
Wheelchairs —

Part 7:

Measurement of seating and wheel dimensions

Fauteuils roulants —

Partie 7: Mesurage des dimensions d'assise et des roues



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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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7176-7 was prepared by Technical Committee ISO/TC 173, *Technical systems and aids for disabled or handicapped persons*, Subcommittee 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 the efficiency 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 retardation 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 of 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*

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 wheelchairs*
- *Part 21: Requirements and test methods for electromagnetic compatibility of powered wheelchairs and motorized scooters*
- *Part 22: Set-up procedure for adjustable wheelchairs*

A Technical Report will also be made available giving a simplified explanation of these parts of ISO 7176.

Annex A forms an integral part of this part of ISO 7176. Annex B is for information only.

Introduction

The purpose of this part of ISO 7176 is to ensure comparability of information on seating and wheel dimensions by specifying a consistent, repeatable method of measurement that provides information relevant to prescribers' needs.

Wheelchair seats and wheels tend to involve deformable, contoured and flexible structures with few consistent reference points to which reliable measurements can be made. In the past, manufacturers have developed their own methods of measurement that differ from each other. This prevents comparison of measurements from one manufacturer to those of another.

In addition, measurements are sometimes selected for reasons of ease of measurement rather than for clinical usefulness. For example, seat depth for sling seats is usually determined along the sling material and does not consider the gap between the back of the seat and the backrest. This gap can be as large as 5 cm and significantly affects the wheelchair's seat depth.

Further problems can arise from adjustable features which can interact to generate, potentially, very large numbers of measurements.

This part of ISO 7176 involves first placing a standardized loader gauge in the wheelchair seat. Two sizes of loader gauge are specified corresponding respectively to adult and child body sizes. The gauge deforms any flexible structures in a repeatable manner and provides reference points to which dimensions can be measured. The positions at which measurements are made are described relative to the loader gauge. Accurate positioning of the gauge is essential for repeatability of results and is specified in detail in the text. Finally, to facilitate comparisons of different manufacturers' data, a format is included in which results are to be presented.

It should be noted that wheelchairs are often produced in model ranges, consisting of a basic model with a series of variations from this basic model. It is the responsibility of those commissioning the measurements to select which model variations are measured.

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Wheelchairs —

Part 7:

Measurement of seating and wheel dimensions

1 Scope

This part of ISO 7176 specifies a method for measuring the seating and wheel dimensions of wheelchairs.

It is applicable to wheelchairs and vehicles intended to provide indoor and outdoor mobility at speed up to 15 km/h for people with disabilities whose mass does not exceed 120 kg, including the following classifications from ISO 9999:1992:

Electric motor-driven wheelchairs with manual steering	12 21 24
Electric motor-driven wheelchairs with power steering	12 21 27
Powered attendant-controlled wheelchairs	12 21 21
Manual attendant-controlled wheelchairs	12 21 03
Bimanual rear-wheel-driven wheelchairs	12 21 06
Bimanual front-wheel-driven wheelchairs	12 21 09
Bimanual lever-driven wheelchairs	12 21 12
Single-side-driven nonpowered wheelchairs driven by one arm or one leg	12 21 15
Foot-propelled wheelchairs	12 21 18

It does not apply to wheelchairs with a seat width of less than 212 mm.

This part of ISO 7176 does not specify nominal seating and wheel dimensions for wheelchairs.

NOTE For wheelchairs not covered by the scope, this part of ISO 7176 may still give an indication of where measurements should be made. Observe that for wheelchairs designed for users whose mass is significantly greater than the reference loader gauge (see Annex A) and which have compressible parts such as sprung wheels and/or seats, this measurement procedure may not give the correct seat measurements, as the compressible parts will not be fully compressed.

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 indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

ISO 7176-15:1996, *Wheelchairs — Requirements for information disclosure, documentation and labelling*.

ISO 9999:1992, *Technical aids for disabled persons — Classification*.

3 Definitions and abbreviations

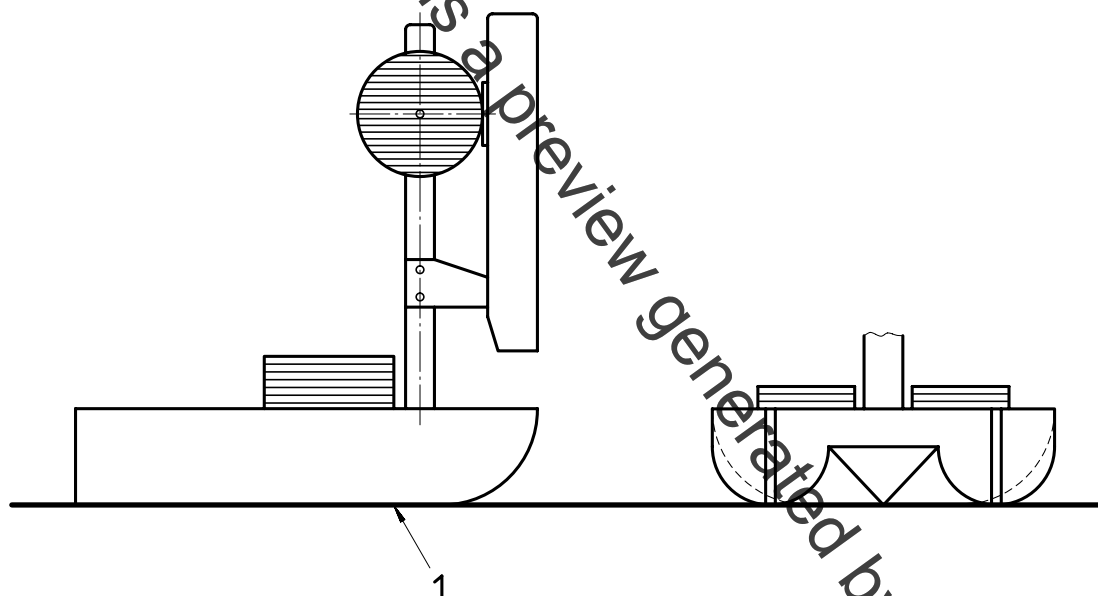
For the purposes of this part of ISO 7176, the definitions given in ISO 6440 and ISO 7176-15 and the following definitions and symbols apply.

3.1 reference loader gauge RLG

device used to load wheelchair seat and form a basis from which to make measurements

3.2 seat reference plane

plane of the bottom surface of the RLG seat unit, as shown in figure 1



Key

- 1 Seat reference plane

Figure 1 — Seat reference plane