

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium, nickel cadmium and nickel-metal hydride cells and batteries for portable applications – Guidance on environmental aspects

Accumulateurs alcalins et autres accumulateurs à électrolyte non acide – Accumulateurs et batteries d'accumulateurs lithium, nickel-cadmium et nickel-métal hydrure pour applications portables – Recommandations relatives aux aspects environnementaux



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2021 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC online collection - oc.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC online collection - oc.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium, nickel cadmium and nickel-metal hydride cells and batteries for portable applications – Guidance on environmental aspects

Accumulateurs alcalins et autres accumulateurs à électrolyte non acide – Accumulateurs et batteries d'accumulateurs lithium, nickel-cadmium et nickel-métal hydrure pour applications portables – Recommandations relatives aux aspects environnementaux

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.220.30

ISBN 978-2-8322-1014-0

**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.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 General considerations.....	11
5 Requirements and recommendations	11
5.1 General.....	11
5.2 Environmental aspects of relevant secondary cells and batteries	12
5.2.1 Environmental aspects of relevant secondary cells and batteries including valuable and/or hazardous metals.....	12
5.2.2 Environmental aspects of relevant secondary cells and batteries other than those specified in 5.2.1.....	12
5.3 Requirements and recommendations on environmental hazardous substances	12
5.3.1 Heavy metals in relevant secondary cells and batteries	12
5.3.2 Analysis methods	13
5.3.3 Nickel cadmium cells and batteries	13
5.4 Marking.....	13
5.5 Collection and sorting	13
5.6 Recommendations to improve recycling possibilities	13
6 Environmental impact assessment.....	14
6.1 Interaction with the environment during life cycle	14
6.1.1 General	14
6.1.2 Input.....	14
6.1.3 Output	14
6.2 Life cycle stages	15
6.2.1 General	15
6.2.2 Design and development	15
6.2.3 Raw material usage	16
6.2.4 Manufacturing.....	17
6.2.5 Transportation, storage, disposal, and recycling	17
6.2.6 Carbon footprint of batteries (production and use)	17
7 Identifying product environmental aspects using a systematic approach	17
Annex A (informative) Battery specific laws and regulations.....	18
A.1 General.....	18
A.2 Minamata Convention on Mercury	19
A.3 Asia	20
A.3.1 China.....	20
A.3.2 Japan	21
A.3.3 Korea, Republic of.....	21
A.3.4 Malaysia	22
A.3.5 Singapore.....	22
A.3.6 Vietnam	23
A.4 Europe.....	23
A.4.1 European Union (EU) members and non-EU members where existing battery law/regulations are based on EU Directives	23

A.4.2	Russian Federation	25
A.5	South America	25
A.5.1	Argentina.....	25
A.5.2	Brazil.....	25
A.5.3	Colombia	25
A.6	Middle East.....	26
A.6.1	Israel	26
A.6.2	Saudi Arabia.....	26
A.7	North America.....	26
A.7.1	Canada.....	26
A.7.2	United States of America	27
Annex B (informative)	Global regulations and standards not applicable to batteries	28
B.1	General.....	28
B.2	Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)	28
B.3	Directive 2012/19/EU on waste electrical and electronic equipment (WEEE)	28
B.4	Directive 2005/32/EC establishing a framework for the setting of ecodesign requirements for energy-using products (EuP)	28
B.5	Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products (ErP).....	28
B.6	PVC and Halogens in accordance with IEC 61249-2-21	29
Annex C (informative)	Example instructions on disposal, transportation, storage, collection and recycling for the end-user	30
C.1	Disposal.....	30
C.1.1	Local laws and regulations	30
C.1.2	Disposal of damaged or disassembled secondary cells and batteries.....	30
C.2	Transportation of cells and batteries for recycling	30
C.2.1	Lithium cells and batteries	30
C.2.2	Ni-MH and Ni-Cd cells and batteries	30
C.3	Storage at a collection site.....	31
C.4	Design of end-use products and instruction manuals.....	31
Bibliography.....		32
Figure A.1	Taiwan (Province of China) collection symbol	20
Figure A.2	Crossed-out wheeled bin symbol indicating "separate collection" for all batteries and accumulators	23
Figure A.3	Symbols for collection and recycling of batteries in Brazil	25
Table A.1	Relevant secondary battery specific laws and regulations	18
Table A.2	Products subject to Article 4, paragraph 1 of the Minamata Convention on Mercury	19
Table A.3	Target and restriction of mercury (Japan).....	21

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SECONDARY CELLS AND BATTERIES CONTAINING ALKALINE OR OTHER
NON-ACID ELECTROLYTES – SECONDARY LITHIUM, NICKEL CADMIUM
AND NICKEL-METAL HYDRIDE CELLS AND BATTERIES FOR PORTABLE
APPLICATIONS – GUIDANCE ON ENVIRONMENTAL ASPECTS**

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.

