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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Wheelchairs —

Part 10 :
Determination of obtacle-climbing ability of electric wheelchairs

Fauteuils roulants —

Partie 10 : Détermination de l'aptitude des fauteuils roulants électriques à gravir les obstacles

Reference number
ISO 7176-10 : 1988 (E)

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 by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7176-10 was prepared by Technical Committee ISO/TC 173, *Technical systems and aids for disabled or handicapped persons*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Wheelchairs —

Part 10 :
Determination of obstacle-climbing ability of electric wheelchairs

0 Introduction

ISO 7176 at present consists of the following parts :

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 : Determination of seating dimensions — Definitions and measuring methods.

Part 8 : Static, impact and fatigue strength for manual wheelchairs.

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 controls.

1 Scope and field of application

This part of ISO 7176 specifies a method for determining the obstacle-climbing ability of electric wheelchairs.

2 References

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

ISO 7176-11, *Wheelchairs — Part 11 : Test dummies.* [1)]

ISO 7176-13, *Wheelchairs — Part 13 : Determination of coefficient of friction of test surfaces.* [1)]

ISO 7930, *Wheelchairs — Type classification based on appearance characteristics.*

3 Definitions

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

4 Principle

Performance of a number of tests for determination of the ability of electric wheelchairs to negotiate obstacles such as kerbs and steps.

5 Test equipment

5.1 Test plane

The tests shall be carried out on a flat and hard plane. The surface of the plane shall have a coefficient of friction as defined in ISO 7176-13.

1) At present at the stage of draft.

5.2 Obstacle

The obstacle (see the figure) shall be a rectangular area, the step height, h, of which can be increased in steps of 20 mm up to 200 mm.[1)]

The dimensions of the obstacle shall be sufficiently large that, after climbing the obstacle, all wheels of the wheelchair can be accommodated on the obstacle at the same time, i.e.

$$b \geqslant l$$

$$l_1 \geqslant 2\,l$$

where

b is the width of the test obstacle;

l_1 is the length of the test obstacle;

l is the length of the wheelchair.

The upper front edge of the obstacle shall be smooth and shall have a radius, r, of 3 mm.

The surface of the obstacle in contact with the wheelchair shall have a coefficient of friction as specified in ISO 7176-13. The obstacle shall be fixed to the test plane to prevent motion during the test.

6 Test wheelchair

Unless otherwise specified and wherever appropriate, the following conditions shall be fulfilled during testing.

6.1 The wheelchair shall be fully equipped for normal use including armrests and leg supports with footrests, but excluding seat cushions.

6.2 If the wheelchair has pneumatic tyres, the air pressure in them shall be adjusted in accordance with the manufacturer's instructions. If a pressure range is specified, the lowest recommended pressure shall be selected.

6.3 During the tests the wheelchair shall be loaded with a test dummy of appropriate size, constructed and positioned in accordance with ISO 7176-11, or with a person of the same mass. The dummy shall be secured to prevent movement from its position during the tests. If a human equivalent is used, motion of the body from the stated dummy position shall be minimized.

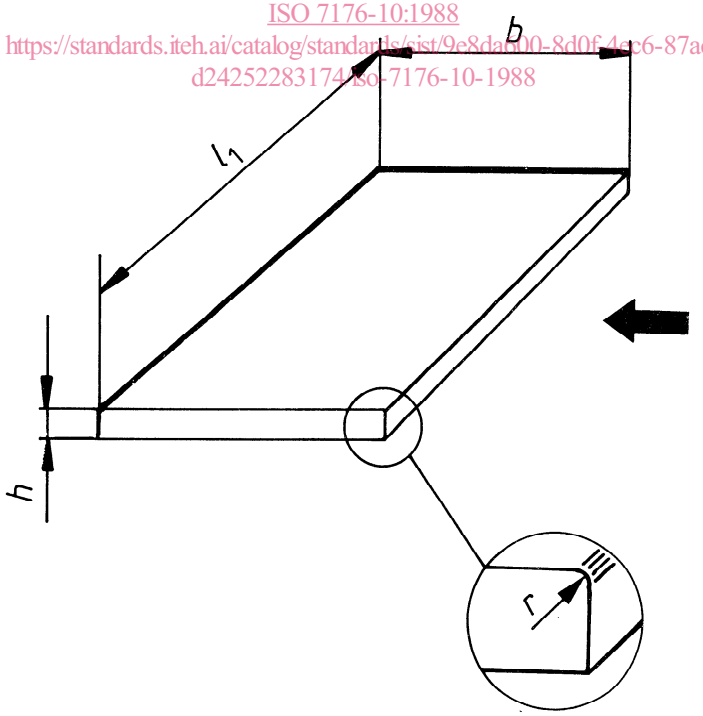

Figure — Test obstacle

1) Four plates are required of heights 20, 40, 60 and 80 mm.

6.4 The body support system, if adjustable, shall be set to correspond to natural sitting posture, with the seat at normal sitting height. Footrests shall be adjusted, if possible, so as not to strike the obstacle first. Pivoting body support systems shall be set in the forward position. The slope of the seat relative to the horizontal shall be as close as possible to 4°. The slope of the backrest relative to the vertical shall be as close as possible to 10° of recline. The angle between the seat and the leg support shall be as close as possible to 90°. All other parts of the body support system shall be set at their middle position.

All tests should begin with the castors (if present) in the trailing position.

If anti-tipping levers are present, they should be adjusted so as not to interfere during the performance of the tests.

6.5 The batteries (accumulators) shall have at least 75 % of their rated nominal capacity at the start of the tests.

6.6 If the wheelchair has variable speed settings, the highest value shall be used.

6.7 If an obstacle-climbing angle other than 90° is recommended by the manufacturer, the test should be performed at the recommended angle.

7 Test procedures

Before the tests are started, all castors shall be swivelled to the trailing position relative to the direction of travel. The run-up distance of 0,5 m shall be measured from the point of contact of the obstacle-facing wheel with the ground to the obstacle.

7.1 Drive the wheelchair forwards, without any run-up, at a 90° angle of incidence towards the obstacle (5.2). Determine the highest obstacle that the wheelchair can climb. (On completion of the test, all wheels of the wheelchair shall be on top of the obstacle.)

7.2 Carry out the test procedure specified in 7.1, but in the backwards direction.

7.3 Carry out the test procedure specified in 7.1, but with a 0,5 m run-up.

7.4 Carry out the test procedure specified in 7.2, but with a 0,5 m run-up.

8 Test report

The test report shall contain the following information :

a) a reference to this part of ISO 7176;

b) the product type and type designation (see ISO 7930);

c) the name and address of the manufacturer;

d) a photograph of the wheelchair equipped as during the tests;

e) the name and address of the test institution;

f) the test results as referred in 7.1 to 7.4;

g) details of the test load used during the tests;

h) the height from the ground to the lowest point of the footrests;

i) a record of the angle of incidence, if other than 90°.

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Descriptors : wheel chairs, tests, performance tests.

Price based on 3 pages