

The Building (Amendment) Regulations 2018

Regulation 7(2), Regulation 7(3) and Requirement B4

Technical guidance for interpretation in relation to the external walls and specified attachments of Relevant Buildings in England

Issue 1, September 2020

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The Centre for Window and Cladding Technology (CWCT) is a publisher of industry standards and guidance on building envelopes. CWCT provides training for many people involved in the design, specification, and construction of building envelopes. Founded in 1989 it is now supported by over 350 member companies drawn from the broad spectrum of the industry, from clients and architects to contractors and manufacturers.

About the Society of Façade Engineering (SFE)

The Society of Façade Engineering brings architects, façade engineers, building services engineers, structural engineers and contractors together in a forum where they can work together to advance knowledge and practice in facade engineering, promote good practice and ensure that today's increasingly complex building façades meet the many and varying performance criteria.

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1 INTRODUCTION

In November 2018 the UK government announced changes to the Building Regulations in order to implement the ban on the use of combustible material in the external walls of certain high-rise buildings in England.

This guide has been written by the Technical Committee of the Centre for Window and Cladding Technology (CWCT) and the Society of Façade Engineering (SFE) Fire Committee.

The interpretation provided by this guidance has been formed through extensive consultation and collaboration between industry professionals, including façade engineers, fire engineers, architects, building control professionals, surveyors, and manufacturers.

Within the range of professions that are responsible for specifying and engineering the various aspects of the building envelope there will always be some differences of opinion as to the specific interpretation of certain terms and requirements and it is therefore important to discuss and agree the choice of materials on a case-by-case basis with interested parties such as the project fire engineer, building control officer, insurer and warranty provider.

This guidance proposes a practical and pragmatic interpretation where conflicting interpretations have already been identified or where the potential for conflicting interpretations may be possible. This guidance is not intended to 'bypass' the amendments to building Regulation 7, Requirement B4 or the guidance contained in Approved Document B.

The exemptions given by regulation 7(3) recognise the vital role that certain combustible materials presently play in the performance of modern facades, particularly in terms of thermal performance and weathertightness. However, the exemptions do not fully recognise the complexity of modern building envelopes and leave some ambiguity and uncertainty over materials which may or may not be used, and in what circumstances they may be used.

It is envisaged that in the future further non-combustible alternative materials will be developed to replace currently used essential combustible materials. This is already happening, but this process takes time and guidance is required in the interim. Wherever there is a suitable non-combustible material available it will almost always be appropriate to use it in preference to a more combustible alternative which achieves the same performance in other regards.

This guidance document is solely focussed on the combustibility of materials. Other measures such as compartmentation will also be required to limit fire spread in external walls. These issues are not discussed here.

1.1 Disclaimer

Publication of this guidance has been overseen by the CWCT Technical Committee and SFE Fire Committee.

This guidance is intended for use only by appropriately qualified designers, specifiers and others (with relevant experience) in each case having regard to the particular circumstances and requirements of each case, and exercising professional judgement including the reasonable skill and care to be expected of a professional of the relevant discipline, in that context.

CWCT and SFE accept no duty of care, obligation or liability, whatsoever, to its members or others, in relation to the use of this guidance for any purpose.

1.2 Regulation 7

The ban on the use of combustibile material in the external walls of certain high-rise buildings in England has been implemented by amending Regulation 7 of the Building Regulations, which deals with materials and workmanship.

Regulation 7 establishes specific requirements for materials and workmanship which must be followed in order to fully comply. It is not possible to use alternative means such as testing or fire engineering to demonstrate an acceptable standard of fire safety.

Regulation 7(2) has been added to Regulation 7 and states:

'(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 Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled "Fire classification of construction products and building elements. Classification using test data from reaction to fire tests" (ISBN 978 0 580 59861 6) published by the British Standards Institution on 30th March 2007 and amended in November 2009.'

It should be noted that a new version of BS EN 13501-1 was published in 2018 and it is anticipated that regulation 7(2) will be amended to refer to it. The testing and classification of products achieving A2-s1, d0 or better has not changed.

1.3 Exemptions

The amended regulations list materials which are exempt from the limits on combustibility introduced by regulation 7(2). The following exemptions are given in regulation 7(3):

- '(a) cavity trays when used between two leaves of masonry;*
- (b) any part of a roof (other than any part of a roof which falls within paragraph (iv) of regulation 2(6)) if that part is connected to an external wall;*
- (c) door frames and doors;*
- (d) electrical installations;*
- (e) insulation and water proofing materials used below ground level;*
- (f) intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;*
- (g) membranes;*
- (h) seals, gaskets, fixings, sealants and backer rods;*
- (i) thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or*
- (j) window frames and glass.'*

It should be recognised that the list of exemptions may change over time. The ambition of the government is to reduce this list as new products that meet the A2-s1, d0 classification become available. It is therefore incumbent on the reader to refer to the latest version of regulation 7(3) for the most up to date exemptions.

Whilst the above items are exempt from the requirements of regulation 7(2), limits may still be required on their use in order to limit the external spread of fire. This is discussed further in section 1.7 and 1.8.

1.4 Material change of use

Where a building becomes a relevant building due to a material change of use, for example the conversion of a hotel into a student residence, the requirements of regulation 7(2) apply to the existing external walls and specified attachments as well as any modifications or additions. Material change of use is described in Regulations 5 and 6.

1.5 Definitions

The amendments to the Building Regulations provide further definitions which identify where regulation 7(2) applies.

1.5.1 Relevant building

Regulation 7(4) defines what is meant by a relevant building:

'(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 (excluding any room in a hostel, hotel or boarding house); 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.'

By including institutions, it also covers residential schools, care homes and hospitals, student residences or other institutional accommodation blocks. A full definition of an institution may be found in the Building Regulations, <http://www.legislation.gov.uk/ukxi/2010/2214/regulation/2/made>.

A mixed-use building with a storey 18m or more above ground level would be deemed a relevant building if it contained any of the uses given in regulation 7(4), even if those parts of the building are below 18m. Similarly, a building would become a relevant building where previously it was not by the addition of any of the uses given in regulation 7(4). This would include adding a flat to an office building for example.

A development may contain multiple buildings of different heights. Where these buildings are constructed over a common basement or shared podium, it would be necessary to agree with the relevant building control body as to how far the amended regulations apply within the development.

1.5.2 External wall

An external wall is defined in regulation 2(6):

'(6) In these Regulations -

(a) any reference to an "external wall" of a building includes a reference to -

- (i) anything located within any space forming part of the wall;*
- (ii) any decoration or other finish applied to any external (but not internal) surface forming part of the wall;*
- (iii) any windows and doors in the wall; and*
- (iv) any part of a roof pitched at an angle of more than 70 degrees to the horizontal if that part of the roof adjoins a space within the building to which persons have access, but not access only for the purpose of carrying out repairs or maintenance.;*

This definition of the external wall therefore not only includes materials used in the wall construction, but also any materials that are contained within it or pass through it.

1.5.3 Specified attachments

Regulation 2(6) also defines a specified attachment as:

'(b) "specified attachment" means -

- (i) a balcony attached to an external wall; or*
- (ii) a solar panel attached to an external wall.'*

Materials used on specified attachments must be class A2-s1, d0 or better.

1.6 Frequently asked questions (FAQs)

In April 2019, the Ministry of Housing, Communities and Local Government (MHCLG) published a series of FAQs relating to the amended Building Regulations. They were updated in January 2020. They are available online only, with no .pdf or printed version available.

The FAQs provide some useful clarifications which are discussed further in this guidance document. A link to the FAQs can be found in section 1.10.

1.7 Building Regulations 2010

In addition to the new requirements introduced by the 2018 amendments, the existing Building Regulations must also be complied with. The Building Regulations 2010 are functional requirements. The technical requirements are listed in Schedule 1 of the Regulations, for example *'the external wall shall adequately resist the spread of fire'*. The Regulations themselves do not give any specific detail on how the functional requirements should be achieved. This differs from Regulation 7 where specific requirements for materials must be followed as described in section 1.2.

Practical guidance on how to meet the functional requirements is given in a series of Approved Documents, with Approved Document B (ADB) providing design guidance on how to meet the functional requirements relating to fire safety. Although Approved Documents cover common building situations, compliance with the guidance set out in the Approved Documents does not provide a guarantee of compliance with the requirements of the regulations because the Approved Documents cannot cater for all circumstances, variations and innovations.

There may be other ways to comply with the requirements than the methods described in an Approved Document for example fire engineering, risk analysis or testing. If this approach is taken, agreement should be sought from the relevant building control body at an early stage.

1.7.1 Requirement B4(1)

Control of external fire spread is given in requirement B4 of Schedule 1 of the Building Regulations, and states:

'The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building'.

Therefore the external walls of a building should not contribute to undue fire spread from one part of a building to another part, or provide a medium for undue fire spread to adjacent buildings or be readily ignited by fires in adjacent buildings.

1.8 Approved Document B 2019

ADB was revised in 2019 and further amended in 2020 in order to provide additional clarity regarding the guidance contained within, and to refer to the requirements of the amended Regulation 7. ADB consists of two volumes. Volume 1 (ADB1) covers dwellings and volume 2 (ADB2) covers buildings other than dwellings. Blocks of flats would therefore be covered by ADB1 and other building types, including mixed use would be covered by ADB2.

The key clauses in ADB relating to the combustibility of materials are given below, with a brief commentary. Where clause numbers are given, the first number refers to ADB1 and the number in brackets to ADB2.

10.4 (12.4) *In relation to buildings of any height or use, consideration should be given to the choice of materials (including their extent and arrangement) used for the external wall, or attachments to the wall, to reduce the risk of fire spread over the wall.*

This clause has been subject to much debate. Whilst no one would argue with the intention of the above clause, there is no clearly defined way to give 'consideration' and therefore different interpretations are possible on how this should be met.

10.5 (12.5) *The external surfaces (i.e. outermost external material) of external walls should comply with the provisions in Table 10.1 (Table 12.1). The provisions in Table 10.1 (Table 12.1) apply to each wall individually in relation to its proximity to the relevant boundary.*

In a relevant building the above clause is redundant as the requirement of regulation 7(2) for all materials to achieve class A2-s1, d0 is a higher level of performance than is required by Table 10.1 (12.1).

10.6 (12.6) *In a building with a storey 18m or more in height (see Diagram D6 in Appendix D) any insulation product, filler material (such as the core materials of metal composite panels, sandwich panels and window spandrel panels but not including gaskets, sealants and similar) etc. used in the construction of an external wall should be class A2-s3, d2 or better (see Appendix B). This restriction does not apply to masonry cavity wall construction which complies with Diagram 8.2 (9.2) in Section 8 (9). Where regulation 7(2) applies, that regulation prevails over all the provisions in this paragraph.*

In a relevant building the above clause is redundant as the requirement of regulation 7(2) for all materials to achieve class A2-s1, d0 is a higher level of performance than is required by 10.6 (12.6)

10.14 (12.15) *The provisions of regulation 7 apply in addition to requirement B4. Therefore, for buildings described in regulation 7(4), the potential impact of any products incorporated into or onto the external walls and specified attachments should be carefully considered with regard to their number, size, orientation and position.*

This clause is important as it reiterates that both regulation 7(2) and requirement B4 apply to relevant buildings. Therefore whilst certain materials may be exempt from the limits of combustibility in regulation 7(2), their use may still have to be restricted in order to comply with requirement B4.

10.15 (12.16) *Particular attention is drawn to the following points.*

- a. *Membranes used as part of the external wall construction above ground level should achieve a minimum of class B-s3, d0.*
- b. *Internal linings should comply with the guidance provided in Section 4.*
- c. *Any part of a roof should achieve the minimum performance as detailed in Section 12.*

d. As per regulation 7(3), window frames and glass (including laminated glass) are exempted from regulation 7(2). Window spandrel panels and infill panels must comply with regulation 7(2).

e. Thermal breaks are small elements used as part of the external wall construction to restrict thermal bridging. There is no minimum performance for these materials. However, they should not span two compartments and should be limited in size to the minimum required to restrict the thermal bridging (the principal insulation layer is not to be regarded as a thermal break).

f. Regulation 7(2) only applies to specified attachments. Shop front signs and similar attachments are not covered by the requirements of regulation 7(2), although attention is drawn to paragraph 10.15g.

g. While regulation 7(2) applies to materials which become part of an external wall or specified attachment, consideration should be given to other attachments to the wall which could impact on the risk of fire spread over the wall.'

