



Standard Test Method for Measurement of Web/Roller Friction Characteristics¹

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1. Scope

1.1 This test method covers the simulation of a roller/web transport tribosystem and the measurement of the static and kinetic coefficient of friction of the web/roller couple when sliding occurs between the two. The objective of this test method is to provide users with web/roller friction information that can be used for process control, design calculations, and for any other function where web/roller friction needs to be known.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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:²

D883 Terminology Relating to Plastics

D1894 Test Method for Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting

D3108 Test Method for Coefficient of Friction, Yarn to Solid Material

E8 Test Methods for Tension Testing of Metallic Materials

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

G40 Terminology Relating to Wear and Erosion

G115 Guide for Measuring and Reporting Friction Coefficients

G117 Guide for Calculating and Reporting Measures of Precision Using Data from Interlaboratory Wear or Erosion Tests

G163 Guide for Digital Data Acquisition in Wear and Friction Measurements

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *blocking*, n —unintentional adhesion between plastic films or between a film and another surface. **D883**

3.1.2 *coefficient of friction*, μ , n —in tribology—the dimensionless ratio of the friction force (F) between two bodies to the normal force (N) pressing these bodies together. **G40**

3.1.3 *friction force*, n —the resisting force tangential to the interface between two bodies when, under the action of external force, one body moves or tends to move relative to the other. **G40**

3.1.4 *kinetic coefficient of friction*, n —the coefficient of friction under conditions of macroscopic relative motion between two bodies. **G40**

3.1.5 *stick-slip*, n —a cyclic fluctuation in the magnitudes of friction force and relative velocity between two elements in sliding contact, usually associated with a relaxation oscillation dependent on elasticity in the tribosystem and on a decrease of the coefficient of friction with onset of sliding or with increase of sliding velocity. **G40**

3.1.5.1 *Discussion*—Classical or true stick-slip, in which each cycle consists of a stage of actual stick followed by a stage of overshoot slip, requires that the kinetic coefficient is lower than the static coefficient. A modified form of relaxation oscillation, with near-harmonic fluctuation in motion, can occur when the kinetic coefficient of friction decreases gradually with increasing velocity within a certain velocity range. A third type of stick-slip can be due to spatial periodicity of the friction coefficient along the path of contact. Random variations in friction force measurement do not constitute stick-slip.

3.1.6 *triboelement*, n —one of two or more solid bodies which comprise a sliding, rolling, or abrasive contact, or a body subjected to impingement or cavitation. **G40**

3.1.6.1 *Discussion*—Contacting triboelements may be in

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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.