

ASTM D5961 TESTING FIXTURE - PROCEDURES A,C,D

LAMINATE BEARING STRENGTH

ASTM Standard D 5961 includes four distinct laminate bearing test methods, identified as Procedures A, B, C, and D. Procedure B is actually a specimen support fixture. The other three procedures, as will be described here, are pin bearing fixtures.

PROCEDURE A: DOUBLE-SHEAR TENSILE LOADING

Procedure A in ASTM D 5961, has the objective to test composite laminates double-edged. The pin in the device, creating two cutting plans, extracts a segment of the composite laminate specimen. The sample used for this test has these dimensions: 1.5 "in width, 5.5" in length, and its thickness should be in the range 0.125 "to 0.208". A ¼ "diameter or pin fastener is used.

The two halves of the fixture are separated by a spacer of the same thickness as the specimen being tested. The specimen will be placed at the other end of the device using the hardened steel pin diameter ¼ "available.

The specimen is uniformly supported when gripped since a raised boss is present at the pin hole. Indeed the opposite end of the fixture is thicker by an equal amount. The end of the fixture with the spacer in place is gripped in a standard tensile wedge grip. Each half of the device is 0.2 "thick; for this reason this socket must have an opening to accommodate the range 0.4" longer the spacer thickness (specimen). A tensile load is applied until a maximum loading has been reached, monitoring both applied force and hole deformation, as described in the ASTM standard.

PROCEDURE C: SINGLE-SHEAR, TENSILE LOADING

Procedure C of ASTM D 5961 loads the laminate bearing specimen in single shear. When the tensile load is applied, a single cutting plane in the load pin is generated. The specimen is placed on the right surface of the test fixture. The flat tang at the top of the test fixture is gripped in a wedge grip and a tensile force is applied to the lower end of the specimen. Are recorded the deformation of the hole in the specimen and the maximum force attained

PROCEDURE D: DOUBLE SHEAR, COMPRESSION LOADING

Procedure D of ASTM D 5961 loads the laminate bearing specimen in double shear through a close-tolerance, lightly torqued fastener. The two lower components of the device are opened to allow the insertion of the 1.50 "wide laminated composite sample aligning the 1/4" diameter hole towards the end of the sample with the holes of the fixture. A pin is inserted in the hole. The lower end of the specimen is held in a vice as the upper end of the device. To avoid buckling, the specimen is kept short enough. In ASTM D 5961 is specified that the length of the specimen shall be 5.5". The compression load applied induces a double cut in the sample and in the cargo closure. Are measured tensile strength and deformation of the hole.

Sources of Additional Information:



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ASTM Standard D5961/D5961M-13 (2013), "Bearing Response of Polymer Matrix Composite Laminates," American Society for Testing and Materials, West Conshohocken, Pennsylvania (first issued in 1996).

SACMA Recommended Method SRM 9-89, "Bearing Strength Properties of Oriented Fiber-Resin Composites," Suppliers of Advanced Composite Materials Association, Arlington, Virginia, 1989 (now discontinued).