

SAFETY AND HEALTH PROGRAM

HOT WORK PERMIT PROGRAM

1.0 PURPOSE

To provide written procedures to prevent fires resulting from any temporary operation involving open flames or which produces heat and/or sparks. This includes, but is not limited to: brazing, cutting, grinding, soldering, thawing pipes, torch applied roofing and welding.

2.0 SCOPE

The following procedures specify the requirements for various hot work processes carried out by Campus Facilities Employees. This procedure does not apply to areas specifically designed and equipped for such operations, i.e. maintenance shop and designated welding areas. When conducting hot work in a University Hospital Center or Missouri University Research Reactor (MJRR) their procedures will apply.

3.0 REFERENCES

National Fire Protection Association Standard 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work". OSHA 29 CFR 1910.251-255 subpart Q, and OSHA 29 CFR 1926.350-351 subpart J.

4.0 DEFINITIONS

Hot Work: Any operation producing flame, sparks or heat including cutting, welding, brazing, grinding, sawing, soldering, thawing frozen pipes, applying roof covering etc.

Permit: A special permit, which authorizes "Hot Work" activities at a specific location and time. The permit will be properly filled out, displayed on site and filed with the supervisor that indicates that hot work has been approved for the location. Permits contain a checklist to be completed prior to commencing hot work activities and also at the conclusion of hot work.

Fire Watch: Trained person stationed in the hot work area who monitors the work area for the beginnings of potential, unwanted fires.

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

Permit Authorizing Individual (PAI): Designated employee competent to authorize hot work. This would be a designated employee who is trained in the Hot Work procedures and competent to authorize Hot Work.

Hot Work Operator (HWO): Formally trained and qualified in proper hot work procedures and techniques. This employee performs hot work as part of the job classification.

Designated Hot Work Area: any area where hot work is being performed on a regular basis. This area is exempt from permitting unless they warrant more stringent requirements. Designated areas must meet certain criteria found later in this document. These areas must be marked.

Designated Occasional Hot Work Area: any area where hot work is performed periodically or for extended periods of time. Permitting is required for this area but may be issued for specific time periods not to exceed 1 year. Designated areas must meet certain criteria found later in this document.

5.0 Training

All Campus Facilities employees who conduct Hot Work operations will receive initial training and annual refreshers

Hot Work Training will consist of:

1. Review the requirements referenced in OSHA and NFPA
2. The CF Hot Work Permit system and procedures
3. Responsibilities
 - Supervisors
 - Permit Authorizing Individual (PAI)
 - Hot Work Operator (HWO)
 - Fire Watch
 - A. Duties
 - B. Review of Fire Extinguisher use

C. Emergency response

- Operators
 - Contractors
4. Documentation/Permit
 5. Personal Protective Equipment Requirements
 6. Fire Extinguisher Training/Re-Training

6.0 Procedures

- a. Where practicable all combustibles shall be relocated at least 35 feet from the work site. **Where relocation is impractical, combustibles shall be protected with flameproof covers, shielded with metal, guards, curtains, or wet down material to help prevent ignition of material.**
- b. Ducts, conveyor systems, and augers that might carry sparks to distant combustibles **shall be protected or shut down.**
- c. Where cutting or welding is done near walls, partitions, ceilings, or a roof of combustible construction, fire-resistant shields or guards shall be provided to prevent ignition.
- d. If welding is to be done on a metal wall, partition, ceiling, or roof, precautions shall 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 the work and cannot be effectively monitored by a single fire watch person, an additional fire watch person shall be assigned a fire watch shall be provided on the opposite side of the work.**
- e. Welding shall not be attempted on a metal partition, wall, ceiling or roof having a covering or on walls having combustible sandwich panel construction.
- f. Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceilings, or roofs shall not be undertaken if the work is close enough to cause ignition by combustion.
- g. Area where welding/hot works will be conducted, *all combustible dust accumulation should be eliminated and/or minimized as referenced in item a. above.*

