



Wheelchairs

Part 2: Requirements and test methods for electrically powered wheelchairs (including mobility scooters)

This Australian Standard is the adoption of EN 12184:2014 with national modifications as set out in the Appendix ZZ to take account of Australian conditions with the permission of the European Committee for Standardization -GEN, Avenue Marnix 17, B-1000 Brussels, Belgium.



This Australian Standard® was prepared by Committee ME-067, Assistive Technology Products for Persons with Disability. It was approved on behalf of the Council of Standards Australia on 27 February 2019.
This Standard was published on 7 May 2019.

The following are represented on Committee ME-067:

- Assistive Technology Suppliers Australasia
 - Australian Rehabilitation and Assistive Technology Association
 - Department for Communities and Social Inclusion (SA)
 - Heavy Vehicle Industry Australia
 - Independent Living Centres Australia
 - Medical Aids Subsidy Scheme (MASS) (Qld)
 - National Disability Insurance Agency (Australian Government)
 - Novita (SA)
 - Occupational Therapy Australia
 - Physical Disability Australia
 - Royal Perth Hospital
 - Technical Aid to the Disabled (TAD) Australia
-

This Standard was issued in draft form for comment as DR AS/NZS 3695.2:2018.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting www.standards.org.au

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.org.au, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard®

Wheelchairs

Part 2: Requirements and test methods for electrically powered wheelchairs (including mobility scooters)

First published as AS 3695—1992.
Revised and designated as AS/NZS 3695.2:2013.
Revised and designated as AS 3695.2:2019.

COPYRIGHT

© Standards Australia Limited

© European Committee for Standardization -GEN, Avenue Marnix 17, B-1000 Brussels, Belgium, 2017

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968.

ISBN 978 1 76072 422 1

PREFACE

This Standard was prepared by the Standards Australia Committee ME-067, Assistive Technology Products for Persons with Disabilities, to supersede, in part, AS/NZS 3695.2:2013, *Wheelchairs, Part 2: Requirements and test methods for electrically powered wheelchairs (including mobility scooters)*.

The objective of this Standard is to specify test requirements and minimum performance, safety and durability requirements for electrically powered wheelchairs, scooters and their battery chargers.

This Standard is an adoption with national modifications and has been reproduced from EN 12184:2014, *Electrically powered wheelchairs, scooters and their chargers — Requirements and test methods*. The modifications are additional requirements and are set out in Appendix ZZ, which has been added to the end of the source text.

The braking requirements of this Standard differ from the braking requirements of EN 12184 primarily when the wheelchair is in 'freewheel mode'. This Standard requires a warning in the user manual where no braking exists when a wheelchair is in freewheel mode while EN 12184 does not.

Where this Standard does not apply to particular wheelchairs, contracting parties should consider if relevant parts of this Standard can be used.

Manufacturers may also wish to consider if relevant parts of this Standard can be used to assess the performance of their products against the relevant requirements for medical devices in the *Therapeutic Goods Act 1989* (Cth).

In revising this Standard, the committee continues to incorporate developments from the ISO series of test methods for wheelchairs (ISO 7176) and seating (ISO 16840).

This Standard is part of a series as follows:

AS/NZS 3695.1, *Wheelchairs, Part 1: Requirements and test methods for manual wheelchairs*.

AS 3695.2, *Wheelchairs, Part 2: Requirements for electrically powered wheelchairs* (this Standard).

SA TS 3695.3, *Wheelchairs, Part 3: Requirements for designation of powered wheelchairs and mobility scooters for public transport and/or road-related area use*.

Appendix ZZ lists the variations to EN 12184:2014 for the application of this Standard in Australia which clarify jurisdictional variations and other additional Australian requirements outlined in this Standard. These include the following:

- (a) The definition of a custom-made wheelchair [see Clause 3.101 (new)].
- (b) Where the manufacturer specifies that the seat can be used in a motor vehicle, the wheelchair is required to conform with AS/NZS 3696.19:2009 (see Clause 8.3).
- (c) A more rigorous test for ignitability of upholstery is required. The Standard for testing ignitability of upholstery has been updated from ISO 8191-2:1988 to AS/NZS ISO 7176.16:2013 (see Clause 9.5).
- (d) Variations to the electrical requirements in accordance with jurisdictional requirements (see Clauses 12.1 and 12.3).
- (e) The wheelchair is to be equipped with a charge level indicator [see Clause 12.101 (new)].
- (f) All batteries that are part of the wheelchair power and control system are required to be non-spillable batteries. Lead-acid chemistries are required to be in accordance with AS/NZS ISO 7176.25:2014 [see Clause 12.102 (new)].

