



Standard Test Methods for Vitrified Ceramic Materials for Electrical Applications¹

This standard is issued under the fixed designation D116; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods outline procedures for testing samples of vitrified ceramic materials that are to be used as electrical insulation. Where specified limits are mentioned herein, they shall not be interpreted as specification limits for completed insulators.

1.2 These test methods are intended to apply to unglazed specimens, but they may be equally suited for testing glazed specimens. The report section shall indicate whether glazed or unglazed specimens were tested.

1.3 The test methods appear as follows:

Procedure	Section
Compressive strength	6 C773
Dielectric strength	13 D618, D149
Elastic properties	8 C623
Electrical resistivity	15 D618, D257, D1829
Flexural strength	7 C674, F417
Hardness	9 C730, E18
Porosity	5 C373
Relative permittivity and dissipation factor	14 D150, D2149, D2520
Specific gravity	4 C20, C329, F77
Thermal conductivity	10 C177, C408
Thermal expansion	12 C539, E288
Thermal shock resistance	11

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific precaution statements are given in 11.3, 13.5, and 15.3.

2. Referenced Documents

2.1 *ASTM Standards:*²

C20 Test Methods for Apparent Porosity, Water Absorption,

¹ These test methods are under the jurisdiction of ASTM Committee C21 on Ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.03 on Methods for Whitewares and Environmental Concerns.

Current edition approved July 1, 2016. Published July 2016. Originally approved in 1921. Last previous edition approved in 2011 as D116 – 86 (2011). DOI: 10.1520/D0116-86R16.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

Apparent Specific Gravity, and Bulk Density of Burned Refractory Brick and Shapes by Boiling Water

C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

C329 Test Method for Specific Gravity of Fired Ceramic Whiteware Materials

C373 Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products, Ceramic Tiles, and Glass Tiles

C408 Test Method for Thermal Conductivity of Whiteware Ceramics

C539 Test Method for Linear Thermal Expansion of Porcelain Enamel and Glaze Frits and Ceramic Whiteware Materials by Interferometric Method

C623 Test Method for Young's Modulus, Shear Modulus, and Poisson's Ratio for Glass and Glass-Ceramics by Resonance

C674 Test Methods for Flexural Properties of Ceramic Whiteware Materials

C730 Test Method for Knoop Indentation Hardness of Glass

C773 Test Method for Compressive (Crushing) Strength of Fired Whiteware Materials

D149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

D150 Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation

D257 Test Methods for DC Resistance or Conductance of Insulating Materials

D618 Practice for Conditioning Plastics for Testing

D638 Test Method for Tensile Properties of Plastics

D1829 Test Method for Electrical Resistance of Ceramic Materials at Elevated Temperatures (Withdrawn 2001)³

D2149 Test Method for Permittivity (Dielectric Constant) and Dissipation Factor Of Solid Dielectrics At Frequencies To 10 MHz And Temperatures To 500°C

D2520 Test Methods for Complex Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials at Microwave Frequencies and Temperatures to 1650°C

³ The last approved version of this historical standard is referenced on www.astm.org.