



Designation: C 1014 – 99a^{ε1}

Standard Specification for Spray-Applied Mineral Fiber Thermal and Sound Absorbing Insulation¹

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^{ε1} NOTE—The title and section 9.10 were editorially revised in August 2000.

1. Scope

1.1 This specification covers the composition and the physical properties of spray-applied mineral fiber thermal and sound absorbing insulation.

1.2 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 pre-mixed with the fibers or added at the spray nozzle with the water.

1.3 The spray-applied mineral fiber insulation is intended for use in building constructions at ambient conditions.

1.4 This is a material specification only and is not intended to cover methods of application that are supplied by the manufacturer.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- C 168 Terminology Relating to Thermal Insulating Materials²
- C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus²
- C 390 Criteria for Sampling and Acceptance of Preformed Thermal Insulation Lots²
- C 423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method²
- C 518 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus²
- C 665 Specification for Mineral Fiber Blanket Thermal

Insulation for Light Frame Construction and Manufactured Housing²

C 1104/C 1104M Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation²

C 1114 Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus²

C 1149 Specification for Self-Supported Spray Applied Cellulosic Thermal/Acoustical Insulation²

C 1338 Test Method for Determining the Fungi Resistance of Insulation Materials and Facings²

C 1363 Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus²

E 84 Test Method for Surface Burning Characteristics of Building Materials³

E 605 Test Methods for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members⁴

E 736 Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members³

E 759 Test Method for the Effect of Deflection of Sprayed Fire-Resistive Material Applied to Structural Members³

E 795 Practices for Mounting Test Specimens During Sound Absorption Tests²

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, see Terminology C 168.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *constant mass*—the mass of a sample at equilibrium conditions of $75 \pm 5^\circ\text{F}$ and $50 \pm 5\%$ relative humidity that shall not deviate more than 0.5 % over a 24-h period.

3.2.2 *cured*—the state or condition of the finished product after the liquid vehicle has been evaporated to a constant mass.

4. Materials and Manufacture

4.1 *Composition*—The basic material shall be fibers made from mineral substances such as rock, slag or glass processed from the molten state into a fibrous form. Organic or inorganic substances may be added to the fibers or to the binder, or to

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² *Annual Book of ASTM Standards*, Vol 04.06.

³ *Annual Book of ASTM Standards*, Vol 04.07.

⁴ *Annual Book of ASTM Standards*, Vol 04.11.

both, to enhance properties such as flame retardancy, processing, and adhesive/cohesive properties.

5. Physical Properties

5.1 For spray-applied mineral fiber insulation, the properties of density, thermal resistance, and sound absorption will vary with the manufacturer. These values shall be as stated by the manufacturer before sale and shall be tested in accordance with 9.1, 9.3, and 9.10, respectively.

5.1.1 *Test Specimens*— Three specimens shall be tested, unless otherwise agreed upon between purchaser and supplier. These are to be obtained from one representative package of insulation.

5.2 *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 9.2.

5.3 *Substrate Deflection*—The insulation shall not spall, crack, or delaminate when the substrate is deflected an equivalent of $\frac{1}{120}$ th the span when tested in accordance with 9.4.

5.4 *Water Vapor Sorption*—The insulation shall gain not more than 5 % moisture by weight when tested in accordance with 9.5.

5.5 *Surface Burning Characteristics*—The insulation shall have a maximum flame spread index of 25 and a maximum smoke developed of 50 when tested in accordance with 9.6.

5.6 *Smoldering Combustion*—The insulation shall have a weight loss not greater than 5 %, nor shall there be a flaming ignition when tested in accordance with 9.7.

5.7 *Fungi Resistance*— When tested in accordance with 9.8 the insulation shall have growth no greater than that observed on the white birch tongue depressor comparative material.

5.8 *Corrosion*—The spray-applied mineral fiber shall show no greater corrosion than the comparative plate in contact with the sterile cotton for the particular metal substrate to which classification is desired, when tested in accordance with 9.9.

6. Workmanship, Finish, and Appearance

6.1 The spray-applied mineral fiber insulation shall be free of all extraneous foreign material such as metal and paper, which would adversely affect the performance of the insulation.

6.2 The thickness and the appearance of the insulation shall be as agreed upon between the purchaser and the supplier. Surface alterations shall be done only in accordance with the manufacturer's instructions.

7. Sampling

7.1 Sampling of the insulation shall be in accordance with Criteria C 390. Specific provision for sampling shall be agreed upon between the purchaser and the supplier.

8. Specimen Preparation

8.1 All specimens of spray-applied mineral fiber insulation shall be prepared using the manufacturer's recommended spray apparatus and spray techniques. All specimens shall be cured to constant mass before testing. All specimens shall be tested at the maximum design thickness or the applied thickness unless otherwise specified by the specific test method in Section 9.

9. Test Methods

9.1 *Density and Thickness*—Density and thickness of each sample tested in accordance with this specification shall be determined in accordance with Test Methods E 605.

9.2 *Adhesive/Cohesive Strength*—The adhesive/cohesive strength of the spray-applied mineral fiber insulation shall be determined in accordance with Test Method E 736.

9.3 *Thermal Resistance*—The thermal resistance of the spray-applied mineral fiber insulation shall be determined in accordance with Test Methods C 177, C 518, C 1114, or C 1363.

9.3.1 When Test Methods C 177, C 518 or C 1114 are used, the surface irregularities shall be trimmed to provide uniform thickness and surface for good plate contact.

9.4 *Substrate Deflection*—Effects of substrate deflection of the insulation shall be determined in accordance with Test Method E 759.

9.5 *Water Vapor Sorption*—Water vapor sorption of the spray-applied mineral fiber insulation shall be determined in accordance with Test Method C 1104/C 1104M.

9.6 *Surface Burning Characteristics*—The surface burning characteristics shall be determined in accordance with Test Method E 84.

9.7 *Smoldering Combustion*—The smoldering combustion shall be determined in accordance with Specification C 1149.

9.8 *Fungi Resistance*— The fungi resistance of the insulation shall be determined in accordance with Test Method C 1338.

9.9 *Corrosion*—The corrosion of a particular metal substrate by spray-applied mineral fiber shall be determined in accordance with Specification C 665.

9.10 *Sound Absorption*— Sound absorption of the insulation shall be determined in accordance with Test Method C 423 and material shall be tested at applied thickness on applicable mountings in accordance with Practices E 795. The test results shall be reported as the absorption coefficients at the six test frequencies, and the single number ratings shall be the noise reduction coefficient (NRC). Report thickness, density, and area of test specimen.

10. Packaging and Package Marking

10.1 Material shall be delivered to the site in the approved manufacturer's original and unopened packing, bearing labels showing the type of material, brand name, labels as required, and the manufacturer's name and address.

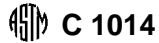
11. Delivery and Storage

11.1 Material shall be stored under cover in a dry and clean location. Delivered materials that have been exposed to water before use or are otherwise not suitable for insulation shall be removed from the job site and replaced with acceptable materials.

12. Installation

12.1 Sprayed thermal insulation material shall be applied in strict conformance with the manufacturer's written instructions, and in conformance with all applicable codes.

12.2 Material shall be applied within the temperature limitation in accordance with manufacturer's written instructions.



13. Keywords

13.1 mineral fiber insulation; sound absorbing; spray-applied; thermal

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