



Fire Protection Requirements for EWI Systems

The three geographic regions to which the Building Regulations apply, namely England and Wales, Scotland, and Northern Ireland, each have their own provision for achieving an acceptable standard of fire protection. These take into account the resistance to fire spread over external walls, structure height, space separation between buildings, position in relation to boundaries, unprotected areas, and the intended use of the structure. Until recently, the requirements between individual regulations differed; however, a common consensus of underlying principles has now been reached which are outlined in this guide.

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Building Regulations

In England and Wales, certified systems must meet the requirements of approved documents B1 (Fire Safety - dwellings) in Part B4 Section 8 or B2 (Fire Safety – buildings other than dwellings) in Part B4 Section 12; in Scotland, Part 2 (Fire) of the Technical Handbooks for Domestic or Non-Domestic Regulations; and in Northern Ireland, Technical Booklet E (Fire safety) Section 4.

Sections within each regulatory document refer to external wall construction, external spread of fire and the use and definition of materials classified as either non-combustible, of limited combustibility or low risk, making reference to British Standards, European Standards, National Classification and Building Research Establishment (BRE) publications.

Where systems are to be considered as non-combustible, the total external wall insulation (EWI) system, not only the insulation, must be non-combustible and have either achieved an A1 or A2 European classification or none of the materials are to contain more than 1% of homogeneously distributed organic material.

Other sections complimentary to EWI should not be overlooked, particularly those relating to space separation – boundaries, unprotected areas and compartmentation in the England and Wales and Northern Ireland Regulations and compartmentation and spread to and from neighbouring structures in the Scottish Regulations.

Building Regulations in England and Wales and Northern Ireland for EWI systems used on buildings greater than 18m in height must either conform to the Regulation definition for limited combustibility (or better) or alternatively meet the provisions in BR135. Likewise external wall cladding less than 1m from a relevant boundary should conform to the same requirement.

In Scotland, Building Regulations for EWI systems used on buildings greater than 18m in height must be totally non-combustible or conform to the alternative guidance given in BR135 (see later section). Similarly, external wall cladding less than 1m from a relevant boundary should meet the same requirement.



Fire Standards

BS 476 parts 6 and 7 are the traditionally accepted “reaction to fire” standards used to assess the performance of external surfaces of EWI construction products available on the UK market. The National Class system, as defined in Building Regulations, is based on results from these standards. More recently, the Regulations have included equivalent European standards, EN 13823: 2002 (single burning item) and EN ISO 11925-2:2002 (single flame source) with the harmonised method of classification given by BS EN 13501-1:2002 as alternatives which will eventually replace the British Standards. The external surfaces of EWI systems conforming to the requirements of Class 0 or Euro Class B-s3, d2 or better, meet the Building Regulations provision for external surfaces of walls on buildings below 18m in height.

BS 8414 parts 1 and 2 (Fire performance of external cladding systems) are large scale fire performance test methods for non-load bearing exterior wall assemblies, including EWI systems. Part 1 is applicable to systems fixed to a solid substrate and part 2 to systems fixed to and supported by a structural steel frame. The test methodology enables the overall fire performance of the system and its relevant components to be assessed as closely to typical end-use conditions as possible in respect of multi-storey dwellings.

Systems not meeting the non-combustible requirements of the Scottish regulations for buildings greater than 18m or the limited combustibility requirements of England and Wales and Northern Ireland but tested to this methodology may provide an acceptable alternative if the performance criteria of Annex A (Part 1) or Annex B (Part 2) of BR135 are fulfilled.

Building Regulations refer to BR135 – “Fire performance of external thermal insulation for walls of multi-storey buildings” – which is a Building Research Establishment (BRE) guidance document that via Annex A compliments BS 8414 part 1, and Annex 2 (BRE digest 501) supports BS 8414 Part 2 by providing performance criteria and a classification method for the test methodology. Additionally, there is useful guidance on the fire performance and design principles of EWI (see section on Key fire performance design elements).

LPS 1581, a Loss Prevention Certification Board (LPCB) standard (formerly LPS 1181 part 4), is a nationally accredited third party approval scheme leading to a LPCB Red



Book listing. Fire testing follows the BS 8414 part 1 methodology with performance criteria similar to BR135 plus a mechanical performance assessment. Review of product documentation and specifications together with an annual manufacturing plant quality surveillance audit are required to provide a level of accreditation widely accepted by insurers.

LPS 1582, a comparable standard to LPS 1581, provides an accredited third party approval leading to Red Book entry for EWI fire performance using BS 8414 part 2 methodology for systems applied to lightweight steel framing.

Key Design Considerations

Full guidance should be taken from the recommendations provided in BR135 unless a system manufacturer can demonstrate otherwise via documented compliance with BR135/LPS assessment criteria.

Fire Barriers

Fire spread should be contained to the floor level immediately above the origin of the fire. To achieve this in both thermoplastic insulated systems e.g. expanded polystyrene (EPS) and thermoset insulated systems e.g. phenolic foam, horizontal “fire barriers should be installed at each floor level above the first floor level i.e. starting with the second storey”.

