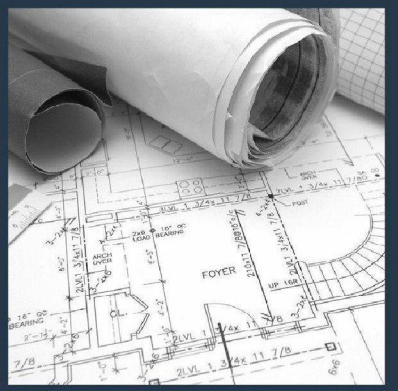
Facades to tall buildings

7 July 2016

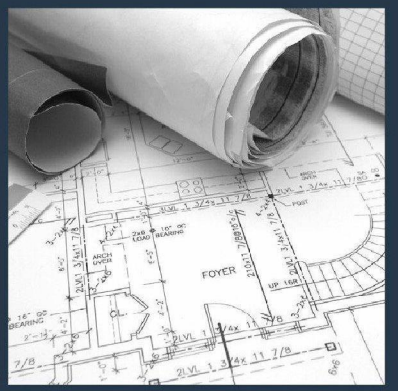


Ian Davis, Operations Director - NHBC

NHBC
Raising Standards. Protecting Homeowners

Facades to tall buildings

7 July 2016



Diane Marshall, Head of Technical Services - NHBC

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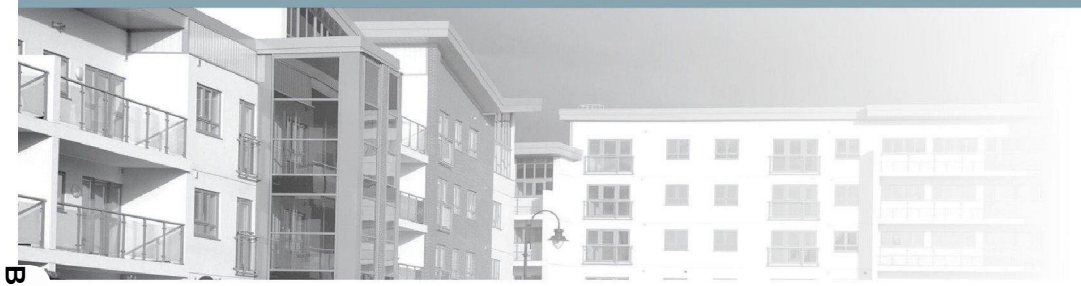
Facades to tall buildings
Objectives

- Explain requirements for facades to tall buildings
- Provide background and context on the routes to demonstrate compliance
- Provide some solutions for common wall types



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Agenda

10:00 – 10:10	**INTRODUCTION** Ian Davis, NHBC
10:10 – 10:25	**REGULATORY REQUIREMENTS FOR FACADES OF TALL BUILDINGS** Brian Martin, DCLG
10:25 – 10:45	**TESTING PROCEDURES** Stephen Howard, BRE
10:45 – 11:00	**ALTERNATIVE METHODS TO DEMONSTRATE COMPLIANCE – BCA GN 18** Steve Evans, BCA
11:00 – 11:20	**Coffee Break**
11:20 – 11:40	**FACTORS AFFECTING FIRE ENGINEERED APPROACHES** Janet Murrell, Exova Warringtonfire
11:40 – 12:00	**NHBC TECHNICAL GUIDANCE NOTES** John Lewis / Maulik Katkoria, NHBC
12:00 – 12:20	**Q&A AND CLOSE**

Agenda

14:00 – 14:10	**INTRODUCTION** Diane Marshall, NHBC
14:10 – 14:25	**REGULATORY REQUIREMENTS FOR FACADES OF TALL BUILDINGS** Brian Martin, DCLG
14:25 – 14:45	**TESTING PROCEDURES** Stephen Howard, BRE
14:45 – 15:00	**ALTERNATIVE METHODS TO DEMONSTRATE COMPLIANCE – BCA GN 18** Steve Evans, BCA
15:00 – 15:20	**Coffee Break**
15:20 – 15:40	**FACTORS AFFECTING FIRE ENGINEERED APPROACHES** Janet Murrell, Exova Warringtonfire
15:40 – 16:00	**NHBC TECHNICAL GUIDANCE NOTES** John Lewis / Maulik Katkoria, NHBC
16:00 – 16:20	**Q&A AND CLOSE**

How did we get here…?

- Profile of Combustible Materials to facades of tall buildings increased in mid 2015
- NHBC reviewed 292 projects with floors over 18m
- 97 needed further evidence to show compliance
- Negative feedback from builder customers about the application & clearing of ‘late’ conditions

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Who does what?

Person Carrying out the Work

- meeting NHBC Standards and Building Regulations

Building Control Body

- ensuring Building Regulations met by helping person carrying out work

NHBC

- work meets Building Regulations and NHBC Standards and CML logic test satisfied

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Why is it important?

Prosecution

- Loss of licence (AIs)
- Corporate manslaughter
- Fines and imprisonment

Claims

- From people or relatives of injured or killed

Reputation

- Company and industry image damaged

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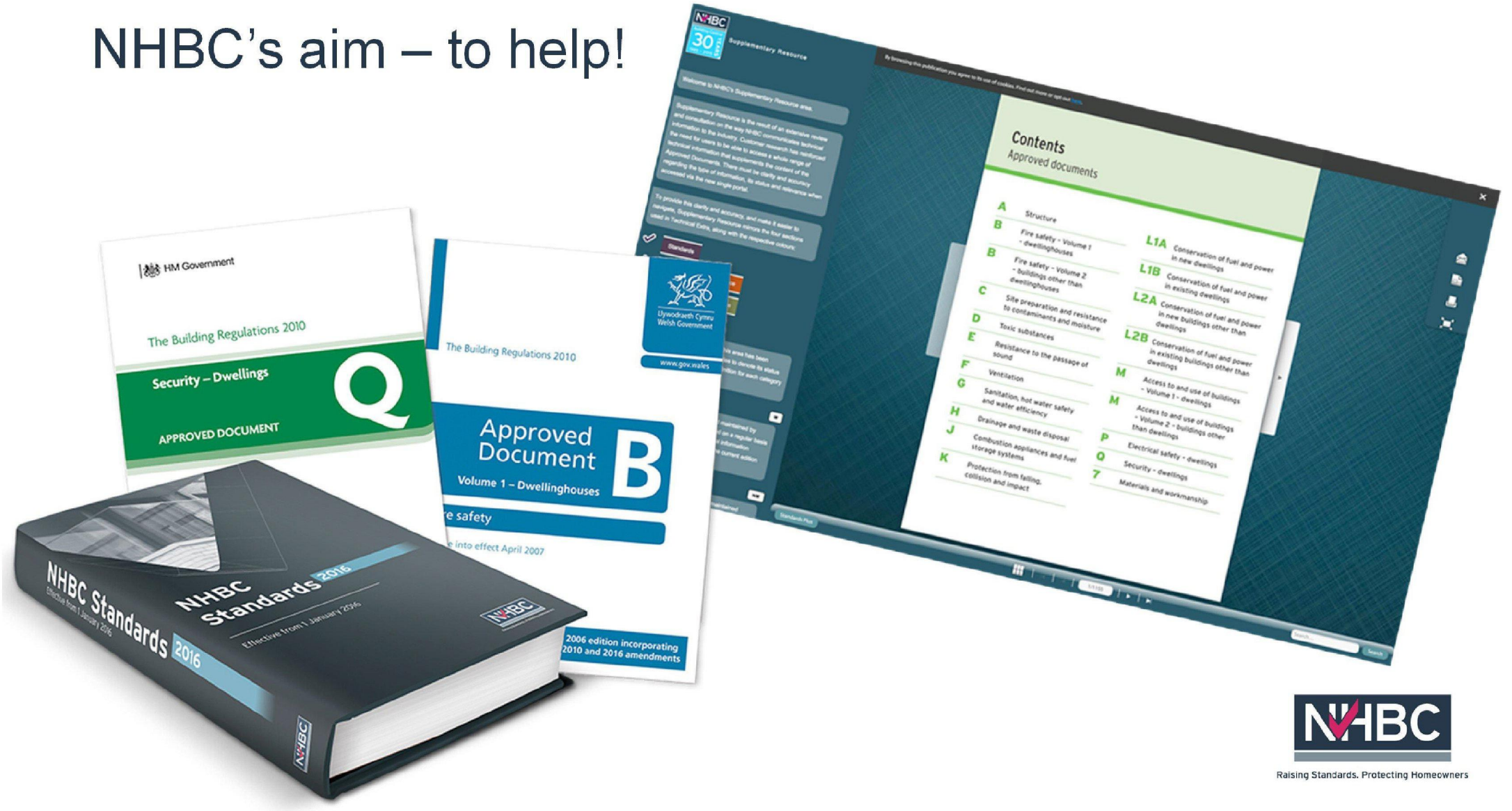
NHBC's aim – to help!



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BRE00004395/9

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Regulatory Requirements

Brian Martin
Building Regulations and Energy Performance Div

Communities and Local Government

- Façade Fires
- The 5 requirements
- How they apply to Façades
- What this means for Façade design
- What Approved Document B says
- Alternative Approaches

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Façade Fires

- In 1979, 865 people in the UK died from fires in dwellings.
- Nearly thirty years later, the number of deaths had fallen to 353, a reduction of 60 per cent, and the lowest figure since official records began in 1960.
- But the Fire Service still attends 45,000 building fires per year – 10,000 of them in blocks of flats.

The Address – Dubai - 2016

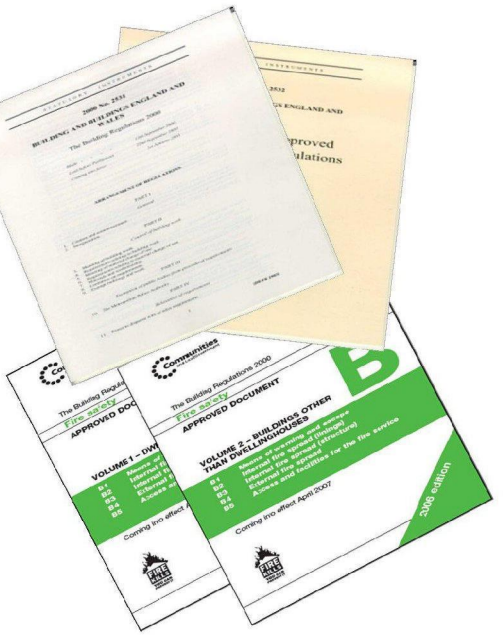
Garnock Court – Glasgow 1999

Baku – Azerbaijan 2015 – 15 Dead

The 5 Requirements of Building Regulations

Part B – Fire Safety

- B1 Means of Warning and Escape
- B2 Internal fire spread (linings)
- B3 Internal fire spread (structure)
- B4 External fire spread
- B5 Access and facilities for the fire service



Limitation on requirements

8. Parts A to D, F to K, N and P (except for paragraphs G2, H2 and J7) of Schedule 1 shall not require anything to be done except for the purpose of securing reasonable standards of health and safety for persons in or about buildings (and any others who may be affected by buildings, or matters connected with buildings).

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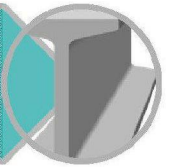
Facades

Access and egress – For fire service access (B5) and means of escape (B1)

Combustibility of internal linings – To limit internal fire growth (B2)

Fire Resistance – for structural stability (B3) if it supports floors etc.



