

High Rise Buildings-What's Going On? (The Walls)



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Worldwide Problem Combustible exterior wall assemblies are found around the world. As fires involving those assemblies occur, safety officials seek out buildings that utilize similar materials.





Recent Fires- London- June 14, 2017

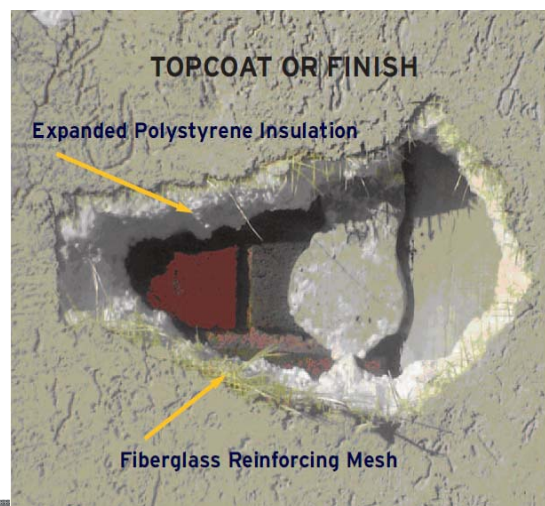
- Grenfell Tower Fire
- At least 79 people died and 74 injured
- Began around 1 a.m. Wednesday morning
- Combustible exterior cladding contributed to fire spread



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Photo credit: Getty

4



Exterior Walls

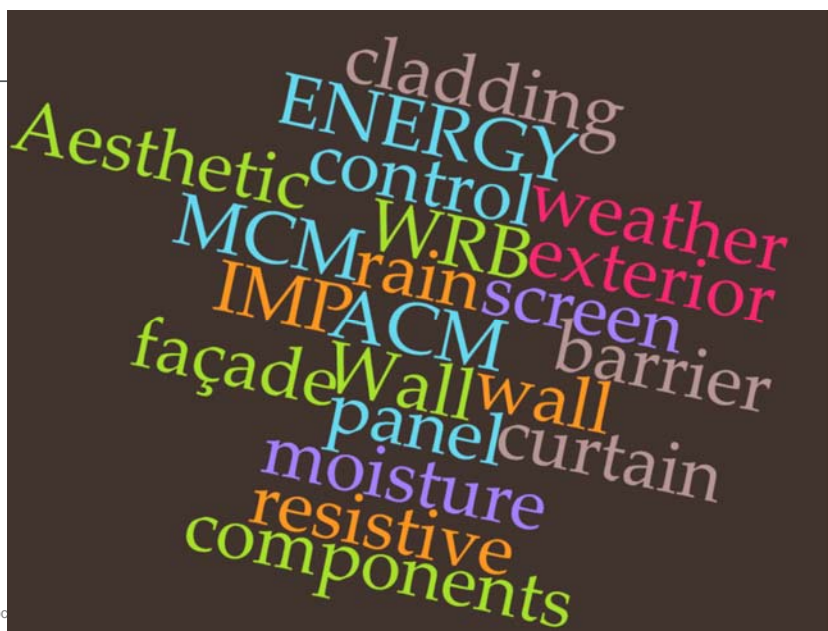
- Mid 1970's foam plastic proposed for non-combustible exterior walls
 - EIFS (Exterior Insulation Finish Systems)
- Problems:
 - Combustible
 - Many construction types require non-combustible exterior walls
 - Flame propagation
 - Vertical over surface
 - Vertical within core
 - Lateral to adjacent compartments



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High Rise Buildings-What's Going On? (The Walls)

- Why?
- What?



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Anatomy

- What is the “assembly”
- Constituent parts
- Testing
- Installation

Combustible Components

Exterior wall assemblies exist in a range of configurations, but many include the same elements found on London's Grenfell Tower

AIR GAP

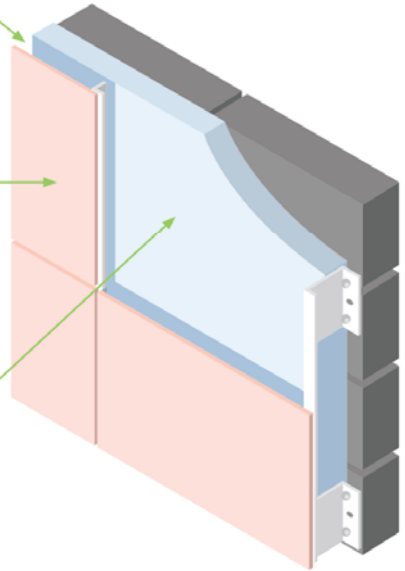
In many assemblies using insulation board and MCM panels, an air gap exists between the two components, which in a fire can aid in funneling flames up the sides of a building.