- (g) A variation to the assistant reach space to include an area of 100 mm behind the wheelchair (see Figure 3).
- (h) Variations to Annex C in accordance with jurisdictional variations previously agreed to by transport regulators.

In the reproduction of the EN text, deleted text will be shown with ~~black strikethrough~~ and text which has been deleted with replacement text will be shown with ~~blue strikethrough~~, as instructed in Appendix ZZ.

As this document has been reproduced from an International Standard, the following applies:

- (i) In the source text 'this European Standard' should read 'this Australian Standard'.
- (ii) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms 'normative' and 'informative' are used in Standards to define the application of the appendices or annexes to which they apply. A 'normative' appendix or annex is an integral part of a Standard, whereas an 'informative' appendix or annex is only for information and guidance.

CONTENTS

Foreword.....	6
Introduction	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 Test apparatus	10
5 Type classes.....	11
6 General requirements.....	11
7 Preparation for testing	12
7.1 General.....	12
7.2 Test dummy.....	12
7.3 Human test occupant	12
8 Wheelchair performance.....	12
8.1 Performance of driving characteristics	12
8.1.1 General.....	12
8.1.2 Ability to climb rated slope.....	12
8.1.3 Ground unevenness	13
8.1.4 Maximum downhill speed	13
8.1.5 Dynamic stability	14
8.1.6 Obstacle climbing and descending	15
8.1.7 Static stability.....	15
8.1.8 Maximum speed	15
8.1.9 Distance range	15
8.2 Static, impact and fatigue strength.....	16
8.2.1 Requirements	16
8.2.2 Test.....	16
8.3 Wheelchairs for use as seats in motor vehicles.....	16
8.4 Climatic performance	17
9 Component properties	17
9.1 Foot supports, lower leg support assemblies and arm supports	17
9.1.1 Requirements	17
9.1.2 Test methods.....	17
9.2 Component mass.....	18
9.3 Pneumatic tyres	18
9.4 Anterior pelvic support	18
9.5 Resistance to ignition	18
9.5.1 Upholstered composite parts	18
9.5.2 Foam materials.....	19
9.5.3 Other parts in contact with the occupant.....	19
9.5.4 Power and control systems	19
10 Propulsion and braking systems	19
10.1 Means for operating brakes.....	19
10.1.1 Requirement	19
10.1.2 Test for determination of brake operating forces	20
10.2 Braking functions	20

10.2.1	Requirements.....	20
10.2.2	Test methods	21
10.3	Freewheel device.....	22
11	Operations.....	23
11.1	Operations intended to be carried out by the occupant and/or assistant.....	23
11.2	Controls intended for operation by the occupant.....	23
11.3	Controls intended for operation by an assistant	24
11.4	Assistant control unit, push handles and handgrips	24
11.4.1	Requirements.....	24
11.4.2	Test method	25
11.5	Operating forces.....	25
11.5.1	Requirements.....	25
11.5.2	Test method	25
11.6	Seating adjustments for tilt and recline systems	26
11.6.1	Requirements.....	26
11.6.2	Test method	26
12	Electrical systems	26
12.1	General requirements	26
12.2	Circuit protection.....	26
12.3	Battery chargers	27
12.4	Charging connector	27
12.5	Battery enclosures and containers	27
12.6	Emergency stop.....	27
12.7	Lighting.....	28
12.8	Switching off while driving.....	28
12.9	Software	28
13	Information supplied by the manufacturer	28
13.1	General	28
13.2	Pre-sale information.....	29
13.3	User information.....	30
13.4	Service information	31
13.5	Labelling.....	31
14	Test report.....	32
15	Tables	33
16	Figures.....	36
Annex A	(informative) Recommendations for dimensions and manoeuvring space of electrically powered wheelchairs	42
A.1	Specific dimensions.....	42
A.1.1	Dimensions when ready for use	42
A.1.2	Push handle height	42
A.1.3	Ground clearance	42
A.2	Manoeuvring space	42
A.2.1	Turning diameter	42
A.2.2	Pivot width or reversing width	42
A.3	Speed settings	42
Annex B	(informative) Recommended design features	44
B.1	Introduction.....	44
B.2	General recommendations	44