Fire Resistance – to restrict fire spread from one building to another (B4)

Combustibility of cladding – to restrict fire spread upwards from one floor to another (B4)

BRE00004395/14

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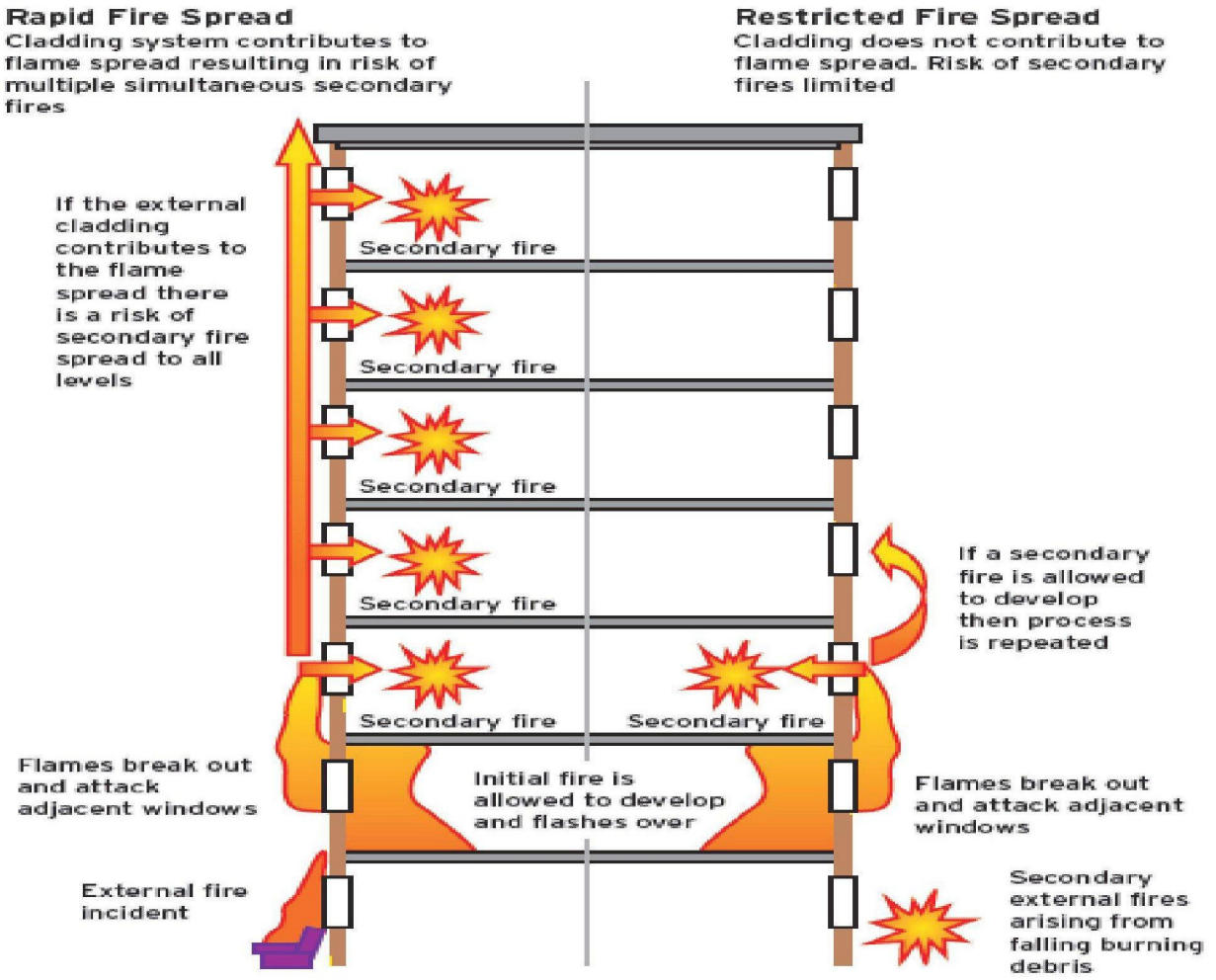
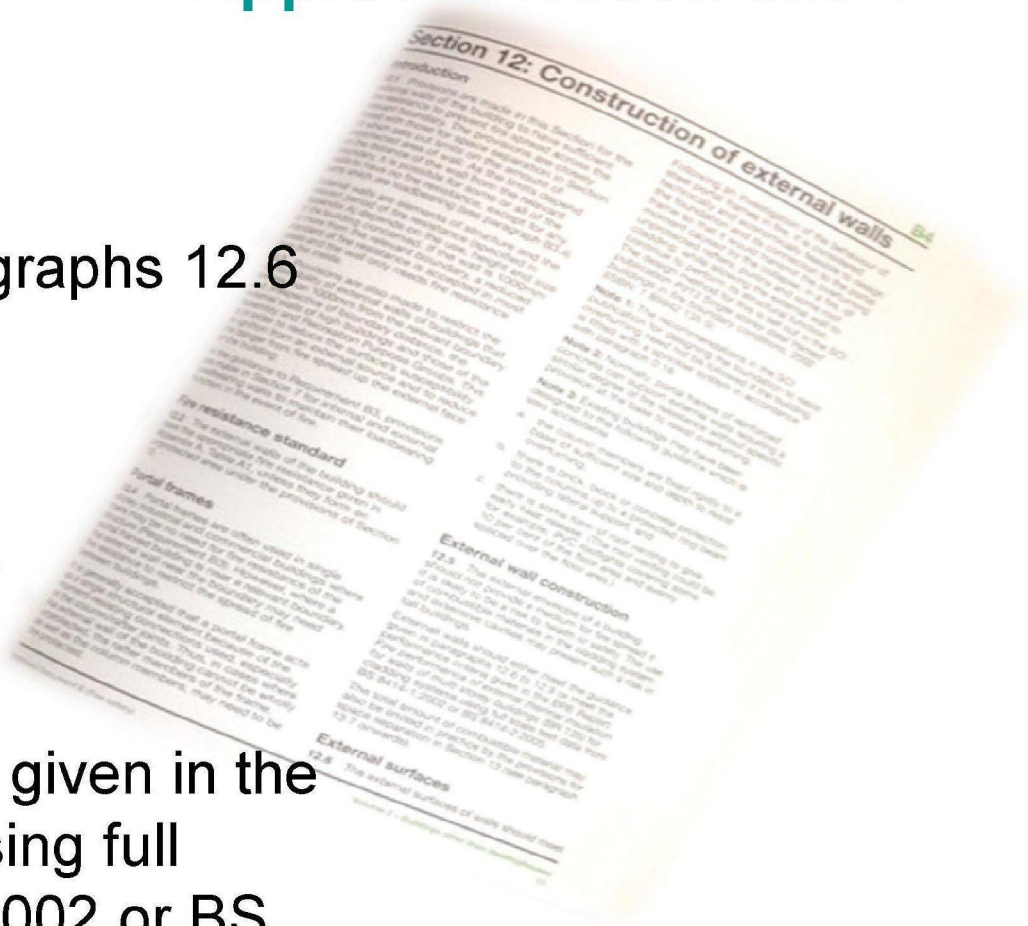


Communities and Local Government

Approved Document B



External walls should either

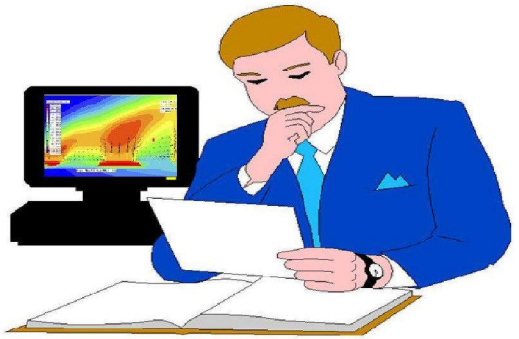
- meet the guidance given in paragraphs 12.6 to 12.9
    - External Surfaces
    - Insulation materials/products
    - Cavity barriers
- Or meet the performance criteria given in the [BR 135] for cladding systems using full scale test data from BS 8414-1:2002 or BS 8414-2:2005.

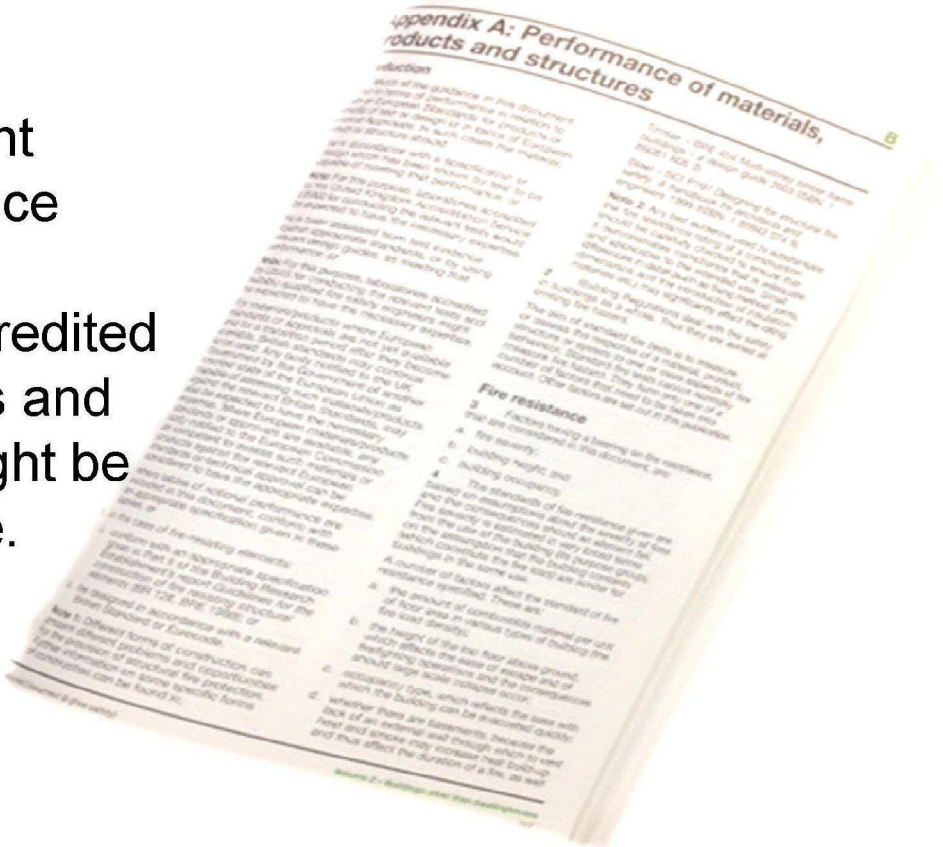
Alternative Approaches

- **Assessments (Desk top studies)**

  ….assessed from test evidence against appropriate standards, or by using relevant design guides, as meeting that performance

  NOTE: For this purpose, laboratories accredited by UKAS for conducting the relevant tests and suitably qualified fire safety engineers might be expected to have the necessary expertise.





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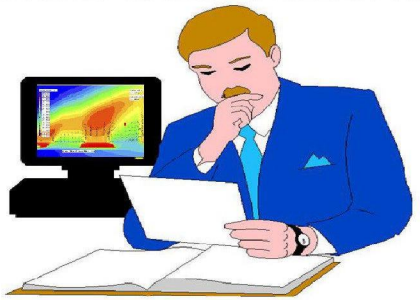
Alternative Approaches

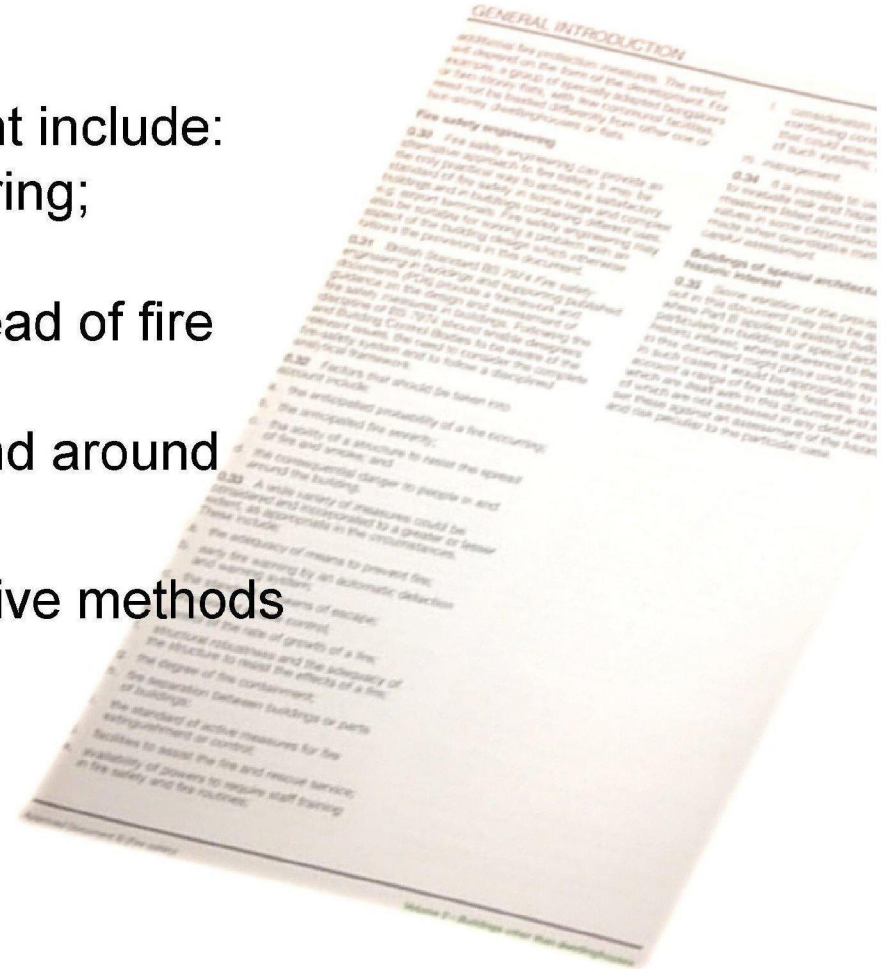
- **Fire Safety Engineering**

……Factors that should be taken into account include:

a. the anticipated probability of a fire occurring;
b. the anticipated fire severity;
c. the ability of a structure to resist the spread of fire and smoke; and
d. the consequential danger to people in and around the building.

