



FIRE SAFETY: APPROVED DOCUMENT B

Updated: August 2019

Supersedes: 2006 edition, which is now withdrawn

OVERVIEW OF CHANGES AFFECTING FLAT ROOFS

A review by Bauder Ltd

NEW FIRE PERFORMANCE UPDATES 2019

Update to Fire Safety Approved Document B

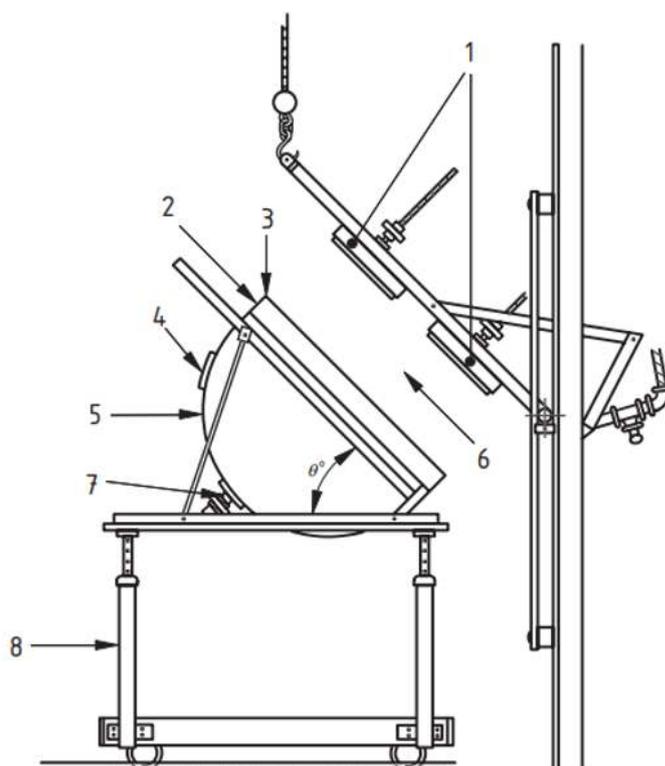
On the 30th August 2019 the new edition of 'Fire Safety-Approved Document B' (ADB) came into force and with it there are a number of changes that affect flat roofing. Gone is reference to the National Classification system set out in BS 476-3:2004 as the principle determinant of external fire performance for roofs (with exception of a listing in Appendix B Table B2 that sets out the old classification system for historic projects).

This means that the European Classification system set out in BS EN 13501-5, that has run alongside the National classification system for many years, is now the main reference for external fire performance of roofs in the UK. This classification still covers external fire penetration and spread of flame of roof systems in their response to fire from outside the building, not to be confused with individual comprising components tested for reaction to fire. The test is not concerned with the behaviour of roofs when subjected to the effects of fire from the underside, ie from within the building.

EUROPEAN FIRE STANDARDS

To advance and clarify the fire standards across Europe for External Fire Performance the roofing industry has been going through a changeover from the test and classification of BS 476-3:2004 to the tests of TS 1187 (planned to become BS EN 1187 in the next few years) and classification using BS EN 13501-5, the culmination of which has now come in the new ADB 2019 edition. The standardisation into one European test proved indefinable as many countries within the EU had differing regulations and so four test standards were required to cover the legislation in place within the various member states at the time. As such the TS 1187 has four tests for roof covering systems: t1 for Germany, t2 for Scandinavia, t3 for France and t4 for the UK (and used in the Republic of Ireland).

The results from testing under TS 1187 with BS EN 13501-5 are given as European Class ratings BROOF(t4), CROOF(t4), DROOF(t4), EROOF(t4) and FROOF(t4). The easiest way of explaining how these class ratings are achieved is to relate back to the BS 476-3 classification system - see classifications next page.



