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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 14172-2021

Replacing GB/T 14172-2009

**Bench test methods of static roll stability for motor vehicles,
trailers and combination vehicles**

汽车、挂车及汽车列车静侧倾稳定性台架试验方法

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part

1.Rules for the structure and drafting of standardizing documents". This Standard replaces GB/T 14172-2009 "Static roll stability test method for motor vehicles". Compared with GB/T 14172-2009, in addition to editorial modifications, the main technical changes in this Standard are as follows: - changed the application scope (see Chapter 1 of this Edition, Chapter 1 of Edition 2009); - changed the terms and definitions for static roll stability, roll angle, maximum stable roll angle (see 3.1, 3.2,

3.3 of this Edition, 3.1, 3.2,

3.3 of Edition 2009); - added the term and definition for stable roll angle (see

3.4 of this Edition); - added the maximum allowable error requirement of the tire pressure measuring instrument (see

4.1 of this Edition); - changed the test bench ascending speed and descending speed requirements (see

4.2.2 of this Edition,

4.2.2 of Edition 2009); - changed the test bench surface requirements (see 4.2.3, 4.2.4 of this Edition, 4.2.3, 4.2.4 of Edition 2009); - changed the anti-skid stop requirements (see 4.3 of this Edition, 4.3 of Edition 2009); - changed the vehicle load state requirements (see 5.1.2 of this Edition, 5.1.5 of Edition 2009); - changed the suspension locking requirements (see

1 Scope

GB/T 14172-2021 is the Chinese national standard on bench test methods of static roll stability for motor vehicles, trailers and combination vehicles, in the field of road vehicles engineering. 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 20 August 2021 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 March 2022. Classification: ICS 43.020, CCS T04. 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 test equipment, test conditions, test methods and test records for bench test of static roll stability for motor vehicles, trailers and combination vehicles. This Standard is applicable to motor vehicles, trailers and combination vehicles. Other types of vehicles may refer to this Standard for implementation.

2 Normative references

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

GB/T 1184-1996, Geometrical tolerancing - Geometrical tolerance for features without individual tolerance indications

GB/T 3730.1, Motor vehicles and trailers - Types - Terms and definitions

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 3730.1 as

well as the followings apply.

3.1 static roll stability the vehicle's inherent anti-rolling ability when subjected to lateral forces under static conditions

3.2 roll angle when the vehicle tilts with the tilt test bench, the angle between the vehicle tire support plane and the horizontal plane

3.3 maximum stable roll angle the roll angle when the normal reaction force of all tire support planes on the lifting side of the vehicle reaches zero

4 Test equipment

4.1 Measuring instruments The requirements for measuring instruments are shown in Table 1.

4.2 Roll test bench

4.2.1 The maximum roll angle of the test bench surface shall be able to meet the static roll stability requirements of the vehicle under test. The roll angle of the test bench shall be able to be adjusted continuously between zero degrees and the maximum roll angle, and can be fixed at any angle.

4.2.4 The flatness of the test bench is not lower than the tolerance level 12 specified in Table B.1 of GB/T 1184-1996. The parallelism between the longitudinal axis of the test bench and the centerline of rotation shall not be lower than the tolerance level 12 specified in Table B.3 of GB/T 1184-1996.

4.3 Anti-skidding block In order to prevent the vehicle from skidding during the test, an anti-skidding block can be installed on the roll test bench. The height of the anti-skidding block is set to minimize the impact on the test results.

4.4 Anti-rollover safety equipment Special safety equipment to prevent the vehicle from overturning accidents shall be equipped during the test.

5.1 Vehicle conditions

5.1.1 Tires In the test load state, the cold inflation pressure of the test vehicle's tires shall meet the vehicle manufacturer's regulations.

5.1.3 Vehicle preparation All vehicle assemblies, components and auxiliary equipment (including tools and spare tires) shall be fully equipped according to the manufacturer's regulations and installed in the prescribed positions. As for the assembly or component whose position can be adjusted (such as lifting shaft, adjustable air suspension), it shall be adjusted to a state suitable for the load.

5.2 Environmental conditions In the outdoor test, the ambient wind speed shall not exceed

5m/s, and the lateral wind speed shall not exceed 3m/s.

5.3 Special requirements for trailers

5.3.1 Semi-trailers Semi-trailer measurement shall be carried out in the form of a combination of tractor or tractor simulation device. The tractor simulation device shall have structural characteristics similar to the actual tractor. The structure and height of the tractor seat of the tractor (or tractor simulation device) shall match that of the semi-trailer.

5.3.2 Tow bar trailer and central axle trailer A tractor, tractor simulation device or other supporting device shall be used to assist in the test. The structure and height of the connecting device used on the tractor, tractor simulator or other supporting device shall match the tested trailer.

6.1.1 Measure the maximum stable roll angle when the vehicle leans to the left

6.1.1.1 Place the vehicle on the roll test bench. The tires are driving in a straight line. The longitudinal symmetry plane of the vehicle is parallel to the centerline of rotation of the test bench.

6.1.1.2 Implement the parking brake. The transmission is in neutral position (when applicable). The differential lock is in an inactive state. Install anti-skidding block and anti-rollover safety equipment.

6.1.1.5 Drive the vehicle away from the roll test bench and park again according to the requirements of 6.1.1.1.

6.1.1.6 Repeat the provisions of 6.1.1.1~6.1.1.5. The test is carried out three times in total.

6.1.1.7 If the maximum difference between the three measurements exceeds 0.6° , the number of tests shall be increased until the maximum difference between the three consecutive measurements does not exceed 0.6° . It shall be based on the last three measurements.

6.1.2 Measure the maximum stable roll angle when the vehicle leans to the right Repeat the test steps in 6.1.1. Measure the maximum stable roll angle when the vehicle leans to the right.

6.2.1 Judgment test of the stable roll angle when the vehicle leans to the left

6.2.1.1 Test according to 6.1.1. The vehicle will stop when it leans to the left with the test bench to the value of θ (if it reaches the critical state of rollover before the value of θ , it shall stop). The test is repeated three times.

6.2.2 Judgment test of the stable roll angle when the vehicle leans to the right Repeat the test steps in 6.2.1. Determine the stable roll angle when the vehicle leans to the right.