

## Guidance

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





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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.**

## 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 waterproofing systems the substrate needs to be completely dry before they will accept the new waterproofing.

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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. **"**

The above means that anyone writing a specification which includes hot works needs to assess the hazards associated with the works and design out, or greatly reduce the risks of fire involved in the specification. Where a flammable substrate or risk of fire occurs, or the risk is not known, an alternative, torch-free solution should be specified from the outset, which might be local just to the risk area. This does not mean torch-on membranes are not safe to use but the specification needs to reflect the areas where there could be a risk of fire.

Specification writers must always undertake a site inspection prior to commencement of work to ensure that any fire risks have been identified and an alternative product that is compatible is used instead of a torch. A plan of the roof should be included to highlight the areas where it is not Safe2Torch. Figure 1 gives an example of how the specification writer can give a visual impression of the areas where it is not Safe2Torch so the contractor understands the change in circumstances and can change his costings accordingly.

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



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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 on the roof. It is also recommended to mark the areas that are not Safe2Torch on the actual roof prior to commencement of work.

Torching directly to insulation is not advisable unless 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 will be required. Where this situation occurs, the person responsible for the specification will provide, without delay, a detailed explanation in writing describing the reasons behind the amendments, and request a full cost breakdown.

**Figure 1**

Visual impression of the areas where it is not Safe2Torch

 No naked flames  Safe2Torch



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## Gas bottles, torches and fire extinguishers

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

Propane gas hoses should be orange in colour and of a suitable length. If the hose is to be used for heating bitumen, then the hose should be armoured for added protection. Hoses should be checked before use and be free from tears, burns, fraying or cuts. Damaged hoses should be removed from service and replaced with new industry-approved fitted hose. The regulator should be a left-hand threaded for fuel gases, with the hexagon nut on the union connections notched to aid identification and have a safety cut off valve to stop the gas supply to the hose if the hose becomes 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. If there are leaks which cannot easily be stopped, the gas supply should be isolated and the leaking components taken out of service, replaced or repaired. Excessive force should never be used on cylinder valve spindles or hexagon nuts of regulator connections to stop a leak. Neither are sealing tape nor other jointing materials recommended for use to prevent leaks between metal to metal surfaces that are designed to be gas tight.

Gas torches come in various lengths and burner sizes and must comply with the Pressure Equipment Regulations 1999 - the manufacturer will be required to affix the CE marking to each item of pressure equipment or assembly and draw up a declaration of performance.

Gas torches should be fitted with a stand to ensure that the flame is always pointing away from the roof. Torches that self-ignite and extinguish by using an electronic ignition system are safer and use less gas, so are therefore most cost effective in the long run as well as being more environmentally friendly than gas torches that utilise a pilot light for keeping the propane gas alight. The NFRC strongly recommend, where possible, that gas torches meeting this specification are used as a further risk reduction in preventing fire on roofs.

The appropriate fire extinguishers should be selected and have an up to date service record.



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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**

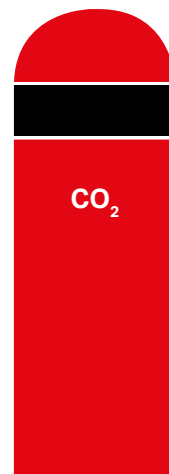
Dry powder fire extinguishers can be used on Class A, B and C fires. They can also be used on fires involving electrical equipment however, they do not cool the fire so it can re-ignite.

