

A Guide to Wheelchair Selection

How to Use the ANSI/ RESNA Wheelchair Standards
to Buy a Wheelchair

Peter Axelson, MSME
Jean Minkel, MAPT
Denise Chesney, MEBME

Illustrations by Peter Thomas

© 1994 by the Paralyzed Veterans of America.
All rights reserved.

Washington, DC 20006

Standardized Testing and Information Disclosure

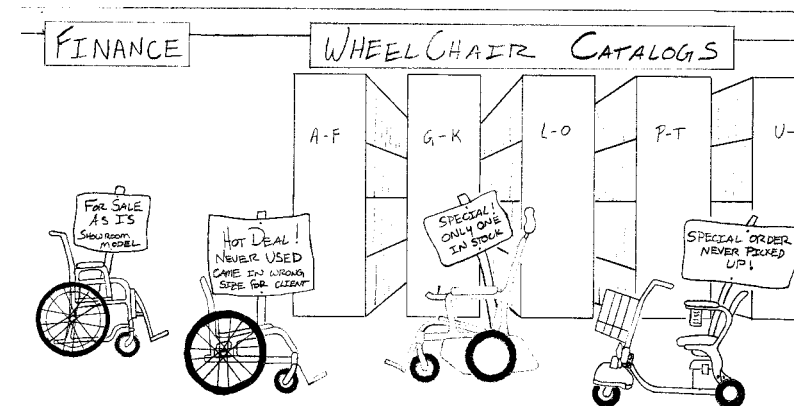
Purchasing a wheelchair can be a harrowing experience and finding the right chair among so many choices might seem impossible. Comparing wheelchair characteristics and performance has been difficult in the past because manufacturers used different standards and procedures to measure and test their chairs. For example, one manufacturer measured seat width from the outside of the seat rails, another measured from inside the rails, and a third measured the distance between the armrest panels. Thus, if you requested a chair with a seat width of 18 inches, the actual distance from the outside of the seat rails could be anywhere from 17 to 19 inches. This inconsistency, as well as a general concern for user safety, led to the development of standardized wheelchair measurements and test procedures. The results of these procedures will provide you with the information you need for true comparison shopping.

BACKGROUND ON TESTS AND STANDARDS

Since June 1979, the ANSI/RESNA Wheelchair Standards Committee has been working to provide consumers with objective information about the characteristics and performance of wheelchairs. The committee includes rehabilitation engineers, wheelchair manufacturers, representatives from the Department of Veterans Affairs (VA) and the Food and Drug Administration (FDA), wheelchair users, and wheelchair prescribers.

The standards developed by the committee consist of a number of test procedures that apply to all wheelchairs and some that apply only to powered wheelchairs, including scooters. The 18 test procedures are detailed instructions on how to perform the tests or measurements on wheelchairs. Some of the test procedures suggest minimum performance criteria for durability and

safety, while others disclose the results of the tests for comparison purposes. The information obtained from the tests is designed to help you make better educated selections. The standardized test procedures also allow you to compare the test results of wheelchairs from different manufacturers. Since many of the test procedures set minimum performance levels, they also help manufacturers produce better products.



Finding the right chair among so many choices might seem impossible. . .

Standards Increase Your Buying Power

The standards are voluntary: manufacturers are not required by law to use the test procedures. However, if consumers start using the results as a basis for wheelchair selection, the manufacturers who do not use the standards may lose sales. VA, the single largest purchaser of wheelchairs in the United States, is adopting the standards for future wheelchair purchasing. Marketplace pressure will most likely encourage overall compliance with the standards.

More About the Standards

To gain the maximum benefit from the standardized testing, both consumers and professionals must understand how to use the information.

The following is a list of the test standards, listed by their ANSI/RESNA number designation, that apply to all wheelchairs, with a brief description of the test procedure.

- Part 00: Nomenclature, Terms, and Definitions.** This section establishes the terms and definitions used in the test procedures.
- Part 01: Determination of Static Stability.** This test determines how stable the wheelchair is when it is resting on a sloped surface.
- Part 03: Determination of Effectiveness of Brakes.** This test determines how well the wheel locks (parking brakes) prevent the wheelchair from rolling on a sloped surface. This test also determines the minimum stopping distance of a powered wheelchair at its maximum speed.
- Part 05: Determination of Overall Dimensions, Mass, and Turning Space.** This section addresses the overall length, width, height, folded width, weight, and turnaround space of the chair.
- Part 07: Determination of Seating and Wheel Dimensions.** This section addresses the dimensional information needed to fit a chair to a rider. Standard methods of measurement eliminate the problems that result from variations in measurement methods.
- Part 08: Static, Impact, and Fatigue Strength.** This section addresses the strength and durability of a wheelchair.
- Part 11: Test Dummies.** This section addresses the dimensional and weight specifications of the dummies to be used when conducting the tests.
- Part 13: Determination of the Coefficient of Friction of Test Surfaces.** This test describes the roughness or slipperiness of the surface to be used for testing.
- Part 15: Guidelines for Information Disclosure.** This section tells what information manufacturers are required to disclose and how it should be disclosed in their product literature, if they choose to comply with the standards.

Part 16: Determination of Flammability. This test addresses the extent to which upholstery will burn and how fire retardant the upholstery is.

Part 93: Wheelchair Maximum Overall Dimensions. This section establishes suggested maximum dimensions of a chair for other organizations to use as guidelines for architectural accessibility.

Part 7930: Type Classification Based on Appearance Characteristics. This section describes the five-number code used to classify a wheelchair based on appearance characteristics.

