



ASTM Standard Specifications for Mineral Fiber Blanket, Loose-Fill and Spray-Applied Insulation

Information from NAIMA

In this issue, we review ASTM C 665 Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing, ASTM C 764 Mineral Fiber Loose-Fill Thermal Insulation, and ASTM C 1014 Spray-Applied Mineral Fiber Thermal or Acoustical Insulation.

ASTM International develops and maintains standard specifications for mineral fiber blanket (fiber glass, rock wool and slag wool), loose-fill (blowing wool) and spray-applied insulation materials. The ASTM standards cover fiber glass, rock and slag wool insulation for use in housing and other buildings at ambient temperatures.

While products that comply with the ASTM standards may be used thermally or acoustically to insulate various constructions, they are adaptable primarily, but not exclusively, to wood joist, rafters, and wood and steel stud construction.

The basic material shall be fibers made from mineral substances processed from the molten state into a fibrous form. The ASTM standards establish classification for materials and require insulation products to meet standards for thermal performance, product safety and labeling.

ASTM C 665 replaces the cancelled Federal Specification HH-1-521F for insulation blankets and ASTM C 764 replaces Federal Specification HH-1-1030B for loose-fill insulation. ASTM C 1014 is the standard for spray-applied mineral fiber and does not have a counterpart Federal Specification.

As a service to the North American Insulation Manufacturers Association (NAIMA) members and their customers, this issue of Insulation Facts has been prepared to help users of mineral fiber insulation material be aware of and understand the major requirements of the ASTM standards and their uses as replacements for the Federal Specifications.

ASTM C 665 MINERAL FIBER BLANKET

Classification

Type I — Blankets without membrane coverings. Unfaced insulation.

Type II — Blankets with a non-reflective vapor retarder membrane covering one princi-

pal face. Class A, B & C, typically kraft faced.

Type III — Blankets with a reflective vapor retarder membrane covering one principal face. Class A, B & C, foil faced.

Class A — Membrane faced surface with flame spread of 25 or less. For use in exposed applications meeting building code requirements.

Class B — Membrane faced surface with flame propagation resistance critical radiant flux of 0.12 W/cm^2 or greater.

Class C — Membrane faced surface not rated for flame propagation resistance (for use in non-exposed applications only).

Material Quality Requirements ASTM C 665

Thermal Resistance

The thermal resistance (R) for any four randomly selected samples shall average not more than 5% below the listed R-value when tested in accordance with ASTM C 177 and C 518, nor shall any single specimen be more than 10% below the listed R-value. The product must always be produced to the labeled R-value.

Surface Burning Characteristics

Insulation blankets exclusive of membrane facing shall have a flame spread index no greater than 25 and a smoke developed index no greater than 50. Insulation blankets with facings and membranes intended for exposed application shall have a flame spread index no greater than 25 and a smoke developed index no greater than 50 when tested in accordance with ASTM E 84.

Critical Radiant Flux

Insulation blankets shall have a critical radiant flux-flame

propagation resistance $>0.12 \text{ W/cm}^2$. Blankets with membrane coverings on both surfaces shall be tested on the surface to be left exposed and shall be marked on either surface. Class B products having a critical radiant flux of $>0.12 \text{ W/cm}^2$ are suitable for exposed applications when tested in accordance with ASTM E 970.

Water Vapor Permeance

Vapor-resistant membrane coverings shall have a vapor permeance of no more than 1 perm, and vapor-permeable membrane coverings shall have a vapor permeance of no less than 5 perm when tested in accordance with ASTM E 96.

Water Vapor Sorption

When tested in accordance with ASTM C 1104, the water vapor sorption of the insulation shall not be more than 5% by weight.

Odor Emission

When tested in accordance with ASTM C 1304, a detectable odor of strong objectionable nature recorded by more than two of the five test panel members shall constitute rejection of the material.

Corrosiveness

When tested in accordance with ASTM C 665, the metal plates in contact with the insulation shall show no corrosion greater than that observed on the comparative plates in contact with sterile cotton that has been tested in the same manner.

Fungi Resistance

When tested in accordance with ASTM C 1338, the insulation shall have growth no greater than that observed on the comparative items.

Marking and Labeling

Warning Statements

When tested in accordance with ASTM E 84, insulation faced with a membrane covering shall have the flame spread classification (FSC) printed a minimum of every 8 ft. 0 in. (2.4m) on the membrane facing. If the manufacturer elects not to print the flame spread ratings, then a warning statement shall be printed every 8 ft. 0 in. (2.4m) on the membrane facing indicating that the membrane is flammable, may burn and should not be left exposed.

Packaging

Unless otherwise specified, the insulation shall be packaged in the manufacturer's standard commercial containers.

Package Marking

The markings shall be clear and legible. Unless otherwise specified, each container shall be marked as follows:

- Name of manufacturer.
- Blanket width and length.
- Square footage of material in the container.
- R-value.
- Required thickness to obtain the R-value.
- Facing type if a facing is employed.

ASTM C 764 MINERAL FIBER LOOSE FILL

Classification

Type I — Pneumatic application.

Type II — Poured application.

