

## Guidance

**For the safe installation of reinforced bitumen membranes and use of gas torches in the workplace.**



Safe2  
Torch

**NFRC**  
LEADING ROOFING EXCELLENCE

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## Introduction

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**The purpose of this guidance document is to promote Safe2Torch specification writing at the initial survey and design stage and a safe system of work when using propane gas torches for the application of roofing membranes and the drying of roof surfaces for all flat roofing applications.**

## What are hot works?

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Hot works is a process that can be a source of ignition when flammable material is present or can be a hazard regardless of the presence of flammable material in the workplace. Common hot work processes include:

- Cutting
- Grinding
- Welding
- Torch-on roofing
- Bitumen boilers
- Drying substrates with a torch before application of roof system

In many types of flat roof systems the substrate needs to be completely dry before they will accept the new waterproofing. The risk of a fire arising from hot works depends on many factors such as the environment, materials being used, and the composition of the structure being worked on, materials being used, and the composition of the structure.

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## Responsible specification writing

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Many specification writers (e.g. architects, surveyors, building owners, roofing manufacturers, roofing contractors) may not be aware of their responsibilities under the Construction Design and Management Regulation (CDM) 2015, which states:

**"** The person who selects products for use in construction is a designer and must take account of health and safety issues arising from their use. If a product is purpose-built, the person who prepares the specification is a designer and so are manufacturers, if they develop a detailed design. **"**

Those designing or specifying roof systems should ensure that all likely hazards that have the potential to create a fire risk during construction are removed when preparing the specification, or when modifying roof designs.

In the event that a hazard cannot be removed then measures to mitigate the risk, which could include the choice of materials and the installation process, should be identified and the relevant information provided on these residual risks and the control measures to be implemented.

When a flammable substrate is present, a residual fire hazard is identified, or the potential for a fire hazard cannot be confirmed—an alternative, flame-free solution should be specified from the outset. This alternative flame-free solution could be for the whole roof area (depending on the size, shape or number/type of penetrations) or could be adjacent just to the areas where the residual risk has been identified.

When formulating a specification for a refurbishment project it is imperative that a site inspection is undertaken to ascertain the existing roof construction and to highlight any areas or details that may constitute a potential fire hazard so that the specification can be written to include project-specific mitigation measures like the inclusion of alternative, compatible materials in-lieu of those that require installation by naked flame.

Where a residual fire hazard is identified, or the potential for a fire hazard cannot be confirmed, these should be highlighted on a roof plan for the project. Figure 1 gives an example of how the specification writer can give a visual impression of the areas where it is not suitable to use a naked flame so the tendering contractor understands the change in circumstances and can quote accordingly.

In the event where a thorough roof inspection of all fire-related hazards is not practical due to access restriction or other circumstances, the specification writer must adopt a flame-free area in line with the **contractor's public liability insurance**, however it is recommended that this should be **no less than 900 mm** (one roll width but to include for a lap), and be risk assessed accordingly.

For high-risk sites such as timber-frame structures, and **CLASP buildings**<sup>1</sup> the aim must be always be to design out any hot works. Any decisions to carry out hot works must be justified and controlled under strict conditions, following the principles within this guide and in accordance with HSG168.

<sup>1</sup> NFRC Safety Alert SA01 CLASP buildings and their increased fire risk: <https://bit.ly/3N7VH34>

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## Procedure for amending specifications

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The specification and any Safe2Torch roof plan must always be available in the tender package and also on the roof with the operatives when the roof system is being installed. It is also recommended to mark the areas where it is not safe to use a naked flame on the actual roof prior to commencement of work.

Torching directly to insulation is not advisable unless the insulant is specifically designed and tested for use with torch-on membranes.

All reasonable precautions should be made to ensure the specification is correct and costed accordingly before work starts, but it is accepted that in some cases some amendments may be required. Where this situation occurs, the person responsible for the specification should provide, a detailed explanation in writing describing the reasons behind the amendments, and a revised project specific specification along with a revised marked up roof plan where applicable..

