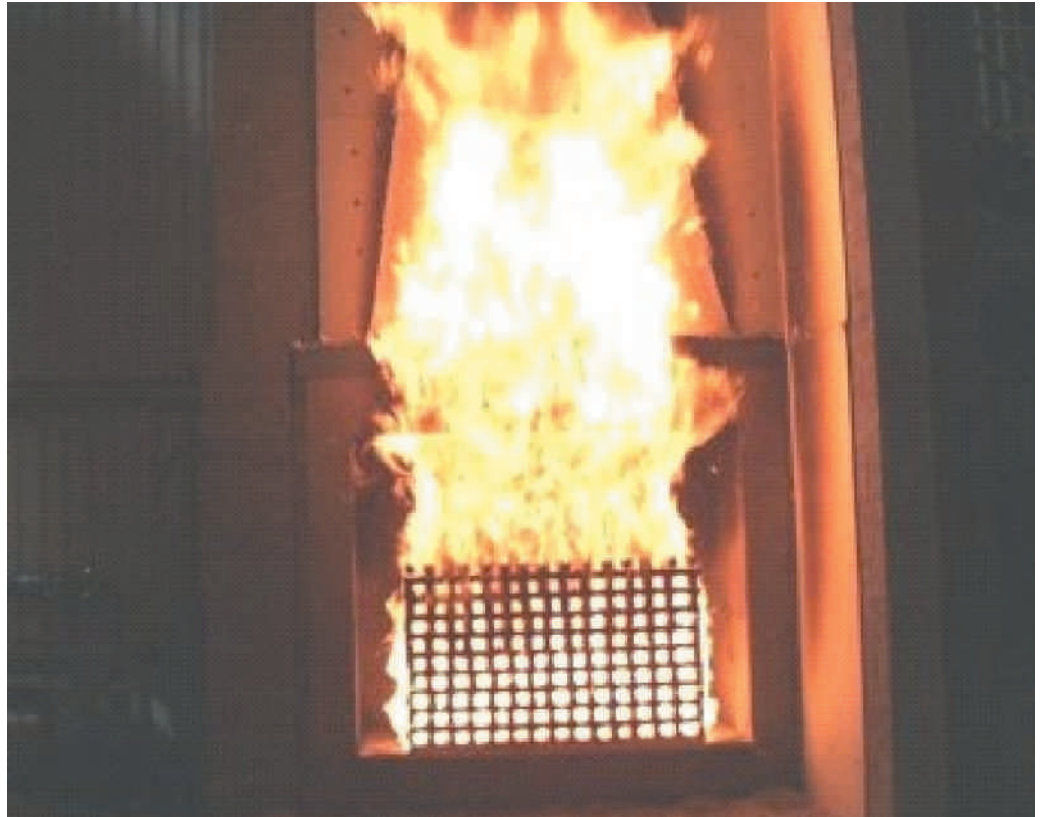


System under test on
BRE External Cladding
Test Facility



Assessing the fire performance of external cladding systems

The Issue

Fires involving multi-storey buildings are fortunately rare but when they occur, they have the potential to be dangerous, both in terms of risk to life and property loss. They can generate major disruption to commercial business or domestic life if dwellings are involved.

By Sarah Colwell

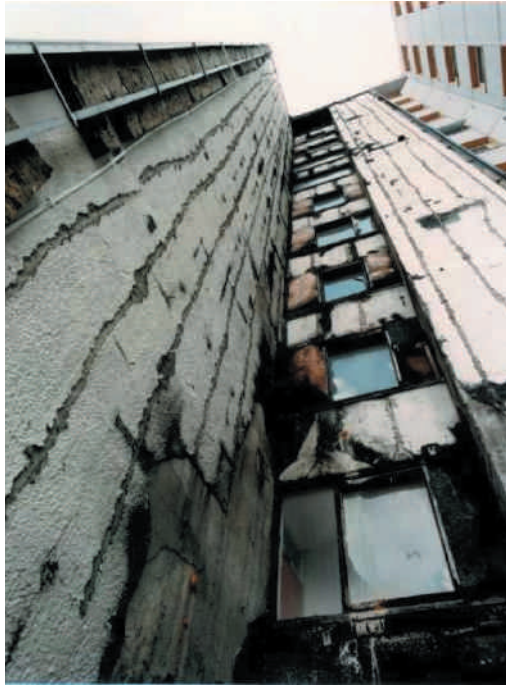
BRE

Losses from commercial property can be considerable. The Basingstoke fire in 1991, in which two floors of a 14-storey office block were damaged, resulted in a £15.6M claim and the more recent fire in Madrid, in 2005, led to significant property and consequential losses.

