

BR 135 Fire performance of external thermal insulation for walls of multi-storey buildings. 3rd edition (2013)

3 MECHANISMS OF FIRE SPREAD

The key stages associated with fire spread on the outside of a building envelope are:

- Ignition of the cladding
- Fire spread
- Penetration through openings

These stages are discussed below, and are illustrated schematically in Figure 3.

Figure 3: Mechanisms of fire spread on the exterior of the external cladding system.

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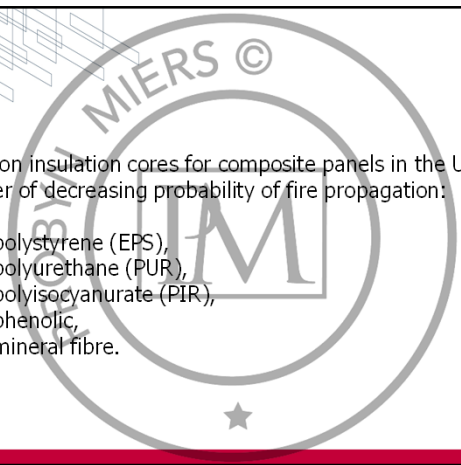
Figure 6: Fire spread through cavities

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Typical UK Composite Cladding Panel

KS600-1000 Optimo

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Common insulation cores for composite panels in the UK, in order of decreasing probability of fire propagation:

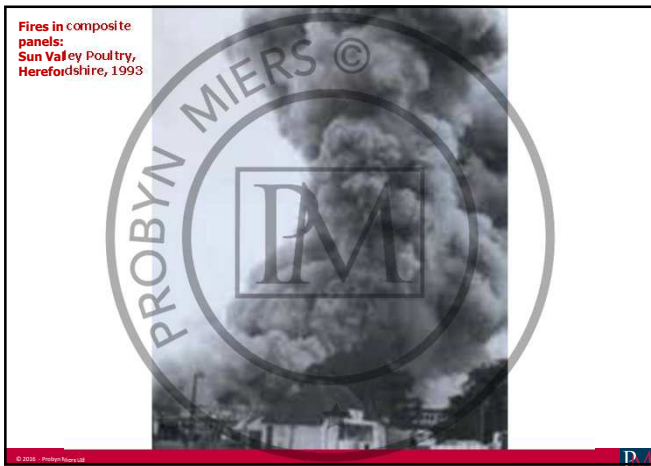
- polystyrene (EPS),
- polyurethane (PUR),
- polyisocyanurate (PIR),
- phenolic,
- mineral fibre.

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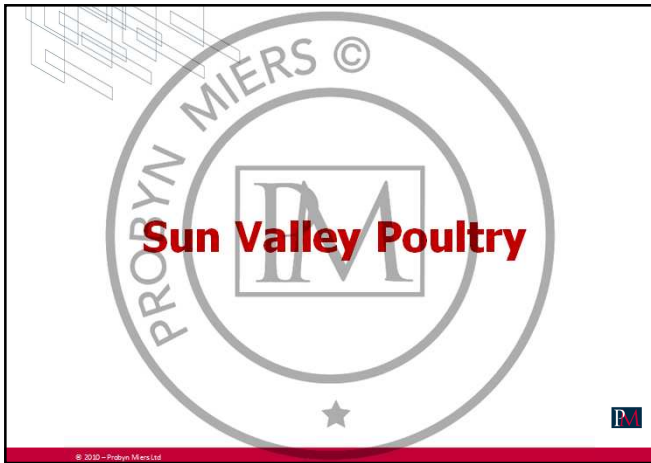
Fires in composite panels:
Sun Valley Poultry,
Herefordshire, 1993

