

University of Alaska Anchorage	Section EHS/RM
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Title WELDING AND HOT WORK SAFETY	Effective Date <del>10/25/2018</del> 06/30/2021

## 1. Purpose

University of Alaska Anchorage (UAA) employees, student workers, faculty, staff, and outside contractors who perform hot work are exposed to the risk of fires from ignition of flammable or combustible materials in the space, and from leaks of flammable gas into the space. The hazards associated with hot work can be substantially reduced by using the equipment properly, working in a safe location with fire hazards removed or covered, and using guards to confine the heat, sparks, and slag. This program for welding and hot work is intended to ensure workers are knowledgeable in the hazards when performing hot work and the steps to be taken to protect themselves and others.

## 2. Objective

UAA, in its continuing effort to provide employees with safe, healthful working conditions, and to comply with the Occupational Safety and Health Act is implementing the following program for welding and hot work to protect people working at the University, by helping employees, student workers, faculty, staff, and outside contractors better understand and prevent the hazards associated with performing hot work.

## 3. Scope

This policy applies to UAA employees, student employees, faculty, staff, and outside contractors working on UAA equipment who weld or perform other hot work.

## 4. Definitions

Brazing — a metal-joining process in which two or more metal items are joined together by melting and flowing a filler metal into the joint, the filler metal having a lower melting point than the adjoining metal.

Combustible Material — any material that, in the form in which it is used and under the conditions anticipated, will ignite and burn or will add appreciable heat to an ambient fire.

Designated Hot Work Area — a permanent location designed for or approved by ESH/RM for hot work operations to be performed regularly. No permit is needed for a designated hot work area.

Fire Watch — a person assigned to observe ongoing hot work to identify and react to hazards. A fire watch is necessary at any time where hot work is performed in locations outside of a designated welding area.

Flammable Material — a material that is capable of being easily ignited and burning quickly.

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Hot Work - —any work that involves burning, welding, using fire or spark producing tools, or that produces a source of ignition.

Hot Work Area - —an area where hot work activities occur.

Hot Work Permit - —a document issued for the purpose of ensuring hazards are identified, communicated and mitigated prior to the commencement of hot work activities (Appendix A).

Local Exhaust Ventilation - —system used to provide exhaust at for a specific area designed to prevent dispersion into the air of dust, fumes, mists, vapors, and gasses in concentrations causing harmful exposure.

Torch Cutting - —process for cutting metal using an apparatus that produces a very hot flame through the combustion of gases.

Welding - —fabrication process that joins materials, usually metals or thermoplastics, by causing fusion, techniques such as brazing and soldering, which do not melt the base metal.

## 5. Authority and Responsibilities

In addition to the roles and responsibilities outlined in the UAA Training Program, the following apply to the Welding and Hot Work Safety Program.

### EHS/RM

- Assist departments with designation of hot work areas, and review regularly to ensure compliance with this program
- Assist departments with the issuance of hot work permits upon request
- Review Designated Hot Work Areas annually
- Review this program annually

### Supervisor

- Determine the need for hot work within their department, and if necessary work with EHS/RM to designate welding areas
- Assist with the completion of hot work permits in their departments, and authorize prior to hot work being performed
- Conduct periodic inspections of hot work equipment in their department to ensure compliance with this program
- Ensure designated employees are properly trained in the welding, gas cylinder use, fire extinguisher use and the procedures in this hot work program

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- Ensure employees are properly trained in the operation of welding and other hot work equipment

#### Department Safety Coordinator

- Assist with the completion of hot work permits in their departments
- Conduct periodic reviews of hot work activity in their department to ensure integrity
- Assist in the determination of hot work areas in their department

#### Employees

- Ensure hot work is performed in a designated hot work area, or a hot work permit is obtained prior to performing any hot work
- Alerts department supervisor when upcoming jobs will require hot work
- Assesses work to determine if alternative methods to perform the work without hot work is possible

#### Outside Contractors

- Perform all work in compliance with their company's hot work program, which will be reviewed and approved by the EHS/RM department ~~as approved by the EHS/RM department~~
- If the company does not have a program, they must comply with this program

### **6. Hazards**

Personnel performing hot work such as welding, cutting, brazing, soldering, and grinding are exposed to the risk of fires from ignition of flammable or combustible materials in the space, and from leaks of flammable gas into the space, from hot work equipment.

### **7. Engineering Controls**

Engineering controls are design plans or changes to the working environment to prevent or reduce employee exposure to hazards associated with welding and hot work. The following example of engineering controls should be considered in hot work areas to prevent risk of fire and injury.