A number of the recommendations in 10.15 (12.16) have potential implications for various materials used as part of the external wall. These are discussed in further detail in this guidance document.

1.9 Future work

The amendments to the Building Regulations and Approved Document B guidance have introduced several challenges and apparent inconsistencies which need addressing by designers. They have also raised questions that cannot readily be answered with current testing methodologies.

Further research and testing are required in order to better understand what happens to façade materials and complex façade systems in the event of a fire.

We encourage all those with role in ensuring that facades are safe and adequately resist the spread of fire to engage and collaborate to help increase our knowledge in this vital area.

It is intended that this document will be maintained and revised as further information becomes available. Your feedback is an important part of this process. If you identify any gaps in the guidance or encounter conflict, inconsistency or disagreement over different interpretations, we would like to know. Please email any feedback to cwct@cwct.co.uk and sfe@cibse.org.

A designer has a responsibility to ensure that they follow the most up to date regulations and guidance as published by the government and should regularly check for updates to all relevant documents.

1.10 Key documents

Approved Document B, Fire Safety, Volume 1, Dwellings (ADB1), 2019 edition – for use in England,
Approved Document B, Fire Safety, Volume 2, Buildings other than dwellings (ADB2), 2019 edition – for use in England,

Approved Document 7, Materials and workmanship, 2013 edition incorporating 2018 amendments – for use in England,

Building (Amendment) Regulations 2018

(<https://www.legislation.gov.uk/ukSI/2018/1230/contents/made>)

Building (Amendment) Regulations 2018: frequently asked questions (MHCLG FAQs)

(<https://www.gov.uk/government/publications/building-amendment-regulations-2018-frequently-asked-questions/building-amendment-regulations-2018-frequently-asked-questions>),

BS EN 13501-1:2007+A1:2009, Fire classification of construction products and building elements.

Classification using test data from reaction to fire tests.

2 MATERIALS

Regulation 7(2) states that:

'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 Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled "Fire classification of construction products and building elements. Classification using test data from reaction to fire tests" (ISBN 978 0 580 59861 6) published by the British Standards Institution on 30th March 2007 and amended in November 2009.'

This requirement applies to 'materials'; however, there has been some confusion over the definition of a 'material'.

Approved Document 7 states:

'Materials include:

- 1.a. manufactured products such as components, fittings, items of equipment and systems*
- 2.b. naturally occurring materials such as stone, timber and thatch*
- 3.c. backfilling for excavations in connection with building work.'*

The classification document referred to in regulation 7(2) has a different definition of a material. EN 13501-1 defines a material as:

'single basic substance or uniformly dispersed mixture of substances, e.g. metal, stone, timber, concrete, mineral wool with uniformly dispersed binder or polymers.'

EN 13501-1 goes on to define a 'product' as:

'material, element or component about which information is required.'

Therefore the Building Regulations definition of a 'material' is more closely aligned with the definition of a 'product' given in EN 13501-1.

The Building (Amendments) Regulations 2018: frequently asked questions, published in April 2019 and updated in January 2020, confirms there is no difference between 'materials' and 'components'.

Therefore, combustible elements can be used in 'products' or 'components' provided the complete 'product' or 'component' has been tested and classified in accordance with EN 13501-1, and has achieved a classification of A2-s1, d0 or better. An example of this would be polyester powder coated aluminium. The powder coating is combustible, but when tested with an aluminium substrate, the component can achieve class A2-s1, d0. This is discussed further in section 6.2.

2.1 Testing

BS EN 13501-1 defines a harmonised procedure for the classification of reaction to fire of construction products. The classification is based on certain test procedures and the relevant field of application procedures.

The test standards referenced by BS EN 13501-1 are highly prescriptive and the results achieved apply to the tested configuration. In order to widen the scope of the test result, test reports may include an extended field of application which give additional parameters under which the test result would remain valid. Depending on the product that is tested, these extended applications might include thickness and colour of applied paint, the properties of the substrate (typically density and reaction to fire) on to which the product can be applied, thickness of insulation and depth of any cavity (for example when used as a rainscreen panel).

When selecting materials and products, it is vital to ensure that the proposed use is within the scope of the field of application of the test result. If the use falls outside of the scope, further assessment and/or testing may be required in order to establish the classification of the product.

2.2 EC Decisions

A number of construction materials where the reaction to fire is well known can be classified without further testing (CWFT) following several European Commission (EC) decisions. These include mineral wool, concrete, stainless steel, aluminium, glass, gypsum plasterboard and fibre cement. Care should still be taken in the use of these materials as the EC decisions may have certain limitations, for example the nominal board thickness, paper grammage allowed and substrate for certain classifications of gypsum plasterboard. This is discussed further in terms of glass in section 6.1.

The MHCLG FAQ confirms that products which have been deemed by European Commission decisions to meet Class A2-s1, d0 or A1 can be considered to meet the new requirements.

3 TERMINOLOGY

The use of correct and consistent terminology is crucial to avoid misunderstanding. Unfortunately, inconsistent use of terminology is common in the façade industry, and different people often use the same term to mean two different things.

With the new exemptions given by regulation 7(3), appropriate use of terminology is now more important than ever. Where possible terminology should be used that is consistent with regulation 7(3), so as to avoid later confusion.

An example of imprecise terminology is the use of the word ‘mastic’. ‘Mastic’ could be used for the following:

- To provide a weathertight seal between components, in which case ‘seal/sealant’ would be more appropriate,
- To fill a gap for aesthetic purposes, in which case ‘filler’ might be more appropriate,
- To bond materials together, in which case ‘adhesive’ would be more appropriate.

As is shown above, the specific use of the ‘mastic’, determines which of these three terms may be appropriate, and this in turn determines whether or not the material is exempt under regulation 7(3).

Where possible, the terminology below is taken from British standards and other reputable sources.

| Term | Definition |
|-----------------------|--|
| ADB | Approved Document B, Fire Safety, 2019 Edition – for use in England. |
| Adhesive | Non-metallic substance capable of joining material (BS ISO 6707-1). A discrete product used either in a thin controlled layer or as discrete dabs or lines for bonding two components, for instance the insulation product to the wall substrate. |
| Air brick | Type of brick that contains holes to allow the circulation of ‘fresh’ outside air beneath suspended floors and within cavity walls to prevent moisture building up and allow drying out (Designing Buildings Wiki). |
| Backer rod | Component inserted into a joint to help ensure the correct depth of sealant in a joint and provide a stop against which the sealant may be applied and tooled. |
| Balcony | Upper accessible platform within a storey, not fully enclosed by walls (BS ISO 6707-1). NOTE: FURTHER BALCONY DEFINITIONS ARE GIVEN IN SECTION 5.3. |
| Balustrade | A railing or wall to prevent people from falling over the edge of stairs, a balcony, etc (Cambridge Dictionary). |
| Bonded glazing | Assembly in which glass products are fixed to the structural seal frame by means of a sealant that has been shown to be capable of withstanding the load actions applied to the glass products of the structural seal frame (BS EN 1279-1:2018) Note bonded glazing was previously called structural sealant glazing (SSG) and is still used in some already published standards. |
| Bonding | Action of an adhesive (BS ISO 6707-1). |

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| Breather membrane | <p>Membrane with water vapour resistance greater than 0.25 MNs/g and less than 0.6 MNs/g (BS 5250:2011).</p> <p>A layer within the construction that allows the passage of air and water vapour but is resistant to the passage of liquid water. This is sometimes used within a rainscreen wall to prevent water from reaching the insulation or other parts of the backing wall whilst allowing the wall to breathe.</p> |
| Brick slip | <p>Lightweight, thin facing applied to a built-up wall to give the impression of traditional brick wall finish. The brick slips themselves may be thin clay bricks or a synthetic alternative.</p> |
| Built-up wall | <p>Layered construction typically consisting of an airtight back wall with an outer layer of insulation and external cladding/covering.</p> <p>In the context of this document, built-up walls refer to walls with EWIS or a rainscreen system as the external covering.</p> |
| Cavity barrier | <p>Construction provided to close a concealed space against penetration of smoke or flame, or provided to restrict the movement of smoke or flame within such a space (BS 9999:2017).</p> |
| Cavity closer | <p>Cavity barrier located so as to close a cavity at any opening in a cavity wall, such as that formed around a window, door or perimeter of the wall, against the penetration of smoke or flame (note: it may also have thermal insulation and moisture resistance properties)</p> |
| Cavity tray | <p>Damp-proof course that bridges a wall cavity to lead moisture to the external face (BS 5628-3:2005).</p> |
| Cavity wall | <p>Wall of two leaves effectively tied together and with a space between them (BS 5628-3:2005).</p> <p>An inner skin comprised a framed (steel or timber) wall is common with modern cavity walls.</p> |
| Class 0 | <p>A product performance classification for wall and ceiling linings (ADB:2013).</p> <p>Class 0 is not a classification identified in any British Standard test and relates to the spread of flame over the surface of a material.</p> <p>NOTE THAT CLASS 0 DOES NOT INFER THAT A MATERIAL IS NON-COMBUSTIBLE. THE USE OF CLASS 0 IS BEING PHASED OUT IN FAVOUR OF EUROPEAN CLASSIFICATIONS.</p> |
| Combustible | <p>A material/product classified as anything other than class A1 in accordance with BS EN 13501-1. Combustible classifications range from A2 (very limited contribution to fire spread) through to F (highly combustible). It should be noted that in some countries A2 is regarded as non-combustible.</p> |
| Component | <p>A part that combines with other parts to form something bigger (Cambridge Dictionary)</p> <p>'Components' are covered by regulation 7(2).</p> |

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| Curtain wall | <p>Non-loadbearing wall positioned on the outside of a building and enclosing it (BS ISO 6707-1).</p> <p>A wall system typically comprising framing, glazing and opaque panels is commonly referred to as a 'curtain wall', and this terminology is used throughout this document. However, other forms of non-loadbearing wall construction may also be referred to as 'curtain walling'.</p> |
| Damp-proof course | <p>Layer or coat of material covering the bedding surface of a wall to resist the passage of moisture (BS ISO 6707-1).</p> <p>Layer of sheeting, masonry units or other material used in masonry to resist the passage of water (BS EN 1996-1-1:2012).</p> |
| Decking | Floor covering, typically in plank form, often used on balconies and other outdoor spaces. |
| EIFS | Exterior Insulated Finish System, See EWIS. |
| ETICS | Exterior Thermal Insulation Composite System, See EWIS. |
| EWIS | <p>Exterior Wall Insulation System.</p> <p>This terminology is used by the British Board of Agreement (BBA) and is widely understood in the UK.</p> <p>EWIS is a composite system made up of three basic components: an insulant, a fixing, and a render or cladding. This is applied to an existing wall to improve the thermal performance or a new back wall as part of the external wall</p> |
| External wall | See 1.5.2. |
| Fastener | <p>Mechanical connecting device that fixes one component to another (BS ISO 6707-1).</p> <p>Screw, bolt, rivet or similar component used to secure two or more components together, typically as part of a framing or bracket system.</p> |
| Filled joint | Joint that makes use of a jointing product to fill the gap between adjacent parts (BS 8298-1). |
| Fire stop | A seal provided to close an imperfection of fit or design tolerance between elements or components, to restrict the spread of fire and smoke (ADB). |
| Fixing | Mechanical connecting device that fixes one component to another. |
| Gasket | Flexible pre-formed component that is used to seal a joint. |
| Glazing edge seal | Assembled edge of an insulating glass unit, designed to ensure that moisture and gas transmissions between the inside and outside of the unit are limited, with a certain mechanical strength, and with a certain physical and chemical stability (BS EN 1279-1:2018). |
| Glazing spacer bar | Component used to separate the panes and control the width of the cavity at the edge of the insulating glass unit (BS EN 1279-1:2018). |
| Infill panel | <p>Translucent or opaque filler or facing material, either of one piece or an assembly, installed within a surrounding frame (BS EN 13119:2016).</p> <p>In the context of this document, infill panels are considered as opaque panels only.</p> |

