

Hot Work Safety

Environmental Health and Safety



Course Objectives

1. Be able to identify the general hazards associated with Hot Work Activities.
2. Be able to explain the procedures involved in the UNH Hot Work Permitting System.
3. Be able to explain the roles of personnel for the Hot Work Permit System including: the Hot Work Operator, Permit Authorizing Individual, and the Fire Watch.
4. Be able to explain the difference between a designated hot work area, a controlled hot work area, and an area where hot work is not permitted under any circumstances.
5. Understand Contractor Responsibilities, Mutual Responsibility, and the importance of individual initiative to halt work operations when workplace conditions develop that could pose a hazard.

Hot Work Definitions

Hot Work

Defined as “work involving burning, welding, or similar operation that is capable of initiating fires or explosions”.

- Hot work also includes other activities with the potential to create a source of ignition such as cutting, brazing, grinding, soldering, or hot riveting.
- The OSHA hot work standard 29 CFR 1910.251-257, defines practices that should be implemented during the performance of hot work. This standard covers the safety requirements of the different types of welding processes.

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Hot Work Definitions

- **Permit Authorizing Individual (PAI)** is the Departmental employee who is trained and authorized to issue a hot work permit by management.
- **Hot Work Operator** is the Departmental employee or contractor who is qualified and authorized by management to perform hot work such as welding, brazing, soldering, and other associated work tasks.

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Hot Work Permit Program Requirements—Review of Hot Work Locations

Hot work is allowed in **two** types of locations:

- 1) **Designated area** is a permanent location approved for routine hot work operations made safe by removal of all possible sources of ignition that could be ignited by the hot work tool.
 - 2) **Controlled Area** is one in which safe conditions for hot work exist or where safe conditions can be created by moving or protecting combustibles. A hot work permit is required in a controlled area
- **Non permissible location:** Hot work is never permitted in certain types of locations where safe conditions do not exist and cannot be created.

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Hot Work Permit Program Requirements

A **Fire Watch** is needed when there is a chance that fire might develop from combustible materials. A fire watch is needed if combustible materials are located:

1. Closer than 35' from the hot work.
2. More than 35' away from the hot work but might be easily ignited by sparks.
3. Walls or floor openings within 35' expose combustible materials in adjacent areas including concealed areas spaces in walls and floors.
4. Adjacent to the opposite side of partitions, walls, ceilings, or roofs.

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Hot Work Definitions

Welding Curtain is heat-resistant fabric designed to be placed in the vicinity of a hot work operation. Intended for use in vertical application with light to moderate exposures such as that resulting from chipping, grinding, heat treating, and light horizontal welding. Designed to prevent sparks from escaping a welding area.



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Hot Work Definitions

Welding Pads are heat-resistant fabric designed to be placed directly under a hot work operation such as welding or cutting. Welding pads are intended for use horizontal applications with severe exposures such as that resulting from molten substances of heavy horizontal welding. Welding pads are designed to prevent the ignition of combustibles that are located adjacent to the underside of the pad.

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Hot Work Hazards

Combustible Materials are anything that is combustible or flammable and is susceptible to ignition by cutting and welding. The most common materials likely to become involved in fire are those of combustible building construction such as the following:

1. Floors, partitions, and roofs
2. Wood, paper, textiles, plastics, chemicals, and flammable liquids and gases, and dusts.
3. Ground cover such as grass and brush.



Hot Work Hazards

Explosion Hazard

Welding and cutting can cause explosions in spaces containing flammable gases, vapors, liquids, or combustible dusts, and tanks and vessels that contain or have held flammable substances.



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Hot Work Hazards

Physical and Health Hazards

There are many hazards to the hot work operator (i.e. welder) associated with hot work such as:

- Burns,
- Sparks,
- Electric shock hazards,
- Optical (UV) radiation,
- Inhalation of welding fumes.



Engineering controls, personal protective equipment, and safe work practices safeguards the welder from many physical and health hazards.

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Hot Work Hazards

What Hazards Exist?

- *Eye hazards* (UV optical radiation and burn hazards) to the eyes.
- *Skin burn hazards* from the welder and hot surfaces.
- *Electrical hazards* (for above electric welding processes); notice that the work area is dry and free from water and moisture at the welding work area.
- *Slip, Trip, and Fall* hazards from welding hoses and shop equipment.
- *Inhalation (respiratory) hazards* of welding fumes and smoke generated from welding processes when inadequate ventilation is used as illustrated in the top left picture. Notice that in the right picture there is less welding smoke.

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Hot Work Hazards Summary

Hot work can be dangerous because the tools used are highly portable sources of ignition that can be introduced into areas where ignition sources do not usually exist.

- **Sparks, flame, or heat can travel great distances** by various means and ignite combustibles in other areas far away from the hot work.
- **There are also explosion, fire, and physical and health hazards** associated with hot work as previously reviewed.
- The goal of **hot work safety practices** is to avoid bringing sparks, flame, or heat produced by the tool into contact with a source of fuel.

