

# Fire Safety in Flat Roofing Specification and Compliance



## Guidance notes

# Fire Safety in Flat Roofing Specification and Compliance

---

## Guidance Note 001

Contents	Page No.
1. Introduction .....	3
2. Building Use .....	3-5
3. Achieving Compliance .....	6-9
4. Fire Performance Standards.....	10-11
5. What is a Specified Attachment? .....	13-14
6. Flat Roof Upstands.....	15-16
7. Green Roofs .....	17-18
8. Summary.....	19

# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001



## 1. Introduction

The UK Construction industry has changed significantly since the 2017 Grenfell disaster and subsequent Hackitt Report. Rules on how buildings are constructed have been updated to enhance building safety. Radmat is at the forefront of these changes, ensuring our interpretation of the revised rules keeps us on the right side of compliance for our clients, end users, and specifiers alike. This document is a guidance note intended to help its readers navigate the rule changes and is based on the latest information available at the publication date listed herein.

We will primarily address how regulations affect flat roof construction and specification in England, note that some minor variances may apply in Scotland, Wales, and Northern Ireland, so please exercise caution when using this guidance on any projects outside of England and check with the relevant local authority Building Control Officer or an Approved Inspector if you are still unsure.

## 2. Building Use

Before considering a route to compliance, we must consider the intended use case for the building being constructed, as this will impact how we specify.

**Approved Document B Fire Safety** is split into two parts:

**Volume 1: Dwellings**

**Volume 2: Buildings other than Dwellings**

As you would expect, there are different considerations for both volumes, but the important clauses that concern flat roof specification are consistent between both documents.

**A Relevant Building:** This definition is linked directly to the Building Regulations (the law) and is defined as follows in Regulation 7(4):

- (a) a 'relevant building' means a building with a storey (not including roof-top plant areas or any storey consisting exclusively of plant rooms) at least **18 metres** above ground level and which—
  - (i) contains one or more dwellings;
  - (ii) contains an institution; or
  - (iii) contains a room for residential purposes; and

- (b) 'above ground level' in relation to a storey means above ground level when measured from the lowest ground level adjoining the outside of a building to the top of the floor surface of the storey.

A Relevant Building covers most instances of high-rise residential developments, but another consideration is the **Purpose Group** for the building in question, which is a separate series of classification criteria from that of a Relevant Building.

# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001

## 2. Building Use (cont)

**Purpose Groups** represent different levels of hazard. A single building might have separate compartments and multiple Purpose Groups (for example, flats above a row of shops). In this case, the most onerous purpose group is given priority with regard to roofing specifications.

The lower the Purpose Group number, the greater the hazard. A simplified version of ADB Table 0.1 Classification of Purpose Groups is reproduced below:

**Table 0.1 Classification of purpose groups Purpose Group**

Purpose Group	Title	Purpose for which the building or compartment of a building is intended to be used
<b>Approved Document B Volume 1 Purpose Groups</b>		
1	Residential (dwellings)	Flats, Dwellinghouses
<b>Approved Document B Volume 2 Purpose Groups</b>		
2(a)	Residential (institutional)	Hospital, home, school or other similar establishment, where people sleep on the premises.
2(b)	Residential (other)	Hotel, boarding house, residential college, hall of residence, hostel or any other residential purpose not described above.
3	Offices	Office administration, clerical work etc.
4	Shops and Commercial	Retail or Trade premises accessible to the public
5	Assembly and Recreation	Place of assembly, entertainment or recreation
6	Industrial	Factories and premises used for manufacturing or power generation
7	Storage and other non-residential	Premises for the storage or deposit of goods and materials, Car Parks

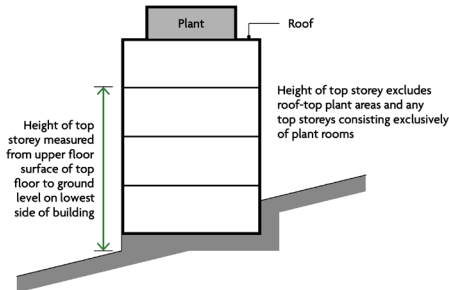
For consideration of flat roofing specification, the important distinction is whether a building fits into **Purpose Group 1 or 2 or within 3 to 7**. A building can be both a Relevant Building and fit into these Purpose Groups simultaneously – in which case, the legal, Regulation 7 definition of being a **Relevant Building** prevails – but the ultimate impact on flat roofing specification is unchanged.

In Summary, the first question we ask clients to consider is “Is it feasible that someone could be sleeping overnight on this premises?” If the answer is yes, the more onerous restrictions on combustible materials will likely be applicable



# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001



Above: Diagram D6 'Height of top storey in building' from Approved Document B.

## 2. Building Use (cont)

### 11m or 18m?

Another factor that can generate confusion is the height of the building and how this affects its classification. A **Relevant Building** (as outlined above) specifically states a height measurement of 18 meters, as measured using Diagram D6 from ADB, illustrated on the left-hand side of this page.

However, other sections of ADB instead refer to a measurement of 11 meters, and this is mirrored in further guidance document *BS 8579:2020 Guide to the design of balconies and terraces*.

The discrepancy has come about due to Regulation 7 being a legal requirement (the law), which has lengthy processes for review and implementation taking longer to change - whereas "guidance" is less onerous to bring about new recommendations.

In any event, as the table below summarises, the minimum height of 11 meters applies to any building with a residential purpose – ie. a building where persons may feasibly sleep overnight.

11 Meters or 18 Meters?		
Definition	Height Referenced	Ban on Combustible Materials in Balcony Construction
Relevant Building	18 meters	Yes – Regulation 7(2) applies
Purpose Group 1 Building	11 meters	Yes – Section 10.10 of ADB Volume 1 applies
Purpose Group 2(a) & 2(b) (any building with a residential purpose)	11 meters	Yes – Section 12.11 of ADB Volume 2 applies
Purpose Groups 3-7	None	No – no minimum performance criteria apply

This means that for a commercial building, such as a Central London high-rise office block, the same restriction on non-combustible materials is not currently applicable. Consideration to fire spread should still be given however, and with advancement and the development of new materials and systems, a greater approach to fire safety will generate further options for these applications. For the time being, it is entirely within the regulatory framework to provide a compliant flat roof system on a balcony with combustible insulation on these types of buildings.

# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001

## 3. Achieving Compliance

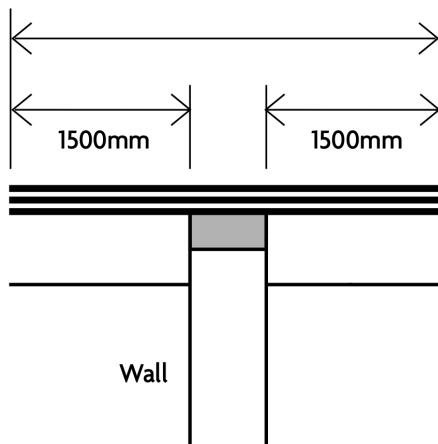
Any 'Building' Work in England must comply with the **Building Regulations 2010**. Guidance on how to meet these requirements is detailed in what we call the **Approved Documents**. Fire Safety makes up **Approved Document B: Fire Safety** (or AD:B for short) which is issued in two parts; Volume 1 for Dwellings and Volume 2 for all Buildings other than Dwellings. The relevant parts of these documents when assessing compliance for Flat Roofing are:

**Requirement B3:** Internal fire spread (structure)

**Requirement B4:** External fire spread

**Regulation 7** (Paragraph 2).

### a. ANY BUILDING OR COMPARTMENT



**Above:** Extract from Diagram D5.2 'Junction of compartment wall with roof' from **Approved Document B**.

### Compliance with Requirement B3: Internal fire spread (structure)

The purpose of Requirement B3 is to ensure that load-bearing elements of a structure retain their stability for a defined period and that compartmentation is assured with the use of fire-resisting materials. As 'Roofs' are generally external elements, they are largely unaffected by this requirement. If the building structure is concrete or composite framed, the flat roofing specification is unaffected by Requirement B3, since the structure itself satisfies the fire resistance (REI) criteria. If, however, the specified structural deck is timber (CLT or Plywood) and the 'roof' passes above internal compartment walls, this is the scenario when roofing specification is affected. Whilst the example diagrams for this section detail a pitched roof construction, this section does not exempt flat roofing, so the same logic must be applied. At the junction with a compartment wall, where the deck is not non-combustible (ie. Timber) then for 1500mm either side of the compartment wall must have a roof covering of at least  $B_{ROOF}(t4)$  on a non-combustible substrate of at least class A2-s3,d2. What this means in practice, is a Radmat specification that features a non-combustible insulation to satisfy the 'substrate' classification, whilst the roof covering (membrane) would also have a minimum performance of  $B_{ROOF}(t4)$ . Such instances have proven to be very rare in specification and tend to only affect low-rise residential buildings, which would not typically have a flat roof anyway, as pitched roofing is much more common on these dwelling types.

### Compliance with Requirement B4: External fire spread

The purpose of Requirement B4 is twofold:

- Resisting fire spread over external walls &
- Resisting fire spread from one building to another

**Resisting fire spread over external walls** also incorporates balconies, see also Section 4: *What is a Specified Attachment?* No elements of the External Walls or attachments should present an unrestricted risk of ignition or provide a conduit for the spread of fire up the external envelope of the building, critically this is defined vertically, so performance is determined by the height and intended use of the building.

# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001

## 3. Achieving Compliance (cont)

### Compliance with Requirement B4: External fire spread (cont)

**Resisting fire spread from one building to another** – the external envelope should not provide a medium for fire spread to adjacent buildings nor ignition from fires in those adjacent buildings. Flame spread **across** the roof and penetration from fire **through** the roof from external sources is restricted by performance standards. The determination for performance to satisfy this section is therefore based on the proximity of adjacent buildings (site boundary) and the intended use. For other flat roofs and terraces, compliance with Requirement B4 in roofing specification terms is to meet the External Exposure to Fire Performance criteria of Table 12.1 “Limitations on roof coverings” which is recreated below:

**Table 12.1 (ADB V1) / 14.1 (ADB V2) Limitations on roof coverings**

Designation of covering of roof or part of roof	Distance from any point on relevant boundary			
	Less than 6m	At least 6m	At least 12m	At least 20m
B <sub>ROOF</sub> (t4)	•	•	•	•
C <sub>ROOF</sub> (t4)	◦	•	•	•
D <sub>ROOF</sub> (t4)	◦	•	•	•
E <sub>ROOF</sub> (t4)	◦	•	•	•
F <sub>ROOF</sub> (t4)	◦	◦	•	•

Acceptable •  
Unacceptable ◦

**Radmat**, like most flat roofing manufacturers on the market, will strive to achieve B<sub>ROOF</sub>(t4) as the highest performance classification which can currently be reached as this permits **unrestricted use** of such roofing systems in relation to the relevant boundary – effectively; B<sub>ROOF</sub>(t4) can be used anywhere on a development with this classification.

You may be familiar with the former ‘National Classifications’ BS 476-3:2004 – e.g. “EXT.FAA”. As of 2nd March 2025, the transition period which included a crossover of equivalent relevance between these National Standards and the European Classifications will have ended, and any references to the former National Classifications have been removed from Approved Document B.

One further means of compliance which is particularly relevant to Inverted (or “Protected”) roof systems, is that of “CWFT” or classified without further testing. For flat roofing, European Commission Decision ref. 2000/553/EC lists inorganic roof coverings which are deemed to fulfil all of the requirements for the performance characteristic ‘external fire performance’ – and are equally unrestricted in terms of where such roof coverings can be used. The 2000/553/EC roof coverings most relevant to Radmat are as per the table overleaf:

# Fire Safety in Flat Roofing

## Specification and Compliance

### Guidance Note 001

### 3. Achieving Compliance (cont)

Roof covering products (and/or materials) which can be considered to fulfil all requirements for the performance characteristic 'external fire performance' without the need for testing, subject to any national provisions on the design and execution of works being fulfilled.

