



The Green Roof Organisation

GRO fire risk guidance document





Following the tragic events at The Grenfell Tower on 14th June 2017 the fire safety of buildings has been extensively discussed and reviewed. As part of its contribution to these debates a specially convened expert group reviewed the Green Roof Code of Best Practice 2014 and produced the following guidance in respect of fire risk and the spread of fire.

In conducting this review GRO has consulted the Building Regulations Approved Document B "*Fire Safety*" and the additional guidance as laid out in the Department for Communities and Local Government document "*Fire Performance of Green Roof and Walls*" (August 2013).

Following is an overview of the both documents together with GRO recommendations for achieving compliance. In reviewing this information GRO would remind the reader of responsibilities in law under The Construction (Design and Management) Regulations 2015 (CDM 2015).

This document should be read in conjunction with:

- 1 Building Regulations Approved Document B which can be downloaded for free at <https://www.gov.uk/government/publications/fire-safety-approved-document-b>
- 2 Department for Communities and Local Government document "*Fire Performance of Green Roofs and Walls*" and the *GRO Guidelines (2014)*. This contains more detailed help and design guidance and be downloaded for free at <https://www.gov.uk/government/publications/fire-performance-of-green-roofs-and-walls>

GRO would strongly recommend that designers, contractors and building owners comply fully with all recommendations.



The Responsibilities for Fire Safety under CDM

- The Principle Designer for the roof design (including the green roof)
- To the Principle Contractor for the construction of the roof.
- To the Building Owner or the maintenance of the roof.

Building Regulations Approved Document B

The requirements of Approved Document B relate to five different areas:

- B1 Means of warning and escape
- B2 Internal fire spread (linings)
- B3 Internal fire spread (structure)
- B4 External fire spread
- B5 Access and facilities for the fire service

When considering the risks associated with green roofs section B4 of Approved Document B is the relevant regulation. Within B4 there are two statements with the second relating to roofs: 'The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.'

The guidance in Approved Document B limits the use of roof coverings near a boundary which will not give adequate protection against the spread of fire over them. The term roof covering does not refer to the roof structure as a whole, but is used to describe constructions which may consist of one or more layers of material.

The recommendations in Section B4 of ADB refer to the performance of roofs when exposed to fire from the outside:

- Roof coverings are given a designated rating based on their performance in BS 476-3: 2004 or BS EN 13501-5: 2005, and examples of common roof coverings and their performance ratings are given in Appendix A of Approved Document B. Constructions are classified within the National system by 2 letters in the range A to D. The first letter indicates the time to penetration and the second letter is a measure of the spread of flame.
- Approved Document B provides guidance on the separation distances according to the type of roof covering and the size and use of the building. There are no restrictions on the use of roof coverings designated AA, AB or AC (National class) or BROOF(t4) (European class).

Department for Communities and Local Government document “Fire Performance of Green Roof and Walls” (August 2013)

This document details testing conducted on tests samples of growing medium and their performance in relation to fire. The main conclusions from the cone calorimeter tests were:

- No ignition occurred for substrates using the standard (<20% organic content) mix even when they were completely dried.
- For a completely dried 100% standard organic mix substrate where ignition occurred the flame spread could not be sustained because the peak heat release rate was 55 kW/m².
- For substrates using leaf mould as the organic material ignition occurred at concentrations greater than 50%. The sample containing 100% leaf mould when completely dried was very flammable, which could be seen to represent the fire spread and growth conditions in a forest fire.

GRO Design Guidance recommendations for Fire Safety Roof Waterproofing System

The waterproofing system installed beneath the green roof should always achieve the required fire rating for the project, which can be evidenced through independent third-party certification from bodies such as the BBA, BRE or WarringtonFireGent.



Growing Medium

- The growing medium should be certified by STRI in accordance with GRO recommendations, or FLL Certified, for use on green roofs.
- Where no permanent irrigation system is installed, as on most extensive and biodiverse green roofs, the growing medium should contain less than 20% organic content.
- The organic material used in extensive, biodiverse or intensive green roofs should be peat free.
- Recommended substrate depths should be adhered to, including the stated allowance for settlement.

Fire breaks

The provision of fire breaks within the green roof construction are important to eliminate/minimise the risk of fire spread into or out from the building. Approved Documents B and the Scottish Technical Handbooks recognise the guidance in DCLG Fire Performance of Green Roofs and Walls 2013. This guidance suggest that compliance with Regulation B3 is achieved through:

- 500mm wide fire breaks consisting of 20-50mm rounded pebble at a minimum 75mm thickness around all vertical elements (perimeters, penetration, etc), or paving slabs.
- A 1m wide fire break consisting of 20-50mm rounded pebble at a minimum 75mm thickness should be installed every 40m on larger roofs.



There is no guidance on pebble margins around rainwater outlets or at roof verges but GRO recommend the installation of a minimum 300mm gravel margin at 50mm depth around rainwater outlets to prevent vegetation blocking the outlets. At roof verges it may be possible to take the green roof to the verge but consideration should be made as to the risk of wind scour due to the building height. Where a gravel margin is installed at the verge GRO recommend it is a minimum 300mm gravel margin at 50mm depth.

Maintenance

Ongoing maintenance is important to ensure that firebreaks remain effective, but also to ensure the good health of the green roof. Maintenance for fire safety on extensive and biodiverse roofs should be carried out twice yearly to ensure:

- Fire breaks are kept clean and clear of vegetation.
- That on wildflower roofs the vegetation is cut back in the autumn and the thatch removed.

Other considerations

- Green roofs should be designed to prevent the system from drying out completely as this will impact plant life and may impact fire performance. If the type of planting prevents a fire risk when dried out (dead) a suitable temporary or permanent irrigation system should be required.
- During the roof establishment period, which may be up to 2 years depending on planting chosen and season of installation, the green roof should be watered regularly and in such a way as to enable the required vegetation to establish without dying and creating a potential fire hazard.

Exclusions

In preparing this guidance GRO has focused on site assembled built-up green roof construction incorporating a non-combustible growing medium. This guidance does not necessarily apply to site assembled built-up green roof systems that incorporate substitute for a non-combustible growing medium such as foam, or pre-grown cassettes/modules. Where a client or specifier is considering using an alternative to site assembled built-up green roof construction incorporating a non-combustible growing medium fire performance information should be sought from the manufacturer.





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