



AEROSPACE MATERIAL SPECIFICATION

AMS3709™

REV. D

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Superseding AMS3709C

Syntactic Foam Tiles

RATIONALE

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

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1. SCOPE:

- 1.1 Form: This specification covers dielectrically-loaded syntactic foam tiles having a polyimide resin matrix.
- 1.2 Application: Primarily as a controlled-dielectric core material for applications requiring long-term heat resistance up to 315°C (600°F).
- 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 latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 3619 - Resin, Polyimide, Laminating, High Temperature Resistant,
315°C (600°F)
AMS 3751 - Microspheres, Hollow Glass

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

ASTM C271 - Density of Core Materials for Structural Sandwich Constructions
ASTM D2520 - Complex Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials at Microwave Frequencies and Temperatures to 1650°C
ASTM D2841 - Sampling Hollow Microspheres

- 2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

- 2.3.1 Federal Specifications:

0-A-551 - Acetone, Technical

- 2.3.2 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

- 3.7 Material: Tiles shall be composed of the following materials in the proportions specified:

Component	Parts by Weight
Hollow Glass Microspheres, AMS 3751, Class 15	100
Polyimide Resin Solution, AMS 3619	140
Glass Fibers, 0.25 in. (6 mm) (See 8.3)	7.2
Aluminum Powder (See 8.3)	15-16
Acetone, Technical, 0-A-51	85

- 3.2 Fabrication: Tiles shall be fabricated as follows; drying, curing, and post-curing temperatures and vacuum readings shall be continuously monitored and recorded. All equipment and thermocouples used shall be calibrated at regular intervals.

- 3.2.1 Mold Preparation: The foam tile mold surfaces shall be coated with a fluorocarbon mold-release material.

- 3.2.2 Foam Mixing: Each component of the foam formulation in 3.1 shall be weighed to the nearest gram. The resin and acetone shall be combined in a slow-speed, low-shear mixer and mixed thoroughly. While mixing, the other components shall be sprinkled slowly into the resin-acetone solution in the following order; the glass fibers, the aluminum powder, and the microspheres (taken in accordance with ASTM D2841), with thorough mixing after each addition. Mixing shall be continued for not less than 5 min. after adding the final component.

- 3.2.3 Mold Packing: The foam mixture shall be evenly packed into the release-coated moldes to the specified depth for the applicable tile design.