



NSAI
Standards

Irish Standard
I.S. EN IEC 62984-2:2020

High-temperature secondary batteries - Part 2: Safety requirements and tests

I.S. EN IEC 62984-2:2020

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN IEC 62984-2:2020

Published:

2020-05-01

This document was published under the authority of the NSAI and comes into effect on:

2020-05-18

ICS number:

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN IEC 62984-2:2020 is the adopted Irish version of the European Document EN IEC 62984-2:2020, High-temperature secondary batteries - Part 2: Safety requirements and tests

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

EN IEC 62984-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2020

ICS 29.220.20

English Version

**High-temperature secondary batteries - Part 2: Safety requirements and tests
(IEC 62984-2:2020)**

Batteries d'accumulateurs à haute température - Partie 2:
Exigences de sécurité et essais
(IEC 62984-2:2020)

Hochtemperatur-Sekundärbatterien - Teil 2:
Sicherheitsanforderungen und Prüfungen von Zellen und
Batterien
(IEC 62984-2:2020)

This European Standard was approved by CENELEC on 2020-04-15. 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.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, 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: Rue de la Science 23, B-1040 Brussels

EN IEC 62984-2:2020 (E)**European foreword**

The text of document 21/1032/FDIS, future edition 1 of IEC 62984-2, prepared by IEC/TC 21 "Secondary cells and batteries" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62984-2:2020.

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) 2021-01-15
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-04-15

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

Endorsement notice

The text of the International Standard IEC 62984-2:2020 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 60068-2-64	NOTE	Harmonized as EN 60068-2-64
IEC 60068-2-75	NOTE	Harmonized as EN 60068-2-75
IEC 60721-3-2	NOTE	Harmonized as EN IEC 60721-3-2
IEC 60952 (series)	NOTE	Harmonized as EN 60952 (series)
IEC 61982 (series)	NOTE	Harmonized as EN 61982 (series)
IEC 62262	NOTE	Harmonized as EN 62262
IEC 61373	NOTE	Harmonized as EN 61373

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where 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 60068-2-18	2017	Environmental testing - Part 2-18: Tests - Test R and guidance: Water	EN 60068-2-18	2017
IEC 60112	-	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	-
IEC 60204-1	-	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	EN 60204-1	-
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 61140	2016	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2016
IEC 61508	series	Functional safety of electrical/electronic/programmable electronic safety-related systems	EN 61508	series
IEC 62984-1	2020	High-temperature secondary batteries - Part 1: General requirements	-	-

This page is intentionally left blank



IEC 62984-2

Edition 1.0 2020-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**High-temperature secondary batteries –
Part 2: Safety requirements and tests**

**Batteries d'accumulateurs à haute température –
Partie 2: Exigences de sécurité et essais**





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2020 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 Varembe
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.

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 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

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.

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.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.



IEC 62984-2

Edition 1.0 2020-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**High-temperature secondary batteries –
Part 2: Safety requirements and tests**

**Batteries d'accumulateurs à haute température –
Partie 2: Exigences de sécurité et essais**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.220.20

