



Designation: **C892 – 10 C892 – 17**

Standard Specification for High-Temperature Fiber Blanket Thermal Insulation¹

This standard is issued under the fixed designation C892; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This specification covers high-temperature fiber blanket thermal insulation for use from ambient up to 3000°F (1649°C).

~~1.2 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.~~

1.2 When the potential exists that the installation or use of thermal insulation materials, accessories, and systems will pose safety or health problems, the manufacturers shall provide the user with appropriate current information regarding any known problems associated with the recommended use of the products, and shall also recommend protective measures to be employed in their safe utilization. The user shall establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.

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

~~1.4 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.~~

~~1.5 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.~~

2. Referenced Documents

2.1 *ASTM Standards:*²

[C71 Terminology Relating to Refractories](#)

[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](#)

[C201 Test Method for Thermal Conductivity of Refractories](#)

[C209 Test Methods for Cellulosic Fiber Insulating Board](#)

[C356 Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat](#)

[C390 Practice for Sampling and Acceptance of Thermal Insulation Lots](#)

[C411 Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation](#)

[C447 Practice for Estimating the Maximum Use Temperature of Thermal Insulations](#)

[C665 Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing](#)

[C680 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](#)

[C795 Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel](#)

[C1045 Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions](#)

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.

- [C1058 Practice for Selecting Temperatures for Evaluating and Reporting Thermal Properties of Thermal Insulation](#)
- [C1101/C1101M Test Methods for Classifying the Flexibility or Rigidity of Mineral Fiber Blanket and Board Insulation](#)
- [C1104/C1104M Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation](#)
- [C1335 Test Method for Measuring Non-Fibrous Content of Man-Made Rock and Slag Mineral Fiber Insulation](#)

3. Terminology

- 3.1 *Definitions*—Terminology [C71](#) and Terminology [C168](#) shall be considered as applying to the terms used in this standard.
- 3.2 *Definitions of Terms Specific to This Standard:*
 - 3.2.1 *fibers*—the fibers shall be refractory oxides, processed from a molten state into fibrous form.
 - 3.2.2 *high-temperature fiber thermal insulation*— a thermal insulation, varying in flexibility, composed of refractory inorganic fibers, with or without binder added, and furnished in either flat sheets or rolls.

4. Classification

- 4.1 The general-type product governed by this specification is blanket or batt composed of inorganic refractory fibers.
- 4.2 *Types*—The product is separated into types based upon temperatures of use ([Table 1](#)).
- 4.3 *Grades*—The product is separated into grades based upon its maximum Apparent Thermal Conductivity values (see [Table 2](#)) and minimum Tensile Strength values (see [Table 3](#)).

5. Ordering Information

- 5.1 High-temperature fiber blanket thermal insulation is normally purchased on the basis of brand name, type, grade, length, width, thickness, and total square footage as specified in the purchase order.
- 5.2 The type and grade for the intended service shall be as specified by the user with the assistance of the supplier where desirable.
- 5.3 The purchaser shall be permitted to specify, inspect and sample the material.
- 5.4 When a certification or test report, or both, is required, this shall be specified by the purchaser.

6. Materials and Manufacture

6.1 *Composition*—High temperature fiber thermal insulation shall be composed of fibers, made of metallic oxides of, but not limited to, silicon, aluminum, calcium, and magnesium. The raw materials, processed from the molten state into spun fibers, are then mechanically interlocked through a needling process into insulation blanket felts with out the use of chemical binders.

7. Physical and Mechanical, and Chemical Properties Requirements

- 7.1 *Apparent Thermal Conductivity* shall conform to the requirements of [Table 2](#) when tested in accordance with [11.1.2](#).
- 7.2 *Tensile Strength*—shall conform to the requirements of [Table 3](#) when tested in accordance with [11.1.5](#).
- 7.3 *Flexibility*—shall be classified as flexible when tested in accordance with [11.1.8](#).
- 7.4 *Maximum Use Temperature*—shall conform to the requirements of [4.2](#) when tested in accordance with [11.1.4](#).
- 7.5 *Non-fibrous content (shot)*—shall be limited to a maximum of 30% by weight when testing in accordance with [11.1.3](#).
- 7.6 *Linear Shrinkage*—shall be limited to a maximum of 5%, after exposure to the Maximum Use Temperature, in accordance with [11.1.4](#).

