during Hot Work activities in order to prevent accidents that may cause injuries including (but not limited to) pinching, crushing, cuts, slices, burns, shocks, electrocution, or death that may be caused by unexpected energization or startup of machines or equipment, or the release of stored energy from machines and equipment when maintenance or servicing operations are taking place.

Special Hazard Occupancies: Any area containing flammable liquids or vapors, has potential for combustible dust accumulation, and/or contains areas of use or storage of gases, plastics, rubber and paper products.

3.0 HOT WORK PRECAUTIONS AND PROCEDURES

Welding and Hot Work, including but not limited to activities such as welding, cutting, brazing or grinding presents a significant opportunity for fire and injury. University employees and contractors must apply all precautions within this program prior to commencing any welding or hot work.

- Where practical all combustibles will be relocated at least 30-feet from the work site.
- Where relocation is impractical, combustibles must be protected with flameproof covers, shielded with metal, non-combustible guards, curtains or be wet down to help prevent ignition of material.
- Ducts, conveyor systems, and augers that might carry sparks to distant combustibles must be protected or shut down. 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.
- If welding is to be done on a metal wall, partitions, ceiling, or roof, precautions must be taken to prevent ignition of combustibles on the other side, due to conduction or radiation of heat.
- Where combustibles cannot be relocated on the opposite side of work, a fire watch person shall be provided on the opposite side the work.
- Welding will not be attempted on a metal partition, wall, ceiling, or roof having a covering or on walls having combustible sandwich panel construction.
- 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.
- In areas where there is dust accumulation of greater than 1/16 inch within 30 feet of the area where welding/hot works will be conducted, all dust accumulation will be removed following the housekeeping program of the facility before welding/hot works are permitted.
- A minimum of one portable fire extinguisher *minimally* rated at 2-A:20-B:C must be readily available within 30 feet of the operation.
- A fire watch person will provided during and for 30 minutes past the completion of the welding project, or of a longer duration if warranted.
- A cutting/welding permit (Hot Work Permit) must be issued by a Supervisor or Manager. This person shall be responsible for ensuring the required hot work safety measures are taken to prevent fires and fire spread prior to the commencement of any hot work *outside of* designated and approved welding areas.

- Signs, barricades, and other means of notification (as needed) have been posted to warn workers and other persons who may be in the area of the hot work operations and any other hazards created by the operation.
- Cutting or welding is not permitted in the following situations:
 - ❖ In areas not authorized by management.
 - ❖ In sprinklered buildings while such protection is impaired, unless alternate provisions such as a fire watch is in place.
 - ❖ In the presence of potentially explosive atmospheres.
 - ❖ In areas near the storage of large quantities of exposed, readily ignitable materials.

4.0 WELDING AND HOT WORK FIRE PREVENTION MEASURES

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

- Floors swept and clean combustibles within 30 feet of work area.
- Flammable and combustible liquids and materials are kept 35 feet from work area.
- Adequate ventilation providing 20 air exchanges per hour, such as a suction hood system should be provided to the work area.
- At least one 2A-20B:C fire extinguisher is to be readily available within access of the 30-foot of work area.
- Protective dividers such as welding curtains or non-combustible walls will be provided to contain sparks and slag to the combustible free area.

4.1 Requirements for Welding Outside Designated Areas

- Portable welding curtains and/or shields must be used to protect other workers in the welding area.
- A Hot Work permit must be completed and complied with prior to welding operation.
- Respiratory protection is required unless an adequate monitored airflow directs vapors and fumes away from the welder and others present can be established and maintained.
- Plastic materials must be covered with welding tarps during welding procedures.
- Fire watch must be provided as specified in this program.

4.2 Welding Standard Operation Procedures (SOP)

The following sections list Welding Standard Operating Procedures (SOP) and are applicable for all electric and gas welding operations. Equipment safety considerations are also listed.

These standard operation procedures are to be posted at each Designated Welding & Hot Work Area in a location where they are readily available for quick reference and review.

4.3 Electric Welding

- Perform a visual safety check of all equipment.
- Ensure fire extinguisher is fully charged and readily available.
- Ensure electrical cord, electrode holder and cables are free from defects (no cable splices are allowed within 10 feet of the electrode holder.)
- Ensure PPE (welding hood, gloves, rubber boots/soled shoes, and aprons) are available and have no defects.
- Ensure the welding unit is properly grounded.
- All defective equipment must be repaired or replaced before use.
- Remove flammables and combustibles from the area.
- No welding is permitted on or near containers of flammable material, combustible material or unprotected flammable structures.
- 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).

- Ensure adequate ventilation and lighting.
- Execute Hot Work Permit procedures.
- Set Voltage Regulator no higher than the following for:
 - ❖ Manual Alternating Current Welders- 80 volts
 - ❖ Automatic Alternating Current Welders – 100 volts
 - ❖ Manual or automatic Direct Current Welders – 100 volts
- Uncoil and spread out welding cable.
- 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.)
- Fire watch for 30 minutes after welding and until all welds has cooled.
- Perform final fire watch and terminate permit by indicating the time of completion and final fire watch check of the area.

