

ASTM D6671 TESTING FIXTURE

MIXED-MODE BENDING FRACTURE TOUGHNESS



ASTM D6671 Testing Fixture

ASTM D 6671 is used for determining the interlaminar fracture toughness of continuous fiber-reinforced composite materials. It can also be used in the adhesive joints testing.

This test method is designed for use of composites consisting of unidirectional carbon fiber tape laminates with brittle and tough single-phase polymer matrices. An important feature of this test method and associated fixture is the ability to perform tests at desired ratios of Mode I to Mode II. Most of the other currently available test methods only allows the application of the specific coefficients, or the relationship is not well defined. The test specimen is typically 4.5” to 7” long, 0.8” to 1.0” wide, and 0.12” to 0.20” thick. It contains an 1.5” to 3.0” long non-adhesive insert at the mid-plane on one end. The hinges are glued or bolted to the top and bottom of the specimen at this end. One of the two hinges is then fixed at the right end of the base, while the other to the right end of the loading lever. At the left end of the loading lever, a force through a yoke will be applied. Applied force versus load point displacement is recorded, as well as the length of the corresponding propagating crack.



ASTM D 6671 Testing Fixture - Drawing

Test Standard	ASTM D 6671 - D6671 M / no ISO equivalent
Maximum Load	1171 N
Temperature Range	da -80 °C a 149 °C
Specimen Thickness	6 mm
Specimen Width	36 mm
Specimen Length	250 mm
Mass	5.00 kg



ASTM D 6671 Testing Fixture - Assembly



ASTM D 6671 Testing Fixture - Application

Additional Information:

ASTM Standard D6671-13, “Test Method for Mixed Mode I-Mode II Interlaminar Fracture Toughness of Unidirectional



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Fiber Reinforced Polymer Matrix Composites,” American Society for Testing and Materials, West Conshohocken, Pennsylvania (first published in 2001).

H. Crews, Jr. and J.R. Reeder, “A Mixed-Mode Bending Apparatus for Delamination Testing,” NASA Technical Memorandum 100662, NASA Langley Research Center, Hampton, Virginia, August 1988.

Reeder and J.H. Crews, Jr., “Redesign of the Mixed-Mode Bending Delamination Test to Reduce Nonlinear Effects,” *Journal of Composites Technology & Research*, Vol. 14, No. 1, Spring 1992, pp. 12-19.

Referenced Documents

ASTM Standards

D883 Terminology Relating to Plastics

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

D5528 Test Method for Mode I Interlaminar Fracture Toughness of Unidirectional Fiber-Reinforced Polymer Matrix Composites

E4 Practices for Force Verification of Testing Machines

E6 Terminology Relating to Methods of Mechanical Testing