**Figure 1**

Visual impression of the areas where it is not safe to use a naked flame.



No naked flames



Safe2Torch



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## Gas bottles, torches and fire extinguishers

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LPG is a safe product when stored and used correctly. However, as it is a flammable, pressurised gas then there is a potential danger of an explosion hazard if stored or used incorrectly; or if it comes into contact with any uncontrolled ignition sources. Therefore the following information is provided to minimise any risks:

### Storing LPG

It is important that LPG cylinders are stored in the upright position and removed from the workplace when not in use. Any cylinders not in use should be stored in a lockable gas cage.

### Hoses

LPG hoses should be orange in colour and of a suitable length. Hoses are relatively vulnerable pieces of equipment, which are vital to ensuring a flow of gas to the torch, therefore they checked regularly for damage and stored with care.

### Connections

The regulator should be a left-hand threaded for fuel gases, with the hexagonal nut on the union connections notched to aid identification. It should also have a safety cut-off valve that stops the gas supply to the hose should the hose become damaged during use.

After the gas torch has been attached to the gas cylinder it is advisable to check all connections for leakage using a detergent solution.

### Torches

Gas torches should be fitted with a stand to ensure the hot burner does not come into contact with the roof surface, or materials within the work area. Torches that self-ignite and extinguished by using an electronic ignition system are safer and use less gas. Gas torches that are manually lit, must be extinguished after use; **never leave a gas torch running on a pilot flame.**

Those individuals using gas torches, even in the short term (drying a roof for example), must have the relevant skills, knowledge, experience and training required to use the equipment correctly and be following the **Safe2Torch safe system of work<sup>2</sup>**.



<sup>2</sup> NFRC Safe2Torch Safe System of Work: <https://bit.ly/3Ja5pko>

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### Common types of fire extinguishers include:

#### Water

Water fire extinguishers can be used on Class A fires only. They can also be used on fires involving wood, paper, textiles and similar materials.

#### Dry-powder

Dry powder fire extinguishers can be used on Class A, B and C fires. They can also be used on fires involving electrical equipment however, they do not cool the fire so it can re-ignite.

#### Foam

Foam fire extinguishers can be used on Class A and B fires. They are most suited to extinguishing liquid fires such as petrol or diesel and are more versatile than water jet extinguishers because they can also be used on solids such as wood and paper. The foam extinguishes liquid fires by sealing the surface of the liquid, preventing flammable vapour reaching the air and starving the fire of fuel.

#### CO<sub>2</sub>

CO<sub>2</sub> fire extinguishers can be used on Class B fires. They can also be used on fires involving electrical equipment and are effective way to put out fires and prevent fire from reigniting because of the lack of oxygen and the ice-cold temperature of the CO<sub>2</sub> when released from the extinguisher.



