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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Wheelchairs —

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

Fauteuils roulants —

Partie 6 : Détermination de la vitesse, de l'accélération et du ralentissement maximaux des fauteuils roulants électriques

Reference number
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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 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 7176-6 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 6 : Determination of maximum speed, acceleration and retardation 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 test methods for determining the maximum speed, acceleration and retardation 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 the determination of the maximum speed, acceleration and retardation of electric wheelchairs.

5 Test plane

The tests shall be carried out on a hard, flat and horizontal plane.

The surface of the plane shall have a coefficient of friction as defined in ISO 7176-13.

6 Test wheelchair

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.

1) At present at the stage of draft.

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 highest 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. The dummy shall be secured to prevent movement from its position during the tests.

A person of the same mass may be used for test 7 only.

6.4 The body support system, if adjustable, shall be set to correspond to natural sitting posture, with the lowest part of the leg support/footrest 50 mm above the test plane and the seat corresponding to normal sitting height. Horizontally adjustable body support systems shall be set at their middle position. 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°, sloping downwards to the rear. 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°.

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

6.6 Control systems which provide for adjustment in the rate of acceleration and/or retardation shall be set to provide maximum values in each case.

7 Determination of maximum speed

The maximum speed shall be determined on a straight test plane as described in clause 5.

7.1 The wheelchair shall enter the test plane at full speed and shall be driven at full speed between two markers. The time to cover the distance between the two markers shall be recorded for two forward runs in one direction and two forward runs in the opposite direction. The maximum speed shall be calculated by dividing the distance between the markers, by the average time for the four runs. The distance between the markers and the accuracy of the time measurement shall be chosen so that the inaccuracy of the calculated maximum speed does not exceed 5 %. Results shall be expressed in kilometres per hour.

7.2 Repeat the test specified in 7.1, but driving backwards at maximum speed. If necessary, the trailing castors may be fixed for this test.

8 Determination of maximum acceleration and maximum retardation

The maximum acceleration and retardation shall be determined using an accelerometer mounted on the test dummy. The accelerometer should have a range from 0 to about 10 m/s^2, with an accuracy to 5 %. The mass of the accelerometer should not exceed 2 kg. The accelerometer should be such that frequencies greater than 30 Hz are excluded.

The maximum acceleration and retardation may be determined using an accelerometer that either records the maximum value or displays graphically the acceleration with respect to time, wherein the maximum value may be determined visually.

8.1 Maximum acceleration

The measurement of acceleration shall be carried out from zero to full speed. The maximum acceleration shall be determined from the average of four forward runs, two in one direction and two in the opposite direction.

8.2 Maximum retardation

The measurement of retardation shall be carried out from full speed to zero speed. The retardation shall be achieved by release of the controls. The maximum retardation shall be determined from the average of four forward runs, two in one direction and two in the opposite direction.

9 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, in accordance with clauses 7 and 8;

g) if the backwards speed cannot be measured, this fact shall be stated;

h) details of the test load used during the tests.

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Descriptors : wheel chairs, tests, determination, speed limit, acceleration.

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