

NFPA 285-2006 Approval for Wall Assemblies Using Foam Plastic Insulation

NFPA 285-2006: An Overview

This white paper briefly describes the National Fire Protection Agency (NFPA) 285-2006 standard fire test, which has attracted a great deal of attention in recent years. It is important to note, however, that some version of this critical test standard has been codified since the late 1980s.

The assembly test UBC 17-6 and other requirements for use on noncombustible walls were inserted into the 1988 edition of the International Conference of Building Officials (ICBO) Uniform Building Code (UBC). The UBC 17-6 was developed using tests of Insulated Metal Panel Systems and an Exterior Insulated Finish System. Also at approximately that time, the other model building codes (SBCCI and BOCA) included language requiring testing of exterior wall assemblies containing foam plastic for vertical flame spread. The large-scale UBC 17-6 was renamed UBC 26-4 and within a few years, the intermediate-scale UBC 26-9 was developed and referenced in the UBC.

When the International Building Code (IBC) was promulgated in 2000, NFPA 285 was cited since it was an ANSI-approved version of UBC 26-9. At the time, UBC 26-4 was also included

to allow for manufacturers with tested and approved wall assemblies per UBC 26-4 to continue and update their approvals to the new NFPA 285 standard. UBC 26-4 was subsequently removed from the 2003 IBC, leaving NFPA 285 as the requirement per Section 2603.5.5 of the IBC (IBC 2003-2009).

NFPA 285 testing provides a method of determining the flammability characteristics of exterior, non-load-bearing wall assemblies/panels that contain foam plastic insulation. The test method described is intended to evaluate the inclusion of combustible components within wall assemblies/panels that are required to be of noncombustible construction. It is intended to simulate the multistory flammability fire performance of entire exterior wall assemblies.

An international nonprofit membership organization, NFPA is the world's leading advocate of fire prevention and an authoritative source on public safety. The NFPA's mission is to reduce the worldwide burden of fire and other hazards on the quality of life by developing and advocating consensus codes and standards, research, training and education.

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Foam plastic insulations used in exterior wall assemblies are required to pass all seven elements of Chapter 26 of the IBC, including Section 2603.5.5, which requires compliance with NFPA 285. Be sure to ask your foam plastic insulation manufacturer if its products are part of an approved NFPA 285 assembly.

NFPA 285 Approval Requirements per IBC

As stated, Section 2603.5.5 of the 2000, 2003, 2006 and 2009 editions of the IBC requires exterior wall systems on buildings of any height that incorporate foam plastic insulation of Type I, II, III or IV classification meet the requirements of NFPA 285-2006 "Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Apparatus."

Foam plastics can be open-cell and closed-cell SPF insulating foams, or rigid board stock insulations of EPS, XPS and ISO chemistries. Type IV and Type X extruded polystyrene and polyisocyanurate insulation

products classified as foam plastic insulation for exterior applications must pass NFPA 285-2006 testing.

It is important to understand that the NFPA 285-2006 standard fire test is an assembly test, not a component test. The details of the test assembly and application materials should be strictly followed in practice. According to Chapter 26 of the IBC, Section 2603.5.5:

The wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. Exception: One-story buildings complying with Section 2603.1.4.

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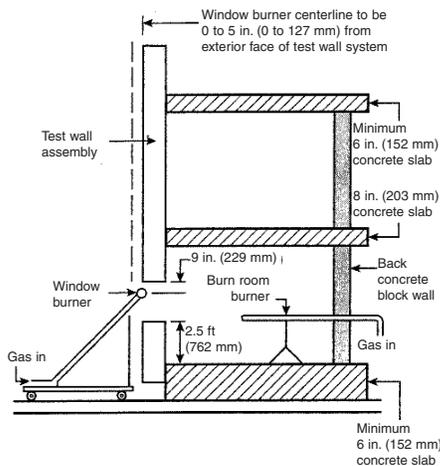
NFPA 285-2006 Tested Systems Using Foam Plastic Insulation

Requirements

The NFPA 285-2006 testing apparatus is a two-story wall assembly that includes a framed window opening on the first floor. The pass/fail criteria are that flame propagation does not occur either vertically or laterally beyond an acceptable distance from the area of flame plume impingement on or within the wall assembly. Thermocouples are placed throughout the wall and the defined temperature limits cannot be exceeded, otherwise the test is considered a failure.

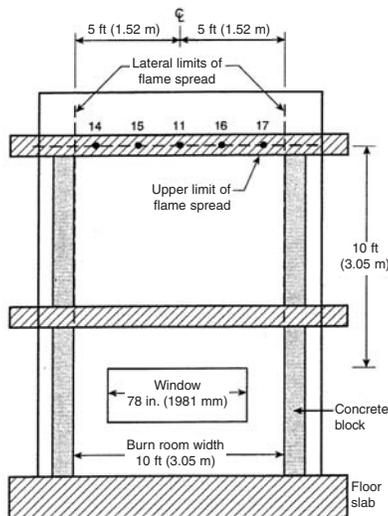
Diagrams of the NFPA test assembly are shown in Figures 1 and 2. Views of the test itself are shown in Figures 3, 6 and 7. Figures 4, 5, 8, 9 and 10 show some of the approved wall assemblies that include foam plastic insulation. The foam plastic insulation or veneer manufacturer can answer technical questions related to specific assemblies or veneer types not shown here.

