

# Oregon State University

## Hot Work Safety Program

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## Policy and Responsibilities

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### Policy

Refer to section [214: Hot Work Safety](#) of the OSU [Safety \(SAF\) Manual](#).

### Responsibilities

#### Environmental Health and Safety (EH&S)

- Overall implementation, maintenance, review, and revision of the written program with input from stakeholders.
- Conduct periodic inspections of hot work locations.
- Provide training and consultation as necessary.
- Investigate and document reported incidents and near-misses related to hot work.

#### Unit Supervisor

- Ensure this program is implemented in those areas under their jurisdiction where applicable.
- Establish and document designated areas and procedures for permanent hot work activities where the potential fire danger is limited.
- Designate qualified Firesafety Supervisors, prior to permit issuance, to implement and monitor mobile hot work requirements and processes.
- Ensure all unit employees involved in hot work operations are suitably trained in the safe operation of their equipment and understand the hot work permit program requirements and processes.
- Periodically review cancelled permits and inspection forms and correct deficiencies in a timely manner.

#### Firesafety Supervisor

- Overall safety of hot work operations under supervision.
- Be qualified to examine the work site, and familiar with the operation and the facility to the extent necessary to recognize any potential hazards, and ensure that the appropriate protective steps are being taken.
- Implement and monitor all provisions of the hot work permit program for work areas under their control.
- Assign employees to perform Fire Watch, and confirm their presence, as required by the hot work permit.
- Ensure the precautions listed on the hot work permit are understood by the Hot Work Operator and Fire Watch.
- Review and sign written mobile hot work permits.
- Terminate unsafe work practices or conditions.
- Notify EH&S of unsafe working conditions that cannot immediately be resolved.
- Periodically review cancelled permits and inspection forms and correct deficiencies in a timely manner.
- Cannot perform the hot work operations on the same permit that

#### Hot Work Operator

- Successfully complete all required hot work and fire extinguisher training.
- Document and maintain hot work equipment in safe operating condition.
- Obtain written approval from a Firesafety Supervisor before hot work begins.
- Post the approved hot work permit and any warning signs at the work location.

- Use appropriate Personal Protective Equipment (PPE) while performing hot work.
- Cease hot work operations if unsafe conditions develop.
- Contact a Firesafety Supervisor if conditions become unsafe or warrant reassessment during the hot work task.
- Return the completed hot work permit to the Firesafety Supervisor.

### **Fire Watch**

- Successfully complete all required hot work and fire extinguisher training.
- Notify other personnel in the area of the hot work operations.
- Ensure that safe conditions are maintained during the hot work.
- Have fire-extinguishing equipment readily available and be trained in its use.
- Extinguish fires when they are obviously within the capacity of the available fire extinguisher. If a fire is beyond the capacity of the equipment, immediately sound the fire alarm, evacuate the area and call 911.
- Maintain a fire watch for at least 60 minutes after the hot work is completed.

### **Point of Contact**

- Coordinate all hot work operations and activities involving both OSU and non-OSU employees (i.e. contractors) following this Program.
- Verify that a Contractor's Safety Program includes an established hot work program.
- Ensure that the contractor understands their responsibilities as outlined in this policy and the OSU Hot Work Safety Program.
- Inform hot work contractors of all other relevant OSU programs and procedures, and all known or potential hazards in that space and the immediate surrounding area.
- Discuss the planned project completely with the contractor including the type of hot work to be conducted and measures to control damage to property, injury to persons, and loss, expense, inconvenience, and delay that may be caused by, or result from, the carrying out of the contracted work.
- Consult with EH&S if there is concern that control measures are inadequate or otherwise unacceptable.
- Inform all other potentially affected contractors working in the vicinity of the pending hot work operations of the hazards and necessary precautions.

### **Contractors**

- Follow this Program as directed by the Point of Contact on all hot work operations or activities that include operators from OSU.
- Provide the Point of Contact with a copy of the Contractor's established hot work safety program upon request.
- For hot work performed solely by contractors, the contracting Firesafety Supervisor shall be identified and the name and contact information provided to the Point of Contact.
- Discuss the planned project completely with the Point of Contact including the type of hot work to be conducted; established hazards in the area; and measures to control damage to property, injury to persons, and loss, expense, inconvenience, and delay that may be caused by, or result from, the carrying out of the contracted work.
- Immediately inform the Point of Contact if any conditions change that could undermine hazard and loss controls.

