

Risk Management Guidelines

Hot Work

Introduction

Hot Work is work that involves open flames or sparks, or any other activity that generates heat.

Fires involving hot work have led to multi-million pound losses. Most frequently the cause is carelessness and ineffective supervision while hot work operations are being carried out.

The sources of heat most commonly involved include:

- gas and electric welding and cutting equipment
- blow lamps and blowtorches
- grinding wheels and cutting discs
- bitumen and tar boilers

Managing hot work means preventing all hot work losses and having absolute control over hot work activities. There are four key steps to the management process:

1. The Hot Work Permit
2. Site Preparation
3. Safe Working
4. Follow up Checking

Experience has shown that a satisfactory standard of care and supervision is far more likely to be achieved where a formalised permit to work system is in force, issued under the supervision of an experienced person who has the authority to ensure compliance with the procedures.

The Hot Work Permit:

- specifies the particular job to be carried out
- specifies the area where the work is to be done
- is issued for a set time period
- lists any special conditions

An example of a hot work permit is given at the end of this document.

Procedure for use

The person nominated to authorise hot work must have experience or training in the problems associated with hot work and be of suitable status to ensure compliance with procedures. The nominated person is normally the site fire or safety officer.

Before any hot work starts, a hot work permit must be obtained from the authorised person.

The permit should not be issued without first considering the significance of any other permits to work in the vicinity.

The permit is issued for a specific task that is to be undertaken in a clearly identified area. Hot work permits should not be issued for protracted periods and separate permits should be issued for work which extends from morning to afternoon periods.

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Before completing the first part of the hot work permit the person responsible for carrying out the work should complete the checklist on the reverse side of the form to confirm that fire protection measures are adequate, suitable precautions have been taken and equipment to be used is safe.

Further measures may be required by the person issuing the permit, and any additional conditions should be entered on the permit. The earliest time at which a final fire check should be made will also be specified. This will normally be at least one hour after the time of the expiry of the permit, when work must stop. If no trained personnel will be available to carry out the check (e.g., for a permit issued late in the day) work must not start.

The hot work permit should be completed in duplicate, with the top copy being handed to the person carrying out the work. The issuer who may wish to inspect the site of the work or instigate spot checks to ensure that the conditions are being met and the work is completed before the expiry of the permit should retain the second copy.

Safe Systems for Hot Working

General precautions

1. Hot work should only be authorised where a safer method of work is not available. For example, it may be possible to do the job with a hand saw or pipe cutter or it may be possible to move the component requiring work to a workshop or to a safer working area.
2. Hot work should only be carried out by trained and competent personnel.

3. In sprinkler-protected premises hot work operations should not be carried out when the water supply to the sprinkler system is shut off.
4. When hot work is being undertaken in premises fitted with automatic fire detection systems, it may be necessary to isolate the detector zone where the work is being carried out. The zone should be reinstated as soon as the work has been completed.
5. When work is completed, paint strippings, ends of welding rods and other hot waste materials should be removed and disposed of safely.
6. All equipment should be removed to a secure area at the end of each working period or when the task is completed, whichever is sooner.
7. A trained person, not directly involved with the work, should provide a continuous fire watch during and for at least 1 hour following each period of work.

Site Preparation

Before work commences, the following precautions should be taken:

- Clear the area for 10 metres around the hot work process

Remove all combustible materials and flammable liquids and sweep floors clean. It is important to protect or clean thoroughly any surfaces impregnated with paint, oil and grease which can spread fires rapidly. Flammable solvents should not be used to clean surfaces immediately before work commences.

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This distance may need to be more than 10 metres in some circumstances, especially where overhead work is being carried out.

- Protect everything that cannot be removed

All combustible construction elements and surface finishes should be protected using non-combustible material or purpose-made blankets, drapes or screens. Some examples of these are listed at the end of this document.

Walls, floors and ceilings should be checked for any openings, holes or gaps through which sparks or molten metal could pass. These should be blocked off with non-combustible materials.

