

# TECH SOLUTIONS 514.0 NFPA 285-[06] APPROVED WALL ASSEMBLIES USING FOAM PLASTIC INSULATION FROM DOW



## SUMMARY

This document briefly describes the National Fire Protection Agency (NFPA) 285-[06] standard fire test requirement per the International Building Code (IBC) when foam plastic insulation is used in exterior walls of Types I-IV construction. Dow offers several foam plastic insulation products that have been tested and are approved in NFPA 285 assemblies:

- STYROFOAM™ Brand Extruded Polystyrene (XPS) Foam Insulation of ASTM C578 Type IV or Type X
- THERMAX™ products (all meet ASTM C1289 Type I, Class 2)
- STYROFOAM™ Brand Spray Polyurethane Foam (CM Series) as part of the THERMAX™ Wall System

Tables 1 and 2 list the NFPA 285 approved extruded polystyrene and polyisocyanurate insulation products from Dow. This Tech Solutions guide details specific approved assemblies containing these components. Test reports are listed in Table 3.

## NFPA 285 APPROVAL REQUIREMENTS PER THE IBC

Section 2603.5.5 of the 2000, 2003, 2006 and 2009 editions of the IBC requires exterior wall systems that incorporate foam plastic insulation meet the requirements of NFPA 285-[06] “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.” Type IV and Type X STYROFOAM™ Brand XPS Foam Insulation products and THERMAX™ Insulation products are classified as foam plastic insulation for exterior applications, therefore passing NFPA 285-[06] testing is essential.

It is important to understand that the NFPA 285-[06] 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.*

**TABLE 1: NFPA 285-[06] APPROVED STYROFOAM™ BRAND EXTRUDED POLYSTYRENE FOAM INSULATION PRODUCTS**

Product	ASTM C578 Type
STYROFOAM™ Brand CAVITYMATE™	X
STYROFOAM™ Brand CAVITYMATE™ Plus	IV
STYROFOAM™ Brand CAVITYMATE™ SC	X
STYROFOAM™ Brand CAVITYMATE™ Ultra	IV
STYROFOAM™ Brand SCOREBOARD™	IV
STYROFOAM™ Brand Square Edge	IV
STYROFOAM™ Brand Tongue and Groove	IV

**TABLE 2: NFPA 285-[06] APPROVED THERMAX™ POLYISOCYANURATE INSULATION PRODUCTS**

Product	ASTM C1289 Type
THERMAX™ (ci) Exterior Insulation (preferred)	I, Class 2
THERMAX™ Heavy Duty	I, Class 2
THERMAX™ Heavy Duty Plus	I, Class 2
THERMAX™ Light Duty	I, Class 2
THERMAX™ Metal Building Board	I, Class 2
THERMAX™ Sheathing	I, Class 2
THERMAX™ White Finish	I, Class 2

**TABLE 3: NFPA 285-[06] TEST REPORTS FOR FOAM PLASTIC INSULATION FROM DOW**

STYROFOAM™ Brand XPS Foam Insulation <sup>(1)</sup>	THERMAX™ Products and STYROFOAM™ Brand SPF (CM Series) <sup>(2)</sup>
Brick exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.06440.01.001, dated May 2003	Brick exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.05805.01.001, dated November 2002
Brick exterior wall construction – Reported in Underwriters Laboratories, Inc. Final Report 05CA2541, NC2650, dated January 10, 2005	Brick exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.13104.01.001c, dated September 5, 2008
Brick exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.13537.01.106, dated September 26, 2008	Metal composite panel exterior wall construction – Reported in Southwest Research Institute Final Report No. 01.13104.01.001d, dated September 5, 2008
Analysis and Extension of NFPA 285 Tests, HAI Project No. 1JJB05242.008, dated December 2, 2008	Various NFPA Complying Exterior Wall Constructions, HAI Project No. 1JJB05306.008, dated October 3, 2008

(1) Testing conducted by the Extruded Polystyrene Foam Association (XPSA); refer to Table 1 for Type IV and Type X STYROFOAM™ Brand XPS Foam Insulation products.

(2) STYROFOAM™ Brand SPF (CM Series) is designed for use exclusively with the THERMAX™ Wall System and meets NFPA 285 approval in this assembly. Only THERMAX™ (ci) Exterior Insulation may be specified as continuous insulation in the THERMAX™ Wall System. Any THERMAX™ Insulation product, including THERMAX™ (ci) Exterior Insulation, may be specified as continuous insulation in other wall assemblies.

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## NFPA 285-[06] APPROVED WALL ASSEMBLIES USING FOAM PLASTIC INSULATION FROM DOW

The NFPA 285-[06] 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 the exterior face of the wall assembly. Thermocouples are placed throughout the wall and the defined temperature limits cannot be exceeded, otherwise the test is considered to be a failure.

