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# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA



# GB/T 45099-2024

## Technical requirements for the completion and delivery inspection of repaired traction batteries

动力蓄电池维修竣工出厂技术条件

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## 1 Scope

GB/T 45099-2024 sets the technical requirements for releasing a repaired traction battery back into service. Battery repair, replacing a failed module or a damaged cell block rather than the whole pack, is now a large business in China and a genuinely dangerous one: a pack that leaves a workshop with mismatched modules, a compromised seal or an unverified BMS calibration can fail in a way an unrepaired pack does not. The standard specifies what has to be true before the pack goes back: the requirements on the appearance and the mechanical integrity including the enclosure and the sealing, the insulation resistance and the withstand voltage, the consistency of the cells and modules after repair, the capacity and the state of health verification, the function and calibration of the battery management system, the thermal management and the cooling circuit integrity, the safety functions, the required records and the traceability of the parts fitted, and the test methods for each. For a repair workshop, a fleet operator or an insurer in China, this is the release criterion.

This document specifies the maintenance operation requirements, completion inspection requirements and quality assurance for traction batteries. This document applies to unpacking maintenance of traction batteries for electric vehicles.

## 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 16739.1 Operating Conditions for Automobile Maintenance and Repair Trade - Part 1: The Enterprise for Automobile Maintenance and Repair

GB 18384 Electric Vehicles Safety Requirements

GB/T 19596 Terminology of Electric Vehicles

GB/T 44510 Technical Requirement for Maintenance and Repair of New Energy Vehicle

## 3 Terms and Definitions

The terms and definitions defined in GB/T 19596, and the following are applicable to this document.

3.1 traction battery; propulsion battery A storage battery that provides energy for the electric vehicle's power system. [source: GB/T 19596-2017, 3.3.1.1.1.1]

3.2 secondary cell The basic unit device for the interconversion between chemical energy and electrical energy. NOTE: usually it includes electrodes, diaphragm, electrolyte, casing and terminals, and is designed to be rechargeable. overtemperature, abnormal insulation, leakage, enclosure deformation, or water immersion, it shall be handled in accordance with the requirements of the automobile maintenance technical information.

4.1.4 Battery maintenance operation shall be carried out in accordance with the maintenance items determined by the incoming inspection and battery unpacking inspection and diagnosis. During the maintenance process, process inspection shall be carried out and records shall be kept in accordance with the maintenance items.

4.1.5 After battery maintenance, the quality inspection on completion shall be carried out in accordance with Chapter 5, and records shall be kept in accordance with Table A.2.

4.1.6 Battery maintenance enterprises shall keep records of battery maintenance and replacement information, and fill them out in accordance with Appendix B.

### 4.2 Battery Disassembly and Loading

4.2.1 The rated load-bearing capacity of battery lifting and hoisting equipment shall meet the battery lifting and hoisting requirements. Before lifting and hoisting, the contact surface between the equipment and the battery shall be insulated.

4.2.2 Before disassembling the battery, the vehicle shall be secured, the battery guard plate shall be removed, the battery high-voltage maintenance switch shall be disconnected, and the cooling pipelines, low-voltage connectors, high-voltage connectors, equipotential wires, battery enclosure fixing bolts, etc. shall be removed in sequence.

4.2.3 When disassembling the battery, do not violently pull the various wire harnesses or connectors or excessively bend them.

4.2.4 After the battery is disassembled, it shall be insulated, and the installation location of the battery enclosure shall be recorded. When loading the battery on the vehicle, it shall be installed in accordance with the recorded location.

4.2.5 Battery disassembly and loading shall be carried out using the following different tools, equipment and methods in accordance with the battery installation mode or installation location:

a) If the battery is located under the chassis, use battery lifting equipment to place it near the force point under the battery, and ensure that the battery force point corresponds to the force-bearing point of the lifting equipment;

b) If the battery is located above the chassis, fix the lifting equipment on the battery;

c) If the battery enclosure cover is inverted, use a flip fixture to secure and support the battery.

4.2.6 When loading the battery on the vehicle, the battery shall be lifted or hoisted so that it is aligned with the battery installation position locating pin, and the vehicle body locating pin and battery locating hole shall correctly match. The battery shall be loaded in the reverse order of its disassembly and, if necessary, filled with coolant of the specifications and models specified in the automobile maintenance technical information.



### 4.3 Battery Unpacking and Packaging

4.3.1 Before unpacking the battery, the battery enclosure shall be tested for air tightness in accordance with the requirements of the automobile maintenance technical information.

4.3.2 Before unpacking the battery, the battery coolant shall be pumped and drained in accordance with the maintenance items.

4.3.3 The battery unpacking method shall be used in accordance with the battery packaging form.

4.3.4 After unpacking the battery, it shall be ensured that the high-voltage circuit is disconnected. If there is a built-in high-voltage maintenance switch, the high-voltage maintenance switch shall be disconnected first, and insulation treatment shall be performed.

4.3.5 After unpacking the battery, the internal insulation test shall be carried out on the battery, and the insulation resistance value shall satisfy the provisions specified in the automobile maintenance technical information.

4.3.6 Before packaging the battery, the internal components of the battery enclosure shall comply with the provisions of Chapter 5.

### 5.1 Basic Requirements

5.1.1 The appearance of the battery pack shall meet the technical requirements for the appearance of traction battery systems in GB/T 44510.

5.1.2 The high-voltage connectors of the battery module (hereinafter referred to as the "module") shall be properly installed and the contact surfaces shall be clean.

5.1.3 The fuse shall not be blown, the relay shall not be stuck, and the lock of the fuse cover shall be locked and effective. The performance parameters of fuses, relays and pre-charging resistors shall be consistent with those specified in the automobile maintenance technical information.

5.1.4 The grounding point shall be clean and free of rust, and the grounding connection shall be reliable.

5.1.5 The hardware mounting bracket of the battery management module shall be fixed intact and the installation direction shall be correct.

5.1.6 In addition to meeting the technical requirements for cooling systems of traction battery technical information.

5.2.2.2 The insulation resistance between the input and output of other high-voltage wire harnesses and connectors of the battery and their casings shall comply with the provisions of the automobile maintenance technical information.

5.2.3 Air tightness The air tightness of the battery enclosure and battery cooling system shall comply with the provisions of the vehicle maintenance technical information.

5.2.4 Potential equalization The potential equalization used to protect exposed conductive parts in direct contact with Class B voltage circuits shall comply with the provisions of GB 18384.

### 5.2.5 Working conditions

5.2.5.1 After the battery is loaded on the vehicle, the on-board instrument shall have no battery fault alarm. When the battery data is read by instruments and equipment, there shall be no battery fault information. The battery management system software version No. shall be the applicable version.

5.2.5.2 There shall be no alarm in insulation resistance monitoring.

## 6 Quality Assurance

6.1 After the battery maintenance, if the battery passes the quality inspection on completion, the maintenance quality inspection personnel shall issue a motor vehicle maintenance completion exit-factory certificate.