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

GB/T 31467.3-2015

**Lithium-ion traction battery pack and system for electric
vehicles - Part 3: Safety requirements and test methods**

电动汽车用锂离子动力蓄电池包和系统 第3部分：安全性要求与测试方法

(English Translation)

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1 Scope

This Part of GB/T 31467 specifies test procedures and safety requirements for lithium-ion battery packs and systems to be used in electrically propelled vehicles.

This Part of GB/T 31467 is applicable to lithium-ion battery packs and systems installed in electrically propelled vehicles. For Ni-MH battery packs or systems, this standard can be served as reference.

2 Normative references

The following documents are indispensable for application of this document. For the dated documents so quoted, only the dated versions apply to this document. For the undated documents so quoted, the latest versions (including all modification sheets) apply to this document.

GB 4208 Degrees of protection provided by enclosure (IP code)

GB/T 18384.1 Electric vehicles - Safety specification - Part 1: On-board energy storage

GB/T 18384.3 Electric vehicles-Safety specification - Part 3: Protection of persons against electric hazards

GB/T 19596 Terminology of electric vehicles

GB/T 28046.1-2011 Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 1: General

GB/T 31467.1-2015 Lithium-ion traction battery pack and system for Electric vehicles - Part 1: Test specification for high power applications

GB/T 31467.2-2015 Lithium-ion traction battery pack and system for electric vehicles - Part 2: Test specification for high energy applications

3 Terms and definitions

For the purpose of this document, the terms and definitions given in GB/T 19596 AND the following apply.

3.1 Battery electronics

Electronic device that collects and possibly monitors thermal or electric data of cells or cell assemblies. It may contain electronics for cell balancing, if necessary.

Note: The battery electronics can include a cell controller. The functionality of cell balancing can be controlled by the cell electronics or it can be controlled by the BCU.

3.2 battery control unit; BCU

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

3.3 Rated capacity

Total number of ampere-hours that can be withdrawn from battery pack or system for a specified set of test conditions.

3.4 Battery pack

Energy storage device that includes battery pack(s), battery management modules (BCU excluded), battery containers and accessories. It includes the units which can obtain and output power from external systems.

3.5 Battery system

Energy storage device that includes one or more of battery packs or accessories (management system, high voltage circuit, low voltage circuit, heat management devices and mechanical assemblies)

3.6 High voltage

A voltage with the maximum working voltage greater than 30 V a.c. (rms) and lower than or equal to 1000 V a.c. (rms), or greater than 60 V d.c. and lower than or equal to 1500 V d.c.

3.7 Low voltage

A voltage with the maximum working voltage greater than 30 V a.c. (rms) or not greater than 60 V d.c.

4 Symbols and abbreviated terms

For the purpose of this document, the following symbols and abbreviated terms apply.

nC. Current multiple-rate. It is equal to n time(s) of discharge capacity for 1h (unit. A);

SOC. State of charge under room temperature (state of charge).

5.1 General conditions

5.1.1

Unless otherwise specified, the test temperature is $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ and the test humidity is 15%~90%. The room temperature referred in this standard is $25^{\circ}\text{C}\pm 2^{\circ}\text{C}$.

5.1.2

A battery pack or system shall fulfill the relevant requirements in GB/T 18384.1 and GB/T 18384.3.

5.1.3

The necessary documentation for operation and needed interfaces connection to the test equipment (i.e. connectors, plug including cooling) shall be delivered together with the battery pack or system. The typical configuration of battery pack or system is shown in Annex A. The manufacturers shall prescribe the working limits of battery pack or system to ensure the safety of overall test process.

5.1.4

The protection level of battery pack and system shall fulfill the relevant requirements given in GB 4208.

5.1.5

As to the battery pack or system, the insulating resistance test shall be performed before starting all the tests. The test positions shall be at the positive electrode and casing OR the negative electrode and casing. The insulating resistance is required to be lower than 100 ohm/V.

5.1.6

When the target test environmental temperature is changed, all the test objects shall undergo the environmental adaptation before testing. The test objects shall be at the low temperature environment for at least 24 h and at the high temperature environment for at

least 16h.

5.1.7

If the battery pack or system is not adaptive to some tests due to some reasons (i.e. dimension or weight), the subsystems of battery pack or system can be replaced as the test object to undergo all the tests or some of tests upon mutual agreement through friendly negotiation between supplier and purchaser. The subsystem as the test object shall comprise all the parts which fulfill the requirements of vehicle.

5.1.8

The method to adjust SOC to $n\%$ of the test target value. The battery pack or system shall be fully charged by the method prescribed by the manufacturer; stand for 1 h; then discharge at 1C for $(100-n)/100$ h. After the adjustment of SOC, the test object shall be tested for 30min before starting new test.

5.1.9

During the test, the internal response of battery pack or system shall be equilibrated. Therefore, certain time interval between test processes is required.

5.1.10

Discharging multiple-rate during the test shall be in accordance with the provisions of this Part. The charging mechanism and discharging shut-off conditions are prescribed by manufacturers.

5.1.11

The rated capacity of battery pack or system plays an important role in the test procedure. The deviation of the actual capacity of battery pack or system (6.2) and the rated capacity shall not exceed 5% of the rated capacity value.

5.1.12

Unless otherwise specified, all the test objects shall be tested under fully charged state as prescribed by manufacturer.

5.1.13

For the test items, article number of test method and test conditions of battery pack or system are shown in Annex B.

5.1.14

The symbol of discharging current of battery is positive, and the symbol of charging current is negative.