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

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**Lithium ion battery design and verification requirements for
space application**

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the redrafting method to modify and adopt ISO 17546..2016 "Design and

Verification Requirements.

Compared with ISO 17546..2016, this standard has more adjustments in structure. Appendix A lists this standard and ISO 17546..2016.

Article number comparison.

There are technical differences between this standard and ISO 17546..2016, and the terms related to these differences have passed the margins on their outer margins

The installed vertical single line (|) is marked.

The technical differences between this standard and ISO 17546..2016 and the reasons are as follows.

--- Leakage rate index of single battery. ISO 17546..2016 5.1.4 stipulated that the leakage rate of single battery is not more than 1.0×10^{-6}

$\text{Pa} \cdot \text{m}^3 \cdot \text{s}^{-1}$, according to the actual application status of domestic models, this indicator is tightened in 6.3.1.2 in this standard, and there are few regulations.

At $1.0 \times 10^{-7} \text{ Pa} \cdot \text{m}^3 \cdot \text{s}^{-1}$.

--- Residual magnetic design. ISO 17546..2016 does not deal with the residual magnetic design of lithium-ion battery packs.

The size may affect the design of the entire star, so the 7.1.4.6 residual magnetic design clause has been added, which clarifies the design of the battery pack.

Use low magnetic materials as much as possible, and reduce the area of the current loop that generates magnetic moment as much as possible.

Twisting, arrangement of low magnetic flux strips and other methods reduce the residual magnetism of the battery pack.

--- Battery pack over-discharge protection (under-voltage protection). ISO 17546..2016 does not cover battery pack over-discharge protection (under-voltage protection)

Protection). Similar to the safety issue that may occur when overcharging, the battery pack after overdischarge may have occurred inside

Copper dissolves and precipitates, and then charging and discharging it may also cause safety problems. When using battery packs, avoid

Overdischarged. Based on this, this standard adds 7.2.3.12 undervoltage protection, and it is clear that the battery pack should be designed with undervoltage protection.

This standard also makes the following editorial changes.

--- Change the name of the standard to be consistent with the existing standard series;

--- Added informative appendix A.

This standard is proposed and managed by the National Aerospace Technology and Application Standardization Technical Committee (SAC/TC425).

This standard was drafted. Shanghai Space Power Research Institute.

1 Scope

This standard specifies the design of aerospace lithium-ion battery packs (including polymer lithium-ion battery packs, hereinafter referred to as "battery packs").

And minimum verification requirements.

The battery uses an intercalable compound (intercalable lithium exists between the layers of the electrode material in the form of ions or quasi atoms) as the positive and negative electrodes

material.

This standard applies to the design and verification of battery packs. Performance, safety and security are the focus of this standard.

This standard does not include the specific content of battery pack disposal and recycling, but gives some suggestions for battery pack disposal.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this article

Pieces. For undated references, the latest version (including all amendments) applies to this document.

ISO 24113 Space System Space Debris Mitigation Technical Requirements
(Spacesystems-Spacedebrismitigationrequire-
ments)

3 terms and definitions

The following terms and definitions apply to this document.

3.1

Activation

In the manufacturing process of the battery, the battery is made functional by adding electrolyte. This is usually defined as the battery storage period

Limited starting point.

3.2

Battery

Electrically connected by two or more battery cells (and equipped with the necessary devices, such as. cabinet, electrical connector, identification and protector

Pieces).

Note 1. A battery pack containing a single battery is regarded as a single battery.

Note 2. The battery pack can also include one or more accessories, such as. current bypass devices, charge control devices, heating belts, temperature sensors, thermal switches and thermal

Note 3. In this standard, "modules" and other units that have the basic function of supplying power to other equipment are considered battery packs.

3.3

Single cell cel

An electrochemical cell that is separately housed into a shell, specifically a positive electrode and a negative electrode, and can display a voltage difference through two poles.

3.4

Disassembly

Pressure release or rupture, solid matter from any part of the battery or battery pack passes through the distance from the battery or battery pack

25cm metal mesh (composed of 0.25mm diameter aluminum wire, grid density is 6 ~ 7 wires per cm).

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