



1. Product Name

THERMOMASS® Building Insulation System

2. Manufacturer

Composite Technologies Corp.

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3. Product Description

BASIC USE

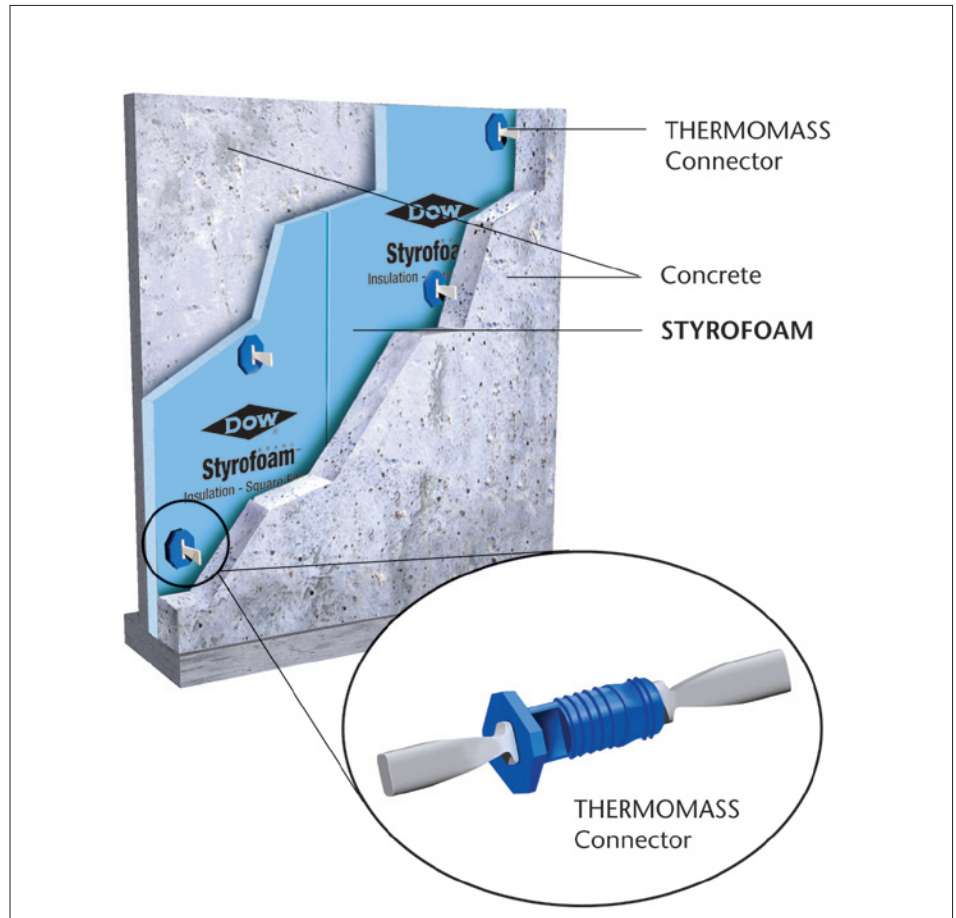
The THERMOMASS® Building Insulation System is comprised of THERMOMASS fiber-composite connectors and rigid foam plastic insulation. The system is designed for construction of non-composite, load-bearing concrete sandwich panels and is used with specially fabricated boards of either STYROFOAM® extruded polystyrene insulation or ISO-CAST R° polyisocyanurate insulation. The connectors are corrosion and alkali resistant and provide an integral insulation system for concrete walls, as well as a connection between the 2 wythes of concrete to transfer loads to the structural wythe.

COMPOSITION & MATERIALS

THERMOMASS Connectors include a structural portion composed of E-CR glass fiber and cured vinyl ester resin, as well as thermoplastic molded sealing collars. The vinyl ester matrix impregnates the fiber strands, creating a composite material that has been tested and shown to be resistant to chemical attack. The sealing collars provide a friction fit when placed within the predrilled holes in the insulation. The flange (stop) ensures proper embedment depth. Panels of either Styrofoam extruded polystyrene insulation or Isocast™ R polyisocyanurate insulation are fabricated with predrilled, regularly spaced holes identifying connector placement locations.

TYPES

The THERMOMASS Building Insulation System is available in MC Series and MS Series. The MC Series connectors are for sandwich walls that



THERMOMASS® Building Insulation System

have fascia wythe of 2 1/2" (63.5 mm) or more. The MS Series connectors are for sandwich walls that have fascia wythe less than 2 1/2" (63.5 mm).

SIZES

Connector lengths are selected per insulation thickness and minimum concrete wythe thickness.

BENEFITS

Connectors

- Manufactured from high tensile capacity fiber-composite rods
- Noncorrosive
- Possess low thermal conductivity
- Allow insulation to extend edge to edge

Insulation

- Closed cell, providing long term thermal resistance
- Prefabricated for ease of installation

4. Technical Data

APPLICABLE STANDARDS

ASTM International

- ASTM C177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- ASTM C581 Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass-Fiber-Reinforced Structures Intended for Liquid Service
- ASTM D209 Standard Specification for Lampblack Pigment
- ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

- ASTM D1621 Standard Test Method for Compressive Properties Of Rigid Cellular Plastics
- ASTM D4842 Standard Test Method for Determining the Resistance of Solid Wastes to Freezing and Thawing (Historical Standard)
- ASTM D3039/D3039M Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials
- ASTM E488 Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements

ICC Evaluation Service, Inc. (ICC-ES)

- ICC-ES AC308 Acceptance Criteria for Fiber-Reinforced Composite Connectors Anchored in Concrete

APPROVALS, CODE COMPLIANCE

ICC Evaluation Service, Inc. (ICC-ES)

- ICC-ES Report ESR 1746

International Building Code (IBC)

Uniform Building Code (UBC)

PHYSICAL PROPERTIES

The THERMOMASS Building Insulation System exhibits the properties and characteristics indicated in Table 1 and Table 2 when tested as represented.

