



Designation: D8289 – 20

Standard Test Method for Tensile Strength Estimate by Disc Compression of Manufactured Graphite¹

This standard is issued under the fixed designation D8289; 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 test method covers testing apparatus, specimen preparation, and testing procedures for determining the splitting tensile strength of graphite by diametral line compression of a disk. This small specimen geometry (Test Method D7779) is specifically intended for irradiation capsule use. Users are cautioned to use Test Method C749 if possible for measuring tensile strength properties of graphite.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.3 All dimension and force measurements and stress calculations shall conform to the guidelines for significant digits and rounding established in Practice D6026.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

C749 Test Method for Tensile Stress-Strain of Carbon and Graphite

D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.F0 on Manufactured Carbon and Graphite Products.

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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.

D6026 Practice for Using Significant Digits in Geotechnical Data

D7542 Test Method for Air Oxidation of Carbon and Graphite in the Kinetic Regime

D7775 Guide for Measurements on Small Graphite Specimens

D7779 Test Method for Determination of Fracture Toughness of Graphite at Ambient Temperature

E4 Practices for Force Verification of Testing Machines

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 Refer to Terminology D4175 for specific definitions.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *splitting tensile strength, n*—the tensile strength of a material estimated from a splitting compressive configuration such as that described here.

4. Significance and Use

4.1 By definition, the tensile strength of manufactured graphite is obtained by the direct uniaxial tensile test (Test Method C749). The C749 tensile test specimen is relatively large and is frequently incompatible with available irradiation capsule volumes, or oxidation apparatus (Test Method D7542). The splitting tensile test provides an alternate means of testing tensile properties on specimens that have severe geometric constraints and otherwise cannot meet the prescribed testing geometries of Test Method C749. By loading a disc-shaped specimen, on edge, under a compressive load, the resulting tensile stresses transverse to the loading axis provide an indication of the tensile strength properties of graphite. To obtain consistent and meaningful values of a splitting tensile strength, it is vital that the fracture initiate in the center of the disk and not along an edge. This standard test helps to ensure that the disk specimens break diametrically along the loading diameter due to tensile stresses that are perpendicular to the loading axis and that the fracture initiates at the center of the disk.

*A Summary of Changes section appears at the end of this standard