

SLOVENSKI STANDARD
SIST EN 62133-2:2017**01-september-2017****Nadomešča:**
SIST EN 62133:2013

Sekundarni členi in baterije z alkalnimi ali drugimi nekislinskimi elektroliti - Varnostne zahteve za prenosne zatesnjene sekundarne člene in za baterije, narejene iz njih, za uporabo v prenosnih napravah - 2. del: Litijevi sistemi

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 2: Lithium systems

ITEH STANDARD PREVIEW
(standards.iteh.ai)[SIST EN 62133-2:2017](#)

Accumulateurs alcalins et autres accumulateurs à électrolyte non acide - Exigences de sécurité pour les accumulateurs portables étanches, et pour les batteries qui en sont constituées, destinés à l'utilisation dans des applications portables - Partie 2: Systèmes au lithium

Ta slovenski standard je istoveten z: EN 62133-2:2017**ICS:**

29.220.30	Alkalni sekundarni členi in baterije	Alkaline secondary cells and batteries
-----------	--------------------------------------	--

SIST EN 62133-2:2017**en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 62133-2:2017](#)

<https://standards.iteh.ai/catalog/standards/sist/cd3dd88b-4449-4b8e-b466-2064f0c3a11c/sist-en-62133-2-2017>

EUROPEAN STANDARD

EN 62133-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2017

ICS 29.220.30

Supersedes EN 62133:2013 (partially)

English Version

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 2: Lithium systems
(IEC 62133-2:2017)

Accumulateurs alcalins et autres accumulateurs à électrolyte non acide - Exigences de sécurité pour les accumulateurs portables étanches, et pour les batteries qui en sont constituées, destinés à l'utilisation dans des applications portables - Partie 2: Systèmes au lithium
(IEC 62133-2:2017)

Sekundärzellen und -batterien mit alkalischen oder anderen nichtsäurehaltigen Elektrolyten - Sicherheitsanforderungen für tragbare gasdichte Akkumulatoren und daraus hergestellte Batterien für die Verwendung in tragbaren Geräten - Teil 2: Lithiumsysteme
(IEC 62133-2:2017)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2017-03-14. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member. [SIST EN 62133-2:2017](#)

[https://standards.iteh.ai/catalog/standards/sist/cd3dd88b-4449-4b8e-b466-](https://standards.iteh.ai/catalog/standards/sist/cd3dd88b-4449-4b8e-b466-40691a103693/en-62133-2-2017)

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 62133-2:2017**European foreword**

The text of document 21A/620/FDIS, future edition 1 of IEC 62133-2, prepared by SC 21A "Secondary cells and batteries containing alkaline or other non-acid electrolytes", of IEC/TC 21 "Secondary cells and batteries" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62133-2:2017.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-12-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-03-14

This document supersedes EN 62133:2013 (partially).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

(standards.iteh.ai)

Endorsement notice

<https://standards.iteh.ai/catalog/standards/sist/cd3dd88b-4449-4b8e-b466-2064f0c3a11c/sist-en-62133-2-2017>

The text of the International Standard IEC 62133-2:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60051	NOTE	Harmonized in EN 60051 series.
IEC 60664	NOTE	Harmonized in EN 60664 series.
IEC 61434	NOTE	Harmonized as EN 61434.
IEC 62281	NOTE	Harmonized as EN 62281.

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-482	2004	International Electrotechnical Vocabulary (IEV) - Part 482: Primary and secondary cells and batteries	-	-
IEC 61960	-	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Secondary lithium cells and batteries for portable applications	EN 61960	-
ISO/IEC Guide 51	-	Safety aspects - Guidelines for their inclusion in standards	EN 61960	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62133-2:2017

<https://standards.iteh.ai/catalog/standards/sist/cd3dd88b-4449-4b8e-b466-2064f0c3a11c/sist-en-62133-2-2017>



IEC 62133-2

Edition 1.0 2017-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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 2: Lithium systems

SIST EN 62133-2:2017

<https://standards.iteh.ai/catalog/standards/sist/cd3dd88b-4449-4b8e-b466-3047b3eacc00a2017e5177>

Accumulateurs alcalins et autres accumulateurs à électrolyte non acide – Exigences de sécurité pour les accumulateurs portables étanches, et pour les batteries qui en sont constituées, destinés à l'utilisation dans des applications portables – Partie 2: Systèmes au lithium