Roof covering product/material	Specific conditions
Flat metal sheets: aluminium, aluminium alloy, copper, copper alloy, zinc, zinc alloy, uncoated steel, stainless steel, galvanised steel, coil coated steel, vitreous enamel steel	Thickness $\geq 0.4$ mm Any external coating shall be inorganic or have a PCS $\leq 4.0$ MJ/m <sup>2</sup> or a mass $\leq 200$ g/m <sup>2</sup>
Products intended to be fully covered in normal usage (by the inorganic coverings listed to the right)	Loose laid gravel with a thickness of at least 50 mm or a mass $\geq 80$ kg/m <sup>2</sup> (minimum aggregate size 4 mm, maximum 32 mm) Sand/cement screed to a thickness of at least 30 mm Cast stone or mineral slabs of at least 40 mm thickness

There are numerous debates on the suitability of roof coverings from the above table and their practical application, as the EEC document is open to a degree of interpretation.

- Gravel** (ballast) available in the UK Market does not fall within the specified 4 to 32mm grading. Typically, Roofing Ballast is 20-40mm diameter, rounded, washed stone – which would be outside of the range listed in the Commission Decision document. It is the opinion of Radmat, and that of the BBA, following extensive testing to TS 1187 part 4, that the larger grading of stone does not affect the external fire performance despite this discrepancy. However, a specifier should be made aware of this minor variation.
- Cast stone or mineral slabs** – typically on a flat roof build-up such trafficable roof finishes will be installed on height-adjustable pedestals to ensure a level, Part M-compliant surface free from trip hazards, complete with gaps to facilitate drainage and, sometimes, to accommodate horizontal services. However, this is not specifically listed in the EEC document, leaving this open to interpretation. For example, the EOTA (European Organisation for Technical Assessment) has interpreted this as pavers resting *directly* on the roofing system, with no air gap. In practice, this would prohibit effective drainage and create a very uneven surface finish, as inconsistencies in the roofing system (such as membrane laps) would be manifested in the trafficked surface. Once again, it is the opinion of Radmat, after significant research and testing, that joint gaps between paving units and varying void depths beneath paving areas do not impact the outcome of a TS 1187-part 4 fire test, but once again a client should be made aware of this interpretation until further clarification is provided by the European Commission.

**FYI:** A Flat Roof system with a finish compliant with CWFT rules achieves the classification 'B<sub>ROOF</sub>'

i.e. without the 't4' – as this part of the abbreviation references Test 4 from CEN TS 1187.

Whilst un-tested, CWFT criteria permits unrestricted use of a flat roofing system in terms of where it can be specified in relation to the relevant boundary. It is the equal to B<sub>ROOF</sub>(t4) in accordance with BS EN13501-5.



# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001

### Regulation

#### Regulation 7 – Materials and workmanship

(2) Subject to paragraph (3), building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or A1 (classified in accordance with the reaction to fire classification).

#### Euroclass Contribution to Fire Chart

A1 Non-combustible

A2 Non-combustible, no Flashover

B Combustible, no Flashover

C Combustible, Flashover after 10 min

D Combustible, Flashover before 10 min

E Combustible, Flashover before 2 min

F Combustible, NPD



**Above:** Some pre-faced insulation board products which expedite installation and aid sequencing are no longer classified as 'non-combustible' in accordance with BS EN 13501-1 and should not be used where non-combustible insulation is required.

## 3. Achieving Compliance (cont)

The final clause within Approved Document B which affects flat roofing specification is **Regulation 7 – Materials and Workmanship**.

A 'regulation' represents **the law** and is a direct extract from the 2010 Building Regulations – other parts of Approved Document B which show black text on a white background are strictly **statutory guidance** on how you might achieve compliance with the regulations. Regulation 7(2) is sometimes referred to as 'the ban on the use of combustible materials'.

Paragraph 2, illustrated to the left and identifiable by the distinct green background, is significant when it comes to flat roofing specifications. It is applicable only to those areas which become part of the External Wall or a Specified Attachment – ie. the formation of a Balcony. The intent is to limit the use of materials with a reaction-to-fire classification of less than A2,s1-d0 – ie. non-combustible. A reaction-to-fire classification is different to a roofing classification – Roofing classifications (e.g. B<sub>ROOF</sub>(t4)) are applicable to a **System**, whereas Reaction-to-fire classifications (AKA "Euroclass") are applicable to **Products**.

Regulation 7, Paragraph 3 lists exemptions to the requirement for non-combustible materials. Notable inclusions which affect flat roofing are:

- (b) any part of a roof if that part is connected to an external wall
- (e) insulation and waterproofing materials used below ground level or up to 300mm above that level
- (g) membranes
- (h) seals, gaskets, fixings, sealants and backer rods.

Therefore, any waterproofing membrane used on a balcony is exempt from the requirement to be non-combustible. Attention is brought to clause (h) which does not include adhesives, which are commonly used in flat roofing specifications. Radmat has specialist roof build-up options which can overcome these material restrictions on balconies which might require insulation.

Insulation materials are not exempted, so Radmat will only approve specifications with insulation which is of a minimum reaction-to-fire classification of A2,s1-d0. This is one area where Radmat would urge caution; since there exist products on the market with pre-laminated facings to facilitate ease of application (ie. bituminous-impregnated surfaces for efficient bonding). As the Euroclass of these products falls outside of the Class A1-A2 minimum requirements, Radmat cannot endorse their use in such applications, irrespective of the percentage ratio of the combustible element. Legally, these boards state an unsuitable reaction-to-fire classification. Un-faced materials which do achieve the required non-combustible classification are available and should be used, not substituted for those which can potentially save time and provide easier installation procedures.

# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001



**Above:** Test apparatus for EN TS1187 Test 4 - Two Stages incorporating Burning Brands, Wind and Supplementary Radiant Heat, as shown in a 45° incline position. Image used with permission of Fire Testing Technology Ltd.

## 4. Fire Performance Standards

Now that we have established what performance requirement we need to achieve with our flat roofing specification, we need to understand how we can demonstrate those performance criteria. Since the National Classifications are no longer listed in Approved Document B, this simplifies our route to compliance somewhat.

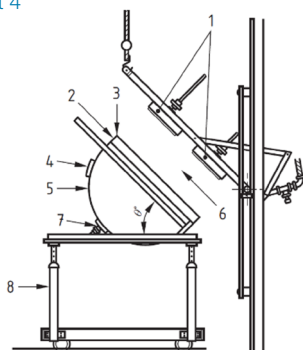
All flat roofing systems, except for those complying with CWFT rules, should be tested to CEN TS 1187 Test 4 – this is the test relevant to the UK (including Scotland and Wales, Ireland, and Rol).

The results of this test can then facilitate a classification in accordance with BS EN13501-5:2016 Classification using data from external fire exposure to roofs tests AKA “Part 5”.

The classification criteria are outlined in the table below:

Test method	Class	Classification criteria
<b>CEN/TS 1187 Test 4</b>	$B_{ROOF}(t4)$	<ul style="list-style-type: none"> <li>- No penetration of roof system within 1 h</li> <li>- In preliminary test, after withdrawal of the test flame, specimens burn for &lt; 5 mins</li> <li>- In preliminary test, flame spread &lt; 0.38m across region of burning</li> </ul>
	$C_{ROOF}(t4)$	<ul style="list-style-type: none"> <li>- No penetration of roof system within 30 min.</li> <li>- In preliminary test, after withdrawal of the test flame, specimens burn for &lt; 5 mins</li> <li>- In preliminary test, flame spread &lt; 0.38m across region of burning</li> </ul>
	$D_{ROOF}(t4)$	<ul style="list-style-type: none"> <li>- Roof system is penetrated within 30 min but is not penetrated in the preliminary test</li> <li>- In preliminary test, after withdrawal of the test flame, specimens burn for &lt; 5 mins</li> <li>- In preliminary test, flame spread &lt; 0.38m across region of burning</li> </ul>
	$E_{ROOF}(t4)$	<ul style="list-style-type: none"> <li>- Roof system is penetrated within 30 min but is not penetrated in the preliminary test</li> <li>- Flame spread is not controlled</li> </ul>
	$F_{ROOF}(t4)$	<ul style="list-style-type: none"> <li>- No performance is determined</li> </ul>

**Below:** CEN TS 1187 diagram of test apparatus for TS1187 Test 4



- Key**
- |                              |                      |
|------------------------------|----------------------|
| 1 Surface combustion heaters | 5 Specimen cover     |
| 2 Roof specimen              | 6 Direction of flame |
| 3 Edge "A"                   | 7 Suction pipe       |
| 4 Mica window                | 8 Trolley            |

Angle  $\theta$  = 45° for inclined test  
 $\theta$  = 0° for horizontal test

### Test 4 comprises 2 Stages:

**Stage 1:** Preliminary ignition test with burning brands

**Stage 2:** Penetration test with burning brands, wind and supplementary radiant heat

**Stage 1, the ignition test,** is relatively straightforward for most flat roofing systems to pass, particularly those with inorganic coverings such as ballast, paving, aluminium decking etc. A burning brand is introduced to the centre of a test specimen for 1 minute, before being withdrawn. If a fire emanates from the burning brand, the flame must not spread > 381mm in any direction and must not prevail for more than 5 minutes after the brand has been withdrawn to achieve  $B_{ROOF}(t4)$ . Single-ply and Cold-applied thermosetting Liquid Waterproofing kits are the most susceptible to failure at this stage of the test.

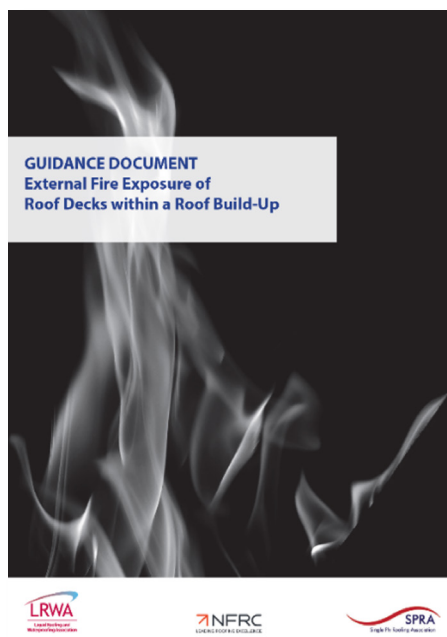
# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001



Above: Stage 2 Penetration Test in progress

Below: Flat roofing joint committee report on establishing a 'worst case' roof deck – full report available online



## 4. Fire Performance Standards (cont)

**Stage 2, the 'Penetration Test'**, is far more onerous on a roofing build-up and requires the specialist apparatus illustrated above. The end-use orientation of the roof system (i.e. 0° / horizontal for a flat roof, 45° for a pitched roof) is what time taken for fire to penetrate through the whole roof build-up, with the effects of a burning brand, wind (negative pressure) and supplementary radiant heat. determines the test angle. Flat Roofing tests obtained at 0° / horizontal are valid for pitches up to 10°. The nature of the test dictates that the specimen is square-edged and flat, which is particularly relevant with regard to **tapered** insulation roofing systems. Insulation boards with a manufactured taper or 'cut-to-falls' will typically have a gradient of 1:60 or 1:40, which is just 1.4° of incline, far below the 10° at which a horizontal test becomes invalid.

