TECHNICAL REPORT

ISO/TR 13570-2

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Wheelchairs —

Part 2: Typical values and recommended limits of dimensions, mass and manoeuvring space as determined in ISO 7176-5

Fauteuils roulants —
Partie 2: Valeurs types et limites ou dimensions recommandées, masses et espace requis pour maneuvres comme évalués dans l'ISO 7176-5

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 173, *Assistive products for persons with disability*, Subcommittee SC 1, *Wheelchairs*.

ISO/TR 13570 consists of the following parts, under the general title *Wheelchairs*:

— *Part 1: Guidelines for the application of the* ISO 7176 *series on wheelchairs*

— *Part 2: Typical values and recommended limits of dimensions, mass and manoeuvring space as determined in* ISO 7176-5

Introduction

The purpose of this part of ISO/TR 13570 is to provide typical values (where enough evidence has been gathered) and recommended limits of important dimensions and masses of manual wheelchairs and electrically powered wheelchairs including scooters. Typical values are based on evidence that was current at the end of 2011. The items are grouped to reflect their importance and utility for the different user groups of the standard. Typical values are reported where there has been enough sampling to give reliable data and contributions are sought to enable the future publication of values currently marked as Insufficient Data (+).

These user groups are:

— wheelchair occupants — for items that are of importance for the estimation of the space needed and the general manoeuvrability;

— architects and public authorities — for items with regard to the accessibility of e.g. dwellings, lifts, kitchen and bathroom equipment, lodging and public buildings, and areas etc.;

— manufacturers, wheelchair providers, clinicians, and test laboratories — for items that need to be considered when manufacturing, setting up, adjusting, repairing, or testing wheelchairs.

The core information of this part of ISO/TR 13570 is contained in two Clauses:

Clause 5 gives the typical values and recommended limits of dimensions and masses of a wheelchair that are most important for the wheelchair occupant (as defined and tested in ISO 7176-5, Clause 8, Required measurements). These dimensions inform the wheelchair occupant before purchase whether the wheelchair will fit to its specific requirements and needs. They also provide guidance to the wheelchair manufacturer for new developments. They inform the wheelchair occupant about the space the wheelchair will need. They also assist architects in planning accessible buildings and environments.

Clause 6 gives the typical values and recommended limits of supplementary dimensions (as defined and tested in ISO 7176-5, Annex A, Technical dimensions), which are of higher influence to good performance of the wheelchair (driving, steering, tracking etc.). They are worthwhile to be known by the technical personnel when designing, making, testing, repairing, setting up or even adjusting the wheelchair.

Call for Contribution

Much work and effort went into this project in order to collect data for the tables in this document. However, there are still values for which there is insufficient data (+) in these tables. Therefore every manufacturer, institution or expert, who can contribute with additional data, preferably for blank boxes, is invited to send any usable information to ISO/TC 173, SC 1, at project@tech4life.com.au.

Wherever possible, the material should be submitted comprising the following auxiliary information:

a. collected data;

b. type of wheelchair (with handrims or without);

c. if the procedures of ISO 7176-5 are not used for the measurements, the actual method of measurement;

d. the occupant mass group I, II, or III claimed for the wheelchair(s);

e. the class of the wheelchair A, B, or C (for electrically powered wheelchairs);

f effective seat width of the test wheelchair;

g. number of samples from which these data are derived;

h. whether the selection of the wheelchair is in accordance with ISO 7176-5, Clause 6 and the preparation for the measurements is in accordance with ISO 7176-5, Clause 7;

All contributions will be highly appreciated.

Wheelchairs —

Part 2:
Typical values and recommended limits of dimensions, mass and manoeuvring space as determined in ISO 7176-5

1 Scope

This part of ISO/TR 13570 lists the typical values and recommended limits of the dimensions obtained from measurements taken in accordance with ISO 7176-5. This part of ISO/TR 13570 lists the typical values and recommended limits of the important wheelchair dimensions (ready for occupation and folded or dismantled), space for pivoting or reversing between limiting walls and some dimensions worthwhile to estimate usability of the wheelchair as well as determination of the mass of the wheelchair. It is intended for use of prescribers, clinicians, wheelchair occupants or manufacturers.

This part of ISO/TR 13570 lists the typical values and recommended limits of the dimensions when the wheelchair is occupied and some operating areas when performing special tasks encountered in every day's life. This part of ISO/TR 13570 lists the typical values and recommended limits of the technical dimensions critical to the performance of the wheelchair. This part of ISO/TR 13570 applies to manual wheelchairs and electrically powered wheelchairs (including scooters).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 7176-26, *Wheelchairs — Part 26: Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7176-5 and ISO 7176-26, and the following apply.

3.1
insufficient data
+
there have not been sufficient samples evaluated to produce reliable values for this measurement

4 Wheelchair groups

4.1 General

Wheelchairs appear in a very wide variety of designs, types, models, and sizes. To cope with these circumstances, all wheelchair models are listed into one of four principal groups.

These four principal groups listed in 4.2 to 4.5 comprise wheelchairs with handrims and electrically powered wheelchairs of class A, B, and C.

When measurements are made, the size of the wheelchair is selected according to ISO 7176-5, Clause 6, and equipped and adjusted according to ISO 7176-5, Clause 7, for the respective occupant mass group.