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| Insulating glass unit (IGU) | Assembly consisting of at least two panes of glass, separated by one or more spacers, hermetically sealed along the periphery, mechanically stable and durable (BS EN 1279-1:2018). |
| Insulation product | A prefabricated product, with a high thermal resistance, which is intended to impart insulating properties to the substrate to which it is applied. |
| Intumescent material | <p>Reactive materials which are specifically formulated to provide a chemical reaction upon heating such that their physical form changes and in so doing provide fire protection by thermal insulative and cooling effects (BS EN 16623:2015).</p> <p>Many intumescent materials expand upon heating so that they can be used to block gaps which are necessary in day-to-day use but in a fire situation would prohibit the passage of smoke and flame, for example at open-state cavity barriers or around the perimeter of doors.</p> |
| Joint | Discontinuity in the construction works where adjacent products, components or assemblies are put together, fixed or united (BS ISO 6707-1). |
| Laminated glass | Assembly consisting of one sheet of glass with one or more sheets of glass and/or plastic glazing sheet material joined together with one or more interlayers (BS EN ISO 12543-1:2011). |
| Limited combustibility | <p>Material/product classified as class A2-s3, d2 or better in accordance with BS EN 13501-1:2007 (ADB:2013).</p> <p>NOTE THAT THIS TERM IS NO LONGER REFERRED TO IN REGULATION 7(2) OR ADB:2019.</p> |
| Lining | Internal boards, typically plasterboard, attached to a framed backing wall or drylining system. |
| Location block | A block of resilient non-absorbent material used between the edges of the glass or other infill and the frame, other than the bottom (see setting block), to prevent movement of the glass within the frame by thermal expansion or when the window or door is opened or closed. |
| Material | <p>Single basic substance or uniformly dispersed mixture of substances, e.g. metal, stone, timber, concrete, mineral wool with uniformly dispersed binder or polymers (BS EN 13501-1:2018).</p> <p>Materials include manufactured products such as components, fittings, items of equipment and systems; naturally occurring materials such as stone, timber and thatch; and backfilling for excavations in connection with building work (Approved Document 7).</p> <p>'Materials' are covered by regulation 7(2).</p> |
| Membrane | <p>Thin layer of material (BS 5250:2011).</p> <p>A membrane can be supplied as a pre-formed sheet of material, or as a liquid which cures after it is typically brushed or sprayed onto a substrate.</p> |
| MHCLG | Ministry of Housing, Communities and Local Government. |
| Movement joint | Joint permitting free movement in the plane of the wall (BS EN 1996-1-1:2012). |
| Non-combustible | A material/product classified as class A1 in accordance with BS EN 13501-1. It should be noted that in some countries A2 is regarded as non-combustible. |

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| Non relevant building | Any building that is not classified as a 'relevant building'. |
| Perimeter seal | <p>Joint between the curtain walling and adjacent construction designed to give continuity at both the air and water barriers of the wall (BS EN 13119:2016).</p> <p>This definition would also apply to other similar situations, for example a window within a back wall.</p> |
| Product | <p>Material, element or component about which information is required (BS EN 13501-1:2018).</p> <p>'Products' are covered by regulation 7(2).</p> |
| Rainscreen system | Rainscreen panels and their support system of rails and brackets. |
| Relevant building | See 1.5.1. |
| Render | <p>Mixture of one or more inorganic binders, aggregate, water, and sometimes admixtures, used to obtain an external finish (BS ISO 6707-1).</p> <p>A render is applied to the external face of the wall in a liquid or paste form, and then cures or hardens to form a tough, resilient, waterproofing finish. A render may be self-coloured or painted after application. Modern renders are applied in several layers, which may have different properties, and may include one or more reinforcing layers of mesh/scrim to improve their resistance to movement/expansion.</p> |
| Seal | Component fitted into a joint to prevent the passage of dust, moisture and gasses (BS ISO 6707-1). |
| Sealant | <p>Material applied in an unformed state which, once cured or dried, has the adhesive and cohesive properties to seal a joint (BS ISO 6707-1).</p> <p>Unformed flexible material applied in joints to prevent the passage of moisture, wind and dust. Sealants are generally applied in a liquid or paste form, which then cures to seal the gap, whilst also bonding permanently to the substrate. Some forms of sealant rely on a chemical cure, which is permanent, whilst others rely on the evaporation of a solvent and may never set into a final form (non-setting or non-curing sealants).</p> |
| Sealant tape | Impregnated foam or non-curing sealing tape used in place of a wet-applied sealant. |
| Setting block | <p>Small block of suitable material, placed under the lower edge of a pane of glass, insulating glass unit or infill panel when setting it in a frame (BS EN 13119:2016).</p> <p>The setting block creates a gap under the glass to allow for drainage, and also helps to prevent direct contact between the glass and frame.</p> |
| Shadow box | Spandrel feature typically incorporating clear glass (to provide visual continuity with vision areas), a cavity and an opaque infill. The cavity creates the illusion of depth behind the glass and changes the visual appearance of the glass externally. |

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| Sheathing board | Board attached to the outer surface of the studs in a framed backing wall. Sheathing boards provide a flat and stable surface onto which insulation/membranes can be fixed. The sheathing board also provides structural stability to the framing system, particularly with regard to lateral torsional buckling. |
| Spandrel area | Area of a curtain walling between two horizontal zones, normally between glazing and concealing the edge of the floor slab (BS EN 13119:2016). Note that whilst the definition above specifically refers to curtain walling, the term spandrel area is also used to describe the horizontal zone in other forms of cladding, for example between horizontal strips of ribbon windows. |
| Spandrel panel | Panel within the spandrel area (BS EN 13119:2016). |
| Specified attachment | See 1.5.3. |
| Stick curtain wall | Carrier framework of site assembled components supporting glass, insulating glass units and infill panels (BS EN 13119:2016). |
| Structural framing system (SFS) | Series of channels and studs used to form the back wall of a built-up wall. SFS may be used as infill between floor slabs or continuously, fitted outside of the structural frame of the building. |
| Structurally insulated panel system (SIPS) | A panel consisting of an insulating core sandwiched between two structural facings. SIPS may be used to form the back wall of a built-up wall. |
| Structural sealant glazing (SSG) | See bonded glazing. |
| 'Structural' thermal break | Thermal break material that transmits structural loads as well as reducing thermal conduction across the connection. Typically used to minimise thermal bridging in building details that pass between spaces of differential temperature, such as balconies and canopies which must be attached through the building envelope. |
| Terrace | External horizontal area, usually for people, and often fitted with a balustrade (BS ISO 6707-1). |
| Thermal break | Element of low thermal conductivity incorporated into an assembly to reduce the flow of heat between more conductive materials (BS EN 13119:2016). |
| Toughened (tempered) glass | Glass within which a permanent surface compressive stress, additionally to the basic mechanical strength, has been induced by a controlled heating and cooling process in order to give it greatly increased resistance to mechanical and thermal stress and prescribed fragmentation characteristics (BS EN 12150-1:2015). |
| Unitised curtain wall | Pre-assembled, interlinking, storey height or multi-storey height facade modules, complete with infill panels (BS EN 13119:2016). |
| Vapour control layer | Layer comprising a material or coating with greater resistance to vapour transmission than the other layers of the wall and designed to control vapour movement through the wall (BS EN 13119:2016). Note that an air barrier may function as a vapour control layer (and vice versa), and the positioning of the air barrier must therefore be considered with this in mind. It is generally more efficient to perform both functions with one layer, and unwise to provide a separate air barrier and vapour control layer without considering the risks associated with the potential presence of two vapour control layers. |

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| Wall tie | Component connecting leaves of a cavity wall (BS ISO 6707-1). Device for connecting one leaf of a cavity wall across a cavity to another leaf or to a framed structure or backing wall (BS EN 1996-1-1:2012). |
| Window | Building component or multiple components for closing an opening in a wall or roof that may admit light and/or provide ventilation (BS EN 12519:2018). |
| Window frame | Component forming the perimeter of a window, enabling it to be fixed to the building structure (BS EN 12519:2018). |
| Weep hole cover/insert | Component used to stop vermin and insects entering into cavity walls through weep holes in the outer masonry. |

Table 1 – Glossary of terms

4 REQUIREMENTS FOR SPECIFIC MATERIALS AND COMPONENTS

The application of the new regulation to a number of components is considered in following sections, as listed in Table 2.

| Material/component | Interpretation | Further guidance & explanation |
|---------------------------------|----------------------------------|---|
| Curtain wall and window frames | Exempt from regulation 7(2) | Section 5.1 and 5.1.1 |
| Glazing – vision areas | Exempt from regulation 7(2) | Section 5.1.2 and 6.1.1 |
| Glazing – opaque areas | Required to meet regulation 7(2) | Section 3.1.3 and 4.1.2 |
| Glazing – Insulated glass units | Exempt from regulation 7(2) | Section 6.1.3 |
| Glazing – balconies | Required to meet regulation 7(2) | Section 4.1.3 |
| Glazing – Juliet guarding | Exempt from regulation 7(2) | Section 0 |
| Membranes | Exempt from regulation 7(2) | Section 6.4 and 5.3.1 |
| Thermal breaks | Exempt from regulation 7(2) | Section 6.3 and 5.3.1 |
| Fixings | Exempt from regulation 7(2) | Section 5.2, 5.2.1 and 5.2.3 |
| Seals | Exempt from regulation 7(2) | Section 6.5, 6.1.2 and 6.1.3.1 |
| Adhesives | Required to meet regulation 7(2) | Section 6.6 |
| Spandrel panels | Required to meet regulation 7(2) | Section 6.2 and 5.1.3 |
| Paint finishes | Required to meet regulation 7(2) | Section 6.2 |

Table 2 – Summary of key components/elements

5 FAÇADE SYSTEMS

This section on 'façade systems' briefly summarises the key interpretation for different types of building envelope. Further details on the issues are provided in the section on 'materials and components'.

5.1 Stick or unitised glazed curtain walling

Curtain walling is not specifically referred to in the exemptions given by regulation 7(3). However, the MHCLG FAQs give the following guidance:

'Window frames are exempted from the requirements of regulation 7(2) under the provision of regulation 7(3). Conventional curtain walls consisting of mullions, transoms and glazing can be considered as a window frame. Regulation 7(3) exempt window frames from the requirements of regulation 7(2) this exemption includes all component parts of a windows frame.'

However, please note that panels such as spandrel panels and/or other opaque insulated panels in curtain walls are not exempted in regulation 7(3) and therefore must comply with regulation 7(2).

In addition to the above please note that compliance with Requirements B4 of Schedule 1 Part B of the Building Regulations must always be demonstrated.'

For the purposes of the above FAQ, it is our view that the following could be considered as 'conventional' curtain walling:

- Framed systems, such as stick systems and unitised curtain walls with glazing retained by means of:
 - Pressure plates,
 - Glazing beads,
 - Toggle fixings,
 - Bonded glazing/structural silicone/sealant glazing (SSG).

The following would not be considered as 'conventional' curtain walling:

- Glazing not retained by a frame, such as:
 - Bolted glass,
 - Structural glass assemblies, such as glass fin supported walls,
 - Cable supported glazing.

Double skin façade configurations may vary significantly, in particular regarding the method of construction and the depth and extent of the cavity between the inner and outer skin. For this reason, they do not fall easily into either of the two classifications above. It is therefore recommended that double skin facades are assessed on a project-by-project basis with advice sought from a fire engineer and building control. Note that in addition to considering the combustibility of the materials used in such walls, measures to reduce the risk of fire spread via the cavity may also be required in order to comply with requirement B4.

