



Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers the composition and physical properties of nodulated mineral fiber thermal insulation for use in attics or enclosed spaces in housing and other framed buildings.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are provided for information only.

1.3 *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:

- B 152 Specification for Copper, Sheet, Strip, Plate, and Rolled Bar²
- C 168 Terminology Relating to Thermal Insulating Materials³
- C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus³
- C 236 Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box³
- C 390 Criteria for Sampling and Acceptance of Preformed Thermal Insulation Lots³
- C 518 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus³
- C 519 Test Method for Density of Fibrous Loose-Fill Building Insulations³
- C 687 Practice for Determination of Thermal Resistance of Loose-Fill Type Building Insulation³
- C 1104/C1104M Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation³

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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² *Annual Book of ASTM Standards*, Vol 02.01.

³ *Annual Book of ASTM Standards*, Vol 04.06.

C 1304 Test Method for Assessing The Odor Emission of Thermal Insulation Materials³

C 1338 Test Method for Determining Fungi Resistance of Insulation Materials and Facings³

E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C⁴

E 970 Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Energy Heat Source⁴

G 1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens⁵

3. Terminology

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

4. Classification

4.1 The nodulated mineral fiber thermal insulation shall be of the following types and classes:

4.1.1 *Type I*—Pneumatic application.

4.1.2 *Type II*—Poured application.

5. Ordering Information

5.1 Both types of nodulated mineral fiber thermal insulation are intended for use as thermal insulation in open spaces, such as attics and enclosed spaces, such as walls, in housing and buildings at ambient temperatures. Type I is used for pneumatic application (blown or conveyed by an air stream through a hose and discharged over the area to be insulated). Type II is used for application by pouring in place.

6. Materials and Manufacture

6.1 *Basic Material*— The basic material shall be fibers made from mineral substances such as rock, slag, or glass processed from the molten state into an incombustible fibrous form.

6.2 *Manufacture*— The fibers shall be mechanically processed into nodules, and may be treated to provide improved processing and handling characteristics suitable for installation by pouring or pneumatic applications.

⁴ *Annual Book of ASTM Standards*, Vol 04.07.

⁵ *Annual Book of ASTM Standards*, Vol 03.02.

7. Physical Properties

7.1 *Thermal Characteristics*—The standard thermal resistance values normally recommended for open application are: 11, 19, 22, 30, and 38 (1.9, 2.3, 3.3, 3.9, 5.3, and 6.7) and are expressed in °F·h·ft²/Btu (K·m²/W). 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 12.2, 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.

7.2 *Critical Radiant Flux*—Mineral fiber loose fill when tested in accordance with 12.3 shall have a critical radiant flux-flame propagation resistance ≥ 0.12 W/cm² (.11 Btu/ft²·s).

7.3 *Combustion Characteristics*—Mineral fiber loose fill when tested in accordance with 12.4 shall not have a recorded temperature rise of more than 54°F (30°C); shall have no flaming after the first 30 s; and, if the specimen weight loss exceeds 50 % during the test, the recorded temperature of the specimen during the test shall not rise above the furnace air temperature at the beginning of the test, and there shall be no flaming of the specimen.

7.4 *Water Vapor Sorption*—The water vapor sorption of the insulation shall not be more than 5 % by weight when tested in accordance with 12.5.

7.5 *Odor Emission*—A detectable odor of objectionable nature recorded by more than two of the five panel members shall constitute rejection of the material when tested in accordance with 12.6.

7.6 *Corrosiveness*—When tested in accordance with 12.7, the metal plates that are in contact with the insulation shall show no corrosion greater than the comparative plates that are in contact with sterile cotton that has been tested in the same manner.

7.7 *Fungi Resistance*—When tested in accordance with 12.8, the insulation shall have growth no greater than that observed on the white birch tongue depressor comparative material.

8. Other Requirements

8.1 *Qualification Requirements*—The following requirements are generally emphasized for purposes of initial material product requirements:

- 8.1.1 Thermal resistance,
- 8.1.2 Critical radiant flux,
- 8.1.3 Combustion characteristics,
- 8.1.4 Water vapor sorption,
- 8.1.5 Odor emission, and
- 8.1.6 Corrosiveness.
- 8.1.7 Fungi Resistance

8.2 *Inspection Requirements*—The following requirements are generally emphasized for purposes of acceptance sampling of lots of qualified thermal insulation:

- 8.2.1 Minimum bag weight, and
- 8.2.2 Workmanship.

9. Workmanship

9.1 Mineral fiber nodulated insulation shall be free of

foreign materials and shall be clean and dry. The insulation shall not have visible defects that will adversely affect the service quality.

10. Significance and Use

10.1 This specification covers products that are used in buildings. While products that comply with this specification may be used in various constructions, they are adaptable primarily, but not exclusively, to wood frame constructions.

11. Sampling

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

12. Test Methods

12.1 *Density*—Prepare test samples in accordance with Test Method C 519. The density determined by Test Method C 519 shall be equal to or less than the design density of the manufacturer.

12.2 *Thermal Resistance*—Using samples prepared in accordance with 12.1 and adjusted to the design density, the thermal conductivity or thermal conductance shall be determined in accordance with Test Method C 518, Test Method C 177, or may be derived from measurements made by Test Method C 236. The mean temperature shall be 75°F (23.9°C) and the temperature difference shall be a minimum of 40°F (22°C). The thermal resistance shall then be calculated from the thermal conductance values using Practice C 687. See Note 1.

NOTE 1—The thermal resistance is a function of mean temperature. As an option, the thermal resistance may be determined at additional mean temperatures as agreed upon by the purchaser and the manufacturer.

12.3 *Critical Radiant Flux*—The critical radiant flux of the insulation shall be determined in accordance with Test Method E 970.

12.4 *Behavior of Materials in a Vertical Tube Furnace at 1382°F (750°C)*—The behavior of mineral fiber loose-fill insulation in a vertical tube furnace at 1382°F (750°C) shall be determined in accordance with Test Method E 136.

12.5 *Water Vapor Sorption*—The water vapor sorption of the test specimen shall be determined in accordance with Test Method C 1104/C 1104M.

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

12.7 *Corrosiveness:*

12.7.1 *Scope*—This test method provides a qualitative measure of the corrosiveness of mineral fiber insulation by comparison to a control.

12.7.2 *Summary of Test Method:*

12.7.2.1 Individually sandwich five each of specially cleaned steel, copper, and aluminum test plates between pieces of insulation. Hold the insulation uniformly against each side of the test plate with wire screens and rubber bands.

12.7.2.2 Sandwich an equal number of cleaned metal test plates between pieces of washed sterile cotton in an identical manner.

12.7.2.3 Vertically suspend the samples in a humidity test chamber at 95 ± 3 % relative humidity and temperature of 120