### NFPA 285-[06] TESTED SYSTEMS USING FOAM PLASTIC INSULATION FROM DOW

#### STYROFOAM™ Brand XPS Approved Assemblies

Dow has performed several NFPA 285-[06] standard fire tests on various exterior wall assemblies. Type IV and Type X STYROFOAM™ Brand XPS Foam Insulation products (2-1/2" thick max.) passed NFPA 285 for a steel stud or block-backed cavity with 4" nominal exterior brick veneer. Mineral wool fire safing (min. 1" thick) is required in the

header of all openings. Attachment may be achieved with impaling pins welded to the underside of the header lintel or similar method. Floor-line firestopping is also required in the stud cavity at each floor line when the studs are placed outboard of the floor slab.

#### Air/Water-Resistive Barrier Methods

Based on NFPA 285 testing, there are three approved air/water-resistive barrier methods in wall assemblies using STYROFOAM™ Brand XPS Foam Insulation products.

1. Seal the joints of STYROFOAM™ Brand XPS Foam Insulation boards with WEATHERMATE™ Flashing.
2. Place WEATHERMATE™ or WEATHERMATE™ Plus Wrap over STYROFOAM™ Brand XPS Foam Insulation products.
3. Apply an approved full-coverage air/water-resistive barrier to the face of the exterior gypsum. Tested and approved air/water-resistive barriers are listed in Table 4.

**TABLE 4: APPROVED FULL-COVERAGE AIR/WATER-RESISTIVE BARRIERS<sup>(1)</sup> FOR ASSEMBLIES USING STYROFOAM™ BRAND XPS FOAM INSULATION**

#### WEATHER-RESISTIVE BARRIER - SHEATHING

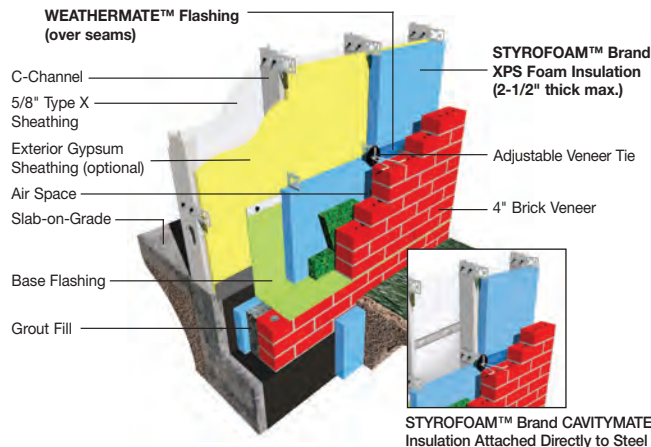
Green Guard Max Building Wrap – Pactiv
WEATHERMATE™ or WEATHERMATE™ Plus – Dow Chemical
Tyvek Commercial Wrap – Dupont
Backstop NT – Dryvit
Barritech VP – Carlisle
CCW-705FR w/ CCW-702WB primer – Carlisle
Fire-Resist Barritech NP – Carlisle
AIR-SHIELD LMP (Black only) – W.R. Meadows
Air Bloc 31MR – Henry Co.
Perm-A-Barrier Aluminum Wall Membrane w/ WB Primer – W.R. Grace
Perm-A-Barrier VPS – W.R. Grace

#### WEATHER-RESISTIVE BARRIER - FOAM

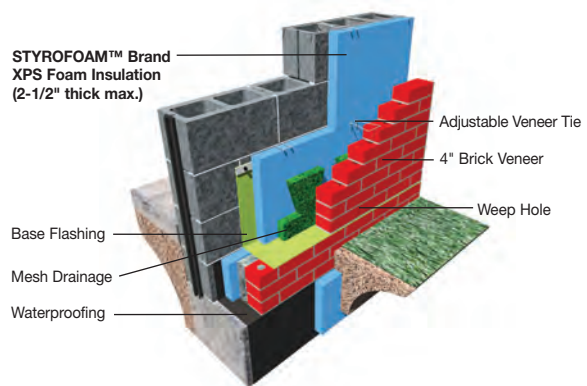
Green Guard Max Building Wrap – Pactiv
WEATHERMATE™ or WEATHERMATE™ Plus – Dow Chemical
Tyvek Commercial Wrap – Dupont

(1) Install all barriers at recommended application rates and per manufacturer installation instructions.

**Figure 1: STYROFOAM™ Brand XPS Foam Insulation\* in Steel Stud Cavity Wall**



**Figure 2: STYROFOAM™ Brand XPS Foam Insulation\* in Block-Backed Cavity Wall**



Isometric drawings courtesy of MASONPRO, Inc.

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 \*Refer to Table 1 for Type IV and Type X STYROFOAM™ Brand XPS Foam Insulation products that meet NFPA 285 requirements.

## NFPA 285-[06] APPROVED WALL ASSEMBLIES USING FOAM PLASTIC INSULATION FROM DOW

### THERMAX™ Wall System Approved Assemblies

Dow recently launched the THERMAX™ Wall System, which provides designers and contractors with a fundamentally different steel frame construction option – one that can contribute to a more efficient building envelope.

The THERMAX™ Wall System eliminates the need for batt insulation and is a systematic approach to achieving efficiency at every level: Simplified design, streamlined construction and reduced energy consumption.

The three-in-one system includes continuous insulation (complying with the prescriptive requirements of ASHRAE 90.1-2007), an air barrier and flashing, and meets all applicable IBC requirements, including all seven points in IBC Section 2603.5.1-7.

