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National Standard of the People's Republic of China

GB/T 18287-2013
Replacing GB/T 18287-2000

General specification of lithium-ion cells and batteries for mobile phone

移动电话用锂离子蓄电池及蓄电池组总规范

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Foreword

This Standard is drafted according to the rules specified in GB/T 1.1-2009.

This Standard replaces GB/T 18287-2000 *General Specification of Lithium-ion Battery for Cellular Phone* and has the following major changes in comparison with GB/T 18287-2000:

— It has a structural improvement, which makes a clear distinction between lithium-ion cells and batteries;

— In terms of definitions, definitions of reference test current (3.5), recovery capacity (3.6), leakage (3.9), venting (3.10), rupture (3.11), fire (3.12) and explosion (3.13) are added;

— Modifications are made to low temperature discharge (4.2.4 and 5.3.2.5; 4.4 and 5.3.4 “low temperature performance” of GB/T 18287-2000), free fall (4.3.4 and 5.3.3.4; 4.7.4 and 5.3.7.4 of GB/T 18287-2000), cycle life (4.2.7 and 5.3.2.8; 4.6 and 5.3.6 of GB/T 18287-2000), over-charge protection (4.4.1 and 5.3.4.2; 4.8.1 and 5.3.8.1 of GB/T 18287-2000), weight impact (4.5.1 and 5.3.5.2; 4.9.1 and 5.3.9.1 of GB/T 18287-2000), thermal abuse (4.5.2 and 5.3.5.3; 4.9.2 and 5.3.9.2 “heat impact” of GB/T 18287-2000), overcharge (4.5.3 and 5.3.5.4; 4.9.3 and 5.3.9,3 of GB/T 18287-2000), short circuit (4.5.5 and 5.3.5.6; 4.9.4 and 5.3.9.4 of GB/T 18287-2000) and other inspection items;

— Impact (4.7.3 and 5.3.7.3 of GB/T 18287-2000) is deleted;

— ESD (Electro-static discharge) (4.3.1 and 5.3.3.1), internal resistance (4.2.8 and 5.3.2.9), low pressure (4.3.5 and 5.3.3.5), molding shell stress under high temperature (4.3.6 and 5.3.3.6), forced discharge (4.5.4 and 5.3.5.5), mechanical shock (4.5.6 and 5.3.5.7), temperature cycle (4.5.7 and 5.3.5.8) and other inspection items are added.

Please note that some content of this Standard may involve patents. The issuing organizations of this Standard shall not bear the responsibility to identify these patents.

This Standard was proposed by Ministry of Industry and Information Technology of the People’s Republic of China.

This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Alkaline Storage Batteries (SAC/TC 77).

Drafting organizations of this Standard: Tianjin Lishen Battery Joint-Stock Co., Ltd., Shenzhen BYD Lithium Battery Co., Ltd., Motorola Mobile Technology (China) Co., Ltd., ZTE Cooperation, and Dongguan New Energy Technology Co., Ltd.

The main drafters of this Standard: Qin Xingcai, Su Jinran, Liu Haojie, Zhang Shoubo, Chen Jinyue, Qiu Haidong, Wu Yuanming, and Sheng Kesong.

The previous edition replaced by this Standard:

— GB/T 18287-2000.

General specification of lithium-ion cells and batteries for mobile phone

1 Scope

This Standard specifies the terms and definitions, requirements, test methods, quality assessment and marking, packaging, transportation and storage of lithium-ion cells and batteries used for mobile phones.

This Standard is applicable to lithium-ion cells (hereinafter referred to as cells) and battery packs (hereinafter referred to as batteries) used for mobile phones.

Other lithium-ion cells and batteries for mobile communication terminal products may implement this Standard as reference.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated edition is applicable to this document. For undated references, the latest editions (including all amendments) are applicable to this document.

GB/T 191-2008 Graphic signs for packaging, storage and transportation

GB/T 2828.1 Sampling procedures for inspection by attributes. Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

GB/T 2829 Periodic inspection counting sampling program and table (for test with stability process)

GB/T 2900.41-2008 Electrotechnical terminology Primary and secondary cells and batteries

GB/T 17626.2 Electromagnetic compatibility Testing and measurement techniques; Electrostatic discharge immunity test

ISO/IEC Guide 51 Safety aspects Guidelines for the inclusion of safety aspects in standards

3 Terms and definitions

Those defined in GB/T 2900.41-2008 and ISO/IEC Guide 51, and the following terms and definitions apply to this Standard.

