



**1. Product Name**

STYROFOAM® Brand Insulation

**2. Manufacturer**

The Dow Chemical Company  
 STYROFOAM Brand Products  
 200 Larkin Center  
 Midland MI 48674  
 (800) 441-4369  
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**3. Product Description**

**BASIC USE & TYPES**

STYROFOAM® Brand Insulation is a closed cell, rigid plastic foam manufactured exclusively by The Dow Chemical Company by a unique extrusion process. This distinctive Blue™ extruded polystyrene foam product is designed for use in roof, wall and foundation insulation applications in new commercial and residential buildings as well as in existing structures being thermally retrofitted. STYROFOAM Brand Insulation is also used in agricultural buildings, low temperature warehouses and food processing plants.

STYROFOAM Brand Square Edge insulation is an extruded board, blue in color, with a high density, smooth, extruded skin and square edges on four sides. See Table 1 for product size information for all types.

STYROFOAM Brand Scoreboard insulation has the same physical properties, surface and edge characteristics as STYROFOAM Brand Square Edge insulation, except that it is scored longitudinally on 16" (406 mm) and 24" (610 mm) centers.

STYROFOAM Z-MATE® Brand insulation is pre-cut to 23 7/8" x 96" (606 x 2438 mm) boards; it can be installed between Z-furring channels placed on 24" (610 mm) centers without cutting or trimming, saving time and money.

STYROFOAM CAVITYMATE™, CAVITYMATE Plus and CAVITYMATE Ultra brand insulation are custom-made for today's wet cavity

walls. The 16" (406 mm) width and physical properties of CAVITYMATE were designed specifically for the cavity wall application.

STYROFOAM PERIMATE® panels have grooved drain channels on one face which are installed against the foundation wall and connected to a foundation tile and gravel drainage system to provide protection for the waterproofing, thermal insulation and drainage of the subsurface soil moisture.

Dow Protection Board II is recommended for perimeter concrete and masonry walls where waterproofing protection is the primary requirement. It is installed against the exterior foundation wall.

Because of properties imparted by Dow's unique extrusion process that produces closed cells, and the hydrophobic nature of polystyrene, STYROFOAM Brand Insulation has exceptional resistance to water and water vapor. Hence, it exhibits dependable and predictable long-term performance even in severe moisture environments.

STYROFOAM Brand Insulation is odorless, chemically inert, and resistant to most chemicals found in the soil. It has no food value to attract plant or animal life or the growth of microorganisms.

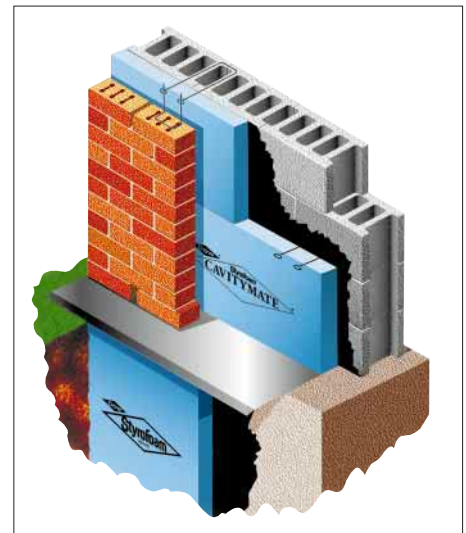


Figure 1: Wall Cross Section

**4. Technical Data**

**APPLICABLE STANDARDS**

American Society for Testing & Materials (ASTM)

- ASTM C203-92 - *Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation*
- ASTM C272-91 - (1996) *Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions*

