

# Zonolite®

## Masonry Insulation

### Product Description

#### Basic Use

Zonolite® Masonry Insulation is free flowing vermiculite used to insulate masonry wall cores and cavities. It also increases the fire-resistance rating and Sound Transmission Classification (STC) of the wall system.

#### Composition & Materials

Zonolite Masonry Insulation, available in 0.11 m<sup>3</sup> (4 ft<sup>3</sup>) bags, is lightweight, free flowing, inorganic vermiculite, specially treated for water repellency. It has a dry loose weight density of 72-112 kg/m<sup>3</sup> (4.5-7.0 lb/ft<sup>3</sup>), and is capable of supporting its own weight, so it will not settle. It is fire-resistant, with a fusion point of approximately 1,204°C (2,200°F), rotproof and vermin-proof.

#### Limitations

Where average interior relative humidity exceeds 50%, a vapor barrier is recommended on the exterior side of the interior wythe of the cavity wall or composite masonry wall system.

### Technical Data

#### Applicable Standards

American Society for Testing & Materials (ASTM)

- ASTM E 84-96a – Surface Burning Characteristics of Building Materials

#### Approvals

Underwriters' Laboratories, Inc. (UL) Fire Resistance Directory, approved designs include:

- Design U-901
- Design U-904
- Design U-905
- Design U-907

#### Physical/Chemical Properties

Zonolite Masonry Insulation is manufactured to meet or exceed the following standards:

- ASTM C 516-80 – Vermiculite Loose Fill Thermal Insulation, Type II
- Federal Housing Authority (FHA) – FHA Bulletin UM-30
- Federal Specification for Insulation, Thermal (Vermiculite) – Fed Spec HH-585C, superseded by ASTM C 516-80 effective March 31, 1983
- National Concrete Masonry Association (NCMA) – General Performance Criteria

### Heat Transmission

Tables 1, 2, 4 and 5 provide system thermal design values, and measured values where noted, for thermal transmittance (U-value) and thermal resistance (R-value) for common constructions insulated with Zonolite Masonry Insulation. A manufacturer's insulation fact sheet is available upon request.

### Fire Resistance Rating

Zonolite Masonry Insulation will not burn. When tested in accordance with the ASTM E 84 Tunnel Test, Zonolite Masonry Insulation received the following ratings:

- Flame spread: 0
- Fuel contributed: 0
- Smoke developed: 0

UL Designs U-901, U-904, U-905 and U-907 will improve to a minimum 4 hour rated wall when filled with Zonolite Masonry Insulation. Due to its outstanding performance in the UL Fire Wall Test, 6 hour rated walls can be achieved when filled with Zonolite Masonry Insulation.

**Table 1: Thermal Properties of Zonolite - CMU Single-Wythe Walls**

Wall Thickness	Type of Block	R-value m <sup>2</sup> •K/W (ft <sup>2</sup> •h•°F/Btu)	U-value W/(m <sup>2</sup> •K) Btu/(ft <sup>2</sup> •h•°F)
152 mm (6 in.)	Lightweight uninsulated insulated	0.44 (2.5)	2.27 (.40)
		0.67 (3.8)	1.48 (.26)
203 mm (8 in.)	Lightweight uninsulated insulated	0.53 (3.0)	1.87 (.33)
		1.04 (5.9)	0.97 (.17)
203 mm (8 in.)	Heavyweight uninsulated insulated	0.37 (2.1) <sup>1</sup>	2.73 (.48)
		0.55 (3.1) <sup>1</sup>	1.82 (.32)
305 mm (12 in.)	Lightweight uninsulated insulated	0.58 (3.3)	1.70 (.30)
		1.41 (8.0) <sup>1</sup>	0.68 (.12)
305 mm (12 in.)	Heavyweight uninsulated insulated	0.40 (2.3) <sup>1</sup>	2.50 (.44)
		0.74 (4.2) <sup>1</sup>	1.36 (.24)