The MHCLG FAQ confirms that the *'exemption includes all component parts of a windows frame'*. This would include the main frame material, any finishes, thermal breaks and minor ancillary components such as setting and location blocks, drainage spouts, ironmongery and actuators that are part of the door or window assembly etc. Seals, gaskets, fixings, sealants and backer rods are explicitly exempt by **regulation 7(3)(h)**. This exemption extends to the fixing of the window or curtain wall assembly and sealing it to adjacent elements – this is described in further detail in **section 6.5**.

5.1.1 Framing materials

Several different materials may be used for the frame profiles of a curtain wall or window system. These include aluminium alloys, other metals such as steel or bronze, timber, and PVC-u. Whilst all curtain wall (and window) frames are exempt from the limits of combustible materials introduced by

regulation 7(2), all external walls must also meet **requirement B4**, and this may introduce limits on the use of certain combustible materials.

The risk of external fire spread will depend not only on the combustibility of the materials used, but also on their exposure, extent and separation between frames.

This is an area of significant uncertainty. There is no published evidence to suggest that combustible curtain wall or windows frames pose a significant risk of external fire spread, or if they do, at what separation distance between frames the risk becomes insignificant.

5.1.1.1 Frame materials achieving class A2-s1, d0 or better

There is no restriction on the extent of curtain wall/window frames, or their proximity to each other, when the main framing material achieves class A2-s1, d0 or better.

Thermal breaks (**regulation 7(3)(i)**) and seals, gaskets, fixings, sealants and backer rods (**regulation 7(3)(h)**) are exempt and can span compartment floors when used in conjunction with non-combustible framing materials. These materials are discussed in further detail in **section 6.3 and 6.5** respectively.

5.1.1.2 Frame materials with a performance worse than class A2-s1, d0

Timber and PVC-u are the main combustible framing materials that are commonly used. When timber is used, it may be for the complete frame, or as part of a composite, typically with aluminium used externally to clad the timber. Timber may also be used to internally clad an aluminium frame.

The risk of external fire spread will depend on the overall extent of the framing and the frame materials used. Generally:

- Small individual windows in punched openings, well separated from one another are likely to be very low risk,
- Storey height windows, or curtain walling/windows that span a compartment wall or floor may present a greater risk,
- Timber and timber composite frames are likely to perform better than PVC-u frames as they will not melt and deform and will therefore maintain their integrity for longer.

Where combustible framing materials are proposed they should be agreed on a project-by-project basis with the project fire engineer, and early engagement with building control and other interested parties such as insurers and warranty providers is recommended.

5.1.2 Glazing in curtain walling

Section 6.1 gives further details on the use of glazing in curtain walls. This is summarised below:

- **'Window frames and glass'** are exempt from regulation 7(2) by **regulation 7(3)(j)**. Therefore, glazing in the vision areas of curtain walling is considered exempt under **regulation 7(3)(j)**:
 - This permits the use of laminated glass in vision areas,
 - Vision areas are taken to include areas where the glass permits light to enter the building, for the purpose of illumination, but a clear view in or out is obscured by the use of translucent or patterned glasses.
- Glazing in opaque areas of windows and curtain walling (for example at spandrel/slab areas and opaque infills between floor slabs) is not exempt from regulation 7(2):
 - This effectively prohibits ordinary laminated glazing in opaque areas as at present standard laminated glazing cannot be tested to achieve an A2, s1-d0 classification,
 - Glazing units (as part of an opaque spandrel/infill) can be used in opaque areas (providing they do not include laminated glass), noting that the perimeter 'seals' and edge spacers (which act as 'thermal breaks' and which are an integral and essential part of the unit, without which it could not exist) are both exempt from regulation 7(2),
 - A shadow box construction is considered to be an opaque area.
- The internal and external gaskets to the perimeter of the glazed infill panels that provide a seal between the infill and the curtain wall frame are exempt from regulation 7(2).
- Spandrel panels which are not glazing/glazing units need to comply with 5.1.3 below.

There are concerns regarding the banning of laminated glass to the outermost pane of glazed spandrel units on relevant buildings. It is recommended that a risk assessment is undertaken for the particular glass type proposed, which includes consideration of:

- Spontaneous breakages that may not be noticed (as the glass is non-vision) until the glass falls from a height.
- Accidental breakages that may result in the falling of sharp shards or large clumps of glass.

Guidance on the selection of glass to limit the risk of injury from falling glass can be found in CWCT Technical Note 68, *Overhead glazing* and CIRIA C632, *Guidance on glazing at height*.

Notwithstanding these concerns it should be made clear that for relevant buildings the glazing in opaque areas of windows and curtain walling (including spandrel/slab areas) must achieve an A2-s1, d0 classification or better.

Glazing units are discussed further in section 6.1.3.

5.1.3 Non-glazed spandrel/infill in curtain walling

Section 6.2 gives further details on the non-glazed infills in curtain walls. This is summarised below:

- Non-glazed spandrel/infill panels are not exempt from regulation 7(2) and therefore are required to achieve class A2-s1, d0 or better.
 - All the materials that make up the panel should individually meet the requirements of regulation 7(2), or alternatively the complete panel assembly (including any combustible materials such as adhesives or paint finishes) should be tested and assessed as meeting the requirements of regulation 7(2).
- The internal and external gaskets to the perimeter of the spandrel/infill panels that provide a seal between the infill and the curtain wall frame are exempt from regulation 7(2).

5.2 Built-up walls

Built-up walls are layered constructions often formed from materials and components from several different suppliers and manufacturers, installed in a series of independent operations.

In this context, built-up walls comprise a back wall, either solid or framed, and an external cladding, typically a rainscreen system, a masonry wall, render on insulation system (EWIS) or a brick slip system. The specific requirements of the different cladding systems are discussed in the sections below. Built-up walls will usually include windows and other penetrations.

Elements used in the construction of the back wall must meet the requirements of regulation 7(2). These include:

- Internal lining boards,
- Insulation,
- Framing,
- Sheathing boards.

If composite/sandwich/SIPS panels are incorporated in the back wall, all the elements that make up the panel should individually meet the requirements of regulation 7(2), or alternatively the complete panel assembly (including any combustible material such as adhesive) should be tested and assessed as meeting the requirements of regulation 7(2). This is a further example of a situation where testing a 'product' may permit the use of minor combustible 'materials' (such as adhesives and coatings), providing the overall performance is within the limits set out in BS EN 13501-1.

Joints between sheathing boards are often taped or sealed with a wet applied sealant, to ensure air- and water-tightness. Such materials are exempt under **regulation 7(3)(h)**. This is discussed further in **section 6.5**.

Membranes, typically used to limit air and water leakage and to control vapour transfer through the external wall are specified exemptions under **regulation 7(3)(g)**. ADB 2019 recommends that membranes should achieve a minimum classification of **B-s3, d0**. Membranes are discussed further in **section 6.4**.

Membranes may be used locally, for example as a strip around the perimeter of a window set into a back wall (where the back wall itself provides the same performance as the membrane, and the membrane is just needed to seal the gap between the window and the back wall), or may be continuous over the entire area of the wall (where the back wall is otherwise not capable of providing the same level of performance that the membrane does).

Regulation 7(3)(f) exempts '*intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1*'. This allows for products such as open state cavity barriers to be used to compartmentalise the rainscreen cavity.

In most situations, insulation will be fixed to the back wall in order to help meet the required U-value target. A variety of fixings have been developed that reduce the effect of thermal bridging, typically plastic plugs and tubes to either replace or isolate metal fixings. These are necessary **fixings** and are therefore exempt under **regulation 7(3)(h)**. Note that occasional metal fixings are still required to guarantee fixity in the event of other fixings melting in the heat of a fire.

Where there is insulation affixed to the outer face of the back wall, the cavity barrier will likely need to penetrate the insulation layer in order to function correctly. Refer to the manufacturer's guidance for the relevant products.

5.2.1 Rainscreen systems

Materials/components used in a rainscreen cladding system must meet the requirements of regulation 7(2). This includes:

- Panels,
- Insulation,
- The support system (rails and brackets).

Materials/components that achieve class A2-s1, d0 or better are readily available.

Where **membranes** are used, the advice in **section 6.4** should be followed.

Thermal pads used behind rainscreen brackets to improve thermal performance and reduce condensation risk are **thermal breaks** and are therefore exempt from meeting the requirements of regulation 7(2) by **regulation 7(3)(i)**.

Some systems use **adhesive** to bond rainscreen panels to the rail system, and where used these systems should **meet the requirements of regulation 7(2)**. It is understood that the exemption for 'sealants' and 'fixings' under **regulation 7(3)(h)** does not cover adhesives and similar materials whose sole function is bonding two or more materials together. Where a material has a dual function, for example where it provides a seal as well as bonding, such as in bonded glazing, it could be considered as exempt. See **section 6.5.1**.

A number of minor local, discrete plastic or rubber components used in a rainscreen system may be classified as '**fixings**' and therefore **regulation 7(3)(h)** excludes them from meeting the requirements of regulation 7(2). These include:

- Plastic anchors/plugs,
- Insulation fixings,
- Anti-rattle clips/gaskets,
- Shims, washers, sleeves and grommets to accommodate tolerance and movement.

Fixings are discussed in further detail in **section 6.5**.

Mesh materials typically used to reinforce brittle rainscreen panels and to prevent vermin from entering the rainscreen cavity are not covered by any of the exemptions given in regulation 7(3). These therefore should either achieve individually class A2-s1, d0, or when tested as a product, for example bonded to the back face of a terracotta panel, the overall combination should achieve A2-s1, d0. Where a mesh is bonded onto the reverse of a panel for reinforcement purposes, the performance of the system will depend upon the thickness of the adhesive used, and so the supplier must be able to demonstrate how they control the applied thickness during manufacture.

5.2.2 External wall insulation (EWI) systems with render or brick slips

External wall insulation systems typically consist of:

- Insulation,
- Rails to support the insulation,
- Render,
- Brick slips (if used for the external finish),
- Adhesives/primers for the render,
- Reinforcing mesh/scrim,
- Ancillary components such as render stop beads, corner beads, movement/expansion profiles and starter tracks.

All the above materials are required to meet the requirements of **regulation 7(2)**, or alternatively the overall system shall be tested (including all non-substantial components as defined in EN 13501-1), and achieve class A2-s1, d0 or better in accordance with EN 13501-1. Several systems which incorporate thin layers of combustible materials, such as surface primers and reinforcing meshes have been tested and classified as A2-s1, d0.

Where a tested system is used, it is crucial to ensure that the proposed installation fulfils the 'field of application' parameters that are listed in the product's test certificate, and that no material substitutions or additions are proposed that are not explicitly included within the certificate.

Some systems incorporate plastic spacers behind insulation support rails to minimise the effect of thermal bridging. These are **thermal breaks** and are therefore exempt under **regulation 7(3)(i)**.

Any ancillary components such as stop beads and starter tracks that are not tested and classified as part of the system are required to be A2-s1, d0 or better.

Movement joints in render systems may be formed in a number of different ways. Where movement joint profiles are used, these should be **A2-s1, d0** or better. Where a **sealant** is used to seal the movement joint, this is exempt under **regulation 7(3)(h)**.

5.2.3 Masonry walls

A number of minor components where combustible materials were previously used are no longer permitted. These include:

- Cavity trays, see below,
- Cavity closers,
- Air bricks,
- Weep hole inserts and covers.

These components must meet the requirements of **regulation 7(2)**.

Cavity trays are exempt under **regulation 7(3)(a)**, but only when used **between two leaves of masonry**. If, as is often the situation in relevant buildings, a **framed back wall** is used, **cavity trays** must meet the requirements of **regulation 7(2)**.

