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**NATIONAL STANDARD OF THE
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GB 36581-2018

**Safety performance requirements and test methods of
automobile wheels**

汽车车轮安全性能要求及试验方法

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1 Scope

GB 36581-2018 is the Chinese national standard on safety performance requirements and test methods of automobile wheels, in the field of road vehicles engineering. It carries no /T suffix, which in the Chinese system means compliance is mandatory: a product or a practice within its scope has to meet it to be lawfully made, sold or carried out in China. It was issued on 17 September 2018 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 January 2020. Classification: ICS 43.040.50, CCS T22. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This Standard specifies the marking safety performance requirements and test methods for automobile wheels. This Standard applies to automobile wheels which are sold on the market; it does not apply to wheels supplied by the vehicle manufacturer.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies to this document.

GB/T 2933-2009, Wheels and rims for pneumatic tyres - Vocabulary, designation and

marking

GB/T 2977, Size designation, dimensions, inflation pressure and load capacity for truck tyres

GB/T 2978, Size designation, dimensions, inflation pressure and load capacity for passenger car tyres

3 Terms and definitions

For the purposes of this document, the following terms and definitions and those given in GB/T 2933 apply.

3.1 wheels supplied by the vehicle manufacturer wheels which are supplied by the vehicle manufacturer and marked with permanently visible trademark and part number of the vehicle manufacturer. determined.

- a) wheels are incapable of continuing to bear loads;
- b) original cracks occur, extends or new visible cracks occur (using the dye penetration inspection or other acceptable methods, such as fluorescent nondestructive testing);
- c) before the cycle index required, the offset increment of load points exceeds 10% of the original load offset. 5.1.1.2.2 Failure criteria for light alloy wheels Conduct test as specified in 6.2.1; during the test or after the minimum cycle index as specified in table 1, in one of the following cases, the failure of test wheels is determined.

- a) wheels are incapable of continuing to bear loads;
- b) original cracks occur, extends or new visible cracks occur (using the dye penetration inspection or other acceptable methods, such as fluorescent nondestructive testing);
- c) before the cycle index required, the offset increment of load points exceeds 20% of the original load offset.

5.1.2 Dynamic radial fatigue performance requirements

5.1.2.1 Strengthening factor and minimum cycle index For strengthening factor and minimum cycle index of dynamic radial fatigue test see Table 2. Table 2 - Requirements for strengthening factor and minimum cycle index of dynamic radial fatigue test Strengthening factor K Minimum cycle index 2.25a 500,000 2.00 1,000,000 a Strengthening factor of prior selection.

5.1.2.2 Failure criteria Conduct test as specified in 6.2.2; during the test or after the minimum cycle index as specified in table 2, in one of the following cases, the failure of test wheels is determined.

- a) wheels are incapable of continuing to bear loads;

b) original cracks occur, extends or new visible cracks occur (using the dye penetration d - inner offset or outer offset of wheels (inner offset is positive; outer offset is negative), in m; Fv - wheels' rated load as specified by the wheel manufacturer, in N; S - strengthening factor (see Table 1).

6.2.1.3 Test procedure 6.2.1.3.1 Clamp wheels firmly on test fixture. 6.2.1.3.2 Connecting parts of test apparatus are connected to the mounting surface of wheels using unlubricated studs and nuts (or bolts); the mounting shall be equivalent to the actual working conditions when they are mounted onboard. Use the star tightening method to tighten wheel nuts (or bolts) to the torque values as specified by the wheel manufacturer. The mounting surface of test apparatus connecting parts and the mounting surface of wheels shall be clean, smooth. 6.2.1.3.3 Under no load, jerk value of wheel loading points shall not exceed 0.15 mm. 6.2.1.3.4 Wheels' bolts and nuts can be tightened once again during test. 6.2.1.3.5 Terminate test when the cycle index requirements of Table 1 are complied with or after the failure of wheels.