Accelerated aging tests conducted at independent testing laboratories verify the alkali resistance of the connector system.

Tensile strength of the connector composite material is in excess of 126,000 psi (869 MPa). Depending on embedment depth, static pull-out strengths range from 1400 lb - 2300 lb (6227 - 10,230 N). Post-dynamic tension and shear capacities exceed 80% of static capacities.

See Table 1.

FIRE PERFORMANCE

In tests conducted at independent testing laboratories, concrete sandwich walls incorporating the THERMOMASS Building Insulation System have been shown to be highly fire resistant. Methods for calculation of fire ratings for concrete sandwich panels are provided in national building codes.

5. Installation

PREPARATORY WORK

Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

Verify that site conditions are acceptable for installation. Do not proceed with installation until unacceptable conditions are corrected.

METHODS

Place insulation sheets on an initial layer of concrete. Install the THERMOMASS Fiber Composite Connectors through the insulation and into the still-plastic concrete layer. Seat the collar flange. Twist each connector one-quarter turn to ensure consolidation of the concrete around the connector anchorage.

For complete installation procedures, please contact Composite Technologies Corp.

BUILDING CODES

Installation must comply with the requirements of all applicable local, state and federal code jurisdictions.

6. Availability & Cost

AVAILABILITY

THERMOMASS Fiber Composite Connectors are manufactured in the United States and are sold directly to sitecast/tilt-up contractors and to precast wall panel manufacturers. Connectors are sold as a part of a system kit that also includes prefabricated Styrofoam extruded polystyrene insulation or Isocast R polyisocyanurate insulation.

COST

Cost information may be obtained from the manufacturer.

7. Warranty

THERMOMASS warrants that the connectors will not vary by more than 10% from performance specifications specified herein. All other warranties, expressed or implied, including the warranty of merchantability and fitness for a particular purpose, are excluded. No endorsement or promotion of any particular panel system or fabricator is intended. Composite Technologies Corp. makes no representation as to the performance of any panel fabricated using THERMOMASS Fiber Composite Connectors in the THERMOMASS Building Insulation System. The concrete wall panel fabricator is solely responsible for the fabrication, installation and performance of the building system panel. For further warranty information, contact a local Composite Technologies Corp. representative.

8. Maintenance

Maintenance is not required.

TABLE 1 PHYSICAL PROPERTIES OF THERMOMASS MC/MS SERIES CONNECTORS

Connector Series	Single Connector - MC Series		Single Connector - MS Series
Sandwich wall application	With fascia wythe of 2/12" (63.5 mm) or more		With fascia wythe of < 2/12" (63.5 mm)
Property and Test	Concrete Strength		
Tensile strength of connector rod, ASTM D3039/D3039M	N/A	126,000 psi (869 MPa)	126,000 psi (869 MPa)
Flexural strength of connector rod, ASTM D790	N/A	116,000 psi (800 MPa)	116,000 psi (800 MPa)
Ultimate tension capacity, ASTM E488	6000 psi	2828 lb (12,584 N)	2432 lb (10,822 N)
	4000 psi	2308 lb (10,268 N)	1358 lb (6043 N)
Ultimate shear capacity, ASTM E488	6000 psi	608 lb (2704 N)	416 lb (1851 N)
	4000 psi	452 lb (2011 N)	402 lb (1789 N)
Alkali Resistance, ASTM C581 and ASTM D3039/D3039M	N/A	97.8% retained strength after 3000 hrs. of immersion in pH12 solution	97.8% retained strength after 3000 hrs. of immersion in pH12 solution



TABLE 2: PHYSICAL PROPERTIES OF STYROFOAM AND ISO-CAST R INSULATION

Property and Test	STYROFOAM®	ISO-CAST™ R
Thermal resistance ³ , ASTM C518, ASTM C177	-	-
Aged R-value per inch at 75 degrees F (24 degrees C) mean temperature	5.0	6.5
Compressive strength ² , ASTM D1621	25 psi, minimum	25 psi, minimum
Water absorption, ASTM D2842	0.9% by volume, maximum	-
Water absorption, ASTM D209, % by volume, maximum	-	0.05% by volume, maximum
Water vapor permeance ¹ , ASTM E96, 1", perm (ng/Pa•s•m-2), maximum	1.6	< 0.03
Maximum use temperature	165 degrees F (74 degrees C)	190 degrees F (88 degrees C)
Notes		
¹ Values based on desiccant method; vapor permeance varies with thickness		
² At 10% deformation or yield, whichever occurs first		
³ R-values expressed in ft ² •h•°F/Btu (m ² •K/W)		

9. Technical Services

Technical personnel are available at Composite Technologies Corporation offices to assist with any project using this system. For technical assistance regarding the use of THERMOMASS Fiber Composite Connectors in the THERMOMASS Building Insulation System, call (800) 232-1748.

10. Filing Systems

Additional product information is available from the manufacturer upon request.