- Check the other side of walls

Before carrying out work on one side of a wall or partition an examination should be made of the area on the other side to ensure that any combustible materials are not in danger of ignition by direct or conducted heat. Heat may be readily conducted where walls are metal or where metal items such as pipes, beams or bolts penetrate to the other side of the wall.

- Beware of flammable vapours

Hot work should never be carried out in an atmosphere containing flammable vapours or combustible dusts. Where a hazardous atmosphere is suspected, air samples should be taken and work only allowed to commence when the atmosphere has been certified to be non-flammable by a competent person.

If there is a risk that the flammable atmosphere may recur, further testing of the atmosphere will be necessary.

- Ensure adequate ventilation

The area should be well ventilated to prevent the build up of toxic or flammable fumes.

- Have fire-fighting equipment ready

The observer carrying out the fire watch during hot work should be equipped and trained in the use of fire-fighting appliances. As a minimum these should consist of either a hydraulic hose reel or at least two LPC approved 9 litre water-type extinguishers. Water must not be used on fires involving electrical arc-welding equipment and in these circumstances carbon dioxide or dry powder extinguishers should be provided.

- Check escape routes

All personnel involved with the hot work should be familiar with the means of escape from the premises. These may well change as construction work progresses. They should also be familiar with the method of raising the alarm and summoning the fire brigade.

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- **Work on composite panels**
Where hot work is being undertaken on composite building panels or similar construction elements, the type of insulating materials behind the metal or other non-combustible surface should be assessed. If combustible materials are identified or suspected, alternative methods should be employed. Cold stores, for example, in the food processing industry, frequently incorporate large amounts of combustible insulating materials in both wall and ceiling panels.
- **Multiple occupancy buildings**
Liaison should be established in multiple occupancy buildings before work commences to enable contractors or others to be effectively controlled and access made available to areas adjacent to where the work is being carried out.

Safe working

- **Gas welding and cutting equipment**
Gas welding and cutting procedures should only be carried out by trained personnel, using equipment which is in good condition, set up in accordance with the manufacturers' instructions. Equipment should be carefully checked for damage before use. Hose leaks can be particularly hazardous because a flammable gas could spread to a remote ignition source.

All gas cylinders should be clearly marked with their contents and should be chained or clamped in position, for example, in a stand or on purpose-made trolleys. Both fuel and oxygen hoses should be fitted with flash-back arresters.

Oxygen should never be released into the air since the danger of fire and explosion is increased if there is excess oxygen in confined working spaces.

- **Electric welding and cutting apparatus**

There should be an easily accessible isolation switch, and a separate earth lead should be used to earth the metal work of the welding set.

The cable connecting any electric welding apparatus to the source of the electrical supply should be as short as possible. Care should be taken to ensure that all wiring is of suitable design and construction to carry the heavy currents required and that connections are made correctly so as to avoid overheating or sparking.

All electrical components should be regularly inspected and tested by a competent person. Damaged equipment should be repaired or replaced immediately. Damaged cables should always be replaced.

Exposed metal parts in clothing and equipment may cause accidental arcing and should be avoided.

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- Blow lamps and blow torches

LPG blow lamps and blow torches should be extinguished and allowed to cool before changing cylinders. Paraffin or petrol blow lamps should only be filled and lit in the open and should not be re-filled when hot.

Blow lamps and blow torches should be lit as short a time as possible before work commences and extinguished immediately after work ceases.

In no circumstances should they be left unattended when lit. Lighting up should only be carried out in accordance with manufacturers' instructions.

- Bitumen and tar boilers

If it is unavoidable that bitumen/tar boilers, lead heaters and similar equipment be taken onto roofs, a non-combustible heat insulating base must be provided to protect the roof. The equipment must be sited on a firm and level surface where spilled material can easily be controlled.

Gas cylinders must be at least 3 metres from the burner. Gas hoses should be in good condition and properly fitted. Spare cylinders should be kept to a minimum. These should be stored away from the working area and never kept on the roof.

The equipment must be supervised at all times by an experienced operator.

The bitumen level and its temperature should be monitored, and the lid should normally be kept on the boiler.

The burner should be turned off before transporting the boiler on a lorry or trailer.