……..The assumptions made when quantitative methods are used need careful assessment.





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Regulatory Requirements

Brian Martin
Building Regulations and Energy Performance Div

BRE: Fire Testing Procedures

Stephen Howard
Director- Fire testing and certification
July 2016

Part of the BRE Trust

External walls – Euroclass Classifications

- A1 and A2 classifications.
- The testing provides data that the products will contribute very little to the further development of a fire.
- The testing and classification evaluates the product as a ‘whole’.
- This is a critical element of this test.

EN ISO 1716

- For multi layer systems, each layer is considered individually and a test program may require multiple tests

External walls – Euroclass Classifications

B, C and D classifications.

- Two tests are performed
- Single burning item (EN13823) and
- Single flame test. (EN11925).
- In both cases a flame source is applied to the outer surface of the sample under test.
- Samples used for testing are representative of the final construction.

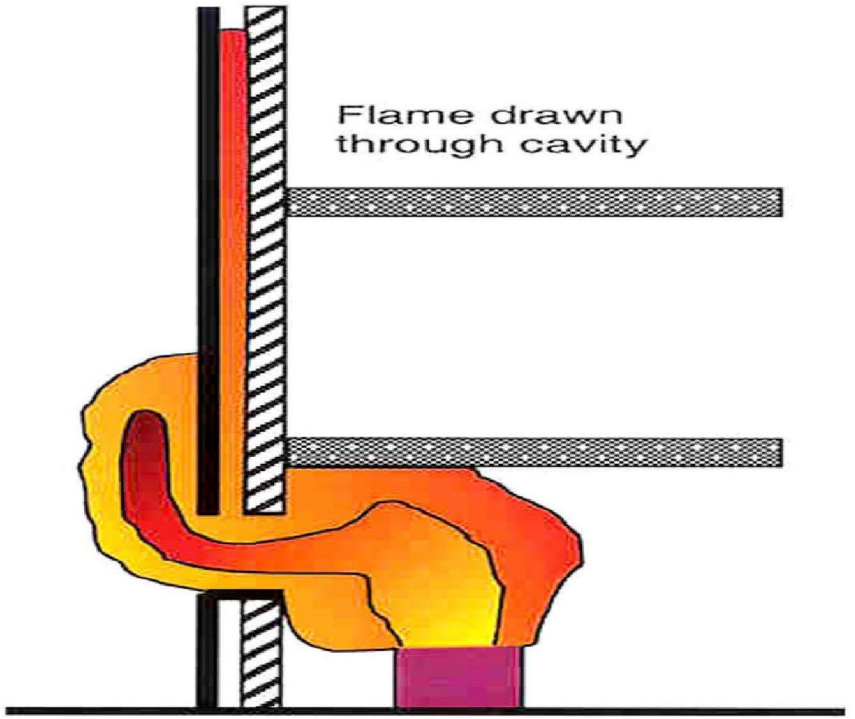
External walls – Euroclass Classifications

- Although samples are representative of the final build, a Euroclass ‘B’ classification can be achieved by the use of an outer layer that provides protection to a more combustible material that lies below.
- A1 and A2 classifications cannot be achieved by this method.
- The burner output for an Single burning Item test is 30kW.
- And if the fire is larger than 30kW?

Mechanisms of fire spread in Façades

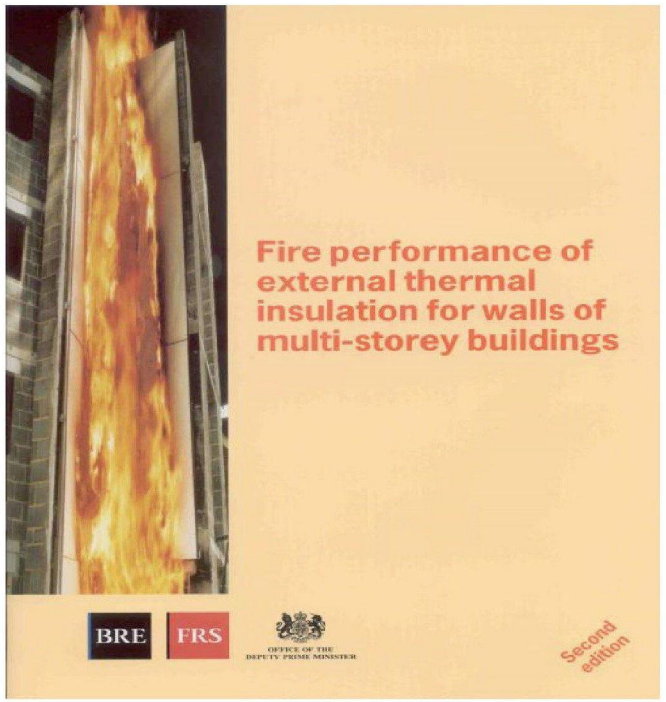
Mechanisms of External Fire Spread

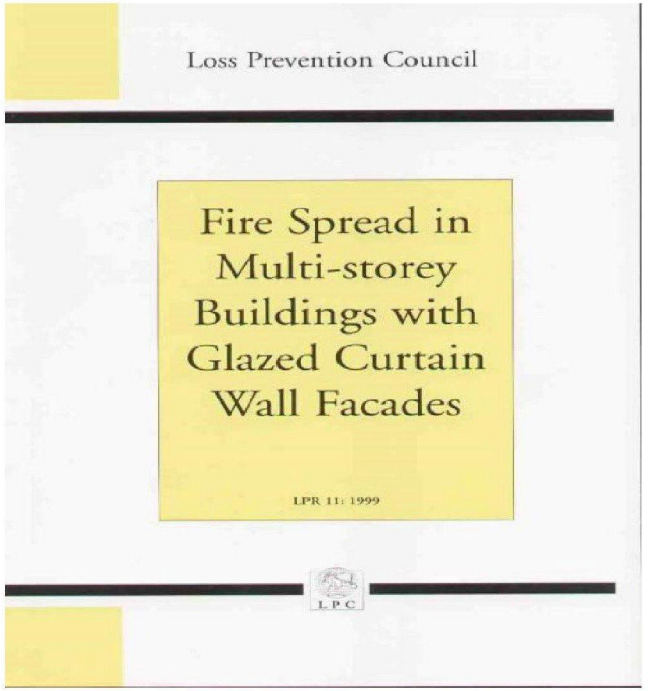
- Combustible materials
- Cavities either
  - Part of system.
  - Created by delamination.
- Flames in cavities can extend 5 to 10 times original length regardless of materials present.



Experimental Programmes – Fire Spread

Experimental investigations



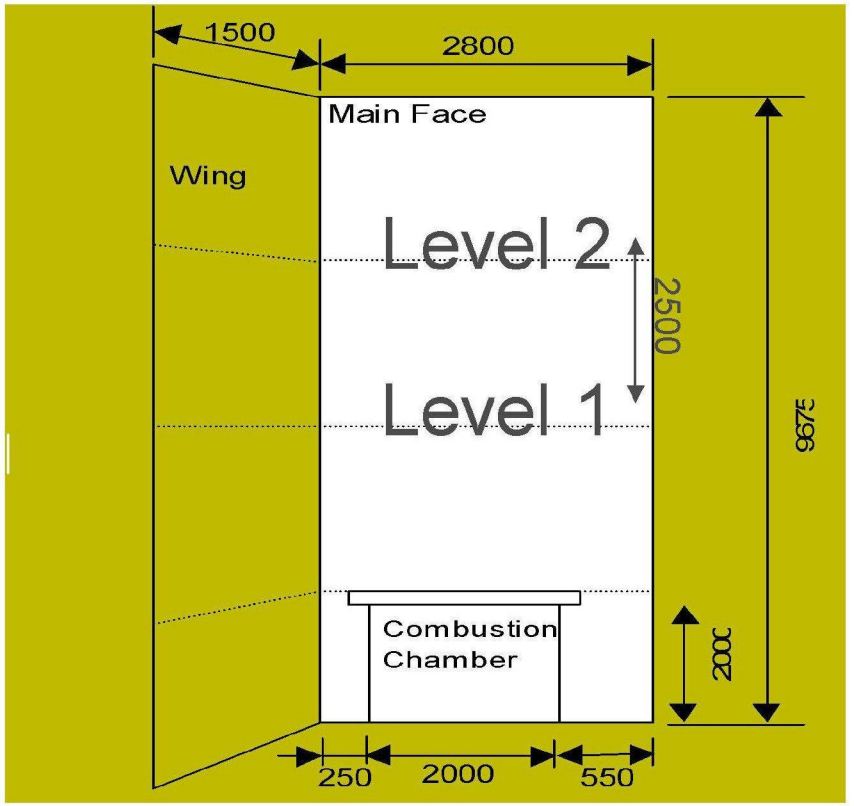


Test Standards

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

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

Test system



- Minimum height of sample:
  - 6 m above chamber opening
  - ground to full height on wing
- Width:
  - 2.8 m main face
  - 1.5 m wing
- Depth:
  - Part 1 - Maximum sample depth 200 mm

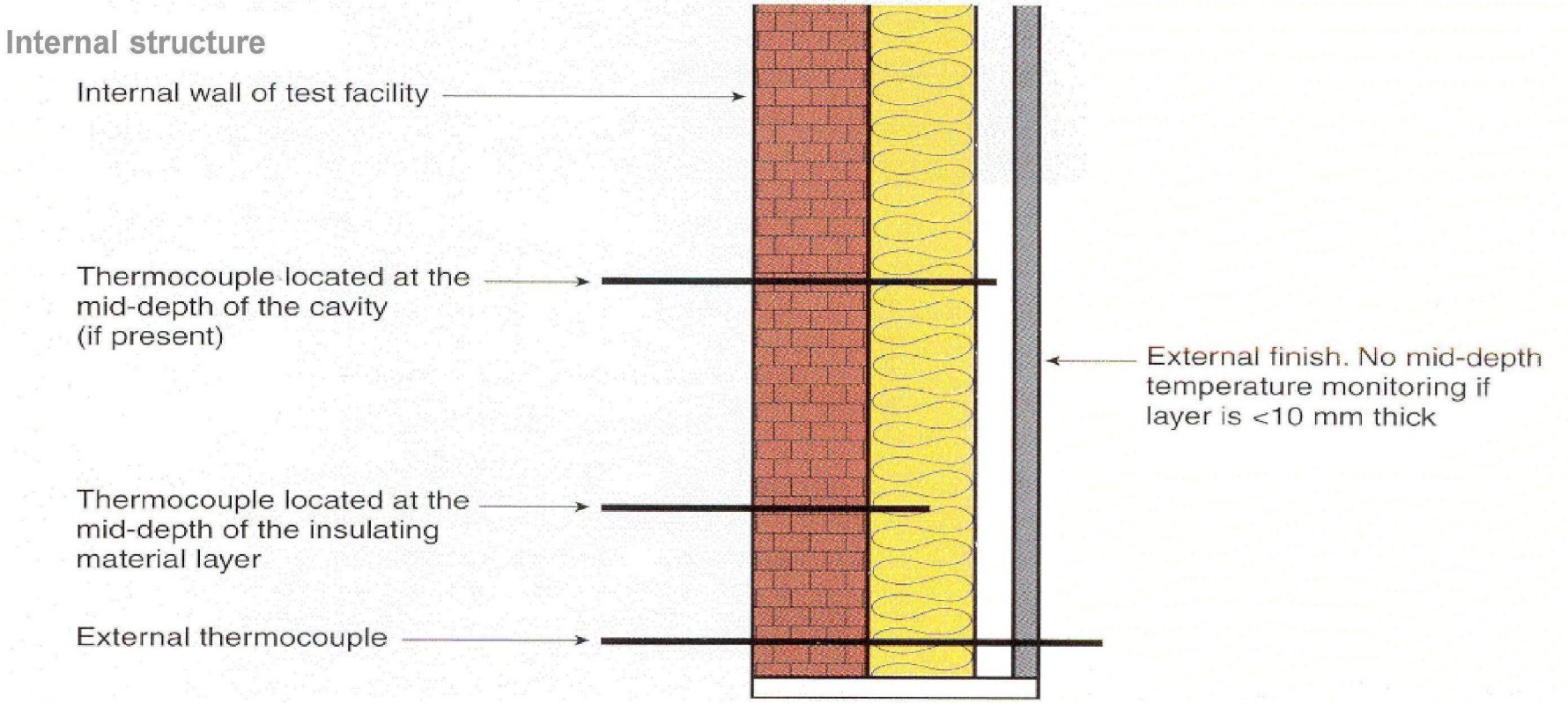
BS 8414: Part 1: 2002

- Test method for non-load bearing external cladding systems applied to the face of the building
- This test method was developed to address systems installed to masonry structures.

