
Wheelchairs —

Part 24:
**Requirements and test methods for user-
operated stair-climbing devices**

Fauteuils roulants —

*Partie 24: Exigences et méthodes d'essai pour les monte-escalier
manipulés par l'utilisateur*



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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 7176-24 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 effectiveness of brakes*
- *Part 4 Energy consumption of electric wheelchairs and scooters for determination of theoretical distance range*
- *Part 5 Determination of overall dimensions, mass and turning 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 electric wheelchairs — Requirements and test methods*
- *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 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

This part of ISO 7176 is written as a response to the need for a common language in the field of stair-climbing devices, to give a means of evaluating important safety issues, and to establish a means of qualifying and quantifying the performance of user-operated stair-climbing devices under the various conditions and environments encountered in their operation. Other relevant wheelchair standards of the ISO 7176 series might be applicable to stair-climbing devices that can also be used as wheelchairs. This allows users and manufacturers to compare the pertinent safety and utility issues of all functions and features of a given stair-climbing device.

The tests given in this part of ISO 7176 are used to gather comparative information about factors relating to the safety and performance of a user-operated stair-climbing device whilst in climbing mode on stairs and in climbing mode or crawling mode on landings as well as in driving mode on level ground. They include identification of suitable operating environments for each device and indications of various performance criteria in climbing mode for on-stairs operations and on level ground.

This part of ISO 7176 specifies tests for the "reference configuration" of the stair-climbing device. Since some stair-climbing devices have adjustable components and/or alternative parts, testing in different configurations may be needed to determine if a given variation conforms to this part of ISO 7176.

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

A Technical Report, ISO/TR 13570:2001, *Guidelines for the application of the ISO 7176 series on wheelchairs*, is also available giving a simplified explanation of these parts of ISO 7176.

Wheelchairs —

Part 24:

Requirements and test methods for user-operated stair-climbing devices

1 Scope

This part of ISO 7176 is applicable to user-operated stair-climbing chairs and user-operated stair-climbing wheelchair carriers where the stair-climbing device climbs backwards up the stairs, with the user facing downstairs, and climbs down the stairs in a forward position with the user facing downstairs.

This part of ISO 7176 specifies requirements and test methods for electrically powered stair-climbing devices that are user-operated. It also includes ergonomic, labelling and disclosure requirements.

This part of ISO 7176 specifies tests to demonstrate the stair-climbing device's ability to perform safely on stairs with a pitch of 35° or higher, if claimed by the manufacturer.

NOTE Attendant-driven stair-climbing devices are dealt with in ISO 7176-23.

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 3880-1, *Building Construction — Stairs — Vocabulary*

ISO 7176-1, *Wheelchairs — Part 1: Determination of static stability*

ISO 7176-2:2001, *Wheelchairs — Part 2: Determination of dynamic stability of electric wheelchairs*

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

ISO 7176-4, *Wheelchairs — Part 4: Energy consumption of electric wheelchairs and scooters for determination of theoretical distance range*

ISO 7176-5, *Wheelchairs — Part 5: Determination of overall dimensions, mass and turning space*

ISO 7176-6:2001, *Wheelchairs — Part 6: Determination of maximum speed, acceleration and deceleration of electric wheelchairs*

ISO 7176-7:1998, *Wheelchairs — Part 7: Measurement of seating and wheel dimensions*

ISO 7176-8:1998, *Wheelchairs — Part 8: Requirements and test methods for static, impact and fatigue strengths*

ISO 7176-9, *Wheelchairs — Part 9: Climatic tests for electric wheelchairs*

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

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

ISO 7176-14:1997, *Wheelchairs — Part 14: Power and control systems for electric wheelchairs — Requirements and test methods*

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

ISO 7176-16:1997, *Wheelchairs — Part 16: Resistance to ignition of upholstered parts — Requirements and test methods*

ISO 7176-21:2003, *Wheelchairs — Part 21: Requirements and test methods for electromagnetic compatibility of electrically powered wheelchairs and motorized scooters*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3880-1, ISO 7176-7, ISO 7176-15 and the following apply.

3.1

stair-climbing device

non-fixed device intended to transport a person and/or occupied wheelchair by climbing up or down stairs

NOTE A hierarchic system of various types of stair-climbing devices is given in Annex A.

3.2

user-operated stair-climbing device

stair-climbing device operated by the user while seated in it

3.3

self-standing (adjective)

stable while at rest on a surface (test plane, stairs or landing) when subjected only to the force of gravity

3.4

balancing (adjective)

maintaining a position of unstable equilibrium through the application of other forces in addition to the force of gravity

3.5

stair-climbing chair

stair-climbing device that includes a seat for the user

3.6

stair-climbing wheelchair carrier

stair-climbing device that carries an occupied wheelchair

3.7

docking system

means of attaching a wheelchair to a stair-climbing wheelchair carrier

3.8

climbing

ascending or descending stairs