4.4 Gas Welding

- Perform visual safety check on all equipment.
- Ensure tank gas valves, hose connections and other fittings are tight.
- Ensure fire extinguisher is charged and readily available.
- Inspect hoses for defects such as damages, cracks, etc.
- Ensure PPE (welding hood, gloves, rubber boots/soled shoes and aprons) are available and have no defects.
- All defective equipment must be repaired or replaced before use!
- Remove flammables and combustibles from the area (35'.)
- No welding is permitted on or near containers of flammable material, combustible material or unprotected flammable structures.
- Place welding screen or suitable barricade around work area to provide a fire safety zone and prevent injuries to passersby (take care to not block emergency exits or restrict ventilation.)
- Use an authorized Air Filtering Respirator, if required.
- Ensure adequate ventilation and lighting.
- Execute Hot Work Permit Procedures and special conditions as needed.
- Open valves on oxygen and gas tanks to desired flow.

4.5 After Hot Work Has Been Completed

- Shut tank valves and relieve hose pressure.
- Store hoses properly.
- Fire watch for 30 minutes after welding and/or until all welds have cooled.
- Perform final fire watch and terminate permit by entering job completion time on permit.

5.0

COMPRESSED GAS SAFETY

5.1 Care, Transporting, Moving, and Storage of Cylinders

- Valve caps on cylinders must be in place and secured. Valve caps must not be used for lifting. Do not pry cylinder caps if frozen. Loosen caps with warm water.
- Cylinders must be transported on a secured cradle only, or by carefully tilting or rolling them.
- Cylinders must be moved by tilting and rolling them on their bottom edges.
- Avoid dropping cylinders or striking other cylinders.
- Cylinders transported by powered vehicles must be secured in a vertical position.
- Regulators must be removed and caps put in place prior to moving cylinders, unless cylinders are secured on a special carrier.
- Proper steadying and securing devices must be used to keep cylinders from falling over.
- Cylinder valves must be closed when cylinders are empty or when cylinders are moved.
- 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.
- 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. Designated storage locations must be arranged to prevent cylinders from being knocked over or damaged.
- 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.
- Cylinders must be placed away from electrical circuits. Do not strike electrodes against a cylinder to strike an arc.
- Cylinders containing oxygen, acetylene or other fuel gas must not be used in confined spaces.
- Cylinders must not be used as rollers or supports.
- Only the gas supplier is authorized to mix gases in a cylinder.
- Only the Supervisor is authorized to have cylinders refilled.
- No damaged or defective cylinder may be used.

5.2 Use of Fuel Gas

- California State University, Chico employees will be properly trained in the safe use of fuel gas prior to conducting operations using fuel gases.
- 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. (Exception: Do not crack hydrogen cylinders as the release of compressed hydrogen may ignite by itself).
- 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.

5.2 Use of Fuel Gas (Continued)

- 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, the item must be tagged as out of service (LOTO) and removed from the work area.

5.3 Manifolds

- Fuel gas and oxygen manifolds must bear the name of the substance they contain.
- Fuel gas and oxygen manifolds must be placed in safe, well ventilated and accessible locations.
- 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
- Manifold and header hose connections must be capped when not in use.
- Nothing may be placed on manifolds that will damage the manifold or interfere with the quick closing of the valves.

5.4 Hoses

- 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 will be tagged (LOTO) and removed from service.
- 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 PSI, if defective, hose must not be used.
- Hose couplings must be disconnected by rotary motion only.
- Hoses stored in boxes must be well ventilated.
- Hoses, cables, and other equipment must be kept clear of passageways, ladders and stairs.

5.5 Torches

- 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.
- Clogged torch tip openings must be cleaned properly.
- Torches may only be lit by friction lighters or other approved devices.

5.6 Regulators and Gauges

- Pressure and regulators and related gauges, must work properly while in use or be tagged and/or locked out in accordance with the University Lockout Tagout Program procedures or be removed from the cylinders (LOTO tag must remain in place to avoid accidental use).

5.7 Oil and Grease Hazards

- 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.

5.8 Fire Protection

- Objects to be welded, cut or heated must be moved to a designated safe location. If the object cannot be easily moved, all combustible items or potential fire hazards are required to be protected by guards or fire resistive materials or curtains.
- Welding, cutting, or heating must not be performed in the presence of flammable or combustible paints, flammable or combustible compounds or heavy dust concentrations.
- Fire extinguishers must be of required minimum rating, immediately available in the work area, free of obstruction, and maintained ready for instant use.
- When normal fire prevention precautions are not sufficient for the welding, cutting, or heating operation the Manager or Supervisor shall assign a fire watch. Sufficient amount of time (30 minutes or longer if required) must be allowed after completion of work to ensure that the possibility of fire does not exist. The designated fire watch person must be trained in the use of fire extinguishers.
- Gas supplies must be shut off during lunch breaks, overnight, or during shift breaks or changes.
- Hoses and torches must be removed from confined spaces when not in use.

6.0

TRAINING

Employees are required to become familiar with and understand the guidelines regarding welding and cutting operations. Designated welders and cutters must receive training and must be able to demonstrate their understanding of the training and this program to the Manager or Supervisor.

