

Seating & Wheeled Mobility Measurement Guide

Part 1

Ginger Walls, PT, MS, NCS, ATP/SMS
Pictures used with permission of Permobil

Fact Sheet

Seat Width – The recommended wheelchair (WC) seat width should match the width of the person.

Anatomical Measurement:

Trochanter to trochanter/
or widest part of the body

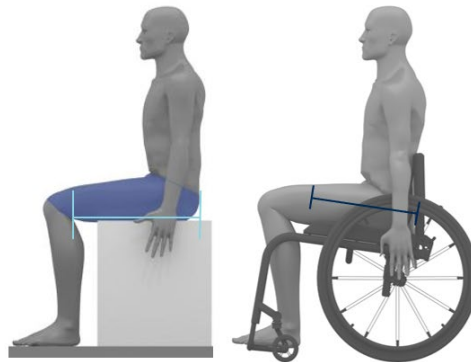


Wheelchair Measurement

Outside to outside of seat
tubes at the back post



Seat Depth



Anatomical Measurement

Upper Leg Length:
Back of sacrum to popliteal fossa

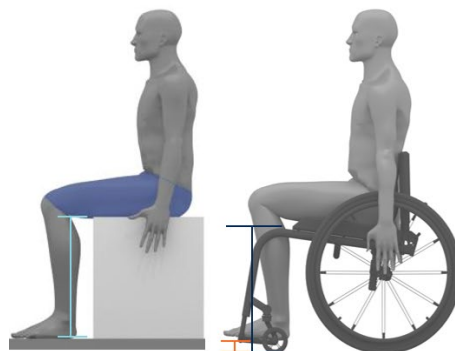
Consider postural limitations, such as a fixed posterior tilt or leg length discrepancy, that will require accommodation of the WC seat depth

Wheelchair Measurements

Seat Depth:
Front of back post to front edge of seat sling

Strategy:
Clear the calf while maximizing seat depth

Front Seat Height



Anatomical Measurement

Back of knee to heel

For a foot propeller the FSTFH will be the client's lower leg length minus the cushion thickness to allow foot contact for propulsion.

Wheelchair Measurements

FSTFH:
Floor to top of seat tube at front edge of seat sling

Ground clearance:
Equivalent to no more than cushion thickness for optimal center of mass

Foot support-to-seat length (leg rest length): lower leg length minus cushion height to provide optimal femoral contact at seat surface.

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Rear Axle Position determined by Rear Seat to Floor Height and Center of Gravity

User Position determines axle position

Seated in w/c with arms straight down at their sides, the user's fingertips should touch the rear axle

Horizontal Axle position

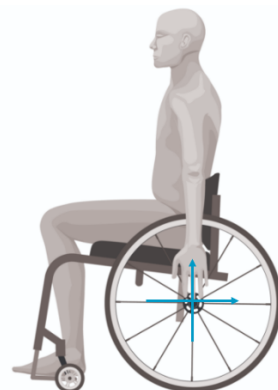
Center of Gravity specification – Front of back post to center of rear wheel.

Goal is 75% - 80% of user weight over rear axle.

Vertical Axle position

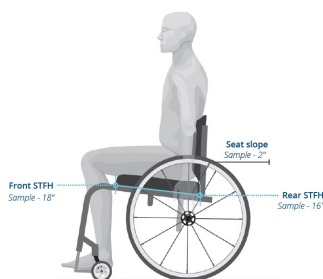
Rear Seat-to-Floor Height specification – Rear seat tube to floor

Use RSTFH and COG of demo chair as reference point to determine where definitive specs should be set

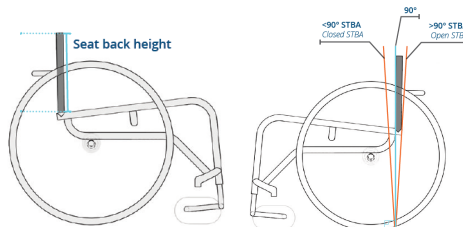


A properly balanced chair should lift easily from the front end with the user sitting in the chair. If it does not, then it is front loaded; the rear axle should be moved forward. Proper weight distribution can be assessed using a scale: Castor Load with hands on rims/ Entire chair with consumer

Seat Slope is the difference between the **Front and Rear STFH** and is important for postural stability and propulsion. Most adults need at least 2" seat slope if they propel with their UEs. Foot propellers need ½" to 1" seat slope.



Back Height is determined by the lowest point of the trunk needing support for stability/function. **Seat-to-Back Angle** is usually open a few degrees past 90 degrees for most adults to provide necessary positioning and postural support.



Armrest Height is measured from the seat tube to the top of the armrest. The armrest height should be set so that the client's arms can be supported in neutral with a 90-degree bend at the elbows.

References:

1. DiGiovine, C., Rosen, L., Berner, T., Betz, K, Roesler, T., & Schmeler, M. (2012). RESNA Position on the Application of Ultralight Manual Wheelchairs, Rehabilitation Engineering & Assistive Technology Society of North America.
2. Medola, F. O., Elui, V. M., Santana, C., & Fortulan, C. A. (2014). Aspects of manual wheelchair configuration affecting mobility: a review. *Journal of physical therapy science*, 26(2), 313-8.
3. The Consortium for Spinal Cord Medicine. (2005). Preservation of Upper Limb Function Following Spinal Cord Injury: A Clinical Practice Guideline for Health Care Professionals. Paralyzed Veterans of America.
4. Sprigle, S., & Huang, M. (2020). Manual wheelchair propulsion cost across different components and configurations during straight and turning maneuvers. *Journal of rehabilitation and assistive technologies engineering*, 7, 2055668320907819.

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