

Changing our
approach to fire risk
when refurbishing
flat roofs:

A White Paper

A chartered surveyor's report to
identifying fire risks when a flat roof
is to be refurbished

A review by Bauder Limited

Putting safety first to eliminate fire risk:

Abstract Identifying the risk of fire to combustible materials sited on or adjacent to a new construction or refurbishment flat roof is vital to ensure any waterproofing system is specified accurately and installed securely, safely and without risk. Safety should always be of paramount importance throughout roofing works and absolutely critical when refurbishing a current building whilst occupied.

Introduction The construction sector is facing urgent demands for improved safety on buildings during or after refurbishment works, with corrective action to be an immediate focus rather than waiting years to take effect. Inevitably, a wide ranging review of fire safety and building regulations will take place. In the meantime, everyone involved in a project delivery team should be looking to change the customary approach and analyse all aspects of the process from review, through to design, product selection, installation, delivery, sign-off and handover.

A roof refurbishment is one common aspect that a chartered surveyor will be involved with when commissioned by a building owner to provide a conditional report for repair or renewal. In many instances, it is conceivable that the occupants will remain in-situ during resultant roofing works and so safety is of paramount importance.

The Construction Industry Stance The standpoint for all in the industry lies within the Construction Design and Management (CDM) Regulation 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."

Furthermore, in July 2017, The National Federation of Roofing Contractors (NFRC) launched a guidance document entitled 'Safe2Torch' to promote safe specification writing at the initial survey and design stage together with a safe system of work when using propane gas torches for not only the application of roofing membranes but also for the commonly used method of drying roof surfaces prior to installing all forms of waterproofing, as a substrate will not accept a new roof covering if moisture is present.

Within both these industry policies, a chartered surveyor who is either writing a specification for a flat roof refurbishment, or approving one put forward by a flat roof waterproofing manufacturer, needs to consider how hot works are utilised, assess the hazards and design out or greatly reduce the risk of fire involved in the specification through the correct selection of roofing products.

The different forms of flat roof waterproofing encompass diverse installation methods and offer varying degrees of risk towards a fire on site. The spontaneous response could be to opt for a cold applied solution, though in reality this would be imprudent as many buildings will require an intensely robust solution and many owners will be seeking a solution with extended service duration in the interests of life-cycle costings. Nonetheless, as recognised by the NFRC, no matter how a waterproofing type is installed the drying of a roof substrate invariably uses a gas torch.

The waterproofing categories most utilised in flat roof refurbishment are:

- Bitumen membranes - installed using varying combinations of self-adhesive, torch-bonding and hot air-welding.
- Single ply membranes such as PVC, FPO and EPDM - installed with mechanical fixings, adhesives and hot air welding.
- Cold liquid applied resins - functional cold application.

The mainstay category for waterproofing utilised within the refurbishment sector is multi-layered bitumen membrane roofing so it is important to appreciate how this particular form of roof covering remains a compelling solution.

To uphold obligation to the CDM Regulations, it is imperative that the specification writer performs a site inspection and comprehensive survey to ensure that any fire risks have been identified and a torch-free application specified on those roof details presenting a risk.

The NFRC Safe2Torch document includes a comprehensive checklist for professionals preparing a specification to assist in the identification of hazards and includes roof details such as expansion joints with voids and/or combustible fillers, under cladding, existing metal or plastic copings/cappings etc. This guidance document and checklist is available to download from the NFRC website www.nfrc.co.uk/safe2torch and is an invaluable resource for a chartered surveyor when operating to best practice.

Putting Safety First

Principally, best practice focuses on the roof survey identifying the combustible elements where naked flame needs to be eliminated, and non-combustible details, such as a concrete deck, that are safe to accept membrane application with a gas torch.

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Problem Definition: The Chartered Surveyor's Responsibility

High Level Solution: Identifying the Risk

Putting safety first to eliminate fire risk:

High Level Solution: Identifying the Risk

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There are two key terms utilised across the roofing industry to distinguish between the risk areas:

Torch-Free Zones

The roof areas which have details formed with, or are adjacent to, combustible construction materials require an exclusion zone to be identified in a minimum 900mm radius. This sanction demands specific membranes, particular design, and accurate flame-free installation techniques.

Safe to Torch Zones

In the majority of situations, it is perfectly safe to use torch-bonded membranes and roof areas involving non-combustible materials are defined as safe to torch. There are two options for safe to torch application and these are dependent on the specific detail and the construction materials used:

1. The roof area does not have any combustible materials within its construction and is safe to accept torch-applied membranes, such as a concrete deck.

or

2. Full encapsulation of the exposed combustible detail with a self-adhesive underlayer, installed using hot air welding so that the detail is now risk-free and a torch-bonded cap sheet is subsequently safe to install.

