

## **ATTACHMENT A – REHABILITATION ENGINEERING SOCIETY OF NORTH AMERICA (RESNA)**

### **1.0 RESNA STANDARDS AND TEST**

The RESNA standards for power mobility device testing are industry recognized objective measures of performance, durability and safety for wheeled mobility devices intended for use by persons with disabilities. These tests are developed by committees of experts from industry, research and clinical practice. The standards for wheelchair testing constantly evolve as refinements in test procedures are incorporated. RESNA has defined the device configuration for testing and clarified test protocols. All parameters and technical information needed to conduct the testing may be obtained from RESNA at:

RESNA (Rehabilitation Engineering Society of North America)  
1700 N. Moore Street, Suite 1540, Arlington, VA 22209-1903  
Phone (703) 524-6686  
FAX (703) 524-6630  
[www.RESNA.org](http://www.RESNA.org)

### **2.0 RESNA STANDARDS REQUIREMENTS**

Each quote submitted for scooters must be accompanied by a RESNA test report meeting the following minimum salient characteristics. Failure to meet any of the minimum salient characteristics requirements will result in your scooter quote being summarily rejected and withdrawn from further consideration.

Requirements for RESNA test reports submitted with each quote:

1. For each scooter offered, the technical literature, including RESNA test report, must be submitted in a single organized package. A separate test report is required for each scooter model submitted.
2. The testing must have been conducted in the United States.
3. The report must be prepared in English.
4. The scooter tested must be the same model as the scooter quoted or clearly be a close predicate that has only cosmetic differences. A test report on a prototype is not acceptable.
5. The report must contain sufficient dimensional and performance measures to verify that solicitation minimum salient characteristics specifications are met.
6. All devices must be tested at the maximum patient weight capacity specified by the manufacturer.

7. The requirement for testing performed at independent test facilities vs. manufacturer facilities is not specified. However, the RESNA report will be significantly weighted as a component of the subjective technical evaluation and higher ratings will be assigned to reports completed by independent test facilities. Facilities that test wheelchairs are located on the RESNA website <http://www.resna.org/knowledge-center/testing-laboratories>. The VA does not specifically endorse any of these testing facilities.

Important Note: While in house testing and reports will be accepted for the quoted scooter, within 6 months of the contract awards, comprehensive test results from an independent testing facility must be provided for each scooter model awarded.

8. The required RESNA tests and results to be submitted for each quoted scooter are listed below. To be consistent with current commercial standards of practice applied by other Government third party payers, VA requirements are consistent with current Pricing, Data Analysis & Coding (PDAC - formerly SADMERC) requirements identified by Noridian Administrative Services, LLC contracted by Centers for Medicare and Medicaid Services (CMS).

VA requires several objective test results beyond those required by PDAC to confirm compliance with MTRs and to support product evaluation, including:

- 1) measure of ground clearance;
- 2) mass of heaviest part and;
- 3) requirements for information disclosure.

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Required RESNA test protocols for Volume 1 and Volume 2 are listed below. Test protocols that are not required are not listed; results from any additional tests provided will be reviewed and considered when rating the RESNA report as a component of the step two of the technical evaluation.

Note: The clause numbers of some tests may have recently changed. The name of the test procedure shall take precedence.

## **RESNA WC-1 – American National Standard for Wheelchairs**

### **Volume 1: Requirements and Test Methods for Wheelchairs (Including Scooters)**

#### **Section 1: Determination of static stability**

Clause 10 – Test for static stability in the rearward direction

10.3 – Wheels locked and the wheelchair in the least stable configuration

Clause 11 – Test for static stability with anti-tip devices

11.2 – Anti-tip device in the least effective configuration (both rearward orientation if anti-tips exist and lateral orientation if anti-tips exist).

**Note:** For scooters with elevating seats, test with the seat in both the normal driving position, and also with the seat elevated to the highest position where full scooter speed is still available. If the device cannot be driven with the seat elevated, the additional test is not indicated.

#### **Section 5: Determination of dimensions, mass and maneuvering space**

Clause 8 – Required measurements

8.2 - Length - Full overall length; Definition 3.9 - distance between the most forward and most rearward point of the wheelchair when assembled and ready for use with any leg supports, foot supports and any anti-tipping devices fitted (see Figure 8). Tested with loader gauge feet on device to verify the feet fit on device.

