



Designation: **C991 – 08^{ε1} C991 – 15**

Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings¹

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^{ε1} NOTE — 6.1.2 was editorially updated in June 2008.

1. Scope

1.1 This specification covers the classification, composition, and physical properties of flexible fibrous glass insulation for use in metal building roofs and walls.

1.2 The basic insulation blanket is designed to be post-processed by a laminating process that applies an adhesive bonded facing.

1.3 The thermal values measured in accordance with this specification for both pre-processed and post-processed insulation are for the insulation only and do not include the effects of air-film surface resistance, changes in mean temperature, or compression of insulation at the framing members of the building, through metal conductance of fasteners and other parallel heat-transfer paths due to design or installation techniques.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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 requirements prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

C167 Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations

C168 Terminology Relating to Thermal Insulation

C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

C390 Practice for Sampling and Acceptance of Thermal Insulation Lots

C518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

C653 Guide for Determination of the Thermal Resistance of Low-Density Blanket-Type Mineral Fiber Insulation

C665 Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

C755 Practice for Selection of Water Vapor Retarders for Thermal Insulation

C1104/C1104M Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation

C1136 Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation

~~C1258 Test Method for Elevated Temperature and Humidity Resistance of Vapor Retarders for Insulation~~

C1304 Test Method for Assessing the Odor Emission of Thermal Insulation Materials

C1338 Test Method for Determining Fungi Resistance of Insulation Materials and Facings

E84 Test Method for Surface Burning Characteristics of Building Materials

E136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C

2.2 Other Referenced Document:

CAN/ULC-S102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies³

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

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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.

³ Available from Underwriters Laboratories (UL), 333 Pfingsten Rd., Northbrook, IL 60062-2096, <http://www.ul.com>.

3. Terminology

3.1 *Definitions*—For definitions of terms relating to insulation, refer to Terminology **C168**.

4. Classification

4.1 The flexible fibrous glass insulation is furnished in two types, as follows:

4.1.1 *Type I*—Glass processed from the molten state into fibrous form, bonded with a thermosetting resin, and formed into a blanket or batt.

4.1.2 *Type II*—Type I material supplied with a suitable facing adhered to one surface.

NOTE 1—Facing properties are not part of this specification. The designer is referred to Practice **C755** and Specification **C1136** for guidance in selecting water vapor permeance and other physical property requirements.

5. Ordering Information

5.1 Type I material shall be ordered by specifying thermal resistance value, length, and width.

5.2 Type II material shall be ordered by specifying thermal resistance value, type of facing, facing permeance, length, width, number of tabs, and tab width.

5.3 Certification, when required, shall be in accordance with Section **11**.

6. Physical Properties

6.1 *Type I Material*:

6.1.1 *Thermal Resistance*—The thermal resistance of the pre-processed insulation shall be determined in accordance with Guide **C653**. The average R-value from nine randomly selected specimens, three specimens from each of three rolls, shall not be less than 103 % of the R-value agreed upon by the purchaser and the supplier. Use Test Method requirements **C177** or **C518** at 75°F (23.9°C) with a minimum temperature difference of 40°F (20°C) for determining apparent thermal conductivity. Use the full roll method from Test Method **C167** to determine the average thickness for each roll and evaluate at the lesser of measured or label thickness.

6.1.1.1 *Thermal Resistance*—The average R-value of nine tests, one each performed on three randomly selected specimens from each of three rolls, shall be not less than 103 % of the R-value agreed upon by the purchaser and the supplier.

(1) The average thickness of each roll shall be determined by Test Method **C167** and the lesser of measured or labeled thickness tested.

(2) The thermal resistance of the pre-processed (unlaminated) insulation shall be determined in accordance with Guide **C653**, using either Test Method **C177** or **C518** at a mean temperature of 75°F (23.9°C) with a minimum temperature difference of 40°F (22°C) for determining the apparent thermal conductivity.

NOTE 2—See Guide **C653**. The thermal resistance is a function of temperature. As an option, the thermal resistance may be determined at additional temperatures as agreed upon by the purchaser and the manufacturer.

6.1.2 *Surface Burning Characteristics*—The surface burning characteristics shall be determined in accordance with Test Method **E84**. For Canada, test in accordance with Test Method CAN/ULC-S102. When the referenced Canadian document in this specification is referred to in applicable Canadian building codes, the editions, referenced by those building codes, shall govern. Results shall be no greater than:

Flame spread	25
Smoke developed	50

6.1.3 *Combustion Characteristics*—The material shall pass the requirements of Test Method **E136**.

6.1.4 *Water Vapor Sorption*—The water vapor sorption from exposure to water vapor shall not be greater than 0.2 % by volume when determined in accordance with the procedure set forth in Test Method **C1104/C1104M**.

6.1.5 *Fungi Resistance*—When tested in accordance with the procedure set forth in Test Method **C1338**, the insulation shall exhibit no growth.

6.1.6 *Corrosiveness*—When tested in accordance with the procedure in Specification **C665**, the metal plates in contact with the insulation shall show no greater corrosion than that observed on the comparative plates in contact with sterile cotton.

6.1.7 *Odor Emission*—When tested in accordance with Test Method **C1304**, the insulation shall not emit a detectable odor objectionable to more than two of the five panel members.

6.1.8 *Dimensional Tolerances*—The average measured length and width shall not differ from the manufacturer's standard dimensions, when determined in accordance with Test Methods **C167**, (Note 3) by more than the following:

Length, – 0 in. (–0 mm)
Width, – 1/8 in. (–3 mm)

NOTE 3—Normally, a slight excess in all dimensions will be permitted. However, the purchaser may elect to specify a maximum tolerance to meet further processing requirements.