

Fire safety basics for hot work operatives

CFPA-E Guideline No 12:2012 F





FOREWORD

The European fire protection associations have decided to produce common guidelines in order to achieve similar interpretation in European countries and to give examples of acceptable solutions, concepts and models. The Confederation of Fire Protection Associations in Europe (CFPA E) has the aim to facilitate and support fire protection activities across Europe.

The market imposes new demands for quality and safety. Today, fire protection forms an integral part of a modern strategy for survival and competitiveness.

This guideline is primarily intended for those responsible for safety in companies and organisations. It is also addressed to the rescue services, consultants, safety companies etc so that, in the course of their work, they may be able to help companies and organisations to increase the levels of fire safety.

The proposals within this guideline have been produced by the SPEK - The Finnish National Rescue Association and the author is Mr Matti Orrainen.

This guideline has been compiled by Guidelines Commission and adopted by all fire protection associations in the Confederation of Fire Protection Associations Europe.

These guidelines reflect best practice developed by the countries of CFPA Europe. Where the guidelines and national requirement conflict, national requirements must apply.

Copenhagen, 22 March 2012
CFPA Europe

Jesper Ditlev
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 **CFPA EUROPE**[®]



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1 Introduction

It is very important to educate and influence those who are involved with hot work processes. Hot work operatives should be able to:

- identify hazards;
- assess hazards in specific hot work situations;
- understand the contents and requirements of national standards;
- understand the characteristics of gases used in hot works; and
- carry out the required safety tasks during and after hot work.

It is also important that hot work operatives should be competent to handle hot work tools and equipment in a safe manner and know alternative safe work methods.

If fire breaks out as a result of hot work, the hot work operative should be familiar with portable fire extinguishing equipment and how to choose and use it effectively.

The main aim should be to improve the understanding and attitude of hot work operatives so that, within a general approach of risk assessment, they can carry out hot work in a safe manner. This is accomplished by hot work training, adherence to a strict hot work permit policy and even, in some European countries, examinations and fixed term licences for hot work operatives.

2 Scope

The aim of this guideline is to help prevent injury to people and damage to property and the environment as a consequence of hot work at temporary work sites.

3 Definition of hot work

Hot work refers to working methods – usually in construction or refurbishment activities - which produce sparks or involve the use of a naked flame or other source of heat as a result of which there is the risk of a fire.

For example, in roofing and waterproofing work hot work can include the drying of the base by flame or hot air, the heating of bitumen in a tar boiler and the attachment of built-up roofing involving the use of heat.

Other sources of heat commonly involved in hot work processes include:

- gas/electric welding and cutting apparatus;
- blowlamps/blowtorches;
- grinding wheels and cutting discs;
- brazing and soldering.



4 Alternative working methods

Given that hot work always involves hazards that could cause fire to start, it is always advisable to consider other working methods such as, for example, bolting rather than welding, the aim being not to produce sparks or involve the use of a naked flame. It might also be possible to transfer the workpiece to a safer area (such as a permanent hot work area), see section 5.

5 Permanent hot work area

A permanent hot work area refers to an area or a fire compartment reserved and planned for the safe carrying out of hot work. The working area must satisfy at least the following requirements:

the construction materials must either be non-combustible or, if the materials are combustible, they must be protected by a screen;
the area shall at all times be kept clear of combustible materials not connected to the work being performed - no flammable liquids shall be handled or stored in the area and the area shall be segregated from any area which contains flammable gases;
the working area shall be equipped with at least one 43A 183B C -class (12kg A-B III-E) portable fire extinguisher and in addition in the immediate vicinity of the working area either another corresponding portable fire extinguisher or two 27A 144B C -class (6kg A-B III-E) portable extinguishers. Requirements can vary in different countries.

6 Temporary hot work site

A temporary hot work site is a site which falls short of the requirements set for a permanent hot work area. Hot work may be performed at a temporary site only if the work cannot be performed at a permanent hot work site.

No hot work operations shall be carried out at temporary hot work sites unless there exists a permit-to-work system at the premises and thus a hot work permit issued for the work concerned. Such provisions should be contained in the company's control plan for fire prevention matters. (See Appendix A for an example of a hot work permit.)

Whenever hot work processes are carried out on premises which are exposed to a particularly great risk of fire or explosion (e.g a refinery) or which are valuable economically (e.g. department store), historically (e.g. a cathedral), artistically (e.g. a museum) or otherwise, the local fire authorities shall be contacted before any hot work operations are commenced. This should not need to apply to industrial companies which should have their own security administration and sufficient fire safety expertise.

