



## Standard Test Method for Coefficient of Kinetic Friction for Wax Coatings<sup>1</sup>

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### 1. Scope

1.1 This test method covers the determination of the coefficient of kinetic friction for a petroleum wax coating or wax-based hot melt coating when sliding over itself.

1.2 *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 585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, or Related Product<sup>2</sup>
- D 1465 Test Method for Blocking and Picking Points of Petroleum Wax<sup>3</sup>

### 3. Terminology

#### 3.1 Definitions:

3.2 *friction*—the resistance to sliding exhibited by two surfaces in contact with each other. Basically there are two frictional properties exhibited by any surface; static friction and kinetic friction.

3.3 *kinetic friction*—the force that resists motion when a surface is moving with a uniform velocity; it is, therefore, equal and opposite to the force required to maintain sliding of the surface with a uniform velocity.

### 4. Summary of Test Method

4.1 A coated surface under load is pulled at a uniform rate over a second coated surface. The force required to move the load is measured, and the coefficient of kinetic friction is calculated.

### 5. Significance and Use

5.1 The coefficient of friction is related to the slip properties of many commercial articles which have been coated with petroleum wax (for example, butter cartons and wax impregnated or hot melt coated corrugated board).

### 6. Apparatus

6.1 *Sled Assembly*, as shown in Fig. 1, weighing  $180 \pm 1$  g, and consisting of the following parts:

6.1.1 *Brass Block*, 25 mm (1 in.) wide by 13 mm ( $\frac{1}{2}$  in.) thick by 75 mm (3 in.) long,

6.1.2 *Microscope Slide*, cemented to one surface, 25 mm (1 in.) by 75 mm (3 in.), and

6.1.3 *Detachable Handle*, using 1.5 mm ( $\frac{1}{16}$  in.) weld rod.

6.2 *Horizontal Plane Assembly and Pulling Device*, consisting of a metal or wood sheet covered by a smooth, flat piece of glass approximately 150 by 300 mm (6 by 12 in.). The plane shall be supported by two 250 by 300-mm (10 by 12 in.) diagonal shelf-brackets. A board attached across the brackets shall be clamped in the jaws of the lower crosshead of an electronic load cell-type tension tester. Adjust the assembly so that the glass surface is level. Attach a low-friction pulley at the edge of the plane with the outer side centered directly beneath the load cell of the testing machine and the bottom side level with the sled handle. Connect the sled handle to the load cell of the tester by a light, flexible metal cable or polyester cord passing around the pulley.

6.3 *Low-Friction Pulley*, consisting of a pulley mounted in hardened steel cone bearings on a metal fork. The pulley should be constructed from materials having hardness and durability equivalent to phenolic-type materials.

### 7. Materials

7.1 *Scissors or Cutter*, suitable for cutting waxed specimen to the desired dimensions.

7.2 *Adhesive Tapes*, single-faced and double-faced, 13 to 20 mm ( $\frac{1}{2}$  to  $\frac{3}{4}$  in.) in width.<sup>4</sup>

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D 02.10.0A on Physical and Chemical Properties.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 15.09.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 05.01.

<sup>4</sup> Double-faced adhesive tape available from 3M Co., Inc., or Permacel Tape Corp., has been found satisfactory for this purpose.