Modern Methods of Construction

- BS 8414 - 2 : 2005
  - For systems where the masonry structure is no longer present.
  - Same fire load and methodology at BS 8414-1:2002
  - Classification is in Annex B to BR135

Location of Thermocouples at Level 2



Fire Load

1500mm x 1000mm x 1000mm timber crib

50mm x 50mm cross section

Each crib consists of 250 sticks

Moisture content of crib controlled 10%-16% by mass

Crib is ignited with fibre board and white spirit

Fire Load

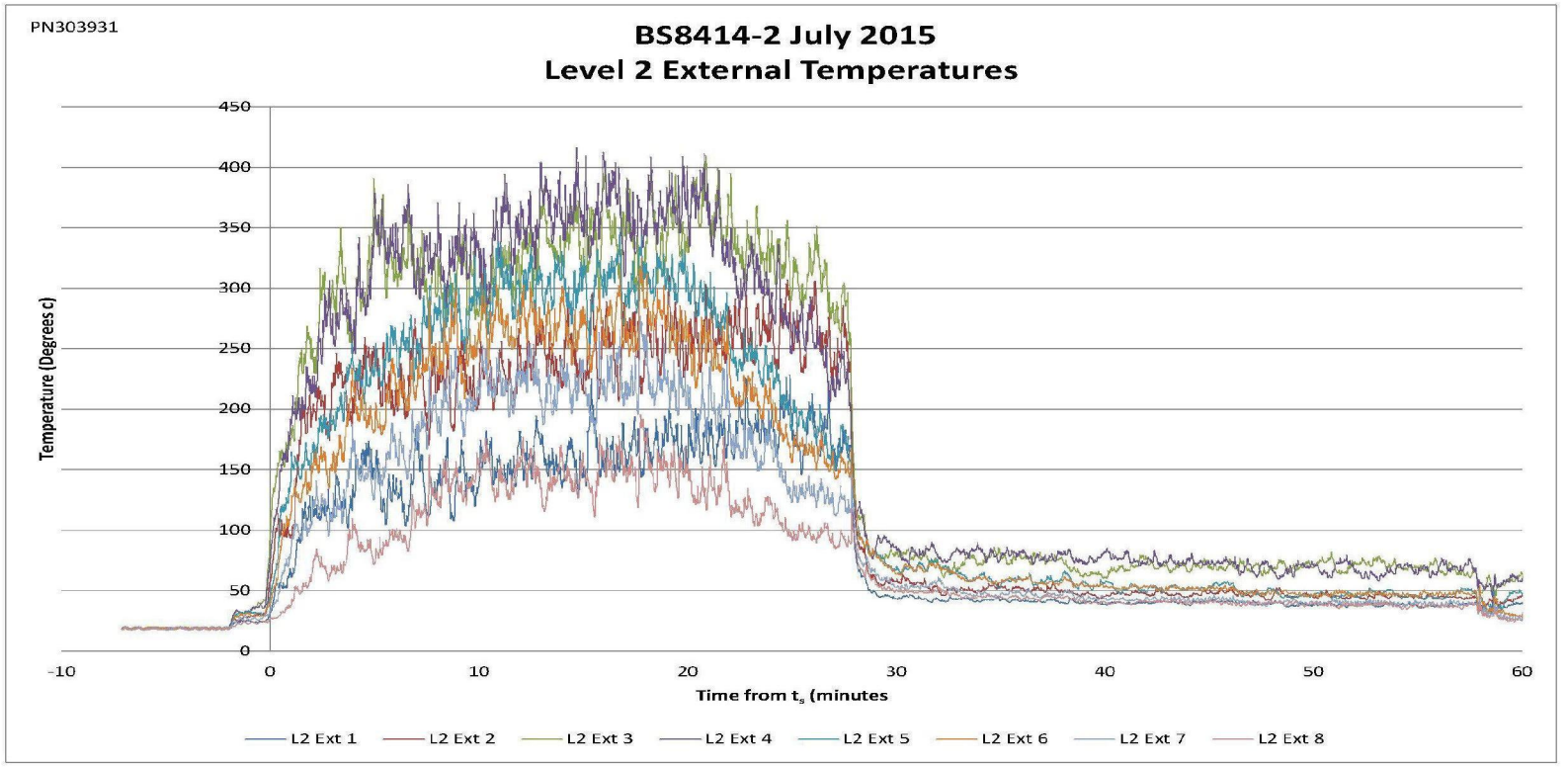
Crib output 4500 MJ over 30 mins

3.0(+/- 5) MW peak output

Test Principles

The duration of the fire load is 30 minutes. Test runs for 60 minutes

Graphical Output



Post Test

- Damage is recorded in the following areas:
  - flame spread on surface
  - flame spread in cavities or insulation
  - area of façade damaged or detached

Assessment of System Performance

- Test method to assess whole system performance including fire breaks

BR 135

- There is no pass fail criteria in BS 8414 parts 1 & 2
- Referenced in Approved Document B
- Primary Pass/Failure criteria BR135
  - Time/temperature at Level 2, 600 deg C at 15 minutes (both external and internal).
  - Must be greater than 30 seconds.
  - Burn through. If flaming is seen on the rear of the test system. (must be for more than 60 seconds)

BR 135 – Referenced in Approved Document B

Items reported in BR135 classification report

- Pool Fires
- Collapse of system
- Spalling
- Delamination
- Flaming debris
- Interest parties can make an informed decision.
- Other classifications can be applied to the BS8414 test.

Currently testing systems for

- UK Building Regulations
- UAE and Gulf states
- Australia
- We understand that China uses a test method adapted from BS8414.
- BS 8414 test is being called up in a number of countries equivalent to Approved Document B.

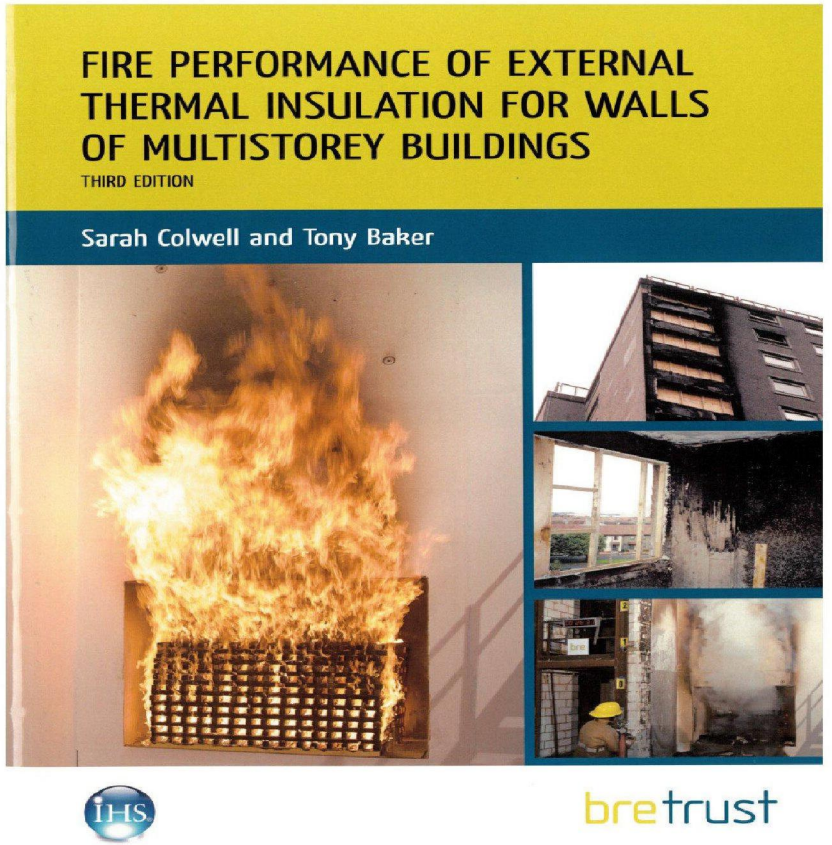
Current operating third party approvals – 'LPCB'

For UK insurance industry

UAE and Gulf states

External Fire Spread Classification UK

BR 135 – Third Addition



Thank you

- Stephen.Howard@bre.co.uk
- [redacted]

Demonstrating Compliance
BCA Guidance Note 18

Steve Evans
Building Control Alliance

Building Control Alliance

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acai Association of Consultant Approved Inspectors

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RICS

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Demonstrating Compliance
BCA Guidance Note 18

Programme

- Requirements of the building regulations
- Overview of BCA Guidance Note 18
- Our experience to date

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Building Control Alliance

- Set and maintain high standards in Building Control
- Informed Advisor
- Generic Information to support members
- Technical Guidance

"A Single Voice for Building Control"

one voice for professional standards of building control and service

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Building Regulations

- Health and Safety not property protection
  - Part B – Life safety
- Responsibility for compliance
  - Person carry out the work
  - BCB – help builder to achieve compliance
- Final certificate does not guarantee compliance

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Building Regulations

- For buildings with a floor over 18m guidance in ADB2 (Para 12.7) and BS9991 (Section 18.2) both require –
  - All major components (including cladding finishes) within wall construction to be "materials of limited combustibility", or
  - The proposed wall build up should meet the performance criteria of BRE Report BR135 for cladding systems using full scale test data from BS 8414-1 or BS 8414-2

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BCA Guidance Note 18

Use of Combustible Cladding Materials on Buildings Exceeding 18m in height

- Originally issued in June 2014
  - 3 methods to demonstrate compliance
- Re-issued in June 2015 (Issue 1)
  - Revised to cover all buildings
  - 4 methods to demonstrate compliance
- Free to download from BCA website and included in presentation pack

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BRE00004395/50

BCA Guidance Note 18

Use of Combustible Cladding Materials on Buildings Exceeding 18m in height

- Option 1
  - Use Materials of Limited Combustibility
- Option 2
  - Testing to BS 8414-1/2 and meeting BR 135 criteria

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BCA Guidance Note 18

Use of Combustible Cladding Materials on Buildings Exceeding 18m in height

- Option 3
  - Fire engineered assessment of cladding based on test data
  - Carried out by suitably qualified fire engineer
  - Based on reasoned arguments/facts not opinion
  - Demonstrate equivalence of performance of a BR135 compliant system

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BRE00004395/52

BCA Guidance Note 18

Use of Combustible Cladding Materials on Buildings Exceeding 18m in height

- Option 3
  - Should use test data which is specific to the product(s) which are proposed
  - Should justify any discrepancies between the tested and proposed build-ups
  - Avoid leaps of faith! Applying data from very dissimilar materials can lead to inaccurate conclusions

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BCA Guidance Note 18

Use of Combustible Cladding Materials on Buildings Exceeding 18m in height

- Option 4
  - Holistic fire engineered assessment of whole building
  - Carried out by suitably qualified fire engineer
  - Take into account all building factors
  - Demonstrate that building provides reasonable provision for life safety
  - May be necessary to adapt the building

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BRE00004395/54

BCA Guidance Note 18

Use of Combustible Cladding Materials on Buildings Exceeding 18m in height

- Option 4
  - Equivalence with BR135 parameters of fire spread (600^{0}C at 5m above the opening after 15 minutes)
  - Needs to consider external fire risks and risks from ancillary accommodation
  - Sprinklers alone aren't the complete answer!
  - Inform Responsible Person under Regulation 38

