



# **SECTION 23–CUTTING & WELDING** **(HOTWORK)**

**23.1 Hot Work Operations**

**23.2 Hot Work Permit**

Date Accepted: April 2002  
Updated: November 2017  
Draft Date: December 2001

## 23.1 HOT WORK OPERATIONS

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### A. Objective

To protect Harper employees while conducting cutting and welding operations (commonly referred to as hot work) associated with machine shops, maintenance, and construction activities. Potential health, safety, and property hazards result from the fumes, gases, sparks, hot metal and radiant energy produced during hot work. Hot work equipment, which may produce high voltages or utilize compressed gases, also requires special awareness and training on the part of the worker to be used safely. The hazards associated with hot work can be reduced through the implementation of effective control programs.

### B. Scope

Cutting and welding operations are prohibited unless appropriate steps are taken to minimize fire hazards, such as removal or guarding of combustible materials and, when possible, restricting hot work to specially designated areas. Departments where hot work is performed are responsible for ensuring that adequate controls and procedures are in place before work begins.

### C. References

Department of Labor, Occupational Health and Safety Administration (OSHA) 29 Code of Federal Regulations 1910 Subpart Q Sections 252-255 and Illinois Department of Labor 820 ILCS 225 Health and Safety Act.

### D. General Hot Work Controls

If there is a practical and safer way to do the job without hot work, that method should be used. Where hot work must be done the area should be properly designated and prepared. Combustible and flammable materials within the work area should be protected against fire hazards and the operation should not pose a hazard to others in nearby areas.

To help achieve this, the following controls should be used:

- Cutting and welding operations restricted to authorized, properly trained individuals;
- If possible, hot work performed in a properly designed shop area equipped with all necessary controls and adequate ventilation;
- Move combustible materials at least 35 feet from the work site. If this is not possible, protect combustible materials with metal guards or by flameproof curtains or covers (other than ordinary tarpaulins);
- Cover floor and wall openings within 35 feet of the work site to prevent hot sparks from entering walls or falling beneath floors or to a lower level;
- Fire resistant curtains and/or tinted shields used to prevent fire, employee burns, and ultra-violet light exposure.

### E. Ventilation and Atmospheric Testing

Hot work should not be conducted in the presence of explosive mixtures of flammable gases, vapors, liquids, or dusts or where explosive mixtures could develop inside improperly prepared tanks or equipment. Atmospheric testing and monitoring for combustible gases and vapors should be done before work begins and at regular, predetermined intervals thereafter. Ventilation of the work site, either through local or general exhaust ventilation, should be adequate for the work performed.

## **F. Fire Protection**

A person other than the operator should perform fire watch duties and remain at the work site for at least one hour after hot work operations have ended.

Additionally, the following steps should be taken:

- An ABC type fire extinguisher must be available in shop areas where hot work is performed;
- An ABC type fire extinguisher must be attached to all portable cutting and welding carts;
- If a building or area is equipped with a sprinkler system, then that system must be operational when hot work is performed;
- A hot work permit is required for all temporary operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: brazing, cutting, grinding, soldering, thawing pipes, torch-applied roofing and welding operations. The Supervisor or Project Manager should sign the hot work permit. See *Section 23.2 Hot Work Permit*

## **G. Personal Protective Equipment**

Eye protection in the form of vented goggles or other suitable eye protection shall be used during all gas welding or oxygen cutting operations. Helmets or hand shields shall be used during all arc welding or arc cutting. All eye protection shall be not readily flammable and shall be capable of withstanding sterilization. The appropriate shade number shall be determined on the type of hot work being performed.

Personal protective equipment (PPE) specifically designed for hot work should be provided to and used by workers (See *Section 6: Personal Protective Equipment*). The potential or toxic fume emissions from the material being worked on or surface coatings should be considered and appropriate steps should be taken to provide for respiratory protection.

## **H. Compressed Gas Cylinder Storage and Handling**

Storage and handling of compressed gas cylinders are important parts of many cutting and welding operations.

The following should be observed:

- Oxygen and fuel gas cylinders should be stored separately with the protective valve caps in place. Except when in use, oxygen and fuel gas cylinders should be stored at least 20 feet apart or separated by a noncombustible wall at least 5 feet high;
- Cylinder cars equipped with a cylinder restraint, such as a chain or strap, should be used for all transporting of compressed gas cylinders;
- Cylinders should be secured from tipping, in an upright position;
- Regulators must be compatible with the cylinder and its contents. Many regulators are similar in design and construction. Check the regulator's model number and compare that with the cylinder's requirements.

## **I. Training**

The Supervisor and/or Contractor shall ensure that all persons performing hot work should be trained in proper equipment operation, handling and storage of welding materials, compressed gas safety, chemical hazards, and in working procedures, including the written hot work permit. Additional training may also be necessary in the proper selection and use of personal protective equipment.

## 23.2 HOT WORK PERMIT

### HOT WORK PERMIT

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

A Hot Work Permit is required for any *temporary* operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: brazing, cutting, grinding, soldering, thawing pipes, torch-applied roofing and welding.

Instructions		Required Precaution Checklist	
1. Harper Supervisor or Contractor:		<input type="checkbox"/> Available sprinklers, hose streams and extinguishers are in service/ operable. <input type="checkbox"/> Hot Work equipment is in good repair.	
A. Verify precautions listed at right (or do not proceed with the work).		<b>Requirements within 35 feet of work</b> <input type="checkbox"/> Flammable liquids, dust, lint and oily deposits removed. <input type="checkbox"/> Explosive atmosphere in area eliminated. <input type="checkbox"/> Floors swept clean. <input type="checkbox"/> Combustible floors wet down, covered with damp sand or fire-resistive sheets. <input type="checkbox"/> Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields. <input type="checkbox"/> All wall and floor openings covered. <input type="checkbox"/> Fire-resistive tarpaulins suspended beneath work.	
B. Keep copy of the Permit on work site.		<b>Work on walls or ceilings</b> <input type="checkbox"/> Construction is noncombustible and without combustible covering or insulation. <input type="checkbox"/> Combustibles on other side of walls moved away.	
C. Harper Supervisor keeps original Permit.		<b>Work on enclosed equipment</b> <input type="checkbox"/> Enclose equipment cleaned of all combustibles. <input type="checkbox"/> Containers purged of flammable liquids/vapors. <input type="checkbox"/> Pressurized vessels, piping and equipment removed from service, isolated and vented.	
Hot work being done by:		<b>Fire watch/Hot Work area monitoring</b> <input type="checkbox"/> Fire watch will be provided during and for 60 minutes after work, including any coffee or lunch breaks. <input type="checkbox"/> Fire watch is supplied with suitable extinguishers. <input type="checkbox"/> Fire watch is trained in use of this equipment and in sounding alarm.	
<input type="checkbox"/> Employee <input type="checkbox"/> Contractor _____			
Date:			
Location/Building & Floor:			
Nature of the Job:			
Name of Person Doing Hot Work:			
<b>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.</b>			
Signed: (Harper Supervisor)			
Permit Expires:	Date:	Time:	AM PM