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ASTM D1894-24

Standard Test Method for Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting

Significance and Use

- 4.1 Measurements of frictional properties on a film or sheeting are made by either sliding the film or sheeting over itself or over another substance. The coefficients of friction are related to the slip properties of plastic films that are of wide interest in packaging applications. These methods yield empirical data for control purposes in film production. Correlation of test results with actual performance can usually be established.
- 4.1.1 This test method includes testing at temperatures other than 23°C by heating only the plane while the sled is at ambient temperature.
- 4.2 Slip properties are generated by additives in some plastic films, for example, polyethylene. These additives have varying degrees of compatibility with the film matrix. Some of them bloom, or exude to the surface, lubricating it and making it more slippery. Because this blooming action will not always be uniform on all areas of the film surface, it is possible that values from these tests will be limited in reproducibility.
- 4.3 The frictional properties of plastic film and sheeting depend on the uniformity of the rate of motion between the two surfaces. Ensure that the rate of motion of the equipment is as carefully controlled as possible.
- 4.4 Data obtained by these procedures for some films or sheets are sensitive to the age of the film or sheet and the condition of the surfaces. The blooming action of many slip additives is time dependent. For this reason, it is sometimes meaningless to compare slip and friction properties of films or sheets produced at different times, unless it is desired to study this effect.
- 4.5 Frictional and slip properties of plastic film and sheeting are based on measurements of surface phenomena. Where products have been made by different processes, or even on different machines by the same process, their surface properties are dependent on the equipment or its running conditions. Such factors must be weighed in evaluating data from these methods.
- 4.6 The measurement of the static coefficient of friction is highly dependent on the rate of loading and on the amount of blocking occurring between the loaded sled and the platform due to variation in time before motion is initiated.
- 4.7 Ensure that the speed of response of the recorder, either electronic or mechanical, is not exceeded.
- 4.8 Some material specifications require modifications to this test method. The material specification shall be referenced before using this test method. Table 1 of Classification System D4000 lists the ASTM materials standards that currently exist.

Scope

- 1.1 This test method covers determination of the coefficients of starting and sliding friction of plastic film and sheeting when sliding over itself or other substances at specified test conditions. The procedure permits the use of a stationary sled with a moving plane, or a moving sled with a stationary plane. Both procedures yield the same coefficients of friction values for a given sample.
- NOTE 1: For the frictional characteristics of plastic films partially wrapped around a cylinder, or capstan, see Test Method G143 under the jurisdiction of ASTM Subcommittee G02.50.
- 1.2 Test data obtained by this test method is relevant and appropriate for use in engineering design.
- 1.2.1 As an option to this test, measuring coefficient of friction at temperatures other than 23°C is performed by heating/cooling only the plane while the sled is at ambient temperature.
- 1.3 The values stated in SI units are to be regarded as standard. The values given 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 the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

For a specific precautionary statement, see the end of 6.5.

NOTE 2: This test method is not equivalent to ISO 8295–1995, and results cannot be directly compared between the two methods.

1.5 *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.*

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