



BSI Standards Publication

Wheelchairs

Part 31: Lithium-ion battery systems and chargers for powered wheelchairs — Requirements and test methods

This is a preview of "BS ISO 7176-31:2023". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of ISO 7176-31:2023.

The UK participation in its preparation was entrusted to Technical Committee CH/173, Assistive products for persons with disability.

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

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2023
Published by BSI Standards Limited 2023

ISBN 978 0 539 05953 3

ICS 11.180.10

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 2023.

Amendments/corrigenda issued since publication

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

This is a preview of "BS ISO 7176-31:2023". [Click here to purchase the full version from the ANSI store.](#)

First edition
2023-05-12

Wheelchairs —

Part 31:

Lithium-ion battery systems and chargers for powered wheelchairs — Requirements and test methods

Fauteuils roulants —

*Partie 31: Systèmes de batteries lithium-ion et chargeurs pour
fauteuils roulants motorisés — Exigences et méthodes d'essai*



Reference number
ISO 7176-31:2023(E)

© ISO 2023

This is a preview of "BS ISO 7176-31:2023". Click here to purchase the full version from the ANSI store.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

This is a preview of "BS ISO 7176-31:2023". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Lithium-ion batteries	3
4.1 Battery performance and safety requirements.....	3
4.1.1 General.....	3
4.1.2 Fire.....	4
4.1.3 Battery cyclic endurance.....	4
4.2 Requirements for battery management systems.....	4
4.2.1 General.....	4
4.2.2 Functional requirements.....	5
4.2.3 Electromagnetic compatibility (EMC).....	5
4.2.4 Climatic tests.....	5
5 Requirements for the battery charging system	6
5.1 Charger connector.....	6
5.1.1 General.....	6
5.1.2 XLR battery charger connector.....	6
5.1.3 XLR wheelchair charger connector.....	6
5.2 Battery charger function.....	7
5.2.1 Requirements.....	7
6 Instructions for use	8
6.1 Battery charger.....	8
6.2 Battery.....	8
7 Battery labelling	9
8 Test report	9
Bibliography	10

This is a preview of "BS ISO 7176-31:2023". [Click here to purchase the full version from the ANSI store.](#)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 173, *Assistive products*, Subcommittee SC 1, *Wheelchairs*.

A list of all parts in the ISO 7176 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This is a preview of "BS ISO 7176-31:2023". [Click here to purchase the full version from the ANSI store.](#)

Introduction

This document was developed to standardize requirements for use of lithium-ion batteries in wheelchairs.

Lithium-ion batteries provide performance enhancements relative to batteries with other chemistries, but operation outside specified limits can pose unacceptable risks. It is important not to overlook conditions that occur not only when charging using the wheelchair battery charger, but during operation of the wheelchair, which can charge the battery system when decelerating and/or travelling down a slope. In many cases, the wheelchair controller can be considered part of the battery system and charging system combined.

This is a preview of "BS ISO 7176-31:2023". [Click here to purchase the full version from the ANSI store.](#)

This is a preview of "BS ISO 7176-31:2023". [Click here to purchase the full version from the ANSI store.](#)

Wheelchairs —

Part 31:

Lithium-ion battery systems and chargers for powered wheelchairs — Requirements and test methods

WARNING — The use of this document can involve hazardous materials, operations and equipment. This document does not purport to address all of the safety or environmental problems associated with its use. It is the responsibility of users of this document to take appropriate measures to ensure the safety and health of personnel and the environment prior to application of this document. Particular care should be taken regarding the possible emission of toxic fumes resulting from lithium battery fires.

1 Scope

This document specifies requirements and test methods for lithium-ion batteries and battery systems intended for use in electrically powered wheelchairs, and their charging systems.

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.

ISO 7176-8, *Wheelchairs — Part 8: Requirements and test methods for static, impact and fatigue strengths*

ISO 7176-14, *Wheelchairs — Part 14: Power and control systems for electrically powered wheelchairs and scooters — Requirements and test methods*

ISO 7176-25:2022, *Wheelchairs — Part 25: Lead-acid batteries and chargers for powered wheelchairs — Requirements and test methods*

IEC 60335-2-29:2016+Amd 1:2019, *Household and similar electrical appliances — Safety — Part 2-29: Particular requirements for battery chargers*

IEC 60417, *Graphical symbols for use on equipment — Registered symbols*

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

IEC 62133-2, *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 61960-3, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Secondary lithium cells and batteries for portable applications - Part 3: Prismatic and cylindrical lithium secondary cells and batteries made from them*

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*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.