

# DESIGN RESOURCE



## Space Clearances

### 2.1 Clear Floor Space

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### 1. Overview

All public accommodations in the U.S. must comply with accessibility standards that are referenced in building regulations and disability rights laws. There are different requirements for existing and new construction but one of the common elements of the standards is clear floor space (CFS) for wheeled mobility device (WMD) users. The CFS serves as a “building block” for many other sections of the standards like the space needed in seating areas, plumbing fixtures, electrical controls, doorways, etc. to accommodate WMD users. Clear floor spaces allow people with wheeled mobility devices to position themselves so that they can comfortably use fixtures, furniture, and equipment, and fixed seating areas. Thus, its dimensions have significant implications throughout a building.

Currently, the CFS standards referenced by regulations are based on data collected during the 1970's. Since that time, wheelchair design and the population of people with disabilities have changed substantially. In the last 20 years, research in the UK and U.S. demonstrated that the current standards are inadequate for accommodating many WMD users, especially those using power wheelchairs and scooters. The U.S. research, completed by the IDEA Center, is used here, as the UK research recruited individuals in a way that introduced bias for applying the findings to buildings (the focus was transportation). There are also substantial differences in the way that WMDs are prescribed and purchased compared to U.S. practice.

### 2. Issues to Consider

*Width and length:* The width and length of the CFS is determined by the overall space required by the WMD itself, the body and additional devices attached to the device. In the IDEA Center study, the largest overall width and length were measured as well as the WMD alone. But, for the purposes of design, the former are most applicable and used for design recommendations. It is also important to consider the position of the individual. People may be able to move into a more compact spatial envelope but that can become uncomfortable. So, the measurements in the IDEA Center study were taken with the body at rest.

*Trend toward larger mobility devices:* Obesity rates in the U.S. are high and still trending upward. Thus, there is an increasing number of larger chairs. This will lead to an increase in the sizes of wheeled mobility devices, in general. Thus, the recommendations are based on the larger sized people and devices. The largest recommendations, to achieve 2 credits toward certification, would accommodate 95% of the sample from the IDEA Center research, with a few outliers excluded. One credit is provided by following recommendations that accommodate approximately 90-95% of the sample, depending on the type of device.

*Access Direction:* At least one side of a CFS must always be contiguous to a circulation path. The designer must consider how best to orient the space to the adjacent circulation. It is easiest to move a wheelchair directly in and out of a tight space so access from the rear or front is most convenient. Access from the side requires more maneuvering. Thus, it is a good idea to make the space larger when such access is required. In fact, access codes and standards require 6 in. (152 mm) more width and/or length where side access is required in bounded areas like alcoves or in between fixed built elements like partitions and seats in a vehicle.

*Positioning the Clear Floor Space:* The shortest and most comfortable reach distance is based on the shoulder point. Thus, the shoulder plan should be used to position the CFS with respect to a reach target like an electrical control. The actual target is often difficult to determine. There

may be several targets (e.g., swipe card slot, keypad, touchscreen) on one piece of equipment. Sufficient clear floor space will allow users to get close to a point of access but providing additional space can allow the individual to position their chair for more effective use of devices. If a user needs to plug-in a device to an electrical outlet, then they may need to approach the outlet from the side or from a forward approach. Allowing for both means of access will accommodate more users. In addition, the IDEA Center research discovered that 25% of the 500 participants were left-handed, compared to 10% in the total population. This is a substantial minority. Thus, providing access for left and right-handed individuals is a good idea as well. It does not necessarily take more space to do that as long as WMD users can enter the space from different directions and directionality is not critical for using it, as in a fixed seating area or bus. Two options, left and right-handed, can also be provided where more than one CFS is required.

*Clear Floor Spaces Overlapping Circulation:* Although accessibility codes and standards allow the CFS to overlap circulation clearances in some locations, someone occupying a clear floor space can block passage to other building users, so care should be taken to insure at least minimum clearances for passing around the individual where this may occur, e.g., at a drinking fountain along a corridor or in front of a building directory. Alcoves can be used to eliminate blocking circulation paths.