<sup>1</sup> Measured Values

**Table 2: Thermal Properties of Zonolite - CMU Wall with Brick Veneer**

Backup CMU Thickness	Type of CMU	Exterior Wythe			
		Face Brick 102 mm (4 in.)		Common Brick 102 mm (4 in.)	
		R-value m <sup>2</sup> •K/W (ft <sup>2</sup> •h•°F/Btu)	U-value W/(m <sup>2</sup> •K) Btu/(ft <sup>2</sup> •h•°F)	R-value m <sup>2</sup> •K/W (ft <sup>2</sup> •h•°F/Btu)	U-value W/(m <sup>2</sup> •K) Btu/(ft <sup>2</sup> •h•°F)
152 mm (6 in.)	Lightweight uninsulated insulated	0.53 (3.0)	1.87 (.33)	0.58 (3.3)	1.70 (.30)
		0.76 (4.3)	1.31 (.23)	0.81 (4.6)	1.25 (.22)
203 mm (8 in.)	Lightweight uninsulated insulated	0.62 (3.5)	1.65 (.29)	0.66 (3.8)	1.48 (.26)
		1.11 (6.3)	0.91 (.16)	1.18 (6.7)	0.85 (.15)
203 mm (8 in.)	Heavyweight uninsulated insulated	0.42 (2.4)	2.39 (.42)	0.49 (2.8)	2.04 (.36)
		0.56 (3.2)	1.76 (.31)	0.63 (3.6)	1.59 (.28)

### Sound Transmission

Zonolite Masonry Insulation has an STC rating of 51, which means noise transmission is reduced by 24% to a level where room-to-room conversation is inaudible. Test results are available upon request.

### Water Permeance

Specially treated Zonolite Masonry Insulation eliminates moisture condensation. Tests conducted by the Structural Clay Products Research Foundation on Zonolite Masonry Insulation in cavity walls showed virtually no water permeation.

Further, there is no need for a vapor barrier when the average indoor relative humidity does not exceed 50% (FHA Bulletin UM-30).

### Approximate Coverage

When installed according to manufacturer's recommendations, approximate coverage can be calculated per Table 5.

### Safety

Health and safety information is available on this product. Contact Grace Construction Products for a Material Safety Data Sheet (MSDS).

**Table 3: Number of 0.11 m<sup>3</sup> (4 ft<sup>3</sup>) bags per 93 m<sup>2</sup> (1,000 ft<sup>2</sup>) of Wall Area**

Type	No. of Bags
203 mm (8 in.) CMU	68
305 mm (12 in.) CMU	121
25 mm (1 in.) cavity	21
51 mm (2 in.) cavity	42
64 mm (2½ in.) cavity	50
102 mm (4 in.) cavity	95

### Installation

#### Preparatory Work

Block joints at pilasters or other vertical members should be mortared, and weep holes should be filled with glass fiber, rope or copper screen to prevent insulation leakage.

#### Method

Insulation should be poured from the bag or hopper directly into the concrete block core or wall cavity. Pours can be made at any interval, but not to exceed 6.1 m (20 ft) in height, without requiring bridging. Rodding and tamping are not required.

### Availability & Cost

#### Availability

Strategically located warehouses and a network of distributors carry Zonolite Masonry Insulation for prompt delivery to project sites.

**Table 4: Thermal Properties of Zonolite - Cavity Walls with 102 mm (4 in.) Exterior Wythe**

Interior Wythe Thickness	Type of Construction		Cavity Dimension			
			64 mm (2½ in.)		114 mm (4½ in.)	
			R-value m <sup>2</sup> •K/W (ft <sup>2</sup> •h•°F/Btu)	U-value W/(m <sup>2</sup> •K) Btu/(ft <sup>2</sup> •h•°F)	R-value m <sup>2</sup> •K/W (ft <sup>2</sup> •h•°F/Btu)	U-value W/(m <sup>2</sup> •K) Btu/(ft <sup>2</sup> •h•°F)
102 mm (4 in.)	Lightweight CMU	Uninsulated	0.67 (3.8)	1.53 (.27)	0.67 (3.8)	1.53 (.27)
		Cavity Insulated	1.55 (8.8)	0.62 (.11)	2.39 (13.6)	0.40 (.07)
102 mm (4 in.)	Heavyweight CMU	Uninsulated	0.53 (3.0)	1.93 (.34)	0.53 (3.0)	1.93 (.34)
		Cavity Insulated	1.41 (8.0)	0.68 (.12)	2.25 (12.8)	0.45 (.08)
102 mm (4 in.)	Concrete (Cinder) Block or Clay Tile	Uninsulated	0.60 (3.4)	1.70 (.30)	0.60 (3.4)	1.70 (.30)
		Cavity Insulated	1.48 (8.4)	0.68 (.12)	2.32 (13.2)	0.45 (.08)
102 mm (4 in.)	Face Brick	Uninsulated	0.48 (2.7)	2.10 (.37)	0.48 (2.7)	2.10 (.37)
		Cavity Insulated	1.36 (7.7)	0.74 (.13)	2.20 (12.5)	0.45 (.08)
102 mm (4 in.)	Common Brick	Uninsulated	0.55 (3.1)	1.87 (.33)	0.55 (3.1)	1.87 (.33)
		Cavity Insulated	1.43 (8.1)	0.68 (.12)	2.27 (12.9)	0.45 (.08)
152 mm (6 in.)	Lightweight CMU	Uninsulated	0.69 (3.9)	1.48 (.26)	0.69 (3.9)	1.48 (.26)
		Cavity Insulated	1.57 (8.9)	0.62 (.11)	2.41 (13.7)	0.40 (.07)
		Cavity & Block Ins.	1.81 (10.3)	0.57 (.10)	2.66 (15.1)	0.40 (.07)
203 mm (8 in.)	Lightweight CMU	Uninsulated	0.77 (4.4)	1.31 (.23)	0.77 (4.4)	1.31 (.23)
		Cavity Insulated	1.67 (9.5)	0.62 (.11)	2.52 (14.3)	0.40 (.07)
		Cavity & Block Ins.	2.16 (12.3)	0.45 (.08)	3.12 (17.1)	0.34 (.06)

