Making sense of risk
Risk engineering
Asia Pacific

Minimising property hot work fire risks

Liberty
Specialty Markets

Hot work guide

Hot work is any operation involving open flames or producing heat and/or sparks, including but not limited to welding, oxygen and arc cutting, open flame soldering, brazing, hot riveting, grinding, and pipe thawing.

Hot work operations should be strictly supervised and controlled to minimise property losses from fire or explosion. Fires following unsupervised hot work result in millions of dollars in property damage and business interruption every year.

This hot work guide is intended for property managers, supervisors, employees and outside contractors involved in performing hot work operations that introduce potential ignition sources. Using this guide should help prevent hot work property losses in institutional, commercial, and industrial operations.

All hot work losses are preventable!

Managing hot work operations

Management plays a vital role in the control of hot work exposures and is responsible for the overall safe operation of hot work activity. Preventing hot work fires requires careful implementation and enforcement of a written Hot work safety programme coordinated by a Fire Safety Manager. To be fully effective, the programme must be implemented for all hot work operations, and must be regularly reviewed and updated to stay current with process, occupancy and personnel changes within your facility.

The Fire Safety Manager is designated by management and is responsible for regulating all non-production hot work and ensuring that all basic safeguards and precautions are in place before any hot work can proceed.

A Hot work safety programme will be effective only if it is backed by a written Hot work policy that is established and communicated by upper management. The policy should clearly state responsibility, accountability and consequences for failure to comply.

The Hot work safety programme should ensure basic safeguards before any hot work is permitted:

- Appoint a Fire Safety Manager.
- Limit hot work operations to designated areas such as a maintenance shop, a detached outside location of non-combustible construction and contents, or other suitably segregated areas.
- If hot work operations cannot be moved to a designated area, establish permissible hot work areas. Permissible areas require a Hot work permit and are made safe by removing combustibles or protecting them from ignition.
- Use approved apparatus such as torches, manifolds, regulators or pressure-reducing valves and acetylene generators.
- Ensure that all individuals involved in hot work operations, including contractors, are trained in the safe operation of the equipment.
- Instruct all individuals involved in hot work of inherent risks and emergency procedures in the event of a fire.
- Advise all on-site contractors of site-specific combustible and flammable materials, hazardous processes, or other potential fire hazards.

Managing contractors

The Fire Safety Manager or other designated person should supervise and follow up on all contractor activities:

- Make contractors aware of the established Hot work policy and procedures, and hold them accountable.
- Specifically identify in the contract the work to be completed.
- Require the contractor to provide a certificate of insurance prior to starting any work. The policy limit of liability should be in line with the potential loss if something were to go wrong.
- Remove any wording in the contract that waives subrogation rights.

Hot work permit

The Hot work permit is issued by the Fire Safety Manager and authorises hot work operations to be conducted in a specific area, on a specific date, by a specific individual or group. The responsibilities of the Fire Safety Manager, hot works operator and fire watch staff are outlined in detail later in this document.

Procedure before hot work starts

- The Fire Safety Manager should print off the Hot work permit and the Hot work precautions checklist. *The checklist is to be used as a guide onsite, and does not replace the Hot work permit.*
- On the Hot work permit, complete the permit number, location and purpose of the hot work.
- Number the Hot work precautions checklist to match the Hot work permit number and then use the checklist to inspect and prepare the site in readiness for the hot work.
- When satisfied that the site is adequately prepared and all precautions have been taken, the Fire Safety Manager should sign and date the permit, provide the time hot work is to start/finish and provide their contact details.
- The hot work operator should sign the permit and provide their contact and company details.

Procedure after hot work finishes

- Use the Hot work precautions checklist to re-examine the site and make good.
- *Any isolated sprinkler heads, fire detectors or zones should be reinstated.*
- Note the time that hot work was completed and the time the fire watch finished. (A fire watch should be maintained on site for at least *thirty [30] minutes* after hot work is complete; revisit high-risk sites for up to *three [3] hours* afterwards.)
- When satisfied that the site is free from smouldering materials and flames, the Fire Safety Manager and hot work operator (Hot work permit holder) should sign and date the permit, releasing the hot work operator from site.
- Place the Hot work permit on file as a hard copy record, or scan and retain in soft copy.

