

2018

HOT WORK (Cutting & Welding)

Pottawattamie County Safety & Health Program Section B 9

It is the policy of Pottawattamie County to provide a safe and healthful workplace for employees. It is the intent of this policy to comply with OSHA requirements listed in 29 CFR 1910.252; all local, state, and federal laws.



Important Contact Information

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MODEL FORMS

Appendix A: Hot Work Permit

I. Objective

The purpose of this procedure is to establish safe hot work practices to reduce/eliminate personal injury and potential fire and explosion hazards. This program is intended to comply with OSHA's fire prevention actions for welding/hot works (29 CFR 1910.252).

II. Scope and Applicability

This program applies to any work where "Hot Work" is performed (i.e., welding, torch cutting, grinding, brazing, and other spark or heat producing tasks) in an area not designated and designed to prevent fires or other hazards associated with this work.

All hot work performed by outside contractors shall be in conformance with OSHA and NFPA 51B at a minimum. Contractors are expected to maintain a written hot work program that outlines their procedures and safety precautions. Proof of employee training in hot work procedures must be available for review.

Hot work operations in confined spaces require additional safeguards and are addressed in the county's Confined Spaces Policy.

Hot work on and near building systems and piping may require additional safeguards and are addressed in county's Lockout/Tagout Policy.

III. Authority & Responsibility

A. Risk Management is responsible for:

1. Reviewing the Hot Work policy and procedures to determine compliance with applicable OSHA regulations.
2. Providing safety training for employees performing hot work and for working with departments to ensure compliance with safety programs.
3. Enforcing the applicable fire and building codes.
4. Conducting random inspections of employee hot work projects to determine if the applicable fire and building codes are being met.
5. Conducting random walk-through of contractor projects and notifying project manager of violations

B. Department and Supervisors are responsible for:

1. Notifying all employees engaged in hot work operations and contractors of the purpose and intent of the Hot Work Management Program.
2. Requiring hot work permits if applicable.
3. Assuming or delegating the role of Fire Watch Supervisor for each permit.
4. Making periodic jobsite inspections to determine compliance with hot work procedures.
5. Notifying all contractors of the purpose and intent of the Hot Work Management Procedures.
6. Determining whether contractors are in compliance with the Hot Work Management Procedures.
7. Determining if hot work will be in an approved Hot Work Zone.
8. Requesting the issuance of a hot work permit for hot work undertaken by contractors
9. Attending required training and ensuring employees are trained in hot work safety procedures.

C. Employees engaged in hot work operations are responsible for:

1. Understanding the county's Hot Work Management Program.
2. Notifying their supervisor when a hot work permit is needed; and
3. Complying with the procedures defined within the Program and completing hot work permits as required.
4. Attending required training

D. Contractors and sub-contractors are responsible for:

1. Understanding the county's Hot Work Management Procedures.
2. Complying with applicable fire and building codes.
3. Maintaining their own companies' written Hot Work Management Program and complying with it or the county's Hot Work Management Program, whichever is more rigorous, during projects on county property.

4. Submitting appropriate shutdown notifications for Fire Alarm systems and building systems that may be affected by Hot Work activities.
5. Submitting requests for hot work permits from, as applicable, county project manager prior to conducting hot work operations.
6. Assuming the role of Fire Safety Supervisor for each permit.
7. Making periodic jobsite inspections of areas where the hot work is being conducted to determine that procedures are being used.
8. Required fire extinguisher(s) shall be provided by the contractor and/or sub-contractor, if determined by county project manager.

IV. Program Elements

A. Designated Hot Work Area:

1. A designated hot work area shall be free of combustibles and flammables and shall be equipped with a fire extinguisher(s), a heat detector and equipped with mechanical ventilation to control smoke and fumes.
2. Hot work shall not be performed in areas not authorized, when the buildings fire safety systems are impaired or in the presence of explosive atmospheres or in the immediate area of combustible materials.
3. **The following conditions must be maintained** at all times at a designated hot work area:
 - a. All combustible materials, papers, notebooks and chemicals must be removed from the surrounding (35 foot clearance).
 - b. Inspect the oxy-acetylene hoses for holes, pinched points, cracks, or any other defects and determine that the hoses fit securely on the gas valve and the burner/torch.
 - c. Hoses having any defects must be replaced before using.
 - d. Loose clothing, long hairs or dangling jewelries must be tied at the time of using the burner.
 - e. All other personnel must be notified that the burner/torch will be in use.
 - f. The open burner/torch must not be unattended.
 - g. Always shut off the gas supply when done.
 - h. If the oxy-acetylene is not going to be used for an extended period of time, remove regulators and secure cylinders with protective cylinder caps if equipped.