**Table 5: Thermal Properties of Zonolite - Cavity Walls with Lightweight 102 mm (4 in.) Exterior Wythe**

Interior Wythe Thickness	Type of Concrete		Cavity Dimension			
			64 mm (2½ in.)		114 mm (4½ in.)	
			R-value m <sup>2</sup> •K/W (ft <sup>2</sup> •h•°F/Btu)	U-value W/(m <sup>2</sup> •K) Btu/(ft <sup>2</sup> •h•°F)	R-value m <sup>2</sup> •K/W (ft <sup>2</sup> •h•°F/Btu)	U-value W/(m <sup>2</sup> •K) Btu/(ft <sup>2</sup> •h•°F)
102 mm (4 in.)	Lightweight Concrete Block	Uninsulated	0.84 (4.8)	1.19 (.21)	0.84 (4.8)	1.19 (.21)
		Cavity Insulated	1.74 (9.9)	0.57 (.10)	2.59 (14.7)	0.40 (.07)
102 mm (4 in.)	Heavyweight Concrete Block	Uninsulated	0.70 (4.0)	1.42 (.25)	0.70 (4.0)	1.42 (.25)
		Cavity Insulated	1.60 (9.1)	0.62 (.11)	2.45 (13.9)	0.40 (.07)
102 mm (4 in.)	Concrete (Cinder) Block or Clay Tile	Uninsulated	0.77 (4.4)	1.31 (.23)	0.77 (4.4)	1.31 (.23)
		Cavity Insulated	1.67 (9.5)	0.62 (.11)	2.52 (14.3)	0.40 (.07)
102 mm (4 in.)	Face Brick	Uninsulated	0.67 (3.8)	1.53 (.27)	0.67 (3.8)	1.53 (.27)
		Cavity Insulated	1.55 (8.8)	0.62 (.11)	2.39 (13.6)	0.40 (.07)
102 mm (4 in.)	Common Brick	Uninsulated	0.72 (4.1)	1.36 (.24)	0.72 (4.1)	1.36 (.24)
		Cavity Insulated	1.62 (9.2)	0.62 (.11)	2.46 (14.0)	0.40 (.07)
152 mm (6 in.)	Lightweight Concrete Block	Uninsulated	0.88 (5.0)	1.14 (.20)	0.88 (5.0)	1.14 (.20)
		Cavity Insulated	1.76 (10.0)	0.57 (.10)	2.60 (14.8)	0.40 (.07)
		Cavity & Block Ins.	1.99 (11.3)	0.51 (.09)	2.83 (16.1)	0.34 (.06)
203 mm (8 in.)	Lightweight Concrete Block	Uninsulated	0.97 (5.5)	1.02 (.18)	0.97 (5.5)	1.02 (.18)
		Cavity Insulated	1.85 (10.5)	0.57 (.10)	2.69 (15.3)	0.40 (.07)
		Cavity & Block Ins.	2.36 (13.4)	0.40 (.07)	3.20 (18.2)	0.34 (.06)

Contact a Grace Customer Service representative for ordering and delivery information.

#### Cost

Zonolite Masonry Insulation is competitively priced. For specific information, contact a Grace representative.

