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

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~~¹ Note—The title and section 9.10 were editorially revised in August 2000.~~

¹ This specification is under the jurisdiction of ASTM Committee C-16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.23 on Blanket and Loose Fill Insulation.

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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:*²

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- C 168 Terminology Relating to Thermal-Insulating Materials³ Insulation
- C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- C 390 ~~Criteria~~ 390 Practice for Sampling and Acceptance of ~~Preformed~~ Thermal Insulation Lots
- C 423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- C 518 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- C 665 Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
- C 1104/C 1104M Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation
- C 1114 Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus
- C 1149 Specification for Self-Supported Spray Applied Cellulosic-Thermal/Acoustical-Insulation³ Thermal Insulation
- C 1338 ~~04~~ Test Method for ~~Determining~~ Assessing the Fungi Resistance Odor Emission of Thermal Insulation Materials and Facings³ Materials
- C 1363 ~~8~~ Test Method for Determining the Fungi Resistance of Insulation Materials and Facings
- C 1363 Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus
- E 84 Test Method for Surface Burning Characteristics of Building Materials
- E 605 Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
- E 736 Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
- E 759 Test Method for the Effect of Deflection of Sprayed Fire-Resistive Material Applied to Structural Members
- E 795 Practices for Mounting Test Specimens During Sound Absorption Tests

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. ~~⊖ If necessary, add organic or inorganic substances may be added~~ to the fibers or to the binder, or to 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.

5.9 *Odor Emission*—A detectable odor of a strong objectionable nature recorded by more than two of the five panel members shall constitute rejection of the material when tested in accordance with 9.1.

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~~; Practice 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. The mean temperature shall be 75°F (23°C) and the minimum temperature difference shall be a minimum of 40°F (4°C). Since this product is normally used for walls, the R-value shall be determined at a minimum of 3.5 in. (8.9 cm).

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.

9.11 *Odor Emission*—Determine the odor emission in accordance with Test Method C 1304.

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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