7 Hot work supervision plan

All industrial and other types of companies, construction sites, plants and facilities should draft a hot work supervision plan. The plan shall constitute a permanent set of instructions approved by



the company or construction site for the safe performance of hot work and will have its basis in a permit-to-work scheme.

8 Tools, their storage and use

As regards tools, the provisions contained in relevant laws, regulations, standards and authorities' requirements on equipment used for hot work operations shall be complied with.

9 Safety precautions

9.1 Safety precautions before performance of hot work

- Assess the fire hazards at the work site.
- Inspect ceiling, wall and floor structures and shield leadthroughs and openings.
- Apply for a written hot work permit from the person appointed by the customer to issue permits.
- Appoint a hot work guard for the duration of work and after work is completed.
- Ensure that everyone at the work site knows the address of the work site, location of telephone, how to make an emergency call and how to use first-aid fire extinguishing equipment.
- Be sure that the work site is equipped with at least one portable fire extinguisher of class 43A 183B C and, at a distance of not more than about 10m, either another qual portable fire extinguisher or two portable fire extinguishers of class 27A 144B C or a hose reel. Requirements can vary in different countries.
- *Clear up and secure* the hot work site. Remove or protect all combustible and flammable machines, *including bins and containers*, equipment and materials at the hot work site or surrounding facilities.
- Protect combustible structures as well as openings in the structures. Mineral wool can be used for temporary protection.
- If necessary, water the hot work site and its surroundings.
- Inspect the facilities around the hot work site. If necessary, arrange hot work guarding in these facilities, as well.
- Non-combustible covers or mineral wool sheets must be available at the work site to prevent sparks from spreading. Wetting the cover improves the shielding effect. The spread of sparks can also be prevented by movable cut-off walls made of non-combustible material.
- When working on a grating, sparks must be prevented from entering the facilities below by covering the grating with non-flammable covers.
- Protect cable racks in the vicinity of the hot work site with wet covers or mineral wool sheets.
- Prevent heat conduction to the surrounding facilities through pipes, ventilation conduits etc.
- If necessary, measure the gas concentration in the work area and ventilate the area.



- If there is a possibility that heat or smoke generated during hot work may cause an unnecessary fire alarm, disconnect the detector of the automatic fire alarm / extinguishing equipment. The systems shall be disconnected only by the person in charge of them or by his/her deputy and the insurer shall be consulted. (The detector must be reconnected at the earliest opportunity after completion of hot work. See below.)
- Sprinkler systems need normally not be disconnected unless hot work is to be performed on the sprinkler system itself. Sprinkler nozzles, however, need to be protected from heat.

9.2 Safety precautions during hot work

- Ensure that a hot work guard is present throughout the duration of the work, including breaks.
- Ensure that the portable fire extinguishers documented in the hot work permit are always present at the site.
- Observe whether the risk of fire in the area has increased during the process and assess the need for additional safety precautions.
- Watch for the generation of flammable gases. Ventilate, if necessary.
- Ensure that all flammable material generated during the work is immediately removed.
- Components which are endangered through heat transport due to the hot work should be permanently cooled down by water.

9.3 Safety precautions after completion of hot work

- Inspect the work site and the surrounding facilities.
- Inform the permit issuer that the hot work is completed.
- After hot work is completed, continue guarding the hot work site and the surrounding area, if necessary. Continue guarding without interruption for the period of time defined in the hot work permit but not less than one hour.
- Close the valves on the gas cylinders and gas outlets used for the work and disconnect the hoses and process equipment from them.
- At the end of the working day take gas cylinders out to an approved place of storage.
- Reconnect the detector of the automatic fire alarm and the extinguishing equipment, disconnected due to hot work. The systems shall be reconnected only by the person in charge of them or by his/her deputy.

10 An example of hot work: Roofs

Before hot work is carried out on a roof a risk assessment will be carried out and consideration given to whether the work can be performed in another way or at another location.

When carrying out hot work on roofs, built-up roofing must not be fastened on the top of sheet metal or over metal structures in such a way that the place of fastening will become heated.

A naked flame or hot air must not be used closer than 1.5m from the opening of the ventilation equipment or the point of intersection of horizontal or vertical structures. In some countries naked flames are forbidden.



The hot work site must have the (initial) firefighting equipment, which is stipulated in the hot work permit, that is, at least two 43A 183B C -class (12kg A-B III-E) portable fire extinguishers and clearing equipment, with which it is possible to make a hole in the roof for the purpose of extinguishing a fire.

10.1 Tar boiler

The construction of the tar boiler must be such that the structures which are underneath it cannot become heated or ignite.

The boiler must have a hinged, closable lid and the lid must be so tight that:

- rainwater will be prevented from getting into the boiler;
- any ignited fire will be smothered when the lid is closed.

