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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 22038-2018

Replacing GB/T 22038-2008

Method of automobile tyre static contact pressure distribution

汽车轮胎静态接地压力分布试验方法

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009. This Standard replaces GB/T 22038-2008, Method of automobile tyre static contact pressure distribution. Compared with GB/T 22038-2008, the main technical changes, except editorial changes, are as follows: -- Modify the definition of the term "radial force"; add the tyre pressure coordinate system (see 3.1, and

3.1 of version 2008); -- Modify the English equivalent of the term "contact patch"; modify the schematic diagram of the contact patch (see 3.2, and

3.2 of version 2008); -- Modify the term "method of pressure sensitive film" to "method of pre-scale film" (see 3.3, and

3.3 of version 2008); -- Modify the term "method of pressure sensor" to "method of sensor" (see 3.4, and

3.4 of version 2008); -- Add the term "method of light absorption" (see 3.5); -- Add the force/displacement measuring system (see 4.1.2.1); -- Add description of the pressure distribution measuring system (see 4.1.2.3); -- Change "deviation <= ±1°" to "accuracy ±0.05°" (see 4.2.1, and

4.2.1.1 of version 2008); -- Add provisions for the accuracy of the pressure gauge (see 4.2.4); -- Add provisions for the accuracy of the displacement measuring system (see 4.2.5); -- Remove the calibration of the device (see

4.2.2 of version 2008); -- Modify the order of each condition description in the test conditions (see 5.1, and

5.1 of version 2008); -- Modify the provisions for tyre appearance quality, test rim, test air pressure and test load (see 5.1.2, 5.1.3, 5.1.4, 5.1.6, and 5.1.2, 5.1.3, 5.1.4,

5.1.5 of version 2008); -- Remove the requirement for tyre weighing in the item (see

5.2.1 of version 2008); -- Add requirements for the steps of the method of light absorption; add requirements for the radial loading speed (see 5.2.5); Method of automobile tyre static contact pressure distribution

1 Scope

GB/T 22038-2018 is the Chinese national standard on method of automobile tyre static contact pressure distribution, in the field of rubber and plastic industries. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 28 December 2018 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 November 2019. Classification: ICS 83.160.10, CCS G41. 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 terms and definitions, equipment composition and accuracy, test conditions, test procedures, test records and numerical value processing for method of automobile tyre static contact pressure distribution. This standard applies to passenger car tyres and truck tyres.

2 Normative references

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

GB/T 521, Test method of measuring peripheral dimensions for tyres

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

GB/T 6326, Tyre terms and definitions

GB/T 8170, Rules of rounding off for numerical values & expression and judgment of limiting values

HG/T 2177, Appearance quality of tyres

3 Terms and definitions

Terms and definitions determined by GB/T 6326 and the following ones are applicable to this document.

3.1 Radial force The vertical force on the test bench that the tyre is subjected to. See Figure 1 for the tyre pressure coordinate system. sensitive film into pressure distribution by calibrating the relationship curve between different color depth and pressure.

3.4 Method of sensor A method of using a pressure sensor to measure the tyre static contact pressure distribution.

3.5 Method of light absorption The light absorptive amount or light scattering degree at a certain point between the optical prism and the flat ground or the rough rubber surface is a function of pressure. The method that uses this rule, to convert the light and dark distribution of this light within the ground plane into a pressure distribution.

4.1 Equipment composition

4.1.1 Loading and positioning device The loading device is any device that can provide radial force to the pneumatic tyre and can maintain the load. The positioning device is any device that can measure and position the relative vertical displacement between the tyre rotation axis and the rigid platform.

4.1.2 Measuring system

4.1.2.1 Force/ displacement measuring system The measuring system shall be able to measure the radial force of the tyre and the vertical distance or change in distance between the tyre's rotation axis and the rigid platform.

4.1.2.2 Ground contact area measuring system The measuring system shall be able to map the graphic of the contact part between the tyre and the rigid platform after the target load is given by the loading system; it can measure the imprint area, the ground contact area, the ground contact length and the ground contact width.

4.1.2.3 Pressure distribution measuring system The measuring system shall be able to identify the radial force distribution (expressed in pressure) within the tyre contact area.

4.1.3 Rigid platform

5.1.5 After the tyre is inflated, park it at room temperature of 18 °C ~ 36 °C for at least 24 h. Re-adjust the tyre pressure after parking to the air pressure that is specified in 5.1.4; test

after 15 minutes of parking. If the test is repeated at the same point, first check whether the air pressure is within the standard deviation of the specified air pressure. The next test can be carried out after parking for 30 minutes.

5.1.6 The radial load should refer to the standard load that is specified in GB/T 2977 and GB/T 2978 (when there are two conditions for single and double tyres, use the single tyre load); or perform the test according to the load that is specified by the test applicant .

5.2 Test procedures

5.2.1 Clean the dirt, debris and other contaminants on the surface of the tyre; trim the exhaust rubber bead and mold seam rubber edge; then, assemble the tyre on the rim that is required by 5.1.3; fill the air pressure that is specified by 5.1.4; park in accordance with the provisions of 5.1.5.

5.2.2 Fix the test tyre and rim assembly on the testing machine.

5.2.3 Mark the required test points on the sidewall of the tyre.

5.2.4 In accordance with the provisions of GB/T 521, measure the tyre inflation outer diameter and section width. Or apply a radial force <=50 N; record the vertical distance between the tyre rotation axis and the rigid platform as the half of the tyre inflation outer diameter.

5.2.5 Place a pressure sensitive film or a pressure blanket with sensors or a special reflective paper between the tyre and the rigid platform; apply a radial load to the prescribed value of

5.1.6 at a radial loading speed of (50 ± 2.5) mm/min; the speed shall ensure that the pressure sensitive film or pressure sensor is not wrinkled at the pressured part; keep it for more than 2 min after loading to the specified load. Measure the static load radius and section width of the tyre under load.

5.2.6 Process the data that is obtained by the pressure distribution measuring system as required.

6 Test record and numerical calculation

6.1 Record the laboratory temperature, test rim, test load, test air pressure, and the tyre inflation outer diameter and section width.