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

GB 40165-2021

**Lithium ion cells and batteries used in stationary electronic
equipments - Safety technical specification**

固定式电子设备用锂离子电池和电池组 安全技术规范

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1 Scope

GB 40165-2021 is the Chinese national standard on lithium ion cells and batteries used in stationary electronic equipments - safety technical specification, in the field of electrical engineering. It carries no /T suffix, which in the Chinese system means compliance is mandatory: a product or a practice within its scope has to meet it to be lawfully made, sold or carried out in China. It was issued on 30 April 2021 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 May 2022. Classification: ICS 29.220.99, CCS K 82. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This Standard specifies the safety requirements and test methods for lithium ion cells and battery packs used in stationary electronic equipment. This Standard is applicable to lithium ion cells and battery packs used in stationary electronic equipment (hereinafter referred to as cells and battery packs). The stationary electronic equipment includes.

- a) Stationary information technology equipment (IT equipment);
- b) Stationary audio and video equipment (AV equipment) and similar equipment;
- c) Stationary communication technology equipment (CT equipment);
- d) Stationary measurement control and laboratory electronic equipment and similar equipment. NOTE. the stationary electronic equipment listed above does not include all

equipment, and hence, equipment not listed may also be included in the scope of this Standard. This Standard is also applicable to uninterruptible power supply (UPS) and emergency power supply (EPS) that use lithium ion cells and battery packs.

2 Normative References

The following documents are indispensable to the application of this document. 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 2423.5 Environmental Testing - Part

3 Terms and Definitions

The following terms and definitions are applicable to this document. 3.1 (lithium ion) Cell (lithium ion) cell is a device that relies on the movement of lithium ions between the positive electrode and the negative electrode to implement the mutual conversion of chemical energy and electric energy and is designed to be rechargeable.

3.2 Large Lithium Ion Cell Large lithium ion cell refers to lithium ion cell whose total mass exceeds 500 g.

3.3 Cell Block Cell block refers to the configuration of multiple cells in parallel, which may or may not have protective devices [for example, fuses or positive temperature coefficient thermistors (PTC)] and monitoring circuits.

3.4 Module Module refers to the configuration of multiple cells in series or in parallel, which may or may not have protective devices [for example, fuses or positive temperature coefficient thermistors (PTC)] and monitoring circuits.

3.5 Battery / Battery Pack Battery / battery pack refers to an energy storage device electrically connected by one or multiple cells or modules.

3.6 Battery System Battery system refers to a system composed of one or multiple cells, modules or battery packs.

4 Test Conditions

4.1 Applicability of Tests The tests specified in this Standard are only carried out when safety is involved. When the content of the Standard stipulates that a certain type of cell or battery pack is clearly not applicable to the product test due to the product's design, structural and functional constraints, it may be exempted from the test. If the cell or battery pack cannot be tested due to the product's design, structural or functional constraints, and this test must be carried out, relevant tests may be carried out on the cell or battery pack, together with the electronic equipment using the cell or battery pack, the charger attached

to the electronic equipment or the components constituting part of the electronic equipment.

4.2 Environmental Conditions of Tests Unless it is otherwise specified, the tests are generally carried out under the following conditions.

4.3 Parameter Measurement Tolerances Relative to the specified values or actual values, the accuracy of all control values or measured values shall be limited to the following tolerance ranges.

4.4 Method of Temperature Measurement Adopt the thermocouple method to measure the surface temperature of the sample. The temperature test point shall select the highest temperature point as the judgment basis of the test.

5 General Safety Requirements

5.1 General Safety Considerations The safety of the cells and battery packs is considered from the following two application conditions.

5.2 Safe Working Parameters In order to ensure the safety in use of cells and battery packs under different conditions, the safe working conditions shall be specified, including parameters, such as.

5.3.1 Requirements for markings

5.3.2 Warning instructions On the body of the battery packs, there shall be warning instructions in Chinese, such as. which shall comply with the above requirements.

5.4 Key Safety Components

5.4.1 Basic requirements Under the circumstance where safety is involved, the components in the cells, modules and battery systems, such as. positive temperature coefficient thermistors (PTC) and thermal fuses, shall comply with the requirements of this Standard, or comply with the requirements of national standards and industrial standards related to components, or safety-related requirements in other specifications.

5.4.2 Evaluation and test of components The evaluation and test of components shall be carried out in accordance with the following stipulations.

6 Cell Electrical Safety

6.1 High-temperature External Short-circuit In accordance with the test method specified in 4.5.1, fully charge the cell, then, place it in an environment of $55\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$; after the cell reaches $55\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, place it for another 30 min.

6.2 Overcharge In accordance with the test method specified in 4.5.1, fully charge the cell,