Concrete may be used as the inner leaf of a 'masonry' wall. A solid reinforced concrete back wall will provide a similarly robust and non-combustible wall as typical masonry construction of brick or block. Therefore it would be logical to extend the exemption given by regulation 7(3)(a) to walls consisting of a concrete inner and masonry outer leaf without any effect on the risk of external fire spread. This should be agreed with all relevant parties on a project-by-project basis.

A number of proprietary non-combustible cavity trays are beginning to appear on the market. Sheet metal (stainless steel and zinc) cavity trays are a compliant alternative to the combustible proprietary products. However, the use of sheet metal cavity trays is not straightforward for a number of reasons, including workmanship, complexity of forming required shapes, tolerances/fit, movement accommodation, safety of cut edges and the lack of the relevant skills that are needed that are not complementary with those of traditional masonry tradespersons. It is important not only to use a non-combustible cavity tray but also that it is correctly installed so as to form an effective barrier.

Cavity tray products based on intumescent materials are being developed. Intumescent materials are only exempt when their inclusion is necessary to meet the requirements of Part B of Schedule 1, and therefore would not be suitable for the sole purpose of performing as a cavity tray, unless they were formed from materials that achieved class A2-s1, d0 or better.

Cavity trays may not be considered as membranes and are therefore not exempt under **regulation 7(3)(h)** of the new regulations.

It should be noted that requirements for cavity trays are subject to a government consultation reviewing the ban on the use of combustible materials in and on the external walls of buildings. The consultation proposes the temporary exemption of cavity trays in all forms of construction for a period of 18 months. Until the results of this consultation are published, the interpretation offered here might be used.

A **damp-proof course (DPC)** is required in a masonry wall to resist moisture rising through the structure. This typically consists of a **membrane** material and is therefore exempt under **regulation 7(3)(g)**, however the guidance in ADB limits membranes to class B-s3, d0. DPC's are usually polymer-based materials and suitable non-combustible alternatives are not readily available at present.

Where an external wall consists of two leaves of masonry regulation 7(3)(a) provides an exemption for cavity trays. Where this is the situation and a combustible cavity tray is allowed, it would be logical to extend this to allow the use of a material with a similar performance for the DPC. The DPC is sandwiched between two courses of brick (or similar), does not extend into the cavity, and has minimal external exposure. This should be agreed with all relevant parties on a project-by-project basis.

High performance resin impregnated **wall ties** have been developed to reduce the thermal bridging effect that stainless steel wall ties introduce. BS ISO 6707-1:2017 defines a wall tie as a 'component connecting leaves of a cavity wall' and as such wall ties may be classified as '**fixings**' and are therefore

exempt under **regulation 7(3)(h)**. **Insulation retaining clips** used with wall ties may also be classified as a **fixing**.

Where a masonry outer leaf is used with an SFS or concrete back wall, the system used to restrain the masonry cladding may comprise a channel fixed through the insulation to back wall. Depending on the type and thickness of insulation, compression sleeves should be used around the fixing screw to provide the necessary support. Again, these would be classified as fixings, and combustible sleeves may therefore be used.

5.3 Balconies and terraces

The amendments to the building regulations give specific requirements for balconies and other 'specified attachments'.

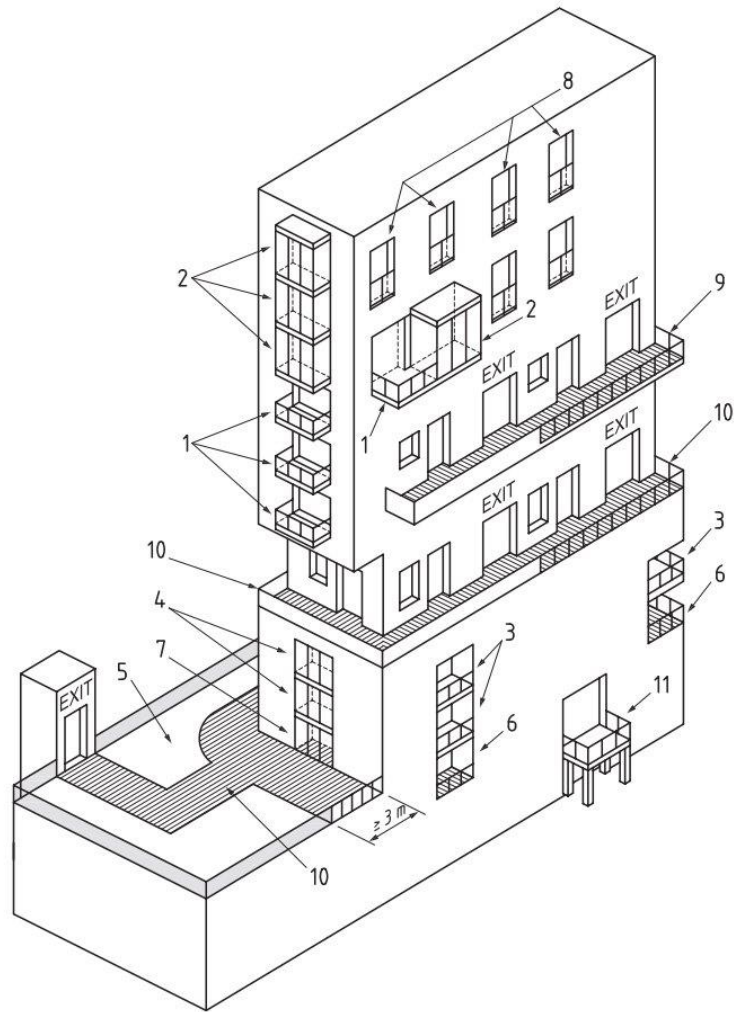
Terraces are not included in the definition of an external wall or specified attachment, however depending on their location and extent, they may need to meet the same requirements as those for a balcony. The overriding requirement of B4 of Schedule 1 is to control external fire spread. Therefore, it is essential for the potential contribution of a terrace and the materials used on and around the terrace to external fire spread be considered during the design and specification of any terrace.

BS ISO 6707-1:2017 defines a balcony as an '*upper accessible platform within a storey, not fully enclosed by walls*'. Under this definition, what has traditionally been referred to as a 'Juliet balcony' is not a balcony because it does not have an external accessible platform. To avoid confusion these are now being referred to as 'Juliet guarding'. Juliet guarding is not defined as a specified attachment and is outside of the scope of regulation 7(2). Requirement B4 would still apply and ADB would define this as an 'other attachment' for which consideration to the impact of external fire spread should be given. See **section 6.1.6**.





The definitions below are taken from BS8579:2020, *Guide to the design of balconies and terraces*, and includes the following:

- **Balcony** – accessible external amenity space above ground level exterior to and with direct access from a building
- **Enclosed balcony** - balcony that is protected from rain ingress by a roof or balcony above and a wall(s) or weather screen to the sides
 - *An enclosed balcony is sometimes referred to as a 'winter garden'*
- **Free standing balcony** – balcony with support(s) independent of the adjacent building structure
- **Inset balcony** – balcony that is recessed inwards from the external wall line of a building but not above a habitable internal space
- **Juliet guarding** – external guarding to openable doors without an associated external floor
 - *NOTE Also known as balconet or balconette,*
- **Open balcony** – balcony that has guarding and does not provide protection to the occupants from weather
- **Projecting balcony** – balcony that cantilevers outwards from the external wall line of a building
- **Terrace** – external accessible surface above an internal space above ground level exterior to and with direct access from a building to occupants for purposes other than exclusively maintenance
 - *Certain spaces might incorporate features of both a balcony and terrace.*

These are shown in **Figure 1** below. Permission to reproduce extracts from British Standards is granted by BSI Standards Limited (BSI). No other use of this material is permitted. British Standards can be obtained in PDF or hard copy formats from the BSI online shop: www.bsigroup.com/Shop. It should be noted that the references to clauses in the key below refer to those from BS 8579:2020.



Key

| | | | |
|---|-----------------------------|---|--|
| 1 | Projecting open balcony | 9 | Access balcony [can be referred to as "access deck" (see 3.1) or "walkway"] |
| 2 | Projecting enclosed balcony | 10 | Access terrace [can be referred to as "access deck" (see 3.1) or "walkway"] |
| 3 | Recessed open balcony | 11 | Free-standing balcony |
| 4 | Recessed enclosed balcony |  | Terrace, access terrace and access balcony surfaces with fire performance $B_{ROOF}(t4)$ or better (see Clause 12). |
| 5 | Terrace |  | Imperforate (as BS 9991) guarding materials reaction to fire class as in Clause 12 |
| 6 | Recessed open terrace |  | Other guarding materials reaction to fire class as in Clause 12 |
| 7 | Recessed enclosed terrace |  | Other guarding |
| 8 | Juliet guarding | | |

NOTE National regulations might cover roof performance in relation to relevant boundaries.

Figure 1- Balcony and terrace definitions (© The British Standards Institution 2020)

5.3.1 Balconies – materials

Balconies are covered by **regulation 7(2)** and therefore the materials used are required to be **A2-s1, d0 or better**. This requirement has significant implications for:

- Thermal insulation,
- Glazing,
- Decking materials,
- Waterproofing materials.

Timber and composite decking materials have been extensively used as the floor covering on balconies. These, and other combustible materials, are not permitted under regulation 7(2).

Thermal breaks between the building structure and the balcony are often required to minimise thermal bridging and condensation risk. These thermal breaks typically take one of two basic forms; load bearing (as shown in the left-hand image below) or non-load bearing (shown in the right-hand image). With a non-load bearing system, the loads are usually transferred via metal fixings with an insulation infill between the two elements. Therefore:

- Where a **load bearing** form is used, this could be considered as a ‘thermal break’ and would be exempt under **regulation 7(3)(i)**. It should be noted that such thermal breaks may require fire protection for other reasons such as to maintain structural stability in the event of a fire, or to maintain compartmentation,
- Where a **non-load bearing** form is used, the insulating material used would not be considered a ‘thermal break’ and would therefore have to achieve **class A2-s1, d0** or better.

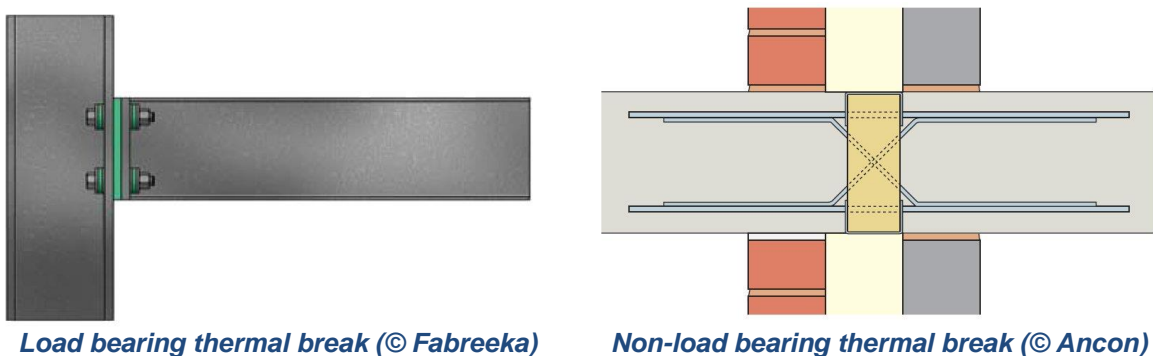


Figure 2 – Balcony ‘thermal breaks’

Insulation that wraps around balcony connections is not classified as a thermal break and should achieve class A2-s1, d0 or better.

Thermal breaks are discussed in further detail in **section 6.3**.

Glazing requirements on balconies are discussed further in **section 6.1.5**.

Terraces are not specifically referred to in the amended regulations, however there may be situations whereby a terrace should effectively be treated as a balcony. This is also discussed in **section 6.1.5**.

Water needs to be appropriately managed where balconies are used. A number of options are available, and the amended regulations have implications for certain methods of water management.

A balcony may be formed from steel or aluminium beams or a concrete slab cantilevered from the main building structure. Where metal beam balconies are used, a specific waterproof membrane may not be required.

Where the balcony structure is formed from concrete the balcony deck typically requires waterproofing, which is often achieved by using a sheet membrane material or a liquid applied coating. For this purpose it is logical to assume that liquid applied coatings may be considered as membranes (they cure after application, to form a continuous membrane of material). Membranes are exempt from the limits on combustibility, specified in regulation 7(2), by **regulation 7(3)(g)**.

The guidance in Approved Document B 2019 is that membranes in the **external wall** should achieve **class B-s3, d0**. As written the guidance in ADB **does not specifically require the use of class B membranes in/on specified attachments**, and this could be interpreted to mean that traditional combustible membranes can be used as waterproofing on specified attachments such as balconies. Regardless, the extent of any combustible membrane used on a balcony must be considered with regard to the risk of external fire spread in order to comply with **requirement B4(1)**. Membranes which are not extensive, used in combination with materials that are A2-s1, d0 or better and do not pass across compartment lines would pose a limited risk of fire spread. Each situation should be assessed on its own merits.

In addition to waterproofing the main balcony deck, the interface detail between the balcony and the façade must maintain the integrity of the waterproof barrier. At the present time this may present challenges due to the limited number of class B products available for this purpose.

6 MATERIALS AND COMPONENTS

This section describes in further detail the interpretation that might be applied to individual materials and components that form part of the external façade.

6.1 Glazing

Regulation 7(3)(j) lists *'Window frames and glass'* as an exemption from regulation 7(2). The accepted interpretation is that this is not a blanket exemption for the use of glass in the building envelope. Other common uses of glass together with an interpretation are given below.

Currently EC Decision 94/611/EC, as amended by 2000/605/EC and 2003/424/EC gives a list of materials to be considered as reaction to fire Classes A1 without the need for testing. The MHCLG FAQs to the amended regulations confirm that *'Products which have been deemed by European Commission decisions to meet Class A2-s1, d0 or A1 can be considered to meet the new requirements.'*

Glass, including laminated glass, is listed as being classified as A1. However, preceding the list of materials are two notes saying the following:

- *'Panel products (e.g. of insulating material) with one or more organic layers, or products containing organic material which is not homogeneously distributed (with the exception of glue) are excluded from the list.'*
- *'None of the materials in the table is allowed to contain more than 1,0 % by weight or volume (whichever is the lower) of homogeneously distributed organic material.'*

It is not clear on which basis laminated glazing is included in the table because a laminated glass product does contain more than '1% by weight or volume' of organic material that is not homogeneously distributed. Further clarification is being sought on this issue, and until forthcoming it is our interpretation that this EC Decision cannot be used to exempt laminated glass.

6.1.1 Glass in windows and curtain walls (vision areas)

Framed glass in the vision area of a window or curtain wall is specifically exempted by **regulation 7(3)(j)**. This permits the use of materials which do not achieve class A2-s1, d0, including laminated glass in these areas. We would consider this permission to extend to areas of translucent glazing which permit light to enter the building but prevent a clear view in or out for reasons of privacy.

6.1.2 Glass in windows and curtain walls (spandrel/infill areas)

The FAQs published by MHCLG in April 2019 confirms the following:

'panels such as spandrel panels and/or other opaque insulated panels in curtain walls are not exempted in regulation 7(3) and therefore must comply with regulation 7(2).'

Whilst the FAQ only refers to curtain walls, it is assumed to also apply to opaque areas of windows.

The implication of this is that laminated glass cannot be used in spandrel areas, including shadow boxes.

6.1.3 Insulated glass units

The following interpretation is offered on insulated glass units (IGUs).

6.1.3.1 IGU edge seals and spacers

An IGU requires an edge seal and spacer to separate the panes of glass and to create a robust seal around the perimeter of the unit. Spacer bars may consist of hollow aluminium or stainless steel sections, or polymeric materials for improved thermal performance (known as warm edge spacers). Edge seals are considered exempt under **regulation 7(3)(h)**. Where non-metal spacer bars are used for the purpose of reducing heat loss or limiting the formation of condensation and mould growth, they are thermal breaks and are exempt under **regulation 7(3)(i)**.

This interpretation applies to both IGUs in the vision and non-vision areas of the wall.

6.1.3.2 Cavity blinds

Blinds may be installed in the cavity of a double skin or closed cavity façade in order to help control incoming solar radiation. Blinds may also be installed within the cavity of an insulated glazing unit. Such blinds are not exempt under 'window frames and glass' and therefore must meet the requirements of **regulation 7(2)**.

Internal blinds which are attached to, but are not part of, the external wall are exempt from the performance requirements given in regulation 7(2).

6.1.4 Films applied to vision glass areas of windows and curtain walls

Regulation 2(6)(a)(i) defines 'any decoration or other finish applied to any external (but not internal) surface forming part of the wall' to be included as part of the 'external wall'. Therefore, a film applied to any external surface would not be exempt from **regulation 7(2)**.

A film applied to the internal surface of a vision glass unit would be exempt.

6.1.5 Glazing to balconies and terraces

A 'balcony attached to an external wall' is defined as a 'specified attachment' and as such must meet the requirements of **regulation 7(2)**. The exemption given for 'window frames and glass' does not apply to glazing used on a balcony and therefore laminated glass cannot be used on balconies for example as a balustrade. Whilst inset balconies are not explicitly defined as being a specified attachment, logically the same rules for the glass should apply.

The basis for not allowing laminated glass on balconies is unclear, and results in significant issues with regard to impact safety and protection from falling. This is discussed further in section **6.1.7**.

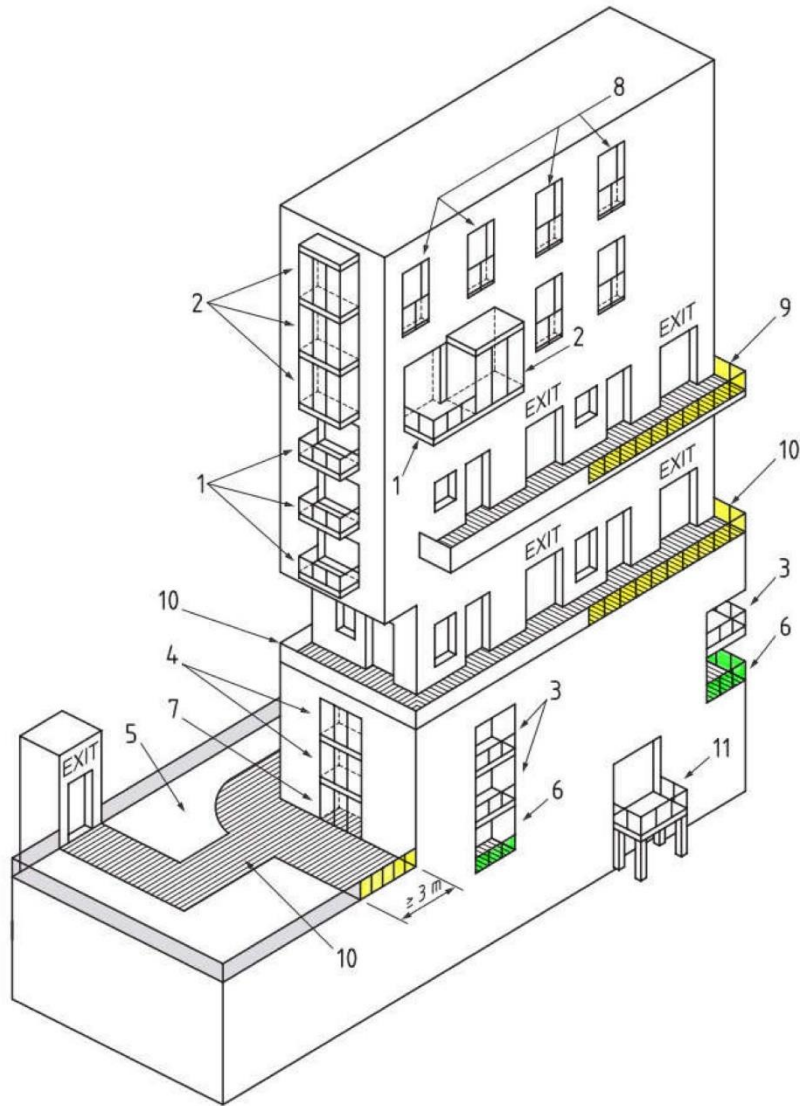
Terraces, as defined in **section 5.3** are not specified attachments and as such regulation 7(2) does not apply. However, **requirement B4** still applies and therefore consideration to external fire spread on the terrace must be given. Two different scenarios are illustrated in **Figure 3** below where the:

- Green shaded area shows a terrace with a balcony directly above,
- Yellow shaded area is adjacent to a façade of the building.





Where a terrace is immediately below a balcony, in the absence of further guidance or assessment by a fire engineer, it would appear logical to treat the guarding in the same way as the balcony above. Therefore, laminated glass could not be used in this location.

There is currently no recognised separation distance between the façade and the balustrade on a terrace that can be used to determine where laminated glass maybe used. BS8579:2020, *Guide to the design of balconies and terraces* recommends that the highest performance of roof covering (B_{ROOF}(t4)) is used within 3m of an extensive vertical façade. In the absence of any further guidance, this value maybe considered as a reasonable distance, as agreed on a project-by-project basis.

It should be noted that the requirements for glazing on specified attachments is subject to a government consultation reviewing the ban on the use of combustible materials in and on the external walls of buildings. It has been proposed to remove the requirement for glazing on specified attachments to achieve class A2-s1, d0 or better, however until the results of the consultation are published, the glazing must achieve A2-s1, d0 or better.



Key

| | | | |
|---|-----------------------------|---|--|
| 1 | Projecting open balcony | 9 | Access balcony [can be referred to as “access deck” (see 3.1) or “walkway”] |
| 2 | Projecting enclosed balcony | 10 | Access terrace [can be referred to as “access deck” (see 3.1) or “walkway”] |
| 3 | Recessed open balcony | 11 | Free-standing balcony |
| 4 | Recessed enclosed balcony |  | Terrace, access terrace and access balcony surfaces with fire performance B _{ROOF} (t4) or better (see Clause 12). |
| 5 | Terrace |  | Imperforate (as BS 9991) guarding materials reaction to fire class as in Clause 12 |
| 6 | Recessed open terrace |  | Other guarding materials reaction to fire class as in Clause 12 |
| 7 | Recessed enclosed terrace |  | Other guarding |
| 8 | Juliet guarding | | |

NOTE National regulations might cover roof performance in relation to relevant boundaries.

Figure 3 - Glazing requirements for terraces (edited from BS 8579:2020 © The British Standards Institution 2020)

6.1.6 Juliet guarding

Juliet guarding/barriers are not specifically defined as either the external wall or a specified attachment. Juliet guarding can take several different forms which leads to the following interpretation:

- A Juliet guarding which is integral to a window, door or curtain wall frame is logically covered by the exemption for 'window frames and glass' and as such the use of laminated glass would be permitted,
- A 'bolt-on' Juliet barrier fixed to the external wall adjacent to the opening it is guarding is an attachment to the external wall. It is not a 'specified attachment'. ADB considers this as an 'other attachment' and consideration should be given to the impact on the risk of fire spread over the wall,
- An internal Juliet barrier/guard does not form part of the external wall and is therefore exempt from the requirements.

6.1.7 Glass – summary

The interpretation above highlights several inconsistencies in existing guidance regarding the use of laminated glass as part of the building envelope (external wall and specified attachments).

There are particular concerns regarding restrictions on the use of laminated glass in balustrades to balconies.

Glazing used in balustrades should not injure anyone who collides with it and should prevent anyone from falling. This generally means that it should be a safety glass and provide adequate containment.

One of the primary benefits associated with laminated glass is its post breakage behaviour. Monolithic glass offers little or no post breakage robustness, and when it breaks it can crack or shatter into small or large pieces (depending on the temper state). The post breakage behaviour of glass is an important design consideration, especially where glass is used overhead or where it is providing a barrier which prevents persons from falling from height, and the relevant requirements K2 and K4 of the Building Regulations must be satisfied in addition to achieving fire safety.

