

Terrain Test

This test is designed to verify the customer need of the wheelchair being able to adequately traverse common terrain. Common terrain includes surfaces that a user would typically encounter in a long-term care facility environment. Examples are plush carpet and hard wood floors indoors, and grass and blacktop outdoors.

The test would be considered a success if the wheelchair can traverse the various surfaces successfully and without requiring an unsafe level of force. The user will determine on a scale of 1-5, how difficult it was to perform (1-easy, 5-difficult). The test would be considered a failure if the wheelchair fails to traverse the more common indoor terrains, or if it is rated greater than 3.

Resources Needed:

1. Locations with various terrains

Date 05-14-09

Test Performed By: 

Terrain:	Rating (1-5):	Pass or Fail?
<u>Carpet</u>	<u>2</u>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
<u>Tile</u>	<u>2</u>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
<u>Concrete</u>	<u>3</u>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
_____	_____	<input type="checkbox"/> Pass <input type="checkbox"/> Fail

Comments: _____

Grip Strength Test

The purpose of this test is to determine that grip strength to engage the braking mechanism is acceptable. Based on the design there will be two brake handles, one for each wheel, which will enable turning. In order to slow down the entire chair both brake handles must be engaged. The target force is 6 kg based on user studies, >6kg is considered a failure. Due to limited resources on measuring grip strength accurately, it will be measured based on the similarity between gripping the individual brakes and the dynamometer.

Equipment Needed:

1. Dynamometer

Resources Needed:

2. Carpeted or tile flooring

Date 05-15-09

Grip Force (Right) 15 kg

Grip Force (Left) 10 kg

Test Performed By:



Check Below:

Pass

Fail

Comments: brake cable was caught on right brakeliner.
needs to be adjusted.

Comfort Test

This test is designed to verify the need of comfort. The wheelchair will be tested by 3-4 members of the team. Each person will use the wheelchair continuously for 24 hours and maintain a record of comfort in terms of seating and using the lever to propel. A failure occurs if the test subjects do not believe that the wheelchair was comfortable for a minimum of 3 hours. The customer, a stroke patient, will also test the comfort of the chair, focusing more on the lever propulsion, only when accompanied by at least one member of the team Comments will be recorded.

Resources Needed:

1. customer/ stroke patient
2. 3-4 test subjects (team)

Date 05/14/09

Hours of Comfort:

Subject #1 0.5
Subject #2 2
Subject #3 0.5
Subject #4 2

Test Performed By:



S.K Allen
Ariel Albenova

Check Below:

Pass

Fail N/A

Comments:

Due to time constraints the test
could not be performed over an 8 hr span.
See paper for details on comfort.

Range of Motion Test

The purpose of this test is to determine that during lever propulsion, the arm angle does not exceed the anthropometric limits (45-170 degrees). If the range of motion at the elbow is not acceptable for repetitive application than hyper-extension or repetitive stress injury (RSI) can occur.

Equipment Needed:

1. Tape Measure

Date 05-13-09

Arm angle from 58° to 170°

Test Performed By:



Check Below:

Pass

Fail

Comments:

Turning Radius Test

The purpose of this test is to determine the wheelchair's turning radius. This radius must be acceptable to turn in a standard hallway. The subject will engage a brake and propel from rest performing a 360 degree turn. This test will be performed in a carpeted area because it is the most common type of flooring in a long term care facility. The turning radius will be measured. A turning radius of >3ft. or 36 in. is considered a failure.

Materials/Equipment Needed:

1. Tape measure

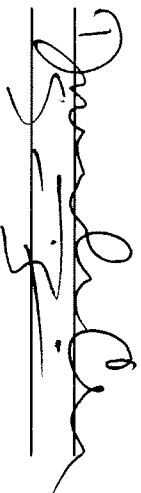
Resources Needed:

2. Carpeted area

Date 05-13-09

Turning Radius 20.25"

Test Performed By:



Check Below:

Pass Fail

Comments: assumption: starting from rest on carpet

16.25" + 4" = dist. from middle of tire + deviation.

Ease of Assembly/Disassembly Test

This test is designed to determine the ease of assembly and disassembly of the wheelchair. 5 test subjects between the ages of 25-55 will be chosen to perform an assembly and disassembly of the wheelchair, and to lift the wheelchair when disassembled. Assembly includes attaching 2 wheels, inserting 2 armrests, attaching 2 foot rests, extending the lever, and folding out the handles. The subject will first be instructed on how to perform the tasks. The time spent to assemble and disassemble will be recorded in the table below. A failure occurs when the time it takes to assemble or disassemble the wheelchair is >3 minutes.