Figure 1: Side View of Burner Placement in First-Story Test Room (not to scale)



NFPA 285-2006 Figure A.4.4.8

Figure 2: Limits of Flame Propagation (not to scale)



NFPA 285-2006 Figure 10.2.1.2

Figure 3: NFPA 285 Assembly Test With Brick Veneer Wall and Foam Plastic Insulation



Figure 4: XPS Foam Insulation in Steel Stud Cavity Wall Mineral wool fire safing (min. 1" thick) is required in the header of all openings.

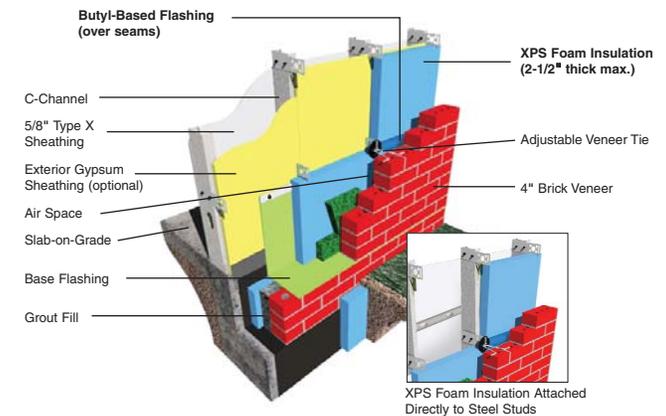
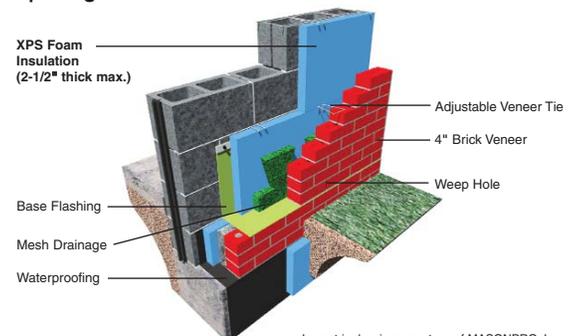


Figure 5: XPS Foam Insulation in Block-Backed Cavity Wall Mineral wool fire safing (min. 1" thick) is required in the header of all openings.



Isometric drawings courtesy of MASONPRO, Inc.

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Figure 6: NFPA 285 Assembly Test With an NFPA 285 Approved Metal Composite Metal (MCM) Veneer and ASTM C1289 Type I Class 2 Fiberglass-Reinforced ISO Insulation



Figure 7: NFPA 285 Assembly Test With an NFPA 285 Approved Metal Composite Metal (MCM) Veneer and ASTM C1289 Type I Class 2 Fiberglass-Reinforced ISO Insulation (post-fire view)



Figure 8: Steel Stud Assembly With Brick Veneer (Type I Class 2 ISO foam insulation with integral drainage plane and air barrier)

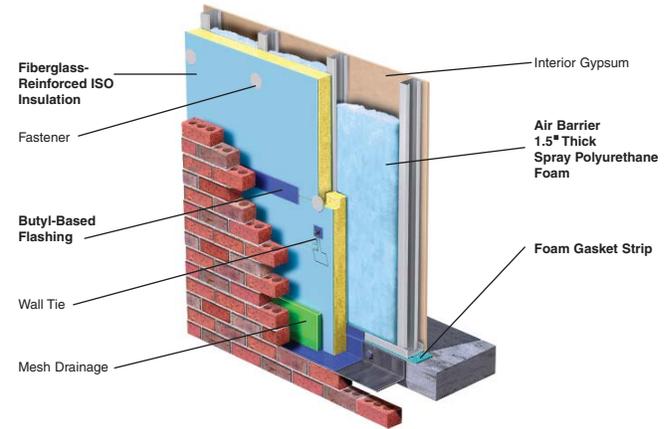


Figure 9: Steel Stud Assembly With Metal Panel or an NFPA 285 Approved MCM Veneer (Type I Class 2 ISO foam insulation with integral drainage plane and air barrier)