## Definitions

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**Approved** – Listed or approved by a nationally recognized testing laboratory (e.g. Underwriters Laboratories (UL) and Factory Mutual Research Corporation (FMRC)) concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

**Combustible material** – Materials that catch and sustain fire when subjected to heat from hot operations. This includes carpeting, paper, books, trash, furniture, cloth, wall coverings, chemicals and plastics.

**Conduction** – The process by which heat is directly transmitted through a substance.

**Designated hot work area** – A permanent location, meeting the requirements in section Hot Work Area Requirements, designed or approved for hot work operations to be performed regularly and, where the type of work and personnel remain consistent.

**Firesafety Supervisor** – The individual designated by a Unit Supervisor to authorize hot work. The Firesafety Supervisor is responsible for enforcing the OSU Hot Work Safety Policy and Program; reviewing sites prior to authorizing hot work and issuing permits; and managing hot work activities including fire watch and all contractors.

**Note:** The Firesafety Supervisor cannot act as the Hot Work Operator on a permit they issued.

For hot work performed solely by contractors, the contracting Firesafety Supervisor shall be identified and the name and contact information provided to the Point of Contact.

**Fire Watch** – A person assigned by the Firesafety Supervisor to observe hot work operations and watch for and abate developing fires. Also, fire watch (the activity; designated by all lower case letters) is required when hot work operations are conducted within 35-feet of combustible or flammable materials, holes, walls, ceiling or floor openings where metal walls or floors can communicate heat to combustible or flammable materials.

**Flammable material** – Materials such as solvents, petroleum products, laboratory chemicals, cleaners, paints, thinners, or compressed gases, that have a flash point of 100 degrees Fahrenheit or less.

**Hazard** – A condition or changing set of circumstances that presents a potential for injury, illness, or property damage. The potential or inherent characteristics of an activity, condition, or circumstances, which can produce adverse or harmful consequences.

**Hot work** – Normal or periodic operations involving brazing, burning, cutting, grinding, sawing, sealing plastic by torch, soldering, thermal spraying, thawing pipe, welding, thermite welding, or any other similar or related activity that produces flames, sparks, heat, or is otherwise capable of initiating fires or explosions.

**Hot work area** – The area exposed to flames, sparks, conductive, convective or radiant heat transfer as a result of hot work.

**Hot Work Operator** – A trained individual authorized by the Firesafety Supervisor to perform hot work.

**Note:** The Hot Work Operator cannot work under the same permit that they issued as the Firesafety Supervisor.

**Listed** – Approved equipment, materials, or services included in a list published by a nationally recognized testing laboratory. See definition of approved.

**Mobile hot work** – Hot work performed beyond the confines of a designated hot work area.

**Monitor** – Keep under observation, maintain regular surveillance over.

**Permanent hot work** – Operations conducted in a designated hot work area.

**Permit** – A document issued by the Firesafety Supervisor for the purpose of authorizing performance of a specified hot work activity or operation.

**Point of Contact** – The OSU employee or operational unit serving as the coordinator or focal point of information concerning an operation, activity, project, or program.

**Shield / Shielding** – An approved or listed fire-resistant protective device or structure such as a welding blanket, curtain, pad or similar device.

**Welder and welding operator** – Any operator of electric or gas welding and cutting equipment.

**Welding and allied processes** – Processes such as arc welding, oxy-fuel gas welding, open-flame soldering, brazing, thermal spraying, oxygen cutting, and arc cutting.

**Welding blanket** – A heat-resistant fabric designed to be placed in the vicinity of a hot work operation; Intended for use in horizontal applications with light to moderate exposures such as that resulting from chipping, grinding, heat treating, sand blasting, and light horizontal welding; Designed to protect machinery and prevent ignition of combustibles such as wood that are located adjacent to the underside of the blanket.

**Welding curtain** – A heat-resistant fabric designed to be placed in the vicinity of a hot work operation; Intended for use in vertical applications with light to moderate exposures such as that resulting from chipping, grinding, heat treating, sand blasting, and light horizontal welding; Designed to prevent sparks from escaping a confined area.

**Welding pads** – A heat-resistant fabric designed to be placed directly under a hot work operation such as welding or cutting; Intended for use in horizontal applications with severe exposures such as that resulting from molten substances or heavy horizontal welding; Designed to prevent the ignition of combustibles that are located adjacent to the underside of the pad.

## Hot Work Permits

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### Permanent Hot Work

#### Issuance

- The unit supervisor will issue all permanent hot work permits for designated hot work areas where the potential fire danger is limited, and maintain a catalog of the locations. Posting designated hot work areas with signage that indicates “Danger” or “Caution” and “Hot Work Area”, or similar, serves as the permanent hot work permit.