TABLE 1 PRODUCT SIZES FOR STYROFOAM BRAND INSULATION

Products	Width & length in (mm)
STYROFOAM CAVITYMATE Brand STYROFOAM CAVITYMATE Plus Brand STYROFOAM CAVITYMATE Ultra Brand	16 x 96 (406 x 2438)
STYROFOAM Z-MATE Brand	23 7/8 x 96 (606 x 2438)
STYROFOAM PERIMATE Brand	24 x 96 (610 x 2438)
Dow Protection Board II	48 x 600 (1219 x 15,240), fanfolded
High Load 40	24 x 96 (610 x 2438)
High Load 60	24 x 96 (610 x 2438)
High Load 100	24 x 96 (610 x 2438)
STYROFOAM Brand Square Edge	24 x 96 (610 x 2438) 48 x 96 (1219 x 2438)
STYROFOAM Brand Score Board	48 x 96 (1219 x 2438)
Grayboard Insulation Square Edge	24 x 96 (610 x 2438) 48 x 96 (1219 x 2438)
Grayboard Insulation Score Board	48 x 96 (1219 x 2438)

Consult local Dow Representative for thickness information. Not all products are available in all parts of the country. Other product sizes are available on a made-to-order basis.

The Dow Chemical Company

- ASTM C518-91 - *Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*
- ASTM C578-95 - *Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*
- ASTM D1621-94 - *Standard Test Method for Compressive Properties Of Rigid Cellular Plastics*
- ASTM D2126-94 - *Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging*
- ASTM E96-95 - *Standard Test Methods for Water Vapor Transmission of Materials*

**PHYSICAL/CHEMICAL PROPERTIES**

STYROFOAM Brand insulation exhibits the properties and characteristics indicated in Tables 2, 3 and 4 when tested as represented.

**ENVIRONMENTAL DATA**

STYROFOAM Brand Products are CFC Free. STYROFOAM Brand Products are manufactured with HCFC blowing agents, which has an ozone depletion potential 94% less than standard CFC blowing agents.

STYROFOAM Brand Products are reusable in many applications. STYROFOAM Brand Products can be recycled where recycling programs and facilities exist.

**CHEMICAL RESISTANCE**

See Table 4.

**FIRE PROTECTION**

All roof and interior wall systems incorporating STYROFOAM Brand Insulation must consider adequate fire protection. Coverings such as 15-minute thermal barriers or other alternatives based on building code diversified tests are regarded as acceptable in most applications.

Consideration should be given to the benefits and costs of additional fire protection gained by installing automatic fire detection, alarm and suppression systems, as specified by building codes.

For proper protection of plastic foam in storage, consult an insurer, local fire department or other authority having jurisdiction.

**5. Installation**

Boards of STYROFOAM Brand Insulation are lightweight and easy to handle, cut

TABLE 2 PHYSICAL PROPERTIES OF STYROFOAM BRAND INSULATION

Property & test	Z-MATE	CAVITYMATE Plus: PERIMATE		40	60	100	CAVITYMATE
	CAVITYMATE	Square edge Score Board	High Load	High Load	High Load	Ultra	
Thermal resistance, ASTM C518 <sup>1,4</sup>							
Aged R-value per inch (645 mm <sup>2</sup> ) at 25°F (-4°C) mean temperature	5.6 (0.99)	5.6 (0.99)	5.6 (0.99)	5.6 (0.99)	5.6 (0.99)	5.6 (0.99)	6.0 (1.06)
Aged R-value per inch (25 mm) at 40°F (4°C) mean temperature	5.4 (0.95)	5.4 (0.95)	5.4 (0.95)	5.4 (0.95)	5.4 (0.95)	5.4 (0.95)	5.8 (1.02)
Aged R-value per inch (25 mm) at 75°F (24°C) mean temperature	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.6 (0.99)
Compressive strength, ASTM D1621, psi (KPa), minimum <sup>2</sup>	15 (103)	25 (172)	40 (276)	60 (413)	100 (689)	100 (689)	25 (172)
Flexural strength, ASTM C203, psi (kPa), minimum	40 (276)	50 (345)	60 (413)	75 (517)	100 (689)	100 (689)	50 (345)
Water absorption, ASTM C272, % by volume, maximum	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Water vapor permeance, ASTM E96, 1" (25 mm), perm (ng/Pa·s·m <sup>2</sup> ), max.	1.1 (63.2)	1.1 (63.2)	1.1 (63.2)	1.1 (63.2)	1.1 (63.2)	1.1 (63.2)	1.1 (63.2)
Dimensional stability, ASTM D2126, % linear change, maximum	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Linear coefficient of thermal expansion in/(in·°F) (mm/(mm·°C))	3.5 x 10 <sup>-5</sup> (7.4 x 10 <sup>-5</sup> )	3.5 x 10 <sup>-5</sup> (7.4 x 10 <sup>-5</sup> )	3.5 x 10 <sup>-5</sup> (7.4 x 10 <sup>-5</sup> )	3.5 x 10 <sup>-5</sup> (7.4 x 10 <sup>-5</sup> )	3.5 x 10 <sup>-5</sup> (7.4 x 10 <sup>-5</sup> )	3.5 x 10 <sup>-5</sup> (7.4 x 10 <sup>-5</sup> )	3.5 x 10 <sup>-5</sup> (7.4 x 10 <sup>-5</sup> )
ASTM C578 compliance, type	X	IV	VI	VII	V	V	IV
Maximum use temperature, °F (°C)	165 (74)	165 (74)	165 (74)	165 (74)	165 (74)	165 (74)	165 (74)