Solution Detail: Writing Safe Specifications

The CDM regulations 2015 also affirm that everyone involved with a construction project has a responsibility to communicate accurate information about any potential risks and how they are being managed.

As such, a chartered building surveyor has accountability towards ensuring that a roof replacement specification fully recognises the risk of fire at installation and that all tender documents incorporate safe to install products and techniques.

A specification should include a roof plan that highlights the areas requiring a minimum of 900mm exclusion zones for a gas torch so that a roofing contractor understands the distinct conditions within which work will be performed and account for the price differentials accordingly. All areas identified as torch-free should be mandatory and under no circumstances should a surveyor accept a tender document that overlooks or disregards this prerequisite for fire safety.

All reasonable precautions should be taken by all involved with the roofing survey and replacement waterproofing, although in some instances, combustible materials may not be identified until refurbishment works have commenced, in which case the roofing contractor should advise of these extenuating circumstances as they arise.

All the products utilised within a torch-free zone need to be stated as installed without use of a naked flame. The effective bitumen membrane solution will typically include these products:

Primers and Activators

The deck will require priming to ensure a satisfactory bond of the first bitumen membrane layer. A primer enables all round year round application and ensures the bonded membrane is resistant to wind uplift throughout the system's lifespan.

As the bitumen layers are installed an activator can also be specified which will increase the strength of the bond between the membranes.

Torch-Free Membranes

Advanced self-adhesive technology is utilised in bitumen membranes for the purpose of bonding it to the substrate beneath. Factory applied adhesive is protected with a thin release film to prevent it from sticking to itself inside the roll. The peel-back release film is used by the installer during application to unroll the membrane onto the surface. With these membranes, a full bond with high initial adhesion develops even further over a 24 hour period.

The laps are welded with hot air to a minimum of 80mm on all side laps and 100mm on head laps. The welding equipment requires an electrical supply of either 110v or 240v depending on the machinery used. Where a 110v supply is preferred, all laps will be welded in two passes as the nozzle on the equipment is 40mm wide.

A visible bitumen bead running the length of the welded laps will indicate a full and complete weld. The shape and form of the bitumen bead created through hot air welding is distinctive and identifiable as a mechanism of compliance to a torch-free zone specification.

Insulation Adhesives

The adhesives used to create a warm roof construction will vary according to the type of insulation specified. Their application can vary from roller applied, strips of poured adhesive, or spray applied.

Insulation adhesive can be used to bond the board to the bituminous vapour control membrane as well as when a multi-layer insulation board solution is specified.

All forms of flat roof waterproofing can present a risk to fire, however, through clear identification of on-site hazards and vulnerable details, awareness of torch-free products, considerate specification, and installation vigilance the hazards can be practically eradicated by all in the project delivery team.

Solution Detail: The Bitumen Membrane Products

Summary

Bauder: Safety Through Survey & Design



Bauder was the first flat roof waterproofing manufacturer to promote and pledge support to the NFRC's Safe2Torch campaign, recognising our role as an industry leading supplier to endorse safety best practice through our products and to promote to our approved contractors the safest installation methods possible in every flat roof project they are involved in.

Flat Roof Solution: The Products

The foundation for our torch-free detailing system is the group of hot air welded, self-adhesive, SBS modified bitumen membranes for the vapour control layer, underlayer and cap sheet. These membranes and their application techniques conform to the recommendations given in the 'Safe2Torch' guidance published July 2017 by the National Federation of Roofing Contractors (NFRC).

Our torch-free detailing is integrated into all the Bauder bituminous waterproofing solutions, including Bauder hot melt, to give versatile safe installation techniques for all roof types, site conditions and the client's budget.



If a whole-roof, torch-free option is required, our established Airtech System only uses hot air welding for the sealing of the self-adhered membranes which can completely eradicate all flame from the waterproofing installation.

The Roof Survey

Critical to us achieving this is being able to differentiate between areas of potential risk and those that are safe to torch, which is why our no obligation roof evaluations are conducted by your area technical manager, who will produce a bespoke specification that draws attention to the details that would be at risk if torch bonded application was considered.

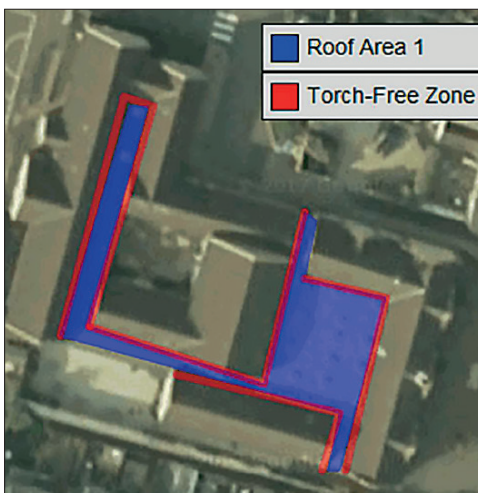
This site survey of an existing roof is just one of the many measures we take to ensure our clients receive the highest quality and safest roofing solution possible.

