

Australian/New Zealand Standard™

Wheelchairs

**Part 21: Requirements and test
methods for electromagnetic
compatibility of electrically powered
wheelchairs and motorized scooters**



AS/NZS 3696.21:2008

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 Standards may also be withdrawn.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 21: Requirements and test
methods for electromagnetic
compatibility of electrically powered
wheelchairs and motorized scooters**

First published as AS/NZS 3696.21:2008.

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 8727 4

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 7176-21:2003, *Wheelchairs—Part 21: Requirements and test methods for electromagnetic capability of electrically powered wheelchairs and motorized scooters*.

The objective of this Standard is to provide a suitable test methods for the determination of electromagnetic compatibility of electrically powered and manual scooters with an added power kit.

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 number.

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	
7176	Wheelchairs	3696	Wheelchairs
7176-5	Part 5: Determination of overall dimensions, mass and turning space	3695.1	Part 5: Determination of overall dimensions, mass and turning space
7176-9	Part 9: Climatic tests for electric wheelchairs	3639.9	Part 9: Climatic tests for electric wheelchairs
7176-15	Part 15: Requirements for information disclosure, documentation and labelling	—	
		AS/NZS	
7176-22	Part 22: Set-up procedures	3696.22	Part 22: Set-up procedures
IEC			
61000	Electromagnetic capability (EMC)	61000	Electromagnetic capability (EMC)
61000-4-2	Part 4: Testing and measurement techniques. Section 2: Electrostatic discharge immunity test	61000.4.2	Part 4.2: Testing and measurement techniques—Electrostatic discharge immunity test
61000-4-3	Part 4: Testing and measurement techniques. Section 3: Radiated, radio frequency, electromagnetic field immunity test	61000.4.3	Part 4.3: Testing and measurement techniques—Radiated, radio frequency, electromagnetic field immunity test
61000-4-4	Part 4: Testing and measurement techniques. Section 4: Electrical fast transient/burst immunity test	61000.4.4	Part 4.4: Testing and measurement techniques—Electrical fast transient/burst immunity test

IEC		AS/NZS	
61000-4-5	Part 4: Testing and measurement techniques. Section 5: Surge immunity test	61000.4.5	Part 4.5: Testing and measurement techniques—Surge immunity test
61000-4-6	Part 4: testing and measurement techniques. Section 6: Immunity to conduct disturbances, induced by radio frequency fields	61000.4.6	Part 4.6: Testing and measurement techniques—Immunity to conduct disturbances, induced by radio frequency fields
61000-4-11	Part 11: Testing and measurement techniques. Section 11: Voltage dips, short interruption and voltage variations immunity tests	61000.4.11	Part 4.11: testing and measurement techniques—Voltage dips, short interruptions and voltage variations immunity test (IEC 61000-4-11, 11.2.0 (2004) MOD)
CISPR		AS/NZS CISPR	
11	Industrial, scientific and medical (ISM) radio frequency equipment—Electromagnetic disturbance characteristics—Limits and methods of measurement	11	Industrial, scientific and medical (ISM) radio frequency equipment—Electromagnetic disturbance characteristics—Limits and methods of measurement

CONTENTS

1	Scope.....	1
2	Normative references	1
3	Terms and definitions.....	2
4	Classification of electrically powered wheelchairs	4
5	Requirements	4
5.1	General	4
5.2	Driving.....	4
5.3	Charging	5
6	Test apparatus.....	7
7	Preparation of test wheelchair.....	8
7.1	Equipping the wheelchair.....	8
7.2	Supporting the wheelchair.....	8
7.3	Adjustments	8
7.4	Settings for driving tests.....	9
7.5	Settings for charging tests.....	9
8	Sequence of tests	9
9	Test methods for electromagnetic emissions	9
9.1	Radiated emissions test.....	9
9.2	Conducted emissions test	9
10	Test methods for electromagnetic immunity	9
10.1	Electrostatic discharge immunity test.....	9
10.2	Charged-frame electrostatic discharge immunity tests	10
10.3	Radiated immunity test.....	11
10.4	Fast transient/burst immunity test.....	12
10.5	Surge immunity test.....	12
10.6	Conducted radio-frequency immunity	12
10.7	Voltage dips test	12
10.8	Short interruptions test	14
11	Wheel speed change calculation	14
12	Test report	15
13	Disclosure.....	15

INTRODUCTION

Electrically powered wheelchairs should operate without introducing significant electromagnetic disturbances to the environment and without significant degradation of operational performance in the presence of electromagnetic disturbances that can be expected in normal use. Wheelchairs can be expected to operate in traffic areas and therefore should be immune to radio frequency fields from fixed and mobile communications equipment, as well as from other sources of electromagnetic disturbance. Injury could occur in the event of unintentional movement or change in direction of a wheelchair.

This part of ISO 7176 specifies requirements and test methods for wheelchairs to minimize the risks connected with reasonably foreseeable electromagnetic interference and electrostatic discharge and minimize the risk of producing electromagnetic fields which could impair the operation of other devices or equipment in the wheelchair's usual environment.

AUSTRALIAN/NEW ZEALAND STANDARD

Wheelchairs

Part 21:

Requirements and test methods for electromagnetic compatibility of electrically powered wheelchairs and motorized scooters

WARNING — 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.

1 Scope

This part of ISO 7176 specifies requirements and test methods for electromagnetic emissions and for electromagnetic immunity of electrically powered wheelchairs and motorized scooters with a maximum speed of not more than 15 km/h for indoor and outdoor use by people with disabilities. It is also applicable to manual wheelchairs with an add-on power kit. It is not applicable to vehicles designed to carry more than one person.

This part of ISO 7176 also specifies additional requirements for electromagnetic emissions and for electromagnetic immunity of electrically powered wheelchairs and motorized scooters with a built-in battery charger. It is not applicable to battery chargers that are not built into a wheelchair.

A reference configuration is specified for adjustable wheelchairs and scooters to enable test results to be used for comparison of performance.

NOTE The term “wheelchair” is used in this part of ISO 7176 to cover electrically powered wheelchairs, motorized scooters and manual wheelchairs with an add-on power kit.

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

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

ISO 7176-15, *Wheelchairs — Part 15: Requirements for information disclosure, documentation and labelling*

ISO 7176-22, *Wheelchairs — Part 22: Set-up procedures*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) — Part 4: Testing and measurement techniques — Section 2: Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) — Part 4: Testing and measurement techniques — Section 3: Radiated, radio frequency, electromagnetic field immunity test*