IEC 63218 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. It is an International Standard.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
21A/763/FDIS	21A/768/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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

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

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

INTRODUCTION

Secondary batteries, such as secondary lithium, nickel cadmium (Ni-Cd) and nickel-metal hydride cells and batteries, consume a large amount of non-renewable resources like copper, manganese, lithium, and nickel. In addition to that, Ni-Cd cells and batteries include hazardous material like cadmium as a negative electrode. Nevertheless, there is no international environmental standard for secondary batteries.

The primary purpose of this document is to contribute to improving environmental sustainability by providing:

- a) basic consideration and information relating to the environmental aspects and environmental impact of secondary cells and batteries;
- b) basic guidance for the collection and recycling of secondary cells and batteries;
- c) basic guidance for environmental impact assessment across all life cycle stages for the designing and manufacturing of secondary cells and batteries;
- d) useful information for interested parties regarding regulations on secondary cells and batteries.

Additionally various countries and regions have their own environmental regulations for secondary cells and batteries. These differing regulations could lead to trade barriers in the future. Therefore, the secondary purpose of this document is to avoid potential trade barrier issues by providing countries and regions that lack secondary battery collection and recycling regulations with guidance with which they can establish harmonized standardization with the international standard.

This document is not intended to be applied for the certification of specific products.

This document provides guidance and recommendations for the collection, recycling, environmental impact assessment, including design, manufacturing, transportation, storage and disposal of secondary cells and batteries.

Collection and recycling are activities that are conducted across national borders. Therefore, international standards are necessary in addition to transport regulations.

The expected users of this document are:

- 1) cell and battery manufacturers, end-product manufacturers, recycling organizations, transport organizations and distributors;
- 2) national, regional, and local authorities that establish the regulation of the collection and recycling, environmental impact assessment, including design, manufacturing, transportation, storage and disposal of secondary cells and batteries;
- 3) national, regional, and local authorities that revise the regulation of the collection and recycling, environmental impact assessment, including design, manufacturing, transportation, storage and disposal of secondary cells and batteries.

However, this document does not preclude other stakeholders from using this document.

National and regional standards, regulations and voluntary stewardship programmes are given priority in the matters covered in this document.

SECONDARY CELLS AND BATTERIES CONTAINING ALKALINE OR OTHER NON-ACID ELECTROLYTES – SECONDARY LITHIUM, NICKEL CADMIUM AND NICKEL-METAL HYDRIDE CELLS AND BATTERIES FOR PORTABLE APPLICATIONS – GUIDANCE ON ENVIRONMENTAL ASPECTS

1 Scope

This document provides requirements and recommendations on environmental aspects of secondary lithium, nickel cadmium and nickel-metal hydride cells and batteries for portable applications (hereafter referred to as “relevant secondary cells and batteries”).

Relevant secondary cells and batteries are specified within the scopes of IEC 61960-3, IEC 61960-4, IEC 61951-1, and IEC 61951-2.

NOTE Portable applications are defined in IEC 61960-3 as comprising hand-held equipment, transportable equipment, and movable equipment. See IEC 61960-3 for examples.

This document is not intended to be applied to batteries embedded in end-use products. Once the embedded battery is removed from an end-use product, this document becomes applicable to it.

The safety and control circuits as well as cases associated with relevant secondary batteries, except for those forming part of an end-use product, are covered by this document as parts of the relevant secondary batteries.

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 62133-2:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems*
IEC 62133-2:2017/AMD1:—¹

IEC 62902, *Secondary cells and batteries – Marking symbols for identification of their chemistry*

ISO 7000, *Graphical symbols for use on equipment – Registered symbols*
(available at <http://www.graphical-symbols.info/equipment>)

ISO 14021:2016, *Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)*

ISO 14040:2006, *Environmental management – Life cycle assessment – Principles and framework*

¹ Under preparation. Stage at the time of publication: IEC FDIS 62133-2:2017/AMD1:2021