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Glazed Systems

- Complete glazed systems would meet guidance as MOLC
- Difficulties arise with spandrel panels using combustible insulation, especially where running full height of building.
- No testing (that we are aware of) which demonstrates how this configuration will react.
  - Fire testing of curtain walling systems can follow the recommendations in BS EN 13830:2015 Curtain Walling – Product Standard.
  - BS EN 13830:2015 directly requires testing of all curtain walling to BS EN1364-4:2014 for fire Compartmentation

Glazed Systems

- At present no evidence to prove Option 1 or Option 2 compliance
- Option 3 Assessments
  - Build up of spandrels/type of insulation
- Option 4 Assessments
  - Location of spandrels/isolation/compartmentation

BCA Experience

Positives

- Adoption of BCA GN 18 as industry best practice by BCB's and Warranty bodies
- Experience and understanding of builders is becoming more common
- Pre-design discussions with builders about facades are becoming more common

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BCA Experience

Not so Positives

- Reports from some fire engineers still based on opinion not fact
- Cavity closers to all openings
- Limited number of published tests available
- No tests using lightweight metal claddings
- Lack of Curtain walling tests being provided to BCB's as justification.
- Substitution of materials

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External Facades to Tall Buildings – Routes to Compliance

Summary

- Requirements of the building regulations
- Overview of BCA Guidance Note 18
- Our experience to date

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External Facades to Tall Buildings – Routes to Compliance

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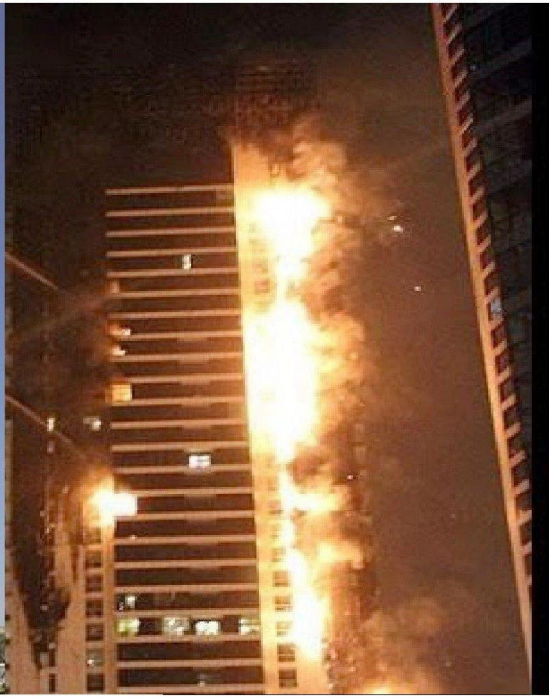
Insulated Facades on High Rise Buildings – options 3 and 4 in Building Control Alliance – Technical Guidance Note 18

Dr Janet Murrell,
Exova Warringtonfire

Grozny

The Address
Dubai

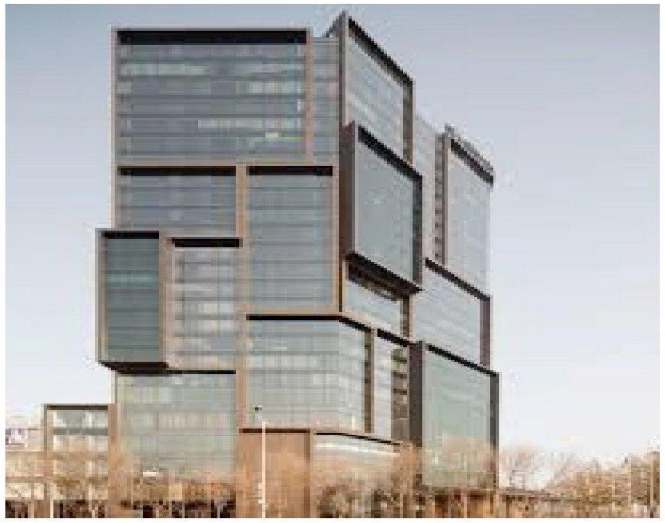


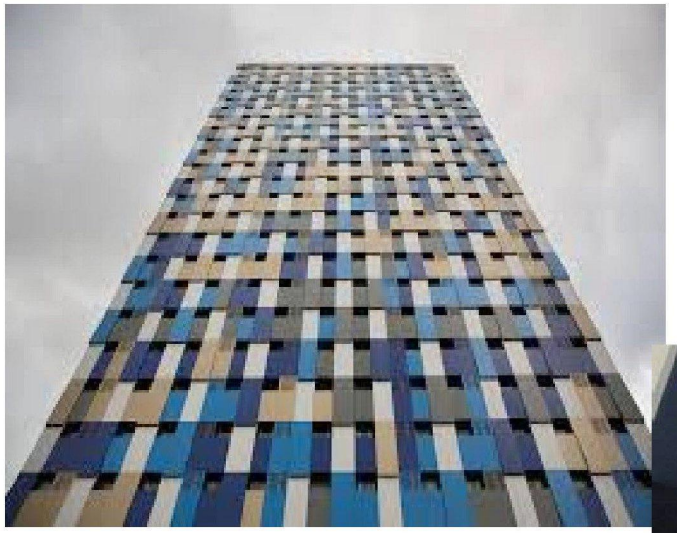
Tamweel Tower
Dubai

Shanghai

Basingstoke

Exova
warringtonfire



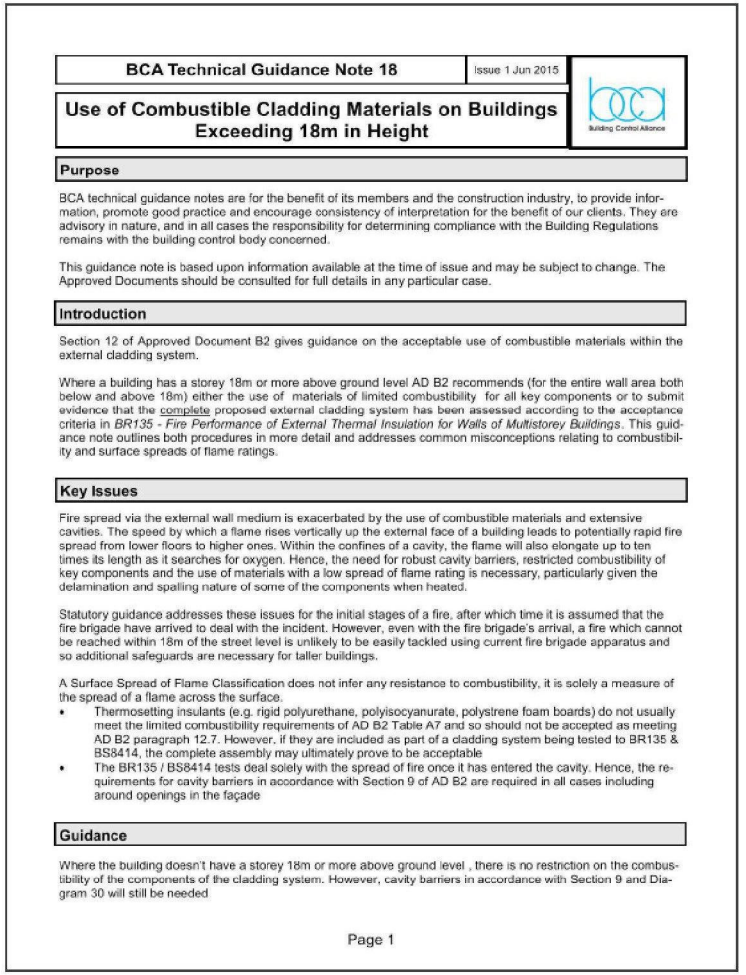


Exova
warringtonfire

Building Control Alliance – Technical Guidance Note 18

Confirms 4 options for compliance with ADB where the building is >18m

1. Use materials of limited combustibility
2. Test to BS8414-1 or -2 and Classify to BR135
3. **Assessment (Desktop Study)**
4. **Fire Engineering solution**



BCA Technical Guidance Note 18 | Issue 1 Jun 2015

Use of Combustible Cladding Materials on Buildings Exceeding 18m in Height

Purpose

BCA technical guidance notes are for the benefit of its members and the construction industry, to provide information, promote good practice and encourage consistency of interpretation for the benefit of our clients. They are advisory in nature, and in all cases the responsibility for determining compliance with the Building Regulations remains with the building control body concerned.

This guidance note is based upon information available at the time of issue and may be subject to change. The Approved Documents should be consulted for full details in any particular case.

Introduction

Section 12 of Approved Document B2 gives guidance on the acceptable use of combustible materials within the external cladding system.

Where a building has a storey 18m or more above ground level AD B2 recommends (for the entire wall area both below and above 18m) either the use of materials of limited combustibility for all key components or to submit evidence that the complete proposed external cladding system has been assessed according to the acceptance criteria in *BR135 - Fire Performance of External Thermal Insulation for Walls of Multistorey Buildings*. This guidance note outlines both procedures in more detail and addresses common misconceptions relating to combustibility and surface spreads of flame ratings.

Key Issues

Fire spread via the external wall medium is exacerbated by the use of combustible materials and extensive cavities. The speed by which a flame rises vertically up the external face of a building leads to potentially rapid fire spread from lower floors to higher ones. Within the confines of a cavity, the flame will also elongate up to ten times its length as it searches for oxygen. Hence, the need for robust cavity barriers, restricted combustibility of key components and the use of materials with a low spread of flame rating is necessary, particularly given the delamination and spalling nature of some of the components when heated.

Statutory guidance addresses these issues for the initial stages of a fire, after which time it is assumed that the fire brigade have arrived to deal with the incident. However, even with the fire brigade's arrival, a fire which cannot be reached within 18m of the street level is unlikely to be easily tackled using current fire brigade apparatus and so additional safeguards are necessary for taller buildings.

A Surface Spread of Flame Classification does not infer any resistance to combustibility, it is solely a measure of the spread of a flame across the surface.

- Thermosetting insulants (e.g. rigid polyurethane, polyisocyanurate, polystrene foam boards) do not usually meet the limited combustibility requirements of AD B2 Table A7 and so should not be accepted as meeting AD B2 paragraph 12.7. However, if they are included as part of a cladding system being tested to BR135 & BS8414, the complete assembly may ultimately prove to be acceptable
- The BR135 / BS8414 tests deal solely with the spread of fire once it has entered the cavity. Hence, the requirements for cavity barriers in accordance with Section 9 of AD B2 are required in all cases including around openings in the façade

Guidance

Where the building doesn't have a storey 18m or more above ground level , there is no restriction on the combustibility of the components of the cladding system. However, cavity barriers in accordance with Section 9 and Diagram 30 will still be needed

Page 1

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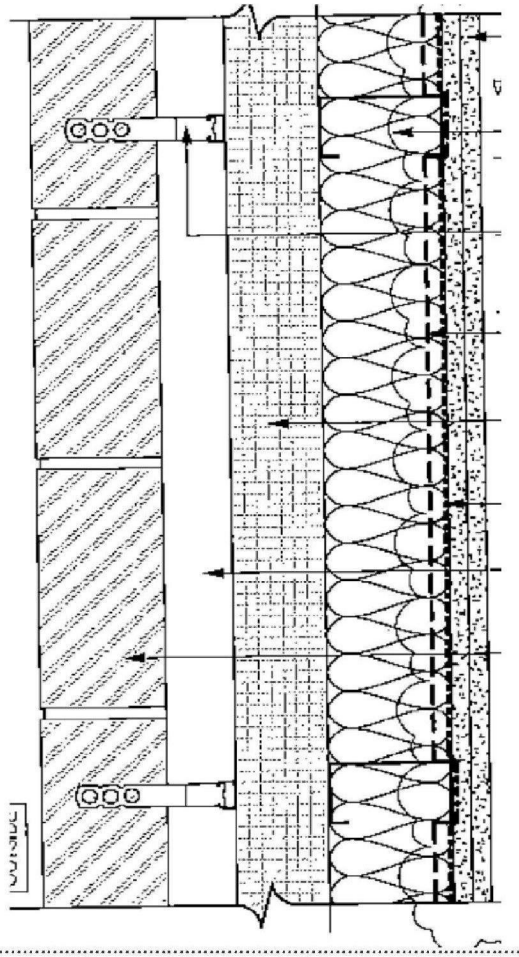
Approval – Option 1

Composed wholly of non combustible materials

Note; Cavity Barriers are not required but are recommended



Insulation in framework

Fixings

Vapour barrier

Insulation in cavity

Plasterboard

Cavity

Brick

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Option 2 - Test to BS 8414 using criteria in BR135

Each individual system proposed for high rise buildings may be tested to BS 8414 and approved on the basis of the test.

