NFPA 285: What You Need to Know

By Jesse J. Beitel

MANY ARCHITECTS, DESIGNERS AND SPECIFIERS ARE surprised when I say that National Fire Protection Association (NFPA) 285, or one of its precursors, have been required for exterior walls that contain foam plastic insulation since 1988. Since that time, this requirement has been in the three Legacy Codes (see insert) and in the International Code Council's (ICC) *International Building Code* (IBC). This article will discuss the history of the test, the test method and, especially, its applicability.

The origins of NFPA 285 began during the energy crisis of the 1970s. At that time, it was proposed by the plastics industry to use foam plastic insulation on or in exterior walls to increase their energy efficiency. The building codes required (and still do) that exterior walls of Types I, II, III and IV construction shall be of noncombustible construction. Thus, the proposals were rejected because foam plastic insulation is a combustible material and because of concerns regarding the vertical spread of fire on and in these types of wall systems.

In the late-1970s, an Exterior Wall Task Group was formed under the auspices of the Society of the Plastics Industry (SPI) with the primary goal of developing a fire test method to evaluate the potential for flame spread of foam plastic insulation when installed on exterior walls. This test was intended to address the concerns expressed by code and fire officials when they rejected the code proposals. Based on discussions with many of these officials, the test was designed to expose the wall assembly to a "typical" fire scenario in which a fire occurs inside a room, vents through a window opening and exposes the exterior wall to a flame plume exiting the window opening.

The specific fire performance characteristics that were of concern and thus needed to be addressed were:

- Vertical and lateral flame propagation over the exterior face of the wall assembly;
- Vertical flame propagation within the combustible core, air cavities, or within combustible components from one story to the next;
- Vertical flame propagation over the interior surface of the wall assembly from one story to the next; and
- Lateral flame propagation from the compartment of fire origin to adjacent compartments or spaces.

The test fixture consisted of an outside two-story building that was 24 ft. high, with floor heights of 12 ft. At that time, the plastics industry proposed to use foam and one adjacent side wall) of the building and the remaining walls were closed using concrete masonry. The full-scale fire test was designed to provide the recommended fire exposure to the exterior walls and to demonstrate, in a realistic fire scenario, if the appropriate fire performance characteristic could be demonstrated by the exterior walls. **FIGURE 1** provides a photograph of the front wall during the test.

Based on this test program and the successful performance of several foam plastic insulated wall systems, a code change to allow the use of foam plastics on the exterior walls of all construction types, as well as the test method, were adopted by the *Uniform Building Code* (UBC) in 1988. The test was designated as UBC 17-6, *Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-Bearing Wall Panel Assemblies Using Foam Plastic Insulation*. The other building codes also adopted similar versions of this code change. In the 1994 UBC, the test standard was renumbered as UBC 26-4.

In the early 1990s, a second test program was initiated by SPI to develop a reduced-scale version of the large-scale test. This resulting test protocol used a smaller, indoor, multi-story test apparatus, with gas-fired burners to produce the same UBC 26-4 exposure conditions. After development of the test apparatus, a series of tests showed a correlation between the new intermediate-scale test and the UBC 26-4. This reduced-scale test was also adopted and became the UBC 26-9.

Finally, in 1998, NFPA promulgated NFPA 285, *Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing*

Figure 1. UBC 17-6 test in progress.

Combustible Components. This standard was based on the UBC 26-9 test and is technically the same with the only differences being formatting and editorial issues. **FIGURE 2** provides a photograph of the NFPA 285 test in progress.

The increased experience with NFPA 285 has widened its applicability and has been extended to control the use of other types of combustible materials used on or in exterior walls.

The use of NFPA 285 to evaluate various exterior walls in Type I to IV construction is referenced in several sections of the 2012 edition of the IBC. The references are:

1. Section 2603.5 – Required when foam plastic is used in exterior walls, of any height.
2. Section 1407 – Required when metal composite materials are used as exterior veneer on exterior walls that are greater than 40 ft. in height.
3. Section 1409 – Required when high-pressure decorative exterior-grade compact laminates are used as exterior veneer on exterior walls that are greater than 40 ft. in height.
4. Section 2612 – Required when fiber-reinforced plastics are used as exterior veneer on exterior walls that are greater than 40 ft. in height.
5. Section 1403.5 – Required where combustible water-resistive barriers are used in exterior walls that are greater than 40 ft. in height.

Figure 2. An NFPA 285 test in progress.

Several important points concerning the applicability and use of test results must be emphasized:

- This test is based on the performance of the entire wall assembly. The complete wall assembly must be tested, including each component that could contribute to the combustibility performance of the overall assembly. Included in this list are elements such as combustible air/vapor/water resistive barriers and insulation materials.
- The results of the test are specific to the assembly tested. Material substitutions such as one type of veneer/cladding, exterior insulation or water resistive barrier for another can provide different results. Substitutions must be evaluated by either a new test or an appropriate analysis under the "Alternative materials, design and methods of constructions and equipment" section of the IBC, which must then be approved by the code official.
- Changes in the wall system geometry may also have a significant effect on overall performance. Even using identical wall assembly components, changes in geometry (for example, addition of air cavities, etc.) can have a significant impact on the test results. Such changes must be evaluated by either a new test or an appropriate analysis under the "Alternative materials, design and methods of constructions and equipment" section of the IBC, which must then be approved by the code official.
- Specific component testing showing compliance with NFPA 285 is not an indication that these components, when combined to create a new wall assembly, will meet the requirements of NFPA 285. For example, if two materials, such as exterior cladding and a combustible insulation, are each tested independently and meet the criteria of the NFPA 285 test, the combination of these two materials may not meet the intent of the code or the NFPA 285 performance requirements. The new combination wall assembly must also be tested as intended for use.

In summary, the NFPA 285 test provides a means to evaluate the potential for vertical and lateral flame propagation on and within exterior walls containing combustible components. As such, NFPA 285 has become the primary test to evaluate and regulate the fire performance of combustible materials used on or in exterior walls that are required to be of noncombustible construction. ■

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THE THREE LEGACY CODES

1. *BOCA National Building Code* (BOCA/NBC) by the Building Officials Code Administrators International (BOCA).
2. *Uniform Building Code* (UBC) by the International Conference of Building Officials (ICBO).
3. *Standard Building Code* (SBC) by the Southern Building Code Congress International (SBCCI).