B. Undesignated Hot Work Areas

1. **Jobsite Inspection:** Prior to making a request for the issuance of the hot work permit, the Responsible Supervisor shall visit the jobsite to determine if the hot work can be avoided. If the hot work involves open flame cutting, the Responsible Supervisor shall consider whether an alternative method of conducting the work (e.g., hand saw, pipe cutter) is feasible. If an alternative method of conducting the work is not feasible, the Responsible Supervisor shall ensure the hot work site is safe.
2. **Hot Work Permit:** Prior to beginning work at any hot work jobsite each day, the Responsible Supervisor shall authorize the job and shall issue a hot work permit. Prior to issuing a hot work permit for that day, the supervisor shall conduct a jobsite review. All hot work jobsites are inspected using the checklist contained on the daily hot work permit.
3. All items included in the jobsite review include, but are not limited to, the following:
 - a. Persons engaged in hot work operations and fire watch personnel are trained in the safe operation of their equipment.
 - b. Fire watch personnel understand the requirements of a fire watch.
 - c. Apparatus used for the hot work is in good condition.
 - d. Hot work operator(s)/fire watch personnel understand the emergency procedures in the event of a fire or general emergency.
 - e. Fire protection and extinguishing equipment are properly located onsite.
 - f. Hot work operator(s) are utilizing personal protective equipment.
 - g. A determination that the proposed work does not jeopardize the health and safety of the hot work operator or others.
 - h. Alarm systems have been prepared for the hot work and the permit is signed appropriate supervisor.
 - i. All permits must be prominently displayed at the hot work jobsite.

C. Fire Watch:

1. IFC Chapter 35 requires a fire watch when hot work is performed in a location where the following condition(s) exist:
 - a. Combustible materials in building construction or building contents are closer than 35 feet to the point of operation of the hot work;
 - b. Combustible materials are more than 35 feet away, but are easily ignited by sparks;
 - c. Wall or floor openings within a 35 feet radius expose combustible materials in adjacent areas, including concealed spaces in walls or floors;
 - d. Combustible materials are adjacent to the opposite side of partitions, walls, ceiling, or roofs and are likely to be ignited.
2. Trained fire watchers are required to be present at all times when hot work is being conducted, armed with portable fire extinguishers. Contractors are required to provide their own fire watchers and fire extinguishers.
3. IFC Chapter 35 will be used as the standard on county projects unless that state's regulations are more restrictive.
4. The fire watch shall:
 - a. Be aware of the inherent hazards of the work site.
 - b. Actively monitor whether safe conditions are being maintained during the hot work operation.
 - c. Have the authority to stop the hot work operations if unsafe conditions develop.
 - d. Have fire extinguishing equipment immediately available and be trained on how to use it.
 - e. Activate emergency response in the event of a fire.
5. Once the hot work is completed, the fire watch shall remain in the area of the hot work jobsite for at least 30 minutes to monitor the worksite and make certain that there is no smoldering combustion taking place. After the 30-minute monitoring period is complete, the fire watch shall sign Part Two of the permit which states: "The work area was observed for at least 30 minutes after work was completed and found to be safe." The fire watch shall return the completed Permit to the Responsible Supervisor.
6. Upon receipt of Part Two of the Permit, the Responsible Supervisor shall do a walk-through of the hot work jobsite.

V. General Requirements for Hot Work Assignments

A. Preparation for Hot Work

1. Notify area management and co-workers of the intention to perform hot work activities.
2. Issue Hot Work Permit for all hot work operations. See Appendix A.
3. Perform housekeeping in hot work areas to remove or cover all combustible or flammable materials within a 35 foot radius.
4. Cover all wood planking, scaffolds, wooden forms, and other combustible material that cannot be removed with fire blankets or other suitable non-combustible material to contain slag and sparks.
5. Provide a fire watch when performing hot work in areas where fires might develop and continue the watch for 60 minutes after completion of hot work.
6. Ensure that at least one 10-pound ABC fire extinguisher is available at each hot work location, and area affected.
7. Position welding curtains to protect workers from welding arc rays.
8. Provide metal buckets or containers for disposal of slag, electrode stubs, and other hot work debris.
9. Check for flammable or explosive gases or vapors and, if necessary, purge and/or inert the atmosphere before performing any hot work in or on containers or pipelines.
10. Refer to the county's confined space entry policy for ventilation and other requirements for hot work in confined spaces.