METAL COMPOSITE MATERIAL (MCM) PANELS

Aluminum is a common metal used for MCM panels, which are often referred to as “cladding.” In combustible exterior wall assemblies, a plastic like polyethylene is sandwiched between two thin metal sheets to create the MCM panels.

FOAM INSULATION BOARD

An insulation layer is applied directly to the building's exterior wall. Commonly used plastics like polyisocyanurate, believed to have been used on Grenfell Tower, are cheaper than insulating materials such as rock wool or glass wool but are combustible.



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Illustration: Reuters

GYPSUM

METAL STUD

EXTERIOR GYPSUM

SUB GIRT

METAL COMPOSITE MATERIAL (MCM) PANEL SYSTEM



Grenfell Tower-Can It Happen in the US

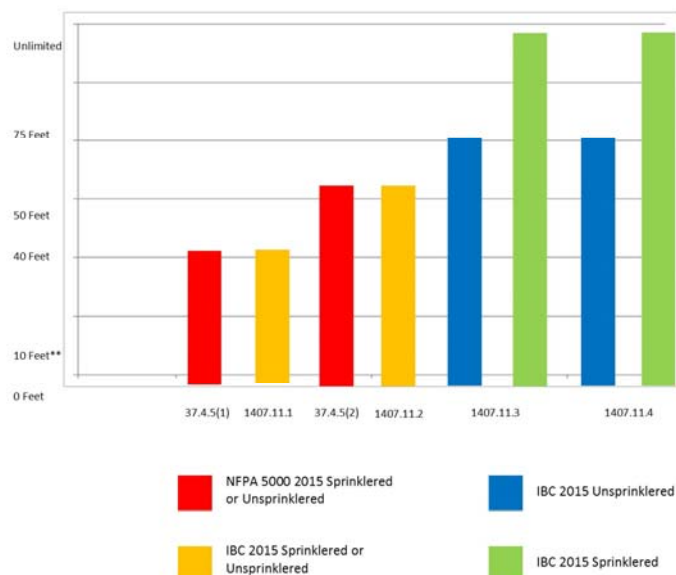
- Grenfell Design
 - No sprinklers
 - Fire alarm system
 - Single exit
 - EAP lacking
 - BS 8414
- Unlikely, but
 - 5 states
 - Liberalized use
 - Equivalency
 - Identification
 - NFPA 285



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9

Allowable Heights of Buildings Using MCM Panels or Panels with Foam Plastic Not Tested to NFPA 285



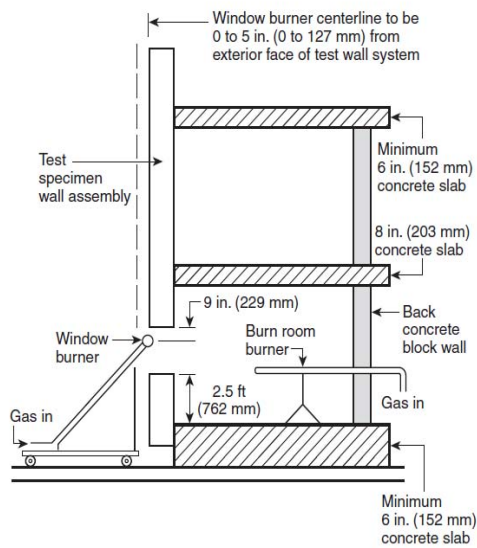


FIGURE A.4.4.3.6 Section View of Burner Placements for First-Story Test Room (not to scale).