#### Operations

- A permanent hot work permit is valid as long as work task, location, conditions, and operations remain the same.
- A new permit is required when any of the above change.

### Mobile Hot Work

**Note:** While the same OSU employee may serve as Unit Supervisor, Firesafety Supervisor, Hot Work Operator, and Fire Watch within the overall scope of their operational unit’s duties, that employee may not serve as both the Firesafety Supervisor and Hot Work Operator on the same permit (i.e. A person cannot write a permit and then perform the work themselves. At least two people must be involved in the process in order to avoid the conflict of interest and ensure appropriate safety oversight).

#### Issuance

- The Firesafety Supervisor may issue only mobile hot work permits. FM Global (F2630) Hot Work Permits shall be utilized. Additional permits may be requested from the OSU Occupational Safety Officer.

#### Operations

- A permit is required for all mobile hot work operations for each location.
- *Prior to initiation of operations*, the mobile hot work area must be examined, required precautions taken to prevent fire, and the completed permit authorizing the hot work *clearly posted* at the particular hot work area.

#### Retention

- The Firesafety Supervisor will retain **Part 1** for a minimum of 1 year for periodic program review and auditing.
- In the event that a confined space entry is necessary to perform hot work, the Firesafety Supervisor shall attach **Part 1A** to the corresponding Confined Space Entry Permit. See [SAF 209: Confined Space Entry](#).  
**Note:** The Firesafety Supervisor shall indicate in the “Other precautions taken:” section on the bottom right corner of the mobile hot work permit that the operation required a confined space entry. Also, the hot work permit number shall be recorded on the confined space entry permit in section 3. Hot Work.
- **Part 2** shall be posted at the mobile hot work location until monitoring is complete. The “Final checkup” signatory (Fire Watch) shall forward **Part 2** to the unit supervisor in a timely manner. The unit supervisor shall retain **Part 2** for a minimum of 1 year for periodic program review and auditing.

### Exclusion Areas

Hot work shall be prohibited in where 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.

## Hot Work Area Requirements

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Areas where hot work is performed shall be properly designated and prepared as described in this section. If the requirements stated in this section cannot be followed, then hot work shall not be performed.

### General

- Make every reasonable effort to isolate the HVAC system for interior operations, eliminate hot work near building intake vents on exterior operations, and provide courtesy notification to occupants prior to the start of operations.
- Place non-combustible or flame-resistant screens so personnel in adjacent areas are protected from arc flash, heat, flames, and welding slag.
- The fire pump is in operation and switched to automatic.
- Control valves to water supply for the sprinkler system are open.
- Fire extinguishing equipment shall be fully charged, in service, operational and readily accessible prior to hot work and throughout the entire duration of the fire watch.

**Note:** Fire extinguishers shall be supplied by the group performing the hot work. The fire extinguishers normally located in a building **are not to be considered** in fulfilling this requirement.

- Hot work equipment is in good working condition.
- Place welding hoses so that they will not be crushed or damaged.

### Requirements within 35 feet of hot work

- Conduct air monitoring as necessary.
- Inspect the hot work area, identify potential hazards and control those hazards.
- Where possible, relocate or eliminate flammables and combustibles.
  - Ignitable liquid, dust, lint and oily deposits removed.
  - Explosive atmospheres eliminated.
  - Floors swept clean.
- Shielding shall be used to protect immovable fire hazards and to confine heat, sparks and slag.
  - Combustible floors wet down, covered with damp sand or other shielding.
  - Shield all floor penetrations to prevent hot sparks from entering floors or falling to a lower level.
- Shield or shut down ducts, conveyors, or similar infrastructure that might carry sparks to distant combustible materials.
- Silence the fire alarm and, if necessary, cover sprinkler heads and smoke detectors in the immediate hot work area with wet rags or other non-combustible materials so they will not be triggered during the work.

### Hot work on walls, ceilings and roofs

- Construction is noncombustible and without combustible covering or insulation.
- Shield all penetrations in walls, ceilings and roofs to prevent hot sparks from entering and/or falling to a lower level.
- Combustible material on other side of walls, ceilings or roofs is removed.



## Hot work on enclosed equipment

- Enclosed equipment cleaned of all combustible material.
- Containers purged of all ignitable liquid/vapor.
- Pressurized vessels, piping and equipment removed from service, isolated and vented.

