Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3680A
Superseding AMS 3680

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INSULATION, THERMAL
Silica Fiber

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: Primarily for use as a component of heat-insulating blankets for turbine engine tailpipes and tail cones for service at temperatures up to 2000° F or 1100° C.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

ASTM C167 - Thickness and Density of Blanket- or Batt-Type Thermal Insulating Materials

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 the following requirements; tests shall be conducted on the product supplied and in accordance with the specified test procedures insofar as practicable:

3.2.1 Thickness, min	0.100 in. (2.54 mm)	ASTM C167
3.2.2 Density	5.5 lb per cu ft ± 1.0 (88 (kg/m^3) ± 16)	ASTM C167
3.2.3 Shrinkage After Heating, max	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 the 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.

3.3 Quality: The product shall be uniform in quality and condition, clean, and free from foreign materials and from imperfections detrimental to fabrication, appearance, or performance of parts. Slight gray or black discoloration shall not be considered objectionable.

3.4 Sizes: Unless otherwise specified, flat pads and rolls shall be supplied in widths of not less than 36 in. or 1 m and lengths of not less than 72 in. or 2 metres. Rolls may be composed of pieces, but no piece shall be less than 72 in. or 2 m long.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to thickness (3.2.1), density (3.2.2), shrinkage after heating (3.2.3), and quality (3.3) are classified as acceptance or routine control tests.

4.2.2 Qualification Tests: Tests to determine conformance to all technical requirements of this specification are classified as qualification or periodic control tests and may be the basis for approval (4.4) of the product (See 4.4.1).

4.3 Sampling: Sufficient material shall be taken at random from each lot to perform all required tests in triplicate.

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

4.3.2 Specimens for density determinations shall be of the thickness ordered and not less than 18 sq ft or 2 m^2 in area.

4.4 Approval:

4.4.1 Sample material shall be approved by purchaser before material for production use is supplied, unless such approval be waived. Results of tests on production material 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 material which are essentially the same as those on the approved sample material. If any change is necessary in ingredients, in type of equipment for processing, or in manufacturing procedures which could affect quality or properties of the material, vendor shall submit for reapproval a statement of the revised materials and processing and, when requested, sample revised material. No production material made by the revised procedure shall be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Shrinkage after Heating: Support a 1 x 12 in. or 25 x 300 mm specimen in the as-received thickness in a horizontal position and heat at 2050° F ± 50 or 1120° C ± 25 for not less than 4 hours. Measure the length of the specimen at room temperature before and after heating.

4.5.2 Breaking Strength: Suspend a 1 x 12 in. or 25 x 300 mm specimen in the as-received thickness in a vertical position. Attach a mass of 9 g for each 0.100 in. (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 in. or 15 x 75 mm specimen in the as-received thickness at 2050° F ± 50 or 1120° C ± 25 for not less than 1 hour. Cool to room temperature and bend the specimen 180 deg (3.14 rad) around a rod having a diameter of 0.250 in. (6.35 mm) for each 0.100 in. (2.54 mm) of thickness.

4.6 Reports:

4.6.1 The vendor of the product shall furnish with each shipment three copies of a report showing the results of tests made on the product to determine conformance to the acceptance test requirements of this specification and a statement that the product conforms to all other technical requirements. This report shall include the purchase order number, material specification number and its revision letter, vendor's material designation, date of manufacture, lot number, and quantity.

4.6.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, supplier's material designation, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

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 and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Each roll, pad, or package shall be clearly marked with a label or tag suitably attached to give the following information:

INSULATION, THERMAL, Silica Fiber
AMS 3680A
PURCHASE ORDER NUMBER _____
MANUFACTURER'S MATERIAL DESIGNATION_____
LOT NUMBER_____
SIZE AND NUMBER OF PIECES_____