

Risk management

Fire caused by Hot Work

A guide to loss prevention



Hot work is usually defined as any open flame, spark or heat producing activity and is typically associated with cutting, welding, grinding and brazing operations as part of maintenance or construction works.

Hot work can generate sparks, molten material and other ignition sources well away from the area of work. In addition, conducted heat can cause ignition of combustible materials both locally and remotely.

Ideally hot work should not be carried out and alternative methods of work should be investigated. If there is no alternative, then every effort should be made to relocate the activity to a designated safe area well away from buildings and structures or to a properly designed and constructed workshop area.

The decision to carry out hot work when the above criteria cannot be met should be a conscious one after all other alternatives have been exhausted. At this stage a formal Hot Work Permit and procedure should be used. This applies to everyone – staff or contractors alike.

Hot work has been recognised as a significant fire risk for many years. Despite this, loss statistics show us that it continues to be a major cause of loss within industrial and commercial facilities, particularly during maintenance periods and construction projects. It is essential that all hot work activities are properly managed.

Hot work procedure

Hot work and timber frame construction

Hot work on timber frame construction sites should be minimised. Where hot work cannot be avoided, in addition to the standard controls for hot work, the area in which the work has been undertaken must be continually monitored for at least one hour following completion of the hot works and be visited two hours after completion prior to closing the permit.

Exposed wooden flooring and other items of combustible material which cannot be removed must be covered with sand or other non-combustible material.

All hot work undertaken outside of a designated 'safe' hot work area or within 15m of buildings, structures or external storage should fall under a Hot Work Permit.

This should be fully documented, adopted as a company standard and applicable to all employees, contractors and visitors. As a minimum the procedure should contain the following:

- Definition of hot work
- Scope of application of procedure
- A dedicated permit for the control of hot work activities – Hot Work Permit
- Training requirements for Hot Work Permit issuers, including refresher training timescales
- A list of those trained and authorised to issue Hot Work Permits
- Requirement for periodic audit of the Hot Work Control Procedure including live and completed Hot Work Permits

Hot Work Permits

The use of a dedicated permit to control hot work activities forms an essential part of a hot work process, but it is not the only level of control needed. Many losses have occurred where permits have been issued but these have not been properly completed, or the precautions identified have not been properly implemented, or those issuing the permit do not recognise all the potential hazards.

Authority to issue permits should be granted following successful completion of appropriate training and demonstration of competence.

The key criteria for a Hot Work Permit are:

- Permits should be issued for a specific task in a specific location.
- Permits should be issued to a named individual and only for that individual to carry out the hot work.
- Permits should not be issued for more than one day or shift (8 hours).

Extensions to permits are acceptable provided all necessary precautions are re-checked and the extension is formally documented.

A copy of the issued permit should be available at the place where the work is being carried out. This allows those carrying out the work to demonstrate that they have the appropriate permission. The issued permit also acts as a checklist to allow review of the conditions under which the permit was issued. Should any of these conditions change then work should be suspended. Resumption of work should only be undertaken when authorised by the original permit issuer.

Fire watch

A fire watch should be posted during the work. As a minimum this should be one person with a fire extinguisher or hose, but could require additional observers if the work is being done close to pits, trenches or cable trays, or near penetrations through walls or floor or ceilings, or on tall or combustible structures. The person doing the hot work should never be allowed to be their own fire watch. Note that the fire watch should be maintained during breaks in the work such as at refreshment breaks.

Statistically the majority of major losses have occurred sometime after the hot work has been completed. Smouldering materials may go unnoticed and develop into fires when the area or building is unoccupied. A fire watch should always be undertaken during the work and following completion of the work. The period of the post-work fire watch should be based on the hazards present. The minimum post-work fire watch should be continuous for 30 minutes then periodic inspection of the work place and surrounding area (including floors below where the floor is penetrated) for at least another 30 minutes. Where there is a significant combustible loading within the building or combustible construction is present, the periodic inspections should be extended to 2 hours or more after the work is completed.

To ensure an adequate fire watch can be achieved, hot work should not be allowed within 2 hours of the end of the normal shift when operations would normally cease and staff leave for the night.

