



SLOVENSKI STANDARD SIST EN IEC 62485-6:2021

01-april-2021

Varnostne zahteve za sekundarne baterije in baterijske naprave - 5. del: Varno obratovanje litij-ionskih baterij, uporabljenih za vleko

Safety requirements for secondary batteries and battery installations - Part 5: Safe operation of lithium-ion batteries in traction applications

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **EN IEC 62485-6:2021**
<https://standards.iteh.ai/catalog/standards/sist/323f4ad1-1c3c-498a-a61a-059a70066d3e/sist-en-iec-62485-6-2021>

ICS:

29.220.20	Kislinski sekundarni člani in baterije	Acid secondary cells and batteries
29.220.30	Alkalni sekundarni člani in baterije	Alkaline secondary cells and batteries

SIST EN IEC 62485-6:2021

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN IEC 62485-6:2021](#)

<https://standards.iteh.ai/catalog/standards/sist/323f4ad1-1c3c-498a-a61a-059a70066d3e/sist-en-iec-62485-6-2021>

EUROPEAN STANDARD

EN IEC 62485-6

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2021

ICS 29.220.20; 29.220.30

English Version

Safety requirements for secondary batteries and battery installations - Part 6: Safe operation of lithium-ion batteries in traction applications
(IEC 62485-6:2021)

Exigences de sécurité pour les batteries d'accumulateurs et les installations de batteries - Partie 6: Fonctionnement en toute sécurité des batteries ions-lithium dans les applications de traction
(IEC 62485-6:2021)

Sicherheitsanforderungen an sekundäre Batterien und Batterieanlagen – Teil 6: Sicherer Betrieb von Lithium-Ionen-Batterien in Traktionsanwendungen
(IEC 62485-6:2021)

This European Standard was approved by CENELEC on 2021-02-09. 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, 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 62485-6:2021 (E)**European foreword**

The text of document 21/1071/FDIS, future edition 1 of IEC 62485-6:2021, prepared by IEC/TC 21 "Secondary cells and batteries" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62485-6:2021.

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) 2021-11-09
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-02-09

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 62485-6:2021 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 60664 (series)	NOTE	Harmonized as EN 60664 (series)
IEC 60730-1:2013	NOTE	Harmonized as EN 60730-1:2016 (modified)
IEC 60730-1:2013/A1:2015	NOTE	Harmonized as EN 60730-1:2016/A1:2019 (not modified)
IEC 60730-1:2013/A2:2020	NOTE	Harmonized as EN 60730-1:2016/A2:— ¹ (not modified)
IEC 60812	NOTE	Harmonized as EN IEC 60812
IEC 60900	NOTE	Harmonized as EN IEC 60900
IEC 61025	NOTE	Harmonized as EN 61025
IEC 61429	NOTE	Harmonized as EN 61429
IEC 61508-1	NOTE	Harmonized as EN 61508-1
IEC 62281	NOTE	Harmonized as EN IEC 62281
IEC 62485-1	NOTE	Harmonized as EN IEC 62485-1
IEC 62485-3:2014	NOTE	Harmonized as EN 62485-3:2014 (not modified)
IEC 62902	NOTE	Harmonized as EN IEC 62902
IEC 62928	NOTE	Harmonized as EN IEC 62928
IEC 62660 (series)	NOTE	Harmonized as EN 62660 (series)

¹ To be published. Stage at the time of publication: EN 60730-1:2016/FprA2:2020.

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 60204-1	-	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	EN 60204-1	-
IEC 60364-4-41	2005	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41	2017
+A1	2017		+ A11	2017
-	-		+ A12	2019
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 61000-1-2	-	Electromagnetic compatibility (EMC) - Part 1-2: General - Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena	EN 61000-1-2	-
IEC 61000-6-1	-	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments	EN IEC 61000-6-1	-
IEC 61000-6-2	-	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments	EN IEC 61000-6-2	-
IEC 61000-6-3	-	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential environments	EN IEC 61000-6-3 ²	-

² To be published. Stage at the time of publication: prEN IEC 61000-6-3:2019.

