

# UNI T1675:2017 Furniture - Furniture design and their approaches to meet the needs of all people - Requirements

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If we stop for a moment to observe the world in which we live, we notice how evident and frequent are the situations in which people's physical abilities have a limitation due to punctual situations such as diseases of various kinds or injuries. Aging also inevitably leads to a decrease in muscle strength, in joints mobility (mainly lower limbs) and to a reduced vision.

The interaction and integration with the surrounding environment (people and things) is heavily influenced, limiting accessibility to various activities and services which discriminate in an unacceptable and not sustainable way for a civilized and advanced society.

In this regard, the scientific and technical literature and the production of books and articles on the topic of accessibility for all is very large.

These studies pay the closest attention to buildings, their accessibility from the outside and the accessibility to the various and numerous internal areas.

The furnishing topic and its layout has definitely been treated to a much lesser degree, and the studies that lead to useful design data are very few and rare.

Another important evidence can also be found in the numerical data concerning the European population:

- 50 million people in Europe (approximately one in six people) aged between 16 and 64 are affected by a permanent health problem or a disability;
- this figure represents 16% of the total EU working age population;
- 63% of people with disabilities are older than 45;
- almost 30% of the population in the 55-64 age group is affected by a disability;
- 50% of disabled people are employed compared to 68% of non-disabled people.

To this decidedly complex scenario we must also add the fact, deriving from the statistical data, that the incidence of disability will increase as the European population is becoming increasingly old.

If we limit ourselves to the data of Italy, the Italian Institute of Statistics (ISTAT) gives us the following "picture" of the demographic trend and the distribution of age groups.

Region / Province	Population trends (per 1000 residents)
Bolzano prov.	+6,6
Lumbardy	+1,1
Emilia Romagna	+0,2
Veneto	-1,9
Friuli Venezia Giulia	-3,4
Valle d'Aosta	-5,7
<b>ITALY</b>	<b>-1.4</b>

Table 1: rate of population variation by region - Year 2016 - per thousand residents

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Year	> 65 years old	> 90 years old	> 100 years old
2007	11.7 mil (20,1% )	466.700 (0,8 %)	10.386 (0,02 %)
2017 (1 <sup>st</sup> January)	13.5 mil. (22,3 %)	727.000 (1,2%)	17.000 (0,03%)

Table 2: age distribution in the last ten years

Given the topic we are dealing with, considering its scope, it is essential to use terms (and define their meaning) which can represent what is common knowledge and, possibly, to share them in a standard.

Disability is an evolving concept, and this disability is the result of interaction between people with impairments and behavioral and environmental barriers, which prevent full and effective participation in the society based on equality with other people. This concept has been well expressed and defined by the UNI EN ISO 9999 standard (\*) as follows:

## **disability**

umbrella term for impairments, activity limitations and participation restrictions denoting the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors. (environmental and personal factors)

\* ISO 9999, *Technical aids for disabled persons – Classification*

## **The UNI 11675 standard**

Given the scenario described in the introduction, about a couple of years ago the UNI Furniture Commission has started the study of a draft standard, now published, addressing the topic of furniture, functionality, design and its positioning in the living environments in an adaptable, useful and easily accessible way for all adult people, regardless of their physical abilities.

The standard then provides requirements and recommendations for this design and also, as modern technical standards do, explains the approach and perspective used.

The standard also contains five informative appendices:

1. Room for passages on access routes (Appendix A)
2. Ranges of the dimensions of reachability by people (Appendix B)
3. Use of the surface reflectance (Y) to evaluate visual contrast (Appendix C)
4. Strength and durability requirements (Appendix D)
5. Recommendations for the design and positioning of furniture for all (Appendix E)

Let's underline two aspects that are fundamental and which have been the reference points on which the activities have focused. The first consists in the fact that what is reported in the standard, in terms of requirements, dimensions and - recommendations, is absolutely suitable, usable and very useful even for people who do not show particular disabilities. The second aspect is that we tried to consider the main physical disabilities such as those of people in wheelchairs, those with walking difficulties (crutches, sticks, etc.) and the visually impaired.

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To do this we have drawn and followed some of the indications given in the document cited in the bibliography of the standard.

Appendix B is particularly interesting and absolutely essential for defining the dimensions given in the body of the standard.

In this part (Appendix B), the basic dimensions relating to wheelchair users, such as the armrest height, knee height and footrest depth are shown, as a function of the percentage (80, 90, and 95%) of the users accommodated by these values. These dimensions define the room under the surface of desks, counters and kitchen tables.

Percentage of seated users (%)	Armrest height (mm)	Knee height (mm)	Footrest depth (mm)
80	713	661	445
90	751	674	473
95	794	691	490

Table B.1 Wheelchair size range

Then Appendix B considers the definition of reachability ranges by people both in the sitting position (e.g. wheelchair users) and in the standing one.