Identifying and Labelling the Torch-Free Zones

Our Roof Survey Report identifies the areas where:

- Combustible materials are present and need to have torch-free installation.
- Combustible materials might be exposed but could be made safe through the application of self-adhesive membranes to encapsulate them.
- Construction materials are non-hazardous and are therefore safe to torch.

Individual schematic roof plans are denoted with red boundary lines to indicate the torch-free zones and are included in both the survey report and the specification so that all connected with delivering the project have our perception of the hazards. Our survey report information will combine with the assessments completed by others in the project team in an alignment of responsibilities to identify and communicate potential risks.



Our installing approved contractor will refer to the specification and corresponding schematic roof plans to incorporate the correct combination of membranes to deliver the torch-free requirements when submitting a tender document.

Detailing the Torch-Free Zones

The roof areas which have details formed with, or are adjacent to, combustible construction materials require an exclusion zone to be identified with a minimum 900mm radius from the material. This sanction demands specific membranes, particular design, and accurate torch-free installation techniques.

In the case of a particularly common construction detail, an upstand to low eaves, the 900mm exclusion zone will be measured from the overhang and not from the vertical upstand behind the overhang. Some details of this nature have a very large overhang, in which case it will be necessary to increase the amount of torch-free self-adhesive membranes accordingly to enable the minimum 900mm torch-free zone to be maintained.

Installation in the Torch-Free Zones

The torch-free zones are marked out precisely by our approved contractor during the installation of the self-adhered waterproofing membranes so that the operative knows which laps require hot air welding and which are suitable for application of a gas torch.

Approved Contractors

High-quality workmanship is crucial to the guarantee that accompanies Bauder installations and so we have always operated a policy to train and approve the individual installer, and not simply the contracting roofing company.

Bauder Site Technicians

Once your roofing works commence, one of our experienced team of site technicians will monitor and inspect the workmanship at key stages to ensure that the standards required to meet our guarantee are fulfilled, as well as providing you with concise reports on how the works are progressing.

Guarantees

We offer a full range of guarantees that can provide you with complete satisfaction and will be bespoke to your project and its requirements.

Get in Contact

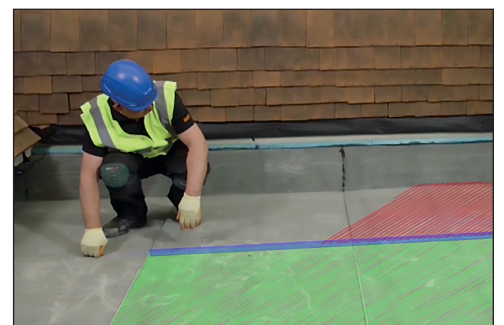
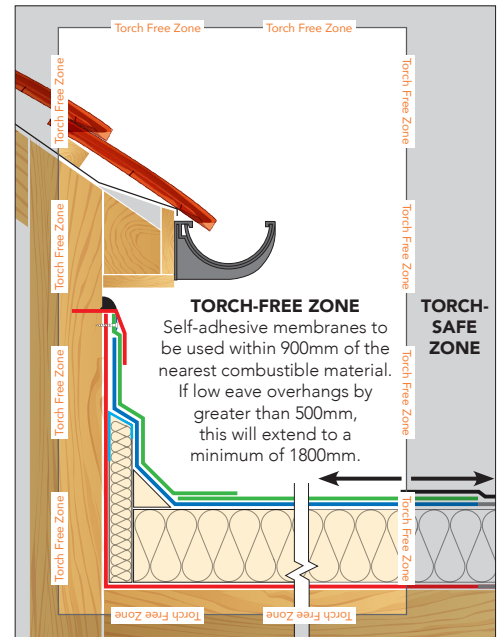
If you have a flat roof specification that you would like to ensure is following the safety-first tenet, let us know and we'll arrange for you to speak with your local technical manager.

E: info@bauder.co.uk

T: 0845 271 8800

W: bauder.co.uk/contact

For more information go to: www.bauder.co.uk/torch-free





UNITED KINGDOM

Bauder Limited

70 Landseer Road, Ipswich, Suffolk IP3 0DH,
England

T: +44 (0)1473 257671 E: info@bauder.co.uk

bauder.co.uk

IRELAND

Bauder Limited

O'Duffy Centre, Carrickmacross, Co. Monaghan,
Ireland

T: +353 (0)42 9692 333 E: info@bauder.ie

bauder.ie