



Standard Test Method for Side Force Friction on Paved Surfaces Using the Mu-Meter¹

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1. Scope

1.1 This test method covers the measurement of the side force friction of paved surfaces utilizing a device commonly called a Mu-Meter.²

1.2 This test method utilizes a measurement obtained by pulling the Mu-Meter, containing two freely rotating test wheels angled to the direction of motion, over a wetted pavement surface at a constant speed while the test wheels are under a constant static load. This method provides a continuous graphical record of the side force friction along the whole length of the test surface and enables averages to be obtained for any specified length.

1.3 The values stated in inch-pound units are to be regarded as the standard.

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 and health practices and determine the applicability of regulatory limitations prior to use.* Safety precautionary information is contained in Section 6.

2. Referenced Documents

2.1 ASTM Standards:

- D 297 Test Methods for Rubber Products—Chemical Analysis³
- D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension³
- D 1054 Test Method for Rubber Property Resilience Using a Rebound Pendulum³
- D 1765 Classification System for Carbon Blacks Used in Rubber Products³
- D 2240 Test Method for Rubber Property—Durometer Hardness³
- D 3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets³

¹ This test method is under the jurisdiction of ASTM Committee E17 on Vehicle-Pavement Systems and is the direct responsibility of Subcommittee E17.21 on Field Methods for Measuring Tire Pavement Friction.

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² As manufactured by M. L. Aviation Co. Ltd., White Waltham Aerodrome, Maidenhead, Berkshire, England and distributed in the United States by Bison Instruments, 5708 W. 36th St., Minneapolis, MN 55416.

³ *Annual Book of ASTM Standards*, Vol 09.01.

E 178 Practice for Dealing with Outlying Observations⁴

E 303 Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester⁵

3. Summary of Test Method

3.1 The Mu-Meter consists of a trailer similar to the one in Fig. 1 which is towed by a vehicle or incorporated into an automotive vehicle.²

3.2 The test tires are positioned in the test mode. The Mu-Meter is brought to the desired test speed. Water is delivered ahead of the test tires and the beginning of the test is marked. The resulting sideways or cornering friction force acting between the test tires and the pavement surface is recorded on a strip chart. The speed of the test vehicle is recorded with the aid of suitable instrumentation.

3.3 The side force friction is determined from analysis of the strip chart record and reported as Mu Number (MuN).⁶

4. Significance and Use

4.1 The knowledge of side force friction serves as an additional tool in characterizing pavement surfaces. Side force friction data alone may be of limited value in determining the suitability of paving materials or finishing techniques. However, when used in conjunction with other physical and chemical tests, the side force friction may contribute to characterization of pavement surfaces.

4.2 The values measured with the equipment and procedures stated herein do not necessarily agree or correlate directly with those obtained by other paved surface friction measuring methods.

5. Apparatus

5.1 *Tow Vehicle*—The tow vehicle shall be capable of towing the Mu-Meter at a speed of at least 40 mph (65 km/h) and maintaining this speed within ± 0.5 mph (0.8 km/h). If tests are conducted at speeds greater than 40 mph, the vehicle shall be capable of maintaining these speeds within ± 1 mph (1.5 km/h). The vehicle shall have a suitable towing hitch centered 18 ± 0.5 in. (457 ± 13 mm) from the ground for Mu-Meters with unadjustable hitches. For Mu-Meters with adjustable hitches, the towing ball shall be placed so that the

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ *Annual Book of ASTM Standards*, Vol 04.03.

⁶ Refer to manufacturers instruction and servicing manual (MLH 148) for method of determining Mu number from strip chart.