B.2.1	Anti-tip devices	44
B.2.2	Component mass	44
B.2.3	Fittings and tools	44
B.2.4	Tyres	44
B.2.5	Means to inflate tyres	44
B.2.6	Surface temperature	44
B.2.7	Occupant transfer into or out of the wheelchair	45
B.2.8	Resistance to contamination from urine incontinence.....	45
B.2.9	Indication for rated slope	45
B.2.10	Mirrors.....	45
B.2.11	Head support.....	45
B.2.12	Continuous operating forces.....	45
B.3	Recommendations for performance characteristics	46
B.3.1	Indication of electrical faults	46
B.3.2	Batteries and their containers	46
B.3.3	Control mechanism feedback.....	46
B.3.4	Freewheel alarm.....	46
B.3.5	Maximum speed	46
Annex C	(informative) Recommendations for lighting and reflectors	47
C.1	General.....	47
C.2	Headlights.....	47
C.3	Lateral reflectors.....	47
C.4	Rear lights	47
C.5	Rear reflectors.....	48
Annex D	(informative) EN 12184 and rail interoperability	49
D.1	Background.....	49
D.2	Related provisions in this document.....	49
Annex E	(informative) Recommendations for safety in freewheel mode	50
E.1	General.....	50
E.2	Recommendation.....	50
E.3	Recommended test methods.....	50
E.3.1	Caution.....	50
E.3.2	Wheelchair switched on.....	50
E.3.3	Wheelchair switched off.....	51
E.3.4	Attempted switch-on	51
E.3.5	Battery set disconnected	51
Annex F	(informative) Wheelchairs with nominal speed of not less than 10 km/h — Dynamic stability for slopes of 10° or steeper.....	52
F.1	General.....	52

F.2	Modifications to dynamic stability test environment	52
Annex G	(informative) Technical changes from previous editions of EN 12184.....	53
G.1	Technical changes between the first (1999) and second (2006) editions.....	53
G.2	Technical changes between the second (2006) and third (2009) editions	54
G.3	Technical changes from the third (2009) edition	55
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of Council Directive 93/42/EEC	57
Bibliography	60

FOREWORD

This document (EN 12184:2014) has been prepared by Technical Committee CEN/TC 293 “Assistive products for persons with disability”, the secretariat of which is held by SIS.

~~This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2014 and conflicting national standards shall be withdrawn at the latest by March 2017.~~

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

~~This document supersedes EN 12184:2009, which is to be withdrawn (dow) three years after the date of availability (dav) of this edition. See CEN/TC 293 resolution 493.~~

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of Council Directive 93/42/EEC of 14 June 1993 concerning medical devices.

~~For relationship with the applicable EU Directive(s), see informative Annex ZA, which is an integral part of this document.~~

~~Informative Annex G provides details of significant technical changes between this European Standard and the previous editions of 1999, 2006 and 2009.~~

~~According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.~~

INTRODUCTION

This is the fourth edition of this European Standard. The first edition was published in 1999, the second in 2006 (withdrawn in 2007) and the third in 2009.

Where this European Standard does not apply to particular wheelchairs, contracting parties should consider whether appropriate parts of this European Standard can be used. Manufacturers might also wish to consider whether appropriate parts of this European Standard can be used to assess the performance of their products against the Essential Requirements of the Council Directive 93/42/EEC of 14 June 1993 concerning medical devices.

This European Standard contains requirements for ergonomic design related to the ease of wheelchair operation.

AUSTRALIAN STANDARD

Wheelchairs**Part 2:
Requirements and test methods for electrically powered wheelchairs
(including mobility scooters)****1 Scope**

This European Standard specifies requirements and test methods for electrically powered wheelchairs, including electrically powered scooters with three or more wheels, with a maximum speed not exceeding 15 km/h intended to carry one person of mass not greater than 300 kg.

It also specifies requirements and test methods for battery chargers for wheelchairs and scooters.

This European Standard does not apply in total to:

- electrically powered wheelchairs intended for special purposes, such as sports, showering or toileting,
- manual wheelchairs with handrim-activated power-assisted propulsion,
- custom-made electrically powered wheelchairs,
- electrically powered stand-up wheelchairs,
- manual wheelchairs with add-on power kits used for propulsion, and
- electrically powered office chairs.

NOTE Requirements for manually propelled wheelchairs are specified in EN 12183.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1021-2:2006, *Furniture — Assessment of the ignitability of upholstered furniture — Part 2: Ignition source match flame equivalent*

EN 12182:2012, *Assistive products for persons with disability — General requirements and test methods*

EN 60335-1:2012, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2010, modified)*

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 60601-1:2006, *Medical electrical equipment — Part 1: General requirements for basic safety and essential performance (IEC 60601-1:2005)*

EN 62304:2006, *Medical device software — Software life-cycle processes (IEC 62304:2006)*

EN ISO 14971:2012, *Medical devices — Application of risk management to medical devices (ISO 14971:2007, Corrected version 2007-10-01)*

ISO 7176-1:1999, *Wheelchairs — Part 1: Determination of static stability*

ISO 7176-2:2001, *Wheelchairs — Part 2: Determination of dynamic stability of electric wheelchairs*

ISO 7176-3:2012, *Wheelchairs — Part 3: Determination of effectiveness of brakes*