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 $\theta = 45^\circ$ for inclined test
 $\theta = 0^\circ$ for horizontal test

Typical roof test apparatus

National Class	European Class	Minimum distance from any point on relevant boundary (England)	Minimum distance from any point on relevant boundary (Scotland)
AA, AB or AC	B _{ROOF} (t4)	Unrestricted and can be used anywhere on the roof	Low Vulnerability (<6m)
BA, BB or BC	C _{ROOF} (t4)	At least 6m of the boundary	Medium Vulnerability (6-24m)
CA, CB or CC	D _{ROOF} (t4)	At least 6,12 or 20m of the boundary depending on the building type and use	Medium Vulnerability (6-24m)
AD, BD or CD	E _{ROOF} (t4)	At least 6,12 or 20m of the boundary depending on the building type and use	High Vulnerability (>24m)
DA, DB, DC or DD	F _{ROOF} (t4)	At least 20m of the boundary depending on the building type and use	High Vulnerability (>24m)

For TS 1187 Test 4 it was recognised that Approved Document B focused upon saving human lives rather than protecting the building itself and therefore set the highest requirement of A for penetration - not penetrated within 1 hour and C for spread of flame - more than 533mm. This meant that Test 4 needed to replicate the penetration test but did not require the spread of flame full test because the preliminary test allowed the tester to determine if classification D or better was achieved. If the preliminary test specimen did not burn for more than 5 minutes after removal of the test flame and spread of flame was not more than 381mm then class C is achieved. This is why Test 4 just requires the preliminary test and penetration test.

First Letter - Fire Penetration Classification (BS476-3)

- A : Those specimens which have not been penetrated within 1 hour.
- B : Those specimens which are penetrated in not less than 30 minutes.
- C : Those specimens which are penetrated in less than 30 minutes.
- D : Those specimens which are penetrated in the preliminary flame test.

Second Letter - Spread of Flame Classification (BS476-3)

- A : Those specimens on which there is no spread of flame.
- B : Those specimens on which there is not more than 533mm, spread of flame.
- C : Those specimens on which there is more than 533mm, spread of flame.
- D : Those specimens which continue to burn for 5 minutes after the removal of the test flame or with spread of flame more than 381mm, in the preliminary test.

It should also be recognised that the classification is for all types of roof system, but virtually all commonly used flat roof build-ups achieve BROOF(t4) when tested. However, to meet the Building Regulations for fire you need to prove that the 'as installed' system has a valid test certificate. For this reason, late product substitution has a high risk of not complying with the Building Regulations.

The advantage of using systems achieving BROOF(t4) is that there is no minimum distance required between adjacent buildings and this result is often referred to as 'unrestricted' or 'low vulnerability'. The worse the external fire classification the further away any adjacent buildings need to be as shown in the table.

In roofs that incorporate non-combustible surface finishes as set out in European Commission Directive 2000/553/EC such as min 50mm thickness of stone ballast or min 40mm thick stone or concrete paving slabs that fully cover the roof, these are deemed to fully satisfy the regulations with no testing. The national designations in the previous Approved Document B in Appendix A Table A5 for 'Flat Roofs covered with bitumen felt' have been removed which means reinforced bitumen membranes with bitumen-bedded chippings or non-combustible tiles on the surface need to be tested.

GREEN ROOFS

Approved Document B references 'Fire Performance of Green Roofs and Walls' published by the former Department of Communities and Local Government (DCLG) in 2013 and this document is the basis of the Green Roof Organisation (GRO) Design Guidance. In summary, the growing medium should be certified for use on green roofs and where there is no permanent irrigation organic content should be <20% and peat free. Fire Breaks should be min 50mm thick 20-40mm rounded pebbles or min 40mm thick concrete or stone paving slabs around all perimeters and glazing ideally 500mm wide, with a 1m wide Fire Break across the roof every 40m. Maintenance is important to prevent vegetation growing over Fire Breaks and to remove wildflower dry thatch in the Autumn.

ROOF INSULATION FIRE PERFORMANCE

Individual construction products are covered within BS EN 13501-1 for which insulation as a separate component will be encompassed and allocated a Class according to their reaction to fire test results with letter classifications from 'A1' through to 'F'. On the whole, materials manufactured from plastics will achieve an 'E' rating, which will include the insulants Expanded Polystyrene (EPS), Extruded Polystyrene (XPS) and Polyisocyanurate (PIR).

