

ICS 43.120



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

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**Safety requirements and test methods for traction battery of
electric vehicle**

(English Translation)

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1 Scope

1 Scope

This Standard specifies the safety requirements, test methods, and inspection rules for traction battery of electric vehicle (hereinafter referred as "battery").

This Standard is applicable to lithium-ion battery and metal hydride nickel battery which are used in electric vehicle. For other traction batteries, this Standard is 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/T 2900.41 Electrotechnical terminology - Primary and secondary cells and batteries
GB/T 19596 Terminology of electric vehicles

3 Terms and definitions

The following terms and definitions AND those specified in GB/T 2900.41 and GB/T 19596 apply to this Standard.

secondary cell

A basic unit, designed to be chargeable, that can directly transform chemical energy into power energy and is composed of electrode, membrane, electrolyte, case and terminal.

battery module

A power supply combination of one or more of secondary cells which are connected in series or in parallel or in series-parallel, with only one pair of positive and negative output terminals.

explosion

Fierce explosion of battery case, with violent noise and projectiles of major composition (solid substance).

fire

Combustion occurred in any part of battery (the last time is more than 1s). Spark and arc do not belong to combustion.

leakage

The liquid inside battery is leaked out.

case

Protection parts which is used to seal inner parts of battery and prevent it from being in direct contact with outside.

4 Symbol

For the purpose of standard, the following symbols shall apply.

C1.Rated capacity per one hour rate (Ah).

I1.Discharge current per one hour rate, equal to C1 (A).

5.1.1 When over-discharge test in sub-clause 6.2.2 is carried out on secondary cell, there

shall have no explosion, fire or leakage.

5.1.2 When over-charge test in sub-clause 6.2.3 is carried out on secondary cell, there

shall have no explosion and fire.

5.1.4 When dropping test in sub-clause 6.2.5 is carried out on secondary cell.

- a) For lithium battery, there shall have no explosion, fire and leakage;
- b) For nickel-metal hydride battery, there shall have no explosion and fire.

5.1.5 When heating test in sub-clause 6.2.6 is carried out on secondary cell, there shall

have no explosion or fire.

5.1.6 When crushing test in sub-clause 6.2.7 is carried out on secondary cell, there shall

have no explosion or fire.

5.1.7 When puncturing test in sub-clause 6.2.8 is carried out on secondary cell, there shall

have no explosion or fire.

5.1.8 When sea water immersion test in sub-clause 6.2.9 is carried out on secondary cell, there shall have no explosion or fire.

5.1.9 When temperature cycle test in sub-clause 6.2.10 is carried out on secondary cell, there shall have no explosion, fire or leakage.

5.1.10 When low atmospheric pressure test in sub-clause 6.2.11 is carried out on secondary cell, there shall have no explosion, fire or leakage.

5.2.1 When over-discharge test in sub-clause 6.3.2 is carried out on battery module, there

shall have no explosion, fire or leakage.

5.2.2 When over-charge test in sub-clause 6.3.3 is carried out on battery module, there

shall have no explosion and fire.

5.2.4 When dropping test in sub-clause 6.3.5 is carried out on battery module.

- a) For lithium battery, there shall have no explosion, fire and leakage;
- b) For nickel-metal hydride battery, there shall have no explosion and fire.

6.1.1 Environmental conditions

Unless otherwise specified, the test shall be conducted at the temperature of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, relative humidity of 15%~90% and atmospheric pressure of 86 kPa~106 kPa. The room temperature referred in this Standard means $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

6.1.2 Precision of measuring instrument and apparatus

The precision of measuring instrument and apparatus shall conform to the following requirements.

6.1.3 Secondary cell charging

Under room temperature, secondary cell is discharged at the current of 1I1 (A) until it reaches to the final voltage as specified in the technical conditions of manufacturer. Put it aside for 1 h (or less than 1 h as specified by manufacturer); then charge the secondary cell according to the method provided by manufacturer.

If manufacturer does not provide charging method, the following method can be adopted.

a) As to lithium ion battery, charge it at the constant current of 1I1 (A) and then change to constant-voltage charge when it reaches to the final voltage as specified in the technical conditions. When the charging current falls to 0.05I1 (A), charging shall be stopped. Put it aside for 1 h (or less than 1 h as specified by manufacturer);

b) As to metal hydride nickel battery, charge it at the constant current of 1I1 (A) for 1 h and then charge it at the constant current of 0.2I1 (A) for 1 h. Put it aside for 1 h (or less than 1 h as specified by manufacturer).

6.1.4 Battery module charging

Under room temperature, battery module is discharged at the current of 1I1 (A) until it reaches to the final voltage as specified in the technical conditions of manufacturer. Put it aside for 1 h (or less than 1 h as specified by manufacturer) and then charge the battery module according to the method provided by manufacturer.

If manufacturer does not provide charging method, the following method can be adopted.

a) As to lithium ion battery, charge it at the constant current of 1I1 (A) and then change to constant-voltage charge when it reaches to the final voltage as specified in the technical conditions. When the charging current falls to 0.05I1 (A), charging shall be stopped. Put it aside for 1 h (or less than 1 h as specified by manufacturer);

b) As to metal hydride nickel battery, charge it at the constant current of 1I1 (A) for 1 h and then charge it at the constant current of 0.2I1 (A) for 1 h. Put it aside for 1 h (or less than 1 h as specified by manufacturer).

6.2.1 General requirements

All test items shall be carried out with sufficient safety protection measures. If the test objective has additional active protection circuit or apparatus, it shall be removed.