- Local exhaust ventilation installed at a welding station to alleviate fumes created while performing welding and hot work
- Segregation of welding areas from other operating areas using non-combustible barrier

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walls and welding screens

- Proper storage areas for oxygen cylinders at least 20 ft. away from flammable gasses or separated by a noncombustible barrier at least 5 ft high with a fire-resistance rating of at least a half hour

## 8. Administrative Controls

Administrative controls are safe work practices and procedures designed to reduce the risks associated with hot work activities and welding. Examples of administrative controls include the following:

- Train employees who perform hot work
- Routine inspections of hot work areas to ensure compliance with this program
- Immediate removal of any flammable or combustibles from a hot work area
- Provide employees with the proper tools and equipment to complete hot work safely
- When feasible, use alternative methods to avoid hot work activities.

## 9. Procedures

The following procedures will be followed for hot work and welding activities:

### General Procedure

- When it is determined a job or task will require hot work outside of a designated hot work area, personnel will notify their supervisor to initiate the hot work permit process
- The supervisor will work with the trained authorized employee(s) performing the hot work to complete the hot work permit (Appendix A) and ensure the scope and limitations for the work is clearly communicated to all affected employees
- Prior to completing the permit, the items being welded should be evaluated to determine if there is a risk of lead paint. Conditions to consider include:
  - Any paint older than 1978 has a higher probability of containing lead and should be tested.
  - Outdoor application of paint even after 1978 can contain lead and should be tested. Commonly lead-containing outdoor paints include:
    - Yellow and white traffic paint
    - Gray and white paints on tanks

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- Red paint on structural beams (typically indoor application)
- UAA has many supplies donated including welding rod and flux. All welding materials must be evaluated by reviewing spec sheets or SDS to determine if the product contains lead. If the materials are found to contain lead, these materials must be disposed of and not used in welding or other hot work.
- If any condition of the permit ~~can not~~cannot be satisfied, the hot work ~~can not~~cannot be performed without review by the EHS/RM and approval by the department director or equivalent.
- After completion of the hot work permit, trained personnel will visibly post the hot work permit in the area of work and commence with the hot work.
- If at any time during the work if conditions change or new hazards are discovered, work must stop, and the supervisor notified to mitigate the new hazard prior to commencement of work
- Upon completion of hot work, the designated fire watch will continue to monitor the area for the time specified on the permit, but no less than 30 minutes.
- Permits will be closed out and maintained in the department, with a copy sent electronically to the EHS/RM.
- The hot work permit will be closed for the following conditions:
  - The completion of the hot work activity
  - At the end of a work shift
  - If an unsafe condition is discovered or occurs in or around the hot work area

### **Hot Work Permit Completion**

The person performing the hot work with the assistance of their supervisor, safety coordinator, or EHS/RM as necessary will complete the hot work permit. Hot work must not commence until permit conditions are met and the area is made safe.

This permit or a copy of this permit must be visibly posted in the work area until the hot work is complete.

After the work is complete, the closed permit should be stored in the department for a rolling ~~12~~12-month period, or until the permits can be audited.

### **Permit Section 1**

Section 1 should be completed with as much detail as possible to avoid miscommunication

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leading to performing hot work on the wrong system, location, or timeframe.

- Specific names of employee performing hot work and fire watch will be on the permit. If names need to be added later, it is permissible if all aspects of the hot work permit have been covered with the new individual(s).
- Permits ~~can not~~cannot be issued for longer than one working shift. A new permit must be issued and covered with all employees involved prior to work on the next shift.
- The permit must be signed by the area supervisor, at least one person performing the hot work, indicating they have reviewed the permit conditions and agree the hazards have been mitigated to the best of their knowledge.

## Permit Section 2

The employee(s) completing the hot work permit must check yes, no, or N/A next each item on the list in Section 2 before the final sign off and hot work begins.