It was estimated in 2001 that there were over 5,000 blocks of flats in England, representing about 300,000 homes. One of the fire issues raised with this type of building is the potential for fire to spread via the external cladding on the structure, as seen in the Knowsley Heights fire in 1991.

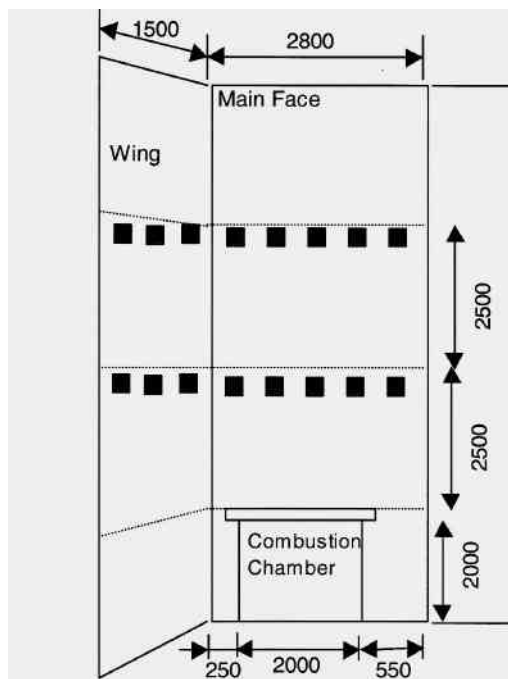
The Garnock Court fire in Irvine, Scotland in

1999, gave rise to a Parliamentary inquiry into the potential risk of fire spread in buildings via external cladding. One of the recommendations from the inquiry included the statement that “we do not believe it should take a serious fire in which people are killed before all reasonable steps are taken towards minimising the risks.” As a consequence of this, BRE’s sister company the Loss Prevention Certification Board (LPCB) constantly develop and publish certification schemes that protect people and their property. Some examples can be found at the end of this article. For a full listing visit: www.redboolive.com

Knowsley Heights**External Fire Spread**

Fires can occur within a property or in close proximity to the building envelope. If no intervention occurs, the fire within the building may develop to flashover and break out from the room of origin via a window opening or doorway. Flames breaking out of a building from a post flashover fire will typically extend 2m above the top of the opening irrespective of the material used to construct the outer face of the building envelope and the potential then exists for any external cladding system to become involved in the fire.

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



Test facility

BS 8414 : Part 1: 2002, based on BRE Fire Note 9, is a full-scale test designed to investigate the fire performance of non-loadbearing exterior wall systems, including external wall insulation systems and curtain walling, fitted to a masonry substrate when exposed to an external fire source at a realistic scale.

A 9.6m high test facility is used with a main face 2.8m wide and includes a right angle internal return wall, a minimum of 1.5m deep. The fire source is designed to represent a post flashover fire exiting from an opening such as a window in a post flashover room. The duration of the fire source is 30 minutes.

Thermocouples are placed at the mid-depth of each combustible layer and cavity where present. The thermocouples are located at two heights above the fire source; 2.5m and 5m and the time taken for the fire to spread between these two levels is determined for each layer and cavity in the system. Any system collapse or delamination is also noted. The test method does not assess the fire resistance of the exterior wall assembly.

BR135 – Fire Performance of External Thermal Insulation for Walls of Multi-Storey Buildings. Second Edition.

The second edition of the BRE Report 'BR135 – Performance of External Thermal Insulation for Walls of Multi-Storey Buildings' was published in 2003. This document provides updated guidance on the fire performance of external cladding systems and a classification system for the BS 8414 – 1:2002 test method. The principles behind the classification system are based on fire spread away from the initial fire source and the rate of fire spread. Additionally if fire spreads away from the initial fire source, the rate of progress of fire spread, or tendency for collapse, should not unduly hinder intervention by the emergency services.

