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AMERICAN SOCIETY FOR TESTING AND MATERIALS  
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## **Standard Specification for Alumina Ceramics for Electrical and Electronic Applications<sup>1</sup>**

This standard is issued under the fixed designation D 2442; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

### **1. Scope**

1.1 This specification covers the requirements for fabricated alumina parts suitable for electronic and electrical applications and ceramic-to-metal seals as used in electron devices. This standard specifies limits and methods of test for electrical, mechanical, thermal, and general properties of the bodies used for these fabricated parts, regardless of part geometry.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

### **2. Referenced Documents**

#### *2.1 ASTM Standards:*

- C 20 Test Methods for Apparent Porosity, Water Absorption, Apparent Specific Gravity, and Bulk Density of Burned Refractory Brick and Shapes by Boiling Water<sup>2</sup>
- C 108 Symbols for Heat Transmission<sup>2</sup>
- C 242 Terminology of Ceramic Whitewares and Related Products<sup>3</sup>
- C 408 Test Method for Thermal Conductivity of Whiteware Ceramics<sup>3</sup>
- C 573 Methods for Chemical Analysis of Fireclay and High-Alumina Refractories<sup>4</sup>
- C 623 Test Method for Young's Modulus, Shear Modulus, and Poisson's Ratio for Glass and Glass-Ceramics by Resonance<sup>3</sup>
- D 116 Methods of Testing Vitrified Ceramic Materials for Electrical Applications<sup>5</sup>
- D 149 Test Methods for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies<sup>5</sup>
- D 150 Test Methods for A-C Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials<sup>5</sup>

- D 257 Test Methods for D-C Resistance or Conductance of Insulating Materials<sup>5</sup>
  - D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing<sup>6</sup>
  - D 1711 Terminology Relating to Electrical Insulation<sup>5</sup>
  - D 1829 Test Method for Electrical Resistance of Ceramic Materials at Elevated Temperatures<sup>5</sup>
  - D 2149 Test Method for Permittivity (Dielectric Constant) and Dissipation Factor of Solid Ceramic Dielectrics at Frequencies to 10 MHz and Temperatures to 500°C<sup>5</sup>
  - D 2520 Test Method for Complex Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials at Microwave Frequencies and Temperatures to 1650°C<sup>7</sup>
  - E 6 Terminology Relating to Methods of Mechanical Testing<sup>8</sup>
  - E 12 Terminology Relating to Density and Specific Gravity of Solids, Liquids, and Gases<sup>9</sup>
  - E 122 Practice for Choice of Sample Size to Estimate a Measure of Quality for a Lot or Process<sup>10</sup>
  - E 165 Practice for Liquid Penetrant Inspection Method<sup>11</sup>
  - E 228 Test Method for Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer<sup>10</sup>
  - F 19 Test Method for Tension and Vacuum Testing Metalized Ceramic Seals<sup>12</sup>
  - F 77 Test Method for Apparent Density of Ceramics for Electron Device and Semiconductor Application<sup>3</sup>
  - F 109 Terminology Relating to Surface Imperfections on Ceramics<sup>3</sup>
  - F 134 Test Methods for Determining Hermeticity of Electron Devices with a Helium Mass Spectrometer Leak Detector<sup>12</sup>
  - F 417 Test Method for Flexural Strength (Modulus of Rupture) of Electronic-Grade Ceramics<sup>3</sup>
- 2.2 Other Standards:*
- MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes<sup>13</sup>

<sup>1</sup> This specification is under the jurisdiction of Committee C-21 on Ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.03 on Fundamental Properties.

This specification also includes material and suggestions provided by ASTM Committee D-9 on Electrical and Electronic Insulating Materials.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 15.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 15.02.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 03.05.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 10.01.

<sup>6</sup> *Annual Book of ASTM Standards*, Vol 08.01.

<sup>7</sup> *Annual Book of ASTM Standards*, Vol 10.02.

<sup>8</sup> *Annual Book of ASTM Standards*, Vol 03.01.

<sup>9</sup> *Annual Book of ASTM Standards*, Vol 15.05.

<sup>10</sup> *Annual Book of ASTM Standards*, Vol 14.02.

<sup>11</sup> *Annual Book of ASTM Standards*, Vol 03.03.

<sup>12</sup> *Annual Book of ASTM Standards*, Vol 10.04.

<sup>13</sup> Available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.