

Australian/New Zealand Standard™

Wheelchairs

Part 4: Energy consumption of electric wheelchairs and scooters for determination of theoretical distance range



AS/NZS ISO 7176.4:2011

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 6 December 2011 and on behalf of the Council of Standards New Zealand on 1 December 2011. This Standard was published on 20 December 2011.

The following are represented on Committee ME-067:

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Association of Consultants in Access Australia
Australian Rehabilitation and Assistive Technology Association
Bus and Coach Association of New Zealand
Consumers Federation of Australia
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This Standard was issued in draft form for comment as DR AS/NZS ISO 7176.4.

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Originated as AS 3696.4—1992.
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME-067, Mobility Appliances for People with Disabilities to supersede AS 3696.4—1992, *Wheelchairs, Part 4: Determination of energy consumption of electric wheelchairs*.

The objective of this Standard is to update AS 3696.4—1992 by adopting ISO 7176-4. Since publication in 1992, significant innovation and development have occurred in power wheelchair battery, control, and drive systems. As a result, the approaches to evaluating the performance of power wheelchairs have been refined. Determining the theoretical distance range is an important element of wheelchair selection and a consistent and objective approach is critical to device comparison.

This Standard is identical with, and has been reproduced from ISO 7176-4:2008, *Wheelchairs—Part 4: Energy consumption of electric wheelchairs and scooters for determination of theoretical distance range*.

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 or Australian/New Zealand Standards, as follows:

<i>Reference to International Standard</i>	<i>Australian/New Zealand Standard</i>
ISO	AS
7176 Wheelchairs	3696 Wheelchairs
7176-11 Part 11: Test dummies	3696.11 Part 11: Test dummies
	AS/NZS
	3696 Wheelchairs
7176-22 Part 22: Set-up procedures	3696.22 Part 22: Set-up procedures
	AS/NZS ISO
	7176 Wheelchairs
7176-26 Part 26: Vocabulary	7176.26 Part 26: Vocabulary

Any international references not listed have not been adopted as Australian or Australian/New Zealand Standards.

The term ‘informative’ has been used in this Standard to define the application of the annex to which it applies. An ‘informative’ annex is only for information and guidance.

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INTRODUCTION

The distance range of an electrically powered wheelchair is affected by energy consumption and battery condition. Energy consumption is affected by a number of factors such as ambient temperature, total weight and weight distribution of the occupant, topography, surface characteristics and tyres. Battery condition is affected by factors such as temperature, age, charging history and discharging history. Hence the result obtained from the tests specified in this part of ISO 7176 cannot be used to derive an accurate range estimate for a particular wheelchair and occupant. However, it can be used to give a basis for comparison between different wheelchairs under similar test conditions.

Distance range is also strongly dependent on the way in which a wheelchair is driven, and a single value for theoretical range can be insufficient to provide an understanding of the performance of a wheelchair. Two methods for determining theoretical range are provided in this part of ISO 7176, for driving and for manoeuvring. These values are intended to facilitate wheelchair comparison in a manner analogous to the extra-urban and urban fuel consumption figures published for motor vehicles.

AUSTRALIAN/NEW ZEALAND STANDARD

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1 Scope

This part of ISO 7176 specifies methods for determining the theoretical distance range of electrically powered wheelchairs, including scooters, using measurements of energy consumed while driving and the nominal energy capacity of the wheelchair's battery set. It is applicable to electrically powered wheelchairs with a maximum nominal speed no greater than 15 km/h, intended to provide indoor and/or outdoor mobility for one disabled person whose mass is within the range represented by ISO 7176-11. This part of ISO 7176 also includes requirements for test reports and information disclosure.

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

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

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

ISO 7176-26, *Wheelchairs — Part 26: Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7176-26 and the following apply.

3.1

wheelchair

electrically powered wheelchair

NOTE A scooter is an electrically powered wheelchair.

4 Principle

Energy consumption is measured for two types of driving: continuous driving and manoeuvring. For continuous driving, the wheelchair is driven around a test track ten times clockwise and ten times anti-clockwise, and the energy consumed is measured. For manoeuvring, the wheelchair is driven in a circuit between two markers 5 m apart, stopping and turning outside them, ten times in each direction while the energy consumed is measured. Theoretical range values are calculated from the energy consumed, the nominal distance travelled, and the battery capacity.