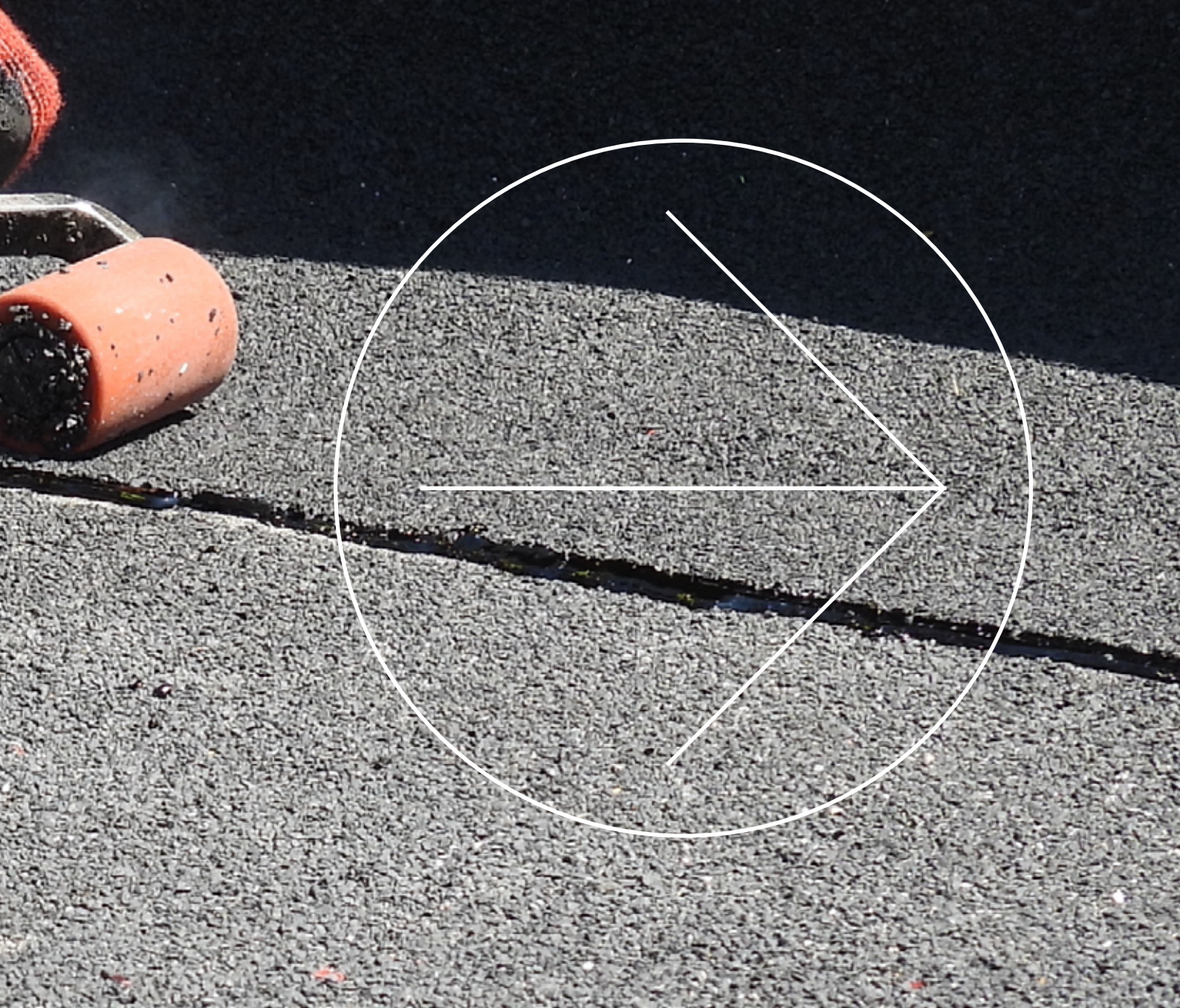




## Pre-hot works checks

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The potential hazard from the use of gas torches needs to be assessed before work starts. Any combustible materials (e.g. combustible insulation, flammable liquids, wood, paper, waste material and packaging) need to be removed from the vicinity of the work and the Safe2Torch Checklist (see page 16) should be completed. Where areas are identified that are not safe to use a naked flame, these should be raised with the Specification Writer to ensure flame-free products are selected.



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## Pre-work checks

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The work area must be clean and tidy and free from loose combustible materials. Other pre-work checks should include an assessment of the substrate—under no circumstances should a torch be applied direct to a timber roof deck or timber upstands, including timber fillets, even if the substrate has been treated with a bituminous primer. A self-adhesive base-layer or a mechanically-fastened polyester base layer should be used to protect the timber substrate coming into contact with the naked flame. A gas torch should never be used directly to a timber roof deck. (Figure 2)

### Expansion joints

Expansion joints which are filled with combustible fillers, such as foam or fibreboard, should not come into contact with high heat or naked flame. (Figure 3)

### Adjoining a pitched roof

If a membrane roof is adjoining a pitched roof with details to be completed under abutments to roof tiles and slates, the slates or tiles should be removed and a compatible flame-free product should be selected. (Figure 4)