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Option 3 – Desktop Assessment - 1

- Assessments are probably the most common approach to determining the fire safety of the facade system
- Based entirely on BS 8414 test evidence and evidence of material behaviour from EN tests such as the SBI
- The insulation **must** have been tested to BS 8414 and the facings used must bear some material similarity to those which have been tested
- The assessment takes each individual part of the system and compares its fire performance with that of any potential similar replacement.

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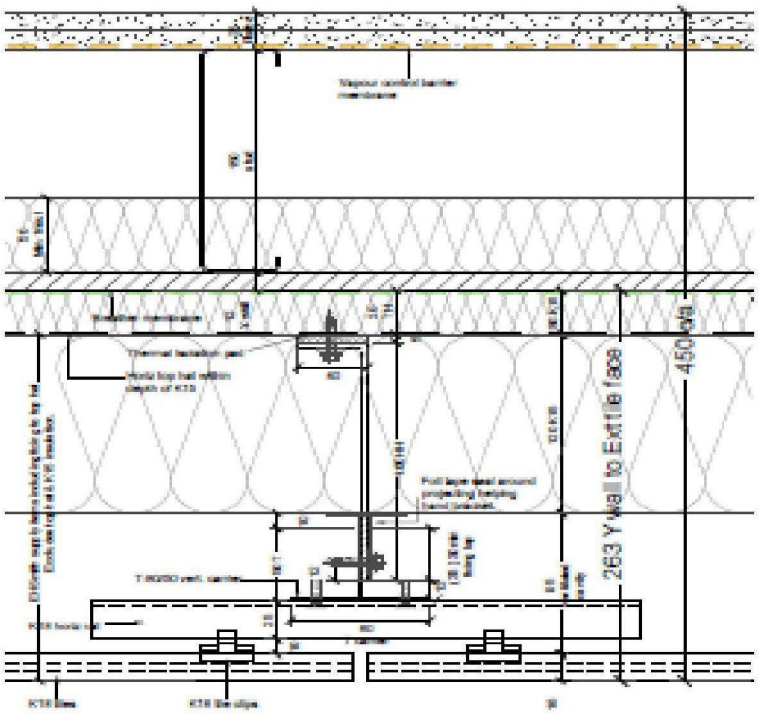
Option 3 – Desktop Assessment - 2



In general simple facades on frameworks consist of:

- 2 layers plasterboard.
- A vapour barrier
- The framework which may or may not be filled with an insulation product.
- A sheathing board fixed to frame
- Insulation fixed to board
- A cavity containing cavity barriers
- A facing

In addition there is great emphasis on the nature of the fire stopping around every penetration in the façade, eg around the window

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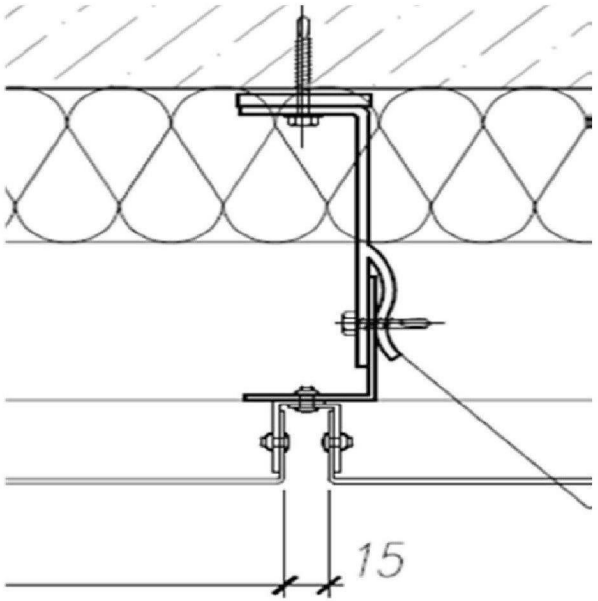
Option 3 – Desktop Assessment - 3



The fixing methods are addressed as part of the desktop study to ensure that they are robust enough to maintain the positioning of any protective materials in the façade assembly

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Option 3 – Desktop Assessment - 4

Façade Facings

Large variety of facings including:

- Metal – steel, aluminium, panels and cassettes, zinc etc
- Metal composites - aluminium honeycomb, sandwich constructions, copper over wood etc
- Non combustible boards - fibre cement, marble, stone, concrete, ceramic tile, terracotta tile
- Glass - spandrel panels, glass
- Brick slips
- External thermal insulation systems (ETICs)
- High Pressure Laminates

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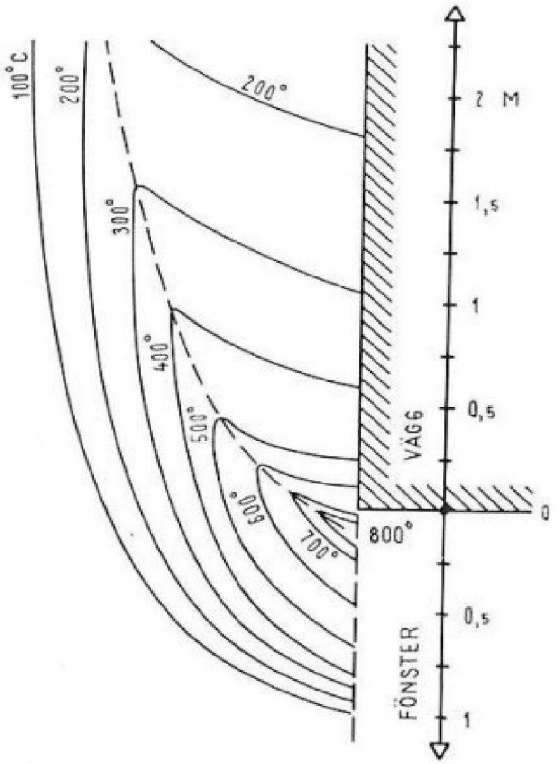
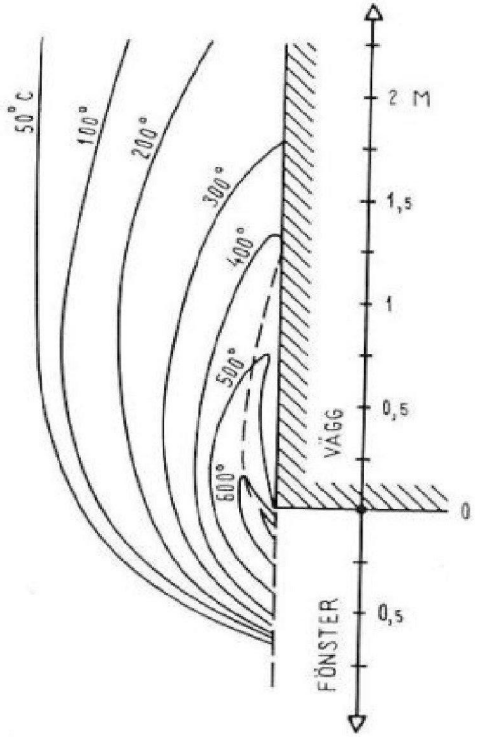
Conditions on the surface of the facade





Window aperture size affects conditions on the surface.

The height and width affects how far the flames project from the window and the depth of the flames thus affecting the heat flux imposed onto the surface

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Option 4 Fire Safety Engineering

In this approach, we consider the entire building and the work is very much building specific.

An FSE approach is often conducted where there is a lot of glass in the façade or curtain wall system.

The approach takes into account the nature of the active and passive precautions in the building and the effect this may have on the size of the fire which may exit the structure.

This is then used to determine the spread of fire on the facing to the facade and the potential for the fire to enter the cavity or penetrate the facing. It also addresses fire spread into the building at another level.

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Option 4 Fire Safety Engineering

All elements of the design of the building are factored into models to predict any fire development, smoke movement and people evacuation.

It is then possible to look at the active and passive protection proposed to optimise its effectiveness by altering positioning or adding into that proposed.

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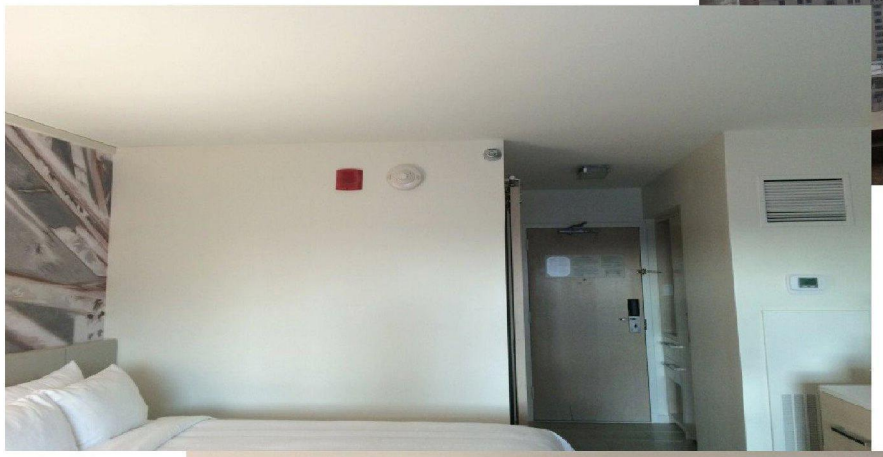
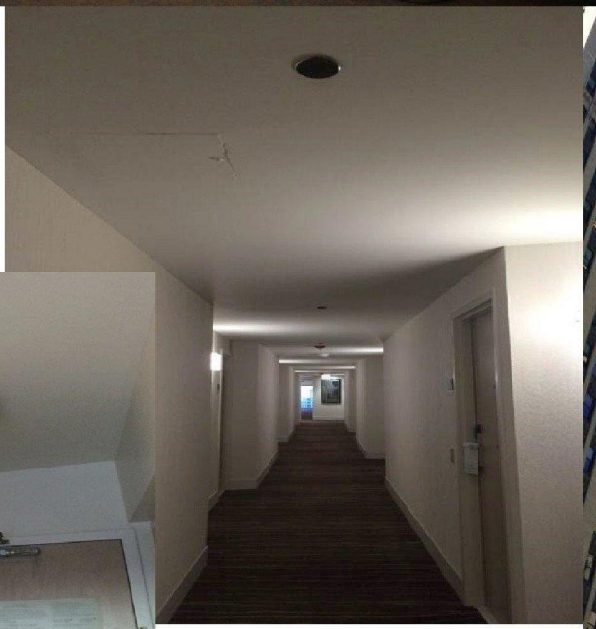
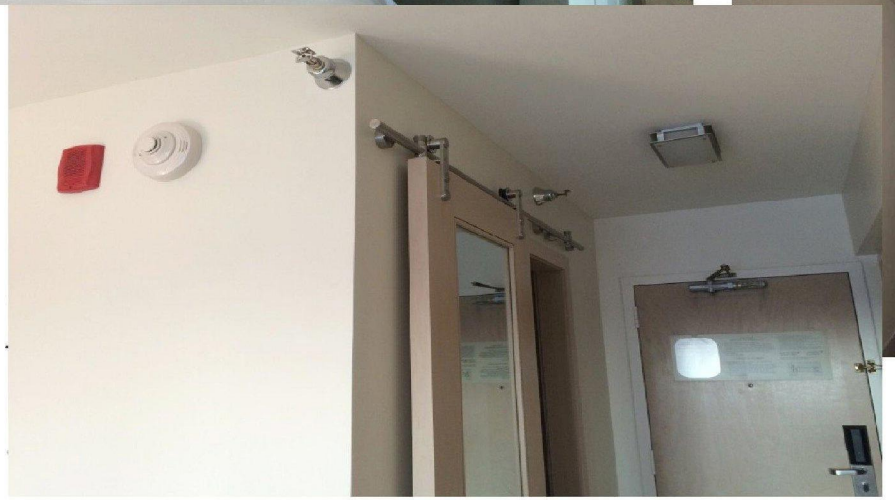
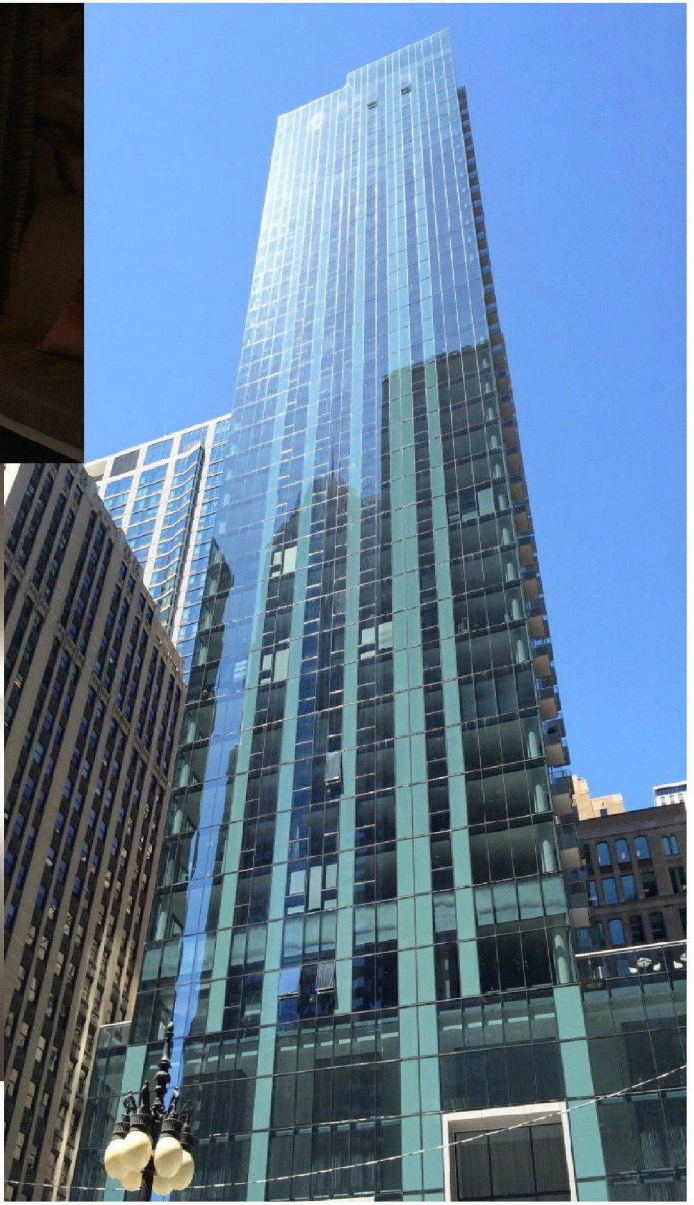




