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Building standards – Scotland

The design and construction for fire safety in buildings in Scotland is controlled by the Building Standards (Scotland) Regulations 1990 (as amended) [3]. These Regulations are supported by Technical Standards.

Structural fire protection measures are detailed in Part D of the Technical Standards and measures relating to means of escape, warning and fire fighting are given in Part E.

Whereas in England and Wales the regulations are set in functional form, in Scotland it is mandatory to comply with the measures detailed in the Technical Standards. Whilst some relaxation of these provisions is possible this is generally more difficult to achieve.

The 6th amendment to the Technical Standards are applicable from 4th March 2002 and the main provisions of these standards as they relate to the external building envelope are summarised below.

4.1 Fire spread across surfaces

In order to resist the spread of fire and smoke, the Technical Standards set out the minimum required performance standards for the surface properties of all wall and ceiling linings. The potential for the surface of a material to contribute to fire spread is defined in terms of a risk ranking. The risk classification of materials can be carried out in accordance with either British or European test standards as summarised below in table 5.

Table 5. Classification of materials in British Standard and European test regimes

Risk*	British Standards	European Standards*
Non-combustible	Non-combustible (BS 476: Part 4 [10] or BS 476: Part 11 [11]).	Classification A1 (BS EN ISO 1182 and BS EN ISO 1716) or Classification A2 (EN 13823 and BS EN ISO 1182 or BS EN ISO 1716).
Low	Class 0 (Class 1 in BS 476: Part 7 and an index of performance (I) not exceeding 12 and a sub-index (II) not exceeding 6 in BS 476: Part 6).	Class B or better (EN 13823 and BS EN ISO 11925-1)
Medium	Class 1 (BS 476: Part 7)	Class C or better (EN 13823 and BS EN ISO 11925-1)
High	Class 2 or Class 3 (BS 476: Part 7)	Class D or better (EN 13823 and BS EN ISO 11925-1)
Very High	Any material that does not meet the criteria for high risk	Any material that does not meet the criteria for high risk

Notes to table 5

*The required surface classification of wall and ceiling linings for various end use conditions is summarised in table 6.

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The Technical Standards set out minimum requirements for walls and ceiling linings in different locations. These are set out in table 6.

Table 6. Fire Spread on wall and ceiling surfaces

Purpose group	Highest permitted level of risk of a building component			
	Room 30m ² or less	Room more than 30m ²	Unprotected zone and protected enclosure	Protected zone and fire fighting shaft
2a Institutional	Medium	Low	Low	Low
2b Other residential	Medium	Medium	Medium	Low
3 Offices	High	Medium	Medium	Low
4 Shops and commercial	High	Medium	Low	Low
5 Assembly & recreational	High	Medium	Medium	Low
6 Industrial	High	Medium	Medium	Low
7a Storage – high risk	High	Low	Medium	Low
7b & C Storage – low risk & open sided car parks	High	Medium	Medium	Low

Notes to table 6

Most commercially available insulated panels designed for use in the external building envelope will be classified as low risk and will therefore satisfy the most onerous flame spread requirements of this table.

4.2 Insulated panels

Guidance given in part D7.3 of the Technical Standards requires that insulated panels used internally or as internal wall or ceiling linings in purpose groups other than residential must be suitably designed and installed. It is considered that the recommendations presented in sections 9 and 10 of this guide should satisfy this requirement for insulated panels that form both the external cladding and internal lining.

D7.3 requires insulated panels used for internal walls or linings in a building of purpose group 1 or 2 (Residential) must be fully filled with cores that consist of non-combustible material.

4.3 Fire spread on the external wall

In order to limit fire spread on external walls the Technical Standards (D10) require that any external cladding must either comply with the specifications given in Table 7 or meet the requirements of a suitable test for the fire performance of external cladding systems.

Table 7. Required level of performance for cladding to an external wall

Height of building above ground	Purpose group or sub-purpose group	Location	Highest permitted level of risk of product (see table 5, page 21)
18m or less	5 Assembly and recreational	Up to 10m above the ground (or above a roof or any part of the building to which the public have access)	Low
	5 Assembly and recreational	10m or more above the ground	Very high
	2A Institutional	Any	Low
	All others	Any	Very high
More than 18m	Any	Any	Low

Notes to table 7

Most commercially available insulated panels designed for use in the external building envelope will be classified as low risk and will therefore satisfy the most onerous flame spread requirements of this table.