ISBN 978-2-8322-7923-6

**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
1 Scope.....	6
2 Normative references	6
3 Terms, definitions, symbols and abbreviated terms.....	6
3.1 Battery safety.....	7
3.2 Symbols and abbreviated terms	9
4 Environmental (service) conditions	9
4.1 General.....	9
4.2 Normal service conditions for stationary installations	9
4.3 Special service conditions for stationary installations	9
4.4 Normal service conditions for mobile installations (except propulsion).....	9
4.5 Special service conditions for mobile installations (except propulsion)	9
5 Safety requirements	10
5.1 Functional safety requirements	10
5.1.1 Safety of battery management system	10
5.1.2 Battery protective management	10
5.1.3 Thermal management	10
5.2 Mechanical requirements	10
5.2.1 General	10
5.2.2 Battery enclosure.....	10
5.3 Protection against electrical shock.....	10
5.3.1 General	10
5.3.2 Normal conditions.....	11
5.3.3 Single-fault conditions	11
5.3.4 Insulation voltage	12
5.3.5 Separation.....	15
5.3.6 Spacing	15
5.3.7 Earthing.....	16
5.4 Resistance to abnormal conditions.....	18
5.4.1 Resistance to overcharge	18
5.4.2 Resistance to short circuit	18
5.4.3 Resistance to external fire	19
5.4.4 Resistance to internal overheating.....	19
5.4.5 Flooding	19
5.4.6 Drop	19
6 Safety tests	20
6.1 General.....	20
6.1.1 Classification of tests.....	20
6.1.2 Test object selection.....	20
6.1.3 DUT initial conditions before tests	20
6.1.4 Measuring equipment	20
6.2 List of tests	21
6.3 Type tests.....	21
6.3.1 Overcharge test.....	21
6.3.2 Short circuit test	22
6.3.3 External fire exposure test.....	22

6.3.4	Cell failure propagation test	24
6.3.5	Overheating test	25
6.3.6	Drop test	27
6.4	Routine tests	28
6.4.1	Withstand voltage test	28
6.4.2	Insulation resistance measurement	29
6.5	Special tests	30
6.5.1	Immersion test	30
7	Markings	30
7.1	General	30
7.2	Data plate marking	32
8	Rules for transportation, installation and maintenance	32
8.1	Transportation	32
8.2	Installation	32
8.3	Maintenance	32
9	Documentation	32
9.1	Instruction manual	32
9.2	Test report	32
Annex A (informative) Standard template for report of test results and description of the DUT – Report of type test		33
Bibliography		36
Figure 1 – Examples of binding screw assemblies		18
Figure 2 – Fire exposure test: pre-heating		23
Figure 3 – Fire exposure test: direct exposure		24
Figure 4 – Fire exposure: end		24
Figure 5 – Plan view of specimen cross section for cell failure propagation test		25
Figure 6 – Temperature management subsystem		26
Figure 7 – Application of test voltage		29
Figure 8 – Insulation resistance measurement		29
Figure 9 – Examples of safety labels for sodium-nickel-chloride / sodium-sulfur batteries		31
Table 1 – List of symbols and abbreviated terms		9
Table 2 – Withstand voltages		13
Table 3 – Actual test voltage for impulse test with corresponding altitudes		14
Table 4 – Guide to overvoltage category assignment		15
Table 5 – Multiplication factors for clearances of equipment rated for operation at altitudes up to 5 000 m		16
Table 6 – Type tests		21
Table 7 – Routine tests		21
Table 8 – Special tests		21
Table 9 – Drop test severity classes		27

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH-TEMPERATURE SECONDARY BATTERIES –**Part 2: Safety requirements and tests**

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 62984-2 has been prepared by IEC technical committee 21: Secondary cells and batteries.

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

FDIS	Report on voting
21/1032/FDIS	21/1042/RVD

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

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

This document is to be read in conjunction with IEC 62984-1:2020.

A list of all parts in the IEC 62984 series, published under the general title *High-temperature secondary batteries*, can be found on the IEC website.

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 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.

HIGH-TEMPERATURE SECONDARY BATTERIES –

Part 2: Safety requirements and tests

1 Scope

This part of IEC 62984 specifies safety requirements and test procedures for high-temperature batteries for mobile and/or stationary use and whose rated voltage does not exceed 1 500 V.

This document does not cover aircraft batteries, which are covered by IEC 60952 (all parts), and batteries for the propulsion of electric road vehicles, covered by IEC 61982 (all parts).

NOTE High-temperature batteries are electrochemical systems whose cells' internal minimum operating temperature is above 100 °C.

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 60068-2-18:2017, *Environmental testing – Part 2-18: Tests – Test R and guidance: Water*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

IEC 62984-1:2020, *High-temperature secondary batteries – Part 1: General requirements*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the terms and definitions given in IEC 62984-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-