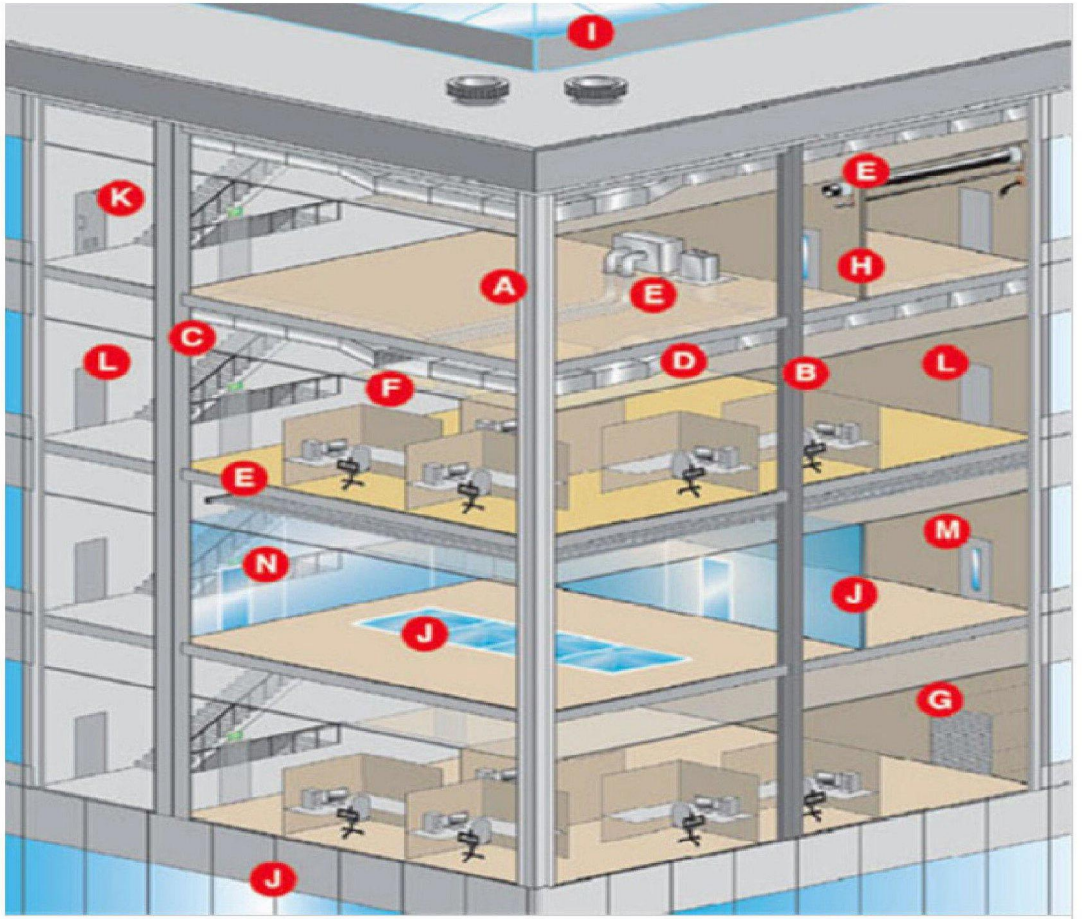




Fire Resistance - Passive Fire Protection

Fire resisting elements:

a. Structural frame (intumescent)
b. Structural frame (other sprays)
c. Structural frame (boards)
d. Fire/smoke control ductwork
e. Fire stopping – penetration seals
f. Fire/smoke control dampers
g. Fire doors and shutters
h. Fire resisting partitions
i. Fire resisting glazing (roof)
j. Fire resisting glazing (screens)
k. Fire resisting building hardware
l. Smoke control doors
m. Fire resisting glazed doors
n. Fire resisting glass doors



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Active and Passive

These measures should be used in tandem not isolation

High rise buildings need safe refuges which require containment and insulation from the temperatures of any fire in the vicinity - Passive precautions

Sprinklers are used to provide cooling effects which result in reduction of fire size and fire growth rate.

Passive and active fire protection both serve to ensure that there is extended time to escape the building and time for fire brigade attendance. All these factor into any fire safety assessment.

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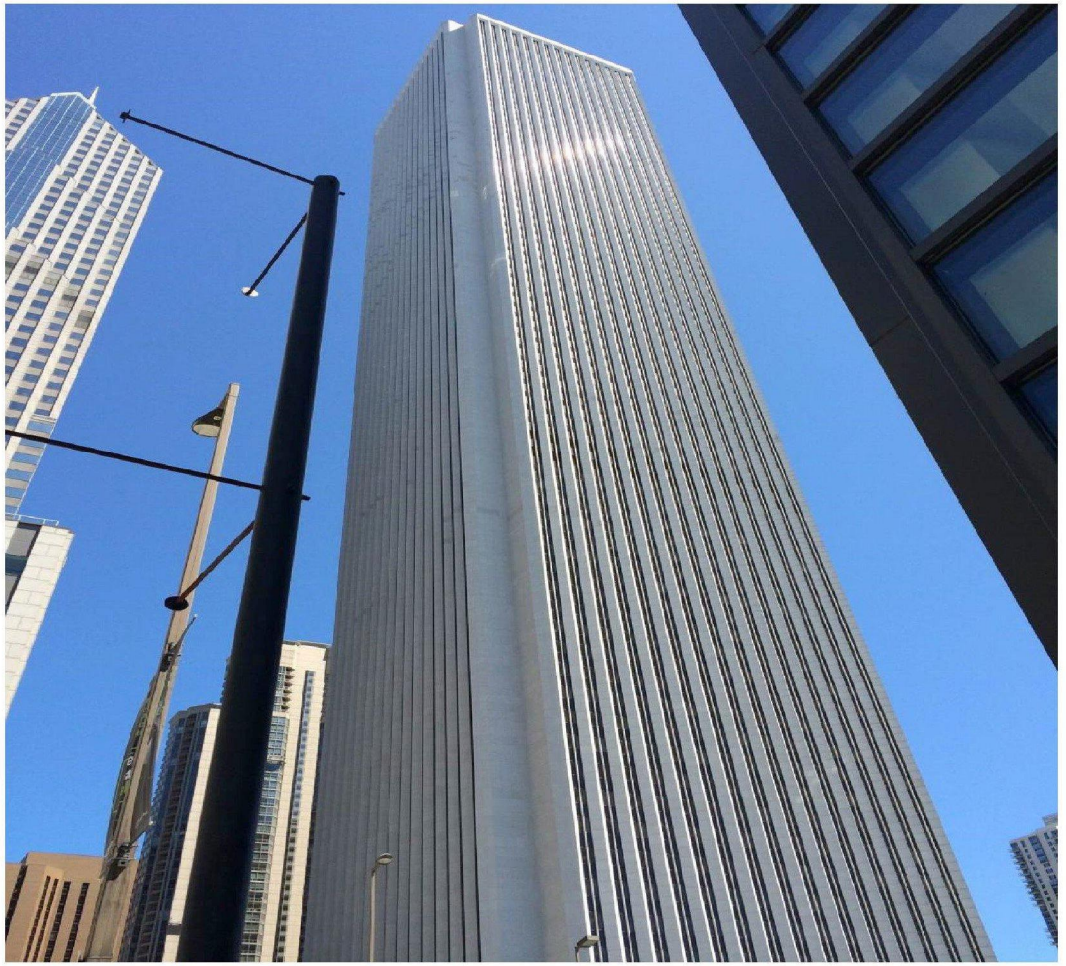

Geometry of the Building

The shapes introduced into the façade can make a big difference to the effects of flame on its facing.

These need to be factored into any model that is used to predict fire spread and fire penetration.

It is also considered in a desk top study.

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Thank you for listening and any questions?

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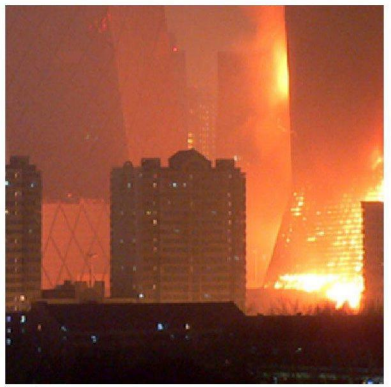
NHBC Technical Guidance Notes

7 July 2016


John Lewis – Specialist Surveyor (Fire)
Maulik Katkoria – Major Projects Surveyor (Fire)

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Contents

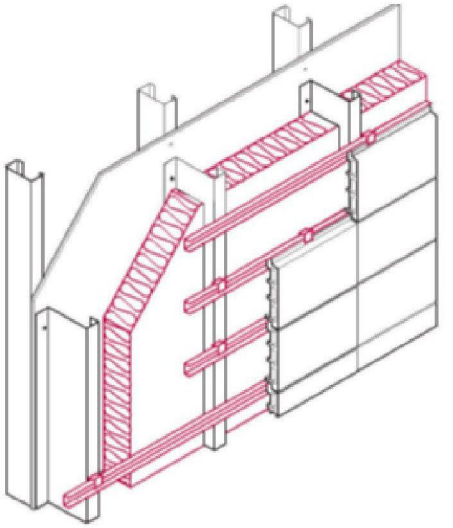
NHBC Technical Guidance Notes

NHBC Standards Requirements – Chapter 6.9

Compliance 6.9.1

Curtain walling and cladding systems shall comply with the Technical Requirements.

Curtain walling and cladding that comply with the guidance in this chapter will generally be acceptable.



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NHBC Technical Guidance Notes

NHBC Standards Requirements – Requirement R1

Technical Requirements

The Builder shall ensure that the work complies with the Technical Requirements.

R1 Statutory requirements

Work shall comply with all relevant Building Regulations and other statutory requirements relating to the completed construction work.

NHBC will generally accept work that accords with relevant Building Regulations/Building Standards and supporting documents. Exceptions would be where NHBC has a higher standard.

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NHBC Standards Requirements – Regulation B4(1)

External fire spread

B4. (1) 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.