BS8414: Part 2:2005 – Fire performance of external cladding systems. Part 2. Test method for non-loadbearing external cladding systems applied to a steel frame.

The increasing use of lightweight framed systems and offsite construction techniques for these types of buildings identified a need to provide a second part of the test standard to allow these types of systems to be assessed. This part of the standard can be used for assessing the fire performance of non-loadbearing external cladding systems supported by a building frame, such as curtain walling, glazed units, infill panels and insulated composite panels at full-scale. The specimen sizes, fire exposure conditions and monitoring locations are the same as those used in Part 1 of the BS 8414-1:2002.

As with part 1 of the test method, a classification system for this part of the test standard is currently being drafted as an annex to the BR135 document.

Guidance for current Building Regulations in England and Wales

Where the guidance provided in Approved Document B (AD B) (Fire Safety) to the Building Regulations 2000 cannot be met for the fire performance of external cladding system, an alternative method such as BRE Fire Note 9 can be used to demonstrate that the risks of spread of

What's lurking behind your façade?

The last thing you need behind a rainscreen cladding system is flammable insulation, particularly in a multi-storey construction. A careless cigarette, an act of arson or an electrical fault could all be sufficient to start a fire. Combine that with the chimney effect of a ventilated cavity and you could be looking at a towering inferno scenario in no time. Unless, that is, you have had the foresight to install an insulation material that will limit the spread of fire.

The advantages of specifying such a material for any building are obvious – limited fire and smoke damage means less property damage, lower remedial costs and most importantly, greater chance of escape for occupants.

Fortunately, help is at hand from Kingspan Insulation.

Kingspan Kooltherm® K15 Rainscreen Board has been successfully tested at the Building Research Establishment to BS 8414-1: 2002 and when assessed in accordance with BR 135 it is acceptable for use above 18 metres in accordance with the English, Scottish and Irish Building Regulations. **Kingspan Kooltherm® K15 Rainscreen Board** also achieves a Class O / Low Risk fire rating to the Building Regulations / Standards, and less than 5% smoke obscuration when tested to BS 5111.

Kingspan Kooltherm® K15 Rainscreen Board consists of premium performance rigid phenolic insulation which is CFC/HCFC-free with zero Ozone Depletion Potential (zero ODP). With a thermal conductivity as low as 0.021 W/m·K, **Kingspan Kooltherm® K15 Rainscreen Board** achieves required U-values with minimal thickness, thus maximising available space.

Further information on the **Kingspan Kooltherm® K15 Rainscreen Board** is available from Kingspan Insulation on:

Tel: +44 (0) 870 733 8333 (UK)

email: literature.uk@insulation.kingspan.com

Tel: +353 (0) 42 97 95038 (Ireland)

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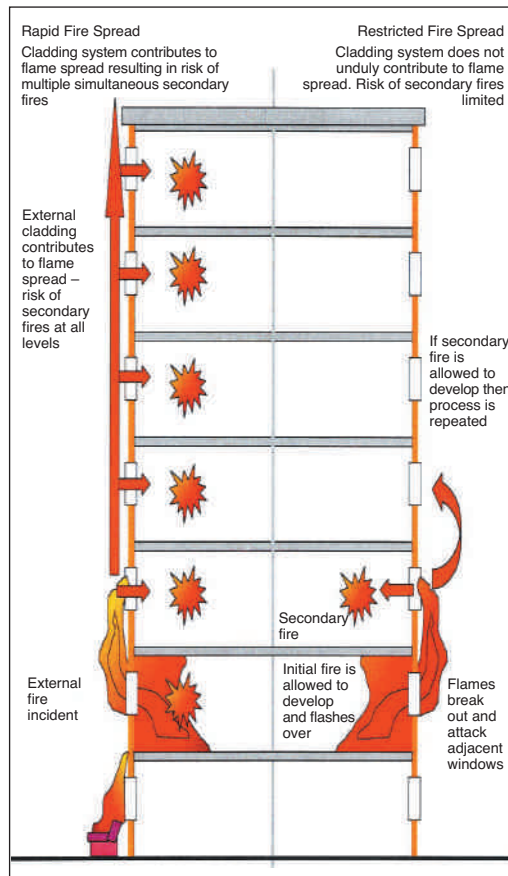


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Principle behind BS 8414 parts 1&2 and BR 135



fire over external walls have been minimised. This test method does not assess the fire resistance of the systems nor does it address the provisions for fire spread between buildings. BR135 Second Edition, BS 8414-1:2002 and BS 8414-2:2005 have superseded BRE Fire Note 9.