B. Personal Protective Equipment (PPE)

1. Employees are required to complete a hazard assessment to determine personal protective equipment required for the hot work operation.
2. Personal protective equipment used for hot work operations may include:
 - a. Proper eye protection, e.g. welding hood with proper shaded lens
 - b. Cutting or burning goggles for torch cutting
 - c. Full face shields for grinding with safety glasses.
 - d. Consult Personal Protective Equipment program for proper lens shades
 - e. Safety glasses must be worn under hoods and face shields when grinding.
 - f. Appropriate gloves for task being performed.

- g. Fire resistant welding jackets and leathers.
- h. High top leather boots, tight to pant leg.
- i. Clothing free of oil and grease, and non-synthetic fiber.

C. Torch Cutting Operations

1. Inspect torches and hoses at the beginning of each shift for leaking shutoff valves, damaged hoses and couplings, and tip connections. Tag defective torches and remove from service until properly repaired.
2. Oxygen and fuel gas regulators and valves shall be in proper working order and shut off when work is completed. Hose pressure shall also be relieved when work is completed.
3. Light torches with strikers or other approved means, never with matches or lighters.
4. Keep oxygen cylinders and fittings free of oil and grease.
5. Oxygen and fuel gas hoses shall be easily distinguishable from each other and not interchangeable. Do not use a single hose having more than one gas passage.
6. Provide flashback arrestors/check valves on all oxygen and fuel gas torches.
7. Remove hose that shows evidence of flashback or damage from service and repair or discard.
8. Refer to the Confined Space Entry program for ventilation and other requirements for hot work in confined spaces.
9. Do not cover more than 4 inches out of 12 inches (10 cm out of 30 cm) of hose with tape when taping parallel lengths of hose to prevent tangling.
10. Uses only hose couplings that cannot be unlocked or disconnected by means of a straight pull.
11. Boxes used to store hose shall be ventilated.
12. String hoses overhead using non-metallic hangers or otherwise position them to keep clear of walkways, ladders, and stairways; or damage.
13. Provide proper ventilation and respiratory equipment when cutting zinc coated, or other hazardous coating or alloy that could contain such materials as cadmium, chromium, mercury, lead, arsenic or other toxic material (See your Respiratory Protection Program). Employees shall complete a pre-assessment as needed to determine hazards and a Hazard Assessment to specify needed protective measures and PPE.

14. Shut off cylinder valves and bleed regulators and hoses when task is completed and never leave unattended.

D. Cylinder Handling

1. Secure cylinders in an upright position at all times.
2. Assure tags are used indicating, full, in use, or empty.
3. Segregate materials based on hazards (e.g., Fuel Gas and Oxygen cylinders must be separated at least 20 feet or with a fire wall). Refer to the Safety Data Sheet (SDS) for the materials.
4. Replace and secure valve safety caps when cylinders are not in use
5. Close valves, remove regulators, and replace valve safety caps before moving cylinders.
6. Move cylinders by use of a cylinder cart with securing device.
 - a. Never "hand roll" cylinders; always use a cart that secures the cylinders.
 - b. Never lay cylinders on their sides and roll them.
7. Do not use magnets, chokers, or slings to hoist cylinders. Use a cradle or bottle rack designed and constructed for hoisting purposes.
8. Use only warm, not boiling, water to thaw cylinders and valves.
9. Provide bottle carts, chains, or other steadying devices to keep cylinders from being knocked over while in use.
10. Assure all cylinders are marked with container labels with either the chemical or trade name, and hazards of the contents, and that a current SDS is on hand, and all staff are trained and current in their Hazard Communication training for the material.
11. Do not attempt to refill or mix gases in a cylinder.
12. Require all cylinders to be equipped with a handle or wrench so that they can be turned off immediately if necessary.
13. Stand to the side of the outlet and open valve slightly and close immediately prior to connecting a regulator to a cylinder. Never crack a valve near ignition sources.
14. Position cylinders where they will not be struck by sparks, slag, or flame, and where they cannot become part of an electrical circuit.
15. Never take gas cylinders into confined spaces.
16. Do not strike an electrode against a cylinder to strike an arc.