6.1 Training shall include:

1. Complete review of CSU, Chico Hot Work Program.
2. Proper use of Hot Work Permit.
3. Supervisor responsibilities.
4. Fire watch responsibilities.
5. Operator responsibilities.
6. Contractor's responsibilities.
7. Documentation requirements.
8. Respirator program requirements.
9. Fire Extinguisher training.

7.0**PRE-HOT WORK INSPECTION AND CHECKLIST**

**THIS PRE-HOT WORK CHECKLIST SHALL BE KEPT AT THE JOB SITE
AND SHALL BE READILY AVAILABLE UPON REQUEST**

Pre-Hot Work Inspection Check List

Before hot work is permitted and at least once per day while this permit is in effect, the hot work area shall be inspected by the individual responsible for authorizing the hot work operations to ensure that it is a fire safe area. Information shown on this permit shall be verified prior to signing the permit.

- All hot work equipment is in satisfactory operating condition and in good repair.
- Hot work site is clear of combustibles or combustibles are protected.
- Exposed construction is of non-combustible materials, or if combustible, then protected.
- All wall and floor openings are protected and/or tightly covered.
- Floors are clean, combustible floors are wet down, covered with damp sand or fire-resistant sheets.
- No exposed combustibles are located on the opposite side of partitions, walls, ceilings or floors.
- Within the hot work area, remove all exposed combustible materials where possible, otherwise protect with fire-resistant tarpaulins, screens or shields to prevent contact with sparks, slag, and radiant and convective heat.
- Fire-resistant tarpaulins have been suspended beneath elevated hot work.

Work on Walls or Ceilings / Enclosed Equipment

- No danger exists by conduction of heat into another room or area. Combustibles have been moved or protected.
- Enclosed equipment cleaned of all combustibles.

Fire Watch Personnel / Fire Safety

- Fire watch shall be provided during work and continuously for 30-minutes after work, including during any break from work.
- Fire watch personnel have readily available a minimum 2-A:20:B:C rated fire extinguisher which shall be located within 30' of the hot work area.
- :
- Fire watch personnel are trained in use of portable fire extinguishers and in sounding an alarm, if needed.
- Additional fire watch personnel may be required for adjoining areas, including above and below hot work area.

General Safety Requirements

- Signage stating: “CAUTION, HOT WORK IN PROGRESS, STAY OUT” (or equivalent) is posted as needed.
- Adequate ventilation is provided to remove smoke/vapors from hot work area.
- All hot work operators shall be trained in safe equipment use and can demonstrate knowledge of the requirements of the Hot Work Program and have completed all required training.

Additional Precautions or Requirements

- Confined space entry permit required. Welding vs. soldering. Lockout/Tagout required.

Special Conditions (Requires notification to EHS prior to work)

1. Hot work in any area containing flammable liquids, vapors and/or hazardous materials.
2. Hot work in an area with fire protection devices such as smoke and/or heat detection.
3. Hot work in areas with automatic sprinkler protection; area sprinkler heads must be protected by non-combustible barriers or damp cloth guards. Shields or covers must be removed at the end of the work day or immediately after work has been completed.
4. If a buildings fire sprinkler system is impaired (shut off), the local Fire Department must be notified in advance of the impairment and notified once the system has been restored to normal operations.

Note: Contact EHS. If work is outside of normal business hours, directly notify Chico Fire at (530) 897-3400, staff will transfer you to dispatch. If this number is not answered, request that University Police notify Chico Police and Fire Dispatch Center directly. University Police (530) 898-5555.

Comments or additional precautions required:

HOT WORK PERMIT

7.1

California State University, Chico
 Department of Environmental Health and Safety
 Phone: (530) 898-5126 Fax: (530) 898-6511



Hot Work Permit

This Hot Work Permit is required for *temporary operations* involving open flame or work that produces heat and/or sparks. This includes brazing, cutting, grinding, soldering, welding, or using a torch to thaw piping or heat material. **The Permit and Pre-Hot Work Checklist and Inspection are to be at the job site, readily available and maintained at the premises for a minimum of 48 hours after work has been completed.**

Hot Work To Be Performed By: Contractor ____ Internal FMS ____ Other (specify)_____		
Building Name, Room Number, and Location:		
Work Description:		
I have verified that the above location has been inspected and the required INSPECTIONS & SAFEGUARDS have been taken. Permission is authorized only for the work described above.		
Name of Hot Work Supervisor (HWS): _____		
Contact Numbers: Phone: _____ Cell: _____		
Permit Issued	Date:	Time: <input type="radio"/> AM <input type="radio"/> PM
Permit Terminated	Date:	Time: <input type="radio"/> AM <input type="radio"/> PM
Signature of HWS:		
EHS Approval (Required For Special Conditions As Listed):		

Pre-Hot Work Inspection & Checklist

Reviewed & Approved By:	Final Check:	Date:	Time: <input type="radio"/> AM <input type="radio"/> PM
Comments:	Employee Signature: _____		
	Supervisor Signature: _____		

This permit applies only to this job, in the area specified, during the time and dates noted.