Technical Approval

As part of the Construction Products Directive (CPD), an ETAG (European Technical Approval Guideline has been produced by EOTA to enable CE marking of these types of products), ETAG 004 for External Thermal Insulation Composite Systems with Rendering was published in 2000 to provide a route for CE marking of these products. As part of this ETAG, the reference to fire performance includes the provision for the use of full-scale testing to evaluate the performance of fire barriers for insulated systems, if required.

Certification

One method of ensuring that the product meets a standard is to choose one that is approved by a nationally accredited certification body, such as the Loss Prevention Certification Board (LPCB). Certification by LPCB is independent third party confirmation that the product meets and continues to meet the appropriate standard. The certification process involves rigorous assessment and testing of products coupled with regular audits of quality procedures governing the factory production process to ensure that they meet quality standards reviewed by a team of experts which include manufacturers, installers, designers, clients, regulators, insurers, engineers and scientists. This differs from a test which is basically a snapshot showing that the product passed the test on a given day,

whereas certification, through regular audits, ensures that the product continues to comply with the standard and meet the specification.

In order to meet the demands from the market for certification schemes to cover the fire performance of composite systems, a new LPCB scheme has been launched as part of the LPS 1181 series of fire growth tests for LPCB approval of construction product systems. LPS1181 part 4 covers systems tested under BS8414-1:2002 with a part 5 scheme in preparation to cover BS 8414-2:2005 systems.

There are many approval bodies including some with their own strong brands. However, not all of them have their own on-site testing facilities and expertise. LPCB, together with its predecessor the Fire Offices' Committee (FOC) has been involved for over 150 years in working with specifiers including clients, insurers, and regulators to set the standards necessary to ensure the quality of products in the market place.

Listing

Once a product, service or company meets the required standard, a certificate is issued and listed in the relevant 'Red Book', either under the List of Approved Fire and Security Products and Services or List of Approved Companies and Construction Products. Listing in the Red Book is a very useful marketing tool for the approved companies as thousands of specifiers and insurers around the world use the Red Book to select their suppliers. The Red Book is published in January each year and on CD ROM in January and June of each year. A "live" copy of the Red Book is continually updated online at www.RedBookLive.com.

A small list of LPCB certification schemes:

- LPS 1107-1.1 Requirements, Tests and Methods of Assessment of Passive Fire Protection Systems for Structural Steelwork
- LPS 1132-4.1 Requirements and Tests for LPCB Approval of Wall and Floor Penetration and Linear Gap Seals
- LPS 1158-2.1 Requirements and Tests for Fire Resistant Glazing Systems
- LPS 1208-2.1 LPCB Fire Resistance Requirements for Elements of Construction Used to Provide Compartmentation
- LPS 1181 Part 1-1.1 Requirements and Tests for Built-up Cladding and Sandwich Panel Systems for Use as the External Envelope of Buildings.
- LPS 1181: Part 2 – Issue 2.0 Requirements and Tests for sandwich panels and built-up systems for use as internal constructions in buildings
- LPS 1181: Part 4 – Issue 1 Requirements and Tests for External Thermal Insulated Cladding Systems with rendered finishes (ETICS) or Rain Screen Cladding systems (RSC) applied to the face of a building.
- LPS 1196-1.1 Requirements and Tests for Exposed Surfaces Having Reaction to Fire Classifications of Class 0 and Class 1
- LPS 1204-2.1 Requirements for Firms Engaged in the Design, Installation and Commissioning of Fire Fighting Systems
- LPS 1260-2.2 Requirements for Testing Plastic Pipes and Fittings for Sprinkler Systems
- LPS 1261-1.1 Requirements for Testing Flexible Hoses for Sprinkler Systems