



BSI Standards Publication

Safety requirements for secondary batteries and battery installations

Part 2: Stationary batteries (IEC 62485-2:2010)

This is a preview of "BS EN IEC 62485-2:20...". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of EN IEC 62485-2:2018. It is identical to IEC 62485-2:2010. It supersedes BS EN 50272-2:2001, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/21, Secondary cells and batteries.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

© The British Standards Institution 2018
Published by BSI Standards Limited 2018

ISBN 978 0 580 52172 0

ICS 29.220.30; 29.220.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 May 2018.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

This is a preview of "BS EN IEC 62485-2:20...". Click here to purchase the full version from the ANSI store.

EUROPÄISCHE NORM

May 2018

ICS 29.220.20; 29.220.30

Supersedes EN 50272-2:2001

English Version

Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries (IEC 62485-2:2010)

Exigences de sécurité pour les batteries d'accumulateurs et les installations de batteries - Partie 2: Batteries stationnaires
(IEC 62485-2:2010)

Sicherheitsanforderungen an Sekundär-Batterien und Batterieanlagen - Teil 2: Stationäre Batterien
(IEC 62485-2:2010)

This European Standard was approved by CENELEC on 2018-04-09. 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: Rue de la Science 23, B-1040 Brussels

This is a preview of "BS EN IEC 62485-2:20...". [Click here to purchase the full version from the ANSI store.](#)

European foreword

This document (EN IEC 62485-2:2018) consists of the text of IEC 62485-2:2010 prepared by IEC/TC 21 "Secondary cells and batteries".

The following dates are fixed:

- latest date by which this document has to be implemented (dop) 2019-04-09
at national level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2021-04-09

This document supersedes EN 50272-2:2001.

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 62485-2:2010 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 60065	NOTE	Harmonized as EN 60065.
IEC 60079-10-1:2008	NOTE	Harmonized as EN 60079-10-1:2009 (not modified).
IEC 60364-1	NOTE	Harmonized as HD 60364-1.
IEC 60364-4-42	NOTE	Harmonized as HD 60364-4-42.
IEC 60364-5-54	NOTE	Harmonized as HD 60364-5-54.
IEC 60364-7-706	NOTE	Harmonized as EN 60364-7-706.
IEC 60950-1	NOTE	Harmonized as EN 60950-1.
IEC 60990	NOTE	Harmonized as EN 60990.

This is a preview of "BS EN IEC 62485-2:20...". Click here to purchase the full version from the ANSI store.

(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 60364-4-41	-	Low-voltage electrical installations -- Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41	-
IEC 60364-4-43	-	Low voltage electrical installations -- Part 4-43: Protection for safety - Protection against overcurrent	HD 60364-4-43	-
IEC 60364-5-53	-	Electrical installations of buildings -- Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control		-
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
-	-		+ corrigendum May	1993
IEC 60622	2002	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Sealed nickel-cadmium prismatic rechargeable single cells	EN 60622	2003
IEC 60623	2001	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells	EN 60623	2001
IEC 60664-1	-	Insulation coordination for equipment within low-voltage systems -- Part 1: Principles, requirements and tests	EN 60664-1	-
IEC 60896-11	2002	Stationary lead-acid batteries -- Part 11: Vented types - General requirements and methods of tests	EN 60896-11	2003
IEC 60896-21	2004	Stationary lead-acid batteries -- Part 21: Valve regulated types - Methods of test	EN 60896-21	2004
IEC 60896-22	2004	Stationary lead-acid batteries -- Part 22: Valve regulated types - Requirements	EN 60896-22	2004
IEC 60900	-	Live working - Hand tools for use up to 1 000 V a.c. and 1 500 V d.c.	EN 60900	-
IEC 61140	-	Protection against electric shock - Common aspects for installation and equipment	EN 61140	-
IEC 61340-4-1	-	Electrostatics -- Part 4-1: Standard test methods for specific applications - Electrical resistance of floor coverings and installed floors	EN 61340-4-1	-

