



Designation: C 592 – 08

## Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type)<sup>1</sup>

This standard is issued under the fixed designation C 592; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification covers the composition, dimensions, and physical properties of metal-mesh covered mineral fiber (rock, slag, or glass) blanket and blanket-type pipe insulation (typically on 24 in. (610 mm) diameters or larger) for use on cooled surfaces at temperatures operating below ambient to 0°F (–18°C) and on heated surfaces operating at temperatures up to 1200°F (649°C). Specific applications outside the actual use temperatures shall be agreed upon between the manufacturer and purchaser.

1.2 For satisfactory performance, properly installed protective vapor retarders or barriers shall be used on below ambient temperature applications to reduce movement of moisture/water vapor through or around the insulation towards the colder surface. Failure to use a vapor retarder can lead to insulation and system damage. Refer to Practice C 921 to aid material selection. Although vapor retarder properties are not part of this specification, properties required in Specification C 1136 are pertinent to applications or performance.

1.3 The orientation of the fibers within the blanket is primarily parallel to the heated surface. This specification does not cover fabricated pipe and tank wrap insulation where the insulation has been cut and fabricated to provide fiber orientation that is perpendicular to the heated surface.

1.4 This standard does not purport to provide the performance requirements of hourly-rated fire systems. Consult the manufacturer for the appropriate system.

1.5 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.

1.6 *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:<sup>2</sup>

- C 167 Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations
- C 168 Terminology Relating to Thermal Insulation
- C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- C 356 Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat
- C 390 Practice for Sampling and Acceptance of Thermal Insulation Lots
- C 411 Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation
- C 447 Practice for Estimating the Maximum Use Temperature of Thermal Insulations
- C 518 Test Method for Steady-State 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 795 Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel
- C 680 Practice for Estimate of the Heat Gain or Loss and the Surface Temperatures of Insulated Flat, Cylindrical, and Spherical Systems by Use of Computer Programs
- C 921 Practice for Determining the Properties of Jacketing Materials for Thermal Insulation
- C 1045 Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions
- C 1058 Practice for Selecting Temperatures for Evaluating and Reporting Thermal Properties of Thermal Insulation
- 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

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- C 1136** Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation
- C 1304** Test Method for Assessing the Odor Emission of Thermal Insulation Materials
- C 1335** Test Method for Measuring Non-Fibrous Content of Man-Made Rock and Slag Mineral Fiber Insulation
- C 1338** Test Method for Determining Fungi Resistance of Insulation Materials and Facings
- E 84** Test Method for Surface Burning Characteristics of Building Materials
- E 136** Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C

2.2 *Other Document:*

**CAN/ULC-S102** Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies<sup>3</sup>

### 3. Terminology

3.1 Terminology **C 168** shall be the terms used in this specification.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *mean temperature*—the sum of the cold surface temperature and the hot surface temperature divided by two.

3.2.2 *metal-mesh covered blanket*—mineral fiber thermal insulation held together by metal-mesh facings on one or both sides with heat-resistant metal ties attached through the blanket from one face to the other.

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

3.2.3 *metal-mesh covered blanket-type pipe*—mineral fiber thermal insulation sized to fit around a large Nominal Pipe Size (NPS) and held together by metal-mesh facings on one or both sides with heat-resistant metal ties attached through the blanket from one face to the other.

### 4. Classification

4.1 Mineral fiber metal-mesh covered blanket insulation covered by this specification shall be classified into the three types shown in **Table 1**. The classification is based upon the maximum use temperature and apparent thermal conductivity.

### 5. Ordering Information

5.1 The type, dimensions, maximum use temperature, and facings for one or both sides shall be specified by the purchaser. A product certification shall be specified in the purchase order.

### 6. Materials and Manufacture

6.1 *Composition*—Mineral fiber metal-mesh covered blanket shall be composed of rock, slag, or glass processed from the molten state into fibrous form, bonded with or without an organic binder, and secured with metallic supporting facing(s). Asbestos shall not be used as an ingredient or component part of the product.

6.2 *Facings:*

6.2.1 Types of facings for one or both sides of blanket units shall be specified. When both sides are to be faced, units are permitted to have the same or different types on the two sides. (**Warning**—The user of this specification is advised that the

**TABLE 1 Physical Requirements**

Properties	Type I	Type II	Type III
Maximum use temperature °F (°C) (see 6.2.1) (Excluding metal-mesh facings and metal tie wires/stitching)	850 (454)	1200 (649)	1200 (649)
Apparent Thermal Conductivity <sup>A</sup> (Excluding metal-mesh facings and metal tie wires/stitching) max Btu, in./h ft <sup>2</sup> °F (W/m K)			
Mean Temperature, °F (°C)			
25 (−4)	0.21 (0.030)	0.21 (0.030)	0.23 (0.033)
75 (24)	0.25 (0.036)	0.25 (0.036)	0.24 (0.035)
100 (38)	0.27 (0.039)	0.27 (0.039)	0.26 (0.038)
200 (93)	0.34 (0.049)	0.34 (0.049)	0.31 (0.045)
300 (149)	0.43 (0.062)	0.42 (0.060)	0.37 (0.053)
400 (204)	0.55 (0.079)	0.53 (0.076)	0.44 (0.063)
500 (260)	0.70 (0.101)	0.64 (0.092)	0.52 (0.075)
600 (316)		0.75 (0.108)	0.60 (0.087)
700 (371)		0.86 (0.124)	0.70 (0.101)
Linear Shrinkage, max % at maximum use temperature	4.0	4.0	4.0
Water Vapor Sorption, <sup>B</sup> max % by weight	5.0	5.0	1.25
Surface Burning Characteristics			
Maximum-flame spread index	25	25	25
Maximum smoke developed index	50	50	50
Density maximum, <sup>C</sup> lb/ft <sup>3</sup> (kg/m <sup>3</sup> )	10 (160)	12 (192)	8 (128)

<sup>A</sup> Values for apparent thermal conductivity are for insulation and do not include mesh and wire through insulation thickness. Therefore, Practice **C 680** or other heat loss analysis using these data are not possible without accounting for heat losses through attaching media.

<sup>B</sup> Some water sorption characteristics will change after the product is subjected to elevated temperatures within normal service conditions.

<sup>C</sup> The maximum density specified is for the weight design purpose only and includes weight for the facings. Additional density requirements including the density for the blanket without facing(s) are permitted to be specified by agreement between the purchaser and the manufacturer or seller.