### 3. Related Standards

[2017 ICC/ANSI A117.1 Standard - Section 305 Clear Floor Space](#) defines the minimum dimensions necessary for clear floor space. Section 305 Clear Floor Space from the 2017 ICC/ANSI A117.1 Standard defines the minimum dimensions necessary for CFS. These standards are minimum requirements and do not accommodate all WMD users. Recently, the minimum length was increased for new buildings and facilities to 52 inches (1320 mm), but this version of the standard has not been adopted by the International Building Code (IBC) which is the model building code adopted by most state building codes in the U.S. The 2009 version of the ICC/ANSI A117.1 Standard, which was adopted by the latest version of the IBC required only 48 inches (1220 mm).

[2010 ADA Standards for Accessible Design - Section 305 Clear Floor or Ground Space](#) is identical to the 2009 ICC/ANSI 117.1 Standard.

Both versions of the ICC A117.1 and the 2010 ADA require centering the clear floor space on operable equipment, fixtures and appliances, however the *isUD<sup>TM</sup>* offset the space to improve reach to a target as noted above. Meeting the code and the *isUD<sup>TM</sup>* is not necessarily a problem, for example, if controls on a water fountain are at the side. But it may be a problem where there are several reach targets on a piece of equipment. Increasing the size of the CFS to provide options in positioning is a good solution. In other words, provide a larger space that has an overlap between the code requirement and the *isUD<sup>TM</sup>* recommendations.

### 4. Measurement and Verification

CFS can be verified by measuring the area to confirm the built space meets the standard. A designer may also choose to include a standard illustration of the CFS dimensions used in a project on sheet with standard details, showing how they accommodate the codes. A good practice is to show the CFS on the drawings in outline wherever it is provided. Such drawings can also be used to communicate to facility managers where the CFS is to be kept free from obstacles.

## 5. Design Considerations

- i. *Clear floor spaces are at least 34 inches (856 mm) wide and 56 inches (1420 mm) deep. This clear floor space will accommodate 95% or more of manual wheelchair, power wheelchair, and scooter users.*
- ii. *Clear floor spaces are at least 32 inches (815 mm) wide and 54 inches (1370 mm) deep. This clear floor space will accommodate 95% or more of manual wheelchair users, and between 90-95% of power wheelchair and scooter users.*

*See Appendix A for illustrations providing additional clear floor space guidance*

## 6. References

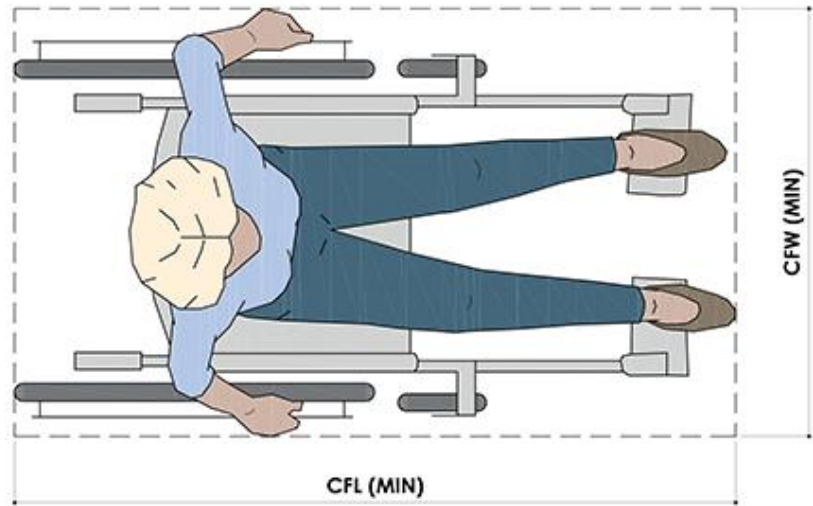
Steinfeld, E., Maisel, J., Feathers, D., & D'Souza, C. (2010). Anthropometry and standards for wheeled mobility: an international comparison. *Assistive Technology*<sup>®</sup>, 22(1), 51-67.

Steinfeld, E., Paquet, V., D'Souza, C., Joseph, C., & Maisel, J. (2010). Anthropometry of wheeled mobility project-Final report. *Buffalo, New York: Center for Inclusive Design and Environmental Access (IDeA Center)*. Retrieved from

[http://www.udeworld.com/documents/anthropometry/pdfs/AnthropometryofWheeledMobilityProject\\_FinalReport.pdf](http://www.udeworld.com/documents/anthropometry/pdfs/AnthropometryofWheeledMobilityProject_FinalReport.pdf).