The objective of the Penetration Test, as the name suggests, is to measure the Test specimens are exposed to surface temperatures exceeding 300°C and must maintain their integrity for 1 hour to satisfy the requirements of B<sub>ROOF</sub>(t4). Surface fire(s) may break out during this test, but contrary to some industry interpretations, this does not constitute a test failure – the parameter measured is that of penetration, not ignition (this is established during the Stage 1 test).

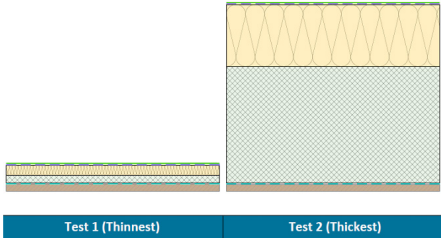
**Substrate Selection:** One issue the flat roof industry has encountered is that of deck/substrate selection. For example, the phrasing of BS EN13501-5 states that the direct field of application defining the 'nature of deck and supporting structure' is that the test is only valid on the as-tested. The issue here is that, particularly with concrete frame structures, a concrete substrate is not something which the test apparatus can accommodate, not considering the substantial practical limitations of such an unwieldy test specimen.

To counter this, the LRWA, NFRC and SPRA joint committee commissioned a few tests to establish the 'worst case' substrate for flat roof systems. The detailed report, available online, concluded that an 18mm OSB (oriented-strand board) substrate represented this condition – as such most flat roof testing conducted in the UK now utilises 18mm OSB as the test substrate. It is only with future revisions to the phrasing of this standard which will overcome challenges in the industry when the 'as tested' doesn't align with the 'as built'.

Whilst it may be perfectly reasonable to expect a solid concrete substrate to perform better than a timber substrate, the standards fall short of making this distinction and do not currently permit deck substitution – something which a prospective client and fire consultant/building control officer should be made aware of from the outset. exposure to fire test will cover just that exact combination (i.e. insulation thickness, finishes, colour, pedestal height). Despite increasing industry pressure, it is not feasible to test every potential variation of roof build-up, particularly in the event of varying insulation thicknesses, with ever-increasing thermal efficiency requirements for New buildings in accordance with Part L.

# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001



**Above:** Example of variables within an Extended Field of Application (ExAp) report.

## 4. Fire Performance Standards (cont)

**Extended Field of Application:** A further limitation to testing is that an external exposure to fire test will cover just that exact combination (i.e. insulation thickness, finishes, colour, pedestal height). Despite increasing industry pressure, it is not feasible to test every potential variation of roof build-up, particularly in the event of varying insulation thicknesses, with ever-increasing thermal efficiency requirements for New buildings in accordance with Part L.

Single, direct field of application fire tests are only valid for the 'as tested' build-up without any variation permitted.

To overcome this limitation, Extended field of Application or 'ExAp' reports should be sought, as these have a far greater scope for the many variables which can occur across a roofscape. ExAp reports are still classification reports insofar as they can provide a classification of BROOF(t4), whilst also offering flexibility in the layers, orientation and thickness in accordance with the rules and methodologies set out in CEN TS/16459:2019.

With an ExAp report, layer substitution and exclusion also become a possibility, as this will be based on the best and worst-case scenario for a given roofing system (this is generally thickest to thinnest), using both primary and secondary evidence and interpolation techniques.

The principle of an ExAp also permits the classification of build-ups or systems which might otherwise be impossible to test due to practical/physical limitations. As part of our ongoing test regime commitment, Radmat is seeking all future fire tests to include ExAp reports to extend the potential scope of application and cover any 'grey areas' for greater reassurance to both our clients and subcontractors.

# Fire Safety in Flat Roofing

## Specification and Compliance

### Guidance Note 001

**\*Specified attachment** Includes any of the following.

- A balcony attached to an external wall.
- A device for reducing heat gain within a building by deflecting sunlight which is attached to an external wall.
- A solar panel attached to an external wall.

### 5. What is a ‘Specified Attachment?’

One of the newer terminologies introduced in the 2018 revision to Approved Document B was that of a ‘Specified Attachment’, see the adjacent definition.

The definition is directly connected to Regulation 7, so whilst the contents of Regulation 7 are limited explicitly to a Relevant Building, the clause and exemptions are repeated in both ADB Volume 1 and ADB Volume 2 under the subheadings “Balconies” – Sections 10.10 & 12.11 respectively.

There remained, however, no strict definition of what a balcony was, or how to differentiate between a balcony and terrace. It is not uncommon for a balcony to be inset, or project, from the building line – indeed in some instances both characteristics can apply simultaneously on the same balcony. This led to some confusion in the industry and different interpretations by insurance companies, industry trade associations etc. followed, with most urging caution and insisting on compliance with the combustible materials ban wherever there was any doubt.

Terraces, for the purposes of fire, are classified as roofs – ie. Are entirely over conditioned (internal, heated) spaces. If a terrace features a projecting element or shares characteristics with a balcony, the specification of this element should be treated as a Specified Attachment and be subject to material limitations. It remains a common misconception that “Inset Terraces” at the base of a stack of balconies are also to be subject to these limitations, but the correct interpretation is that these are roofs (if their footprint is entirely over conditioned space).

In 2020, the first issue of BS 8579: Guide to the design of balconies and terraces was released. The guidance document included a useful diagram which is reproduced on the left-hand side of this page, illustrating clearly what constitutes a terrace, roof or balcony.