#### Approved Veneers

The THERMAX™ family of products is approved with these veneer types per NFPA 285 testing:

- Brick
- Stucco (min. 3/4" thick)
- Metal panel

- Metal composite metal (MCM) (panel type contingent on MCM manufacturer's NFPA 285 approval)
- Terra-cotta cladding (min. 1-1/4" thick)
- Cement board siding
- Limestone (min. 2" thick)

Figures 3-5 show approved brick, stucco and metal panel or MCM assemblies for the THERMAX™ Wall System. As details for terra-cotta, limestone and cement board siding may vary significantly from one design to another, contact Dow at 1-866-583-BLUE (2583) or the veneer manufacturer for technical questions related to these veneers.

Figure 3: Brick

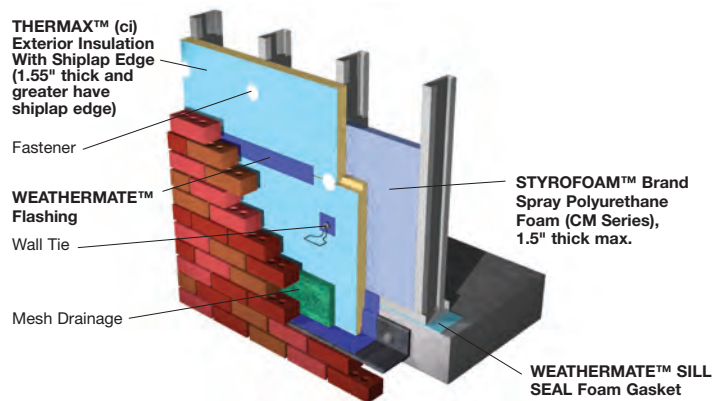


Figure 4: Stucco

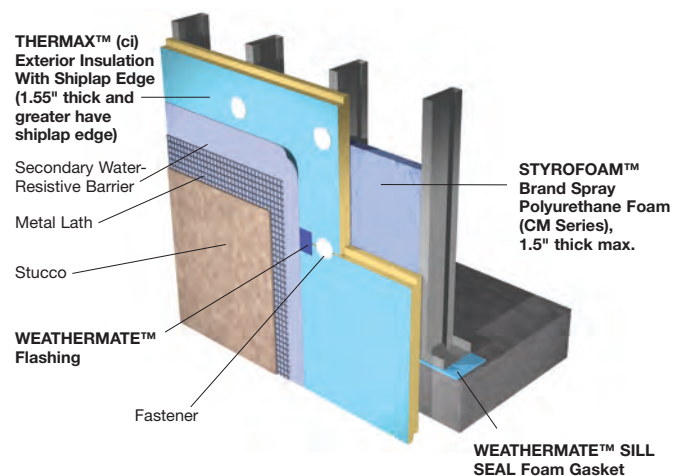
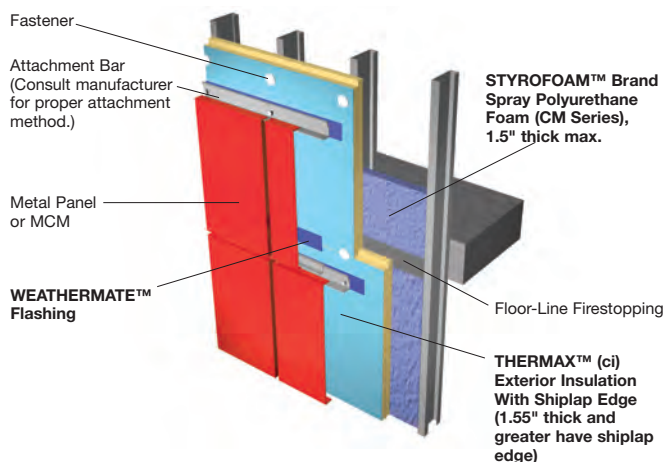


Figure 5: Metal Panel or MCM



For more information about the THERMAX™ Wall System, featuring THERMAX™ (ci) Exterior Insulation, WEATHERMATE™ Flashing and STYROFOAM™ Brand SPF (CM Series), visit [www.thermaxwallsystem.com](http://www.thermaxwallsystem.com) or call 1-866-583-BLUE (2583) and request Tech Solutions 513.0: THERMAX™ Wall System.

**NFPA 285-[06] APPROVED WALL ASSEMBLIES  
USING FOAM PLASTIC INSULATION FROM DOW**

For Technical Information: 1-866-583-BLUE (2583) . For Sales Information: 1-800-232-2436  
THE DOW CHEMICAL COMPANY . Dow Building Solutions . 200 Larkin . Midland, MI 48674  
[www.dowbuildingsolutions.com](http://www.dowbuildingsolutions.com)

Illustrations are not intended to replace the need for design by appropriate professionals such as architects or engineers.

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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 contact your local building inspector. In an emergency, call 1-989-636-4400.

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

**COMBUSTIBLE:** STYROFOAM™ Brand Spray Polyurethane Foam is combustible and may constitute a fire hazard. Do not expose to flame or temperatures above 240°F. 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.

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.

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.

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