

Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 62619:2017 sisaldab Euroopa standardi EN 62619:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 62619:2017 consists of the English text of the European standard EN 62619:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 19.05.2017.	Date of Availability of the European standard is 19.05.2017.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 29.220.30

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:  
Koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

ICS 29.220.30

English Version

Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications  
(IEC 62619:2017)

Accumulateurs alcalins et autres accumulateurs à électrolyte non acide - Exigences de sécurité pour les accumulateurs au lithium pour utilisation dans des applications industrielles  
(IEC 62619:2017)

Akkumulatoren und Batterien mit alkalischen oder anderen nicht säurehaltigen Elektrolyten - Sicherheitsanforderungen für Lithium-Akkumulatoren und -Batterien für die Verwendung in industriellen Anwendungen  
(IEC 62619:2017)

This European Standard was approved by CENELEC on 2017-03-20. 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, 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

## European foreword

The text of document 21A/617/FDIS, future edition 1 of IEC 62619, 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 62619:2017.

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) 2017-12-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-03-20

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.

The text of the International Standard IEC 62619:2017 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 60730-1:2013	NOTE	Harmonized as EN 60730-1:2016.
IEC 60812	NOTE	Harmonized as EN 60812.
IEC 61025	NOTE	Harmonized as EN 61025.
IEC 61434	NOTE	Harmonized as EN 61434.
IEC 61508 (series)	NOTE	Harmonized as EN 61508 (series).
IEC 61511-1	NOTE	Harmonized as EN 61511-1.
IEC 61513	NOTE	Harmonized as EN 61513.
IEC 61960	NOTE	Harmonized as EN 61960.
IEC 62061	NOTE	Harmonized as EN 62061.
IEC 62660 (series)	NOTE	Harmonized as EN 62660 (series).
IEC 62281	NOTE	Harmonized as EN 62281.
ISO 9001:2015	NOTE	Harmonized as EN ISO 9001:2015.

## CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references .....	6
3 Terms and definitions .....	7
4 Parameter measurement tolerances .....	9
5 General safety considerations .....	10
5.1 General.....	10
5.2 Insulation and wiring.....	10
5.3 Venting .....	10
5.4 Temperature/voltage/current management.....	10
5.5 Terminal contacts of the battery pack and/or battery system .....	10
5.6 Assembly of cells, modules, or battery packs into battery systems .....	11
5.6.1 General .....	11
5.6.2 Battery system design .....	11
5.7 Operating region of lithium cells and battery systems for safe use .....	11
5.8 Quality plan .....	11
6 Type test conditions .....	12
6.1 General.....	12
6.2 Test items.....	12
7 Specific requirements and tests .....	13
7.1 Charging procedures for test purposes .....	13
7.2 Reasonably foreseeable misuse.....	13
7.2.1 External short-circuit test (cell or cell block).....	13
7.2.2 Impact test (cell or cell block) .....	14
7.2.3 Drop test (cell or cell block, and battery system).....	15
7.2.4 Thermal abuse test (cell or cell block).....	17
7.2.5 Overcharge test (cell or cell block).....	18
7.2.6 Forced discharge test (cell or cell block).....	18
7.3 Considerations for internal short-circuit – Design evaluation .....	19
7.3.1 General .....	19
7.3.2 Internal short-circuit test (cell) .....	19
7.3.3 Propagation test (battery system) .....	20
8 Battery system safety (considering functional safety).....	20
8.1 General requirements .....	20
8.2 Battery management system (or battery management unit).....	21
8.2.1 Requirements for the BMS.....	21
8.2.2 Overcharge control of voltage (battery system).....	22
8.2.3 Overcharge control of current (battery system) .....	23
8.2.4 Overheating control (battery system) .....	24
9 Information for safety.....	24
10 Marking and designation.....	24
Annex A (normative) Operating region of cells for safe use .....	25
A.1 General.....	25
A.2 Charging conditions for safe use.....	25
A.3 Consideration on charging voltage .....	25
A.4 Consideration on temperature .....	26

A.5	High temperature range .....	26
A.6	Low temperature range .....	26
A.7	Discharging conditions for safe use.....	26
A.8	Example of operating region .....	27
Annex B (informative)	Procedure of propagation test (see 7.3.3).....	28
B.1	General.....	28
B.2	Test conditions .....	28
B.3	Methods for initiating the thermal runaway can include .....	28
Annex C (informative)	Packaging .....	29
Bibliography.....		30
Figure 1	– Configuration of the impact test.....	15
Figure 2	– Impact location.....	17
Figure 3	– Configuration for the shortest edge drop test.....	17
Figure 4	– Configuration for the corner drop test.....	17
Figure 5	– Examples of BMS locations and battery system configurations.....	22
Figure 6	– Example of the circuit configuration for overcharge control of voltage .....	23
Figure A.1	– An example of operating region for charging of typical lithium-ion cells.....	27
Figure A.2	– An example of operating region for discharging of typical lithium-ion cells .....	27
Table 1	– Sample size for type tests .....	13
Table 2	– Drop test method and condition .....	16

# SECONDARY CELLS AND BATTERIES CONTAINING ALKALINE OR OTHER NON-ACID ELECTROLYTES – SAFETY REQUIREMENTS FOR SECONDARY LITHIUM CELLS AND BATTERIES, FOR USE IN INDUSTRIAL APPLICATIONS

## 1 Scope

This document specifies requirements and tests for the safe operation of secondary lithium cells and batteries used in industrial applications including stationary applications.

When there exists an IEC standard specifying test conditions and requirements for cells used in special applications and which is in conflict with this document, the former takes precedence (e.g., IEC 62660 series on road vehicles).

The following are some examples of applications that utilize cells and batteries under the scope of this document.

- Stationary applications: telecom, uninterruptible power supplies (UPS), electrical energy storage system, utility switching, emergency power, and similar applications.
- Motive applications: forklift truck, golf cart, auto guided vehicle (AGV), railway, and marine, excluding road vehicles.

Since this document covers batteries for various industrial applications, it includes those requirements, which are common and minimum to the various applications.

Electrical safety is included only as a part of the risk analysis of Clause 8. In regard to details for addressing electrical safety, the end use application standard requirements have to be considered.

This document applies to cells and batteries. If the battery is divided into smaller units, the smaller unit can be tested as the representative of the battery. The manufacturer clearly declares the tested unit. The manufacturer may add functions, which are present in the final battery to the tested unit.

## 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 62133:2012, *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*

IEC 62620:2014, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for use in industrial applications*

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