Items where vertical fire spread can be propagated by the presence of combustible materials are highlighted in red, these include the definitions:




- Projecting Open Balcony
- Projecting Enclosed Balcony
- Recessed Open Balcony
- Recessed Enclosed Balcony

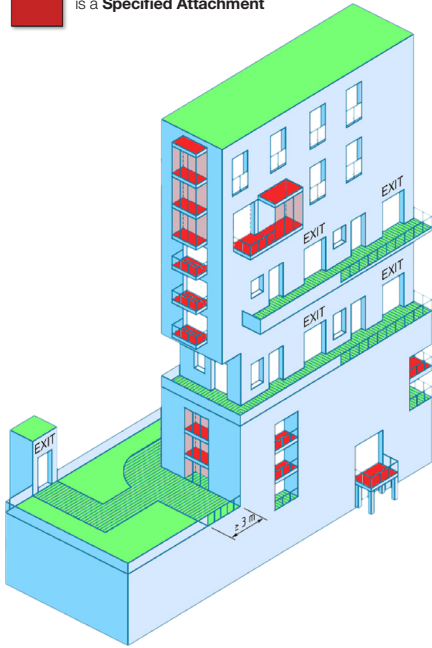
In all cases, the driver behind the distinction is the lack of compartmentation. With a terrace, entirely over a conditioned (internal, heated) space, the structure is fulfilling Requirement B3 by providing the relevant REI (Resistance) and compartmentation. Where compartmentation cannot be controlled due to the geometry or ‘open’ nature of the building element, the ban on combustible materials will be applicable. regularly incorrectly interpreted in specifications. If in doubt, contact the Radmat Technical Department to determine which classification is applicable.



# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001

-  is a Roof or Terrace (Over Heated Space)
-  is Required to be raised to a minimum of B<sub>ROOF</sub>(t4)
-  is a Specified Attachment



**Above:** Example of variables within an Extended Field of Application (ExAp) report.

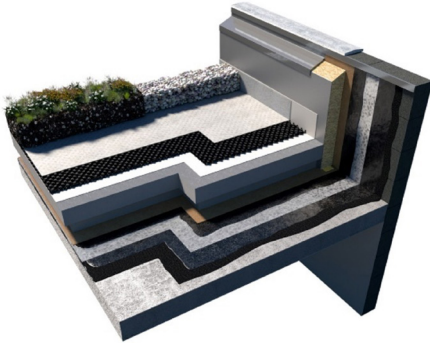
## 5. What is a ‘Specified Attachment?’ (cont)

3rd-Party Building Insurers such as the NHBC, LABC & Premier Guarantee have their interpretations of how to comply with fire safety requirements in roofing specifications – these sometimes conflict with the government and BSI official standards and guidance. If your project is being insured by one of these bodies, it is important to gain early engagement and, in some instances, challenge these interpretations to facilitate the design intent and meet other performance criteria – such as the thermal performance or ‘U-Value’. Not only does insistence on non-combustible materials in these instances drastically increase costs for the client, but the ultimate, maximum measurable fire performance remains B<sub>ROOF</sub>(t4), whether the insulation is combustible or not.

‘Reaction-to-fire’ and ‘External Exposure to Fire for Roofs’ classifications are regularly incorrectly interpreted in specifications. If in doubt, contact the [Radmat Technical Department](#) to determine which classification is applicable.

# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001



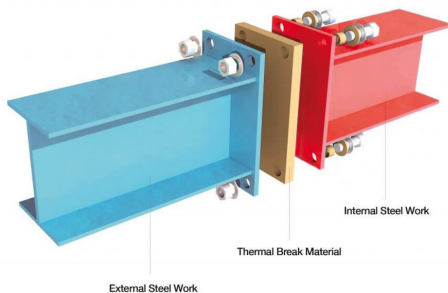
**Above:** Installed example of ProTherm RockFace A2 Upstand Insulation on the inside face of a parapet wall

## 6. Flat Roof Upstands

An unintended consequence of the ban on combustible materials in the construction of balconies and external walls was the treatment of flat roof upstands.

At the base of a vertical abutment, where a flat roof system meets with a change in plane, the roof system must be turned up vertically, to a height not less than 150mm above FFL (or less, if certain criteria are met). This part of the roof is called the upstand. The intention of Regulation 7(3) item (b) was to exempt the upstand connection with a flat roof, but the phrasing of the document continues to confuse industry experts.

Initially, the new clause in Regulation 7 was interpreted as upstands constituted part of the roof which was 'pitched at more than 70° to the horizontal'. But this interpretation results in a double-negative when referencing Regulation 7(3) and does not make sense in practice – a roof cannot be exempt at the point which it 'connects' to a wall but also not exempt if that part of the roof is 'pitched' at more than 70°. The intention was to group pitched roofs and steep mansard roofs as 'external walls', but the lack of clarity and poor phrasing has divided the industry.



**Above:** Balcony connections are a good example of an actual thermal break. Flat roof upstands do not fit the criteria of a thermal break, and should instead be considered part of the principal insulation layer)

Another misinterpretation is that a flat roof Upstand constitutes a 'Thermal Break', as these are a listed exemption under Regulation 7(3), but this definition does not fit at all. The inclusion of insulation on a flat roof Upstand is to minimise the effect of cold bridging by insulating the junction at the base of a wall. A 'Thermal Break' on the other hand, is an isolating element within the construction itself, which sits between two otherwise thermally conductive elements, to decouple each part and restrict thermal transfer. A good example of a thermal break, and the example given in BS 8579, is that of a thermally broken balcony connection. The industry has for some time provided arbitrary guidance on the maximum dimensions and positioning of upstands in the context of them being a "Thermal Break" (i.e. "max. 60mm thick and 300mm high"). This appears to be based on (the now obsolete) Accredited Construction Details – but critically these details were a recommended minimum, not a maximum permissible dimension, and they had nothing at all to do with fire safety.

Perhaps most telling about the "Thermal Break" misinterpretation is within Clause 10.21(e) in ADB which recommends that [thermal breaks] "should not span two compartments" – of course, the upstand of a roof would normally be entirely external, and those internal compartment walls would already be subject to strict criteria to achieve fire resistance (REI). This has given rise to some peculiar recommendations to have two different specifications of upstand – one which comprises non-combustible insulation wherever it 'bridges' a compartment wall.

# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001



Radmat ProTherm RockFace  
Non-Combustible Upstand Board



Radmat ProTherm SD Upstand Board

## 6. Flat Roof Upstands (cont)

Implementing such a tactic is fraught with issues, not least of which being able to identify – from the outside – where a compartment wall line on the inside of a structure is located. If a combustible flat roof upstand can compromise the integrity of a compartment wall by acting as a conduit for fire from the external side, that compartment wall was not compliant with ADB.

Radmat interpretation of what constitutes a Thermal Break is also supported by the CWCT (Centre for Window and Cladding Technology) / SFE (Society of Façade Engineering) *Fire Guidance Note Issue 2*.

Vertical upstands on a flat roof are exempt from the ban, as confirmed by the Ministry of Housing, Communities and Local Government (MHCLG) Technical Policy Division, Building Safety Portfolio to the flat roofing industry (in November 2019). However, there was no clarification on the maximum height of the exemption, which clearly could not be unrestricted, as a flat roof system is not and cannot be tested to the same rigorous standards as a vertical cladding system. A 'Sensible upper limit' on the maximum height of a combustible upstand may be considered at 1100mm AFFL, the same height required for safety guarding against falls in accordance with Approved Document K – regularly this is the height of most masonry or concrete upstands at roof parapets. Lift overruns or 'pop-up' roofs may exceed this height, however, so it is up to the project Building Control Officer to determine a sensible upper limit. CWCT/SFE *Fire Guidance Note* recommends this sensible upper limit to be 300mm, in alignment with Regulation 7(3) clause (e) which exempts insulation and waterproofing materials up to 300mm from 'ground level'.

To facilitate either interpretation, Radmat can provide a non-combustible roof upstand board in the form of ProTherm RockFace A2, which has been independently fire-tested and classified to A2,s1-d0 in accordance with BS EN13501-1. Alternatively, conventional Extruded Polystyrene (XPS)-based upstand insulation can be provided in the form of ProTherm SD Upstand Insulation.

One consideration from the aforementioned MHCLG industry letter is the further clarification that “*No further limitations are placed in the guidance on parts of the roof which extend to the external wall other than achieving the performance recommended in other parts of the guidance with regards to the resistance of fire spread over the roof see section 12 in ADBV1 and 14 in ADBV2.*” – in summary, this implies that all parts of a roof must achieve  $B_{ROOF}$ .

For an upstand, oriented vertically, this is not something which the current test standard TS 1187 Part 4 can accommodate. Furthermore, the test apparatus designed for this fire test cannot be tilted to a 90° incline. No other fire test is suitable or relevant for testing flat roof upstands, but Radmat remains at the forefront of what can be demonstrated and achieved and is in constant engagement with UKAS-accredited testing facilities and the BSI to undertake experimental and indicative testing methods to ensure fire safety for this interface.

# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001



**Above:** Extensive Wildflower Green Roof finishes provide biodiversity accreditation to a flat roof specification.



**Above:** Green roof systems comprise different layers of components designed to support plant life. These can vary in depth to suit many different living roof conditions.

## 7. Green Roofs

Green roofs or 'living roofs' are those which have a surface finish designed to sustain plant life. There are many different types of green roofs, the planting intention will dictate what plant species or biodiversity is required to be supported. Most new-build developments will have a planning requirement for the inclusion of green roofs, particularly where the development is displacing natural habitat space.

Green roof surface finishes represent a potential risk with regard to fire safety, particularly during the late summer season, when plant life has flowered, and surplus vegetation remains on the roof. It is important to implement a robust maintenance procedure to remove this excess, as dried-out vegetation could provide a medium for fire spread.

Until recently, testing of green roof systems to TS1187 Part 4 has not been practically viable due to the limited depth of specimen which can be accommodated under the testing apparatus. Within the UK market there exist 'lightweight' systems with  $B_{ROOF}(t4)$  classification, but these are subsequently non-compliant with GRO / FLL guidance due to the lack of adequate growing media or a functioning reservoir board. Other systems Radmat are aware of have been tested without the waterproofing system layers which would classify the tested build-up as a 'roof system' and we would therefore urge caution if such certificates have been presented to our clients, as these should be viewed as 'indicative' only. Radmat MedO Living Roof Systems are scheduled to be tested as complete build-ups in 2025.

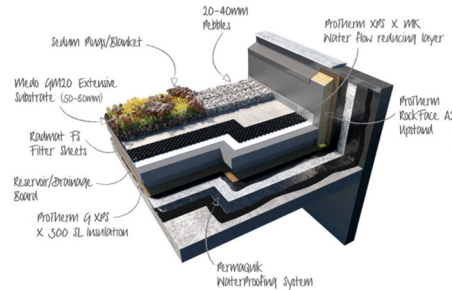
Instead of direct application data, the flat roof industry relies on other sources of technical guidance – the 2013 DCLG (former Department for Communities & Local Government) document '*Fire Performance of Green Roofs and Walls*', the FLL '*Green Roof Guidelines*' and GRO (Green Roof Organisation) '*Green Roof Code of Best Practice*'. The most official document is that from the DCLG – there is no reference to Green Roofs in **Approved Document B**.

**Fire Breaks** – Comprises an inorganic strip, minimum 500mm wide, around any perimeter or opening in the roof or at 40-meter intervals on very large roof spans. It may be viable to reduce the perimeter fire break to 300mm in some circumstances, but whilst the namesake implies these are purely for mitigating fire risk, they also function as an access route for maintenance and minimise wind scour. Fire breaks can be made up of min. 75mm depth loose stone ballast or 40mm thick concrete paving. An 'opening' can comprise an internal façade abutment with opening windows/doors, an opening rooflight, or services penetration. It is debatable whether a Rainwater outlet comprises an 'opening' into the building since the penetration is required to have proprietary fire-stopping to the underside. Radmat recommends installing a 500mm fire break around outlets unless permitted otherwise by Building Control.



