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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 46991.1-2025

Requirements and test methods for the durability of in-vehicle traction batteries of electric vehicles - Part 1: Light-duty vehicles

电动汽车车载动力电池耐久性要求及试验方法 第1部分：轻型汽车

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1 Scope

GB/T 46991.1-2025 is the Chinese national standard covering how long an electric car's battery must last - the capacity and energy it has to retain after a defined number of years and kilometres, the accelerated ageing tests that stand in for that time, and the reporting of the state of health to the owner. Battery degradation is the single largest unknown in the residual value of an electric car, and this is China's answer to it. Part 1, first edition, and it belongs with the health assessment standard GB/T 47136-2026. It was issued on 31 December 2025 and has been in force since 1 July 2026, as a first edition. The document is under the responsibility of the Ministry of Industry and Information Technology. This page is published from the official record of the 2025 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the durability requirements and test methods for on-board traction batteries of pure electric vehicles and plug-in hybrid electric vehicles. This document applies to N1 category vehicles and M1 and M2 category vehicles with a maximum design gross weight not exceeding 3500 kg. M1 category vehicles with a maximum design gross

weight exceeding 3500 kg shall refer to this document for further details.

2 Normative references

The contents of the following documents, through normative references herein, constitute essential provisions of this document. For dated references, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies to this document.

GB/T 15089 Classification of power-driven vehicles and trailers

GB 18352.6-2016 Limits and measurement methods for emissions from light-duty vehicles (CHINA 6)

GB/T 18386.1-2021 Test methods for energy consumption and range of electric vehicles - Part

3 Terms and definitions

The terms and definitions defined in GB/T 15089, GB/T 18386.1-2021, GB/T 19596, GB/T 19753-2021, GB/T 29317, as well as the following terms and definitions, apply to this document.

3.1 Usable battery energy (UBE) In a range test, the energy supplied by the battery from the start to the end of the test.

3.2 Certified usable battery energy (UBE certified) The change in electrical energy obtained during type certification, according to the test methods of GB/T 18386.1-2021 and GB/T 19753-2021.

3.3 Measured usable battery energy (UBE measured) The change in electrical energy measured at the current point in the vehicle's lifecycle, according to the test methods of GB/T 18386.1-2021 and GB/T 19753- 2021.

3.4 Certified battery electric range (BER certified) The type certification value for the driving range determined according to the test methods of GB/T 18386.1-2021 and GB/T 19753-2021.

3.5 Measured battery electric range (BER measured) The vehicle's driving range measured at the current node, according to the test methods of GB/T 18386.1-2021 and GB/T 19753-2021.

4.1 General requirements

4.1.1 Vehicles shall be equipped with diagnostic interfaces conforming to GB 18352.6- 2016 (or other applicable versions).

4.1.2 Externally pluggable hybrid electric vehicles (OVC-HEVs) shall comply with the relevant requirements of SAE J1979 or SAE J1979-

2.Battery electric vehicles (BEVs) shall comply with the relevant requirements of SAE J1979-3.

4.1.3 Vehicles shall have SOCE and SOCR monitoring functions; continuously monitor and update SOCE, SOCR, and other data in Appendix A throughout their entire life cycle.

4.1.4 SOCE and SOCR shall be expressed as percentages, ranging from 0 to 100%, rounded to one percentile.

4.1.5 The vehicle manufacturer or its authorized agent shall provide the latest onboard SOCE and SOCR values through the On-board Diagnostic (OBD) system port; it may also provide them via Over-The-Air (OTA) transmission. The vehicle manufacturer or its authorized agent shall provide users with at least one method to obtain SOCE values, ensuring that the values obtained by users are consistent with those of relevant regulatory authorities. Examples include. - Dashboard indication; - On-board infotainment system; - Remote access (e.g., via mobile application).

4.1.6 Over the vehicle's ten-year or 200000 km lifespan, the onboard power battery shall meet the requirements of

4.2 Accuracy requirements

4.2.1 For SOCE accuracy, the difference between SOCEread and SOCEmeasured shall not exceed 5%, i.e., the result of SOCEread minus SOCEmeasured shall be less than or equal to 5%.

4.2.2 For virtual distance accuracy, the relative deviation between the onboard virtual distance and the measured virtual distance shall not exceed 3%.

5 SOCE accuracy verification test

5.1 Test vehicle The test vehicle can be run-in according to the manufacturer's recommended method, with a run-in mileage of not less than 300 km and not exceeding 5000 km. After the run-in is completed, vehicle pretreatment can be performed according to the manufacturer's requirements. Other requirements shall comply with the provisions of GB/T 18386.1-2021 and GB/T 19753-2021.

5.2.1 General requirements

5.2.1.1 For pure electric vehicles, the driving range (BER) and usable battery energy (UBE) shall be obtained according to GB/T 18386.1-2021, where UBE is the change in electrical energy described in

7.3.2 of GB/T 18386.1-2021, calculated according to Appendix B.

5.2.1.2 For plug-in hybrid electric vehicles, BER and UBE shall be obtained according to GB/T 19753-2021, where BER is the equivalent all-electric range (EAER); UBE is calculated according to Appendix B.

5.2.2 Initial test The test shall be conducted according to the requirements of

5.2.1 to obtain the vehicle's UBE and BER.

5.2.3 Verification test The aging and degradation test of the on-board power battery of the electric vehicle shall be conducted according to Appendix C. When one of the following conditions is met, the usable battery energy (UBE) test shall be conducted according to the requirements of 5.2.1, to obtain the corresponding UBE measured at the endurance mileage; the corresponding SOCEread shall be recorded. Before the verification test begins, the manufacturer may conduct a vehicle pretreatment test.

a) For pure electric vehicles. 1) SOCEread is not greater than 99% and the vehicle's cumulative mileage is not less than 20000 km; 2) The vehicle's cumulative mileage reaches 50000 km.

b) For plug-in hybrid electric vehicles that meet GB/T 32694 or GB/T 34598. 1) SOCEread is not greater than 99% and the vehicle's cumulative mileage is not less than 15000 km; 2) The vehicle's cumulative mileage reaches 30000 km.

c) For plug-in hybrid electric vehicles that do not meet GB/T 32694 or GB/T 34598. 1) SOCEread is not greater than 99% and the vehicle's cumulative mileage is not less than 5000 km; 2) The vehicle's cumulative mileage reaches 10000 km.

5.3 Calculation of results

5.3.1 SOCEmeasured is obtained by measuring the available energy of the battery and dividing it by the available energy of the certified battery, expressed as a percentage. SOCEmeasured is calculated according to formula (2). Where. SOCEmeasured - Stated of measured usable battery energy, rounded to one decimal place; UBEmeasured - Measured usable battery energy, rounded to the nearest integer, in watt- hours (Wh); UBEcertified - Certified usable battery energy, rounded to the nearest integer, in watt- hours (Wh). If UBEmeasured is higher than UBEcertified, then SOCEmeasured shall be 100%.

5.3.2 SOCRmeasured is obtained by dividing the measured driving range by the certified driving range, expressed as a percentage. SOCRmeasured is calculated according to formula (3). Where. SOCRmeasured - Measured state of certified range, rounded to one decimal place; BERmeasured - Measured battery electric range, rounded to the nearest integer, in kilometers (km); BERcertified - Certified battery electric range, rounded to the nearest integer, in kilometers (km). If BERmeasured is higher than BERcertified, then SOCRmeasured shall be 100%.