

ASTM D5528 TESTING FIXTURE

MODE I INTERLAMINAR FRACTURE TOUGHNESS OF UNIDIRECTIONAL FIBER-REINFORCED POLYMER MATRIX COMPOSITES



ASTM D5528 Testing Fixture

This test apparatus is useful to determine the opening Mode I interlaminar fracture toughness, G_{Ic} , of continuous fiber-reinforced composite materials by the double cantilever beam specimen. This test application is employable with composites consisting of unidirectional carbon fiber and glass fiber tape laminates with brittle and tough single-phase polymer matrices.

Delamination phenomenon constitutes a strong weakness of many advanced laminated composite structures. Therefore, knowing the laminated composite material's resistance to interlaminar fracture is useful for product development. Additionally, a measurement of the Mode I interlaminar fracture toughness, independent of specimen geometry or method of load introduction, is useful to provide design allowables used in damage tolerance analyses of composite structures made from these materials.

The fixture allows to establish quantitatively the effect of fiber surface treatment, local variations in fiber volume fraction, and processing and environmental variables on G_{Ic} of a particular composite material and to compare quantitatively the relative values of G_{Ic} for composite materials with different constituents. Another purpose is constituted from the composite damage tolerance and durability analysis in order to develop delamination failure criteria. This standard may involve dangerous materials, operations and equipment.



ASTM D 5528 Testing Fixture - Drawing

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|--------------------------|------------------------------|
| Test Standard | ASTM D 5528 |
| Material | Alluminium \ Stainless Steel |
| Temperature Range | da -150 °C a 316 °C |
| Mass | 5.00 kg |
| Specimen Width | 20 - 25 mm |
| Specimen Length | At least 125 mm |



ASTM D 5528 Testing Fixture - Assembly

Related ASTM Standards

D883 Terminology Relating to Plastics



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D2651 Guide for Preparation of Metal Surfaces for Adhesive Bonding

D2734 Test Methods for Void Content of Reinforced Plastics

D3171 Test Methods for Constituent Content of Composite Materials

D3878 Terminology for Composite Materials

D5229/D5229M Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials

E4 Practices for Force Verification of Testing Machines

E6 Terminology Relating to Methods of Mechanical Testing

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

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

E456 Terminology Relating to Quality and Statistics

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

E1471 Guide for Identification of Fibers, Fillers, and Core Materials in Computerized Material Property Databases