



Designation: ~~C449/C449M-00~~ Designation: C 449 – 07

Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement¹

This standard is issued under the fixed designation ~~C449/C449M~~; C 449; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

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

1. Scope

1.1 This specification covers mineral fiber (rock or slag) insulating and finishing cement shipped in dry-mix form, including hydraulic-setting binder, which, when mixed with water and applied in accordance with the manufacturer's directions, affords a smooth surface as a final finish for heated surfaces up to 1200 °F (649 °C) for specific applications. The actual temperature limit shall be agreed upon between the purchaser and the manufacturer.

NOTE 1—Precautionary measures should be taken with this material as with other hydraulic-setting mixtures. This material should be used within the time period recommended by the manufacturer.

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

1.2 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.

1.3 The following safety hazards caveat pertains only to the test method (Section 10) described in this specification: *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.*

1.4 When the installation or use of thermal insulation materials, accessories, and systems may pose safety or health problems, the manufacturer shall provide the user with appropriate current information regarding any known problems associated with the recommended use of the company's 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.

2. Referenced Documents

2.1 *ASTM Standards:*²

C 163 Practice for Mixing Thermal Insulating Cement Samples

C 166 Test Method for Covering Capacity and Volume Change Upon Drying of Thermal Insulating Cement

~~C 168 Terminology Relating to Thermal Insulating Materials²~~ 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 Apparatus²~~

~~C 354 Test Method for Compressive Strength of Thermal Insulating or Finishing Cement²~~ 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 Criteria for Sampling and Acceptance of Preformed Thermal Insulation Lots²~~

~~C 405 Practice for Estimating Consistency of Wet-Mixed Thermal Insulating Cement²~~ Practice for Sampling and Acceptance of Thermal Insulation Lots

C 411 Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation

~~C 518 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus~~

¹ This specification is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.20 on Homogeneous Inorganic Thermal Insulations.

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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*, Vol 04.06, volume information, refer to the standard's Document Summary page on the ASTM website.

- C 795 Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel
- ~~C 1045 Practice for Calculating Thermal Transmission Properties from Steady-State Heat Flux Measurements²~~ Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions
- C 1058 Practice for Selecting Temperatures for ~~Reporting~~Evaluating and ~~Evaluating~~Reporting Thermal Properties of Thermal Insulation
- C 1114 Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus
- E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at ~~750°C~~750C

3. Terminology

3.1 *Definitions*—Definitions found in Terminology C 168 shall be considered as applying to the terms used in this specification.

4. Materials and Manufacture

- 4.1 Mineral fiber insulating and finishing cement shall be composed of mineral fiber and suitable inorganic fillers, premixed with a hydraulic setting binder such that when mixed with clean, fresh water, the cement will attain its initial set in approximately 2 to 4 h as usually applied.
- 4.2 The mineral fiber shall consist of rock or slag or glass processed from a molten state into fibrous form.
- 4.3 Asbestos shall not be used as an ingredient or component part in the manufacture of this product.
- 4.4 Ceramic fiber shall not be used as an ingredient or component part in the manufacture of this product. ~~Note 2—~~
Caution: Warning—In the presence of moisture or water, a hydraulic-setting binder, usually portland cement, will chemically react with aluminum-containing materials such as aluminum lagging and powdered aluminum pigmented paints or coatings.

5. Other Requirements

- 5.1 ~~The cement shall conform to the requirements given in Table 1. Conformance shall be based on results of tests on specimens first mixed with water according to the ratio for proper troweling consistency determined in accordance with Practice C405.~~ Conformance shall be based on results of tests on specimens prepared in accordance with 9.1.
- 5.2 *Maximum Use Temperature*—When tested in accordance with ~~paragraph 10.6~~10.5, the dried cement shall not warp, flame, or glow during hot surface exposure. No evidence of melting or fiber degradation shall be evident upon post-test inspection.
- 5.3 *Non-combustibility*—When tested in accordance with ~~paragraph 10.7,~~ the dried cement specimen, using 9.2, shall not exceed the recorded temperature rise more than 54°F (30°C) with no flaming or weight loss exceeding 5%.—When tested in accordance with 10.6, the dried cement specimen, shall conform to the requirements of Test Method E 136 .
- 5.4 When the cement is to be used in contact with austenitic stainless steel, distilled or demineralized water shall be used for mixing. The cured and dried product, processed in accordance with Section 9 on Specimen Preparation, shall conform to the requirements of Specification C 795.

6. Qualification Requirements

- 6.1 The following requirements are employed for purposes of initial material or product qualifications:
 - 6.1.1 Dry covering capacity.
 - 6.1.2 Volume change upon drying.
 - 6.1.3 Compressive strength.

TABLE 1 Physical Requirements

~~NOTE 1—Conformance to these physical requirements shall be based on the average of the results of tests on specimens prepared in accordance with Section 9.~~

Dry covering capacity min ft ² @ 1 in. thickness per 100 lb of dry cement (m ² @ 1 cm thickness per 100 kg of dry cement)	24 (12.5)
Volume change (shrinkage) upon drying, max %	10.0
Compressive strength at 5 % deformation, min psi (kPa)	100 (689.5)
Linear shrinkage (length) after 24 h heat soak at 1200°F (649°C), max %	5.0
Apparent thermal conductivity, max Btu·in./h·ft ² ·°F (W/m·K):	
Mean temperature° F (°C),	
—75 (24)	0.60 (0.087)
75 (24)	0.95 (0.137)
—200 (93)	0.90 (0.130)
200 (93)	1.00 (0.144)
—400 (204)	1.15 (0.166)
400 (204)	1.10 (0.159)
—600 (316)	1.1 (0.159)
600 (316)	1.30 (0.188)