- h. Suitable fire extinguishers shall be provided and maintained ready for use.
- i. A fire watch person (not the same person doing the work) shall be provided during and for at least 30 minutes past the completion of the welding project. The welder can move on to the next site and prepare to start; however, no welding can begin until the fire watch person is present.
- j. A Hot Work Permit (Appendix A) must be used on all welding or cutting, brazing, flame soldering, grinding, flame roof application, tile and paint removal or any other activity that could cause flames or sparks outside of a Designated Hot Work area.
- k. Contact the Campus Maintenance Fire Protection Service at 882-8211, (contact the power plant control room for hot work in the power plant), prior to any Hot Work in areas where fire alarms or fire suppression systems need to be shut off.
- l. Cutting or welding shall not be permitted in the following situations:
 - In areas not authorized by management.
 - In the presence of potentially explosive atmospheres that may develop inside uncleaned or improperly prepared tanks or equipment which have previously contained such material or that may develop in areas with an accumulation of combustible dusts.
- m. When hot work is complete:
 - The work area and any potentially affected surrounding areas are inspected for fire, fire damage or the potential for fire for a minimum of 30 minutes following completion of the hot work.
 - Smoke and fire alarms that were disabled because of hot work shall be reactivated.
 - Hot work permit is closed out.
 - Hot Work permit is submitted to Supervisor.

7.0 Hot Work fire prevention measures

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

- Floors swept and clean of combustibles within 35 ft. of work-area.

- Flammable and combustible liquids exposed or in portable container and other flammable or combustible materials will be kept 35 feet from the work area.
- Mechanical ventilation shall be provided to minimize fumes, gases and dusts in work areas less than 10,000 cubic feet per welder, in rooms having a ceiling height less than 16 feet and in confined spaces or where the welding space contains partitions, balconies or other structural barriers. The mechanical ventilation must provide a minimum rate of 2,000 cubic feet per minute per welder. Specific chemicals such as fluorine, zinc, cadmium, stainless steel, and lead require special ventilation requirements. Respiratory protection may be needed unless an adequate monitored air flow away from the welder and others present can be established and maintained to minimize fumes, gases and dust.
- At least one 10 lb. dry chemical fire extinguisher should be within access of the 35 ft. 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.
- No wall or floor openings are permissible within 35 feet of the designated Hot Work area unless a Fire Watch is available.

Requirements for Hot Work conducted outside the designated Hot Work area.

- A Hot Work Permit must be completed and complied with prior to welding operation.
- Portable welding curtains or shields must be used to protect other workers in the Hot Work area.
- Respiratory protection may be needed unless an adequate monitored air flow away from the welder and others present can be established and maintained to minimize fumes, gases and dust. Mechanical ventilation is required in areas less than 10,000 cubic feet per welder, in rooms or work spaces with ceilings less than 16 feet in height and in confined spaces. Mechanical ventilation must be provided at 2,000 cubic feet per minute per welder. Specific chemicals as listed above require special ventilation requirements.
- Combustible materials must be separated with flame proof tarps during Hot Work procedures.
- Fire Watch must be provided for all hot work operations.
- No wall or floor openings are permissible within 35 feet of the Hot Work area.

8.0 RESPONSIBILITIES

A) Managers

- 1) It is the responsibility of management to insure that this policy is implemented and enforced in those areas under their jurisdiction where applicable.
- 2) Management or a designated agent shall be responsible for the safe operations of hot work activity.
- 3) Management shall designate permit authorizing individuals (PAI)
- 4) Develop procedures and responsibilities to ensure all equipment is examined to ensure it is in a safe operating condition.

When found to be incapable of reliable safe operation, the equipment shall be repaired by a qualified person prior to being used.

- 5) Shall ensure that all individuals involved in the hot work operations, including contractors, are familiar with the provisions of this policy. Individuals involved in hot work operations shall be trained in safe operations of their equipment and in the safe use of the process.