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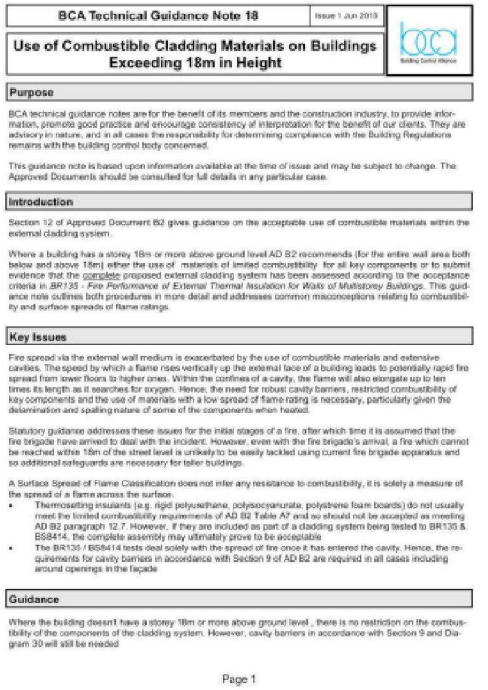
NHBC Technical Guidance Notes

BCA Guidance Note 18 - Option 3

- Not every situation / build-up needs to be tested.
- Extrapolation of test data is a recognised and accepted practice.
- Needs to be carried out by ‘knowledgeable experts’.



BCA Technical Guidance Note 18 | Issue 1 Jun 2019

Use of Combustible Cladding Materials on Buildings Exceeding 18m in Height

Purpose

BCA technical guidance notes are for the benefit of its members and the construction industry, to provide information, promote good practice and encourage consistency of interpretation for the benefit of our clients. They are advisory in nature, and in all cases the responsibility for determining compliance with the Building Regulations remains with the building control body concerned.

This guidance note is based upon information available at the time of issue and may be subject to change. The Approved Documents should be consulted for full details in any particular case.

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Page 1

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NHBC Technical Guidance Notes

Range of Tests and BR135 Certifications

Test	Test Date	Sponsor	Thickness	Product	Façade	BR 135 Result	Test Report Number
BS 8414-1	May-05	Kingspan	60mm	Kooltherm K15	Cement Particle board (Type A1 Non Com)	Pass	220876
BS8414-2	May-14	Celotex	100mm	RS5000	Cement Particle Board (Type A2 Limited Combustible)	Pass	295369
BS 8414-2	Jul-14	Kingspan	80mm	Kooltherm K15	Terracotta (Type A1 Non Com)	Pass	297099
BS 8414-2	Mar-15	CAREA	140mm	Kooltherm K15	Mineral Composite Grooved Tiles (Euroclass B)	Pass	PN 302995
BS8414-2	Mar-15	Xtratherm	120mm	Safe-R SR/RS	Cement Particle Board (Type A2 Limited Combustible)	Pass	
BS8414-2	Mar-15	Xtratherm	120mm	Xtroliner XO/RS	Cement Particle Board (Type A2 Limited Combustible)	Pass	
BS 8414-2	Apr-15	Kingspan	140mm	Kooltherm K15	Terracotta (Type A1 Non Com)	Pass	PN 303930
BS 8414-2	Jul-15	Stofix	120mm	Kooltherm K15	Brick slip panels	Pass	303931
BS 8414-2	Jul-15	Aquarian Cladding	120mm	Kooltherm K15	Brick slip panels	Pass	TBC

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NHBC Technical Guidance Notes

- Approx. 150 Option 3 assessments reviewed representing approx. 100 different façade types.
- Significant amount of data around some common wall types.
- NHBC feels able to accept limited wall types without the need for an Option 3 assessment if incorporating certain key elements.
- Other wall types will continue to require justification.

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NHBC Technical Guidance Notes

Option 3 Report – Key Factors

- Minimum Class B lining board.
- Cavity barriers around openings and compartment lines.
- Comparison of insulation type and external cladding finish with those tested.
- Different cladding finishes behave very differently under fire.

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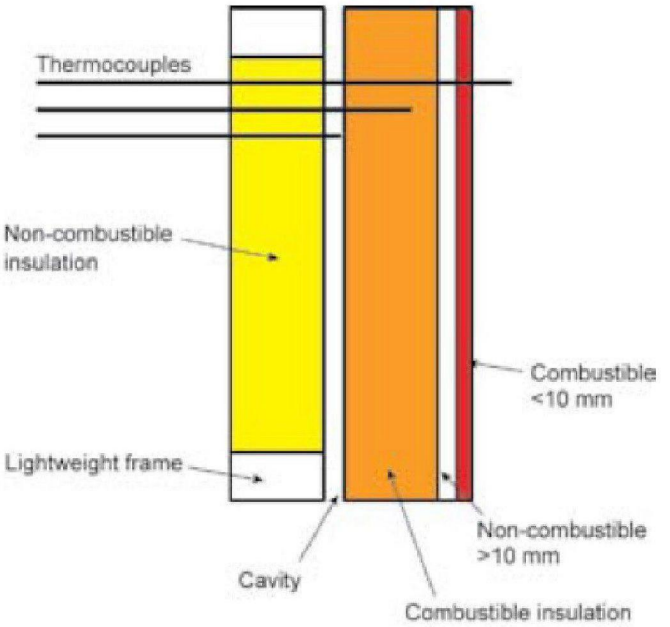
NHBC Technical Guidance Notes

Option 3 Report – Key Factors

- Based on product specific test data.
- Multiple sources of data where possible.



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NHBC Technical Guidance Notes

Option 3 Report – What doesn't work well…

- Highly combustible polythene cored ACM products
- Omission of cavity barriers around openings
- Substitution of Class B HPL products with Class D
- CFD modelling of façade build-ups

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NHBC Technical Guidance Notes

Option 3 Report – What doesn't work well…

- Unrealistic assumptions of glazing failure
- Confusion between fire resistance of the wall assembly and fire spread across / within it
- Timber SIPS panels with combustible facades

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NHBC Technical Guidance Notes

Some wall types are now acceptable by NHBC if designed to meet the minimum specification in the NHBC Technical Guidance Note:

- Brickwork.
- Hardwood Timber (fire treated and minimum 18mm).
- Aluminum Composite Panels (fire rated versions).

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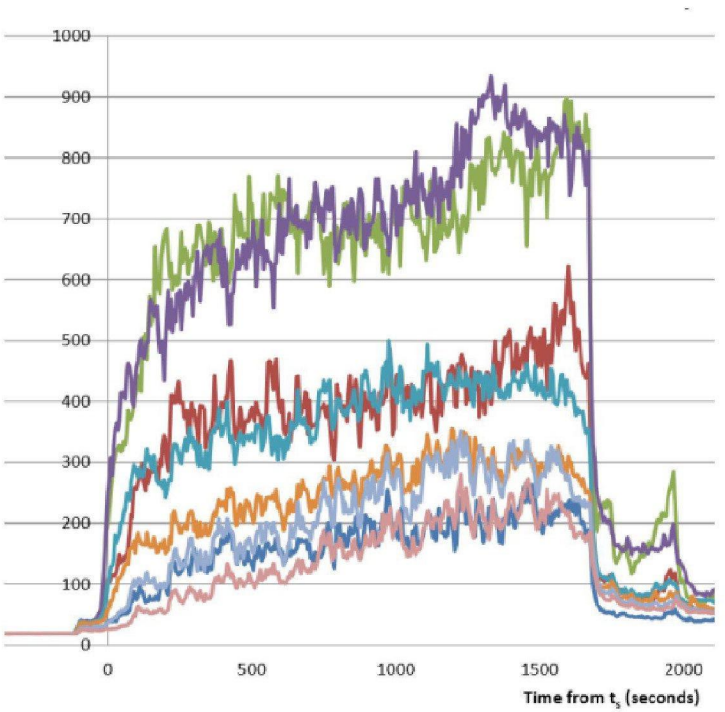
NHBC Technical Guidance Notes

Key Temperature Rises – Level 2

- Externally and within insulation layer - typical maximum peak c900°C.
- CP Board – typical maximums are c220°C
- LWSF - typical maximums are c35°C.
- Plasterboard – typical maximums are c30°C.



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NHBC Technical Guidance Notes

Technical Guidance Notes – Supporting Structure for Each type

- Double layer of 12.5mm plasterboard.
- Minimum 100mm lightweight steel frame internal leaf (which may incorporate combustible or non-combustible insulation).
- No less than 12mm thick cement particle board of minimum combustibility Class B (when assessed to BS EN 13501:1).
- Insulation (maximum 140mm thick) comprising one of:

  Kingspan K15 Celotex RS5000 Xtratherm SR/RS
- Drained and vented cavity.
- External finish.

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NHBC Technical Guidance Notes

Technical Guidance Note – Brickwork Façade

- Minimum 75mm brick leaf.
- Thermal mass and robustness of brick far exceeds any of the tested façade finishes.
- Compartment line fire barrier can be more reasonably assured.
- Excludes brick slip systems.

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NHBC Technical Guidance Notes

Technical Guidance Note – Timber Panelling

- Factory treated (to Class B and class 0) timber bearers (softwood is acceptable) which are 'broken' at compartment lines by a suitably robust cavity barrier.

- Factory treated (to Class B and Class 0) hardwood timber external cladding finish of minimum thickness 18mm.

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NHBC Technical Guidance Notes

Technical Guidance Note – Timber Panelling

- Fire retardant treatment usually needs maintenance.
- Details to be handed to the building owner as part of the Regulation 38 information.

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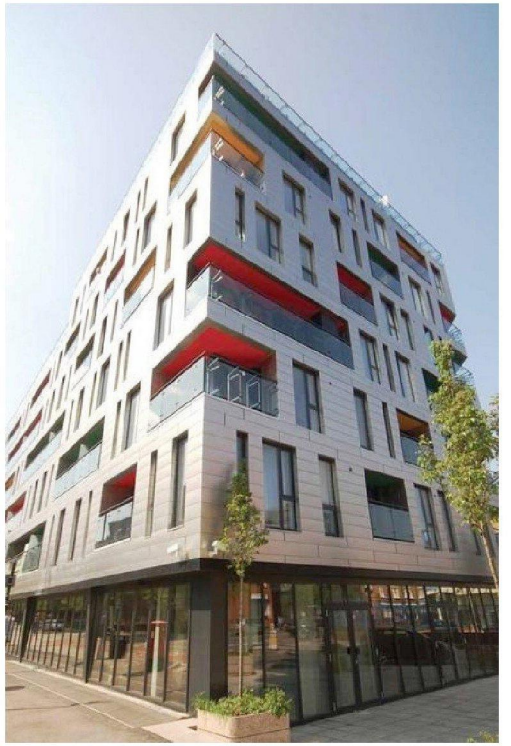
NHBC Technical Guidance Notes



Technical Guidance Note – Aluminium Composite Panels

- Mineral cored versions tend to behave in line with tested cementitious panels.
- Combustibility Class B or better and Class 0 flame spread.

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NHBC Technical Guidance Notes

Technical Guidance Note – Aluminium Composite Panels

- Excludes polythene / low mineral content versions of poor / no combustibility classification.

- **It is imperative that substitution with a less fire resistant product doesn't take place on site.**

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NHBC Technical Guidance Notes

Technical Guidance Note – Cavity Barriers

- Required in all cases
  - Around door and window openings.
  - At compartment lines.
  - Carefully fitted……

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ENVIROGRAF
PC SPECIAL
INTERNAL:
130 x 100 x 50mm
British Made Products
Envirograf
TERRAIN
TERRAIN

NHBC Technical Guidance Notes

Technical Guidance Note – Acceptable Cavity Barriers

- Steel at least 0.5mm thick.
- Timber at least 38mm thick.
- Polythene-sleeved mineral wool, or mineral wool slab, under compression.

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NHBC Technical Guidance Notes

Technical Guidance Note – Acceptable Cavity Barriers

- Calcium silicate, cement–based or gypsum based boards at least 12mm thick.
- Proprietary products which have shown to achieve the requirements for closing cavity without needing to be covered by a plasterboard lining.

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NHBC Technical Guidance Notes

What do we need from you -

- Elevations showing location of different façade types.
- Details of each façade type (with cavity barrier proposals).
- Assessments for Façade types which do not meet:
  - BCA GN 18 Options 1 or 2. Or:
  - Minimum specification of common wall type covered by NHBC Technical Guidance Note

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NHBC Technical Guidance Notes

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Any questions?

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