This is a preview of "BS EN IEC 62485-2:20...". [Click here to purchase the full version from the ANSI store.](#)

		installations in power plants and substations -- Part 1: Calculation of short-circuit currents		
IEC 61660-2	-	Short-circuit currents in d.c. auxiliary installations in power plants and substations -- Part 2: Calculation of effects	EN 61660-2	-
IEC 62259	2003	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Nickel-cadmium prismatic secondary single cells with partial gas recombination	EN 62259	2004
ISO 3864	series	Graphical symbols - Safety colours and safety signs	-	-
IEC/TR 60755	-	General requirements for residual current operated protective devices	-	-

This is a preview of "BS EN IEC 62485-2:20...". [Click here to purchase the full version from the ANSI store.](#)

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions	8
4 Protection against electric shock.....	10
4.1 General.....	10
4.2 Protection against direct contact.....	11
4.3 Protection against indirect contact	11
4.3.1 Protection by automatic disconnection of supply.....	12
4.3.2 Protection by use of class II equipment or by equivalent insulation	16
4.3.3 Protection by electrical separation.....	16
4.4 Protection against both direct and indirect contact.....	16
4.4.1 General	16
4.4.2 Protection by Safety Extra Low Voltage (SELV) or by Protective Extra Low Voltage (PELV).....	16
4.4.3 Protection by Functional Extra Low Voltage (FELV) without protective separation	17
5 Disconnection and separation	17
6 Prevention of short circuits and protection from other effects of electric current.....	17
6.1 General	17
6.2 Short-circuits	18
6.3 Protective measures during maintenance.....	18
6.4 Leakage currents.....	19
7 Provisions against explosion hazards.....	19
7.1 Gas generation.....	19
7.2 Ventilation requirements	19
7.3 Natural ventilation.....	21
7.4 Forced ventilation	22
7.5 Charging modes	22
7.6 Overcharging under fault conditions.....	22
7.7 Close vicinity to the battery	22
7.8 Prevention of electrostatic discharges when working with batteries.....	23
8 Provision against electrolyte hazard	23
8.1 Electrolyte and water	23
8.2 Protective clothing	23
8.3 Accidental contact and "First Aid".....	23
8.3.1 General	23
8.3.2 Eye contact.....	24
8.3.3 Skin contact.....	24
8.4 Battery accessories and maintenance tools.....	24
9 Accommodation, housing	24
9.1 General	24
9.2 Specific requirements for separate battery rooms.....	24
9.3 Specific requirements for the specially separated areas in rooms accommodating electrical equipment	25

This is a preview of "BS EN IEC 62485-2:20...". [Click here to purchase the full version from the ANSI store.](#)

9.4	Battery enclosures	25
9.5	Working on or near batteries.....	26
9.5.1	Working distances within battery rooms	26
9.5.2	Remarks on special work in battery rooms	26
9.6	Accommodation of lead-acid and NiCd batteries in the same room	26
10	Charge current requirements	26
10.1	Superimposed ripple current	26
10.2	Maximum ripple current	27
11	Identification labels, warning notices and instructions for use, installation and maintenance.....	27
11.1	Warning labels and notices in rooms.....	27
11.2	Identification labels or marking on cells and monobloc batteries	27
11.3	Instructions for use, installation and maintenance	28
12	Transportation, storage, disposal and environmental aspects	28
12.1	Packing and transport.....	28
12.2	Dismantling, disposal, and recycling of batteries	28
13	Inspection and monitoring	28
	Annex A (informative) Charging methods and modes of operation.....	30
	Annex B (informative) Calculation of safety distance d to protect against explosion hazards.....	34
	Bibliography	37
	Figure 1 – TN system with separate protective conductor (PE) in the entire system (TN-S network)	13
	Figure 2 – TN system with functional earthing and protective (FPE, PEN) combined with an external line conductor (TN-C system)	13
	Figure 3 – TT system	14
	Figure 4 – IT system	15
	Figure 5 – Converters with intermediate DC circuit (IT-system) (Example)	15
	Figure A.1 – Parallel operation mode circuit.....	30
	Figure A.2 – Battery charge current interlaced with frequent temporary discharge events due to a load current exceeding the current supply capability.....	31
	Figure A.3 – Response mode operation circuit.....	32
	Figure A.4 – IU-or CC-CV charge profile.....	32
	Figure A.5 – Time dependant profile of current I and voltage U	32
	Figure B.1 – Safety distance d as a function of the rated capacity for various charge currents I (mA/Ah).....	36
	Table 1 – Values for current I when charging with IU- or U-charging profiles (see also Annex A).....	21
	Table 2 – Recommended upper limits of AC ripple current flowing through the battery as I_{eff} per 100 Ah rated battery capacity.....	27
	Table A.1 – Float charge voltages for lead-acid and NiCd batteries.....	30
	Table A.2 – Typical charge voltage levels at 20 °C.....	33