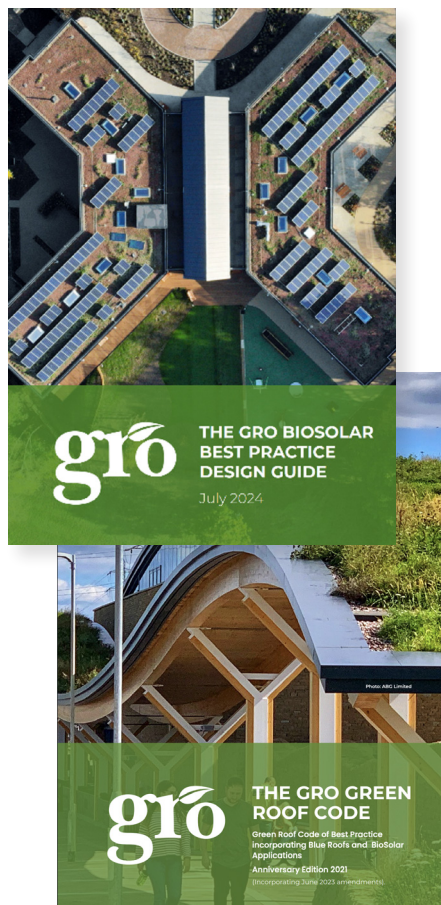
# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001



**Above:** 3D Realisation of a green roof parapet upstand on a PermaQuik PQ6100 Hot Melt inverted warm roof application, demonstrating 500mm 'fire break'

**Below:** GRO (Green Roof Organisation) guidance available online at: <https://www.greenrooforganisation.org/>



## 7. Green Roofs (cont)

**Organic Content** – The growing media (substrate which provides nutrients for plants) should contain **less than 50%** organic matter by volume. This is particularly important when a development contracts the services of a 3rd-party green roof supplier, as the growing media selection – and by extension, the fire performance – cannot be verified by Radmat. This is why, for many years, NHBC guidance insisted that green roof systems were obtained from a single source. All Radmat MedO Growing Media variants (GM20, GM30 & GM40) have been laboratory tested and have certified levels of organic content to comply with this requirement.

**Substrate Depth** – a minimum of **80mm depth** of growing media should be maintained across all green roof areas to minimise the risk of fire penetration. It is particularly important to ensure this depth is maintained beneath pre-grown vegetation blankets and those roofs which feature undulating substrate depths to better mimic real-world environments (sometimes referred to as “brown roofs”).

**Irrigation** – on an ‘Extensive’ green roof comprising sedums, succulents, wildflowers and grasses there is **no requirement** for permanent irrigation. These systems are designed such that the reservoir/drainage board elements provide passive irrigation to the plant species by capturing and temporarily storing rainwater. The fire performance of a green roof growing media was tested by DCLG on a completely dried-out sample – the introduction of an active irrigation system would therefore only increase the fire resistance of this layer. Due to the changing climate in the UK, it is recommended that all green roof areas have a means to access an irrigation point – i.e. a water services point accessible for maintenance or irrigation purposes in the event of prolonged dry weather.

**BioSolar** – This is the practice of combining PV (Photovoltaic) panels with green roof systems. These types of roofs are not currently something which can be tested to the same parameters of a roof system (i.e. to demonstrate  $B_{ROOF}$  Performance). Radmat recommends separating distances as outlined in the 2024 GRO BioSolar Best Practice Design Guide, which stipulates distances between panels and roof upstands/openings and their proximity to one another. The minimum clear space beneath a panel should be maintained at **200mm**. A green roof system which meets the design criteria described herein should pose no greater risk of fire spread due to the presence of PV panels since the panels are elevated above and away from the roof system. Fire risk as a result of the PV panels providing ignition and a medium for the spread of fire is outside of the flat roofing specification and should be determined between the PV supplier and Building Control. Test measures to determine the fire performance of PV panels on flat roofs are being developed.



# Fire Safety in Flat Roofing Specification and Compliance

## Guidance Note 001

### 8. Fire Safety Summary as of January 2025:

- Radmat's commitment to fire testing is ensuring that our flat roofing systems are fire tested to TS 1187 Part 4, with as many variations as possible captured in Extended Application Reports (ExAp).
- When classified to EN13501-5, systems which achieve B<sub>ROOF</sub>(t4) are permitted for unrestricted use on roofs and terraces.
- Radmat Inverted Warm Roofs are tested to the same rigorous standards, but can also be Classified Without Further Testing (CWFT) for unrestricted use – i.e. “B<sub>ROOF</sub>”
- Terraces, including Inset Terraces, are to be treated as roofs for the purposes of fire when the entire footprint is over conditioned (internal) space
- Balconies, Canopies and other ‘Specified Attachments’ should be composed entirely of non-combustible materials on all buildings with a residential purpose over 11m in height – waterproofing membranes are exempt
- Flat Roof Upstands where the roof abuts a wall are not a “Thermal Break” and are exempt from the ban on combustible materials – but 3rd-party insurance providers may have their own requirements. Radmat can provide a robust solution for either condition.
- Green Roof finishes should employ the advice given in relevant guidance documents on the selection of components and setting out design
- If in doubt, always consult with the project Building Control Officer
- Radmat will endeavour to update and keep our clients and contractors informed of any future changes to fire safety guidance.



**Chris Roullier**  
**Key Accounts Technical Advisor**  
**Radmat Building Products Ltd**



This information given in good faith and is based on the latest knowledge available to Radmat Building products Ltd. Whilst every effort has been made to ensure that the contents of the publication are current while going to press, customers are advised that products, techniques and codes of practice are under constant review and liable to change without notice.

For further information on Radmat products and services please call **01858 410372**  
email [techenquiries@radmat.com](mailto:techenquiries@radmat.com) or visit our website [www.radmat.com](http://www.radmat.com)

**Guidance Note 001 – Fire Safety** | **Date: 28/01/25**