SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS3725 REV. B

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Superseding AMS3725A

Core, Polyurethane Foam (Polyether) Rigid, Cellular

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 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 and its supplementary detail specifications cover rigid, cellular polyurethane or polyisocyanurate (polyether only) foam in the form of board or block.

1.2 Application: Primarily for insulating core material in metal-faced sandwich construction for use from -55° to 70°C (-65° to 160°F).

1.3 Classification: This product shall be classified by density as shown in the detail specifications.

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 SAE, 400 Commonwealth Drive, Warrendale, PA 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, PA 19103.

ASTM C177 - Steady-State Thermal Transmission Properties by Means of the Guarded Hot Plate
ASTM C203 - Breaking Load and Calculated Flexural Strength of Preformed Block-Type Thermal Insulation
ASTM C273 - Shear Test in Flatwise Plane of Flat Sandwich Constructions or Sandwich Cores
ASTM D1621 - Compressive Properties of Rigid Cellular Plastics
ASTM D1622 - Apparent Density of Rigid Cellular Plastics
ASTM D1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
ASTM D2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging
ASTM D2842 - Water Absorption of Rigid Cellular Plastics
ASTM F501 - Aerospace Materials Response to Flame, with Vertical Test Specimen (for Aerospace Vehicles Standard Conditions)

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19102.

2.3.1 Military Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Detail Specifications: The requirements for a specific material shall consist of all the requirements specified herein in addition to the requirements specified in the applicable detail specification. In case of conflict between the requirements of this basic specification and an applicable detail specification, the requirements of the detail specification shall govern.

3.2 Material: Shall be a rigid polyurethane or polyisocyanurate foam, formed from polyisocyanates and polyhydroxy compounds (polyether only) and expanded with suitable blowing agents.

3.3 Properties: Core shall conform to the requirements specified in the detail specifications, determined in accordance with methods specified in 4.5.

3.4 Quality: The product, as received by purchaser, shall be uniform in quality and condition, free from foreign materials, large voids, internal and external imperfections, contaminants, or seams detrimental to usage of the product.

3.5 Tolerances: Unless otherwise specified, tolerances shall conform to the following:

3.5.1 Length: Shall be ±1/16 in./ft (±5 mm/m) with a total of 1/4 in. (6.25 mm).

3.5.2 Width: Shall be ±1/16 in./ft (±5 mm/m) with a total of 1/8 in. (3 mm).

3.5.3 Thickness: Shall be ±1/32 in. (±0.8 mm) for core up to 2 in. (50 mm) thick: ±1/16 in. (±1.5 mm) for core over 2 in. (50 mm).

3.5.4 Edges: Shall be square within ±2 degrees.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the core shall supply all samples for vendor's tests 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 sample and to perform any confirmatory testing deemed necessary to ensure that the core conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to the following requirements are classified as acceptance tests and shall be performed on each lot:

Requirement	Paragraph Reference
Density	See Detail Specification
Compressive Strength	See Detail Specification
Shear Strength	See Detail Specification
Flexural Strength	See Detail Specification
Quality	3.4
Tolerances	3.5

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification and the applicable detail specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of core to a purchaser, when a change in material or processing, or both, 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, the contracting officer, or the request for procurement.

4.3 Sampling:

4.3.1 For Acceptance Tests: Sufficient core shall be taken 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.

4.3.1.1 A lot shall not exceed 20,000 lb (9070 kg) or 120,000 board feet (283 m^3) of core but may be packaged in smaller quantities and delivered under a basic lot approval provided the lot identification is maintained.

4.3.1.2 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6 shall state that such plan was used.

4.3.2 For Preproduction Tests: Shall be as agreed upon by purchaser and vendor.

4.4 Approval:

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

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production core which are essentially the same as those used on the approved sample core. 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 material or processing, or both, and, when requested, sample core. Production core made by the revised process shall not be shipped prior to receipt of reapproval.

4.5 Test Methods: Shall be in accordance with the following:

Requirement	Test Method
Density	ASTM D1622
Thermal Conductivity	4.5.1
Water Absorption	ASTM D2842
Flame Resistance	ASTM F501
Compressive Strength	ASTM D1621
Tensile Strength	ASTM D1623
Shear Strength	ASTM C273
Flexural Strength	ASTM C203
Dimensional Stability	ASTM D2126

4.5.1 Thermal Conductivity: Shall be determined in accordance with ASTM C177 at -18°C, 10°C, 38°C, and 66°C (0°F, 50°F, 100°F, and 150°F) after conditioning for 12 days at 32°C (90°F) and 90% relative humidity. Thermal conductivity shall be measured parallel to the rise of the foam. It shall be determined and reported along each major area.

4.6 Reports:

4.6.1 The vendor of core shall furnish with each shipment three copies of a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the core conforms to the other technical requirements of this specification. This report shall include the purchase order number, AMS 3725B and the applicable detail specification number, vendor's material designation, quantity, and block or lot number.

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, AMS 3725B and the applicable detail specification number, contractor or other direct supplier of core, supplier's material designation, part number, and quantity. When core for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of core to determine conformance to the requirements of this specification and shall include in the report either a statement that the core conforms or 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 core may be based on the results of testing three additional specimens, cut from the same block, for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the core represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 The core shall be packaged to prevent physical damage during shipment and handling and shall be shipped flat unless contoured or formed shapes, requiring special support, are ordered.