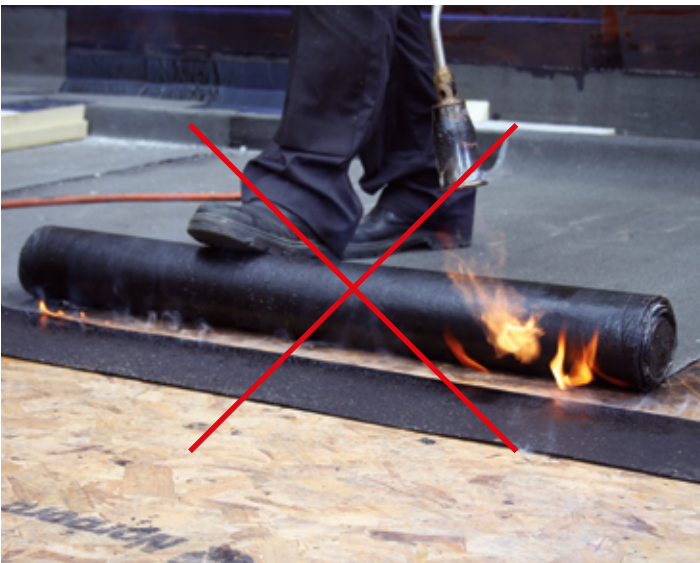
### Abutments with open cavities or open perpend

A compatible flame-free product should be selected for any abutments with open cavities or open perpend. (Figure 5)

### Fixed timber, plastic fascia or soffits

Naked flames should be avoided where there is fixed timber, plastic fascia or soffits. (Figure 6)

2 Do not torch direct to timber deck



3 Expansion Joint



4 Flat roof meeting pitched roof



5 Open Perpend



6 External Timbers and Plastics

**Other areas where flame-free alternatives should be considered are:**

- Timber Upstands (Figure 7)
- Hanging Tiles (Figure 8)
- Thatched Roof (Figure 9)
- Rooflight Kerbs and Upstands (Figure 10)
- Cladding (Figure 11)
- Lantern Rooflights (Figure 12)
- Confined Space (Figure 13)
- Window Sill (Figure 14)

Thought should be given to junctions abutting existing waterproofing with flammable insulation or substrate materials. These areas and existing weathering components need to be assessed and made Safe2Torch before proceeding with hot works, alternatively a flame-free solution should be considered. Attention needs to

be given to concealed flammable materials where there is a chance the flame could travel and ignite particles in inaccessible areas, these include:

- Louvered vents, air ducts, intakes and outtakes
- Timber, DPC or sarking membranes beneath fixed metal capping systems
- Existing kitchen extraction plant coated in oils or fats
- Flammable wrapping to trunking/ducting
- Existing metal or plastic copings/cappings
- Existing vulnerable plastic curbs, domes, pipes

When working near recently applied bituminous primer or other solvent based coatings, torching needs to be avoided.

7 Timber Upstands



8 Hanging Tiles



9 Thatched Roof



10 Rooflight Kerbs and Upstands



11 Cladding



12 Lantern Rooflights



13 Confined Space



14 Window Sill

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## Drying roofs prior to the application of waterproofing systems to new and existing substrates

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Where possible any newly installed roof decking should be protected, and covered from the weather to ensure drying out is not necessary. However, in the event of a roof becoming wet it is important to ensure drying out is done safely.

There are several methods of drying a roof that can be employed by the roofing contractor, but the most common method due to speed and effectiveness is still by use of a gas torch. When a gas torch is to be used for drying, a thorough roof inspection of all fire-related hazards is essential. Where risks are identified, the operative must adopt a flame-free area in line with the contractor's public liability insurance, however it is recommended that this should be **no less than 900 mm** but this will need to be risk assessed.

Methods of drying within a restricted area will vary from wiping with dry rags, mops etc. and then allowing natural weather conditions to finish the drying, or the use of hot-air guns.

