The IBC 2015 & NFPA 285

Navigating NFPA 285 in the IBC 2015 and MA 780 CMR 9th Edition

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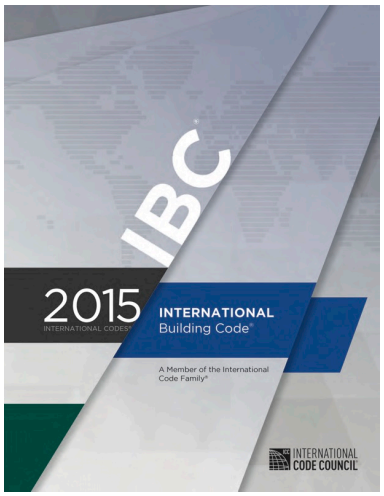
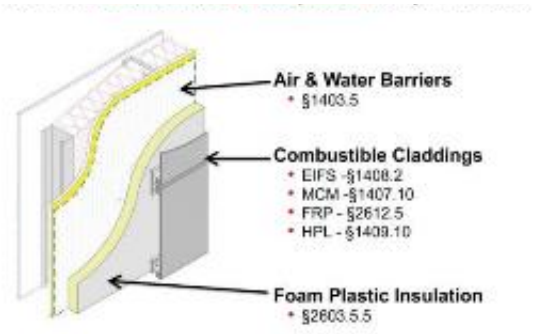


Massachusetts' adoption of the Ninth Edition of the MA State Building Code includes new requirements for when projects are required to comply with NFPA 285 acceptance criteria. The Ninth Edition is based on the 2015 edition of the International Building Code (IBC 2015). The IBC 2015 is the current national model building code published by the International Code Council (ICC). Adoption of the IBC 2015 is ongoing across New England with Vermont leading the way in 2016, Massachusetts following in 2017, and other states considering adoption in 2018. While there were revisions throughout the IBC 2015, this insight will focus on changes regarding the building thermal envelope and triggers for NFPA 285.

NFPA 285 – *Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assembling Containing Combustible Components* (NFPA 285) is a full-scale assembly test procedure for evaluating the consequences of using combustible materials (i.e., foam plastic insulation, MCM, etc.) in non-combustible exterior wall assemblies. Predecessors to NFPA 285 were first developed in the during the 1970's energy crisis to address concerns raised by code officials regarding the addition of combustible insulation materials and systems (e.g., EIFS) to buildings to improve energy efficiency.

IBC 2015 Sections w/ NFPA 285 Triggers



Multiple sections within the IBC 2015 may require projects of Types I, II, III and IV construction[1] to meet NFPA 285 acceptance criteria. Note that NFPA 285 is not applicable for Type V construction as all components are allowed to be combustible. The ICC's use of the NFPA 285 assembly test to regulate the use of unique components and materials has caused confusion among AEC professionals.[2] The lack of a central location[3] of all possible NFPA 285 compliant assembly options has only furthered the confusion.

The following is a summary of IBC 2015 sections and thresholds that trigger the need for a project's exterior wall assemble to meet NFPA 285 acceptance criteria:

Chapter 14 – Exterior Walls

- **Section 1403.5 – Water-Resistive Barriers (WRB):** For exterior walls of buildings of Types I, II, III and IV construction that are >40' in height that contain a combustible water-resistive barrier (WRB). Section provides exceptions if the WRB is the only combustible component. First introduced in the IBC 2012, clarifications excluding flashing materials were added in IBC 2015.

[1] The unifying characteristic of Types I-IV construction is that they all require exterior walls to be constructed of noncombustible materials except as permitted elsewhere in the code.
[2] Similar to the old Christmas lights where if one goes out they all go out. It only takes is one component in an exterior wall assembly to trigger the requirement and everyone gets pulled into the fray.
[3] UL has a select listing of assemblies meeting NFPA 285 acceptance criteria. This listing only contains assemblies for manufacturers that have contracted with UL for NFPA 285 testing and engineering review.

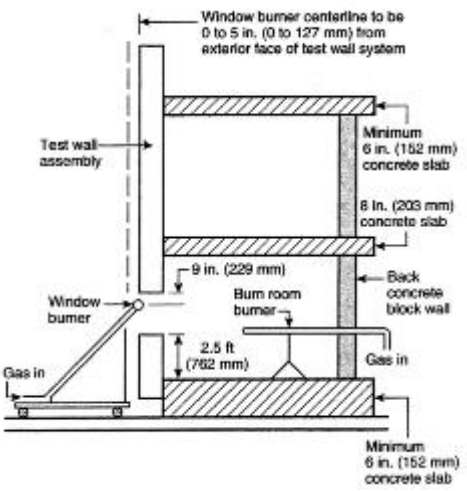
- **Section 1407.10 – Metal Composite Materials (MCM):** For buildings of Types I, II, III and IV construction where metal composite material (MCM) systems have been installed. Section provides alternate conditions not requiring NFPA 285 acceptance for MCM installations up to 40' 50' and 75' if certain fire separation, material performance and/or area limitations and separations are met. First introduced in the IBC 2000, revised in the IBC 2003.
- **Section 1409.10 – High-Pressure Laminates (HPL):** For buildings of Types I, II, III and IV construction where high-pressure laminate (HPL) have been installed. Section provides alternate conditions not requiring NFPA 285 acceptance for HPL installations up to 40' 50' and 75' if certain fire separation, material performance &/or area limitations and separations are met. First introduced in the IBC 2012.