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NFPA 285

Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

11

Instrumentation

Thermocouples

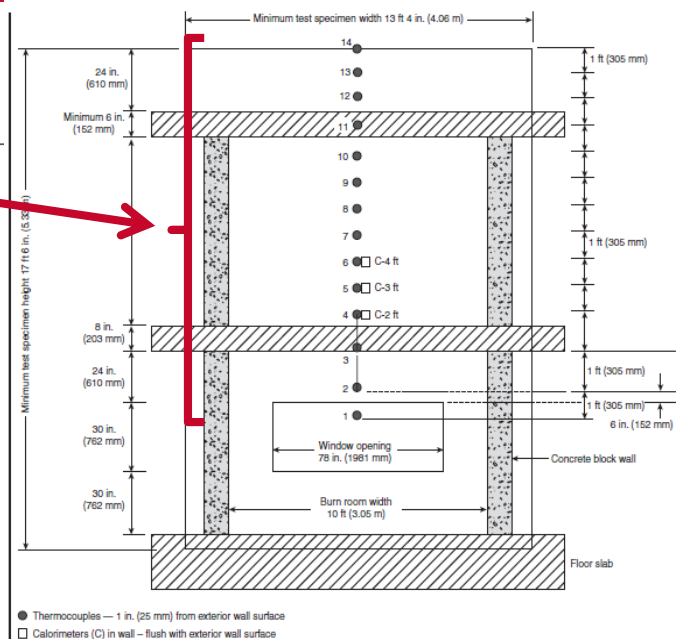


FIGURE 7.1.6(a) Front View of Calibration Wall Assembly Superimposed over Test Apparatus. Calibration instrumentation locations (not to scale).



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Window Burner



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Failure

Flame propagation shall be determined to occur if:

- Temperature of 1000°F reached by TC 11 & 14-17
- Flames from exterior face reach 10ft above window
- Flames from exterior face reach 5ft horizontally from window opening

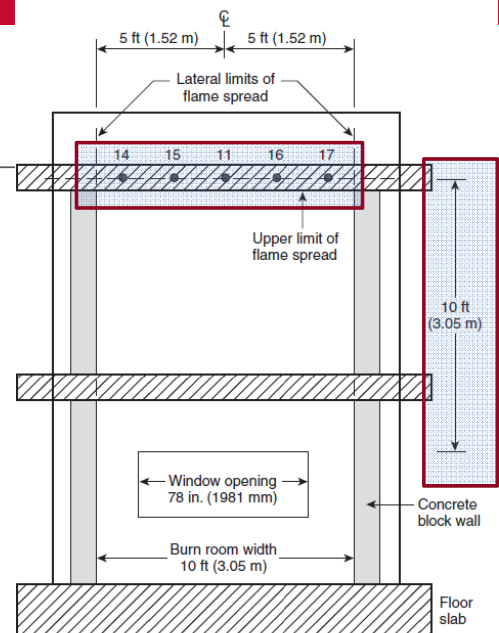


FIGURE 10.2.1.2 Limits of Flame Propagation — Exterior Surface of Test Specimen (not to scale).



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Combustible Components in Exterior Walls

www.nfpa.org/exteriorwalls

- Online interactive tool to help determine Building Code requirements
- Additional resources
 - Journal Articles
 - FPRF Report
 - Videos

Understanding and managing the fire hazards of exterior walls containing combustible components

The tragic fire that occurred in London in June 2017 represents the latest in a series of high-rise fires that have occurred worldwide over the past decade – from Melbourne to Jakarta to Berlin to Las Vegas. All of these fires involved high-rise buildings with exterior wall coverings or insulation that include combustible components. The public, code bodies, local, regional and federal governments as well as the design and build communities are all affected by high-rise building safety, including the exterior wall construction.



Decoding Exterior Wall Requirements: An interactive tool

NFPA has developed a free interactive tool to help navigate the code requirements that apply to exterior walls containing combustible components. It also helps determine when those requirements apply for testing to NFPA 285, Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components. Requirements within the tool are based on the 2015 edition of NFPA 5000, Building Construction and Safety Code, and the 2015 International Building Code.

► Sign-in or register to use this free tool.

Watch a demonstration of this interactive tool in action.



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15

Combustible Components in Exterior Walls

Fire Hazards of Exterior Wall Assemblies Containing Combustible Components

Information Bulletin

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16



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High rise buildings with combustible exterior façade systems:
Fire risk assessment tool

Task 2 – Risk variables | 17 August 2017

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17