Systems using mineral wool insulation, if classified totally non-combustible or compliant to BR135/LPS criteria, may be considered continuous firebreaks in their own right.

A typical fire barrier used with systems comprising thermoplastic and thermoset insulation components must be constructed of non-combustible insulation material and cover the full depth of the insulation used in the system. The fire barrier, as recommended in BR135, should be at least 100mm high.

Systems using mineral wool insulation are considered continuous fire barriers in themselves.



Cavity Systems to meet NHBC Requirements

The cavity must not impede moisture drainage during normal usage but, in the event of fire, the barrier installed must have the capability of preventing fire propagation through the cavity. Special attention to detailing around vulnerable openings such as windows and doorways should be made and if required vertical fire breaks to prevent lateral fire spread.

Fixing Details

A suitable through fixing method is required to ensure the system will not collapse in a fire. This can be adhesive, adhesive supplemented by mechanical fixing, or solely mechanical fixing. Additional guidance on the latter is provided in BRE Defect Action Sheet DAS 132.

Design Approval

The location, type and fixing of all horizontal and vertical fire barriers (that may be necessary to prevent lateral fire spread) should be outlined in the design drawings submitted to the Building Control Department and would ultimately be approved by the Building Control Officer.

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Requests to use any part of this guide should be made in writing to:

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Standards Summary

BS EN ISO 1182	Reaction to fire tests for building products. Non-combustibility test.
BS EN 13501-1	Fire classification of construction products and building elements. Classification using data from reaction to fire tests.
BS EN 13823	Reaction to fire tests for building products. Building products excluding floorings exposed to the thermal attack by a single burning item (SBI).
BS EN ISO 1716	Reaction to fire tests for building products. Determination of the heat of combustion.
BS EN ISO 11925 -2	Reaction to fire tests. Ignitability of building products subjected to direct impingement of flame. Single-flame source test.
BS 476 Part 4	Fire tests on building materials and structures. Non-combustibility test for materials.
BS 476 Part 6	Fire tests on building materials and structures. Method of test for fire propagation for products.
BS 476 Part 7	Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products.
BS 476 Part 11	Fire tests on building materials and structures. Method for assessing the heat emission from building materials.
BS 476 Part 20	Fire tests on building materials and structures. Methods for determination of fire resistance of elements of construction (General Principles).
BS 476 Part 22	Fire tests on building materials and structures. Methods for determination of fire resistance of non-load bearing elements for construction.
BS 8414 Part 1	Fire performance of external cladding systems. Test methods for non-loadbearing external cladding systems applied to the face of a building.
BS 8414 Part 2	Fire performance of external cladding systems. Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame.
BR 135: (Annex A)	Fire performance of external thermal insulation for walls of multi-storey buildings (including performance and classification method of BS 8414-1).
BR 135: (Annex B)	Performance criteria and classification method for BS 8414-2 given in BRE Digest 501.
LPS 1581	Formerly LPS 1181 part 4, a Loss Prevention Certification Board (LPCB) third party accreditation standard for non-load bearing external thermal insulated cladding systems with rendered finishes fixed to a solid substrate.
LPS 1582	A Loss Prevention Certification Board (LPCB) third party accreditation standard awaiting publication, which will cover non-load bearing external thermal insulated cladding systems with render finishes fixed to and supported by a structural steel frame.
Class 0	National Classification of fire performance referred to in Building Regulations and derived from BS 476 parts 6 and 7, but not a British Standard.

Table of National Classification

Equivalent European classifications and European and British Standards required to attain the respective classification.

National Classification - England & Wales and N Ireland	Building Regulation Performance Risk Classification - Scotland	European Classification to BS EN 13501-1	European Standard Test Methods required to achieve Classification	British Standard Test Methods required to achieve Classification
Non-Combustible	Non-Combustible	A1 or A2	BS EN ISO 1182 and BS EN ISO 1716	BS 476 part 4 or BS 476 part 11 or BS 8414 classified to BR 135 or LPS accreditation
Limited Combustibility	N/A	N/A	BS EN ISO 1182 or BS EN ISO 1716 and BS EN 13823 (N/A Scotland)	BS 476 part 4 or BS 476 part 11 or BS 8414 classified to BR 135 (N/A Scotland) or LPS accreditation
Class 0	Low	B – s3, d2 or better	BS EN 13823 and BS EN ISO 11925-2	BS 476 parts 6 and 7 (BS 476 part 6 Scotland)
Class 1	Medium	C – s3, d2 or better	BS EN 13823 and BS EN ISO 11925-2	BS 476 parts 6 and 7 (BS 476 part 7 Scotland)
Class 2	High	D – s3, d2 or better	BS EN 13823 and BS EN ISO 11925-2	BS 476 parts 6 and 7 (BS 476 part 7 Scotland)
Class 3	High	D – s3, d2 or better	BS EN 13823 and BS EN ISO 11925-2	BS 476 parts 6 and 7 (BS 476 part 7 Scotland)
-	Very High	A material which does not attain the performance for high risk		

- 1) National classifications do not automatically equate with the equivalent European classifications.
- 2) When a classification includes s3, d2 there is no limit set for smoke production and/or flaming droplets.