INTERNATIONAL STANDARD

ISO 7176-14

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Wheelchairs —

Part 14:
Power and control systems for electric wheelchairs — Requirements and test methods

Fauteuils roulants —

Partie 14: Systèmes d'alimentation et de commande des fauteuils roulants électriques — Exigences et méthodes d'essai

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Contents

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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.

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

International Standard ISO 7176-14 was prepared by Technical Committee ISO/TC 173, *Technical systems and aids for disabled or handicapped persons,* Subcommittee SC 1, *Wheelchairs*.

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

- Part 5: Determination of overall dimensions, mass and turning space

- Part 6: Determination of maximum speed, acceleration and retardation of electric wheelchairs

- Part 7: Method of 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 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 for 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 18: Stair traversing devices*

- *Part 19: Wheeled mobility devices 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 procedure*

Wheelchairs —

Part 14:
Power and control systems for electric wheelchairs — Requirements and test methods

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 from legal obligations relating to health and safety at any stage.

1 Scope

This part of ISO 7176 specifies the requirements for the power and control systems of electrically powered wheelchairs, including battery chargers, and associated test methods. It sets minimum requirements for the protection of the wheelchair user during normal use and some conditions of abuse and failure. It also specifies methods of measurement of the forces necessary to operate the controls and sets limits on the forces needed for some operations.

This part of ISO 7176 is applicable to electrically powered vehicles intended to provide indoor and outdoor mobility for disabled persons whose mass at speeds up to 15 km/h does not exceed 100 kg.

It is not applicable to electrically powered vehicles which incorporate devices that need to be connected to a domestic or industrial power supply greater than 100 volts (e.g. those with built-in battery chargers).

It does not include requirements on electromagnetic susceptibility or emissions.

NOTE — Further work is in progress by CEN/TC 293 on electromagnetic compatibility requirements for wheelchairs related to the Medical Device Directive, whilst work in ISO/TC 173/SC 1 will provide specific electromagnetic compatibility requirements for wheelchairs.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7176. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7176 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6440:1985, *Wheelchairs — Nomenclature, terms and definitions*

ISO 7176-3:1988, *Wheelchairs — Part 3: Determination of efficiency of brakes*

ISO 7176-6:1988, *Wheelchairs — Part 6: Determination of maximum speed, acceleration and retardation of electric wheelchairs*

ISO 7176-8:—[1)], *Wheelchairs — Part 8: Requirements and test methods for static impact and fatigue strengths*

ISO 7176-11:1992, *Wheelchairs — Part 11: Test dummies*

ISO 7176-15:—[1)], *Wheelchairs — Part 15: Requirements for information disclosure, documentation and labelling*

IEC 335-2-29:1994, *Safety of household and similar electrical appliances — Part 2: Particular requirements for battery chargers*

IEC 529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 601-1:1988, *Safety of medical electrical equipment — Part 1: General requirements*

3 Definitions

For the purposes of this part of ISO 7176, the definitions given in ISO 6440 together with the following apply.

3.1 battery nominal voltage: Voltage by which a battery is designated.

NOTE — The actual voltage may be significantly different under operating conditions.

3.2 command signal: Electrical signal from the device with which the user indicates the desired speed and/or direction of movement.

3.3 controller: All electrical devices, circuits, and the case(s) in which they are housed that are used to convert the user's indication of desired speed and/or direction of movement into the appropriate power to be supplied to the motor(s).

3.4 pinch point: Location at which a moving part contacts or comes in close proximity to another part such that a third part at that location would be cut or crushed.

3.5 watchdog: Circuit dedicated to monitoring the operation of a microprocessor.

3.6 battery: Set of interconnected electric cells integrated into a physical package and designated as a battery by its manufacturer.

3.7 battery pack: Removable enclosure which contains one or more batteries.

NOTE — If there are no such enclosures, a battery pack consists of a single battery.

3.8 battery set: Set of interconnected batteries used to power a wheelchair.

3.9 battery charger: Device that is connected to supply mains and to a battery set for the purpose of charging the batteries.

NOTE — This part of ISO 7176 does not apply to battery chargers which are an integral part of the wheelchair.

[1)] To be published.