



Standard Test Method for Coefficient of Static Friction of Corrugated and Solid Fiberboard¹

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1. Scope

1.1 This test method covers the determination of the coefficient of static friction of corrugated and solid fiberboard or of the materials used to make such board.

1.2 This test method contains the following two methods:

1.2.1 *Horizontal Plane Method*—The horizontal instrument requires some means of movement of the specimen in relation to the surface upon which it rests. The coefficient of friction is measured directly from the resistance to that force and the applied weight (see 7.1).

1.2.2 *Inclined Plane Method*—The incline plane is raised until sliding begins. The coefficient of friction is equal to the tangent of the angle at which sliding begins (see 7.2).

1.3 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are for information 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 whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Products²

D 996 Terminology of Packaging and Distribution Environments²

D 2534 Test Method for Coefficient of Kinetic Friction for Wax Coatings³

D 4332 Practice for Conditioning Containers, Packages, or Packaging Components for Testing²

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method⁴

3. Terminology

3.1 General definitions for packaging and distribution envi-

ronments are found in Terminology D 996.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *coefficient of friction*—the ratio of the frictional force resisting movement of the surface being tested to the force applied normal to that surface (the weight of the material above that surface).

3.2.2 *kinetic coefficient*—the ratio of the force resisting motion of the surface once the motion is in progress.

NOTE 1—Kinetic coefficient is not determined in this test method (see Appendix XI).

3.2.3 *static coefficient*—the ratio of the force resisting initial motion of the surface.

4. Significance and Use

4.1 The coefficient of friction of corrugated and solid fiberboard indicates how containers made from that board will perform in many critical applications. A high coefficient of friction of one surface of board to itself means that containers having that surface will tend to resist sliding under material handling conditions. A low coefficient may indicate potential problems with the containers slipping from the load.

4.2 The coefficient of friction test is empirical. It describes the condition of that surface at the moment of test. This may or may not relate to the condition of the surface in use. Its condition will depend upon the treatment of the surface. Nevertheless, the test results are useful in determining the properties of the surfaces tested. Measurement is not made until the third slide. Experience has shown that variability is greatly reduced after the second slide, and friction measurements are essentially constant for repeated slides.

5. Test Specimens

5.1 From each test unit of a sample obtained in accordance with Practice D 585, cut five specimens (see 5.3 for size). Carefully mark each specimen with its machine direction, on a place that will not be the actual test area. For corrugated board this will be perpendicular to the direction of the flute tips.

5.2 Cut and orient the specimens as follows:

5.2.1 If the specimens are from a container, carefully cut them from a flap area of the container. It is usually desirable to test a flap area since this is the area that normally comes in contact with the next container in pallet loads.

5.2.2 Paper is anisotropic, and the coefficient of friction is particularly so. Care must be taken in making the test to orient

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² Annual Book of ASTM Standards, Vol 15.09.

³ Annual Book of ASTM Standards, Vol 05.01.

⁴ Annual Book of ASTM Standards, Vols 06.04, 08.03, and 14.02.