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

GB/T 31467.2-2015

**[Replaced by GB/T 31467-2023] Lithium-ion traction battery
pack and system for electric vehicles -- Part 2: Test
specification for high energy applications**

电动汽车用锂离子动力蓄电池包和系统 第2部分 高能量应用测试规程

(English Translation)

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1 Scope

This Part of GB/T 31467 specifies test procedures for lithium-ion battery packs and systems specially developed for electric vehicles.

This Part applies to lithium-ion traction battery pack and system that is loaded on electric vehicles and for the purpose of high energy applications. Ni-MH traction battery packs and systems of high energy applications may refer to this

Part.

2 Normative references

The following referenced document is 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 19596 Terminology of electric vehicles

3 Terms and definitions

Terms and definitions defined in GB/T 19596 and the following ones are applicable to this document.

3.1 Battery electronics

Electronic device that collects and possibly monitors thermal and electric data of batteries or battery assemblies, and contains electronics for cell balancing, if necessary.

3.2 Battery control unit. BCU

Electronic device that controls or manages or detects or calculates electric and thermal functions of the battery system and that provides communication between the battery system and other vehicle controllers.

3.3 Rated capacity of battery pack / system

Total number of ampere hours that can be withdrawn from a battery and declared by the manufacturer under specified conditions.

3.4 Battery pack

Mechanical assembly comprising battery cells, battery management modules (except BCU), and battery box and the corresponding accessories, obtaining power from outside and exporting electricity.

3.5 Battery system

Energy storage device that includes batteries or battery assemblies or battery pack(s) as well as appropriate accessories (management system, high-voltage circuit, low-voltage circuits, thermal management, and mechanical equipment assembly).

3.6 High energy application

Characteristic of device or application, for which the numerical ratio between maximum allowed electric power output and electric energy output at a 1C discharge rate at RT for a battery pack or system is typically lower than 10.

3.7 High power application

Characteristic of device or application, for which the numerical ratio between maximum allowed electric power output and electric energy output at a 1C discharge rate at RT for a battery pack or system is typically equal to or higher than 10.

4 Symbols and abbreviated terms

The following symbols and abbreviated terms apply to this document.

5.1 General conditions

5.1.1

If not otherwise specified in certain specific test projects, the test shall be conducted at RT of $25^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and of which the humidity is 15%~90%.

5.1.2 The necessary documentation for operation and needed interface parts

for connection to the test equipment (i.e. connectors, plugs including cooling) shall be delivered, and the typical structure of battery pack and system refers to Appendix A.

5.1.3 When test target ambient temperature changes, test sample needs to

complete the process of adaptation to the environment before test starts. place it at low temperature for not less than 24h; at high temperature for not less than

16h; or temperature difference between cell ambient temperature and target temperature shall not exceed 2°C . If test sample contains BCU, it needs to turn it off during environment adaption.

5.1.4 If battery pack or system is not suitable for some tests due to reasons like size or weight, etc., it shall use subsystem of battery pack or battery system as test sample after agreed by both parties for all or some tests. However, this subsystem shall contain all parts related to vehicle requirements.

5.1.5 The method of adjusting SOC to test target value n%. charge battery pack or system according to charging method provided by the manufacturer, place it for 1h and discharge constant current at 1C discharge rate at $(100-n)/100\text{h}$.

After each SOC adjustment, place test sample for 1h before new test starts.

5.1.7 The discharge rate during the test shall be in accordance with the provisions in this Part. Charging mechanism and cut-off conditions of discharging shall be provided by the manufacturer. However, these conditions shall be unified, for example, charging mechanism and discharging mechanism during cycle performance test shall be same with the provisions of other tests.

5.1.8 Rated capacity of battery pack or system has an important influence on the testing process. If absolute difference between actual available capacity of battery (7.1.2.2) and battery rated capacity exceeds 5% of rated capacity, it shall be clearly stated in the test report, and replace rated capacity by actual available capacity, as the reference to calculation of charge and discharge current, and SOC.

5.1.9 Test items, test methods clause number, test conditions for battery pack

and system are shown in Appendix B.

5.1.10 Battery discharge current sign is positive while charge current sign is negative.

5.4.1 Battery pack preparation

Connect high pressure, low pressure and cooling devices of battery pack to test bench equipment. Activate passive protection of battery pack. Test the working state and operating parameters of bench detection and control battery pack based on battery pack manufacturer requirements and test procedures. Ensure that active protection is activated.

5.4.2 Preparation of battery system

Connect high pressure, low pressure and cooling devices of battery pack as well as BCU to test bench equipment. Activate active protection and passive protection of battery system.

5.4.3 Mass and volume of test sample

Use measuring tool to measure dimensions of test sample. Calculate test sample's volume, in L. Use weighing apparatus to measure test sample's mass, in kg. If test sample contains forced cooling system, it shall be included such as cooling circuit when measuring or calculating its mass and volume. If cooling system adopts liquid cooling, the mass of cooling liquid shall be counted. If test sample's cooling system is integrated with the vehicle or other cooling systems, it shall only consider the mass and volume of the part related to test sample. If it is difficult to measure, it shall use data provided by the manufacturer and data test reference.

6.1.1 Conduct preprocessing cycle for battery pack or system at RT before

official test starts. The procedures are as follows.

6.1.2 If continuous discharging capacity change twice of battery pack or system

is not greater than 3% of rated capacity, it shall be regarded that battery pack or system has completed the preprocessing. And preprocessing cycle can be aborted.

6.2.1 Conduct it according to test procedures specified in this Part during testing

process at RT. It shall follow a sequential order including a standard discharging process and a standard charging process. The procedures are as follows.

6.2.2 If the interval between standard cycle and a new test is longer than 24h, it shall re-conduct a standard charging.