Approved Document K in England refers to BS6180 for further guidance. BS6180 allows monolithic toughened glass to be used as a balustrade. This is an area where much of the industry has significant concerns and have for many years recommended the use of laminated glass on safety grounds, therefore going beyond the minimum requirements set out in the Approved Document.

A glazed balustrade incorporating toughened monolithic glass provides no post breakage robustness. Once broken (for example due to inclusions even if heat soaked, or due to impact) the entire glass pane will shatter into small dice and may fall from its fixings depending on the method of retention and lateral loading. This presents two separate safety risks; firstly, the glass dice may fall in substantial clumps and can fall onto people below, and secondly the missing element of the balustrade presents an opening through which somebody could fall.

Glazed balustrades combining laminated glass with a robust fixing system provide a good level of post breakage robustness. Broken laminated glass will tend to remain in-situ as the broken layer (or layers) of glass are held together by the interlayer and retained by the fixing system. The risk of falling glass is mitigated and no opening is created in the balustrade through which somebody could fall. The glass can be identified as being broken and can remain in place until such time as the replacement glass is installed.

Therefore, the only glazing that the industry considers as satisfying the requirements of Part K of the Building Regulations in a practical way in a balustrade is laminated glass. The current uncertainty about whether it is permitted under the changes to Regulation 7 effectively prevents the use of glazed balustrades in any residential building which is higher than 18m from ground level.

There is an urgent need for research to properly establish the fire safety of laminated glazing in balcony balustrades and to provide clear formal guidance on this topic.

6.2 Spandrel/infill panels

Spandrel/infill panels are not covered by any of the exemptions given in regulation 7(3). This is confirmed in the MHCLG FAQs:

'panels such as spandrel panels and/or other opaque insulated panels in curtain walls are not exempted in regulation 7(3) and therefore must comply with regulation 7(2).'

It is assumed that infills within windows must also comply with regulation 7(2).

As it has already been confirmed, **window and curtain wall frames** are exempt under **regulation 7(3)(j)**. **This exemption includes frames (and all component parts) which are supporting spandrel/infill panels**, i.e. not just frames containing vision glazing.

In addition to the main materials used (facing materials and insulation), this requirement also extends to 'minor' materials such as paint finishes and adhesives. Paint finishes and adhesives generally cannot meet the requirements of regulation 7(2), and therefore when such materials are used, a complete panel build-up would require testing in order to demonstrate that the completed assembly achieves class A2-s1, d0 or better. Due to the limited thickness of these combustible layers, this classification is achievable when tested. However, it is essential that the coverage of coatings and adhesives in test samples is both clearly defined and achieved in the manufactured product.

With regards to paint finishes, some care is required as not all colours and types of paint will perform in the same way. Where a particular combination of paint finish and substrate has not been tested, it should be confirmed that it is covered by the field of application rules of a tested combination.

6.2.1 Perimeter edge seal

A key component of a spandrel/infill panel is the perimeter edge detail. This is a component which performs multiple functions, all of which are vital to the overall performance of the panel. Not only does it provide a weather-seal, but it is also a thermal break and a key structural component of the panel. Typically, a material such as PVC is used.

A non-compressible spacer is required in order to be able to adequately clamp the panel into the curtain wall/window frame. The edge of the panel must also be sealed; the edge of the panel is in the drainage zone of the frame and as such may be subject to periodic wetting. Tapes are often used to create this seal.

The spacer material is often selected so as to reduce heat loss and condensation risk at the panel edge, and so it is considered as a **thermal break** and is therefore exempt from the requirements of regulation 7(2). This applies to spacers used 'normally', i.e. a spacer of minimum size, limited to the very edge of the panel, as illustrated in **Figure 4** below.

Where the edge spacer must be sealed to prevent moisture entering the panel (e.g. to prevent deterioration or reduction of thermal performance of the products/materials within the panel) then the **seal** might be considered exempt from the requirements of Regulation 7(2).

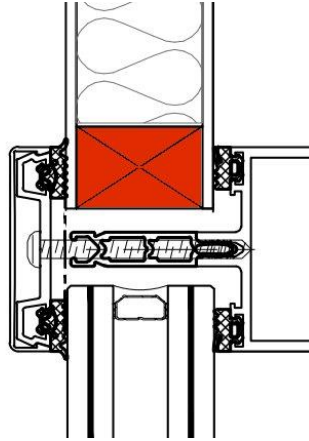


Figure 4 - A 'normal' infill panel edge spacer in a stick curtain wall

The junction between the frame and opaque infill in a unitised curtain wall system is typically more complex than the detail shown above and may include additional elements required to construct the interface and to minimise thermal bridging. An example is shown in **Figure 5** below.

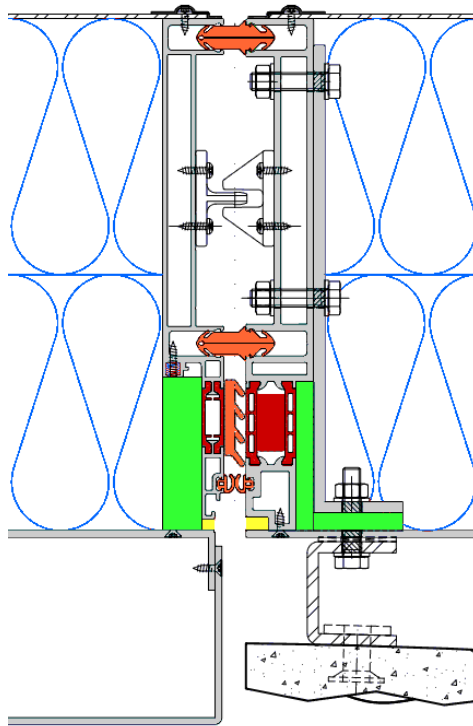


Figure 5 - Unitised curtain wall panel detail

The components shaded green and red in **Figure 5** would also be selected to act as **thermal breaks** and might therefore be considered to be exempt under **regulation 7(3)(i)**. For completeness the components coloured orange (**gaskets**) and yellow (**seals**) would also be exempt.

6.3 Thermal breaks

Regulation 7(3)(i) exempts *‘thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1’*.

The definition *‘necessary to meet the thermal bridging requirements’* is problematic. It would be practically impossible to justify on a case by case basis that a particular thermal break was necessary to meet the thermal bridging requirements of Part L, and it is also not uncommon for projects to significantly exceed the minimum requirements of Part L. The latest draft of the London Plan for example requires buildings to exceed the 2013 Part L CO₂ emissions targets by 35%.

It is not believed that it was the MHCLG’s intention for the wording of this exemption to limit the thermal performance of a façade to that of one which only just meets the minimum requirements that are set out by Part L. The key principle here, as elsewhere, is that the façade should not contribute to external fire spread. Where thermal breaks are required, then the possible contribution of the material to fire spread must be considered in the context of compliance of the overall system with requirement B4.

Thermal breaks, including:

- Parts of window and curtain wall frames,
- Isolation in rainscreen systems (pads behind brackets, thermally broken brackets etc),
- Perimeter spacers in spandrel panels and IGUs,
- Structural thermal pads, such as those for balconies, solar shading and other structural penetrations through the envelope,

are exempt from meeting the requirements of regulation 7(2).

The following materials and elements are not considered as thermal breaks:

- Insulation layers within the façade,
- Cavity closers,
- Board products, such as sheathing boards.
- Thermal wrapping for balcony connections, as discussed in Section 5.3.1.

Approved Document B 2019 gives a number of ‘Additional considerations’ (clause 10.15 and 12.15 in ADBv1 and ADBv2 respectively). The following guidance is given for thermal breaks:

‘Thermal breaks are small elements used as part of the external wall construction to restrict thermal bridging. There is no minimum performance for these materials. However, they should not span two compartments and should be limited in size to the minimum required to restrict the thermal bridging (the principal insulation layer is not to be regarded as a thermal break).’

We understand that the reference that a thermal break *‘should not span two compartments’* is intended to stop any ‘gaming of the system’ by practitioners redefining combustible insulation in the façade as a thermal break. It is not intended to include small, isolated thermal breaks such as those used in curtain wall frames and around infill panels. As confirmed by the MHCLG FAQ, these can all be considered as part of the window frame and can therefore span across compartments.

Thermal breaks which are not part of the window frame, such as structural thermal breaks used in balcony connections, should be localised elements and cannot span across compartments.

The reference to *‘limited in size’* in the above statement refers to the size of the thermal break in the plane of the façade. For example, consider a thermal break behind a helping hand bracket as part of a rainscreen system. The thermal break should be limited to the width and height of the base of the bracket (as shown in green in **Figure 6** below), rather than it extending significantly beyond those dimensions. It is not intended to limit the length of a thermal break in, for example, a window or curtain wall frame.



Figure 6 - Thermal break/spacer behind a helping hand bracket (© Nvelope)

6.4 Membranes

Regulation 7(3)(g) exempts membranes from meeting the requirements of regulation 7(2).

Approved Document B 2019 gives a number of 'Additional considerations' (clause 10.15 and 12.15 in ADBv1 and ADBv2 respectively). The following guidance is given for membranes:

- *'Membranes used as part of the external wall construction above ground level should achieve a minimum of class B-s3, d0'*

When considering the requirements for membranes, it is important to consider the intended function of the product as well as the material used:

- Membranes, including **vapour control layers and breather membranes** that are used **extensively** within the wall should achieve a minimum classification of **B-s3, d0**.
- Membrane materials used in limited quantities around interfaces are usually intended to form localised **seals** against the ingress of air and water and are discussed in further detail in **section 6.5**.

In order to achieve a class B classification, a product must be tested in accordance with EN 13823 (single burning item test). This involves constructing an L-shaped 1500mm tall test sample onto which the membrane is fixed. Membranes achieving this classification are available from several manufacturers. As with all test classifications it is vital to understand what was tested, the configuration in which it was tested, and any limitations on the use of the material/product that arise from that tested configuration. Of particular significance for membrane testing includes:

- The substrate (if any) that the membrane was tested against (material, density, combustibility, size of air gaps between membrane and substrate),
- How the membrane was fixed to the substrate (mechanical fixings or adhesive),
- The nature of any joints/overlaps in the membrane as tested.

Where it is intended that a membrane will be bonded to a substrate in use, it must be tested in that condition, **including the adhesive**. It is essential that the membrane is then used within the application limits stated in the product classification report. Some product certificates list extended applications which classify the use of that product outside of that which was tested.

As already discussed in **section 5.2.3** typical **damp-proof courses** might be considered as **membranes**.

6.5 Seals, gaskets, fixings, sealants and backer rods

Regulation 7(3)(h) specifically exempts seals, gaskets, fixings, sealants and backer rods from meeting the requirements of regulation 7(2). 'Seals' and 'sealants' include, but are not limited to:

- Wet applied sealants, used for example at interfaces between elements, at movement joints, panel joints,
- Tapes, used for example to seal joints in sheathing boards and membranes,
- Impregnated foam tapes, used for example at window perimeter seals and movement joints,
- Bonded glazing/structural sealant glazing application.

In some applications, tapes and other flexible materials may be used to provide an air and/or water seal within materials or at an interface between construction elements. Where this is the situation, products should be limited in width in order to minimise the use of combustible products. In the absence of robust research, we consider the dimensions given below to be reasonable, subject to wider consideration of the ability of the external wall as a whole to meet requirement B4.

The sealing of joints between sheathing boards on a framed back wall may be crucial in terms of limiting air leakage and providing a water barrier within the wall construction. Non-combustible sealing tapes are not readily available and therefore strips of self-adhesive tape or membrane material may be used to seal these joints. Providing the strip is no greater than **150mm** wide and protected behind non-combustible insulation, we consider this a 'seal' and therefore as being exempt from regulation 7(2), in the same way that a sealant used in this location would be considered exempt. Being limited in width and behind non-combustible insulation, the use of a membrane in this location will result in negligible risk of fire spread. The basis for the value of 150mm is simply to minimise the use of the combustible membrane whilst still ensuring there is reasonable embedment on either side of the joint.