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





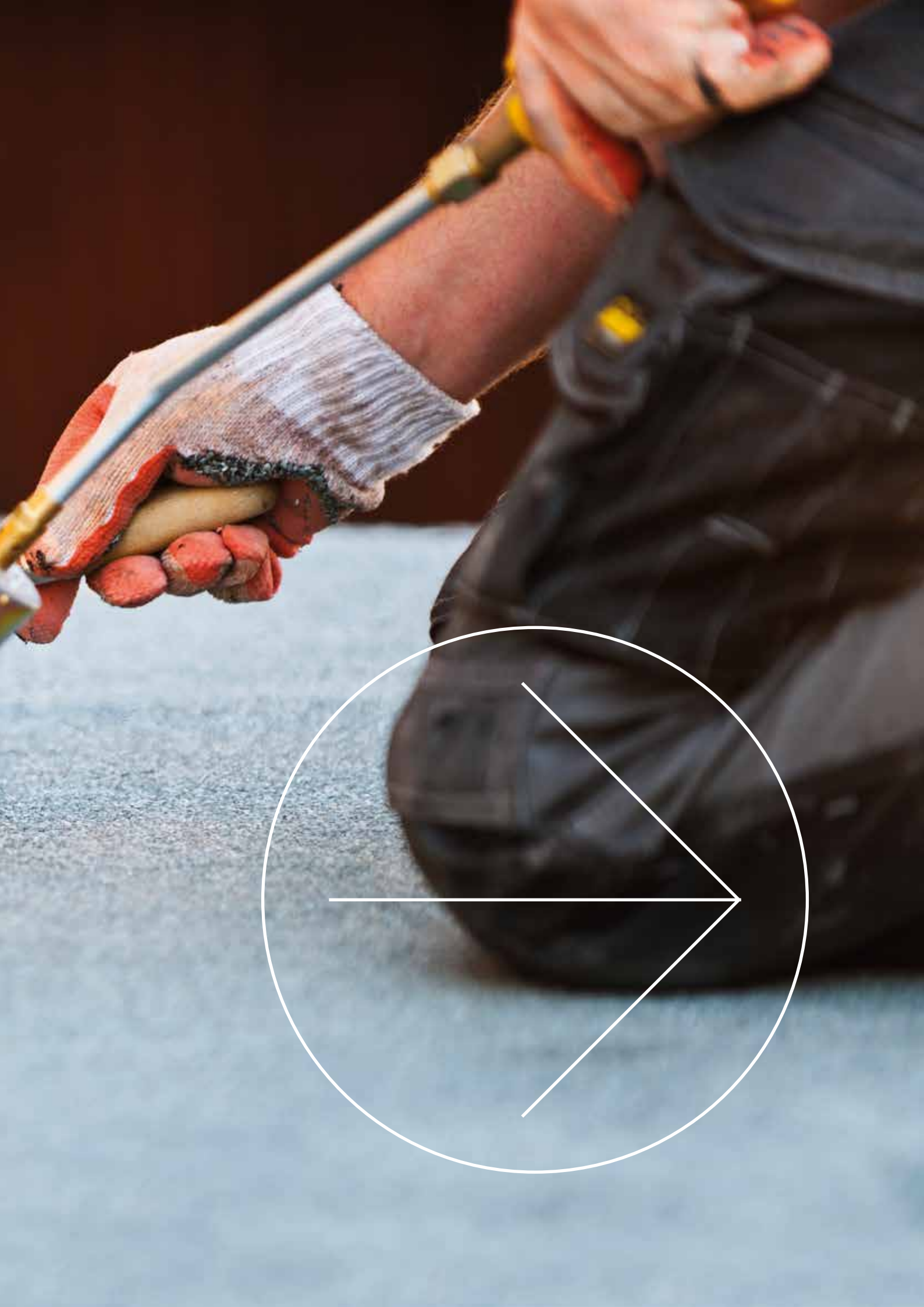
## Pre-hot works checks

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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. dry leaves, flammable liquids, wood, paper, textiles or 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 Safe2Torch, these should be raised with the Specification Writer to ensure torch-free products are selected.







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## Pre-work checks

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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 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 torch-free product should be selected. (Figure 4)

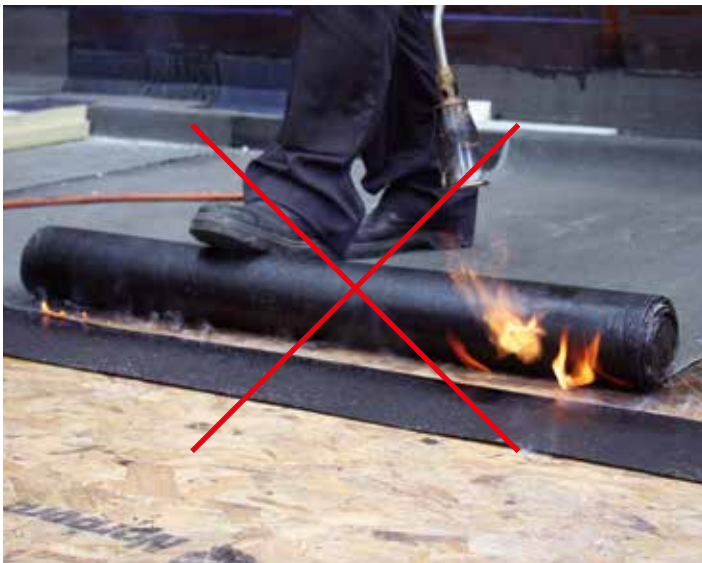
### Abutments with open cavities or open perpend

A compatible torch-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 torch-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 to 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 torch-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 risks is essential. Where risks are identified, the operative must adopt a torch-free area in line with the contractor's public liability insurance, however it is recommended that this should be no less than 900mm.

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 and the precautions to be taken. 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.

A need has also been identified for specification writers to better understand the Safe2Torch checklist and for training in writing specifications. Online training will accompany this guidance document and NFRC will offer a specification checking service for all supplier and contractor members on request.

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## Membership criteria

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This initial 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 (e.g. they have been trained on it either by the manufacturers or by NFRC via webcasts, approved courses etc.).

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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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**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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