The Engineering Society For Advancing Mobility Land Sea Air and Space®

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Laboratory Speed Test Procedure for Passenger Car Tires

SAE Recommended Practice
Issued October 1988

Submitted for Recognition as an American National Standard

The Engineering Society For Advancing Mobility Land Sea Air and Space ®
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HIGHWAY VEHICLE PRACTICE

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LABORATORY SPEED TEST PROCEDURE FOR PASSENGER CAR TIRES

1. INTRODUCTION:

Having a standardized method of evaluating the speed capability of tires is useful in selecting appropriate tires for motor vehicles. This SAE Recommended Practice provides a laboratory method for determining the speed capability of passenger car tires under controlled conditions. The procedure is intended to provide a way of testing tires and gathering data on a uniform basis.

2. SCOPE:

This procedure provides a method for testing the speed performance of passenger car tires under controlled conditions in the laboratory on a test wheel. (This procedure does not apply to extra load tires or 'T'-type temporary use spare tires.)

3. DEFINITIONS:

3.1 Ambient Temperature: This is the temperature of the air measured during a high speed test at a fixed location near the tire. The fixed location of ambient temperature measurement is defined as a point on the rotational axis of the tire, 0.31 m (12 in) from the plane touching the nearest tire sidewall (or at a point where an equivalent temperature exists).

3.2 Bead Separation: A breakdown of the bond between components in the bead area.

3.3 Capped Inflation Pressure: The process of inflating the tire to a specified pressure and allowing the inflation pressure to build up, as the tire temperature increases during the test procedure.

3.4 Chunking: The breaking away of pieces of the tread or sidewall.

3.5 Cord Separation: The parting of cords from adjacent rubber compounds.

3.6 Cracking: The parting within the tread, sidewall or innerliner of the tire extending to cord material.

3.7 Innerliner Separation: The parting of the innerliner from cord material in the carcass.

3.8 Maximum Application Load: For tires having a designated speed category up to and including 210 km/h (130 mph) (including those tires for which no speed category is designated): = 100% of the maximum load.

For tires having a designated speed category above 210 km/h (130 mph): = 91% of the maximum load.

3.9 Maximum Load: The maximum load that is molded on the tire sidewall or, if not molded, shown in the publication of a recognized tire standardizing body.

3.10 Ply Separation: The parting of rubber compound between adjacent plies.

3.11 Service Description: A service designation, which is distinct from the size designation, consisting of the load index and speed symbol.

Examples: P205/60R15 90H

P205/60R15 90V

3.12 Sidewall Separation: The parting of the rubber compound from the cord material in the sidewall.

3.13 Speed Category: A category assigned to a tire denoting the maximum speed for which the use of the tire is rated.

3.14 Tread Separation: The pulling away of the tread from the carcass.

4. Test Equipment:

4.1 Test Wheel Specifications:

4.1.1 Diameter: The diameter of the standard test wheel used for the high speed test is 1.708 m (67.23 in). An optional test wheel of 2.0 m (78.74 in) diameter may be used with the alternate operation specified in 6.2.1.

4.1.2 Width of the Test Surface: This must exceed the tread width of the test tire.

4.1.3 Outer Surface: Smooth steel.

4.2 Test Rim: It must have a contour and width as specified by a recognized standardizing body for the tire size to be tested.

4.3 Control Accuracy: Measurements must be maintained within the following accuracies:

Test Load:	±1%
Inflation Pressure:	±7 kPa (±1 psi)
Speed:	+2, -0 km/h (+1,-0 mph)

4.4 Instrumentation Accuracy:

Test Load:	±20N (5 lbf)
Inflation Pressure:	±4 kPa (0.5 psi)
Temperature:	±0.5°C (1°F)
Speed:	±0.5 km/h (0.3 mph)

5. Test Conditions:

5.1 Load: 80% of the maximum application load.

5.2 Inflation Pressure (Capped):

280 kPa (41 psi) - For tires having a designated speed category up to and including 210 km/h (130 mph). (Including those tires for which no speed category is designated.)

300 kPa (44 psi) - For tires having a designated speed category above 210 km/h (130 mph).

5.3 Ambient Temperature:

25°C (77°F) through 40°C (104°F)

5.4 Camber Angle: Zero ±0.3 deg.

5.5 Slip Angle: Zero ±0.3 deg.

6. Test Procedure:

6.1 Thermal Conditioning: Condition the tire/wheel assembly at test room temperature for not less than 3 hours. Readjust the inflation pressure to that specified in 5.2.

6.2 Operation (1.708 m Diameter Standard Test Wheel): The tire and wheel assembly shall be mounted on the test axle and pressed normal to the outer face of the test wheel with the test load. Carry the test through, without interruption, as follows:

a. Time taken to pass from zero speed to the initial test speed: 10 minutes.

b. Initial test speed is the speed category of the tire less 40 km/h (24 mph).

For tires which do not have a speed category, the initial test speed shall be 110 km/h (68 mph).

c. Duration at initial test speed: 10 minutes.

d. Successive Speed Increments: 10 km/h (6 mph).

e. Duration at Each Speed Step: 10 minutes.

f. Duration at the speed category step: 10 minutes.

6.2.1 Alternate Operation (2.0 m Diameter Optional Test Wheel): This operation is the same as 6.2 except:

a. Initial test speed is the speed category of the tire less 30 km/h (18 mph). For tires which do not have a speed category, the initial test speed shall be 120 km/h (75 mph).

b. Duration at the Speed Category Step: 20 minutes.

6.3 Test Records: The following information should be recorded for each tire:

6.3.1 Tire Identification:

a. Manufacturer

b. Brand or Trade Name

c. Tire Size Designation

d. Tire Maximum Load

e. Service Description (If the tire has a service description designation)

f. Speed Category (If the tire has a speed category designation)

g. Tire Maximum Pressure

h. Serial Number (Identification number)

i. Other Pertinent Information

6.3.2 Test Wheel Identification:

a. Test Wheel Diameter

b. Other Pertinent Information

6.3.3 Test Conditions:

a. Date and Time

b. Rim Diameter, Width and Contour

c. Test Load

d. Test Inflation

e. Ambient Temperature

f. Other Pertinent Information

6.3.4 Test Data:

a. Initial Test Speed

b. Subsequent Completed Speed Steps - Speed and Duration

c. Duration and Speed of Final Step

d. Tire Removal Condition After Final Step

7. Termination of Test and Data Evaluation:

7.1 The test may be considered terminated by one of the following:

a. Completion of predetermined final step.

b. Tire Failure

7.2 Upon visual inspection of the dismounted tire any visible evidence of the following constitutes tire failure:

a. Tread Separation

b. Cord Separation

c. Ply Separation

d. Bead Separation

e. Sidewall Separation

f. Chunking

g. Innerliner Separation

h. Cracking

RATIONALE:

Not applicable.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

J1561 has been offered as a strawman for an ISO High Speed Test Procedure being developed at Committee: ISO/TC31/SC3/WG13.

REFERENCE SECTION:

Not applicable.

APPLICATION:

This procedure provides a method for testing the speed performance of passenger car tires under controlled conditions in the laboratory on a test wheel. (This procedure does not apply to extra load tires or 'T'-type temporary use spare tires.)

COMMITTEE COMPOSITION:

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