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Hot Work Permit Program Requirements

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Hot Work Permit Program Requirements

Analyze the Hazards- Prior to initiation of hot work, perform a hazard assessment that identifies:

1. The scope of the work
2. Potential hazards
3. Methods of hazard control

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Hot Work Permit Program Requirements

After analyzing the hazards, see if there is any possibility of **Hot Work Alternatives**. An alternative hot work method is termed “**Cold Work**”.

1. Can the job be completed with cold work? An example of cold work is performing repairs with another method instead of using a heat producing tool. If yes, a hot work permit is not required.
2. Can hot work be performed in a designated area. If yes, then a hot work permit is not required.
3. Is the proposed work to be performed in a non- permissible area?
HOT WORK AND PERMIT ARE NOT AUTHORIZED in a non-permissible location.

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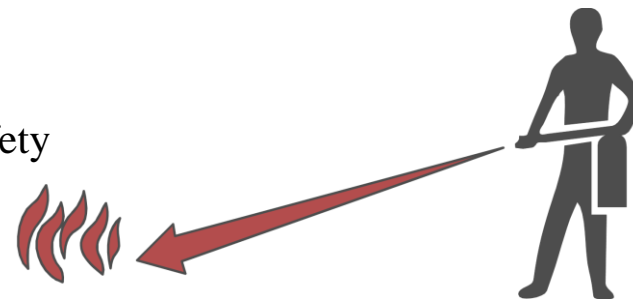
Hot Work Permit Program Requirements

- **Fire Protection Equipment:** All required fire protection, detection, and extinguishing equipment must be available, in service, and fully operable.

Examples of equipment that needs to be considered include:

- Fire extinguishers
- Fire Sprinklers,
- Hose stream, pales of water available?
- Proximity to the fire alarm.

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Hot Work Permit Program Requirements

Fuel sources: fuel sources within 35' from hot work are easily ignited, so within this area:

- Combustible materials must be removed or shielded.
- The floor must be swept clean of combustible materials.
- The absence of hazardous atmospheres and/or flammable materials must be verified, steps must be taken to ensure that none are introduced, and adequate ventilation must be assured.
- Combustible floors must be covered with damp sand or fire resistant sheets.
- If hot work is done on one side of a wall, partition, ceiling, or roof, precautions shall be taken to prevent ignition of combustibles on the other side by relocating the combustibles.

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Hot Work Permit Program Requirements

Fuel sources (cont'd): If relocation is impractical, combustibles shall be protected by a approved welding curtain, welding blanket, welding pad, or equivalent rated ANSI/FM 4950.



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Hot Work Permit Program Requirements

Fuel sources (cont'd):

- If it is impractical to relocate combustibles, a **Fire Watch must** be provided on the side opposite from where work is being performed.



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Hot Work Permit Program Requirements

The **Fire Watch** monitors the hot work area for changing conditions and watches for fires, and extinguishes them if possible. The Fire Watch shall be familiar with the facilities and procedures for sounding the fire alarm and contacting the Fire Department in the event of an emergency.

Note: When changing conditions are observed by anyone—whether the fire watch, hot work operator, PAI, or any other employee— that person should immediately halt the hot work on his or her own initiative!!

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Hot Work Permit Program Requirements

Remember, **Fire Watches** must:

1. Have fire extinguishing equipment readily available and be trained in its use.
2. Be familiar with facilities for sounding an alarm and contacting the Fire Department in the event of a fire.
3. Watch for fires in all exposed areas.
4. Try to extinguish fires only when obviously within the capability of equipment available, or otherwise sound the alarm.
5. Be maintained for at least a half-hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

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Hot Work Permit Program Requirements

Individual Employee Responsibilities:

Any employee that observes changing unsafe condition associated with hot work activities must use individual initiative to report the unsafe condition(s).

- Each employee has the right to halt hot work operations when new conditions develop that could pose a hazard to employees.
- An example of changing conditions might be the introduction of a flammable substance into the hot work area.

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Hot Work Permit Program Requirements

- **Contractor Responsibilities:** The designated departmental PAI should supervise outside contractors that are planning to engage in hot work activities.
- The departmental PAI informs contractors about site-specific hazards including the presence of flammable materials at the work site.
- **Mutual Responsibility:** Management, contractors, the PAI, the fire watch, and the hot work operators shall recognize their mutual responsibility for safety in hot work operations.

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Summary

- Hot work activities creates various health and physical hazards. The goal of the hot work permit program is to prevent heat sources from coming into contact with fuel sources in order to prevent the possibility of fires and explosions that could result in injury, death, and loss of property.
- Hot work is allowed in 2 types of locations. Designated area is a permanent location (such as a Welding or Maintenance Shop) approved for routine hot work operations. A Designated area has been made safe by removal of all possible ignition sources.
- A Controlled Area is an out of shop location which safe conditions exist or where safe conditions can be created by moving or protecting combustibles.
- A Hot Work Operator must obtain a Hot Work Permit from the Departmental Permit Authorizing Individual before performing hot work in a Controlled Area.
- A Fire Watch must be posted when hot work is performed in a location where other than a minor fire might develop.
- A Non-Permissible Location is a hazardous location such as a tank that holds flammable chemicals. No Hot Work is allowed in this type of work environment.
- It is critical that proper planning and communication be implemented by all involved in planning work involving hot work to reduce the possibility of injury, death, and property loss.

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Questions?

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