This is a preview of "BS EN IEC 62485-2:20...". [Click here to purchase the full version from the ANSI store.](#)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY REQUIREMENTS FOR SECONDARY BATTERIES AND BATTERY INSTALLATIONS –

Part 2: Stationary batteries

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 62485-2 has been prepared by IEC technical committee 21: Secondary cells and batteries.

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

FDIS	Report on voting
21/711/FDIS	21/718/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.

A list of all parts of the IEC 62485 series can be found, under the general title *Safety requirements for secondary batteries and battery installations*, on the IEC website.

This is a preview of "BS EN IEC 62485-2:20...". [Click here to purchase the full version from the ANSI store.](#)

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site 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.

This is a preview of "BS EN IEC 62485-2:20...". [Click here to purchase the full version from the ANSI store.](#)

INTRODUCTION

The described safety requirements comprise the protective measures to protect from hazards generated by the electricity, the electrolyte, and the explosive gases when using secondary batteries. In addition measures are described to maintain the functional safety of batteries and battery installations.

For the electrical safety (protection against electric shock) under Clause 4, this standard refers to IEC 60364-4-41. The pilot function of this standard is fully observed by indication of cross-reference numbers of the relevant clauses, but interpretation is given where adoption to direct current (DC) circuits is required.

This safety standard comes into force with the date of publication and applies to all new batteries and battery installations. Previous installations are intended to conform to the existing national standards at the time of installation. In case of redesign of old installations this standard applies.

Valve-regulated lead-acid batteries used in stationary battery installations are intended to fulfil safety requirements in accordance to IEC 60896-21 and IEC 60896-22.

This is a preview of "BS EN IEC 62485-2:20...". [Click here to purchase the full version from the ANSI store.](#)

SAFETY REQUIREMENTS FOR SECONDARY BATTERIES AND BATTERY INSTALLATIONS –

Part 2: Stationary batteries

1 Scope

This part of the IEC 62485 applies to stationary secondary batteries and battery installations with a maximum voltage of DC 1 500 V (nominal) and describes the principal measures for protections against hazards generated from:

- electricity,
- gas emission,
- electrolyte.

This International Standard provides requirements on safety aspects associated with the erection, use, inspection, maintenance and disposal.

It covers lead-acid and NiCd / NiMH batteries.

Examples for the main applications are:

- telecommunications,
- power station operation,
- central emergency lighting and alarm systems,
- uninterruptible power supplies,
- stationary engine starting,
- photovoltaic systems.

2 Normative references

The following referenced documents are indispensable for the application 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 60364-4-41, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-43, *Low-voltage electrical installations – Part 4-43: Protection for safety – Protection against overcurrent*

IEC 60364-5-53, *Electrical installations of buildings – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60622:2002, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Sealed nickel cadmium prismatic rechargeable single cells*

IEC 60623:2001, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells*