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(BAJ/JSA)

Safety requirements for portable sealed
secondary cells, and for batteries made
from them, for use in portable
applications — Part 1: Nickel systems

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In the event of any doubts arising as to the contents,
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Foreword

This Japanese Industrial Standard has been established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by Battery Association of Japan (BAJ)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act. This Standard partially replaces **JIS C 8712 : 2015**, which has been withdrawn.

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JIS C 62133 series consists of the following 2 parts under the general title *Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications* :

Part 1: Nickel systems

Part 2: Lithium systems

Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications — Part 1 : Nickel systems

Introduction

This Japanese Industrial Standard has been prepared based on **IEC 62133-1 : 2017**, Edition 1, with some modifications of the technical contents for reflecting the local needs and situations in Japan.

The dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies requirements and tests for the safe operation of portable sealed secondary cells and batteries of nickel cadmium batteries and nickel-metal hydride batteries, under intended use and reasonably foreseeable misuse.

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

IEC 62133-1 : 2017 *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications — Part 1 : Nickel systems* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS C 8705 *Secondary sealed nickel-cadmium cells and batteries for portable applications*

NOTE Corresponding International Standard : IEC 61951-1 *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Secondary sealed cells and batteries for portable applications — Part 1 : Nickel-cadmium*

JIS C 8708 *Secondary sealed nickel-metal hydride cells and batteries for portable applications*

NOTE Corresponding International Standard : IEC 61951-2 *Secondary cells and*

batteries containing alkaline or other non-acid electrolytes — Secondary sealed cells and batteries for portable applications — Part 2 : Nickel-metal hydride

JIS Z 8051 *Safety aspects — Guidelines for their inclusion in standards*

NOTE Corresponding International Standard : ISO/IEC GUIDE 51 *Safety aspects — Guidelines for their inclusion in standards*

IEC 60050-482 *International Electrotechnical Vocabulary — Part 482 : Primary and secondary cells and batteries*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in IEC 60050-482 and JIS Z 8051, and the following apply.

3.1

safety

freedom from unacceptable risk

3.2

risk

combination of the probability of occurrence of harm and the severity of that harm

3.3

harm

physical injury or damage to the health of people or damage to property or to the environment

3.4

hazard

potential source of harm

3.5

intended use

use of a product in accordance with specifications, instructions and information provided by the supplier

NOTE This is a synonym for “normal use”.

3.6

reasonably foreseeable misuse

use of a product in a way which is not intended by the supplier, but which may result from readily predictable human behaviour

3.7

secondary cell

basic manufactured unit providing a source of electrical energy by direct conversion of chemical energy, that consists of electrodes, separators, electrolyte, container and terminals, and that is designed to be charged electrically

3.8

secondary battery

assembly of secondary cell(s) ready for use as a source of electrical energy characterized by its voltage, size, terminal arrangement, capacity and discharge performance

3.9

leakage

unplanned, visible escape of liquid electrolyte

NOTE..... Escape due to venting which serves a function prepared for safety is excluded.

3.10

venting

release of excessive internal pressure from a cell or battery in a manner intended by design to preclude rupture or explosion

3.11

rupture

mechanical failure of a cell container or battery case induced by an internal or external cause, resulting in exposure or spillage of materials

3.12

explosion

failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled

3.13

fire

emission of flames from a cell or battery

3.14

portable battery

secondary battery for use in a device or appliance which is conveniently hand-carried

3.15

portable cell

secondary cell intended for assembly in a portable battery

3.16

rated capacity

capacity value of a secondary cell or battery determined under specified conditions and declared by the manufacturer

NOTE The rated capacity is the quantity of electricity C_5 Ah (ampere-hours) declared by the manufacturer which a single secondary cell or battery can deliver for 5 h when discharged at the reference test current of $0.2 I_t$ A to a specified final voltage, after charging, storing and discharging under specified conditions.

3.17**reference test current, I_t**

current specified in **IEC 61434**

In this Standard, it refers to current expressed according to the formula $I_t \text{ A} = C_5 \text{ Ah} / 5 \text{ h}$ corresponding to reference time 5 h.

3.18**button cell**

secondary cell with a cylindrical shape in which the overall height is less than the diameter, e.g. in the shape of a button

3.19**cylindrical cell**

secondary cell with a cylindrical shape in which the overall height is equal to or greater than the diameter

3.20**prismatic cell**

secondary cell having the shape of a parallelepiped whose faces are rectangular

4 Parameter measurement tolerances

The overall accuracy of controlled or measured values, relative to the specified or actual parameters, shall be within these tolerances :

- a) ± 1 % for voltage;
- b) ± 1 % for current;
- c) ± 2 °C for temperature;
- d) ± 0.1 % for time;
- e) ± 1 % for dimension;
- f) ± 1 % for capacity ¹⁾.

Note ¹⁾ Capacity is expressed as a product of current and time.

These tolerances comprise the combined accuracy of the measuring instruments, the

measurement techniques used, and all other sources of error in the test procedure.

The details of the instrumentation used shall be provided in any report of results.

5 General safety considerations

5.1 General

The safety of secondary cells and batteries requires the consideration of two sets of applied conditions :

- intended use;
- reasonably foreseeable misuse.

Secondary cells and batteries shall be so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse. It is expected that secondary cells or batteries subjected to misuse may fail to function following such experience. In such a case, the requirements specified in 7.3 shall be satisfied with respect to potential hazards shown below. It may also be expected that secondary cells and batteries subjected to intended use shall not only be safe but shall continue to be functional in all respects.

Potential hazards which are the subject of this Standard are :

- a) fire,
- b) explosion,
- c) leakage of cell electrolyte,
- d) venting,
- e) burns from excessively high external temperatures,
- f) rupture of battery case with exposure of internal components.

Conformity with 5.2 to 5.7 for secondary cells and batteries other than button cells is checked by the tests of Clause 7 and in accordance with the appropriate standard (see Clause 2 and Table 1).

5.2 Insulation and wiring

The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery excluding electrical contact surfaces shall be not less than 5 MΩ at 500 V DC when measured 60 s after applying the voltage.

Internal wiring and insulation should be sufficient to withstand the maximum anticipated current, voltage and temperature requirements. The orientation of wiring should be such that adequate clearances and creepage distances are maintained between conductors. The mechanical strength of internal connections should be sufficient to accommodate conditions of reasonably foreseeable misuse (i.e. solder alone is not considered a reliable means of connection).

5.3 Venting

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