In buildings of more than one storey that have a floor at a height of more than 18m above the ground any insulation material situated within cavities in the external wall construction must be non-combustible. This would preclude the use of insulated panels with combustible cores in buildings with a top storey at more than 18m above ground.

4.4 Junctions between fire resisting walls and the external envelope

4.4.1. Junction with external wall

The Technical Standards require that the junction between an external wall and a fire resisting wall or floor must not prejudice the fire resisting separation. This is usually achieved by fire stopping with non-combustible material to seal any gaps in the construction (see figure 6, page 16).

4.4.2. Junction with roof

Where a fire resisting wall is provided to separate adjoining buildings or parts of a building that are in separate occupation (separating wall) the Technical standards require that no combustible construction materials are carried across the top of the wall in such a way as to impair the fire resistance of the wall. This generally requires that a non-combustible break be provided within the core of an insulated panel with a combustible core. However, if proven by a suitable fire resistance test that a particular roof system does not impair the fire resistance of a wall omission of the non-combustible break may be acceptable.

Roof coverings should also be of a low vulnerability classification (AA, AB or AC to BS 476: Part 3) for a distance of at least 1.7m each side of the separating wall.

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4.5 Fire Spread to adjoining buildings

To minimise the risk of fire spread between adjacent buildings all or part of the external wall may need to be fire resisting.

Prior to the 6th amendment to the Technical Standards it was generally only necessary to calculate the allowable extent of unprotected (non-fire-resisting) areas on the basis of the distance to the actual site boundary. Therefore if two adjacent buildings were located on the same site and in common occupation there was no requirement to consider fire spread between the two buildings (unless in purpose group 2A e.g. hospitals).

However, in the 6th amendment an additional requirement was introduced that involves assessing the allowable unprotected areas in terms of a 'notional boundary' drawn between two buildings in the same occupation on the same site. This requirement only applies when the combined floor area at any level exceeds the maximum compartment size specified in D3.1 of the Technical Standards.

4.5.1. Walls within 1m of boundary

Part D8.2 of the Standards require that every part of an external wall within 1m of the boundary must be of non-combustible materials except for any thermal insulation in a wall in a building with a storey height of less than 18m above ground.

The wall must (with very limited exceptions) also be fire resisting as regards both integrity and insulation. The required period of fire resistance will be either short or medium duration (30 minutes or 60 minutes) depending upon the purpose group and internal compartmentation of the building.

4.5.2. Walls more than 1m from the boundary

Where the external wall is more than 1m from the boundary, those offices, assembly, recreational and industrial buildings that are designated low risk and therefore 'short duration' are required to be fire resisting in terms of integrity but are not required to satisfy the insulation criterion of the fire resistance test.

If a sprinkler system (in accordance with BS 5306: Part 2) is provided in these lower risk buildings there is no limitation on the allowable extent of unprotected areas in walls more than 1m from the boundary.

For purpose group categories defined as 'medium risk' (e.g. storage, shops and commercial usage) there may still be restrictions on the extent of unprotected areas (window openings etc.) and the remaining (protected) areas are required to satisfy the following criteria:

- a) provide a standard of fire resistance (integrity) appropriate to the building structure and a short duration (30 minutes) as regards insulation.
- b) have a surface of non-combustible material except for a maximum 1mm thick external surface layer.

When the external walls are situated some distance from a site boundary or other buildings on the same site, then no fire resistance may be required but this must be checked in accordance with the requirements of the Technical Standards.

The assessment of allowable unprotected areas is beyond the scope of this guide but detailed guidance on the calculation of space separation and unprotected areas is given in the Technical Standards.

4.6. Fire Spread from adjoining buildings – roofs

In order to resist the penetration or ignition by fire from an external source and limit the vulnerability of its external surface, the roof covering, (including any roof lights) should meet the requirements set out in table 8.