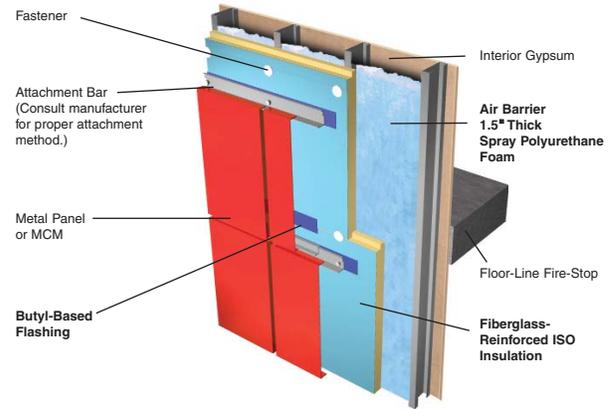
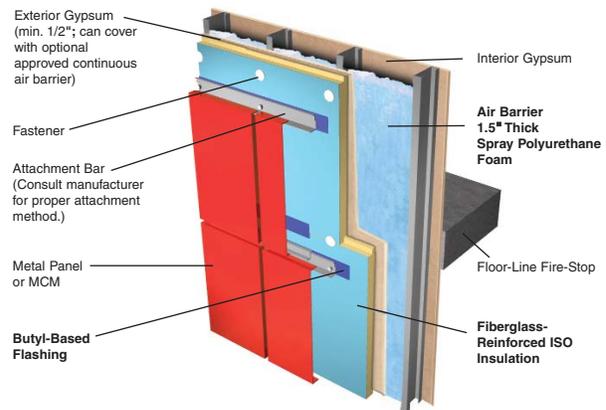


Figure 10: Steel Stud Assembly With Exterior Gypsum and Metal Panel or an NFPA 285 Approved MCM Veneer (Type I Class 2 ISO foam insulation with integral drainage plane and air barrier)





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STYROFOAM™ Brand Extruded Polystyrene Foam Insulation

CAUTION: This product is combustible. Protect from high heat sources. A protective barrier or thermal barrier may be required as specified in the appropriate building code. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400.

Dow Polyisocyanurate Insulation

CAUTION: This product is combustible and shall only be used as specified by the local building code with respect to flame spread classification and to the use of a suitable thermal barrier. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or call your local building inspector. In an emergency, call 1-989-636-4400.

STYROFOAM™ Brand Spray Polyurethane Foam contains isocyanate, hydrofluorocarbon blowing agent and polyol. Read the instructions and Material Safety Data Sheets carefully before use. Wear protective clothing, gloves, goggles and proper respiratory protection. Supplied air or an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter is required to maintain exposure levels below ACGIH, OSHA, WEEL or other applicable limits. Provide adequate ventilation. Contents under pressure. STYROFOAM™ Brand SPF should be installed by a trained SPF applicator.

WARNING: Rigid foam insulation does not constitute a working walkable surface or qualify as a fall protection product.

Building and/or construction practices unrelated to building materials could greatly affect moisture and the potential for mold formation. No material supplier including Dow can give assurance that mold will not develop in any specific system.

Dow Solutions for NFPA 285

Dow offers several foam plastic insulation products that have been tested and are approved in NFPA 285 assemblies:

- STYROFOAM™ Brand Extruded Polystyrene Foam Insulation of ASTM C578 Type IV or Type X
 - STYROFOAM™ Brand CAVITYMATE™
 - STYROFOAM™ Brand CAVITYMATE™ Plus
 - STYROFOAM™ Brand CAVITYMATE™ SC
 - STYROFOAM™ Brand CAVITYMATE™ Ultra
 - STYROFOAM™ Brand SCOREBOARD™
 - STYROFOAM™ Brand Square Edge
 - STYROFOAM™ Brand Tongue and Groove
- THERMAX™ -bg`Uhc'b` products (all meet ASTM C1289 Type I, Class 2)
 - THERMAX™ (ci) Exterior Insulation (preferred)
 - THERMAX™ Heavy Duty
 - THERMAX™ Heavy Duty Plus
 - THERMAX™ Light Duty
 - THERMAX™ Metal Building Board
 - THERMAX™ Sheathing
 - THERMAX™ White Finish
- STYROFOAM™ Brand Spray Polyurethane Foam (CM Series) as part of the THERMAX™ Wall System

Click to learn more about these applications:

- [Exterior Cavity Wall - Block-Backed](#)
- [Exterior Cavity Wall - Steel Stud](#)

Access application and product information at www.dowbuildingsolutions.com/na by clicking on Applications or Interactive Product Finder in the left-hand navigation.

For additional information, including a list of NFPA 285-2006 test reports for foam plastic insulation from Dow, specific assembly details and air/water-resistive barrier methods, refer to [Tech Solutions 514.0: NFPA 285-2006 Approved Wall Assemblies Using Foam Plastic Insulation From Dow](#) (Form No. 179-04502).

This topic is also covered in [Tech Solutions 513.0: THERMAX™ Wall System](#) (Form No. 179-04503) and [Tech Solutions 510.0: STYROFOAM™ Brand CAVITYMATE™ Insulation Products for Steel Stud Cavity Walls](#) (Form No. 179-04396).

References

- (1) www.nfpa.org
- (2) www.iccsafe.org

About the Author

Jeff Hansbro, applications technology leader for Dow Building Solutions, is responsible for building envelope applications development in the field of commercial construction in North America. Hansbro is certified as a Six Sigma MAIC Black Belt.

His previous positions at Dow include senior technical service development specialist and senior product development engineer. Prior to his employment at Dow, Hansbro was a research engineer for Celotex Corporation and an intern at BASF. Hansbro graduated from Wayne State University with a Bachelor of Science in Chemical Engineering. JHansbro@dow.com