- Make all attempts to remove all fire hazards in the hot work area. Combustible materials that can be ignited by ~~the~~ hot work activity will be moved 35 feet from the hot work area ~~where hot work will be performed~~
- If the combustible material ~~can not~~cannot be moved, it must be covered and protected from flying sparks and other potential fire-starting material by covering with metal guards, flame proof curtains, fire blankets or other suitable covers
- Floors must be swept clean of any combustible materials. If the floors are ~~themselves~~ combustible they must be wetted down with an adequate amount of water to prevent ignition. If area will dry prior to the hot work completion, water must be reapplied as necessary
- If the hot work must take place on a tank or vessel which previously contained a flammable or combustible material, a procedure approved by EHS/RM must be created to properly isolate, clean and clear the vessel. Once the tank or vessel is proven cleaned and clear per the procedure, hot work may commence
- When preparing the area for hot work, employee must consider the unintentional spread of sparks to other areas. All wall and floor openings within 35 feet must be tightly covered and protected with metal guards, flame proof curtains, or fire blankets. All ducts, sumps or other conveyances to other areas must be protected to prevent sparks reaching other remote areas. Check the opposite side of walls, partitions, and ceilings for combustible materials that are adjacent which could be ignited by heat transfer via conduction or radiation

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- A fire extinguisher must be immediately available to extinguish a fire in an emergency. The fire extinguisher must be of sufficient size to adequately extinguish an expected fire determined by work being performed and site conditions. Assigned department or building fire extinguishers shall not be used ~~as the~~ for fire watch's ~~fire extinguishers~~ purposes. Personnel performing the hot work will supply fire extinguisher(s) specifically for ~~that the~~ task
- When hot work operations are taking place, there is a risk creating fumes which might collect in the work area creating a hazard for nearby employees. Always consider local exhaust ventilation in the area prior to performing hot work. When available, personnel will make sure local exhaust ventilation is operational and/or open windows and doors if feasible. Personnel will seek assistance from the department supervisor, safety coordinator or EHS/RM if needed
- All gas cylinders used as part of the hot work must be properly handled during the task. Cylinders must be properly transferred to and from the site using a designed cylinder cart if necessary. The cylinders must be positioned so the regulators are not stressed or strained during the handling or moving of the cylinder and should be secured to prevent tipping while in use. The cylinders should be staged as far from the hot work as possible. Personnel will make sure the cylinder, regulators, hoses, valves and all associated equipment are in good working condition prior to performing the work
- Automatic sprinkler or fire suppression systems must be in service for the duration of the hot work. Hot work must cease if the fire suppression system is down or taken out of service for any reason

### **Fire Watch**

—A fire watch will be assigned during the hot work activities that are not performed in designated hot work areas. The fire watch will meet the following requirements:

- An individual with hot work training assigned the responsibility to continuously monitor the hot work area during hot work activities, and take immediate action in the early stages of a fire
- They must have suitable equipment ready and available to extinguish a fire if it is determined it can be done safely
- Have training in the hot work program, fire extinguishing equipment, and emergency response procedures
- Know when and how to call for assistance in the event of a fire

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- Stop work activity if permitted conditions change that could create a hazardous condition
- Maintain the fire watch for the designated time on the hot work permit, not less than 30 minutes after the hot work has concluded

### **Designated Hot Work Areas**

—Work performed in designated areas will not require a hot work permit. An area may become designated hot work area after review by the EHS/RM in conjunction with the department supervisor, safety coordinator and any other affected employees. In order to be designated as a hot work area the following conditions must be met:

- Be separated from combustible materials by at least 35 ft. or protected by welding curtains or other suitable non-combustible barriers
- Have designated fully charged fire extinguishers appropriate for the type of possible fire in the area. At a minimum the extinguisher should be a 10 lb ABC unless it is determined through permitting another type is sufficient
- Inspected at least weekly to ensure the above requirements are maintained
- Areas outside and at least 35 feet away of any building or other structure if they are inspected for flammables and combustibles prior to the hot work and meet the requirements listed above

### **Hot Work in a Confined Space**

Because of the hazards hot work introduces to a confined space, all hot work taking place in a confined space must be evaluated and typically be done in conjunction with a confined space entry permit. Personnel should reference the UAA Confined Space Entry Program for more details. At a minimum the following must be included in the confined space entry evaluation.

- Continuous monitoring for oxygen and percent lower explosive limit
- All gas cylinders will be located outside of the confined space
- All electrodes and/or torches must be removed from the space when hot work is not taking place

## **10. Inspections**

Designated hot work areas will be inspected by EHS/RM annually to ensure compliance with the program using the Approved Designated Hot Work Areas & Hot Work Designated Area Evaluation Form (Appendix B):

Prior to every use, personnel will visually inspect their hot work equipment to ensure they are in



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proper working condition. There must be no missing or worn parts. Cylinders must have caps on when not in use, and available if in use. All gas regulators, valves, and hoses if applicable are all in place and in working condition. All labels and name plates must be in place and legible.

## 11. Training

UAA shall provide a training program for each employee performing hot work.

