

# Cutting, welding, and hot work operations

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Cutting, welding, and other hot work operations using portable equipment, presents a severe hazard, because these operations introduce ignition sources into random areas of the facility. The National Fire Protection Association (NFPA) estimates that approximately 6 percent of all fires in industrial properties have been caused by improper procedures or equipment use during hot work operations. With strong support by management and trained employees, these procedures can help to control this exposure.

## Hot work basics

Hot work is defined as any operation that generates heat, sparks, or a flame. Fires caused by hot work operations routinely result from sparks or molten globules of metal that roll great distances or fall through cracks onto unseen combustibles. The combustible material smolders and eventually bursts into flames, sometimes after work has ended and employees have left the area. Sometimes the heat or flame directly ignites combustible or flammable materials located too close to the hot work operation.

The common reasons for fires caused by cutting, welding, and hot work operations are:

- Inadequate preparation of work site
- Defective equipment
- Outside contractors failing to comply with “hot work” precautions
- Poor housekeeping
- Conducting operations in areas where the sprinkler protection is shut off
- Failure to maintain fire watches or to provide adequate fire extinguishing equipment

It shall be the duty and responsibility of the contractor performing any cutting, welding, or hot work to comply with the safety provisions of the National Fire Protection Association’s *National Fire Codes* pertaining to such work, and the contractor shall be responsible for all damages resulting from a failure to so comply.

Ideally, all hot work operations should be conducted in designated, properly safeguarded areas, such as maintenance shops or a detached outside location. When work cannot be moved into the maintenance shop, a hot work permit must be obtained before any hot work can be conducted. The permit should only be issued after a trained supervisor has assessed the area and the supervisor has verified that all safety precautions are being taken.

## **Selection and responsibilities of a supervisor**

Hot work operations must be strictly monitored if fires are to be prevented. Management should appoint a responsible person to closely supervise the use of all hot work equipment. The person(s) assigned to oversee the hot work program must be thoroughly familiar with hot work processes and the hazards of the areas where work will be performed. They also must be able to determine the precautions that must be taken for the work to be completed in a safe manner. The success of the program will depend on the training and knowledge of those who implement the permit system.

Before cutting or welding is permitted, the assigned supervisor must inspect the area to verify that all fire precautions have been taken. The inspection should start with a simple question, "Is a hot work operation necessary to complete the work?" Many times welding and flame cutting are used because it is fast and easy even though other safer methods, such as mechanical fastening and sawing, could be used. If hot work is not absolutely necessary, it should not be permitted, especially in hazardous areas. Upon verifying that the precautions listed on the permit were implemented, the supervisor can sign the permit and give it to the welder.

No work should be allowed to begin without a properly signed permit at the job site. The supervisor should keep a copy of the permit as a reminder of the project. If the work will continue for more than one shift, a new permit should be issued for the next shift. If conditions cannot be made safe, the supervisor should insist on other methods to complete the maintenance request. Listed below is a brief overview of the safety features that must be verified or implemented before the supervisor will authorize the cutting/welding permit.

### **Precautions**

To extinguish any fires that may start, provide a fire watch for the involved area and include tours of the floors above and below. The fire watch should be continuous during the hot work operations, during lunch breaks, etc., and continue for at least half an hour after the work has been completed. If the hot work ends near the time of a shift change, arrangements should be made for the patrols to continue into the next shift.

The fire watch staff should be equipped with an adequate complement of portable extinguishers and/or charged small hose lines and must be trained in their use. They also should know how to sound a fire alarm. Welding, cutting, or other hot work should not be allowed in any building where sprinklers are out of service.

Use only equipment that is in good condition. Valves, regulators, hoses, and torches should be thoroughly checked. Before beginning, secure the gas cutting and welding cylinders so they will not be upset or damaged, and verify that the protective caps are on all cylinders not in use. When using electrical arc welding equipment, the ground clamp can be a source of ignition. The ground clamp should be carefully connected close to the work so that it can be easily observed.

## **Precautions (Continued)**

Within 35 feet of the work area:

- Prohibit hot work until surrounding floors have been swept clean.
- If floors are of combustible construction, they should be adequately protected to prevent ignition.
- Remove all flammable liquids from the area and clean up any oily deposits.
- Move combustibles at least 35 feet from hot work operations. If combustibles cannot be moved, they must be protected by metal guards or by flameproof curtains or covers. Do not use ordinary tarpaulins.
- Prohibit hot work until all wall and floor openings within 35 feet of the operations have been tightly sealed or otherwise protected with metal guards or flameproof tarpaulins.

### **Work on walls and ceilings**

- Do not work on combustible walls or ceilings, or those containing combustible insulation.
- Combustibles on the other side of the wall should be moved away so any heat that is transmitted through the wall cannot ignite the combustibles.
- When working on ceilings or upper levels of process equipment, fire resistant tarpaulins should be suspended beneath the work area to collect sparks.

### **Work on enclosed equipment**

- Before working on enclosed equipment, remove any combustible residue from its interior. When working on duct systems, in addition to removing combustible residue from its interior, also remove any combustible screens or dust bags.
- Prohibit hot work in or on vessels containing flammable or combustible contents or residue, until they have been completely cleaned and purged or inerted, and verified vapor free by combustible gas detectors. If there is a chance of a gas vapor release during the hot work operations, use gas detectors to constantly monitor the area.

### **Final check-up**

- After the hot work is completed, the welder should sign off on the permit and return it to the supervisor.
- The supervisor should return to the scene within two to four hours after the work has been completed to check the area. After this final check, the supervisor signs off on the permit and needs to bring it back to the Hooksett Department of Public Works, and be kept on file for review by a Travelers Risk Control consultant.

# Town of Hooksett

DEPARTMENT OF PUBLIC WORKS  
210 West River Road  
Hooksett, New Hampshire 03106



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## HOT WORKS OPERATIONS PERMIT

APPLICATION DATE: \_\_\_\_\_

You are hereby given permission to weld or to flame cut, per the National Fire Protection Association's *National Fire Code*, for the purpose of: \_\_\_\_\_

on (date): \_\_\_\_\_ at (time): \_\_\_\_\_. Work is to be performed in accordance with the Cutting, welding, and hot work operations policy, with special precautions as noted below: \_\_\_\_\_

\_\_\_\_ Check here if continued on another sheet

Fire Watch Personnel is: \_\_\_\_\_ Phone #: \_\_\_\_\_  
Permit is valid if signed by the Hooksett Public Works Director, and expires on: \_\_\_\_\_  
Date

I hereby agree to perform the work in accordance with the Cutting, welding, and hot work operations policy, and the above-stated special precautions.

\_\_\_\_\_  
Supervisor's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Supervisor's Address

\_\_\_\_\_  
Phone #

APPROVED: \_\_\_\_\_  
Public Works Director

\_\_\_\_\_  
Date

The following Departments have been notified of the above hot work operations and have indicated their approval below:

\_\_\_\_\_  
Police Department

\_\_\_\_\_  
Fire Department

This monitoring must be done by the immediate Supervisor, and the Fire Watch Personnel designated above. Also, this permit needs to be signed off on when the work is complete and brought back to Hooksett DPW to be kept on file.

\_\_\_\_\_  
Welder's Signature

\_\_\_\_\_  
Date and time

\_\_\_\_\_  
Supervisor's Signature

\_\_\_\_\_  
Date and time