8. Dimensions, Mass, and Permissible Variations

- 8.1 Rolls or flat sheets of blanket are normally furnished in standard dimensions as shown in [Table 4](#), [Table 5](#), and [Table 6](#).
- 8.2 The standard length, width, and thickness combinations available are a function of the type and grade. Contact the supplier for information on standard or non-standard dimension and combinations.

TABLE 1 Classification by Type

Type	Temperature of use, °F (°C), maximum
I	1350 (732)
II	1600 (871)
IIA	2000 (1093)
III	2300 (1260)
IV	2600 (1427)
V	3000 (1649)

TABLE 2 Apparent Thermal Conductivity, maximum Btu in./h-ft²-F (W/m-K) at Mean Temperature, Temperature, °F (°C)

Grade	75 (24)	200 (93)	400 (204)	800 (427)	1200 (649)	1600 (871)	2000 (1093)
3	0.52 (0.075)	0.56 (0.081)	0.73 (.105)	1.32 (.190)	2.42 (.348)	4.05 (.583)	5.94 (.855)
4	0.50 (0.072)	0.54 (0.078)	0.68 (.098)	1.13 (.163)	2.15 (.349)	3.53 (.508)	5.47 (.787)
6	0.42 (0.060)	0.47 (0.068)	0.59 (.086)	1.03 (.149)	1.91 (.276)	3.06 (.440)	4.75 (.604)
8	0.41 (0.059)	0.46 (0.066)	0.56 (.081)	1.01 (.146)	1.67 (.241)	2.60 (.374)	4.18 (.682)
10	0.40 (0.058)	0.45 (0.065)	0.55 (.079)	0.98 (.141)	1.61 (.231)	2.31 (.333)	3.63 (.523)
12	0.37 (0.053)	0.43 (0.062)	0.53 (0.076)	0.96 (.138)	1.43 (.206)	2.11 (.304)	3.14 (.451)

TABLE 3 Tensile Strength, Minimum

Grade	Tensile Strength, lb/in. ² (KPa)
3	1.0 (6.9)
4	1.5 (10.3)
6	2.0 (13.8)
8	3.0 (20.7)
10	4.0 (27.6)
12	5.0 (34.5)

TABLE 4 Density, Maximum and Minimum

Grade	Minimum Density, lbs/ft. ³ (kg/m ³) ^A	Maximum Density, lbs/ft. ³ (kg/m ³) ^B
3	2.5 (41)	4 (64)
4	3.4 (54)	5.5 (88)
6	5.1 (82)	8 (128)
8	6.8 (109)	10.5 (168)
10	8.5 (136)	13 (208)
12	10.2 (163)	16 (256)

^A Minimum density limitations is for the purpose of maintaining structural properties.

^B Maximum density limitations are for the purpose of providing design information for stress analyses of pipe and equipment.

TABLE 5 Thickness Dimensions

Thickness, in. (mm)	Tolerance
1/16 (1.6)	+ 1/32, -1/64 in. (+0.8, -0.4mm)
1/8 (3.2)	+ 1/16, -1/32 in. (+1.6, -0.8mm)
3/16 (4.8)	+ 3/32, -3/64 in. (+2.4, -1.2mm)
1/4 (6.4)	+1/4, -1/8 in. (+6.4, -3.2 mm)
3/8 (9.5)	+3/8, -1/8 in. (+9.5, -3.2 mm)
1/2 (12.7)	+1/2, -1/8 in. (+12.7, -3.2 mm)
3/4 (19.1)	+3/4, -1/8 in. (+19.1, -3.2 mm)
1 (25.4)	+3/4, -1/8 in. (+19.1, -3.2 mm)
1 1/2 (38.1)	+3/4, -1/8 in. (+19.1, -3.2 mm)
2 (51.0)	+3/4, -1/4 in. (+19.6, -6.4 mm)

TABLE 6 Width Dimensions

Width, in. (mm)	Tolerance, %
12 (305)	-2, +10
18 (457)	-2, +10
24 (610)	-2, +10
36 (914)	-2, +10
39 (991)	-2, +10
42 (1067)	-2, +10
48 (1219)	-2, +10
72 (1829)	-2, +10

8.3 The maximum density (determined in accordance with Test Method C167) specified in Table 4 for Grades 3, 4, 6, 8, 10, and 12 are for weight design purposes only.

9. Workmanship, Finish, and Appearance

9.1 The insulation shall indicate good workmanship in fabrication by a uniform appearance, shall not have visible defects such as tears and holes that will adversely affect the service quality, and shall be free from foreign materials.