

Australian/New Zealand Standard™

## Wheelchairs

### Part 2: Determination of dynamic stability of electrically powered wheelchairs



AS/NZS ISO 7176.2:2020

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- Assistive Technology Suppliers Australasia
- Assistive Technology Suppliers New Zealand
- Australian Nursing and Midwifery Federation
- Australian Rehabilitation & Assistive Technology Association
- Canterbury Employers' Chamber of Commerce
- Heavy Vehicle Industry Australia
- Independent Living Centres Australia
- Medical Aids Subsidy Scheme (Australia)
- National Disability Insurance Agency (Australia)
- Novita Children's Services (Australia)
- Occupational Therapy Australia
- Royal Perth Hospital
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### Part 2: Determination of dynamic stability of electrically powered wheelchairs

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## Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME-067, Assistive Technology, to supersede AS/NZS 3696.2:2008, *Wheelchairs, Part 2: Determination of dynamic stability of electric wheelchairs*.

The objective of this Standard is to specify test methods for determining the dynamic stability of electrically powered wheelchairs.

This Standard is applicable to electrically powered wheelchairs, including scooters, with a maximum nominal speed not exceeding 15 km/h, intended to carry one person.

This Standard is not applicable to manual wheelchairs with add-on power kits used for, or to assist, propulsion.

This Standard is identical with, and has been reproduced from, ISO 7176-2:2017, *Wheelchairs — Part 2: Determination of dynamic stability of electrically powered wheelchairs*.

As this document has been reproduced from an International Standard, 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.

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## 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 documents 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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

For an explanation on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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

This third edition cancels and replaces the second edition (ISO 7176-2:2001), which has been technically revised.

The main changes compared to the previous edition are as follows:

- revision of ramp requirements;
- provision for remote control testing.

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

## Introduction

It is important to understand the dynamic stability characteristics of a wheelchair for prescription and adjustment purposes. Wheelchair users and prescribers should understand the safety implications of dynamic stability, particularly when setting up seating systems that offer a large range of configurations. They should consider the environment in which the wheelchair is to be used and the hazards that are likely in that environment while considering possible configurations of the wheelchair when meeting those hazards.

This document specifies tests for dynamic stability under a range of operating conditions with various wheelchair configurations. The effectiveness of stability controlling systems are evaluated by the procedures listed in this document.

Wheelchair instability is a significant contributor to accidents causing injury. Consequently, it is desirable that all parties involved in the supply of wheelchairs understand the factors that contribute to instability. Parties interested in this document could be wheelchair designers and manufacturers, prescribers, therapists, building designers, public facility providers and test houses.

The purpose of this document is to define tests that will consistently demonstrate dynamic stability limits under a variety of proven stability challenges. Tests are designed to reveal the effects of adjustments and configurations.

This document will help interested parties define suitable environments and intended use of the wheelchair.

Although this document does not specify requirements, it is an essential reference document for other documents that do specify stability.

# Australian/New Zealand Standard

## Wheelchairs

### Part 2: Determination of dynamic stability of electrically powered wheelchairs

#### 1 Scope

This document specifies test methods for determining the dynamic stability of electrically powered wheelchairs.

This document is applicable to electrically powered wheelchairs, including scooters, with a maximum nominal speed not exceeding 15 km/h, intended to carry one person. This document is not applicable to manual wheelchairs with add-on power kits used for, or to assist, propulsion.

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

ISO 7176-13, *Wheelchairs — Part 13: Determination of coefficient of friction of test surfaces*

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.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

##### 3.1

##### **wheel lift**

loss of contact between a wheel and the test surface during conditions of instability

Note 1 to entry: This does not include transient loss of contact due to surface irregularity or transitions.

Note 2 to entry: This does not include loss of contact such as a transition onto or rotation of cluster wheels.

#### 4 Principle

The wheelchair is subjected to a number of driving tests, simulating use of a wheelchair, while its movements are observed for the occurrence of a range of defined conditions of instability. Accessories are not accounted for during these tests.