NOTE At the present stage, only data for occupant mass group II and III are available. The test results presented are received from measurements of about 38 different wheelchair models (15 manual wheelchairs with handrim propulsion, about 7 of each class of electrically powered wheelchairs. Because the task of this part of ISO/TR 13570 is to deliver comparable data about typical situations, it is not necessary to support them by large numbers of test wheelchairs and by extensive statistics. Further data collection, in particular for occupant mass group I, and from various sources and with other wheelchair models is in the work plan of ISO TC173 SC1 WG1, which is responsible for the elaboration of ISO 7176-5 and this part of ISO/TR 13570.

4.2 Wheelchairs with handrims

This principal group comprises wheelchairs with manual rear wheel drive by use of handrims and handrim activated power assisted wheelchairs (HAPAW).

4.3 Electrically powered wheelchairs of class A

This principal group comprises electrically powered wheelchairs that usually have rear wheel drive, are compact and manoeuvrable but not necessarily capable of negotiating outdoor obstacles and therefore are primarily intended for indoor use.

4.4 Electrically powered wheelchairs of class B

This principal group comprises electrically powered wheelchairs that usually have rear wheel drive, are sufficiently compact and manoeuvrable for some indoor environments and capable of negotiating some outdoor obstacles and therefore are intended for a combination of indoor and outdoor use.

4.5 Electrically powered wheelchairs of class C

This principal group comprises electrically powered wheelchairs that usually have front wheel drive, are usually large in size, not necessarily intended for indoor use but capable of travelling over longer distances and negotiating outdoor obstacles and therefore are primarily intended for outdoor use.

4.6 Electrically powered wheelchairs (scooter design)

These are electrically powered wheelchairs with tiller steering. Usually they are large in size, not necessarily intended for indoor use but capable of travelling over longer distances and negotiating outdoor obstacles and therefore are primarily intended for outdoor use.

NOTE The values from measurements of scooters are merged into the appropriate class A, B, or C of an electrically powered wheelchair.

5 Typical values and recommended limits for required measurements

5.1 General

The outcome of tests performed with typical wheelchairs and as stipulated in ISO 7176-5, Clause 8 are listed to give an understanding of the state of the art and to provide their recommended limits.

All length dimensions are given in millimetre, all angle dimensions are given in degrees, and all masses are given in kilogram.

NOTE Please see the Call for Contribution in the Introduction.

5.2 Full overall length

NOTE For wheelchairs with leg supports and/or foot supports.

5.2.1 Occupant mass group I

Table 1 — Typical full overall length

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
	+	+	+

Table 2 — Recommended maximum limits of full overall length

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
	+	+	+

5.2.2 Occupant mass group II and III

Table 3 — Typical full overall length

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
1 040	1 100	1 170	1 150

Table 4 — Recommended maximum limits of full overall length

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
1 200	1 200	1 200	1 200

5.3 Overall width

5.3.1 Occupant mass group I

Table 5 — Typical overall width

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
	+	+	+

Table 6 — Recommended maximum limits of overall width

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
	+	+	+

5.3.2 Occupant mass group II

Table 7 — Typical overall width

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
640	620	680	700

Table 8 — Recommended maximum limits of overall width

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
700	700	700	700

5.3.3 Occupant mass group III

Table 9 — Typical overall width

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
	+	+	+

Table 10 — Recommended maximum limits of overall width

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
	+	+	+

5.4 Handgrip height

5.4.1 Occupant mass group I

Table 11 — Typical handgrip height

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
	+	+	+

Table 12 — Recommended maximum limits of handgrip height

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
1 090	1 090	1 090	1 090

5.4.2 Occupant mass group II and III

Table 13 — Typical handgrip height

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
900	920	960	960

Table 14 — Recommended maximum limits of handgrip height

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
1 090	1 090	1 090	1 090

5.5 Stowage length

5.5.1 Occupant mass group I

Table 15 — Typical stowage length

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
	+	+	+

Table 16 — Recommended maximum limits of stowage length

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
	+	+	+

5.5.2 Occupant mass group II and III

Table 17 — Typical stowage length

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
630	920	950	1 050

Table 18 — Recommended maximum limits of stowage length

All dimensions in mm

Wheelchair with handrims	Electrically powered wheelchair		
	Class A	Class B	Class C
700	1 000	1 000	1 200

5.6 Stowage width

5.6.1 Occupant mass group I

Table 19 — Typical stowage width

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	+	+	+	+
Rigid frame	+			

Table 20 — Recommended maximum limits of stowage width

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	+	+	+	+
Rigid frame	+			

5.6.2 Occupant mass group II

Table 21 — Typical stowage width

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	250	620	680	700
Rigid frame	500			

Table 22 — Recommended maximum limits of stowage width

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	300	640	700	720
Rigid frame	520			

5.6.3 Occupant mass group III

Table 23 — Typical stowage width

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	+	+	+	+
Rigid frame	+			

Table 24 — Recommended maximum limits of stowage width

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	+	+	+	+
Rigid frame	+			

5.7 Stowage height

5.7.1 Occupant mass group I

Table 25 — Typical stowage height

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	+	+	+	+
Rigid frame	+			

Table 26 — Recommended maximum limits of stowage height

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	+	+	+	+
Rigid frame	+			

5.7.2 Occupant mass group II and III

Table 27 — Typical stowage height

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	900	600	720	870
Rigid frame	690			

Table 28 — Recommended maximum limits of stowage height

All dimensions in mm

	Wheelchair with handrims	Electrically powered wheelchair		
		Class A	Class B	Class C
Folding frame	1 090	1 000	1 000	1 000
Rigid frame	690			