



Designation: D 7005 – 03

Standard Test Method for Determining the Bond Strength (Ply Adhesion) of Geocomposites¹

This standard is issued under the fixed designation D 7005; 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 It has been widely discussed in the literature that bond strength of flexible multi-ply materials is difficult to measure with current technology. The above is recognized and accepted, since all known methods of measurement include the force required to bend the separated layers, in addition to that required to separate them. However, useful information can be obtained when one realizes that the bending force is included and that direct comparison between different materials, or even between the same materials of different thickness, cannot be made. Also, conditioning that affects the moduli of the plies will be reflected in the bond strength measurement.

1.2 This index test method defines a procedure for comparing the bond strength or ply adhesion of geocomposites. The focus is on geotextiles bonded to geonets or other types of drainage cores; for example, geomats, geospacers, etc. Other possible uses are geotextiles adhered or bonded to themselves, geomembranes, geogrids, or other dissimilar materials. Various processes can make such laminates: adhesives, thermal bonding, stitch bonding, needling, spread coating, etc.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information purposes only.

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 precautionary statements are given in 7.1.1.

2. Referenced Documents

2.1 ASTM Standards:²

D 76 Specification for Tensile Testing Machines for Textiles

D 413 Test Methods for Rubber Property—Adhesion to Flexible Substrate

D 2905 Practice for Statements on Number of Specimens for Textiles

D 4354 Practice for Sampling of Geosynthetics for Testing D 4439 Terminology for Geosynthetics

D 5321 Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method

E 4 Practices for Force Verification of Testing Machines

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

F 904 Test Method for Comparison of Bond Strength or Ply Adhesion of Similar Laminates from Flexible Materials

3. Terminology

3.1 Definitions:

3.1.1 *bond strength (ply adhesion)*—amount of force required (per unit width) to separate plies of material or materials in peeling mode plus the force to bend the plies.

3.1.2 *necking*—localized reduction in cross section, which may occur in a material under tensile stress.

3.1.3 *geocomposite*—a product composed of two or more materials, at least one of which is a geosynthetic.

3.1.4 *geosynthetic*—a planar product manufactured from polymeric material used with soil, rock, earth, or other geotechnical engineering related material as an integral part of a man-made project structure, or system.

3.1.5 *geotextile*—a permeable geosynthetic comprised solely of textiles.

3.1.6 *geonet*—a geosynthetic consisting of integrally connected parallel sets of ribs overlying similar sets at various angles for planar drainage of liquids or gases.

3.1.7 *geomat/geospacer*—any three dimensional, polymeric material used with soil, rock, or other geotechnical engineering related material as an integral part of a man-made project, structure, or system.

3.1.8 *index test*—a test procedure, which may contain a known bias but may be used to establish an order for a set of specimens with respect to the property of interest.

3.1.9 *machine direction*—the direction in the plane of the fabric parallel to the direction of manufacture.

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.01 on Mechanical Properties.

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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.