



SURFACE VEHICLE RECOMMENDED PRACTICE

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Wet or Dry Pavement Passenger Car Tire
Peak and Locked Wheel Braking Traction

RATIONALE

This technical report is being stabilized because other standards exist which are being used widely by regulators and other industry stakeholders. Because all users of this standard cannot be identified, the committee recommends stabilization at this time.

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1. **Scope**—This SAE Recommended Practice defines the best known techniques for evaluating peak and locked wheel braking traction. It covers an important phase of tire braking traction, namely, the wet or dry pavement straight ahead conditions. However, this is but a small portion of the whole field of tire traction. As test procedures are established for other phases of this complex study, additional supplementary procedures will be written. A discussion of this entire subject is contained in Appendix B to this recommended practice.
- 1.1 **Object**—The object of this SAE Recommended Practice is to provide a general test procedure for measuring the braking traction of passenger car tires on wet or dry pavement.
2. **References**—There are no referenced publications specified herein.
3. **Preparation of Tire(s) for Tests**—New tires, both control and design tires to be tested, shall be trimmed to remove all protuberances in the tread area caused by mold air vents or flashes at mold junctions. Tires shall be mounted on Tire and Rim Association (T&RA) recommended rims; inflated to 24 psi; loaded to (80–100%) T&RA maximum load for 24 psi; and run on a passenger car for 100 miles at 60–70 mph on dry roads, 50 miles on front wheels and 50 miles on rear wheels. This is a break-in run to remove mold lubricant and mold sheen from the tread surface. Excessive acceleration, braking, and cornering that might result in abnormal tread surface wear are to be avoided.
4. **Equipment**—A suitable test device designed to measure tire braking forces and meeting requirements outlined in Appendix A.

Control reference tires of specified design, compounds, and construction.

5. **Test Procedure**

5.1 **Test Conditions**

Load: 100% T&RA load limit at 24 psi $\pm$ 25 lb
Inflation Pressure: 24 psi cold $\pm$ 1/2 psi
Test Speed: 20, 40, 60 $\pm$ 1 mph

5.2 Test Surface—Test surface shall be any clean, level surface for which tire-surface braking coefficient information is required. In tests requiring vehicle provided watering, the test surface shall be watered at a rate proportional to speed to provide a 0.020 in. $\pm$ 25% calculated film depth independent of test speed. External watering may be provided to fulfill any specific test condition.

5.3 Testing Procedure—Bring test device up to test speed prior to reaching test site. Apply brakes on test wheel(s) until wheels are locked. Hold wheels locked for a minimum of two seconds. Hold test vehicle at required test speed $\pm$ 1 mph. Record tire braking traction force, vehicle speed, and all other desired parameters, starting a minimum of 1 sec before initiation of lockup to 1 sec after unlocking the test tire.

For each specific test, a minimum of ten readings, five each in opposite directions, are to be made for each tire.

The sequence of testing to be as follows:

- a. Control test tire.
- b. Tests of tire(s) to be evaluated (no more than two).
- c. Repeat of control test tire.
- d. Repetition of steps (b) and (c) to complete all required test tires.

For each test, record the following information:

- a. Tire description (make, type, size, cord material, etc.)
- b. Tire static load.
- c. Tire cold inflation pressure.
- d. Date.
- e. Time.
- f. Ambient temperature.
- g. Surface temperature.
- h. Water temperature.
- i. Speed.
- j. Surface description.
- k. Water depth.
- l. Whether force or torque.
- m. General remarks.

6. Data Reduction and Analysis

6.1 Raw Data Reduction—Peak and locked wheel sliding force shall be read for each specific test run. The sliding value shall be the average value between 0.2 and 1.2 sec after the test wheel lockup. The data processor should note any unusual anomalies appearing in the data.

6.2 Data Reduction—Each separate peak and sliding coefficient should be reduced to a braking coefficient by dividing the force by the applicable tire vertical load corresponding to the force. If the test equipment used is a trailer which does not measure the tire load, changes in tire load due to weight transfer must be compensated for by calculating coefficient according to the following formula:

$$\text{Braking Coefficient } (\mu) = \frac{F}{W - \frac{h}{L}F} \quad (\text{Eq. 1})$$