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

GB/T 12541-2023

Replacing GB/T 12541-1990

Motor vehicles passing capacity test method

汽车通过性试验方法

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1 Scope

GB/T 12541-2023 is the Chinese national standard on motor vehicles passing capacity test method, 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 23 May 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 December 2023. 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 document describes the test conditions and test methods for the passing capability parameter, terrain passing capability and soft ground passing capability of automobiles. This document is applicable to Category-M, Category-N and Category-G vehicles. Other vehicle models may take this as a reference.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the 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 3730.3 Motor Vehicles and Towed Vehicles - Dimensions of Vehicles - Terms and Definitions

GB/T 12534 Motor Vehicles - General Rules of Road Test Method

GB/T 12673 Motor Vehicle Main Dimensions Measurement Method

GB/T 15089 Classification of Power-driven Vehicle and Trailers

GB 18384 Electric Vehicles Safety Requirements

GB 38032 Electric Buses Safety Requirements

3 Terms and Definitions

What is defined in GB/T 3730.3, GB/T 12673 and GB/T 15089, and the following terms and definitions are applicable to this document.

3.1 passing capability parameter Passing capability parameter is an objective parameter index of vehicle passing capability. Example: approach angle, departure angle, minimum ground clearance, ramp breakover angle and transverse passing radius.

3.2 terrain passing capability Terrain passing capability refers to a vehicle's capability of passing certain terrains (such as: vertical obstacles, convex ridges, horizontal ditches, road ditches, craters, twisted roads, wading pools, side slopes and ramps, etc.).

3.3 soft ground passing capability Soft ground passing capability refers to a vehicle's capability of passing certain soft grounds (such as: sandy lands, plowed lands, muddy lands, swampy lands, rice fields and snowfields, etc.).

3.4 lateral passing radius Lateral passing radius refers to the maximum arc radius formed by the projection on the X datum plane between the inside ground contact point of the left and right wheels of the same axle and a certain low point of the chassis under the static condition of the vehicle.

4.1 General Rule

4.1.1 Vehicle preparation and test meteorological conditions shall comply with the stipulations of GB/T 12534.

4.1.2 The amount of wear on the tread pattern of the test vehicle shall not exceed 1/5 of the original tread height.

4.1.3 When the same model has different tyre models, the vehicle equipped with tyres with the smallest diameter shall be selected for the test.

4.1.4 Adjust the tyre pressure of the test vehicle to the pressure value required by design, when equipped with adjustable pressure tyres, in accordance with the manufacturer's design requirements, adjust to the appropriate pressure.

4.1.5 For vehicles equipped with adjustable suspension, adjust the test vehicle to the suspension state required by the manufacturer.

4.1.6 The test vehicle shall be loaded in accordance with the maximum design total mass, axle load and wheel load specified by the manufacturer.

4.2 Measurement Parameters and Accuracy The measurement parameters and accuracy are shown in Table 1.

5.2.1.3 If there is no special requirement from the manufacturer, adjust the vehicle to the maximum design total mass state.

5.2.2 Vertical obstacles

5.2.2.1 The vehicle can drive up / down the vertical obstacles in forward gear and up / down the vertical obstacles in reverse gear.

5.2.2.2 Place the manual transmission in the lowest forward gear / reverse gear. If there is an auxiliary transmission gear, place it also in the lowest forward gear. Place the automatic transmission in the forward gear / reverse gear (or in accordance with the manufacturer's design requirements) and adjust the all-wheel drive vehicle to the all-wheel drive state.

5.2.2.3 When driving on a vertical obstacle, drive the vehicle at a speed not greater than 5 km/h, until the wheels approach the vertical obstacle, then, brake and stop, keep the gear unchanged, release the brake pedal, select an appropriate throttle opening, and drive forward / reverse on the vertical obstacle.

5.2.2.4 When driving down a vertical obstacle, drive the vehicle at a speed not greater than 5 km/h, until the wheels approach the vertical obstacle, then, brake and stop, keep the gear unchanged, appropriately adjust the brake pedal force, and slowly drive forward / reverse down the vertical obstacle.

5.2.2.5 Observe the movement of the vehicle and whether its components are in contact or collide with terrain facilities, or interfere with each other during the process of passing the vertical obstacle.

5.2.2.6 During the process of the vehicle passing the vertical obstacle, if the vehicle, except the wheels, does not contact or collide with the vertical obstacle, or there is no

inter-component interference, and in the parking inspection after passing, there is no collision damage of components, damage or looseness of connectors, and abnormal operation of the assembly, etc., then, vertical obstacles with other parameters can be chosen; repeat 5.2.2.2 ~ 5.2.2.5, until reaching or approaching the maximum value that can be passed; record the passing conditions in the corresponding record table (see Table B.3).

5.2.2.7 During the process of the vehicle passing the vertical obstacle, if the vehicle, except the wheels, does contact or collide with the vertical obstacle, or there is inter-component interference, or if there is a failure in passing, or in the parking inspection after passing, there is collision damage of components, damage or looseness of connects, and abnormal operation of the assembly, etc., after analyzing the causes and recovering the vehicle to the normal state, in accordance with Appendix C, re-select the height of the vertical obstacle and in accordance with 5.2.2.2 ~ 5.2.2.6, re-conduct the test.

5.2.3 Convex ridges, horizontal ditches, road ditches, craters and twisted roads

5.2.3.1 Place the manual transmission in the lowest gear, and if there is an auxiliary transmission gear, place it also in the lowest gear. Place the automatic transmission in the forward gear (or in accordance with the manufacturer's design requirements), and adjust the all-wheel drive vehicle to the all-wheel drive state.

5.2.3.2 Drive the vehicle at a speed not greater than 5 km/h, until the front wheels approach the corresponding terrain, then, brake and stop, keep the gear unchanged, release the brake pedal, select an appropriate throttle opening, pass the corresponding terrain facilities, and observe the movement of the vehicle and whether its components are in contact with or collide with the terrain facilities, or whether there is inter-component interference during the process of passing the corresponding terrain.

5.2.3.3 During the process of the vehicle passing the terrain, if the vehicle, except the wheels, does not contact or collide with the terrain facilities, or there is no inter-component interference, and in the parking inspection after passing, there is no collision damage of components, damage or looseness of connectors, and abnormal operation of the assembly, etc., then, terrain facilities with other parameters can be chosen; repeat 5.2.3.1 ~

5.2.3.2 until reaching or approaching the maximum value that can be passed; record each test condition in the corresponding record tables (see Table B.4 ~ Table B.8).

5.2.3.4 During the process of the vehicle passing the terrain, if the vehicle, except the wheels, does contact or collide with the terrain facilities, or there is inter-component interference, or if there is a failure in passing, or in the parking inspection after passing, there is collision damage of components, damage or looseness of connects, and abnormal operation of the assembly, etc., after analyzing the causes and recovering the vehicle to the normal state, in accordance with Appendix C, re-select the parameters of the terrain and in accordance with 5.2.3.1 ~ 5.2.3.3, re- conduct the test.