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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE | AMS 3870D

Issued 15 JAN 1961
Revised 1 JAN 1993

Superseding AMS 3870C

Submitted for recognition as an American National Standard

CERAMIC MOLDINGS AND EXTRUSIONS
Dense, Ultra-High Alumina (99% Al_2O_3)

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of July, 1992. It is recommended, therefore, that this specification not be specified for new designs.

This cover sheet should be attached to revision "C" of the subject specification.

"NONCURRENT" refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these "NONCURRENT" specifications is available from SAE upon request.

PREPARED UNDER THE JURISDICTION OF AHS COMMITTEE "CP".

AN AMERICAN NATIONAL STANDARD

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AEROSPACE MATERIAL SPECIFICATION

AMS 3870C
Superseding AMS 3870B

Issued l-15-61
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CERAMIC MOLDINGS AND EXTRUSIONS
Dense, Ultra-High Alumina (99% Al_2O_3)

1. SCOPE:

1.1 Form: This specification covers dense, ultra-high alumina in the form of moldings and extrusions.

1.2 Application: Primarily for high-temperature, low-electrical-loss radomes, microwave windows, and spacers.

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

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

ASTM C373 - Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products
ASTM D116 - Testing Vitrified Ceramic Materials for Electrical Applications
ASTM D150 - A-C Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials
ASTM D256 - Impact Resistance of Plastics and Electrical Insulating Materials

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

2.3.1 Military Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be a vitrified ceramic containing not less than 99% alumina (Al_2O_3).

3.1.1 Color: Shall be predominantly white.

3.1.2 Metallizing: When specified, the product shall be receptive to being metallized in accordance with procedures and requirements agreed upon by purchaser and vendor.

3.2 Properties: The product shall conform to the following requirements; tests shall be performed at 20° - 30°C (70° - 85°F), unless otherwise specified, on the product supplied and in accordance with specified ASTM methods:

3.2.1 Compressive Strength, min	250,000 psi (1725 MPa)	ASTM D116
3.2.2 Flexural Strength, min	40,000 psi (275 MPa)	ASTM D116
3.2.3 Impact Strength (1/2 in. (12.5 mm) diameter rod), min	7.0 in.-lb (0.790 N.m)	ASTM D256
3.2.4 Specific Gravity, min	3.8	ASTM C373
3.2.5 Water Absorption, max	0.015%	ASTM D116
3.2.6 Dielectric Strength, 1/4 in. (6.2 mm) diameter electrodes, average, min	260 V per mil (10.2 kV/mm)	ASTM D116
3.2.7 Dielectric Constant at 1 MHz, max	9.5	ASTM D150
3.2.8 Loss Factor, max		ASTM D150
At 1 MHz	0.005	
At 10 GHz	0.002	
At 10 GHz at 500°C ± 5 (930°F ± 10)	0.003	

3.3 Quality: The product, as received by purchaser, shall be uniform in quality and condition and free from foreign materials and from imperfections detrimental to usage of the product.

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. Results of such tests shall be reported to the purchaser as required by 4.5. 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 to determine conformance to requirements for flexural strength (3.2.2), specific gravity (3.2.4), water absorption (3.2.5), and dielectric strength (3.2.6) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of the product 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: Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient product 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 be all product from a single production run made from the same batch of raw materials under the same fixed conditions and presented for vendor's inspection at one time.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

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 by purchaser. Results of tests on production material shall be essentially equivalent to those on the approved sample.