17. Do not use hammers or wrenches to open cylinders having fixed hand wheels.
18. Do not use acetylene at a pressure in excess of 15-psi gauge pressure, or 30 psi absolute.
19. Store cylinders in accordance with SDS instructions and local, state and federal requirements. Don't store where they will not be subjected to sources of heat.
20. Separate oxygen cylinders in storage from fuel gas cylinders and combustible materials by at least 20 feet, or by a non-combustible barrier at least 5 feet high having a fire resistance rating of at least one-half hour.
21. Provide proper signs at storage areas, such as "DANGER – FLAMMABLE" or "No Sources of Ignition, Smoking or Open Flames."
22. Keep storage areas free of vegetation, trash, and other combustible materials.
23. Remove regulators and replace valve safety caps when storing cylinders or when cylinders will be left unattended.

E. Welding Operations

1. Use only electrode holders that are properly insulated and that are specifically designed for arc cutting and welding and are of a sufficient capacity to safely handle the maximum rated current required by the electrodes.
2. Remove electrodes from the holders and placeholders so they cannot make contact with people or conducting objects when leaving holders unattended.
3. Ensure that welding machine frame is properly grounded.
4. Welding units store electrical current; follow the Lockout Program and only work on equipment if properly trained, and authorized by the organization.
5. Shut off the welding machine at the end of each shift or when the machine is to be moved.
6. Welding/cutting/ground cables must meet the following requirements:
 - a. Cables must be completely insulated, flexible, and capable of handling the maximum current requirements of the work in progress.
 - b. Cables must be free from repair or splices for a minimum distance of 10 feet from the electrode holder, except when standard insulated connectors or splices with insulating value equal to the cable are used.

- c. Insulated connectors of a capacity at least equal to that of the cable shall be used for splices. If connecting lugs are used, they must be completely and substantially insulated.
- d. A ground cable must have a safe current carrying capacity at least equal to the maximum output capacity of the unit or units that it services.
- e. Never attach a ground cable to a pipeline containing gases or flammable liquids.
- f. String all cables overhead with non-metallic hangers or otherwise position to keep clear of walkways, ladders, and stairways.
- g. Immediately remove all damaged and worn cable from service until properly repaired.

Hot Work Permit Requirements

Hot work operations such as welding, brazing, cutting, grinding, soldering and thawing create heat, spark and hot slag that may ignite flammable and combustible materials in the area of hot work activities.

The Hot Work Permit was developed in accordance with OSHA regulations and NFPA recommendations with the goal of preventing hot work fires.

Purpose

The purpose for the Hot Work Permit is to protect employees, contractors, vendors and visitors against fire resulting from welding, spark generating, open flame and other hot work activities.

Scope

A Hot Work Permit shall be used whenever work within county facilities & boundaries involves an actual or possible source of ignition; or may cause the activation of a fire alarm system; or may cause occupants of a building or area to contact emergency personnel to report the smell of smoke, heat, etc.

Who's involved in the Hot Work Permit process?

- Supervisors oversee the Hot Work Permit program for hot work operations under their supervision. Supervisors are responsible for designating workers as Permit Authorizing Individual (PAI), who may issue Hot Work Permits. Any employee who successfully completes hot work safety training may be a PAI.
- Permit Authorizing Individual (PAI) inspects hot work sites prior to the start of hot work operations using the checklist on the Hot Work Permit Form. The PAI designates Fire Watch expectations and any specific duties during Fire Watch. Once all of the requirements on Part 1 of the Hot Work Permit have been satisfied and the form is signed by a PAI, it's placed in the active Hot Work slot in the maintenance shop. Hot Work Permit Part 2 must be posted where hot work is to be performed.
- Fire Watch Personnel monitor the safety of hot work operations and watch for fires. Fire Watches are posted when the Hot Work Permit requires, during hot work, and for at least 30 minutes after work has been completed. Any employee who has successfully completed Hot Work Safety and Fire Extinguisher training can serve as Fire Watch.

The 35-Foot Rule

- All flammable and combustible materials within a 35-foot radius of hot work must be removed.
- When flammable and combustible materials within a 35-foot radius of hot work cannot be removed they must be covered with flame retardant tarps and a fire watch must be posted.
- Floors and surfaces within a 35-foot radius of the hot work area must be swept free of combustible dust or debris.
- All openings or cracks in the walls, floors, or ducts that are potential travel passages for sparks, heat and flames must be covered.