EN IEC 62485-6:2021 (E)

IEC 61000-6-4	-	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments	EN IEC 61000-6-4	-
IEC 61000-6-7	-	Electromagnetic compatibility (EMC) - Part 6-7: Generic standards - Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations	EN 61000-6-7	-
IEC 61140	-	Protection against electric shock - Common aspects for installation and equipment	EN 61140	-
IEC 62619	2017	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications	EN 62619	2017
IEC 62620	2014	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Secondary lithium cells and batteries for use in industrial applications	EN 62620	2015
ISO 3864	series	Graphical symbols - Safety colours and safety signs	-	-
-	-	Safety of industrial trucks - Electrical requirements - Part 1: General requirements for battery powered trucks	EN 1175-1	1998
-	-		+A1	2010



IEC 62485-6

Edition 1.0 2021-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Safety requirements for secondary batteries and battery installations –
Part 6: Safe operation of lithium ion batteries in traction applications**

**Exigences de sécurité pour les batteries d'accumulateurs et les installations
de batteries –**
**Partie 6: Fonctionnement en toute sécurité des batteries ions-lithium dans
les applications de traction**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.220.20; 29.220.30

ISBN 978-2-8322-9126-9

**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 and definitions	8
4 Protection against electric shock by the battery and charger.....	10
4.1 General.....	10
4.2 Basic protection and fault protection	10
4.3 Basic protection and fault protection when discharging the traction battery on the vehicle (battery disconnected from charger/mains).....	11
4.3.1 Batteries up to and including 60 V DC	11
4.3.2 For batteries exceeding 60 V DC up to and including 120 V DC.....	11
4.3.3 Batteries exceeding 120 V DC but not exceeding 1 500 V DC.....	11
4.4 Basic protection and fault protection when charging the traction battery.....	11
5 Prevention of short-circuits and protection from other effects of electric current.....	12
5.1 Cables and connectors	12
5.2 Protective measures during maintenance.....	12
5.3 Battery insulation	13
5.3.1 Insulation resistance.....	13
5.3.2 Insulation resistance measurement.....	13
6 Provisions against hazards.....	13
6.1 General.....	13
6.2 Charging modes.....	13
6.3 Temperature influence on the charge voltage and limiting of charge current	14
6.4 Overcharging or overdischarging under fault conditions	14
6.5 Prevention of electrostatic discharges when working with batteries	14
7 Provision against hazards by chemical substances.....	14
7.1 General.....	14
7.2 Initial actions in case of hazardous chemical release	14
7.3 Eye or skin contact	14
7.4 Swallowing.....	14
7.5 Respiratory tract	15
7.6 Burns.....	15
8 Battery containers and enclosures.....	15
9 Battery change	15
10 Battery peripheral equipment/accessories	15
10.1 Battery management system.....	15
10.2 Thermal management systems and series installation.....	16
10.3 Connectors (plugs/sockets).....	16
11 Charge current requirements	16
11.1 Peak voltage/current by charging	16
11.2 Superimposed ripple current	17
11.3 Maximum ripple current.....	17
12 Identification labels, warning notices and instructions for use, installation and maintenance.....	17
12.1 General.....	17
12.2 Warning labels	17

12.3	Identification label.....	18
12.4	Instructions	18
12.5	Other labels	18
13	Transportation, storage, disposal and environmental aspects	18
13.1	Packing and transport.....	18
13.2	Disassembly, disposal, and recycling of batteries.....	19
13.3	Storage.....	19
14	Inspection and monitoring.....	19
15	EMC for traction application.....	19
	Annex A (informative) Cell behaviour inside and outside of operating region.....	20
	Annex B (normative) Electromagnetic compatibility (EMC)	21
B.1	Case 1 – EMC requirements of battery systems depending of each end- device application	21
B.2	Case 2 – EMC requirements for testing battery system as an end-device.....	21
	Bibliography.....	22
	Figure A.1 – An example for operating region of lithium ion cell	20

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN IEC 62485-6:2021](https://standards.iteh.ai/catalog/standards/sist/323f4ad1-1c3c-498a-a61a-059a70066d3e/sist-en-iec-62485-6-2021)

<https://standards.iteh.ai/catalog/standards/sist/323f4ad1-1c3c-498a-a61a-059a70066d3e/sist-en-iec-62485-6-2021>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY REQUIREMENTS FOR SECONDARY BATTERIES AND BATTERY INSTALLATIONS –

Part 6: Safe operation of lithium ion batteries in traction applications

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 62485-6 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
21/1071/FDIS	21/1077/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.

A list of all parts in the IEC 62485 series, published under the general title *Safety requirements for secondary batteries and battery installations*, 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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN IEC 62485-6:2021](https://standards.iteh.ai/catalog/standards/sist/323f4ad1-1c3c-498a-a61a-059a70066d3e/sist-en-iec-62485-6-2021)

<https://standards.iteh.ai/catalog/standards/sist/323f4ad1-1c3c-498a-a61a-059a70066d3e/sist-en-iec-62485-6-2021>