



Designation: D2534 – 88 (Reapproved 2017)

Standard Test Method for Coefficient of Kinetic Friction for Wax Coatings¹

This standard is issued under the fixed designation D2534; 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 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.*

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Product \(Withdrawn 2010\)](#)³

[D1465 Test Method for Blocking and Picking Points of Petroleum Wax](#)

3. Terminology

3.1 *Definitions:*

3.1.1 *friction, n*—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.

3.1.2 *kinetic friction, n*—the force that resists motion when a surface is moving with a uniform velocity; it is, therefore,

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.10.0A on Physical/Chemical Properties.

Current edition approved June 1, 2017. Published July 2017. Originally approved in 1966. Last previous edition approved in 2012 as D2534 – 88 (2012). DOI: 10.1520/D2534-88R17.

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.

³ The last approved version of this historical standard is referenced on www.astm.org.

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 that 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 g \pm 1 g, and consisting of the following parts:

6.1.1 *Brass Block*, 25 mm (1 in.) wide by 13 mm (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 (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 mm by 300 mm (6 in. by 12 in.). The plane shall be supported by two 250 mm by 300 mm (10 in. 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.