## Ventilation or respiratory protection requirements

- Mechanical ventilation or use of air-supplied respirators for workers in the immediate vicinity is required under the following conditions:
  - The area has a ceiling less than 16 feet.
  - Welding is being performed in a space less than 10,000 cubic feet per welder.
  - The welding space contains partitions, balconies, or other structural barriers to the extent that it obstructs cross ventilation.
  - Hot work is performed in a confined space.
- Local ventilation shall be provided when zinc, mercury, lead, beryllium, or cadmium are present in the base or coated metal being welded, cut, or brazed. Air purifying or air-supplied respirators may also be required, based on airborne concentrations or potential airborne concentrations. The designated Firesafety Supervisor should contact EH&S in advance of doing such work so that appropriate precautions may be taken.
- When welding must be performed in a space entirely screened on all sides, the screens shall be so arranged that no serious restriction of ventilation exists. It is desirable to have the screens so mounted that they are about 2 feet above the floor unless the work is performed at such a low level that the screen must be extended nearer to the floor to protect nearby workers from the glare of welding.

## Fire watch & hot work area monitoring

- The Fire Watch may be relieved by another Fire Watch assigned by the authorizing Firesafety Supervisor.
- The Fire Watch is restricted from giving assistance or having other work assignments.
- The Fire Watch is supplied with suitable extinguishers and, where practical, a charged small hose for the duration of the fire watch.
- Fire watch may be required in multiple adjoining areas (above and below or either side) depending on the circumstances and conditions present (e.g. Where combustibles are not relocated, a fire watch on the opposite side from the work shall be provided).
- Fire watch will be provided during hot work operations, including any lunch or break activity. **Exception:** A fire watch is not required for minor hot work tasks such as brazing or soldering when the following conditions exist:
  - Non-combustible building constructions;
  - All combustibles (contents or equipment) are separated by non-combustible building construction including wall, floor, or ceiling opening; and
  - There are no combustible materials adjacent to or on opposite side of partitions, walls, ceiling or roof likely to be ignited by conduction or radiation.
- Upon completion of the hot work task, the Fire Watch will remain in the area for a minimum of one (1) hour, or longer if necessary, to inspect the area to which an ignition source (e.g. sparks and heat) may have spread and determine the area fire safe. **After determining the area fire safe**, the Fire Watch will:
  - Sign the "Fire watch signoff" portion of the hot work permit,
  - Notify the Firesafety Supervisor that they're leaving the area, and
  - Leave the posted permit in place.

- The Fire Watch, for a period of not less than one (1) hour after leaving the permit area, will return at least every 30 minutes to monitor the hot work area to ensure the area remains fire safe.
- When the Fire Watch is satisfied the area shall remain fire safe, the individual will:
  - Sign the “Final checkup” on the hot work permit,
  - Indicate how long the hot work area was monitored, and
  - Return the permit to the unit supervisor for retention as described in the “Mobile Hot Work” section of this program.

## Prohibited Practices

Hot work shall not be performed ...

- in areas requiring authorization before it has been granted;
- in areas where the fire suppression system is impaired or inoperable;
- in areas with a reasonable potential to contain an atmosphere of explosive gases, vapors, or dusts prior to venting;
- on used drums, barrels, tanks or other containers until they have been cleaned so thoroughly as to make absolutely certain that there are no flammable materials present or any substances such as greases, tars, acids, or other materials which, subjected to heat, might produce flammable, explosives or toxic vapors;
- in areas near the storage of large quantities of exposed and readily ignitable materials;
- where there are pipes that are in contact with combustible walls, ceilings, roofs, or partitions where heat conduction may cause ignition; or
- on surfaces that may contain zinc, mercury, lead, beryllium, cadmium, asbestos, or other materials that could give off toxic fumes, vapors, dusts, particulates or similar hazards prior to contacting EH&S in advance so that appropriate precautions may be taken.

## Equipment

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### Hot Work

#### Inspections

All hot work equipment, including attachments and accessories, should be inspected prior to use.

- All equipment shall be in good working condition and maintained per manufacturer's specifications.
- Damaged or defective equipment shall be taken out of service immediately.

Monthly inspections shall be performed by the equipment operator(s) and documented on the [Hot Work Equipment Monthly Inspection Form](#), or similar. The completed monthly inspection forms shall be maintained by the unit supervisor for a period of at least one year and shall include at least the following information:

- Name and signature of the employee performing the inspection;
- date of the inspection;
- name of department or shop responsible for the equipment maintenance;
- type of equipment inspected; and
- equipment number.

