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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB 43854-2024

Safety technical specification of lithium-ion battery for electric bicycle

电动自行车用锂离子蓄电池安全技术规范

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 Directives for standardization - Part

1.Rules for the structure and drafting of standardizing documents. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is proposed by and is under the jurisdiction of the Ministry of Industry and Information Technology of the People's Republic of China. Safety technical specification of lithium-ion battery for electric bicycle

1 Scope

GB 43854-2024 is the Chinese national standard on safety technical specification of lithium-ion battery for electric bicycle, in the field of road vehicles 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 25 April 2024 by the Ministry of Industry and Information Technology, and has been in force since 1 November 2024. Classification: ICS 43.140, CCS Y 14. 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 document specifies the electrical safety, mechanical safety, environmental safety and other requirements for lithium-ion battery cells and battery packs for electric bicycles, and describes the corresponding test methods. This document applies to lithium-ion battery cells and battery packs (hereinafter referred to as cells and batteries) for electric bicycles that comply with the provisions of GB 17761.

2 Normative references

The provisions of the following documents constitute the essential clauses of this document through normative references in this text. Among them, for referenced documents with dates, only the versions corresponding to the dates are applicable to this document; for referenced documents without dates, the latest versions (including all amendments) are applicable to this document.

GB/T 2423.4-2008 Environmental testing for electric and electronic products - Part

3 Terms and definitions

The terms and definitions defined in GB/T 36945-2018 and the following apply to this document.

3.1 rated capacity The capacity value of a cell or battery measured under specified conditions and declared by the manufacturer.

3.2 cell A basic unit device that directly converts chemical energy into electrical energy.

3.3 battery A combination assembled by one or more cells and necessary components such as cases, terminals and protective devices.

3.4 thermal runaway The chain reaction of heat release from cells causes the battery temperature to rise uncontrollably.

4 Symbols

The following symbols apply to this document. C2.2-hour rate rated capacity (Ah)

5.1 Cell safety requirements

5.1.1 Overcharge When tested according to the test method in 6.3.1, the cell shall not catch fire or explode.

5.1.2 Over discharge When tested according to the test method in 6.3.2, the cell shall not catch fire or explode.

5.1.3 External short circuit When tested according to the test method in 6.3.3, the cell shall not catch fire or explode.

5.1.6 Marking The cell shall be clearly marked with at least the following signs in a conspicuous location.

5.2.1 Electrical safety

5.2.1.1 Electrostatic discharge After the test according to 6.4.1.1, the overcharge protection and short circuit protection functions of the battery shall be normal.

5.2.2 Mechanical safety

5.2.2.1 Extrusion When tested according to the test method in 6.4.2.1, the battery shall not catch fire or explode.

5.2.2.2 Acceleration shock When tested according to the test method in 6.4.2.2, the battery shall not leak, rupture, catch fire or explode.

5.2.2.3 Vibration When tested according to the test method in 6.4.2.3, the battery shall not leak, rupture, catch fire or explode.

5.2.2.4 Free fall When tested according to the test method in 6.4.2.4, the battery shall not catch fire or explode.

5.2.2.5 Hander strength When tested according to the test method in 6.4.2.5, the hander of the battery shall not break, and the connection between the handle and the case shall not crack or fall off.

5.2.3 Environmental safety

5.2.3.6 Flame retardancy When tested according to the test method of 6.4.3.6, the non-metallic casing of the battery shall meet the requirements of V-0 level; the printed circuit board shall meet the requirements of V-1 level; and the insulation of the wires shall not contribute to the spread of flames.

5.2.4 Heat diffusion When tested according to the test method in 6.4.4, the battery shall not catch fire or explode within 5 minutes after the thermal runaway alarm is issued.

5.2.5 Mutual recognition and coordinated charging The battery shall have the function of mutual recognition and coordinated charging with the charging device. When tested according to the test method in 6.4.5, the battery shall first be mutually recognized and collaboratively identified with the charging device, and charging can only begin after the mutual recognition and collaborative identification are passed.

5.2.6 Data collection During the battery charging and discharging processes, at least the following data such as cell voltage, battery total voltage, temperature, and current, shall be collected in real time.

5.2.7 Marking The battery shall be clearly and durably marked with at least the following marks in a conspicuous location.

6.1 Test conditions

6.1.1 Environmental requirements Unless otherwise specified, the tests shall be carried out in the following environment. Temperature. (20±5) °C; relative humidity. not more than 85%; atmospheric pressure. 86 kPa~106 kPa.

6.1.2 Requirements for measuring instruments and equipment The accuracy of measuring instruments and equipment shall not be less than the following.

6.1.3 Single fault condition If it is required to apply simulated faults or abnormal operating conditions, they shall be applied sequentially, simulating one fault at a time. Faults directly caused by the simulated fault conditions (such as direct damage to the device) are considered to be part of the fault conditions.

6.2.1 Cell sample preparation

6.2.1.1 Standard charging If the company does not provide a charging method, the cell is charged using the following method.

6.2.1.2 Standard discharge Under the test environment of (23±2) °C, after the cell is charged according to the method in 6.2.1.1, it is discharged at a constant current of I2(A) to the end-of-discharge voltage.

6.2.2 Battery sample preparation

6.2.2.1 Standard charging If the company does not provide a charging method, the battery is charged using the following method.

6.3 Cell safety test

6.3.1 Overcharge test After the cell is fully charged according to the test method in 6.2.1.1,