<sup>1</sup> In accordance with ASTM C578 and 16 CFT Part 460  
<sup>2</sup> Values based on desiccant method; vapor permeance varies with thickness.  
<sup>3</sup> At 10% deformation, 5% for STYROFOAM 40, 60 and 100 High Load products, or yield, whichever occurs first. Since STYROFOAM Brand Insulations are visco-elastic materials, adequate design safety factors should be used to prevent long-term creep. For static loads, 3:1 is suggested. For dynamic loads, 5:1 is suggested.  
<sup>4</sup> R-values expressed in ft<sup>2</sup>·h·°F/Btu (m<sup>2</sup>·K/W)

and install. For product sizing information, see Table 1.

**6. Availability & Cost**

STYROFOAM Brand Insulation is manufactured in many locations across the U.S. and worldwide, and is distributed through an extensive network of dealers and distributors. It is available in several types and sizes. See Tables 1 and 3. Your local Dow representative will be able to further discuss availability of products listed.

**7. Warranty**

A LIMITED THERMAL WARRANTY from Dow is available for most products, stating that the actual insulation value of STYROFOAM Brand insulations will not vary more than 10% from the published R-value of the product for periods ranging from 15 to 30 years. See the actual limited warranty

certificate for details. The certificate should be required by the specifier as one of the submittal documents.

**8. Maintenance**

None required

**9. Technical Services**

Dow can provide technical information to help address questions relating to the use of STYROFOAM Brand Insulation. At each Dow sales office there are trained, experienced, and helpful personnel, anxious to assist with any insulation projects.

**10. Filing Systems**

- Architects' First Source for Products
- Sweet's Catalog Files
- Additional product information is available from the manufacturer.

TABLE 3 THERMAL RESISTANCE OF AGED STYROFOAM BRAND INSULATION BY PRODUCT THICKNESS <sup>1,2</sup>

Normal thickness	R-value (RSI) ft <sup>2</sup> ·h·°F/Btu (m <sup>2</sup> ·K/W) at 25°F (-4°C) mean temperature	R-value (RSI) ft <sup>2</sup> ·h·°F/Btu (m <sup>2</sup> ·K/W) at 40°F (4°C) mean temperature	R-value (RSI) ft <sup>2</sup> ·h·°F/Btu (m <sup>2</sup> ·K/W) at 75°F (24°C) mean temperature
3/4" (19 mm)	4.2 (0.74)	4.1 (0.72)	4.0 (0.70)
1" (25 mm)	5.6 (0.99)	5.4 (0.95)	5.0 (0.88)
1 1/2" (38 mm)	8.4 (1.48)	8.1 (1.43)	7.5 (1.32) <sup>3</sup>
2" (51 mm)	11.2 (1.97)	10.8 (1.90)	10.0 (1.76) <sup>3</sup>
2 1/2" (64 mm)	14.0 (2.46)	13.5 (2.38)	12.5 (2.20)
3" (76 mm)	16.9 (2.97)	16.2 (2.85)	15.0 (2.64)
3 1/2" (89 mm)	19.7 (3.47)	18.9 (3.33)	17.5 (3.08)
4" (102 mm)	22.5 (3.96)	21.6 (3.80)	20.0 (3.52)