8.3 – Width - Overall width; Definition 3.21 – distance between the two outer most lateral points of the wheelchair (left and right) when assembled and ready for use (see Figure 8).

8.10 - Mass of heaviest part; Definition 3.16 – mass of the heaviest part (or assembly of parts) of the wheelchair when dismantled for transport or stowing purposes.

8.12 - Reversing width; Definition 3.33 – minimum distance between two vertical and parallel walls between which the wheelchair with direct steering or limited differential steering can turn through 180° with one initial forward drive, one rearward drive and one final forward drive (i.e. a three-point turn) (see Figure 21 and Annex B.3).

8.13 - Turning diameter; Annex C-2; Annex E-17; Definition 3.40 – diameter of the smallest cylindrical envelope in which the wheelchair can drive in a circle through 360° (see Figure 24).

Note: 8.13 is POV equivalent test to 8.11 “Pivot Width” for power wheelchairs.

8.14 - Ground clearance; Annex E-6; Definition 3.10 – minimum clearance between the occupied wheelchair and the ground.

8.15 - Required width of angled corridor; Annex E-12; Definition 3.32 minimum width of a corridor with a right angled turn in which the wheelchair can be driven in forward and rearward direction (see Figure 20).

## **Section 7:** Method of measurement of seating and wheel dimensions

Clause 7 – Measurement procedure

Clause 7.3 – Measurements

7.3.2 - Dimension 1: Seat plane angle

7.3.3 - Dimension 2: Effective seat depth

7.3.4 - Dimension 3: Seat width

7.3.6 - Dimension 5: Seat surface height at front edge 1) to deck of POV and 2) floor

7.3.7 - Dimension 6: Back support angle

7.3.8 - Dimension 7: Back support height

## **Section 8:** Requirements and test methods for static, impact and fatigue strengths

Clause 10 – Fatigue tests—Test method

10.3 - Multi- drum test

10.4 - Drop Test

## **Section 15:** Requirements for information disclosure, documentation and labeling

Clause 5 – Requirements for disclosure of test information in manufacturer's specification sheets

Clause 7 – Documentation

7.1 – General

7.2.3 - User manual

7.3 - Contents of user manual

Clause 8 – Permanent labeling (RESNA Rev.)

8.4 – Batteries: The batteries in the wheelchair shall meet DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.

## **RESNA WC-2 – American National Standard for Wheelchairs**

**Volume 2:** Additional Requirements for Wheelchairs (including Scooters) with Electrical Systems

**Section 2:** Determination of dynamic stability of electrically powered wheelchairs

Note: If the scooter is drivable with the seat in an elevated position, these tests results shall be submitted with the scooter seat elevated as far as possible per the instructions in section 2.

Clause 8 – Tests for rearward dynamic stability

8.2 - Starting forwards

8.3 - Stopping after traveling forwards

8.4 - Braking when traveling backwards

8.5 – Traveling forward up a step transition from a standing start

8.6 – Traveling backward toward a step transition from a standing start

Clause 9 – Tests for forward dynamic stability

9.2 - Braking when traveling forwards

9.3 - Traveling forward down a slope onto a horizontal surface

9.4 – Traveling forward up a step transition at maximum speed

9.5 – Traveling forward down a step transition from a standing start

Clause 10 – Tests for dynamic stability in lateral directions

10.2 - Turning on a slope

10.3 - Turning in a circle at maximum speed (applies only to POVs) Disclosure

10.5 – One side of the device drops down a step transition

**Section 4:** Energy consumption of electrically powered wheelchairs and scooters for determination of theoretical distance range

Clause 7 – Test procedure

7.1 - Continuous driving test

7.2 - Maneuvering test

**Section 6:** Determination of maximum speed, acceleration and deceleration of electrically powered wheelchairs

Clause 6 – Determination of maximum speed

6.1 - On a horizontal surface

6.3 - On a plane inclined at 6°

**Section 10:** Determination of obstacle-climbing ability of electrically powered wheelchairs (including POVs)

Clause 7 – Test procedures

All sub-clause tests must be conducted to determine the maximum obstacle height that can be ascended and descended.

**Section 14:** Power and control systems for electrically powered wheelchairs - Requirements and test Method

Clause 6 – Electrical systems

6.14 – Maximum Power Stall Condition

6.18 – Maximum Thermal Drive Test