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## Permit-to-work

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A permit-to-work is a formal written system used to control certain types of work that are potentially hazardous including where there is risk of fire from work activities. The purpose of the permit-to-work is to document the work to be done, the precautions to be taken, the type of fire watch, location and duration, and the process required to sign off the permit to work upon completion. Permits-to-work form an essential part of managing and controlling hot works in order to provide a safe system of work.



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## Additional Guidance

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### Guidance Note No. 13

Safe Drying and Preparation of Roof Substrates Prior to Installation of Liquid Waterproofing Systems

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## Training

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It is a requirement of Regulation 9 of the Provision and Use of Work Equipment Regulations 1998 that anyone using work equipment receives adequate training in its use for purposes of health and safety. This includes training in the methods that may be adopted when using the work equipment, any risks that this use entails and the precautions to be taken. The requirement extends beyond those using the equipment to include those supervising or managing them.

There is a need for roofing operatives and their line managers to have a clear understanding of the risks involved when undertaking hot works and the control measures required to make the work safer.

Project specific toolbox talks based on reducing fire risks should be encouraged as part of the Safe2Torch campaign.

Individuals that formulate specifications should be adequately trained, be knowledgeable of Safe2Torch and have an understanding of fire hazards and the requirements of elimination of the techniques to mitigate the risks.

## Membership criteria

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This guidance document will be updated as necessary and accompanied by a full campaign. NFRC are intending to make this part of its supplier membership criteria (e.g. that they train on this and show evidence of compliance) and this will apply to new or existing supplier members of torch-on membranes.

All contractor members engaged in flat roofing will also need to become Safe2Torch registered.

### Links to construction fire safety guidance:

The Construction (Design and Management) Regulations 2015: <https://bit.ly/43Cv2T5>

HSG168 Fire Safety in Construction: <https://bit.ly/33Kp7i3>

JCoP (10.1 Edition) Fire Prevention on Construction Sites: <https://bit.ly/3N6e2gX>

HSE Fire References: <https://bit.ly/3CocpXI>

HSE Process Fire Safety: <https://bit.ly/3qwtYBC>

HSE Construction Fire—Frequently Asked Questions: <https://bit.ly/43zWmla>

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# Safe2Torch Checklist

It is recommended that anyone preparing a specification should complete this checklist and if any boxes are ticked avoid the use of a direct torch-on application in these areas.



**N.B.** This check list has been prepared with the installation of Reinforced Bitumen Membranes in mind. It must be emphasised that the same risks occur when other trades such as Single Ply, Liquid Applied & Hot Melt use gas torches, for example for drying off the surface of a combustible deck.

#### **Disclaimer**

It is always the responsibility of the contractor to carry out a risk assessment on all aspects of the contract. This check list is solely to provide assistance in the assessment of the risks where the use of gas torches is being considered.

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PROJECT NAME \_\_\_\_\_

CLIENT NAME \_\_\_\_\_

DATE OF ASSESSMENT \_\_\_\_\_

**Housekeeping**

Remove waste and loose combustible materials from workplace

**Decks and insulation**

- Timber / Other combustible materials
- Metal deck (refurbishment) where old materials may accumulate in the troughs
- Insulation—unless specifically designed and tested for use with torch-on membranes

**Details**

- Expansion joints with voids and/or combustible fillers
- Fibreboard or timber fillets
- Detail under all abutments to roof tiles, slates and thatch
- Detail under cladding/rendering
- All abutments with open cavities (open perpend)
- All timber substrates
- Change in level details with fixed timber or plastic fascias and/or all soffits, gutters or restricted spaces
- Window sills and frames, door sills, louvered vents, air ducts, intakes and outtakes
- Junctions to existing waterproofing with flammable insulation/deck materials
- Vulnerable plastic curbs, domes, pipes and the like
- Working when in close proximity to potentially flammable coatings

**Existing weathering components with concealed flammable materials.  
These include:**

- Timber, DPC or sarking membranes beneath fixed metal capping systems
- Existing kitchen extraction plant coated in oils or fats
- Flammable wrapping to trunking/ducting
- Timber cladding
- Existing metal or plastic copings/cappings

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## For more information and to pledge your support

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