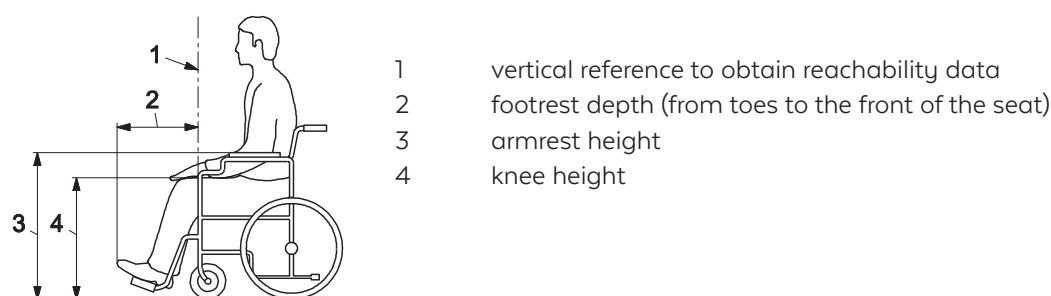
Research on these dimensions resulted in the definition of the following sets of ranges that are (in terms of accuracy of the action or frequency of use):

- Comfortable reachability ranges. This range is determined by the ability of a person to reach during extension and/or by bending the body and it is appropriate for an activity that requires precision and that is frequently performed.
- Extended reachability ranges. This range is determined by the ability of a person to reach during extension and/or by bending the body and it is appropriate for an activity that does not require accuracy and is not frequently performed.

The data reported in the table, as shown in the pictures of the appendix, have been obtained from a research for a comfortable and extended reachability for wheelchair users and people with movement disabilities at different angles above and below the horizontal.

The dimensions indicated in the table represent the reachability capacity of 90% of the sample of wheelchair users and persons with motion disabilities who participated in the research.

However, it should not be forgotten that in everyday practice some actions or activities are normally performed



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outside the reference scenario (e.g. angles) of the research, as for example the bending down to reach a wall socket or the movement to reach the back of a drawer in the kitchen.

Going back to the standard let's examine the scope, the intended uses and the type of products considered in the document.

The standard considers the following end uses for furniture:

- public and private offices (e.g. offices, banks, post offices);
- contract (e.g. shops, hospitals, bars, restaurants, retirement homes, hostels and hotels, tourist villages, etc.);
- schools (e.g. schools, universities, museums, libraries);
- domestic (homes).

Looking into the different buildings mentioned above, the environments considered by the standard refer to the following:

- Workstations in the office and for users
- Workstations in the contract sector and furniture sector for residents/users
- Kitchens
- Living rooms and/or dining rooms
- Bathrooms
- Bedrooms

As regards the products considered by the standard, these are the following:

- Storage units and shelves
- Counters including check-in counters
- Working spaces and working surfaces
- Tables
- Handlebars
- Coat hangers
- Changing units
- Beds

It is a common experience that storage units, including shelves and tops, are among the most critical furniture components as regards to the ease of reaching and operating in order to access (store and pick up) their contents. In this regard, the standard places the due emphasis on these aspects, distinguishing between scenarios of different interactions, but widely known by all of us as users, such as frequent use and not frequent use.

Postponing the many details and data to a careful reading of the complete standard, I report herewith for example the relative heights of shelves for people who can stand up but with reduced mobility:

*Range of reachability from the side for a person standing with difficulty in reaching them and bending - from 750 mm to 1500 mm for frequent use and from 700 mm to 1625 mm for not frequent use (see Figure 1).*

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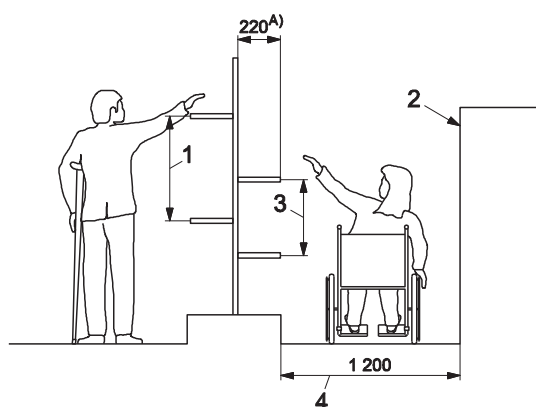


Figure 1: Access to the storage units from the side in a sitting and standing position (dimensions in mm)

A similar approach regards also the storage units and related components (e.g. drawers) for wheelchair users. Of course, in this case there is another factor that is the space occupied by the legs and the armrests of the chair. Both the cases of the presence and the absence of space for the legs have been taken into account in the definition of the requirements.

Another important factor considered is the visibility of the storage units by defining both gloss requirements ( $\leq 45$  when measured according to UNI EN 13722) and color contrast ( $Y$  between the two surfaces is  $\geq 30$  when measured according to UNI EN 13721 with the other surfaces).

Furthermore the consistency with the safety requirements of the European standard UNI EN 16121 is important. Similarly to the storage units, the standard deals with other important topics related to working areas such as check-in counters both in the office and in the contract sector. The reported dimensions fill in a lack repeatedly claimed by the operators (producers / users and suppliers).

A particular attention is also given to the domestic environments (but also applicable to contract buildings) such as bathroom, kitchen, living room and bedroom. Far from placing design constraints on such environments and products, the standard limits itself to providing reference dimensions to ensure the reachability of all people regardless of their physical abilities. From this perspective, the dimensions such as the heights of worktops or the heights of hangers and changing units must be read.

In any case, the reference to the European or national standards that define the requirements of safety, strength and durability is strong.

The standard is in its first edition and my wish, shared by the UNI Furniture Commission, is that its use will bring the improvements and refinements that this fundamental and priority topic requires.

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