Seals are also crucial at interfaces between elements such as windows and curtain walling and the surrounding construction. Such joints are particularly vulnerable to water and air leakage and as such it is vital that a robust and durable seal is provided.

Typical membrane materials such as EPDM (Ethylene Propylene Diene Monomer) have been used for this function due not only to their ability to resist the passage of water and air, but also for their flexibility which aids installation and allows for a good seal to be formed whilst accommodating movement. Such materials are combustible, however, and careful consideration must be given to their use.

Seals in this location are not exposed; typically being fixed between a window and the back wall and subsequently covered with non-combustible insulation, or between a curtain wall profile and the surrounding wall construction and covered by a non-combustible dry lining system, as shown in **Figure 7** below.

Several class B membranes are now on the market, but they tend to lack the physical flexibility provided by materials such as EPDM.

It is therefore recommended that the use of a membrane material at such interfaces is considered as a '**seal**' and is exempt from regulation 7(2). A limit of **250mm** should be applied to the width of material used. The basis for this value is simply to provide an upper limit that is practical and should allow for a reasonable seal to be formed in many typical situations, whilst at the same time minimising the amount of material used. Beyond this it should be classed as a **membrane** and the guidance in **section 6.4** applies

Where a joint is not protected by non-combustible insulation or it is essential to have a width greater than the 150mm/250mm limits given above, such as may be the situation with modular construction, further assessment would be required where combustible seals are considered necessary.

Where windows are close together, individual membrane seals around windows may become 'extensive', and consideration should be given to this. This would require assessment on a case by case basis.

The interpretation above does not mean that class B membranes or seals used in this application should be dismissed. The design team should review the available options and should use less combustible products if they are available and appropriate. It should also be noted that where combustible seals are used, their width should be minimised as much as possible.

The material used to bond the **perimeter of a window or curtain wall** to the surrounding construction is intended as a **seal or sealant**. These materials are essential to the formation of a robust seal to any rough substrate.

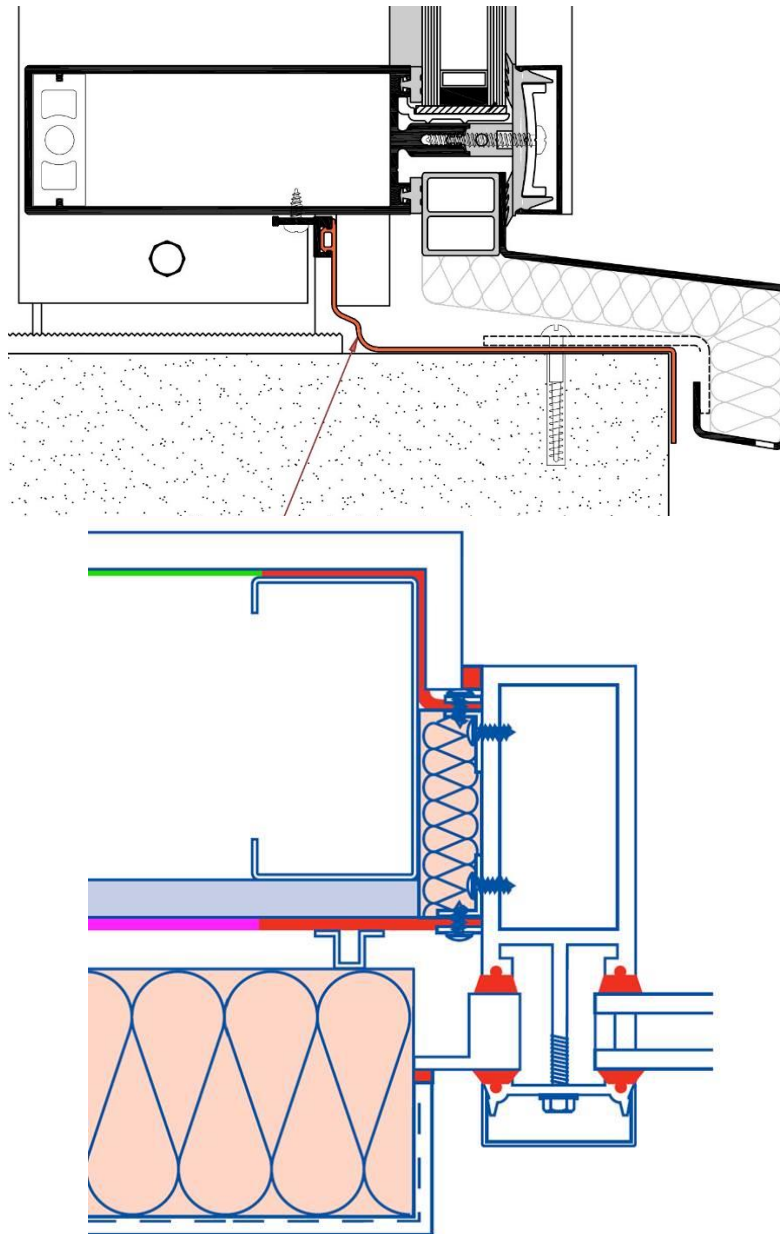


Figure 7 - Typical curtain wall interface seals (in red/orange)

6.5.1 Bonded glazing/structural sealant glazing (SSG)

The structural sealant (shown in orange in Figure 8) has a dual function – it both provides a seal and bonds the glazing to the frame. As such it might be considered as a **sealant** and is therefore exempt under **regulation 7(3)(h)**. This exemption applies to both glazing and spandrel panels bonded to the carrier frame.

As stated in **section 5.1**, SSG is considered a 'conventional' curtain wall and is also exempt under regulation 7(3), however the panels themselves are not exempt (see sections 5.1.2 and 5.1.3).

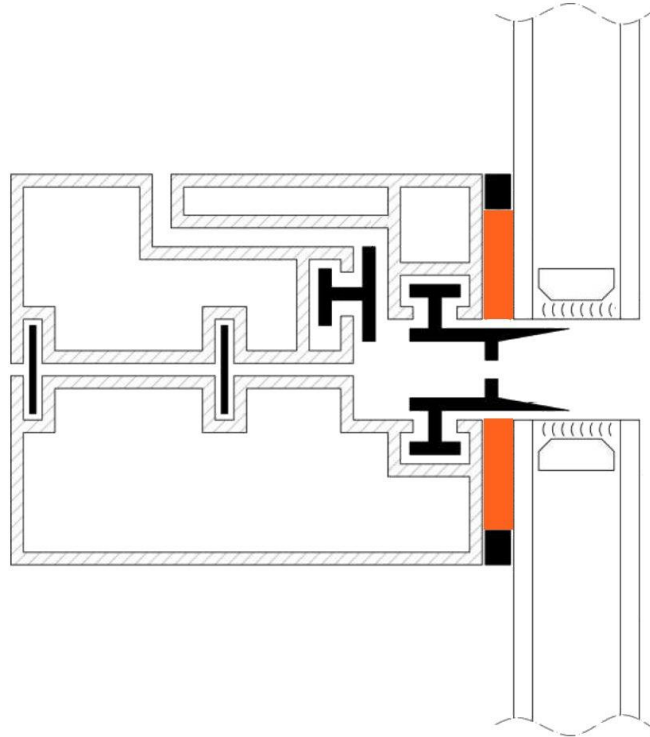


Figure 8 – Structural sealant glazing (edited from prEN 16759:2019)

6.6 Adhesives

Adhesives are not included in any of the exemptions given by regulation 7(3). Some confusion exists regarding definitions of 'adhesives' and 'sealants', and indeed the same materials may be used for both functions. The following guidance is offered.

6.6.1 Rainscreens

Rainscreen panels may require additional stiffeners fixed to the back of the panel in order to limit deflections. The number of stiffeners required will depend on the size of the panel, the design wind load and the stiffness of the panel materials. Stiffeners have typically been attached by welding, mechanical fixings or adhesive bonding. The adhesives used are combustible and as such will not meet the requirements of regulation 7(2). **Such adhesives cannot be considered as seals or sealants.**

Therefore, **where stiffeners are bonded to rainscreen panels, the panel assembly would require testing in order to demonstrate** that it achieves class **A2-s1, d0** or better **as required by regulation 7(2)**. Where the use of any panel differs from that which was tested, and previous test results are being relied upon, it is essential to confirm that the panel meets the field of application rules of the tested system. One alternative to bonding stiffeners to rainscreen panels is the use of stud welding to attach threaded studs to the back of the rainscreen panels and then bolt the stiffener to the studs.

Rainscreen panels are sometimes bonded to support rails, rather than using more traditional mechanical fixings. The **adhesive used in such situations cannot be considered as a fixing or a sealant and is required to satisfy regulation 7(2)**.

6.6.2 Panels

Composite/sandwich/insulation panels consist of a metal facing material bonded to an insulation core. Composite panels have traditionally been used in low rise industrial and office buildings as the external cladding, but in recent years have also been used to form the back wall of some built-up cladding systems.

Typically, the adhesive used to bond the insulation is combustible and therefore the complete panel assembly should be tested in order to demonstrate that it achieves class **A2-s1, d0** or better. As before it is essential that the coverage of coatings and adhesives in test samples is both clearly defined and achieved in the manufactured product.

Spandrel/infill panels used in curtain walls and windows are discussed in **section 6.2**.

6.6.3 Other uses

Chemical/resin anchors may be used in substrates such as masonry or concrete. These are ideally suited to high load applications and where expansion anchors may crack the substrate being used. There are currently no non-combustible chemical anchors.

Due to the fact that the resin is injected into a concrete/masonry substrate, the risk of fire spread is negligible. The resin is an integral part of the fixing system and therefore all component parts of such systems, including the chemical resin, may be considered as 'fixings' and as being exempt under **regulation 7(3)(h)**, however if alternative non-chemical/resin anchors are available, they should be used. A number of manufacturers offer chemical/resin anchors with a proven fire performance.

The material used to bond the **perimeter seal of a window or curtain wall** to the surrounding construction should be considered as a **seal** or **sealant** as described in **section 6.5**.

6.7 External shading devices

In the original ban on the use of combustible materials (the Building (Amendment) Regulations 2018), *'a device for reducing heat gain within a building by deflecting sunlight which is attached to an external wall'* was included in the definition of a specified attachment. Therefore all materials used on external shading devices would have been required to achieve class A2-s1, d0 or better.

Following judicial review, this definition was removed. Therefore brise soleil, blinds, shutters and awnings attached to the external wall are not classified as specified attachments and therefore do not come under the ban on combustible materials, however they would be considered as an 'other attachment'.

In a circular letter published by the government following the judicial review (<https://www.gov.uk/government/publications/building-amendment-regulations-2018-circular-032019>), it was made clear that *'building control bodies should take account of the Building Regulations requirement B4 when considering whether to allow the use of combustible materials intended to reduce heat gain within a building in and on the external walls of buildings'*. The government are currently consulting on this issue with the proposal that external solar shading products would be required to achieve class A2-s1, d0 or better.

7 FURTHER READING

CIBSE Guide E: Fire safety engineering. London, The Chartered Institutions of Building Services Engineers, 2019

BS 8579:2020: *Guide to the design of balconies and terraces*. London, British Standards Institute, 2020

BS 9991:2015: Fire safety in the design, management and use of residential buildings. Code of practice. London, British Standards Institute, 2015

BS 9999:2017: *Fire safety in the design, management and use of buildings*. Code of practice. London, British Standards Institute, 2017

Manual to the Building Regulations. A code of practice for use in England. London, HM Government, 2020

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/901517/Manual_to_building_regs_-_July_2020.pdf

Amendments to the Approved Documents May 2020. London, HM Government, 2020

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/887210/AD_B_2019_edition_May2020_amendments.pdf

The merged approved documents – for use in England – July 2020 compilation of individual approved documents. London, HM Government, 2020

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