## 7. Appendix A

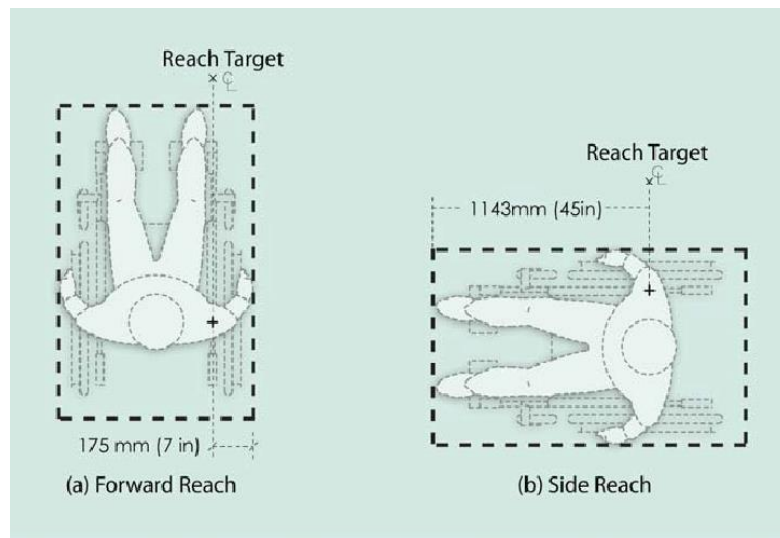
The illustrations below are taken from the *isUD*<sup>TM</sup> and various IDEA Center research. They provide additional information on research results and can be used to provide guidance to designers.





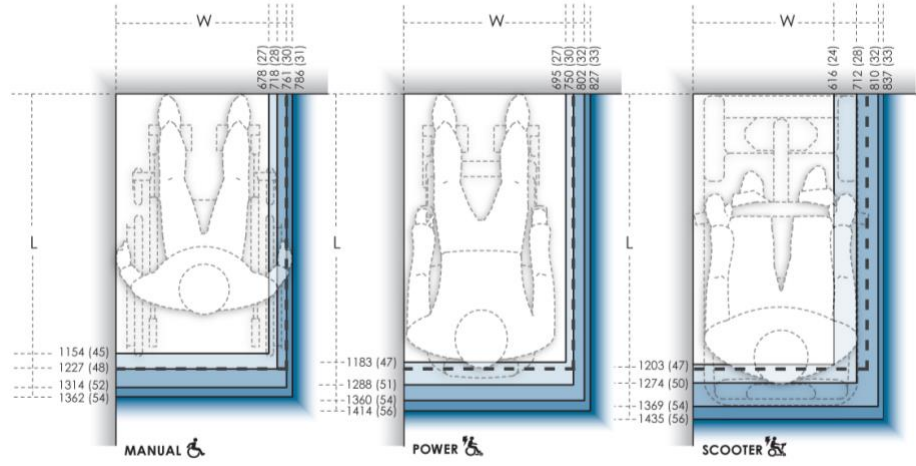
# OF SOLUTIONS SATISFIED	0	1	2
<b>CFL (MINIMUM)</b>	48 (1220)	54 (1370)	56 (1420)
<b>CFW (MINIMUM)</b>	30 (760)	32 (815)	34 (865)

**Figure 1:** Minimum clear floor space dimensions.

**Figure 2:** When needing to optimize for handedness using only enough space for a forward reach or side reach, the clear floor space has to be offset from either the lateral most edge of the space (front reach) or the anterior most edge of the space (side reach).



percent accommodated		W = floor space width, units: mm (in.), L = floor space length, units: mm (in.)		
		MANUAL 	POWER 	SCOOTER 
		276 participants	189 participants	30 participants
< 50%	50%	W: 678 (27)   L: 1154 (45)	W: 695 (27)   L: 1183 (47)	W: 616 (24)   L: 1203 (47)
≥ 50% & < 75%	75%	W: 718 (28)   L: 1227 (48)	W: 750 (30)   L: 1288 (51)	W: 712 (28)   L: 1274 (50)
≥ 75% & < 90%	90%	W: 761 (30)   L: 1314 (52)	W: 802 (32)   L: 1360 (54)	W: 810 (32)   L: 1369 (54)
≥ 90% & < 95%	95%	W: 786 (31)   L: 1362 (54)	W: 827 (33)   L: 1414 (56)	W: 837 (33)   L: 1435 (56)
----- = ADA-ABA requirement of 1220 (48) x 760 (30)				



**Figure 3:**  
Accommodation model  
on clear floor space for  
wheeled mobility  
users.