Non-combustible insulants, such as cellular glass along with mineral wool, are clearly desirable materials to include in a flat roof specification because of fire performance, and it is important to consider and balance the factors for inclusion within a roof system. In general, non-combustible insulants are not as thermally efficient as PIR insulation and therefore extra thicknesses, increased weight and reduced compressive strength can be a limitation in some applications. PIR has the advantage of being highly thermally efficient, which reduces the height and weight of a roof covering build-up whilst also offering good compressive strength meaning greater versatility on a project. Within a Bauder warm roof waterproofing system the insulation, be it mineral wool, cellular glass or PIR, is not directly

exposed and is therefore protected through the performance of the cap sheet and its system classification of Broof(t4); thus these insulants in-situ all conform to Building Regulations for external fire on roofs in the same way - not one achieving a higher rating than the other.

Bauder PIR insulation has also been tested and approved by fire experts Factory Mutual (FM), whose principle global business is the insurance of buildings and loss prevention. FM currently offers PIR insulation within a flat roof just the same as they would mineral wool without an exclusion or premium adjustment to the building owner provided that they are installed as part of a FM Approved Assembly, i.e. a stated system configuration. Bauder PIR, as with all other products with FM Approval, are under regular surveillance by the insurer to confirm performance on buildings.

Inverted roof constructions also generally use plastic-based insulants such as EPS and XPS, though these are only used when they are fully covered with paving slabs etc and are therefore often deemed to meet Building Regulations without testing, with the exception of a 'Specified Attachment'.

NEW REQUIREMENT OF APPROVED DOCUMENT B— 'SPECIFIED ATTACHMENT'

In late 2018 Approved Document B was amended to incorporate in B4 Regulation 7 the Government requirement to ban combustible materials as part of the external wall in buildings containing dwellings or institutions. This includes student accommodation, care homes, sheltered housing, hospitals and school dormitories in buildings where there is a storey at least 18m above ground level. It also introduced a new term 'Specified Attachment' which was included in the ban of combustible materials like the parts of an external wall. The definition includes a balcony 'attached' to an external wall. Notable exclusions are membranes and any part of a roof (except habited mansards with a slope greater than 70°). Although, what happens if the typical flat roof waterproofing membrane is Class 'E' and what if you dress the waterproofing 150mm up the wall?

This new term has caused much misunderstanding with what is the definition of a balcony and it contradicts the European Commission Directive 2000/553/EC and Regulation 7(3) if a balcony is deemed to include an insulated roof. The flat roofing industry believes that attached balconies are differentiated from roof terraces in that they are not over habited conditioned spaces and are usually bolted to or cantilevering from the external wall, however this opinion, and the previous two questions, requires clarification by the Ministry for Housing, Communities and Local Government (MHCLG).

BAUDER WATERPROOFING SYSTEMS

Bauder exposed membrane waterproofing systems achieve the highest classification for external fire testing in compliance with Approved Document B and are classed as 'unrestricted' or 'low vulnerability' due to the fire retardant in the top layer and the mineral chippings on the reinforced bitumen membrane's surface.

Bauder ballasted membrane waterproofing systems generally achieve compliance with Approved Document B due to the European Commission classification without further testing rules or the DCLG fire guidance on Green Roofs.

Bauder has a continuous fire testing programme where all the most common Bauder system build-ups have been tested including thick and thin insulation which means that all thicknesses in between are covered in the same approval to give the most complete cover for certification. Having only one test thickness of insulation is only valid for that thickness and no other because variance in thicknesses can change the test result, just as using generic insulation types is not acceptable as there can be differences due to the core or facings - 'as built' should match 'as tested'. Our BBA certification for fire testing was up to date at publication but results can be extended by our continuous testing.

IN SUMMARY

- **Bauder waterproofing systems are tested to TS 1187 Test 4.**
- **Introduction of the term 'Specified Attachment' has created the question 'what is a balcony?'**
- **Bauder exposed membrane waterproofing systems achieve the highest classification for external fire testing in compliance with Approved Document B 2019 and are classed as 'unrestricted' or 'low vulnerability.'**
- **Bauder ballasted membrane waterproofing systems generally achieve compliance with Approved Document B without testing.**
- **'As built' should match 'as tested'.**

Need more information?

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