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.220.30

ISBN 978-2-8322-3910-0

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	7
4 Parameter measurement tolerances	10
5 General safety considerations	10
5.1 General.....	10
5.2 Insulation and wiring	11
5.3 Venting	11
5.4 Temperature, voltage and current management	11
5.5 Terminal contacts	11
5.6 Assembly of cells into batteries	12
5.6.1 General	12
5.6.2 Design recommendation	12
5.6.3 Mechanical protection for cells and components of batteries.....	13
5.7 Quality plan	13
5.8 Battery safety components.....	13
6 Type test and sample size.....	13
7 Specific requirements and tests	14
7.1 Charging procedures for test purposes	14
7.1.1 First procedure	14
7.1.2 Second procedure	14
7.2 Intended use	15
7.2.1 Continuous charging at constant voltage (cells)	15
7.2.2 Case stress at high ambient temperature (battery).....	15
7.3 Reasonably foreseeable misuse.....	15
7.3.1 External short-circuit (cell).....	15
7.3.2 External short-circuit (battery).....	16
7.3.3 Free fall.....	16
7.3.4 Thermal abuse (cells)	16
7.3.5 Crush (cells)	17
7.3.6 Over-charging of battery	17
7.3.7 Forced discharge (cells)	17
7.3.8 Mechanical tests (batteries).....	18
7.3.9 Design evaluation – Forced internal short-circuit (cells)	19
8 Information for safety.....	21
8.1 General.....	21
8.2 Small cell and battery safety information	22
9 Marking	22
9.1 Cell marking.....	22
9.2 Battery marking.....	23
9.3 Caution for ingestion of small cells and batteries	23
9.4 Other information	23
10 Packaging and transport.....	23
Annex A (normative) Charging and discharging range of secondary lithium ion cells for safe use.....	24

A.1	General.....	24
A.2	Safety of lithium ion secondary battery.....	24
A.3	Consideration on charging voltage	24
A.3.1	General	24
A.3.2	Upper limit charging voltage	24
A.4	Consideration of temperature and charging current.....	26
A.4.1	General	26
A.4.2	Recommended temperature range	26
A.4.3	High temperature range	27
A.4.4	Low temperature range	28
A.4.5	Scope of the application of charging current	29
A.4.6	Consideration of discharge	29
A.5	Sample preparation.....	30
A.5.1	General	30
A.5.2	Insertion procedure for nickel particle to generate internal short	30
A.5.3	Disassembly of charged cell	31
A.5.4	Shape of nickel particle	31
A.5.5	Insertion of nickel particle in cylindrical cell	31
A.5.6	Insertion of nickel particle in prismatic cell.....	34
A.6	Experimental procedure of the forced internal short-circuit test	36
A.6.1	Material and tools for preparation of nickel particle	36
A.6.2	Example of a nickel particle preparation procedure	37
A.6.3	Positioning (or placement) of a nickel particle	37
A.6.4	Damaged separator precaution	38
A.6.5	Caution for rewinding separator and electrode	38
A.6.6	Insulation film for preventing short-circuit.....	39
A.6.7	Caution when disassembling a cell	39
A.6.8	Protective equipment for safety	39
A.6.9	Caution in the case of fire during disassembling	39
A.6.10	Caution for the disassembling process and pressing the electrode core.....	39
A.6.11	Recommended specifications for the pressing device	39
Annex B (informative)	Recommendations to equipment manufacturers and battery assemblers	42
Annex C (informative)	Recommendations to the end-users	43
Annex D (normative)	Measurement of the internal AC resistance for coin cells	44
D.1	General.....	44
D.2	Method	44
Annex E (informative)	Packaging and transport.....	45
Annex F (informative)	Component standards references	46
Bibliography.....		47
Figure 1	– Forced discharge time chart	18
Figure 2	– Jig for pressing	21
Figure 3	– Ingestion gauge	22
Figure A.1	– Representation of lithium ion cells operating region for charging.....	25
Figure A.2	– Representation of lithium ion cell operating region for discharging	30
Figure A.3	– Shape of nickel particle.....	31

Figure A.4 – Nickel particle insertion position between positive and negative active material coated area of cylindrical cell	31
Figure A.5 – Nickel particle insertion position between positive aluminium foil and negative active material coated area of cylindrical cell	32
Figure A.6 – Disassembly of cylindrical cell	33
Figure A.7 – Nickel particle insertion position between positive and negative (active material) coated area of prismatic cell.....	34
Figure A.8 – Nickel particle insertion position between positive aluminium foil and negative (active material) coated area of prismatic cell	35
Figure A.9 – Disassembly of prismatic cells	36
Figure A.10 – Dimensions of a completed nickel particle.....	37
Figure A.11 – Positioning of the nickel particle when it cannot be placed in the specified area	38
Figure A.12 – Cylindrical cell	38
Figure A.13 – Distance / time ratio of several types of pressing devices	41
Table 1 – Sample size for type tests	14
Table 2 – Condition of charging procedure.....	15
Table 3 – Conditions for vibration test.....	19
Table 4 – Shock parameters	19
Table 5 – Ambient temperature for cell test.....	20
Table A.1 – Examples of operating region charging parameters	25
Table A.2 – Recommended specifications of a pressing device.....	40
Table F.1 – Component standard references	46

