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**Test methods of hydraulic braking systems for motor vehicles
(English Translation)**

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1 Scope

This document specifies the test conditions and test methods of hydraulic braking systems for motor vehicles.

This document is applicable to Category-M and Category-N vehicles with hydraulic braking systems as specified in GB/T 15089.

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 5620 Road Vehicles - Braking of Automotive Vehicles and Their Trailers - Vocabulary

GB/T 8170 Rules of Rounding off for Numerical Values & Expression and Judgement of Limiting Values

GB 12676 Technical Requirements and Testing Methods for Commercial Vehicle and Trailer Braking Systems

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

GB 21670 Technical Requirements and Testing Methods for Passenger Car Braking Systems

3 Terms and Definitions

The terms and definitions defined in GB 12676, GB 21670, GB/T 5620 and GB/T 15089 are applicable to this document.

4.1.1 Road surface

The test road surface shall be a straight, solid asphalt road surface or concrete road surface or charged to the state of charge or first charged to above the state, and then, discharged to a fixed load at a roughly constant power, until the corresponding state of charge is reached. For vehicles powered only by power batteries, the state of charge can be adjusted by driving the vehicle. For tests conducted with the power battery partially charged, it is advisable to conduct them as soon as possible after the required state of charge is reached.

5.1.10 For vehicles equipped with an electric regenerative braking system, the state

requirements for the electric regenerative braking system during the O-type test depend on the type of the electric regenerative braking system. If the A-type electric regenerative braking system has a separate control device, during the O-type test, the A-type electric regenerative braking system shall not be enabled. The braking force generated by the B-type electric regenerative braking system shall not exceed the minimum level guaranteed by the system design, or the test shall be conducted without using the regenerative braking components. If the power battery is in one of the following states of charge, then, it is considered to meet the conditions.

- a) The maximum state of charge recommended by the manufacturer in the vehicle instruction manual;
- b) If the manufacturer does not provide specific recommendations, the state of charge shall not be less than 95%;
- c) The highest level of state of charge that can be achieved by the vehicle's automatic control charging.

5.2 Preliminary Test and Static Inspection

Preliminary test and static inspection shall be carried out in accordance with Appendix A.

5.3 No-load Basic Performance Test

No-load basic performance test shall be carried out in accordance with Appendix B.

5.4 Failure Performance Test

The failure performance test shall be carried out in accordance with Appendix C.

5.5 Full-load Basic Performance Test

The full-load basic performance test shall be carried out in accordance with Appendix D.

5.6 Braking and Running Deviation Tests of Vehicles Equipped with Temporary

Spare wheel / tire

The braking and running deviation tests of Category-M1 and Category-N1 vehicles equipped with temporary spare wheel / tire shall be carried out in accordance with Appendix E.

Appendix A (normative)

Preliminary Test and Static Inspection

A.1 Component Inspection

A.1.1 Check the appearance of the braking system to confirm whether the braking system and its components are correctly connected and reliably installed, and whether there is no leakage or component interference that may affect safety.

A.1.2 Perform static operation of the service brake to check whether the service brake acts on all wheels. By disassembling the pipeline, lifting and observing, etc., check and record the layout of the hydraulic circuit.

A.2.1 Service braking system inspection

When the vehicle is stationary, and the driver wears a fixed seat belt and holds the steering wheel with both hands, check whether the service brake control device can be actuated from the driving position, and check whether the service brake and parking brake control devices are independent of each other.

A.2.2 Parking brake system inspection

When the vehicle is stationary, and the driver wears a fixed seat belt, check whether the parking brake control device can be actuated from the driving position.

A.2.3 Emergency braking system inspection

When the vehicle is stationary, and the driver wears a fixed seat belt and holds the steering wheel with at least one hand (for Category-M1 vehicles, two hands are required), check whether the emergency brake control device can be actuated at full stroke from the driving position.

A.3 Alarm Signal Inspection

A.3.1 For vehicles equipped with an anti-lock braking system (ABS), when the vehicle is stationary and the anti-lock braking system is powered on after the vehicle is powered on, check whether the yellow alarm signal is on and the system self-checks. If there is no fault, check whether the alarm signal is off. Check whether the alarm signal is clearly visible during the day.

A.3.2 When the vehicle is stationary, by disconnecting the power supply line of the sensor, disconnecting the external line of the controller and disconnecting the regulator circuit, etc., simulate different ABS electrical faults, and check whether an optical alarm signal is issued to the driver and whether the alarm signal is clearly visible during the day.

A.4.1 Relations between pipeline pressure and control force

When the vehicle is stationary, install a control force measuring device and a pipeline pressure sensor on the vehicle and release the parking brake. Then, actuate the service brake control device, and slowly increase the control force from 0 to the maximum allowable value (500 N for Category-M1 vehicles and 700 N for other categories), and record the control force and pipeline pressure curve. Check in the following two states.

a) Normal assistance state.

- 1) For vehicles that rely on the engine to provide vacuum assistance (intake manifold or mechanical vacuum pump), increase the engine speed from idle to above 50% of the rated speed, run 4 ~ 5 times, and then, carry out the test while the engine is at idle speed;
- 2) For vehicles with vacuum assistance or hydraulic assistance of energy storage devices, the energy level of the energy storage device shall be 90% of the manufacturer's recommended value;
- 3) For vehicles with electronic assistance, the power supply voltage shall be at the manufacturer's recommended value.