3.1

Cell

Basic unit device that directly transforms chemical energy to electric energy, including electrode, membrane, electrolyte, shell, extremity and so on, and that is designed to be chargeable.

3.2

Battery

Combination of one or more cells and accessories, which can be directly used as power supply.

3.3

Limited charge voltage

As specified by the manufacturer, the voltage value of cells and batteries when it switches FROM constant voltage charging TO constant current charging.

3.4

Rated capacity

Cell or battery capacity indicated by the manufacturer, which refers to the electric capacity of cell or battery provided under the ambient temperature of 23°C±2°C when it is discharged to the cut-off voltage with 5h rate, represented by C_5 in (Ah) or (mAh).

3.5

Reference test current

Reference test current is expressed in I_tA. I_t A=C_5 Ah/l h.

3.6

Recovery capacity

The capacity – according to the requirements of manufacturer, under the specified temperature and time, it is stored for certain time; the cell or battery is charged after being discharged; and then discharged again.

results to conform to the requirements of 4.1.1 and 4.1.2.

5.3.2 Electrical performance

5.3.2.1 Charging methods

Cell or battery shall be discharged to the cut-off voltage under the ambient temperature of 23°C±2°C at 0.2 I_tA first before being charged. One of the following charging methods specified can be adopted for cells or batteries in the following tests:

a) Cell or battery shall be charged under the ambient temperature of 23°C±2°C at 0.2 I_tA and then charged under constant voltage when the cell or battery end voltage reaches limited charging voltage. Charging shall be stopped till the charging current is lower or equal to 0.2 I_tA with maximum charging time no greater than 8h. This charging standard is the charging method for arbitration test.

b) Cell or battery shall be charged under the ambient temperature of 23°C±2°C at 1 I_tA and then charged under constant voltage when the cell or battery end voltage reaches limited charging voltage. Charging shall be stopped till the charging current is lower or equal to 0.02 I_tA with maximum charging time not be greater than 4h.

5.3.2.2 0.2 I_tA Discharge

Cell or battery is charged in accordance with the requirements in 5.3.2.1 and after the charging is stopped, it shall be maintained for 0.5 h~1 h and discharged to the cut-off voltage under the temperature of 23°C±2°C at the current of 0.2 I_tA. The test above may be repeated for 5 times. When cell or battery capacity conforms to the requirements of 4.2.1 for one time, the test may be stopped.

5.3.2.3 Rated discharge

Cell or battery with different capacity may be discharged using the following required methods in the following tests:

Cell or battery with rated capacity less than 1000 mAh is charged in accordance with the requirements in 5.3.2.1 and after the charging is stopped, it shall be maintained for 0.5 h~1 h and discharged to the cut-off voltage under the temperature of 23°C±2°C at the current of 1 I_tA. Cell or battery discharge time shall be in accordance with the requirements of Clause 4.2.2.

Cell or battery with rated capacity greater than 1000 mAh is discharged in accordance with the requirements in 5.3.2.1. After the charging is stopped, it shall be maintained for 0.5 h~1 h and discharged to the cut-off voltage under the temperature of 23°C±2°C at the current specified by the manufacturer. Discharge time of the cell or battery shall be in accordance with the requirements of Clause 4.2.2.

5.3.2.4 High temperature discharge

The cell or battery is charged as per 5.3.2.1, and put into a high-temperature chamber of 55°C±2°C and maintained for 2h, then discharged at the current of 0.2 I_tA till the cut-off voltage, and the discharge time shall be in accordance with the requirement in 4.2.3.

5.3.2.5 Low temperature discharge

The cell or battery is charged as per 5.3.2.1, and put into a low-temperature chamber at -10°C±2°C and maintained for 4h, then discharged at the current of 0.2 I_tA till the cut-off voltage, and the discharge time shall be in accordance with the requirement in 4.2.4.

5.3.2.6 Charge retention capability and recovery capacity

The cell or battery is charged as per 5.3.2.1, after being laid aside the battery or battery pack in open circuit under the temperature of 20°C±5°C for 28 d, then discharged under the temperature of 23°C±2°C at the current of 0.2 I_tA till the cut-off voltage, and the discharge time shall be in accordance with the requirement in 4.2.5. After being charged as per 5.3.2.1, and then discharged under the temperature of 23°C±2°C at the current of 0.2 I_tA till the cut-off voltage, the discharge time shall be in accordance with the requirement in 4.2.5.