B) Environmental Health and Safety

- 1) Assist with implementation of program upon request.
- 2) Advise as needed on any changes required to this program

C) Safety Coordinator

- 1) Be thoroughly familiar with the Hot Work procedures.
- 2) Assist in implementation of the Hot Work Program throughout CF.
- 3) Assist in the training on the provisions of this program as required.

D) Supervisors

- 1) Be thoroughly familiar with the Hot Work procedures.
- 2) Identify employees who may perform hot work as defined in this procedure.
- 3) Provide specific Hot Work training to employees who perform Hot Work operations.
- 4) Provide Hot Work Permits.
- 5) Maintain copies of Hot Work Permits.
- 6) Ensure compliance with procedures by employees.

7) Complete CF training program.

8) Other responsibilities assigned by Management concerning hot work operations.

E) Permit Authorizing Individual (PAI)

- 1) Shall consider the safety of the hot work operator and fire watch with respect to PPE.
- 2) The PAI shall determine site –specific flammable materials, hazardous processes, or other potential fire hazards that are present or likely to be present in the hot work location.
- 3) Shall ensure the protection of combustibles from ignition.

If combustibles or processes cannot be protected during hot work operations they shall not be performed.

- 4) Shall determine that fire protection and extinguishing equipment are available on site.
- 5) Shall that fire watch is onsite during hot work activities and at least ½ hour after hot work is completed.

F) Hot Work Operator (HWO)

- 1) Shall handle equipment safely and use it so not to endanger life of property
- 2) Shall have approval before starting hot work operations
- 3) Shall make sure all equipment is safe
- 4) Shall cease operations if unsafe conditions develop and shall notify management

G) Fire Watch

- 1) Shall be trained in the inherit hazards of work site and of the hot work.
- 2) Shall ensure that safe conditions are maintained during hot work operations.
- 3) Shall have authority to stop hot work operations if unsafe conditions develop.
- 4) Shall have fire-extinguishing equipment readily available and shall be trained in its use.
- 5) Shall be familiar with facilities and how to call emergency personnel if needed.

H) Contractors

- 1) Before starting any hot work, contractors and their clients shall discuss the planned project completely, including the type of hot work to be conducted and

Operating Procedure - Electric Welding

HOT WORK PERMIT REQUIRED

1. Perform Safety Check on all equipment

- Ensure fire extinguisher is charged and ready for use
- Ensure electrical cord, electrode holder and cables are free from defects (no cable splices are allowed within 10 feet of the electrode holder.
- Ensure proper PPE (welding hood, gloves, protective footwear, protective clothing, eye protection, etc.) are available and have no defects.
- Ensure the welding unit is properly grounded and all electrical connectors are safe.
- All defective equipment must be repaired or replaced before use.

2. Remove flammables and combustibles

- No welding is permitted on or near containers of flammable material, combustible material or unprotected flammable structures. (reference section IV, item 11)
- 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)

3. Use an authorized Air Purifying Respirator (APR) if required

4. Ensure proper mechanical Ventilation to eliminate and/or minimize fumes, gases and dusts. (see section V)

5. Ensure adequate lighting

6. Set Voltage Regulator properly

When arc welding is to be suspended for any substantial period of time such as during lunch or overnight, all electrodes shall be removed from the holders so that accidental contact cannot occur and the machine power is shut off.

7. 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 wrap welding cables around a body part and avoid welding in wet conditions)

8. Fire watch for 30 minutes after welding & until all welds have cooled

9. Cancel the permit upon completion of the work

Operating Procedure - Gas Welding

HOT WORK PERMIT REQUIRED

1. Perform Safety Check on all equipment

- Ensure tanks have gas and fittings are tight. Cylinders should be kept away from radiators and heat sources. Cylinders must be stored upright and secured from falling over.
- Ensure fire extinguisher is charged and ready for use
- Ensure hoses have no defects
- Ensure proper PPE (welding hood, gloves, protective footwear, protective clothing, eye protection, etc.) are available and have no defects.
- All defective equipment must be repaired or replaced before use.

