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Wheelchairs —

Part 1: Determination of static stability

Fauteuils roulants —

Partie 1: Détermination de la stabilité statique



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7176-1 was prepared by Technical Committee ISO/TC 173, *Technical systems and aids for disabled or handicapped persons*, Subcommittee SC 1, *Wheelchairs*.

This second edition cancels and replaces the first edition (ISO 7176-1:1986), which has been technically revised.

ISO 7176 consists of the following parts, under the general title *Wheelchairs*:

- Part 1: *Determination of static stability*
- Part 2: *Determination of dynamic stability of electric wheelchairs*
- Part 3: *Determination of efficiency of brakes*
- Part 4: *Determination of energy consumption of electric wheelchairs and scooters — Theoretical range*
- Part 5: *Determination of overall dimensions, mass and turning space*
- Part 6: *Determination of maximum speed, acceleration and retardation of electric wheelchairs*
- Part 7: *Measurement of seating and wheel dimensions*
- Part 8: *Requirements and test methods for static, impact and fatigue strengths*
- Part 9: *Climatic tests for electric wheelchairs*
- Part 10: *Determination of the obstacle-climbing ability of electric wheelchairs*
- Part 11: *Test dummies*
- Part 13: *Determination of coefficient of friction of test surfaces*
- Part 14: *Power and control systems of electric wheelchairs — Requirements and test methods*
- Part 15: *Requirements for information disclosure, documentation and labelling*
- Part 16: *Requirements and test methods for resistance to ignition of upholstered parts*

The following parts are also on the programme of work:

- Part 17: *Serial interface for electric wheelchair controllers*
- Part 19: *Requirements and test methods for transportation wheelchairs for use in motor vehicles*

- *Part 20: Determination of the performance of stand-up type wheelchairs*
- *Part 21: Requirements and test methods for electromagnetic compatibility of powered wheelchairs and motorized scooters*
- *Part 22: Set-up procedures*
- *Part 23: Requirements and test methods for attendant-operated stair-climbing devices*
- *Part 24: Requirements and test methods for user-operated stair-climbing devices*

Annexes A and B of this part of ISO 7176 are for information only.

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Introduction

It is important to know the static-stability characteristics of a wheelchair for prescription and adjustment purposes. Some users need large reserves of stability to ensure their safety while others prefer finely balanced wheelchairs which have better manoeuvrability.

This part of ISO 7176 specifies tests in which static stability is measured with wheel locks (parking brakes) applied, as is the case if the wheelchair is standing on a slope. Tests are also made with the wheels unlocked, simulating the situation where the wheelchair is standing on a slope with the wheels against obstacles, the situation on a level surface with the wheels unlocked and the wheelchair user reaching for an object, or instability while rolling. These tests also give information about the ease with which a wheelchair can be tipped about its rear wheels, such as happens when negotiating kerbs or balancing on the rear wheels.

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Wheelchairs —

Part 1: Determination of static stability

1 Scope

This part of ISO 7176 specifies the test methods for determining the static tipping stability of wheelchairs, including scooters. This part of ISO 7176 is applicable to wheelchairs and vehicles that are included in the 12.21 series described in ISO 9999 and are intended to provide indoor and outdoor mobility for people with disabilities whose mass does not exceed the maximum mass of the test dummy given in ISO 7176-11.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 7176. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 7176 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 6440, *Wheelchairs — Nomenclature, terms, and definitions*.

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

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 9999, *Technical aids for disabled persons — Classification*.

3 Terms and definitions

For the purposes of this part of ISO 7176, the terms and definitions given in ISO 6440 and the following apply:

3.1

lockable wheels

wheels equipped with parking brakes, or wheels whose rolling motion is locked by the means of propulsion (e.g., by hands, levers, motors)

3.2

tipping angle

angle of the test plane from the horizontal at which the forces become zero under all uphill wheels

NOTE A number of methods are available with which to determine when the forces become zero under the uphill wheels. These include, but are not limited to, the following: the ability to pull pieces of paper from beneath the wheels, visual identification of when the wheels lift from the test plane or the use of force-sensing instrumentation.