The tar boiler must have a liquefied gas burner, which is an integral part of its structure. The construction of the emptying valve must be such that it will in all circumstances be shut tightly.

In addition, a tar boiler which has a volume of over 50 litres must include:

- a thermometer which shows the temperature of the tar;
- and a burner flame control device and a thermostat or other device, which prevents the tar from overheating.

If a furnace of less than 50 litres does not include a device which prevents overheating, then a metal basin, which has the capacity for taking the entire contents of the furnace, must be fitted under the furnace, so that in the event of the tar boiling over or leaking the contents can flow into the basin. The construction of the basin must be such that it will not ignite the surroundings when it is being filled with hot tar.

11 Hot work licence and safety examination

There are some European countries in which the training and examination of hot work operatives and the permit issuers is linked to a formal, compulsory licensing scheme for such operatives. While such a regime is recommended it is recognised that not all countries subscribe to its adoption.

The hot work operative's licence is a certificate, which shows that the person has passed the hot work safety examination. The minimum prerequisite for taking the examination is at least 7 hours training and an example of the scope of the training is included in Appendix B.



Appendix A: Example of a Hot Work Permit

[Each CFPA Europe country is to include its hot work permit.pdf at this point]
Hot work permit in Finland.

Appendix B: Training for Hot Work Operative's Examination

Contents of programme

- | | |
|--|-------------|
| 1. How to identify hazards at temporary hot work sites | (2 hours) |
| • Definition of hot work | |
| • Conditions necessary for combustion | |
| • Fire | |
| • How to identify hazards related to hot work | |
| • Surrounding facilities | |
| • Fire risk factors | |
| 2. Examples of fire damage caused by hot work and analysis of damage | (0,5 hours) |
| 3. Safety regulations | (2 hours) |
| • Hot work supervision plan | |
| • Safety precautions | |
| • Hot work guard | |
| • Hot work operator | |
| • Tools, their storage and use | |
| 4. Actions in case of emergency | (0,5 hours) |
| • Rescue | |
| • Alert | |
| • Extinguish | |
| • Limit | |
| • Advise | |
| 5. Alternative work processes | (0,5hours) |
| 6. Sharing of responsibility | (0,5hours) |

The training includes fire drills, first-aid extinguishing and safety precautions. (1,5hours)

The training is followed by a hot work safety examination to verify that those performing hot work have an adequate knowledge of fire and hot work safety. Those passing the examination are awarded a hot work licence, which shall include the following information: name of licence holder, number of licence, validity and issuer of licence.



12 References

[at this point each CFPA Europe country is to insert relevant national references .]

In Finland:

SFS 5900 Fire precaution of hot works

Hot work permit, SPEK, Finland

13 European guidelines

- Guideline No 1:2002 F - Internal fire protection control
- Guideline No 2:2007 F - Panic & emergency exit devices
- Guideline No 3:2011 F - Certification of thermographers
- Guideline No 4:2010 F - Introduction to qualitative fire risk assessment
- Guideline No 5:2003 F - Guidance signs, emergency lighting and general lighting
- Guideline No 6:2011 F - Fire safety in care homes for the elderly
- Guideline No 7:2011 F - Safety distance between waste containers and buildings
- Guideline No 8:2004 F - Preventing arson – information to young people
- Guideline No 9:2012 F - Fire safety in restaurants
- Guideline No 10:2008 F - Smoke alarms in the home
- Guideline No 11:2005 F - Recommended numbers of fire protection trained staff
- Guideline No 12:2012 F - Fire safety basics for hot work operatives
- Guideline No 13:2006 F - Fire protection documentation
- Guideline No 14:2007 F - Fire protection in information technology facilities
- Guideline No 15:2012 F - Fire safety in guest harbours and marinas
- Guideline No 16:2008 F - Fire protection in offices
- Guideline No 17:2008 F - Fire safety in farm buildings
- Guideline No 18:2008 F - Fire protection on chemical manufacturing sites
- Guideline No 19:2009 F - Fire safety engineering concerning evacuation from buildings
- Guideline No 20:2012 F - Fire safety in camping sites
- Guideline No 21:2012 F - Fire prevention on construction sites
- Guideline No 22:2010 F - Wind turbines – Fire protection guideline
- Guideline No 23:2010 F - Securing the operational readiness of fire control system
- Guideline No 24:2010 F - Fire safe homes
- Guideline No 25:2010 F - Emergency plan
- Guideline No 26:2010 F - Fire protection of temporary buildings on construction sites
- Guideline No 27:2011 F - Fire safety in apartment buildings

- Guideline No 1:2012 N - Protection against flood