6.2.2 Dynamic radial fatigue test method for passenger vehicles

6.2.2.1 Test apparatus Tester shall be provided with a device with which a constant radial load can be applied during the rotation of wheels. See Figure 2. A driven rotary drum shall be mounted, which has a smooth surface wider than the cross section of tyres. The recommended minimum rotary drum outer diameter is 1,700 mm. Test apparatus shall make loading direction perpendicular to outer surface of rotary drum; and loading direction passes the center lines of test wheels and rotary drum. The axes of rotary drum and test wheel shall be parallel. Accuracy of loading system shall be controlled within the range of $\pm 2.5\%$. 6.2.3.3.1 During the whole process of test, ambient temperature shall be maintained within the range of $10^{\circ}\text{C} \sim 30^{\circ}\text{C}$. 6.2.3.3.2 Use tubeless radial tyres of minimum nominal sectional width applicable to wheels as specified in GB/T 2978. The inflation pressure is $200 \text{ kPa} \pm 10 \text{ kPa}$. 6.2.3.3.3 Mount test wheel and tyre assembly to tester to ensure that impact loads can be applied to wheels' flange. Axes of wheels shall form an angle of $13^{\circ} \pm 1^{\circ}$ to the vertical direction; the highest point of flange shall face directly to punch hammer. 6.2.3.3.4 The mounting of wheels on tester shall be equivalent to the actual working conditions when they are mounted onboard; use the star tightening method to tighten wheel nuts (or bolts) to the torque values as specified by the wheel manufacturer. 6.2.3.3.5 Because of the diversity of design of wheels' central part, select sufficient positions on wheels' rim circumference to carry out impact test to ensure the integrity of evaluation of central part, at least including the positions of window and spoke. Use brand new wheels for each test. 6.2.3.3.6 Punch hammer shall be above tyres and overlap flange for $25 \text{ mm} \pm 1 \text{ mm}$. Lift punch hammer to $230 \text{ mm} \pm 2 \text{ mm}$ above the highest point of flange; then release punch hammer; impact. 6.2.3.3.7 After finishing impact, carry out determination as specified in 5.1.3.

6.3.1 Dynamic bend fatigue performance test method

6.3.1.1 Test apparatus Tester shall be provided with a driven rotary device; wheels can rotate under a stationery bending moment or wheels stay stationery while they are subjected to one rotary bending moment, see Figure 5. Loading arm of force shall have sufficient rigidity, the length of which shall be between

0.76 m and

1.4 m. Measuring system is capable of continuing measurement of the displacement of arm shaft. Accuracy of loading system shall be controlled within $\pm 5\%$. S - strengthening factor (see Table 3).

6.3.1.3 Test procedures 6.3.1.3.1 Clamp wheels firmly on the test fixture. 6.3.1.3.2 Connecting parts of test apparatus are connected to the mounting surface of wheels using unlubricated studs and nuts (or bolts); the mounting shall be equivalent to the actual working conditions when they are mounted onboard. Use the star tightening method to tighten wheel nuts (or bolts) to the torque values as specified by the wheel manufacturer. The mounting surface of test apparatus connecting parts and the mounting surface of wheels shall be clean, smooth. 6.3.1.3.3 Under no load, jerk value of wheel loading points shall not exceed

0.3 mm. 6.3.1.3.4 Wheels' bolts and nuts can be tightened once again during test. 6.3.1.3.5 Terminate test when the cycle index requirements of Table 3 are complied with or after the failure of wheels.

6.3.2 Dynamic radial fatigue performance test method

6.3.2.1 Test apparatus Tester shall be provided with a device with which a constant radial load can be applied during the rotation of wheels. See Figure 2. A driven rotary drum shall be mounted, which has a smooth surface wider than the cross section of tyres. The recommended minimum rotary drum outer diameter is 1,700 mm. Test apparatus shall make loading direction perpendicular to outer surface of rotary drum; and loading direction passes the center lines of test wheels and rotary drum. The axes of rotary drum and test wheel shall be parallel. Accuracy of loading system shall be controlled within the range of $\pm 5\%$.

6.3.2.2 Determination of radial load Radial load F_r is determined in accordance with Equation (5), in N. where. F_v - wheels' rated load as specified by the wheel manufacturer, in N; K - strengthening factor (see Table 4).

6.3.2.3 Test procedures 6.3.2.3.1 Select test tries as specified in GB/T 2977.