2. Remove flammables and combustibles

- No welding is permitted on or near containers of flammable material, combustible material or unprotected flammable structures. (reference section IV, item 11)
- 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)

3. Use an authorized Air Purifying Respirator (APR), if required

4. Ensure proper mechanical ventilation to eliminate and/or minimize fumes, gases and

dusts. (see section V)

5. Gas cylinders must remain outside of confined spaces during welding.

6. Follow Confined Space Permit requirements for work in confined space.

7. Open Valves on Oxygen and Gas tanks to desired flow. Under no condition shall

acetylene be generated, piped (except in approved cylinder manifolds) or utilized at a

pressure in excess of 15 psig or 30 psia.

8. At completion of work, shut cylinder valves & relieve hose pressure.

9. Store hoses and place valve protection caps on cylinders.

10. Fire watch for 30 minutes after welding & until all welds has cooled.

11. Cancel the permit upon completion of work

l) Mutual Responsibilities

- 1) Management, PAI, HW O, Fire watch, and contractors shall recognize their mutual responsibility for the safety of hot work operations.

9.0 Welding Operating Procedures

Referred in the attachments

10.0 ATTACHMENTS

1. CF Hot Work Permit
2. Operating Procedure – Electric Welding
3. Operating Procedure - Gas Welding

HOT WORK PERMIT

Seek an alternative/safer method if possible!

Before initiating hot work, ensure precautions in place as required by NFPA 51 B and ANSI Z49.1.
Make sure an appropriate fire extinguisher is readily available.

This Hot Work Permit is required for any operation involving open flame or producing heat and/or sparks. This work includes, but is not limited to welding, brazing, cutting, grinding, soldering, thawing pipe, torch, applied roofing, or chemical welding

Date: _____	Hot work by <input type="checkbox"/> employee <input type="checkbox"/> contractor
Location/Building and floor _____	Name (print) and signature of person doing hot work
Work to be done: _____ _____	I verify that above location has been examined, the precautions marked on the checklist below have been taken, and permission is granted for this work.
Time started _____ Time Completed _____	Name (print) and signature of permit authorizing individual (PAI) _____
THIS PERMIT IS GOOD FOR ONE DAY ONLY	Name (print) and signature of person performing Fire Watch _____

- Available sprinklers, hose streams, and extinguishers are in service and operable.
- Hot Work Equipment is in good working condition in accordance with the manufactures's specifications.
- Special permission obtained to conduct hot work on metal vessels or pipe lined with rubber or plastic.
- Requirements within 35 feet (11 m) of hot work**
- Flammable liquid, dust, lint, and oily deposits removed.
- Explosive atmosphere in area eliminated.
- Floors swept clean and trash removed.
- Combustible floors wet down and covered with damp or fire-resistive/noncombustible materials or equivalent .
- Personnel protected from electrical shock when floors are wet.
- Other combustible storage material removed or covered with listed or approved materials (welding pads, blankets, or curtains; fire-resistive trapulins), metal shields, or noncombustible material.
- All wall and floor openings covered.
- Ducts and conveyors that migh carry sparks to distant combustible material covered, protected or shut down.
- Requirements for hot work on, walls, ceilings, or roofs**
- Construction is noncombustible and without combustible covering or insulation.
- Combustible material on other side of walls, ceilings, or roofs is moved away.
- Requirements for hot work on enclosed equipment**
- Enclosed equipment is cleaned of all combustibles.
- Containers are purged of flammable liquid/vapor.
- Pressurized vessels, piping, and equipment removed from service, isolated, and vented.
- Requirements for hot work fire watch and fire monitoring**
- Fire watch is provided during and for a minimum of 30 min. after hot work including any break activity.
- Fire watch is provided with suitable extinguishers and, where practical, a charged small hose.
- Fire watch is trained in use of equipment and in sounding alarm.
- Fire watch can be required in adjoining areas, anove and below.
- Yes No Per the PAI/fire watch, monitoring of hot work area has been extended beyond the 30 min.