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**Test Method for Measuring Ice Grip Performance of
Passenger Car Tyres**

轿车轮胎冰地抓着性能试验方法

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Test Method for Measuring Ice Grip Performance of Passenger Car Tyres

1 Scope

This document specifies the test method for measuring ice grip performance of passenger car tyres on icy roads, including test conditions, test procedures, data processing, and tests using reference tyres to test ice grip performance, as well as test reports.

This document is applicable to radial tyres of passenger cars.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 6326 Tyre Terms and Definitions

GB/T 33829 Test Method for Snow Grip Performance of Passenger Car Tyres

3 Terms and Definitions

What is defined in GB/T 6326 and GB/T 33829, and the following terms and definitions are applicable to this document.

3.1 Ice Grip Index

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Ice grip index refers to the ratio of the ice grip performance of tyres under test to the standard test tyres.

3.2 Non-consecutive Sequence

Non-consecutive sequence refers to the test sequence carried out after the icy road surface is refinished, or the test carried out on different test roads, or on different days.

4 Test Conditions

4.1 Road Surface Conditions

4.1.1 The test icy road surface shall be flat and smooth; the length and width shall be able to satisfy the requirements of the relevant tests in this document; the slope shall be not greater than 2%.

4.1.2 Before the test, pre-grinding shall be carried out. If watering is required, it should be completed 1 h before the start of the test. The water used to prepare the icy surface shall be clean. Before the start of the test, for the braking lines, non-test tyres shall be used to simulate braking, until the force of friction becomes stabilized.

4.1.3 Use 225/60R16 98S standard test tyres to measure the ice grip performance on the icy roads. The average deceleration of each test running-in shall be maintained between $0.97 \text{ m/s}^2 \sim 1.72 \text{ m/s}^2$.

4.2 Climatic Conditions

4.2.1 The ambient temperature range measured at about 1 m above the icy road is $-21^\circ\text{C} \sim 4^\circ\text{C}$; the temperature range of the icy road is $-21^\circ\text{C} \sim -5^\circ\text{C}$. The maximum relative humidity of the test environment shall be lower than 90%.

4.2.2 During the test, direct exposure to the sun and sunlight, or relatively major changes in humidity shall be avoided as much as possible; the wind speed should not be greater than 5 m/s.

4.3 Conditions of Test Vehicles

4.3.1 Select test vehicles in good condition, equipped with ABS system, and to which, tyres under test and standard test tyres are applicable.

4.3.2 The test vehicles shall be equipped with calibrated sensors suitable for measurement under cold and freezing conditions. The speed and distance data acquisition system shall have the function of storing measurement results. The accuracy of the sensors and the system shall satisfy: the relative uncertainty of the measured or calculated adequately emitted average deceleration is less than 1%.

4.3.3 The test vehicles shall be in consecutive and mass production, and without any modification that affects the braking characteristics. The load capacity of each wheel shall be able to satisfy the requirements of the test load of the tyre under test. When the tyre load needs to be increased, the vehicle may be counterweighted.

4.4 Test Measuring Instruments

4.4.1 The test measuring instruments shall be insensitive to vibrations, decelerations and ambient temperature changes. All exposed parts shall be able to withstand 100% relative

humidity, dust, shock and vibration, and other unfavorable factors.

4.4.2 The speed of the test vehicle is measured by installing a non-contact speed measuring instrument, for example, GPS. Within the ambient temperature range of $-21\text{ }^{\circ}\text{C} \sim 4\text{ }^{\circ}\text{C}$, the maximum permissible errors:

- a) Speed measurement: $\pm 0.5\text{ km/h}$;
- b) Distance measurement: $\pm 0.1\text{ m}$.

4.4.3 During the test, the actual vehicle speed measured by the measuring instrument, or the difference between the actual vehicle speed and the standard vehicle speed shall be displayed in the vehicle in real time, so that the driver can adjust the vehicle speed in time.

4.4.4 The accuracy of the barometer shall be $\pm 5\text{ kPa}$.

4.5 Tyre under Test

4.5.1 Select 225/60R16 98S standard test tyres, which shall comply with the requirements of the corresponding domestic technical specifications of standard test tyres.

4.5.2 The tyres under test shall be produced in the same batch and reserved in the same environment. Lint, bead and any foreign matters on the treads shall be eliminated.

4.5.3 Before the test, put the tyres under test on pilot run for at least 100 km on a dry pavement. During the pilot run, changes in tread pattern depth, pattern block position and strip pattern completeness shall be avoided.

4.5.4 The tyres under test shall be assembled near the test site. Mount the tyres under test on the rim (measured rim or rim permitted to use) used by the test vehicle. In order to facilitate the installation, an appropriate amount of lubricant is allowed to be used. All assembled tyres to be tested shall be placed in the same outdoor environment for at least 2 h, then, the tyre inflation pressure shall be adjusted to the value specified in the test.

4.5.5 Before the test, the surface of the tyres under test shall be clean and free of debris.

4.5.6 The inflation pressure of the tyres under test is 250 kPa. The load applied to the tyres is 60% ~ 90% of the corresponding load of the tyre load index. The difference between the tyre loads on the same axle does not exceed 10%.

5 Test Procedures

5.1 In accordance with the requirements of 4.4, prepare the measuring instruments.

5.2 Use a temperature measuring device to measure the ambient temperature and the temperature of the icy road surface. Use an anemometer to measure the wind speed.

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