Fire Detection and Suppression

- A suitable fire extinguisher must be readily available and accessible.
- Entire building smoke detection and alarms systems cannot be shut down. Instead smoke detectors in the area of hot work may be covered for the duration of hot work to prevent false alarms.

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- Automatic sprinkler systems may not be shut down to perform hot work. Instead, individual sprinkler heads in the area of hot work may be covered with a wet rag to prevent accidental activation.

Fire Watch

A Fire Watch must be posted by a PAI if the following conditions exist:

- Combustible materials cannot be removed from within a 35-foot radius of the hot work
- Wall or floor openings within a 35-foot radius of hot work expose combustible materials in adjacent areas, including concealed spaces in walls or floors.
- Combustible materials are adjacent to the opposite side of partitions, walls, ceilings or roofs and are likely to be ignited

General Permit Guidelines

- Work should be performed using alternative methods other than hot work whenever possible.
- Hot work should be performed in designated hot work areas whenever practical.
- Hot Work Permit must be fully completed – be specific in location & description of work performed.
- Hot Work Permit is valid for the time period written on the permit.
- The PAI shall file Hot Work Permit Part 1 in the designated maintenance shop location.
- The PAI shall post Hot Work Permit Part 2 in the hot work area for the duration of the activity.
- When Hot Work or Fire Watch responsibilities span shift changes, the PAI shall ensure resources are in place to ensure the protection expected by this program.

Note: Be specific about the work being performed and the object on which the work is being performed when completing a Hot Work Permit. If you are unsure if an activity requires a Hot Work Permit, contact the Risk Manager.

MODEL FORMS

Model forms for this program are located on the following pages. Departments may modify or develop their own forms based on the specific needs of their department.

Modified forms are subject to review and approval of Risk Management

Appendix A: Hot Work Permit

HOT WORK PERMIT

BEFORE INITIATING HOT WORK, CAN THIS JOB BE AVOIDED? IS THERE A SAFER WAY?

This Hot Work Permit is required for any operation involving open flames or heat/spark producing tasks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing, and Welding.

INSTRUCTIONS

- A. Verify precautions listed at right are taken or do not proceed with the work
- B. Complete and retain Permit
- C. Issue Permit to person doing job

HOT WORK BEING DONE BY:

- EMPLOYEE
- CONTRACTOR (Name) _____

DATE: _____ JOB NO.: _____

LOCATION/BUILDING & FLOOR: _____

NATURE OF JOB: _____

NAME OF PERSON DOING HOT WORK:

I verify the above location has been examined, the precautions checked on the Required Precautions Checklist have been taken to prevent fire, and permission is authorized for this work.

SIGNED/SITE SAFETY REPRESENTATIVE:

PERMIT EXPIRES [DATE/TIME (AM/PM)]:

REQUIRED PRECAUTIONS CHECKLIST

- Sprinklers, hose streams, extinguishers are in service/operable, and in vicinity
- Hot Work equipment in good repair... hoses, fittings, etc.

Requirements within 35 ft. (11 m) of work

- Flammable liquids, dust, lint and oily deposits removed
- Explosive atmosphere in area eliminated
- Floors swept clean
- Combustible floors wet down, covered with damp sand or fire resistive sheets
- Remove other combustibles (paper, wood products, etc) where possible. Otherwise protect with fire-resistive tarpaulins or metal shields
- All wall and floor openings covered
- Fire-resistive tarpaulins suspended beneath work

Work on walls or ceilings

- Construction is noncombustible and without combustible covering or insulation
- Combustibles on other side of walls moved away

Work on enclosed equipment

- Enclosed equipment cleaned of all combustibles
- Containers purged of flammable liquids/vapors and inverted if needed; Confined Space Permit issued

Fire watch/Hot work area monitoring

- Fire watch will be provided during and for 60 minutes after work, including any coffee or lunch breaks
- Fire watch is supplied with suitable charged extinguishers
- Fire watch is trained in use of this equipment and in sounding alarm
- Alarm available
- Fire watch required for adjoining areas, above & below
- Monitor Hot Work area periodically for 4 hours after job is completed

Other Precautions to Be Taken