Checklist before hot work commences

1. At least 2 suitable portable fire extinguishers should be available for immediate use within the area of hot work operations and all persons involved and undertaking fire watch duties be trained in their use. Any sprinkler protection should remain fully operational. Any automatic fire detection systems should be isolated only in the area where hot works is undertaken and only for the period of the work.
2. Inspections should be made and combustible materials and flammable liquids should be removed from:
 - an area within 10 metres of the hot work
 - floors above and below, and areas on the other sides of walls, screens or partitions which may be in danger of ignition either directly or from conducted heat.
3. If there are any:
 - combustible materials that cannot be removed
 - any holes, gaps in walls, floors or ceilings where sparks could pass through they should be covered by incombustible material.

Floors of combustible material in the designated area should be covered with sheets of incombustible protective material or wetted and covered with sand.

4. Where work is carried out on building panels, an assessment should be made on insulating or other materials behind or forming the core of the panels.
5. Allow adequate ventilation and ensure enclosed equipment such as tanks, vessels, etc, are emptied and tested to ensure that they are free of flammable or other dangerous materials.
6. Identify any gas pipes or other services adjacent to or below the area of hot work and isolate and protect them.
7. All persons carrying out the hot work and undertaking the fire watch should know how to raise the fire alarm and be aware of any emergency procedures.
8. Confirm all other contractors/operators on site are aware that hot work is being undertaken, and that there is no application of paints or flammable solvent based chemicals.

References

HSB guides to loss prevention

- FPA RC7 – Recommendations for Hot Work
- NFPA 241: Standard for Safeguarding Construction, Alteration, and Demolition Operations Current Edition: 2022
- The Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation, 10th edition (August 2022)

Disclaimer: The guidance in this document refers to industry best practice loss control advice. Adoption of the advice contained within this document does not imply compliance with industry, statutory or HSBEL guidelines, nor does it guarantee that fire related losses will not occur.

Hot Work Permit

Sample permit taken from The Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation, 9th Edition.

HOT WORK PERMIT	
A copy of the completed permit should be retained for auditing purposes	
ISSUING COMPANY	PERMIT NO.
A. PROPOSAL <i>(to be completed by the person responsible for carrying out the work)</i>	
BUILDING	
EXACT LOCATION OF PROPOSED WORK	
NATURE OF WORK TO BE UNDERTAKEN	
I understand the scope of work and precautions to be taken.	
SIGNED	BLOCK CAPITALS
DATE	POSITION
CONTRACTOR COMPANY (WHERE APPLICABLE)	
B. AGREEMENT <i>(to be completed by Company Safety Officer or other nominated person – the 'Issuer of the Permit')</i>	
This Hot Work Permit is issued subject to the following conditions:	
ISSUE OF PERMIT:	DATE TIME
EXPIRY OF PERMIT*:	DATE TIME
* It is not desirable to issue permits for protracted periods. Fresh permits should be issued where, for example, work extends from morning to afternoon.	
A FINAL CHECK OF THE WORK AREA SHALL BE MADE, NOT BEFORE (TIME):	
ADDITIONAL CONDITIONS REQUIRED:	
The above location has been examined and the precautions listed on the reverse side of this form** have been complied with. I have carried out a risk assessment and consider that there is no reasonably practical alternative to doing the job using hot work. I have been provided with evidence of appropriate Public Liability Insurance.	
SIGNED	BLOCK CAPITALS
DATE	POSITION
C. FOLLOWING COMPLETION OF WORK <i>(to be completed by member of staff or contractor responsible for the work. The permit should then be returned to the Issuer)</i>	
The work area and all adjacent areas to which sparks and heat might have spread (such as floors below and above and areas on other sides of walls) have been inspected and found to be free of smouldering materials and flames. <input type="checkbox"/>	
Stub ends of welding rods and other hot waste materials have been removed and disposed of safely. <input type="checkbox"/>	
Any isolated automatic fire detectors or detection zones have been reinstated. <input type="checkbox"/>	
All equipment, including gas cylinders, has been removed to a safe area. <input type="checkbox"/>	
TIME INSPECTION COMPLETED: <i>(this must be at least 60 minutes after work has been completed)</i>	
SIGNED	BLOCK CAPITALS
DATE	POSITION
CONTRACTOR (WHERE APPLICABLE)	
D. SIGN OFF BY ISSUER OF PERMIT	
The hot work has been completed. Any detector(s) or zones of the fire alarm system that were isolated have been fully reinstated.	
SIGNED	BLOCK CAPITALS
DATE	

** The conditions listed in section 16 should appear on the reverse of this permit form.

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