- Hot air guns

Hot air guns are a particular source of danger as no flame is apparent. When using these appliances the same safety measures should be observed as for other forms of hot work.

Follow Up Checking

The fire watch must continue for at least one hour after work is completed, to detect and extinguish any incipient burning in the work area and in all adjoining areas to which sparks and heat may spread. These could include floors above and below and areas on the other side of walls to where the work is being carried out.

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Contracted Work

Controlling contractors' activities is critical in preventing losses.

- Prior to entering into a contractual agreement with a contractor, it is important to ensure that the contractor's insurance arrangements are adequate. Reference to insurers or insurance advisers may be necessary.
- Ensure that contractors are made aware of the fire safety procedures operating at the site, including the hot work permit system. The implementation of fire safety rules should be made a condition of the contract.
- Copies of permits to work should be given to all the contractor's employees when they arrive on site. Before they start any work, their supervisors must sign the form confirming that they have read and understood fire safety rules.
- The fire safety co-ordinator should ensure that the contractor has complied with the requirements of the permit before any hot work begins and, once work has started, check that they are observing precautions by carrying out frequent inspections.

On completion of hot work by a contractor, the issuer of the permit should ensure that the work area and all adjacent areas are free from fire over a period of not less than one hour after the work ceased.

Welding Drapes and Blankets

Welding drapes/blankets are designed to protect equipment or flammable materials when hot work is being carried out. They are used to cover plant, equipment, combustible materials etc. which cannot be removed from the work area and which are at risk of damage or fire from welding or metal cutting sparks or splatter.

The LPC Loss Prevention Standard 1207 'Fire Requirements for Protective Covering Materials', referred to in the Joint Code of Practice for Fire Prevention on Construction Sites, is a minimum standard for flame retardance and emission of toxic gas and smoke for protective flexible coverings. It is not a specification for welding blankets.

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The products marked with an asterisk (*) below are coated with Neoprene and must not be used in enclosed, unventilated areas.

Supplier	Product	Application
Ardenoak Fire Limited Unit 6 Beacon Court Pitstone Green Business Park Quarry Road Pitstone Leighton Buzzard Beds LU7 9GY Tel: 01296 663280 Int +44 1296 663 280 Fax: 01296 663288 Int +44 1296 663 288 E-Mail Address: admin@ardenoak.net Web Address: http://www.ardenoak.net	Weld Barrier Excelsior 1100 Weld Barrier Excelsior 700 Weld Barrier Silica 600 <i>Weld Barrier Silica 1250</i> <i>Weld Barrier Sterling</i>	Protection from welding sparks and splatter Protection from welding sparks and splatter Suitable for light duty welding applications where a vertical welding barrier, to withstand weld splatter, is required
Safety First Manufacturing 2 Lister Close, Newnham Ind Est, Plympton, PL7 4BA Tel: (0)1752 201000	Tusker Welding Blankets WBN9 and WBN11 Tusker Blankets LWB2SO Light duty welding blanket	Protection from molten metal Protection against glare, sparks and splatter.
Jactone Products Springvale Business Park Springvale Avenue Bilston West Midlands WV14 0QL Tel: 01902 357777 Fax: 01902 357711 Email: sales@jactone.com	NG-200* Standard duty GPF 1300 High Performance	Protection from welding sparks and splatter Protection from grinding sparks and molten metal

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Procedures for Hot Work Permits

1. Procedures for use when issuing Hot Work Permits

- a. Hot Work Permits (see specimen) will be incorporated into safe systems of work to minimise the risk of fire.
- b. Work activities which may require the introduction and use of a Hot Work Permit would be:
 - i. work in hazardous environments;
 - ii. work in confined spaces;
 - iii. work near combustible materials, liquids and gases;
 - iv. work on drums and tanks.
- c. The issue of Hot Work Permits will not be limited to the above examples, individual work activities which involve a fire risk will need to be assessed.
- d. Sections One and Four will be completed by an Authorised Person appointed in writing by the Company.
- e. Sections Two and Three will be completed by the Competent Person who will be supervising or carrying out the Hot Work Activity.
- f. A Hot Work Permit should not extend beyond the times stated in Section One.
- g. On completion of the stated times an inspection must be carried out in the work area and areas of close proximity to ensure all sources of heat or ignition are removed or made safe. Such inspection is to include a continuous fire safety check in the vicinity of the work (including the other side of walls or partitions) for a period of 30 minutes after completion of each period of work.