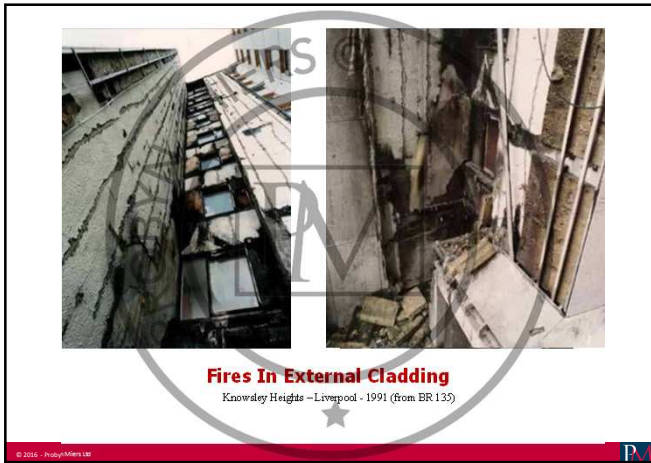
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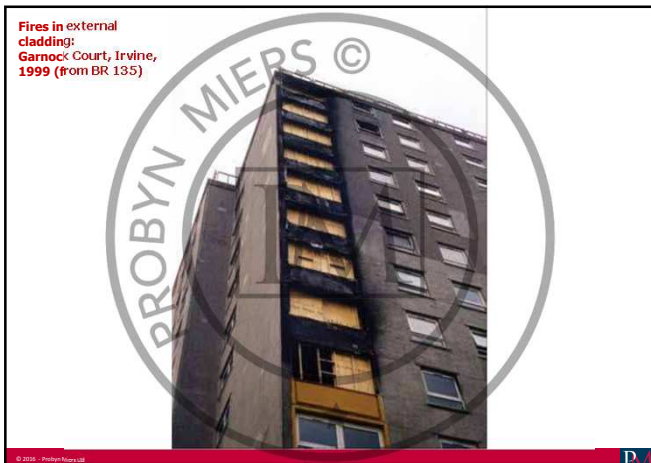


Fires in composite panels:
Sun Valley Poultry,
Herefordshire, 1993

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Building Regulations In The UK

Requirement B4 (1) states:

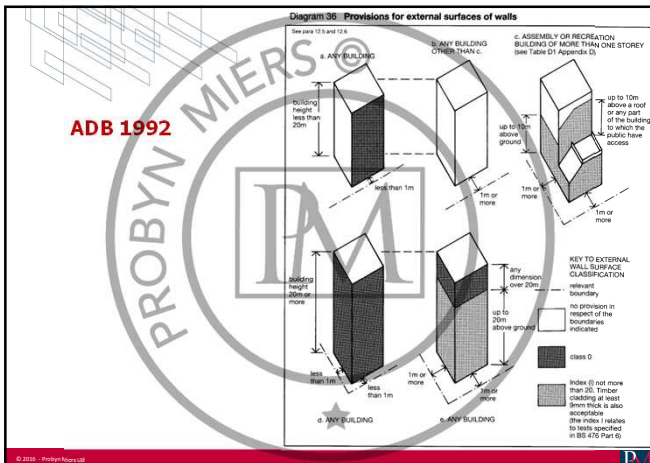
"The external walls of the building shall resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building."

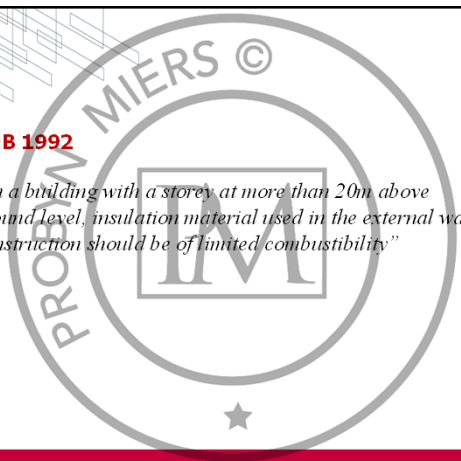
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Building Regulations In The UK

Approved Document B *Fire Safety* (ADB) 1992 revised 'Class 0' applied to the inside (cavity) face as well as the outside of rainscreen cladding systems on 'tall' (>20m) buildings. Class 0 rainscreen cladding recommended above 20m height and/or within 1m of site boundary.

