

SECTION 07 21 19
BUILDING INSULATION



Part 1 General

1.1 Section includes

- A. Foam-in-place insulation for framed stud walls, cavities of Concrete Masonry Unit (CMU) walls, or to fill miscellaneous enclosed wall cavities.
- B. Foam-in-place sound control insulation for interior and exterior walls.

1.2 Related Sections

Section 07 05 00 – Masonry Cell Insulation

1.3 References

- A. American Society for Testing Materials (ASTM):
 - 1. ASTM C177 (2004 or newer) – Thermal Resistance
 - 2. ASTM C518 (2010 or newer) – Thermal Resistance
 - 3. ASTM D5116 Modified Small Chamber – VOC Emissions
 - 4. ASTM E84 (2001 or newer) – Surface Burning Characteristics
 - 5. ASTM E90 (1990 or newer) – Sound Attenuation
 - 6. ASTM E96 (2000 or newer) – Moisture Vapor Transmission
- B. National Fire Protection Association (NFPA)
 - 1. NFPA 259-04 – Potential Heat (expressed as Btu/lb)
- C. National Concrete Masonry Association
 - 1. NCMA TEK 13-1B (2008) – STC Ratings of CMU Walls

1.4 Submittals

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: Manufacturer's data on product, including:
 - 1. "Product Information" Sheet from Manufacturer.
 - 2. Material Safety Data Sheet for Core Foam Masonry Foam Insulation.
 - 3. Upon request, copies of test data showing compliance of product with referenced standards.

1.5 Quality Assurance

- A. Installer Qualifications: A firm with experience installing insulation systems of the type specified and certified by the foam manufacturer.

1.6 Delivery, Storage and Handling

A. Delivery

1. Materials shall be delivered to installer in manufacturer's original, unopened, undamaged packages with identification labels intact.
2. Installer will blend resin and foaming catalyst according to manufacturer's instructions prior to arriving at the jobsite and/or may blend material while at the jobsite, at his discretion. Installer may purchase pre-mixed resin from the manufacturer.

B. Storage and Handling

1. Materials should be stored in original paper packages and boxes protected from moisture until used by installer.
2. Once blended with water by installer, materials must be maintained at a minimum temperature of 75°F.

1.7 Project/Site Conditions

- A. Environmental Requirements: Do not install the product when prevailing weather and environmental conditions conflict with the manufacturers written instructions.

Part 2 Products

2.1 Manufacturers

A. Acceptable Manufacturer:

cfiFOAM, Inc., PO Box 10393, Knoxville, TN 37939.
Telephone: 800-656-3626. Fax: 865-588-6607.
Email: info@cfifoam.com. Website: www.cfifoam.com.

2.2 Materials

A. InsulSmart Interior Foam Insulation

1. Formulation: Cellular plastic insulation comprised of a spray-dried polymeric resin and a foaming catalyst concentrate which are combined with water and then injected, along with compressed air, into the wall cavity by the installer.
2. ASTM E-84 Surface Burning Characteristics:
 - a. Flame Spread: 25 or Less
 - b. Smoke Generated: Less than 450
 - c. Thickness: 4 inches (maximum thickness allowed by test apparatus)
 - d. Tests performed by an independent, certified laboratory located within the United States of America.
 - e. Flammability Classification: Class A or Class I
3. Thermal Conductivity:
 - a. k-value 0.22 BTU/(hr ft² °F in) @ 75°F
 - b. k-value 0.20 BTU/(hr ft² °F in) @ 25°F
4. Thermal Resistance:
 - a. R-value = 4.6 per inch @ 75°F
 - b. R-value = 5.1 per inch @ 25°F

5. Shrinkage
 - a. 0.0 to 1.0%
6. Density of Foam:
 - a. Wet Foam 12x12x12 box weight: 3 ½ - 4 ½ lbs.
 - b. Upon final curing: 0.8-1.8 lb/ft³ ± 6 %

2.3 Product Substitutions

- A. No substitutions permitted.