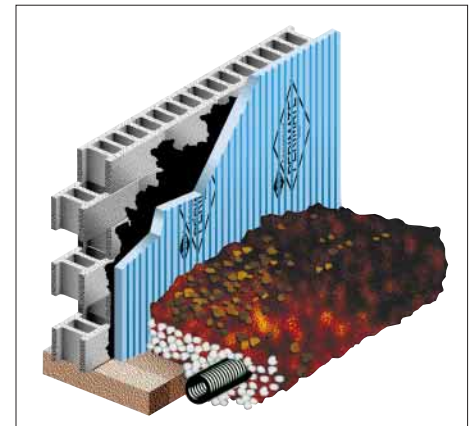


Figure 2: Wall Cross Section

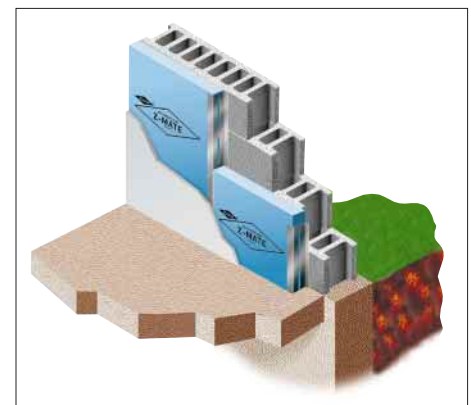


Figure 3: Wall Cross Section

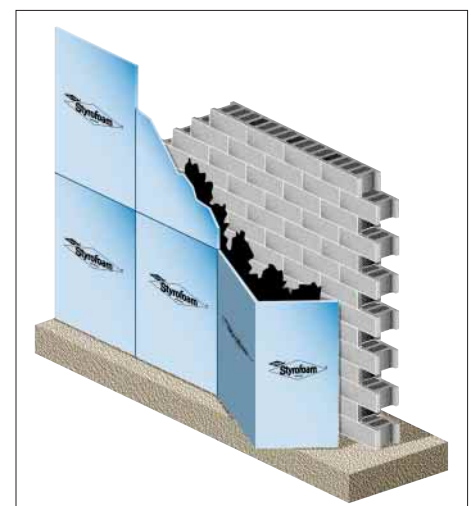


Figure 4: Wall Cross Section

<sup>1</sup> Per ASTM C578 and 16 CFT Part 460

<sup>2</sup> R-values expressed in ft<sup>2</sup>·h·°F/Btu (m<sup>2</sup>·K/W)

<sup>3</sup> CAVITYMATE Ultra has an R-value of 5.6 ft<sup>2</sup>·h·°F/Btu (0.99 m<sup>2</sup>·K/W) at 75°F (24 °C) mean temperature for nominal 1 5/8" (41 mm) thickness and 12.0 ft<sup>2</sup>·h·°F/Btu (2.11 m<sup>2</sup>·K/W) for nominal 2" (51 mm) thickness.

TABLE 4 CHEMICAL RESISTANCE OF STYROFOAM BRAND INSULATION

Acid, inorganic	Good
Acid, organic	Good
Alcohol	Good
Aldehydes, e.g., formaldehyde	Poor
Aromatic hydrocarbons	Poor
Asphalts, solvent based	Poor
Asphalts, water based	Good
Bases, caustics	Good
Bleach	Good
Brines and other salts	Good
Cements and mortar	Good
Chlorinated hydrocarbons	Poor
Ethers	Poor
Gases, carbon dioxide (CO <sub>2</sub> )	Good
Gases, carbon hydroxide (CH <sub>4</sub> )	Good
Gases, chlorofluorocarbons	Good
Gases, dioxide (O <sub>2</sub> )	Good
Gases, nitrous hydroxide (NH <sub>3</sub> )	Good
Gases, sulfur dioxide (SO <sub>2</sub> )	Good
Gasoline	Poor
Ketones, e.g., acetones, MEK,	Poor
Naphthas, paint thinner	Poor
Olefins, e.g., ethylene	Poor
Paints, alcohol based	Good
Paints, water based	Good
Water	Good