

Australian/New Zealand Standard™

Wheelchairs

Part 24: Requirements and test methods for user-operated stair-climbing devices



AS/NZS 3696.24:2008

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee ME-067, Mobility Appliances for People with Disabilities. It was approved on behalf of the Council of Standards Australia on 26 February 2008 and on behalf of the Council of Standards New Zealand on 17 March 2008. This Standard was published on 30 May 2008.

The following are represented on Committee ME-067:

Association of Consultants in Access Australia
Association of Occupational Therapists
Consumers' Federation of Australia
Engineers Australia
Flinders University of South Australia
Furntech
Independent Living Centres Australia
Northern Sydney Area Health Services
Novita Children's Services
Paraplegic & Quadriplegic Association of Australia
Queensland Health
Royal Perth Hospital
The Commercial Vehicle Industry Association of Australia

Keeping Standards up-to-date

Standards are living documents which 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 Standards may also be withdrawn.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 which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.standards.com.au or Standards New Zealand website at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

Alternatively, both organizations publish an annual printed Catalogue with full details of all current Standards. For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

Australian/New Zealand StandardTM

Wheelchairs

**Part 24: Requirements and test
methods for user-operated stair-
climbing devices**

First published as AS/NZS 3696.24:2008.

COPYRIGHT

© Standards Australia/Standards New Zealand

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.

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 8731 2

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME-067, Mobility Appliances for People with Disabilities.

This Standard is identical with, and has been reproduced from ISO 7176-24:2004, *Wheelchairs—Part 24: Requirements and test methods for user-operated stair-climbing devices*.

The objective of this Standard is to provide a suitable test for the determination of the effectiveness of brakes on manual and electrically powered wheelchairs.

As this Standard is reproduced from an international standard, the following applies:

- (a) Its number appears on the cover and title page while the international standard number appears only on the cover.
- (b) In the source text 'this part of ISO 7176' should read 'this Australian/New Zealand Standard'.
- (c) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian/New Zealand Standards, as follows:

<i>Reference to International Standard</i>		<i>Australian/New Zealand Standard</i>	
ISO		AS/NSZ	
3880	Building construction		
3880-1	Part 1: Stairs—Vocabulary	—	
7176	Wheelchairs	3696	Wheelchairs
7176-1	Part 1: Determination of static stability	3696.1	Part 1: Determination of static stability of electric wheelchairs
7176-2	Part 2: Determination of dynamic stability of electric wheelchairs	3696.2	Part 2: Determination of dynamic stability of electric wheelchairs
7176-3	Part 3: Determination of efficiency of brakes	3696.3	Part 3: Determination of efficiency of brakes
7176-4	Part 4: Energy consumption of electric wheelchairs and scooters for determination of theoretical distance range	3696.4	Part 4: Energy consumption of electric wheelchairs and scooters for determination of theoretical distance range
7176-5	Part 5: Determination of overall dimensions, mass and turning space	3696.5	Part 5: Determination of overall dimension, mass and turning space
7176-6	Part 6: Determination of maximum speed, acceleration and deceleration of electric wheelchairs	3696.6	Part 6: Determination of maximum speed, acceleration and deceleration of electric wheelchairs
7176-7	Part 7: Measurement of seating and wheel dimension	—	
7176-8	Part 8: Requirements and test methods for static, impact and fatigue tests	3696.8	Part 8: Requirements and test methods for static, impact and fatigue tests
7176-9	Part 9: Climatic tests for electric wheelchairs	3696.9	Part 9: Climatic tests for electric wheelchairs

ISO		AS/NZS	
7176-11	Part 11: Test dummies	3696.11	Part 11: Test dummies
7176-13	Part 13: Determination of coefficient of friction of test surfaces	3696.13	Part 13: Determination of coefficient of friction of test surfaces
7176-15	Part 15: Requirements for information disclosure documentation and labelling	—	
7176-16	Part 16: Resistance to ignition of upholstered parts—Requirements and test methods	—	
7176-21	Part 21: Electromagnetic compatibility of electrically powered wheelchairs and motorized scooters—Requirements and test methods	3696.21	Part 21: Electromagnetic compatibility of electrically powered wheelchairs and motorized scooters—Requirements and test methods
7176-22	Part 22: Set-up procedures	3696.22	Part 22: Set-up procedures

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annex to which they apply. A ‘normative’ annex is an integral part of a Standard, whereas ‘informative’ annex is only for information and guidance.