Part 3 Execution

3.1 Installation Guidelines:

- A. All open cavities within each wall to be insulated shall be filled with foam insulation as shown on the drawings.
- B. InsulSmart Interior Foam Insulation shall be either mixed by an authorized installer prior to each job or the factory-mixed version shall be supplied by the manufacturer.
- C. All areas being foamed need fresh air ventilation until the foam has fully cured and dried.
- D. Stud wall cavities in retrofit or new construction can be filled with foam after gypsum wallboard is installed using either of three (3) methods:
 1. Top-Fill Method: The installer inserts an extended whip hose through a 2-inch minimum diameter hole drilled in the top plate, extending the hose to begin installing foam from the bottom of the cavity, gradually withdrawing the hose as the foam fills the cavity.
 2. Side-Fill Method: Drill 5/8-inch to 7/8-inch holes in each stud cavity (bottom, middle and top) before injecting foam into the cavity through the hole in 4-foot lifts until it completely fills each cavity as evidenced by foam exiting a small vent hole at the top.
 3. Side-Fill Method (Alternate): Drill a 2-inch minimum diameter hole in the center of the stud cavity, insert a whip hose and fill the lower half of the cavity before repositioning the whip hose to similarly fill the upper portion of the cavity.

Installation can be performed either from the exterior or interior of the wall section. In either case, seal each hole with a snug fitting polystyrene foam plug prior to patching and sealing the hole. The closed-cell polystyrene foam plug is recommended in order to maintain the integrity of the vapor retarder portion of the wall assembly.

- E. Stud wall cavities in new construction can be filled with foam before gypsum wallboard is installed.
 1. Fabric Supported Method: Either non-woven construction fabric or 4 mil polyethylene is stretched tightly and stapled to the framing faces to contain and support the foam during application. The authorized installer then slits a 1" hole through the fabric and injects the foam to fill the cavity through the hole and fills in 4-foot lifts.
 2. Open-Mesh Method: Open-mesh (1/4" max.) is stretched tightly and stapled to the framing faces to contain and support the foam during application. The authorized installer injects the foam to fill the cavity through the open mesh. Excess foam exiting through the mesh is easily swept from the insulated surfaces with a broom for disposal.

Benefits:

 - a. Enables visual confirmation of foam placement during application.
 - b. The foam is biodegradable; thus, may be disposed on-site by mixing with soil used as a turf substrate or landscaping.
 - c. Facilitates curing before installing gypsum wallboard.

Note: A small amount of shrinkage, typically 0.5%, may occur as the foam dries and cures, resulting in small gaps between the foam and the framing members.

F. CMU (Concrete Masonry Unit) cores can be filled with foam using either top-fill or, more commonly, pressure-injection techniques.

1. For top-fill, the installer must use an extension tube to begin installing foam from the bottom of the cavity, withdrawing the extension tube as foam fills the cavity.
2. For pressure-injection, holes are drilled in each CMU at an approximate height of 4' from finished floor level.
 - a. 3/8" holes for visually sensitive areas for use with a low-volume touch-up gun
 - b. 5/8" holes for use with a standard foam gun
 - c. 7/8" holes for use with a high-volume production gun.

Normally each vertical core is drilled and injected with foam in 10'-24' lifts, although in 8" CMU, alternating cores can be used in walls less than 12' high.

3. InsulSmart Interior Foam Insulation is injected until it completely fills each vertical core of block cells, evidenced by foam exiting the adjacent injection hole and an occasional test hole drilled at the top of the wall section. If needed, drill holes and fill with foam at an approximate height of 10'-14' above the initial row of injection holes until the wall is completely filled.
4. Patch holes with mortar to resemble existing surface.

3.2 Field Quality Control

A. Testing

1. Verify insulation density by random sampling of foam
2. Foam weight should be 3 1/2 - 4 1/2 lb.

3.3 Protection

- A. Product should be protected from excess moisture during initial 24 hour curing period after installation. A 72-hour curing period is recommended prior to painting; however, in each case the coating contractor should test the walls to confirm the gypsum wallboard's surface is suitable for painting before beginning paint application.
- B. Foam should not be exposed to surfaces over 190°F for an extended period of time.

END OF SECTION