The program shall enable each employee to recognize the hazards of hot work at UAA and the procedures to be followed to minimize these hazards.

UAA shall ensure that each employee performing hot work or fire watch has been trained by a competent person in the following areas, as applicable:

- The nature of hot work hazards
- Procedures for evaluating the work area using the Hot Work Permit
- How to complete and issue a Hot Work Permit
- Methods to protect the area in preparation for hot work
- Requirements of the fire watch
- Emergency procedures
- Proper use of fire extinguisher, and other emergency equipment

Retraining shall be provided for each employee as necessary in the following circumstances so that the employee maintains the understanding and knowledge acquired through compliance with this section:

- An accident or near loss incident occurs involving hot work
- New workplace hazards are identified
- Change in the program or processes

## 12. Program Evaluation

The Welding and Hot Work Safety Program shall be evaluated on an annual basis utilizing the protocols set forth by EHS/RM. The evaluation team will consist of a department safety coordinator and a representative from EHS/RM. EHS/RM will define the scope of the evaluation. The final report will be developed by the EHS/RM utilizing the information received during the evaluation. The deficiencies determined in the report will be documented and corrective action plans will be developed.

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### 13. References

OSHA regulations and other standards that apply to welding and hot work are included below.

- 29 CFR 1910 Subpart Q (Welding, cutting and brazing)
- NFPA 51B (Fire Prevention During Welding, Cutting and Other Hot Work)

### 14. Revision History

Revision Number	Date Revised	Description of Change	Revised By	Approved By
0	10/25/2018	Initial Issue		VC Shuford
1				
2				
3				

# Appendix A

## UAA Hot Work Permit

1	Date_____ Building/Area_____
	Person(s) Performing Hot Work: _____
	Name of Fire Watch: _____
	Alternate Fire Watch: _____ (Name and Time Replaced Original Fire Watch)
	Scope of work (be specific)_____
	_____
	This Permit expires (no more than one shift)
	Date_____ Time_____
	Cutter/Welder Signed: _____
	Supervisor Signed: _____
Certifies all conditions of the permit are met and work is ready to proceed: FIRE WATCH Final Check-up Work area and all adjacent areas to which sparks and heat might have spread (including floors and below and on opposite sides of walls) were <u>inspected 30 minutes after</u> the work was completed and were found fire safe.  Fire Watch Signature _____ Time:_____	

2				The person performing the hot work with the assistance of their supervisor, safety coordinator, or EHS/RM as necessary should check off each item on the list below when complete before any hot work begins. This permit or a copy of this permit will be posted in a visible place in the work area until the hot work is completed.
	Yes	No	N/A	
				Combustibles have been moved at least 35 feet from the hot work operations
				If combustibles cannot be moved they have been protected by metal guards, flame proof curtains, fire blankets or other suitable covers other than ordinary tarps.
				Surrounding floors have been swept clean.
				All combustible flooring has been wetted down.
				Work will not be performed in or on a tank or vessel containing flammable or combustible materials until they have been properly cleaned and cleared.
				All wall and floor openings within 35 ft. of the operations have been tightly covered or otherwise protected with metal guards or fire blankets.
				All ducts, sumps, or other conveyances that may convey sparks to distant combustibles has been covered with a fire blanket.
				A fire extinguisher is readily available for instant use in the area. Assigned department or building fire extinguishers shall not be used as the fire watch's fire extinguishers
				Adequate ventilation is maintained during hot work operations to assure that personnel are not exposed to harmful fumes.
				All gas cutting and welding cylinders are secured so they will not be damaged and protective caps are available to replace when not in use.
				Sprinklers are verified to be in service and working properly
				Equipment is in good condition. valves, regulators, hoses, torches etc. are thoroughly checked.

## Appendix B

### Approved Designated Hot Work Areas & Hot Work Designated Area Evaluation Form

Name	Location	Date Approved

Hot Work Designated Area Evaluation Form		
Date of Evaluation:		
Name of EHS/RM Representative Performing Evaluation:		
If any item below is checked no, it must be brought to the attention of the area supervisor immediately for correction. If the condition <del>can not</del> <u>cannot</u> be corrected then the space <del>can not</del> <u>cannot</u> be a designated hot work area.		
Question	YES	NO
1. Is the area isolated from combustible materials by a distance of 35 feet or protected by welding blanket or other non-combustible materials or barriers?		
2. Is there a designated fire extinguisher in the hot work area?		
3. Is the space inspected weekly		
4. Area approved as Designated Hot Work Area?		
Signature of EHS/RM representative:		