Material Quality Requirements (ASTM C 764)

Thermal Resistance

The standard thermal resistance values normally

recommended for open application are: 11, 19, 22, 30 and 38. The thermal resistance (R) for the average of any four randomly selected samples shall not be more than 5% below the listed R-value when tested in accordance with ASTM C 177 or C 518 nor shall any single specimen be more than 10% below the listed R-value. R-values other than those listed shall be as agreed upon between the supplier and the purchaser. *Note:* Resistance values for closed applications such as side walls shall be tested at the density intended for closed application.

Critical Radiant Flux

Mineral fiber loose-fill shall have a critical radiant flux-flame propagation resistance >0.12 W/cm² when tested in accordance with ASTM E 970.

Combustion Characteristics

Mineral fiber loose-fill shall pass and be considered non-combustible when tested in accordance with ASTM E 136.

Water Vapor Sorption

When tested in accordance with ASTM C 1104, the water vapor sorption of the insulation shall not be more than 5% by weight.

Odor Emission

When tested in accordance with ASTM C 1304, a detectable odor of strong objectionable nature recorded by more than two of the five panel members shall constitute rejection of the material.

Corrosiveness

When tested in accordance with ASTM C 665, the metal plates in contact with the insulation shall show no corrosion greater than that observed on the comparative plates in contact with sterile

cotton that has been tested in the same manner.

Marking and Labeling

Packaging

Unless otherwise specified, the insulation shall be packaged in the manufacturer's standard commercial containers.

Package Marking

Markings shall be clear and legible. Unless otherwise specified, each container shall be marked as follows:

- Name of manufacturer.
- Type of insulation.
- Net weight of insulation per bag.
- The manufacturer recommends that the insulation be installed at these minimum thicknesses, maximum coverages to provide the levels of insulation thermal resistance (R-values) shown.
- The filled-in coverage chart shall be based on the density determined in accordance

Table 1: Coverage Chart

(Source: ASTM C 764)

Each manufacturer fills in the necessary data based upon manufacturers' particular product. Chart may be given in metric units.
* Optimal information for products intended for sidewall applications.

R-Value at 75°F Mean Temperature		Maximum Net Coverage	Minimum Thickness	Minimum Weight per Square Foot
To obtain an insulation resistance (R) of:	Minimum bags per 1000 square feet net area: (bags/MSF)	Maximum square feet coverage per bag (SF)	Installed insulation should not be less than (inches thick)	The weight per square foot of installed insulation should be not less than: (lb/SF)
Attic				
R-60				
R-50				
R-44				
R-38				
R-33				
R-30				
R-26				
R-22				
R-19				
R-15				
R-13				
R-11				
Sidewalls*				
R-				

with the manufacturer's design density and include information indicated in Table 1.¹

- Certification — The certification shall state the following: This insulation has been installed in conformance with the above recommendations to provide a value of R- ____ using ____ bags to cover ____ square feet of area.¹
- Place for builder's signature, company name and date.¹
- Place for applicator's signature, company name and date.¹
- Where material is intended for both blowing or pouring application, the bag shall have a separate coverage chart for each type of application.

1. These requirements may be satisfied by a separate attic card containing the same information.

ASTM C 1014 SPRAY-APPLIED MINERAL FIBER

Classification

These mineral fibers shall be pneumatically conveyed to a spray nozzle where they are mixed with water. These mineral fibers shall have a binder either premixed with the fibers or added at the spray nozzle with water.

Material Quality Requirements

Thermal Resistance

The thermal resistance of spray-applied mineral fiber insulation shall be determined in accordance with ASTM C 177, C 518, C 1114 or C 1363.

Adhesive/Cohesive (Bond Strength)

All self-supporting applications of the insulation shall have a minimum adhesive/cohesive strength of five times the weight of the material under the testing

plate when tested in accordance with ASTM E 736.

Substrate Deflection

The insulation shall not spall, crack or delaminate when the substrate is deflected an equivalent of 1/120th the span when tested in accordance with ASTM E 759.

Water Vapor Sorption

When tested in accordance with ASTM C 1104, the water vapor sorption of the insulation shall not be more than 5% by weight.

Surface Burning Characteristics

The insulation shall have a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with ASTM E 84.

Smoldering Combustion

When tested in accordance with ASTM C 1149, the insulation shall have a weight loss no greater than 5%, nor shall there be a flaming ignition.

Fungi Resistance

When tested in accordance with ASTM C 1338, the insulation shall have growth no greater than that observed on the comparative items.

Corrosiveness

When tested in accordance with ASTM C 665, the metal plates in contact with the insulation shall show no corrosion greater than that observed on the comparative plates in contact with sterile cotton that has been tested in the same manner.

Marking and Labeling

Packaging

Material shall be delivered to the site in the approved manufacturer's original and unopened packing.

Package Marking

The markings shall be clear and legible. Unless otherwise specified, each container shall be marked as follows:

- Type of material.
- Brand name.
- Labels as required.
- Manufacturer's name and address.

ASTM Standards

ASTM standards may be obtained directly from ASTM at www.astm.org

About NAIMA

NAIMA is the association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation, and to encourage the safe production and use of these materials.

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