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Third edition
2008-10-01

Wheelchairs —

Part 4:

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

Fauteuils roulants —

*Partie 4: Consommation d'énergie des fauteuils roulants et des scooters
électriques pour la détermination de la distance théorique*



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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 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 7176-4 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 7176-4:1997), 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 effectiveness of brakes*
- *Part 4: Energy consumption of electric wheelchairs and scooters for determination of theoretical distance range*
- *Part 5: Determination of dimensions, mass and manoeuvring space*
- *Part 6: Determination of maximum speed, acceleration and deceleration 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 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 electrically powered wheelchairs and scooters — Requirements and test methods*

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- *Part 15: Requirements for information disclosure, documentation and labelling*
- *Part 16: Resistance to ignition of upholstered parts — Requirements and test methods*
- *Part 19: Wheeled mobility devices for use as seats in motor vehicles*
- *Part 21: Requirements and test methods for electromagnetic compatibility of electrically 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*
- *Part 26: Vocabulary*

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.