The following is a list of test procedures that apply to powered wheelchairs only:

Part 02: Determination of Dynamic Stability of Electric Wheelchairs. This section addresses how stable a powered wheelchair is when starting up a hill, braking down a hill, and turning on a level surface.

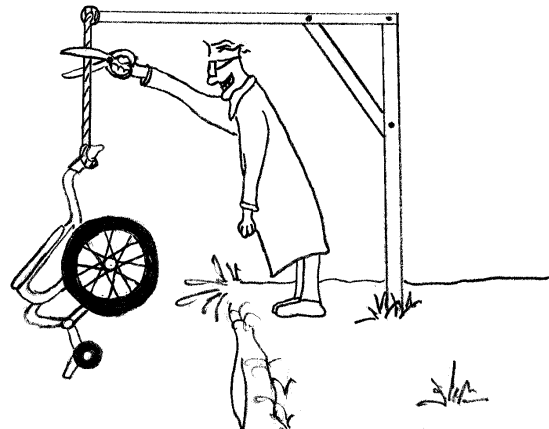
Part 04: Determination of Energy Consumption of Electric Wheelchairs. This test addresses the energy consumption of a powered wheelchair on a standardized track.

Part 06: Determination of Maximum Speed, Acceleration, and Retardation for Electric Wheelchairs. This section addresses the maximum speed in forward and reverse. It also determines the minimum time from stationary to maximum speed (acceleration) and from maximum speed to a complete stop (retardation).

Part 09: Climatic Tests for Electric Wheelchairs. This section addresses the effects of rain and temperature changes on the functioning of a powered wheelchair.

Part 10: Determination of Obstacle-Climbing Ability of Electric Wheelchairs. This test determines how high an obstacle a powered wheelchair can climb over.

Part 14: Testing of Power and Control Systems for Electric Wheelchairs. This test addresses safety, how well the fail-safe braking mechanism works, the force required to actuate the controls, and other issues related specifically to powered wheelchairs.



Testing of wheelchairs has become more sophisticated over the years...

How Chairs are Tested

The ANSI/RESNA Wheelchair Standards are specific instructions on how to perform the test procedures. Some of the test procedures have minimum performance requirements, including the flammability and climatic tests, the static and impact strength tests, and the power and control systems tests for powered wheelchairs. The results of the minimum performance tests are either pass or fail. These tests ensure minimum performance and safety of the product.

Most of the test procedures are performance tests that produce quantified information about a chair. The results give information for comparison purposes only; there is no pass or fail determination. These comparisons are meaningful because, for the first time, each manufacturer uses the same tests. Until now, different manufacturers described their wheelchairs using different terms. By comparing test results of different chairs, you can begin comparative wheelchair shopping.

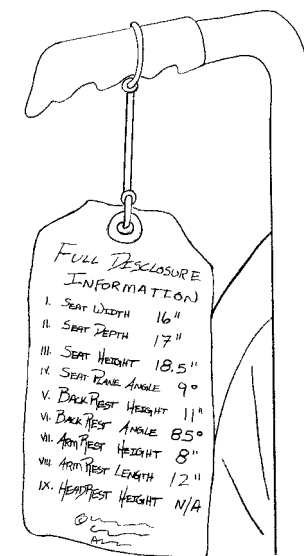
Most of the tests are conducted with a test dummy in the chair to represent the weight of a person. The results for chairs tested in this “loaded” condition more closely approximate the fit and performance of a chair when it is actually occupied. Your own body size, body proportions, and riding style may affect the actual fit and performance of a chair.

For wheelchair components that are adjustable, the manufacturer adjusts the wheelchair configuration and controls to obtain the extreme range of out-

comes for a specific test procedure. For example, rear axle position and other adjustable features affect the stability of a chair. In this case, the manufacturer tests the wheelchair with its rear wheels and other adjustable features in both the least and most stable configurations. These results give a range of tipping angles that reflects the least stable and most stable configurations that can be obtained by adjusting the rear wheels and other features of the wheelchair. On a powered wheelchair with an adjustable controller, the manufacturer will disclose a range of stopping distances to reflect the adjustability of speed and retardation (deceleration).

How Information is Disclosed

Manufacturers that wish to comply with the ANSI/RESNA Wheelchair Standards must comply with Part 15: *Guidelines for Information Disclosure*, which specifies which test results must be contained in the pre-sale technical product literature. A list of the additional tests that the manufacturer is required to perform is contained in appendix A. The manufacturer is not required to disclose the results of these additional tests in the technical product literature, but the consumer can request this information.



To be in compliance with the ANSI/RESNA test procedures, manufacturers are required to disclose certain information about the chair in their pre-sale technical product literature...

The test results of particular procedures are disclosed as performance values, which at first may have little or no meaning to you. For example, a manufacturer may disclose the rear tipping angle of a wheelchair, but there is no minimum performance value available for comparison at this time. However, you can look up the tip angle or the range of tip angles for a specific wheelchair with which you have experience, then look at the tip angles of other wheelchairs and figure out how these chairs will perform compared with the chair you know. For example, suppose your current wheelchair has a rear tip angle of four degrees. You can determine if the wheelchair you are considering is more or less tippy than your current chair by finding out if its rear tip angle is greater or less than four degrees. As you gain experience using one wheelchair, the information about other wheelchairs will become more meaningful to you.

Note: The performance ratings are usually based on testing only one wheelchair. The results disclosed represent the maximum performance of a new wheelchair tested without failure. The performance you get from your wheelchair will vary depending on your body size and proportion, physical strength, abilities, skills, and riding habits and on environmental conditions.