2. Distribution of Hot Work Permits

- a. Copy to Competent Person and to be available at the work place.
- b. Copy retained in booklet by Authorised Person.
- c. On completion of Section Four the Competent Person will return the copy to the Authorised Person for destruction.



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Specimen Hot Work Permit

Contract Title

Permit Number

Applicable to all operations involving flame, sparks, hot air or arc welding and cutting equipment, brazing and soldering equipment, blow lamps, bitumen boilers and other equipment producing heat or having naked flames.

Section 1 – Details of Operation

Exact location of work

Specific details of work

Date work to commence

Time

Date work to be completed

Time

Special precautions/Comments

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General Precautions

- Hot works should only be undertaken where a safer method of working is not available.
- Wherever possible, items to be subjected to hot work should be removed to a safe area designated for that purpose.
- A trained person, not directly involved with the work, should provide a continuous fire watch during, and for at least 1 hour following the hot work, including a check 60 minutes after completion to ensure that the working area and all adjacent areas, including the floors below and above, and areas on the other sides of walls, screens, partitions and above false ceilings are free of smouldering materials or flames.

2. Checklist Before Hot Work Commences

✓(Tick once check is complete)

- a. 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. ☐
- b. Inspections should be made and combustible materials and flammable liquids should be removed from:
 - i. an area within 10 metres of the hot work ☐
 - ii. 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.
- c. If there are any:
 - i. combustible materials that cannot be removed
 - ii. holes or gaps in walls, floors or ceilings where sparks could pass through they should be covered by incombustible material. ☐
- d. Floors of combustible material in the designated area should be covered with sheets of incombustible protective material or wetted and covered with sand. ☐
- e. Where work is carried out on building panels, an assessment should be made of insulating or other materials behind or forming the core of the panels. ☐
- f. 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. ☐



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- g. Identify any gas pipes or other services adjacent to or below the area of hot work, and isolate and protect them. ☐
- h. 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. ☐
- i. 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. ☐

I hereby declare the above has been made known to the Competent Person in charge of the work. I consider the above mentioned area is safe for the Competent Person to commence operations.

Signed

Date

Authorised Person

Time



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Section 2 – Acceptance of receipt of copy by Competent Person

I acknowledge receipt of this permit and understand the precautions/comments described in Section One. Neither I nor the persons under my control will work on any other activity or location other than those specified in Section One.

Signed

Date

Competent Person

Time

Section 3 - Clearance

Following completion of Hot Work

✓(Tick once check is complete)

1. All hot waste materials should be removed and disposed of safely ☐
2. All equipment, including gas cylinders, should be removed ☐
3. Blow lamps and gas cylinders should only be fitted/changed in the open ☐



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Final Check

Maintain Fire Watch and regular inspections for a period of 60 minutes after completion of the Hot Work as specified under "General Precautions" in Section One. ☐

I hereby declare that the work described in Section One is complete and the precautions noted above have been complied with. The area has been inspected and is free of fire risk and all tools/gear have been withdrawn.

Signed

Date

Competent Person

Time

Section 4 – Cancellation

I hereby declare this permit cancelled. I have received the copies of the permit back from the Competent Person and the area has been inspected and is free of risk.

Signed

Date

Authorised Person

Time



Risk Management Guidelines

These and other Risk Management Guidelines addressing a wide variety of risk control issues are freely available from:

<http://www.managerisk.rsagroup.co.uk>

The information set out in this document constitutes a set of general guidelines and should not be construed or relied upon as specialist advice. Therefore RSA accepts no responsibility towards any person relying upon these Risk Management Guidelines nor accepts any liability whatsoever for the accuracy of data supplied by another party or the consequences of reliance upon it.