Chapter 15 – Roof Assemblies and Rooftop Structures

- **Section 1510.6.2 – Rooftop Structures:** For buildings of Types I, II, III and IV construction where combustible exterior wall coverings (e.g., MCM, HPL) are used as mechanical equipment screens.

Chapter 26 - Plastic

- **Section 2603.5.5 - Foam Plastic Insulation:** For exterior walls of buildings of Types I, II, III and IV construction that are any height that contain foam plastic insulation. IBC 2015 provides exceptions for one-story buildings or protected insulation. MA amendment for non-high-rise buildings fully sprinklered per NFPA 13.[4] First introduced in the IBC 2000.
- **Section 2613.5 – Fiber-Reinforced Polymer (FRP):** Allows FRP to be installed on buildings of any construction type when FRP meets the requirements of Section 2603.5. Section 2603.5 only applies to Types I, II, III and IV construction and contains exceptions for fully sprinklered buildings as noted above. First introduced in the IBC 2009.



With so many component options, the challenge of demonstrating that a project specific assembly meets NFPA 285 acceptance criteria, is that it is impractical, if not impossible[5], to perform an NFPA 285 assembly test on each possible assembly. To address this limitation, manufacturers have developed and executed NFPA 285 testing and compliance programs. These programs identified strategic partners, best-case, worst-case, and select intermediate-case wall assemblies to subject to the full NFPA 285 testing protocol. Based on the results of these tests, additional full-scale NFPA 285 assembly tests were conducted along with smaller, bench-scale component tests (e.g., ASTM E1354), to provide manufacturers with large, representative data sets. These data sets provided the necessary information to allow manufacturers to utilize third-party fire engineers (e.g., Jensen Hughes & Priest Associates) to develop comprehensive engineering evaluations summarizing possible assembly combinations and material interchangeability that, in their professional judgement, will meet the acceptance criteria of NFPA 285, even it that particular assembly has not been tested. These engineering evaluations are used by design teams to develop basis of design wall assemblies that meet their unique project requirements as well as NFPA 285 acceptance criteria. When a general engineering evaluation does not demonstrate a

[4] At the writing of this whitepaper, the referenced MA amendment was included in the official version of the 9th Edition of the MA State Building Code. It was questioned if MA intended to adopt this amendment and subsequently removed by an emergency errata.

[5] *Assembly Options = Base Wall x Stud Cavity Insulation x Sheathing x AVB x Insulation Type x Insulation Thickness x Air Gap x Cladding = 6*6*3*12*6*7*5*12 = 3,265,920 unique assembly options!!*

clear judgement for meeting NFPA 285 acceptance criteria, a project-specific review and judgement can be provided. A project specific review can range from a simple letter from a manufacturer's third-party fire engineer to an in-depth analysis and report stamped by an independent fire engineer licensed in the project's jurisdiction. The latter generally include a detailed description of the project scope, proposed assembly(s), applicable codes, existing test data, and technical justifications used to support the judgement for the project. Significant time and cost can be associated with project specific judgements and the scope required to be provided for a project by a contractor or manufacturer should be identified in the contact documents. Project teams should include the following items in project specifications to ensure that NFPA 285 acceptance criteria is met and necessary compliance information is provided:

- Include NFPA 285 as a reference standard.
- Identify that the specified material, as designed in the assembly(s) indicated in the drawings, shall meet the acceptance criteria of NFPA 285.
- Require submission of manufacturer's third-party engineering evaluations that demonstrate the specified material, as designed in the assembly(s) indicated in the drawings, meet the acceptance criteria of NFPA 285.
    - If project specific analysis is required, the qualifications, scope of the analysis, and extent of deliverables should all be clearly defined.
- Include ASTM E1354 properties to provide a basis for minimum performance and interchangeability.

Understanding the potential triggers and requirements to meet NFPA 285 acceptance criteria has historically been challenging. Fortunately, industry awareness and availability of information about how to meet NFPA 285 is increasing. Most manufacturers have performed testing and can provide guidance for meeting NFPA 285 when using their particular material. Project teams should use the following steps for determining NFPA 285 applicability and compliance on their projects:

- Review applicable code sections to determine if NFPA 285 compliance is required.
- Utilize manufacturers' resources to access available documentation and develop an NFPA 285 compliant assembly basis of design (BOD).
- Include requirements for manufacturers' documentation regarding NFPA 285 compliance in contract documents.
- Use third-party fire engineers for comprehensive, project specific engineering evaluations.

The end goal is to protect the health, safety and welfare of the general public through life safety while also meeting a project's unique set of requirements for energy efficiency, aesthetic, durability, resiliency, etc.

For more information on this topic, or solutions that PACE represents, please visit our website www.pacerepresentatives.com or contact me at carmstrong@pacerepresentatives.com.