CONTENTS

1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	Performance requirements	6
5	Test apparatus	10
6	Preparation of the stair-climbing device	14
7	Test conditions	17
8	Skew angle	17
9	Braking effectiveness	20
10	Static stability	22
11	Dynamic Stability	24
12	Step transition safety	29
13	Static, impact and fatigue strength	31
14	Climatic safety	37
15	Electromagnetic compatibility	38
16	Required safety equipment	39
17	Test report	43
18	Labelling and documentation	43
	Annex A (normative) Types of stair-climbing device (with typical representations)	46
	Annex B (informative) Recommended safety equipment	49
	Annex C (normative) Surrogate wheelchair	50
	Annex D (normative) Determination of maximum recommended speed	52
	Annex E (normative) Configuration and position of stair-climbing devices for stability tests	54
	Annex F (normative) Escalator test machine	71
	Annex G (normative) Determination of outer dimensions and operating area	72
	Annex H (normative) Determination of theoretical energy consumption	80
	Annex I (normative) Distinction between smaller and larger clusters	82

INTRODUCTION

This part of ISO 7176 is written as a response to the need for a common language in the field of stair-climbing devices, to give a means of evaluating important safety issues, and to establish a means of qualifying and quantifying the performance of user-operated stair-climbing devices under the various conditions and environments encountered in their operation. Other relevant wheelchair standards of the ISO 7176 series might be applicable to stair-climbing devices that can also be used as wheelchairs. This allows users and manufacturers to compare the pertinent safety and utility issues of all functions and features of a given stair-climbing device.

The tests given in this part of ISO 7176 are used to gather comparative information about factors relating to the safety and performance of a user-operated stair-climbing device whilst in climbing mode on stairs and in climbing mode or crawling mode on landings as well as in driving mode on level ground. They include identification of suitable operating environments for each device and indications of various performance criteria in climbing mode for on-stairs operations and on level ground.

This part of ISO 7176 specifies tests for the “reference configuration” of the stair-climbing device. Since some stair-climbing devices have adjustable components and/or alternative parts, testing in different configurations may be needed to determine if a given variation conforms to this part of ISO 7176.

This part of ISO 7176 calls for the use of procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the manufacturer or test house from legal obligations relating to health and safety at any stage.

A Technical Report, ISO/TR 13570:2001, *Guidelines for the application of the ISO 7176 series on wheelchairs*, is also available giving a simplified explanation of these parts of ISO 7176.

AUSTRALIAN/NEW ZEALAND STANDARD

Wheelchairs

Part 24:

Requirements and test methods for user-operated stair-climbing devices

1 Scope

This part of ISO 7176 is applicable to user-operated stair-climbing chairs and user-operated stair-climbing wheelchair carriers where the stair-climbing device climbs backwards up the stairs, with the user facing downstairs, and climbs down the stairs in a forward position with the user facing downstairs.

This part of ISO 7176 specifies requirements and test methods for electrically powered stair-climbing devices that are user-operated. It also includes ergonomic, labelling and disclosure requirements.

This part of ISO 7176 specifies tests to demonstrate the stair-climbing device's ability to perform safely on stairs with a pitch of 35° or higher, if claimed by the manufacturer.

NOTE Attendant-driven stair-climbing devices are dealt with in ISO 7176-33.

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.

ISO 3880-1, *Building Construction — Stairs — Vocabulary*

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

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

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

ISO 7176-4, *Wheelchairs — Part 4: Energy consumption of electric wheelchairs and scooters for determination of theoretical distance range*

ISO 7176-5, *Wheelchairs — Part 5: Determination of overall dimensions, mass and turning space*

ISO 7176-6:2001, *Wheelchairs — Part 6: Determination of maximum speed, acceleration and deceleration of electric wheelchairs*

ISO 7176-7:1993, *Wheelchairs — Part 7: Measurement of seating and wheel dimensions*

ISO 7176-8:1998, *Wheelchairs — Part 8: Requirements and test methods for static, impact and fatigue strengths*

ISO 7176-9, *Wheelchairs — Part 9: Climatic tests for electric wheelchairs*

ISO 7176-11, *Wheelchairs — Part 11: Test dummies*