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ADB 1992

“In a building with a storey at more than 20m above ground level, insulation material used in the external wall construction should be of limited combustibility”

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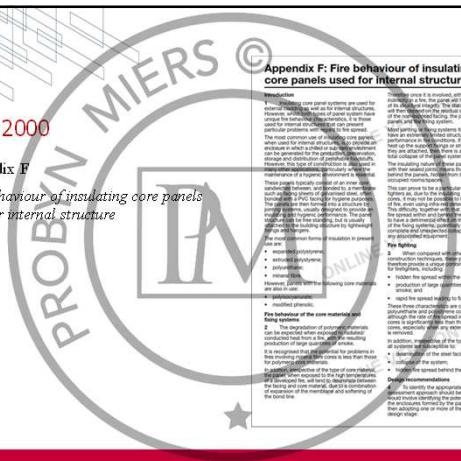


Building Regulations in the UK

ADB 1992 also recommended that the gaps behind rainscreen cladding be closed by cavity barriers.

1. At every floor level
2. On line of compartment walls; of buildings over 20mm high

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ADB 2000

Appendix F

Fire behaviour of insulating core panels used for internal structure

Appendix F: Fire behaviour of insulating core panels used for internal structures

Introduction

1. Insulating core panel systems are used for external cladding and for internal structures using fire limiting materials. It is these particular materials that are of interest. The most common use of insulating core panels is for external cladding. The panels are used to provide a fire resistant barrier between the external face of the building and the internal structure. The panels are also used for internal structures. The panels are used to provide a fire resistant barrier between the internal structure and the external face of the building.

Fire behaviour of the core materials

2. The insulating core materials used in these panels are of limited combustibility. This means that they will not contribute to the fire load and will not burn in a sustained manner. The panels are also used for internal structures. The panels are used to provide a fire resistant barrier between the internal structure and the external face of the building.

Fire testing

3. The panels are tested in accordance with BS 476-28. This test involves exposing the panels to a fire for a period of 30 minutes. The panels are then inspected for signs of charring, cracking, or other damage. The panels are also tested in accordance with BS 476-29. This test involves exposing the panels to a fire for a period of 30 minutes. The panels are then inspected for signs of charring, cracking, or other damage.

Design recommendations

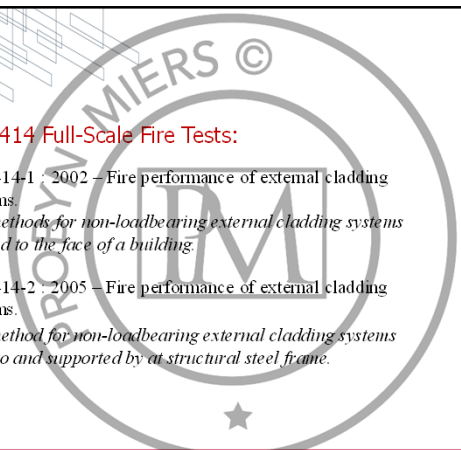
4. The panels should be used in accordance with the manufacturer's instructions. The panels should also be used in accordance with the relevant building regulations. The panels should be used in accordance with the relevant fire safety standards.


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BS 8414 Full-Scale Fire Tests:

BS 8414-1 : 2002 – Fire performance of external cladding systems
Test methods for non-loadbearing external cladding systems applied to the face of a building.

BS 8414-2 : 2005 – Fire performance of external cladding systems.
Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame.





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BS 8414


Photograph 1 – System with insulation comprising a material of limited combustibility, after test.
Photograph 2 Thermo setting core without adequate fixings or fire breaks

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BS 8414

EPS system after test (a) without fire barriers, (b) with fire barriers

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Insulation Materials / Products

12.7 In a building with a storey 18m or more above ground level **any insulation product, filler material** (not including gaskets, sealants and similar) etc **used in external wall construction should be of limited combustibility** (see Appendix A). This restriction does not apply to masonry wall construction which complies with Diagram 34 in Section 9.

ADB 2006

