AEROSPACE MATERIAL SPECIFICATION

AMS3680	REV. D

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Superseding AMS3680C

Insulation, Thermal Silica Fiber

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE AMS P Polymeric Materials Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. SCOPE:

1.1 Form:

This specification covers a silica fiber insulation in the form of felted pads, flat or in rolls, as ordered.

1.2 Application:

This insulation has been used typically as a component of heat-insulating blankets for turbine engine tail-pipes and tail cones for service up to 2000 °F (1093 °C), but usage is not limited to such applications.

1.3 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM C 167 Thickness and Density of Blanket or Batt Thermal Insulations

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-2073-1 DOD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Material and Fabrication:

The product shall be composed of fired, high-silica-content fibers felted into a pad of substantially uniform thickness and density.

3.2 Properties:

The product, as received, shall conform to requirements shown in Table 1, 3.2.6, and 3.2.7; tests shall be conducted on the product supplied and in accordance with specified test procedures, insofar as practicable.

TABLE 1 - Properties

Paragraph	Property	Requirement	Test Method
3.2.1	Thickness, minimum	0.100 inch (2.54 mm)	ASTM C 167
3.2.2	Density	5.5 pounds per cubic foot ± 1.0 (88 kg/m^3 ± 16)	ASTM C 167
3.2.3	Shrinkage After Heating, maximum	2%	4.5.1
3.2.4	Breaking Strength		4.5.2
3.2.4.1	As Received	No rupture	
3.2.4.2	Following “Shrinkage after Heating”	No rupture	
3.2.5	Embrittlement	No separation	4.5.3

3.2.6 Thermal Conductance: When specified, the product shall have thermal conductance acceptable to purchaser, determined by a procedure agreed upon by purchaser and vendor.

3.2.7 Corrosion: The product shall not have a corrosive or deleterious effect on other materials when exposed to conditions normally encountered in service. Discoloration of metal shall not be considered objectionable. Method of test and standards for acceptance shall be as agreed upon by purchaser and vendor.

3.3 Quality:

Insulation, as received by purchaser, shall be uniform in quality and condition, and free from foreign materials and from imperfections detrimental to usage of the insulation. Slight gray or black discoloration shall not be considered objectionable.

3.4 Sizes:

Flat pads and rolls shall be supplied in widths of not less than 36 inches (0.9 m) and lengths of not less than 72 inches (1.8 m). Rolls may be composed of pieces, but no piece shall be less than 72 inches (1.8 m) long.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of the product shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for thickness (3.2.1), density (3.2.2), shrinkage after heating (3.2.3), and quality (3.3) are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of the product to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling and Testing:

Sufficient insulation shall be selected at random from each lot to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.1 A lot shall be all insulation produced in a single production run from the same batch of raw materials under the same fixed conditions and presented for vendor's inspection at one time.

4.3.2 Specimens for density determinations shall be of the thickness ordered and not less than 18 square feet (1.7 m^2) in area.

4.4 Approval:

4.4.1 Sample insulation shall be approved by purchaser before insulation for production use is supplied, unless such approval be waived by purchaser. Results of tests on production insulation shall be essentially equivalent to those on the approved samples.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production insulation which are essentially the same as those used on the approved sample. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample insulation. Production insulation made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Shrinkage after Heating: Support a 1 x 12 inch (25 x 305 mm) specimen in the as-received thickness in a horizontal position and heat at 2050 °F ± 50 (1121 °C ± 28) for not less than four hours. Measure the length of the specimen at room temperature before and after heating.

4.5.2 Breaking Strength: Suspend a 1 x 12 inch (25 x 305 mm) specimen in the as-received thickness in a vertical position. Attach a mass of 9 grams for each 0.100 inch (2.54 mm) of thickness to the lower end of the specimen. Allow the weight to hang free for at least 60 seconds.

4.5.3 Embrittlement: Heat a 0.5 x 3.0 inch (13 x 76 mm) specimen in the as-received thickness at 2050 °F ± 50 (1121 °C ± 28) for not less than one hour. Cool to room temperature and bend the specimen 180 degrees around a rod having a diameter of 0.250 inch (6.35 mm) for each 0.100 inch (2.54 mm) of thickness.

4.6 Reports:

The vendor of the insulation shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the insulation conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 3680D, vendor's material designation, date of manufacture, and quantity.

4.7 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented. Results of all tests shall be reported.