Table 8. Fire Acceptable roof coverings

Maximum distance of roof to the boundary	Highest permitted vulnerability of roof covering	
	Building of purpose sub-group 2a	All other buildings
6m or less	Low	Low
more than 6m	Low	Medium
more than 12m	Low	Medium
more than 24 m	High	High

Notes to table 8

Most commercially available insulated panels designed for use in the external building envelope will be classified AA or AB in accordance with BS 476 Part 3 and will therefore satisfy the most onerous flame spread requirement in table 8 (i.e. low vulnerability).

4.7 Roofs used as escape routes

Any part of a roof that forms an escape route should be fire resisting as regards load bearing capacity, integrity and insulation. Similarly if the roof performs the function of a floor it should have the same fire resistance as is required for other floors within the building. This requirement would generally preclude the use of insulated panels for sections of roof that form part of a floor or escape route.

4.8 External walls adjacent to an external stair

If an external escape stair is located within 2m of an external wall every part of the wall below the stair and within 2m of the stair should be fire resisting for a short duration (i.e. 30 minutes) as regards integrity and insulation.

4.9 Cavity barriers in concealed spaces

An important part of the Technical Standards is the requirement to close off the perimeter of hidden voids and provide fire barriers where a void passes a compartment wall or floor.

Cavity barriers are also usually required to subdivide large concealed spaces such as the void behind a suspended ceiling at 20m intervals (This is reduced to 10m if the internal surfaces of the void are not medium or low risk (Class 1 or Class 0 or Euroclass B or C).

Because the insulating core completely fills the space between the two faces of an insulated panels extensive cavities are only likely to arise if separate internal linings or suspended ceilings are provided.

However, an area that is relevant to the external envelope where the necessity to provide fire resisting and cavity barriers is often forgotten is at the eaves where a pitched roof meets an external wall (see figure 8, page 18).

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Summary of main recommendations of Scottish Technical standards

The main recommendation of the Technical Standards (6th amendment) as they apply to external wall panels are summarised below in table 9 and for roofs in table 10.

Table 9. Main recommendations of Technical Standards for external walls

Room size	Internal lining*	External lining	Fire resistance integrity	Insulation
Small rooms less than 30m ² Rooms greater than 30m ² Unprotected escape routes Protected escape routes	High / medium ¹ High / low ¹ Medium / low Low			
Boundary distance				
Less than 1m		Non- combustible	Yes ²	Yes ²
Greater than 1m: protected areas				
a) buildings classed as medium duration.		Non-combustible (up to 1mm coating on combustible external face).	Yes ²	30mins
b) Buildings classed as short duration			Yes ²	None
c) Buildings situated sufficient distance from boundary			None	None
d) Lower risk buildings provided with a sprinkler system		See table 7, page 23	None	None
Allowable unprotected areas	N/A	N/A	N/A	N/A
Height of wall above ground				
Less than 18m		N/A ³		
Greater than 18m		Low ⁴		
External escape stair				
Stair located within 2m of external wall			30	30

Notes to table 9

1. Requirement varies according to purpose group.
2. Fire resistance period: short or medium depending upon purpose group and degree of internal compartmentation.
3. In assembly and recreation buildings (purpose group 5) the external face should be categorized as of low risk for 10m above any external level to which the public have access. In category 2A (hospitals etc.) all of the external face should be categorized as low risk.
4. If the floor of the top storey is greater than 18m only non-combustible core materials are acceptable.

* Most commercially available external insulated panels will comply with the most onerous requirements for internal linings.

Table 10. Main recommendations of Technical Standards for roofs

Room size	Internal lining* risk category	Roof covering* permitted vulnerability	Non-combustible material
Small rooms less than 30m ² Rooms greater than 30m ² Unprotected escape routes Protected escape routes	High / medium High / low Medium / low Low		
Junction with fire resisting walls			
			Joints to be fire stopped and only non-combustible materials to be carried over separating walls.
Boundary distance			
Less than 6m		Low	
Greater than 6m		Low to high depending upon purpose group and distance.	

Notes to table 10

* Most commercially available insulated panels designed for use in the building envelope will meet the most onerous lining and roof covering requirements when tested in accordance with British Standards.