#### Confined spaces

Equipment used in confined spaces must:

- have welding electrodes removed from their holders when not in use;
- have welding holders positioned in such a manner as grounding will not occur;
- be properly grounded and secured before operations in a confined space can commence; and
- be disconnected from their power source when not in use.
- when gas welding or cutting, the torch valves shall be closed and the gas supply to the torch positively shut off at some point outside the confined space area whenever the torch is not to be used for a substantial period of time, such as during lunch hour or overnight.
- where practicable, when not in use, the gas torch and hose shall be removed from the confined space.

### Personal Protective Equipment (PPE)

Employees, and helpers, shall wear appropriate PPE. This shall include eye protection (i.e., goggles, welding helmets, face shields and/or safety glasses) and fire resistant clothing (i.e., non-synthetic clothing, welding jacket, leather gauntlet gloves).

## Employee Training

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### General

Records of employee training shall be forwarded to EH&S for inclusion in the training database system. Contact EH&S for information on how to view training records via the web.

Unit supervisors shall ensure that all department employees involved in hot work operations have the understanding, knowledge, and skills necessary to perform their jobs safely and in accordance with this program.

Training will be provided in the following manner:

- Appropriate use of all necessary and required equipment.  
**Note:** When respiratory protection is required, the entrant will have current respiratory protection training and respirator fit test. Refer to the OSU EH&S [Respiratory Protection Program](#).
- Before the employee is initially assigned duties.
- Before there is a change in the employee's assigned duties.
- Whenever there is a change in hot work operations that presents a hazard for which the employee has not been trained.
- When the employee does not follow the procedures outlined in this program.
- When there are changes to the hot work program.

The training provider will document employee training, ensuring the documentation:

- Includes the date of training.
- Contains the employee's name and the responsibilities for which they were trained.
- Contains the name and signature of the trainer.

### Specific

Unit Supervisors shall be trained to:

- understand the requirements of this program; and
- to know their responsibilities in promoting its implementation and success.

Firesafety Supervisors will be trained to:

- understand the requirements of this program and the related OSHA standards;
- know their responsibilities under this program, and the potential consequences of not taking or requiring appropriate precautions prior to issuing the permit;
- recognize the potential hazards associated with the various welding operations;
- proactively address prevention of those hazards and to get assistance as needed;
- recognize what appropriate safe work practices, such as PPE, may be needed for the job and ensuring that directives are communicated and followed;
- recognize confined spaces and the requirements associated with them (see [SAF 209: Confined Space Entry](#)); and know how to complete and file the appropriate documentation.

Hot Work Operators will be trained to:

- Understand the requirements of this program and the related OSHA standards;
- know their responsibilities under this program;
- demonstrate proper hot work equipment operation and handling and storage of related materials;
- recognize the potential hazards associated with various welding operations;
- know the safe work practices for welding operations;
- understand the importance and requirements of hot work permits;
- recognize confined spaces and the requirements associated with them;
- use the appropriate PPE for the job; and
- understand the importance of regular inspections of welding equipment, attachments, and accessories.

Fire Watch will be trained to:

- Understand the requirements of this program;
- know their responsibilities under this program;
- recognize the potential hazards associated with various welding operations;
- know the safe work practices for welding operations;
- understand the importance and requirements of hot work permits; and
- operate fire extinguishing equipment and sounding any alarms.

Point of Contact will be trained on:

- [214: Hot Work Safety](#), and
- This program.

## Program Review

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Unit Supervisors and/or Firesafety Supervisors *should periodically review* cancelled permits to ensure that program requirements are being met (i.e hot work permits are legible and all sections are completed in entirety).

Unit Supervisors and/or Firesafety Supervisors **shall routinely review** Hot Work Equipment Monthly Inspection Forms, aggressively correct deficiencies, and develop internal mechanisms to proactively manage the requirements contained therein.

EH&S shall periodically review the Hot Work Safety Program. The review will be a systematic assessment of hot work management processes and procedures to ensure that operations are being conducted properly and that any needed corrective actions, changes or improvements are promptly implemented. EH&S will be accompanied by at least one (1) Firesafety Supervisor and one (1) Hot Work Operator who is thoroughly familiar with the area(s) or process(es) under review. The participation of additional personnel is strongly encouraged but not required.

Situations that require immediate program review and confirmation of EH&S notification include:

- A hot work incident resulting in injury or property loss or a near-miss.
- A condition exists, or practice was performed, that is explicitly prohibited by this program.
- An employee reports concerns about the effectiveness of the program to adequately protect employees or property.
- Any other condition that adversely affects employee safety or may lead to property loss.