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Uniformity test method for motor vehicle tyres

汽车轮胎均匀性试验方法

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Uniformity test method for motor vehicle tyres

1 Scope

This Standard specifies the test method for measuring the uniformity of passenger car tyres and truck tyres on the tyre uniformity test machine (drum method).

This Standard applies to passenger car tyres and truck tyres (including mini truck tyres, light 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 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 9743, Passenger car tyres

GB 9744, Truck tyres

3 Terms and definitions

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

3.1 Uniformity

Under static and dynamic conditions, the constant performance of tyre circumference characteristics, including tyre mass unbalance, dimensional deviation and force fluctuations.

Note: This Standard only refers to the tyre force variation.

The maximum peak-to-peak value of the lateral force variation of first harmonic.

3.7 Test drum

Rotating cylindrical load wheel.

4 Test equipment and its requirements

4.1 General requirements

4.1.1 The tyre uniformity test equipment shall include:

- a) Principal axis, which is equipped with an adjustable width rim; the tyre can be simply installed on the rim;
- b) Test drum, whose axis is parallel to the principal axis;
- c) The equipment shall have a device that has two rotation directions of clockwise and counterclockwise;
- d) The equipment shall have a device that can quickly inflate and deflate tyres and control the air pressure during tyre operation;
- e) A device that loads up the tyre, which can keep the wheelbase between the tyre and the drum constant during the detection process;
- f) When the tyre and drum rotate at a specified speed, there is a device for measuring radial force and lateral force;
- g) The device that is used to identify the test results.

4.1.2 The parallelism between the principal axis and the rotation axis shall be kept below:

- a) If it is the equipment that is equipped with a type-A drum (outer diameter of 854 mm), it is 0.25 mm/m when it is loaded with a radial force of 10 kN and a lateral force of 500 N;
- b) If it is the equipment that is equipped with a type-B drum (outer diameter of 1600 mm), it is 0.5 mm/m when it is loaded with a radial force of 40 kN and a lateral force of 2 kN;

4.1.3 During the measurement, the equipment shall have the ability to rotate the tyre at a speed of not less than 10 r/min and not more than 250 r/min.

4.1.4 For the device that is used to measure radial force and lateral force variations, the accuracy deviation within the range shall meet the following requirements:

5.6.2 If the test tyre is partially deformed due to storage, packaging and transportation, appropriate preheating repair can be used to reduce the deformation to an acceptable level.

5.6.3 In order to ensure that the tyre is properly seated on the rim, the surface of the tyre bead or rim bead seat or both may be coated with a suitable lubricant.

6 Test steps

6.1 Select and adjust the rim of the test machine according to the provisions of 4.3.

6.2 Install the tyre on the rim; inflate to the test pressure that is specified in 5.3.

6.3 Rotate the principal axis of the test machine at the speed that is specified in 5.5; move the test drum against the tyre until it reaches the specified load; keep the distance between the principal axis and the drum axis constant; make the principal axis rotate clockwise and counterclockwise for more than two cycles, respectively; record the following data after measurement:

- a) Radial force variation RFV_{CW} ;
- b) Lateral force variation LFV_{CW} ;
- c) Lateral force deviation LFD_{CW} ;
- d) Radial force variation RFV_{CCW} ;
- e) Lateral force variation LFV_{CCW} ;
- e) Lateral force deviation LFD_{CCW} ;
- g) Radial force of first harmonic RFV_{1H} ;
- h) Lateral force of first harmonic LFV_{1H} ;
- i) Conicity CON ;
- j) Ply steer PLY .

6.4 Move the test drum away from the tyre; deflate the tyre; remove the tyre from the rim.

6.5 Mark the test tyres if necessary.

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