5.3.2.7 Storage Performance

Prior to storage of the cell or battery, charge the battery or battery pack as per 5.3.2.1 to 40-45% of capacity, then store it for 12 months under the environmental temperature of 20°C±5°C and relative humidity of 45%-75%. Then after charging as per 5.3.2.1, discharge under the temperature of 23°C±2°C at the current of 0.2 I_tA till the cut-off voltage. Charge-discharge test can be cycled for five times, and discharge time shall be in accordance with the requirements of 4.2.6.

5.3.2.8 Cycle life

The test shall be conducted under the environmental temperature of 23°C±2°C. During

7 Marking, packaging, transportation and storage

7.1 Marking

The following Chinese marks shall be indicated on cells or batteries:

— Product name, model;

— Rated capacity, limited charge voltage;

— The positive and negative polarity shall apply the characters of "positive, negative", symbol of "+, -" or different colors (such as red and black) to indicate;

— Manufacturer or trademark;

— Manufacturing date or batch number and nominal voltage (not applicable for cells);

— Number of executive standard, warning note (not applicable for cells).

For cells, the rated capacity, rated voltage, positive and negative polarity shall be marked on the body, the other signs are allowed to be marked in the packaging or instructions, but if the manufacturer and the user come into an agreement, the component cells that constitute a battery can not be identified.

For batteries, all above signs shall be marked on the battery body, in which the marks of the manufacturing date or batch number, nominal voltage, executive standard number, warning instructions in the minimum package of the battery are allowed. For batteries with structure that can ensure the user will not have mistaken plugging under any applicable conditions, the polarity marks may not be used.

Notes: When the batteries are sold separately, the minimum packaging refers to the minimum package of batteries; when the batteries are sold together with the electronic products, the minimum packaging can also be the minimum package of the electronic products.

7.2 Packaging

Each battery shall have the outer packing (not applicable for mobile phone cells that can not be replaced by users), shall be accompanied by instructions for use of products. Packaged products shall be placed in dry, dust-proof, moisture-proof boxes.

The packing box shall be marked with product name, model, quantity, manufacturer,

delivery date, shall be with "up" "keep from rain" "stacking layer limit" and other necessary signs, the packing and the signs shall be in accordance with the provisions of GB/T 191-2008.

7.3 Transportation

The cells or batteries shall be packed in boxes for transport and shall be protected from severe vibration, impact or pressure, as well as sun and rain. Motor vehicles, trains, ships, aircrafts and other vehicles can be used for transport.

7.4 Storage

The cells or batteries shall be stored in clean, dry and well-ventilated rooms with ambient temperature of -5°C~35°C and relative humidity no more than 75%, and shall be protected from the contact with corrosive substances, and kept away from fire and heat source.

Annex A

(Informative annex)

Recommendations for end users

The following are the typical but not complete recommendations made by mobile phone manufacturers for end users:

a) Disassembling, opening, cutting or impaling the cells or batteries with metal are forbidden.

b) Exposing the cells or batteries in heat source or flame, putting the cells or batteries into fire are forbidden, and storage in direct sunlight shall be avoided.

c) Shorting the cells or batteries is forbidden. Do not leave several cells or batteries in the box or drawer at random, to avoid short circuit caused between them or short circuit caused by the other metal objects.

d) Making the cells or batteries subject to mechanical shock is forbidden.

e) In case of leakage, avoid direct contact of the leaked liquid with the eyes or skin. In case of any contact, flush the contact area with copious amount of water.

f) Do not use non-dedicated charger, and cells and batteries shall be charged in accordance with the manufacturer's instructions.

g) Pay attention to the "+" and “-” on the batteries and mobile phones and ensure proper usage.

h) Keep the batteries clean and dry.

i) If the poles of battery are dirty, it shall be wiped with clean and dry cloth.

j) The batteries cannot be charged for a long time.

k) The cells or batteries can have the optimum effect of use and service life if being charged or discharged under the conditions of 15°C~35°C.

l) Properly keep the original instructions of products for future reference.

m) The obsolete cells and batteries shall be disposed in accordance with the national laws of environmental protection.

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