ITh STANDARD PREVIEW

(standards.iteh.ai)

<https://standards.iteh.ai/standards/sist/cd3dd88b-4449-4b8e-b466-2064f0c3a11c/sist-en-62133-2-2017>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**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 2: Lithium systems

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62133-2 has been prepared by subcommittee 21A: Secondary cells and batteries containing alkaline or other non-acid electrolytes, of IEC technical committee 21: Secondary cells and batteries.

This first edition cancels and replaces the second edition of IEC 62133 published in 2012. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 62133:2012:

- separation of nickel systems into a separate Part 1;
- inclusion of coin cell requirements;

- update of assembly of cells into batteries (5.6);
- mechanical tests [vibration, shock] (7.3.8.1, 7.3.8.2);
- insertion of IEC TR 62914 within the Bibliography.

The text of this standard is based on the following documents:

FDIS	Report on voting
21A/620/FDIS	21A/628/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The following different practices of a less permanent nature exist in the countries indicated below.

7.3.9: Design evaluation – Forced internal short-circuit test only applies to Korea, Japan, Switzerland and France.

A list of all parts of the IEC 62133 series, published under the general title *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*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 2: Lithium systems

1 Scope

This part of IEC 62133 specifies requirements and tests for the safe operation of portable sealed secondary lithium cells and batteries containing non-acid electrolyte, under intended use and reasonably foreseeable misuse.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-482:2004, *International Electrotechnical Vocabulary – Part 482: Primary and secondary cells and batteries* (available at <http://www.electropedia.org>)

IEC 61960, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for portable applications*

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-482, ISO/IEC Guide 51 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, process or service in accordance with specifications, instructions and information provided by the supplier

3.6**reasonably foreseeable misuse**

use of a product, process or service 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) which may include associated safety and control circuits and case, ready for use as a source of electrical energy characterized by its voltage, size, terminal arrangement, capacity and rate capability

Note 1 to entry: Includes single cell batteries.

3.9**leakage**

unplanned, visible escape of liquid electrolyte

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 but not ejection 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**

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

3.15**portable cell**

cell intended for assembly in a portable battery

3.16**lithium ion polymer cell**

cell using gel polymer electrolyte or solid polymer electrolyte, not liquid electrolyte

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62133-2:2017

<https://standards.iteh.ai/catalog/standards/sist/cd3dd88b-4449-4b8e-b466-20640c3a11c/sist-en-62133-2-2017>

3.17**rated capacity**

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

Note 1 to entry: The rated capacity is the quantity of electricity C_5 Ah (ampere-hours) declared by the manufacturer which a single cell can deliver 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.

[SOURCE: IEC 60050-482:2004, 482-03-15, modified – Note 1 to entry has been added.]

3.18**reference test current** I_t

charge or discharge current expressed as a multiple of I_t A, where I_t A = C_5 Ah/1 h, as defined in IEC 61434, and based on the rated capacity (C_5 Ah) of the cell or battery

3.19**upper limit charging voltage**

highest charging voltage in the cell operating region, which is specified by the cell manufacturer

3.20**maximum charging current**

maximum charging current in the cell operating region, which is specified by the cell manufacturer

3.21**coin cell****button cell****coin battery**

small round cell or battery in which the overall height is less than the diameter

Note 1 to entry: In English, the term “coin cell” or “coin battery” is used for lithium batteries only while the term “button cell” or “button battery” is only used for non-lithium batteries. In languages other than English, the terms “coin” and “button” are often used interchangeably, regardless of the electrochemical system.

[SOURCE: IEC 60050-482:2004 482-02-40, modified — The term “coin battery” has been added, and the NOTE “In practice terms, the term coin is used exclusively for non-aqueous lithium cells.” has been replaced with Note 1 to entry.])

3.22**cylindrical cell**

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

[SOURCE: IEC 60050-482:2004, 482-02-39]

3.23**prismatic cell**

cell having the shape of a parallelepiped whose faces are rectangular

Note 1 to entry: Prismatic cells may be provided with either a rigid metal case or flexible laminate film case.

[SOURCE: IEC 60050-482:2004, 482-02-38, modified – The source term is “prismatic” (adj.). In the definition, “qualifies a cell or a battery” has been replaced with “cell”. Note 1 to entry has been added.]