



Standard Test Method for Coefficient of Static Friction of Uncoated Writing and Printing Paper by Use of the Inclined Plane Method¹

This standard is issued under the fixed designation D 4918; 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 This test method describes a procedure for the determination of the coefficient of static friction of paper measured when sliding against itself. The inclined plane procedure is used.

1.2 Although this test method is basic in concept, the precision statement has been developed on uncoated writing and printing papers. While the use of this test method is recommended for those grades only, it may be used with other types of paper giving specific attention to special paper characteristics and with the understanding that the precision may not be the same.

1.3 Static coefficient of friction (COF) relates to the force required to initiate movement between two surfaces while kinetic COF relates to the force required to cause continuation of the movement at uniform speed. Kinetic COF cannot be measured by this test method. Both static and kinetic COF can be measured by Test Method D 4917.

1.4 A horizontal plane method is described in Test Method D 4917, which gives similar results. The choice of approach depends upon the equipment available and the means of measurement.

1.5 The determination of this characteristic for corrugated and solid fiberboard is described in Test Methods D 4521 and D 3248. The test methods differ in that, in Test Methods D 4521 and D 3248, the two specimens are allowed to slip upon one another three times before the angle of inclination is determined, while in this test method, the angle is determined on the first slip.

1.6 *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.*

2. Referenced Documents

2.1 ASTM Standards:

D 528 Test Method for Machine Direction of Paper and Paperboard²

D 585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard or Related Product²

D 685 Practice for Conditioning Paper and Paper Products for Testing²

D 1968 Terminology Relating to Paper and Paper Products²

D 3247 Test Method for Coefficient of Static Friction of Corrugated and Solid Fiberboard (Horizontal Plane Method)²

D 3460 Specification for White Watermarked and Unwatermarked Bond, Mimeospirit, Duplicator, and Xerographic Cut-Sized Office Papers²

D 4521 Test Method for Coefficient of Static Friction of Corrugated and Solid Fiberboard²

D 4917 Test Method for Coefficient of Static and Kinetic Friction of Uncoated Writing and Printing Paper by Use of the Horizontal Plane Method²

3. Terminology

3.1 *Definitions*—Definitions shall be in accordance with Terminology D 1968 and the *Dictionary of Paper*.³

4. Summary of Test Method

4.1 One specimen of the paper sample is clamped to an inclined plane, the other to a rubber-faced sled. The sled is placed on the inclined plane and the plane raised until the sled begins sliding. The coefficient of static friction is equal to the tangent of the angle at which sliding begins.

5. Significance and Use

5.1 The coefficient of friction of printing and writing papers indicates the ease with which the top or bottom sheet of a stack of paper will slide across the succeeding sheet, such as occurs on the infeed of a sheet-fed printing press or the sheet transport into a copier machine. A minimum coefficient of friction is required to prevent the double-feeding of any sheets.

5.2 Since each sheet is removed from the stack only once, a single slide of each pair of specimens is performed and the value recorded.

¹ This test method is under the jurisdiction of ASTM Committee D-6 on Paper and Paper Products and is the direct responsibility of Subcommittee D06.92 on Test Methods.

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² *Annual Book of ASTM Standards*, Vol 15.09.

³ Available from the Technical Association of the Pulp and Paper Industry, P.O. Box 105113, Atlanta, GA 30348