Fire safety precautions

Fire Safety Manager responsibilities

The Fire Safety Manager is responsible for making sure that the following safeguards and controls are adhered to before, during and after hot work:

Before starting hot work

- Ensure that fire protection, detection and alarm systems are in service, where provided. *If the systems are not in service, postpone all hot work operations* until the fire protection has been restored. Refer to the Liberty Specialty Markets (Liberty) document Fire protection impairment programme when fire protection systems are not in service.
- Schedule hot work operations during planned shutdowns of hazardous operations.
- Determine the duration for which the Hot work permit is valid, based on local conditions. *Limit each permit to a maximum of eight (8) hours; a new permit is also required if hot work stops for more than two (2) hours.*
- Verify that hot work equipment is in a satisfactory, safe operating condition and appropriate for the job.
- Allow only experienced, reliable individuals to operate equipment.
- Choose a location for hot work operations that is free from combustibles as far as is practicable.
- Isolate and/or remove flammable liquids, gases and dusts at least *fifteen (15) metres* from the hot work area.

- Sweep up all combustible and flammable materials such as paper clippings, wood shavings or textile fibres to a radius of *fifteen (15) metres*. For raised hot work platforms, this radius should be larger for vulnerable objects on exposed levels below the hot work.
- Relocate combustibles and flammables at least *fifteen (15) metres* from the work site or protect with metal shields or fire-retardant covers, guards or curtains. For raised hot work platforms, this radius should be larger for vulnerable objects on exposed levels below the hot work. The edges of covers at floor level should be tight to prevent sparks from landing undetected behind/under them.
- Shield generators and gas appliances and their fuel lines in the hot work area.
- Cover ducts, grilles and other openings in the hot work area.
- Wet down or cover with damp sand timber and other combustible floors, or protect with non-combustible materials or fire-retardant shields.
- Avoid (or take special care when) conducting hot work within *fifteen (15) metres* of sandwich-panel walls or ceilings, which may have combustible cores.
- Seal or cover with fire-retardant or non-combustible material any openings or cracks in walls, floors or ducts within *fifteen (15) metres*, to prevent sparks landing on adjacent areas.
- Prohibit hot work on pipes or other metal in contact with or close enough to combustible walls, partitions, ceilings, roofs or other combustibles to cause ignition by conduction.
- Cover automatic sprinklers in close proximity to the hot work area with a wet rag, and, where it is determined to be safe to do so, shield sensitive fire detector heads with proprietary caps.
- Provide fully charged and operable fire extinguishers of the appropriate size and type within *ten (10) metres* of the hot work area.
- Ensure that hose stations within the hot work region are ready for service. Hoses may remain on the reel or rack but should be ready for use.
- *Ensure that there is an adequate escape route in case of emergency.*
- Ensure that those involved in the hot work understand the company's emergency procedures and know the escape route, and that you are ready to respond to any fire threat.

During hot work

- Inspect the area at least once per shift during the hot work project to ensure that it remains a fire-safe area.
- Avoid accidental operation of the automatic fire detection or suppression systems (for example, special extinguishing systems or sprinklers).
- Provide a fire watch during hot work operations, including during breaks and pauses, to ensure safe conditions.

After completion of hot work

- Remove any wet rags used to cover automatic sprinklers, and any caps used to cover fire detector heads.
- Remove non-combustible covers and shields.
- Maintain a fire watch for a minimum of *thirty (30) minutes* after the completion of the hot work operations to detect and extinguish possible smouldering fires.
- Inspect the area, including exposed levels below the work and hidden behind the work.
- Monitor the hot work area for an additional *three (3) hours* after the completion of work at sites with elevated risk (such as difficult-to-see spaces). This may involve you, production personnel, a security guard or other appropriate method, based on local conditions.

Hot work operator responsibilities

- Examine all equipment to ensure it is in a safe operating condition.
- Obtain approval from the Fire Safety Manager before starting hot work operations.
- Monitor the work site during hot work. If unsafe conditions develop, cease hot work operations immediately and notify management, the area supervisor, or the Fire Safety Manager.
- *Familiarise yourself with the company's emergency procedures and the designated emergency escape route.*

Fire watch staff responsibilities

- Understand the inherent hazards of the work site and the potential impact of hot work.
- Maintain fire extinguishing equipment, make sure it is readily available, and make sure you know how to use it.
- Ensure that safe conditions are maintained during hot work operations.
- Stop the hot work operations if unsafe conditions develop.
- Watch for fires in all exposed areas and attempt to extinguish them *only when it is safe to do so*, and when the fires are obviously within the capacity of the available equipment.
- *Know the procedures for sounding an alarm in the event of a fire, and know the emergency escape route.*
- Maintain the fire watch during breaks and pauses in the hot work.
- Maintain the fire watch for at least *thirty (30) minutes* after completion of hot work operations in order to detect and extinguish smouldering fires.
- Provide a fire watch for an additional *three (3) hours* after completion of the hot work in high-risk areas (such as where the potential ignition of combustibles cannot be directly observed).

Want more information?

Australian Standard 1674.1 **Safety in welding and allied processes – Fire precautions.**

National Fire Protection Association (NFPA) 51 B **Standard for Fire Prevention During Welding, Cutting and Other Hot Work.**

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