



Standard Test Methods for Measurement of Skid Resistance on Paved Surfaces Using a Passenger Vehicle Diagonal Braking Technique¹

This standard is issued under the fixed designation E 503/E 503M; 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 These test methods cover the measurement of skid resistance on paved surfaces with a passenger vehicle equipped with specified full-scale vehicle tires and using the diagonal braking mode. These test methods include the following:

1.1.1 *Full-Stop Method*— This represents the nonsteady-state skid resistance on two diagonally locked wheels, as the vehicle decelerates over a wetted pavement surface under specified limits of static wheel load and from a desired speed. The vehicle shall remain essentially parallel to its original direction of motion.

1.1.2 *Pulse-Braking Method*—The deceleration resulting from momentary diagonal wheel lockup (pulse braking) is measured. The vehicle decelerates over a wetted pavement surface under specified limits of static wheel load and at a desired speed. The vehicle shall remain essentially parallel to its original direction of motion.

1.2 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

2. Referenced Documents

2.1 ASTM Standards:

- E 178 Practice for Dealing with Outlying Observations²
- E 274 Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire³
- E 501 Specification for Standard Rib Tire for Pavement Skid-Resistance Tests³
- E 524 Specification for Standard Smooth Tire for Pavement Skid-Resistance Tests³
- F 403 Test Method for Tires for Wet Traction in Straight-Ahead Braking, Using Highway Vehicles⁴

¹ These test methods are under the jurisdiction of ASTM Committee E17 on Vehicle-Pavement Systems and are the direct responsibility of Subcommittee E17.21 on Field Methods for Measuring Vehicular Friction.

Current edition approved Feb. 1, 1988. Published March 1988. Originally published as E 503 – 82 T. Last previous edition E 503 – 82.

² Annual Book of ASTM Standards, Vol 14.02.

³ Annual Book of ASTM Standards, Vol 04.03.

⁴ Annual Book of ASTM Standards, Vol 09.02.

F 457 Method for Speed and Distance Calibration of a Fifth Wheel Equipped with Either Analog or Digital Instrumentation⁴

3. Summary of Test Methods

3.1 The test apparatus for both test methods consists of a passenger vehicle with four wheels, of which two are used for test purposes. The apparatus contains transducers, instrumentation, and a selected brake system for the test wheels. The test wheels are to be equipped with the Standard Pavement Test Tires described in Specification E 501 or E 524.

3.2 For both test methods, the pavement in the test lane is wetted with two applications from a water wagon equipped with a spray bar or other means of distributing water evenly and rapidly. The test vehicle is brought above the desired test speed and permitted to coast onto the wetted section until proper speed is attained. The brakes are then promptly and forcefully applied to cause quick lock-up of the test wheels.

3.3 For the full-stop method, the vehicle operator maintains brake application until a complete stop is obtained. The resulting distance required to stop is recorded with the aid of suitable instrumentation, and the velocity at the moment of brake application is noted. The skid resistance of the paved surface is determined from the resulting stopping distance measurement and test speed as stopping distance number, SDN, as determined from the equations given in Section 10, or as stopping distance, SD.

3.4 For the momentary deceleration (pulse-braking) method, the vehicle operator maintains the locked wheel condition for approximately 1 s, and then releases the brakes. The resulting deceleration during braking is recorded with the aid of suitable instrumentation, and the velocity during brake application is noted. The skid resistance of the paved surface is determined from the resulting deceleration measurement and test speed as diagonal braking number, DBN, as determined from the equation given in Section 10.

NOTE 1—Since tire-tread design has a significant effect on pavement surface skid-resistance measurements, ranking and comparison of pavement surfaces using the Specification E 501 test tire might be considerably different from that using the Specification E 524 test tire.

NOTE 2—Since speed has a significant effect on pavement surface skid-resistance measurements, ranking and comparison of pavement surfaces at higher speeds might be considerably different from that at lower speeds.