#### Warranty

Grace products are warranted to meet published specifications at time of delivery. For further warranty information, contact a Grace representative.

#### Maintenance

Zonolite Masonry Insulation can be stored indefinitely and, when

installed with manufacturer's recommendations, it will not require maintenance.

#### Technical Services

Support is provided by full-time, highly trained Grace representatives and technical personnel. They are supported by a central research and development technical services staff.

## The Grace Wall System

### The Performance of Cavity Wall Construction with the Economies of Single-Wythe Design

The cavity wall concept had long been accepted and used in masonry construction. It utilizes the drainage wall principles of a) protection, b) collection, c) drainage and d) back-up through the components of an a) exterior veneer, b) flashing and weep system, c) cavity for drainage and d) back-up wythe. With the Grace Masonry Products Solution you can achieve cavity wall performance in single-wythe construction. Here's how:

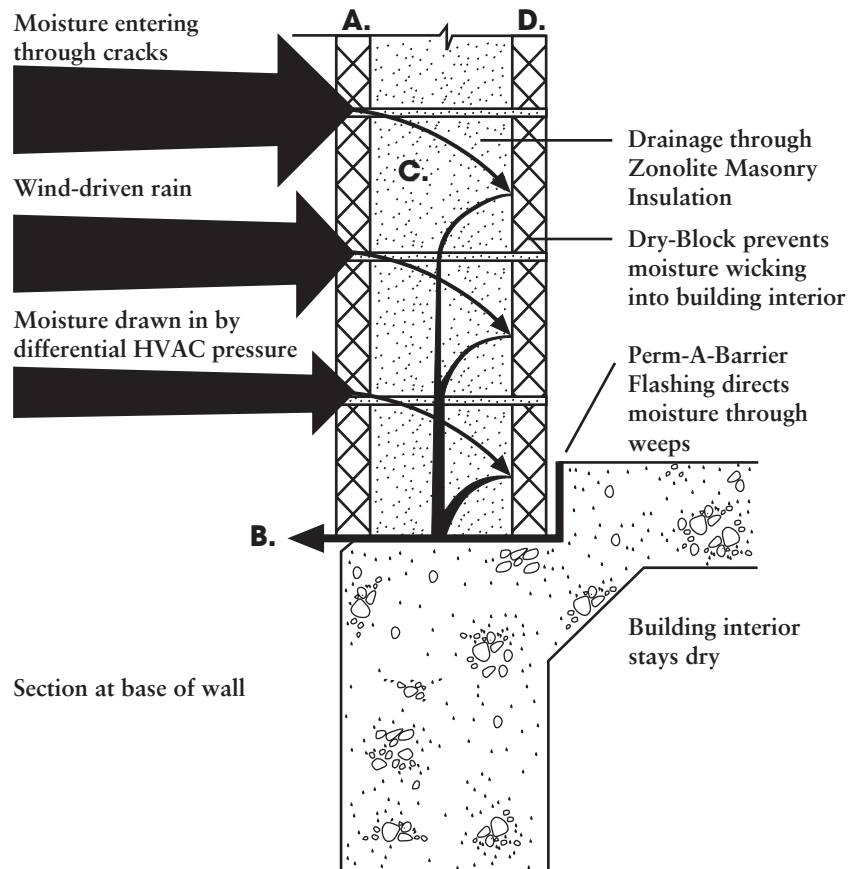
**A. Protection.** The Dry-Block® systems of admixtures in the CMU and mortar provide the first line of defense in preventing moisture entry. The face shell acts as the protection just as the veneer wythe in a cavity wall does.

**B. Collection.** Use of Perm-A-Barrier® Wall Flashing collects the water that passes through the face shell, down the exterior face shell and then is directed out the exterior through the weep system.

**C. Drainage.** The open cores of block in a single-wythe wall can act similarly to a cavity, allowing water to drain to the flashing areas. Zonolite Masonry Insulation provides for a drainable insulation in the core, providing high thermal performance while allowing drainage of the wall.

**D. Back-up.** Since the Dry-Block system is throughout the mortar and block, its water-repellent performance allows the back shell of the CMU to act as the back-up wythe as in a cavity wall.

If the economies of your project don't allow for cavity wall construction, consider the Grace Wall System single-wythe solution. Refer to the short form specification above. Contact your local Grace representative for an architectural manual which contains full specifications and details.



For Technical Assistance call us at 800-342-2017 (in the USA).

**web** Visit our web site at: [www.zonolite.com](http://www.zonolite.com)

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