Materials/Equipment Needed:

1. Stopwatch

Resources Needed:

2. 3 subjects between 25-55 years old

Date 05/14/01

Subject	Assembly Time(s)	Disassembly Time (s)
1	126(s)	60(s)
2	140(s)	72(s)
3	172(s)	64(s)

Test Performed By:



Leo Gal-
Ashley DeViceno
Susan Zagorski

Check Below:

Pass

Fail

Comments: Right side wheel is difficult to
align. Roll buttons stick sometimes

Pinch Point Test

This test is designed to verify the customer's need of a minimal number of pinch points on the wheelchair during operation. The individual conducting the test will operate the wheelchair and evaluate potential pinch points. The location and severity (1-3, 3 is worst) for each pinch point should be noted.

The test can receive a conditional passing if there are a moderate amount of pinch points, but the probabilities for rated 2 or below. However, it will be considered a failure if there are pinch points rated with a severity of 3.

Resources Needed:

1. n/a

Date 05/13/09

Test Performed By:

S. J.

Pinch Point Location:

Between Tr-Keys

Wheel Spokes

Between low/axle/nut

Notes:

Severely (1)

Sanding (2) Wheel Design

Severely (3) while pushing backwards

Check Below:

Pass

Fail

Comments:

Attendant Maneuverability Test

This test is designed to verify the need of the wheelchair to be maneuverable by an attendant. The attendant will push and maneuver the wheelchair while an individual is sitting in the chair. The test shall include pushing the chair down a straight hallway, turning a 90 degree corner, and fitting through a standard sized doorway.

The test would be considered an overall success if the attendant is able to maneuver through each scenario successfully. The test would be considered an overall failure if the attendant fails to maneuver through any of the scenarios.

Resources Needed:

1. Straight Hallway
2. 90 Degree Corner
3. Standard Doorway (~30" width)

Date 05/17/09

Test Performed By:



Test:

Pass or Fail:

Straight Hallway	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
90 Degree Corner	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
Standard Doorway	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

Distance from left side to doorway (in.) 1' 1/4"

Distance from right side to doorway (in.) 2"

Check Below (Overall):

Pass Fail

Comments:

Doorway Test

This test is designed to verify the need of a wheelchair to fit through a standard wheelchair accessible doorway. The individual will maneuver the wheelchair using the lever through a standard doorway 32" in width. The distance from both the left and right side of the wheelchair to the doorway will be measured and recorded. The right side will be measured from the farthest point of the wheelchair whether it is the hand or the wheelchair itself. A failure occurs when the wheelchair does not fit through the doorway while the individual is propelling.

Materials/Equipment Needed:

1. Tape measure

Resources Needed:

2. A standard wheelchair accessible doorway (32" width)

Date 05/17/09

Distance from left side to doorway (in.) 1 1/4"

Distance from right side to doorway (in.) 2"

Test Performed By:



Check Below:

Pass Fail

Comments:

Foldability Test

This test is designed to verify the customer's need of foldability for wheelchair transport. The individual conducting the test will fold the seat back down to meet the seat, remove 2 wheels, 2 arm rests, 2 foot rests, telescope the lever down, and fold the handles inward. The remaining wheelchair frame and all removed components will be placed into the trunk of a small, common vehicle, a Ford Focus Sedan, and the trunk will be shut. Ergonomic issues will be taken note of.

The test can receive a conditional passing if the wheelchair and its components fit into the back seat of the vehicle. However, it will be considered a failure if the wheelchair does not fit into the trunk or the backseat.

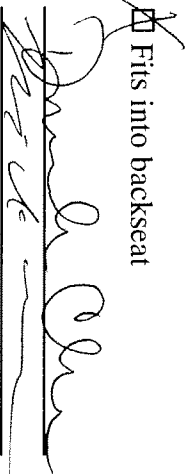
Materials/Equipment Needed:

1. Ford Focus sedan

Date 5/13/09

Fits into trunk Fits into backseat

Test Performed By:



Check Below:

Pass Conditional Pass Fail

Comments: Depending on car, may not always fit into trunk.

Weight Test

This test is designed to verify the weight of the entire wheelchair. The entire wheelchair consists of wheels, foot rests, arm rests, and entire frame along with the differential and disc brakes. The wheelchair will be placed on a large scale to measure and record the weight. If a large scale is unavailable, a bathroom scale will be used. The weight of the individual will be subtracted from the weight of the wheelchair and the individual, together. A failure occurs if the weight of the wheelchair exceeds 50 lbs.

Materials/Equipment Needed:

1. large scale or bathroom scale

Date 5/13/09

Weight (lbs.) 46

Test Performed By:



Check Below:

Pass \leq 50lbs

Fail $>$ 50lbs

Comments:

Straight Line Test

This test is designed to verify the customer need of maintaining movement in a straight line without the need to correct using one's feet. The individual conducting the test will find area of level ground that does not contain any obstructions, preferably tile, and align one wheel on the line. There will be two parts to this test. In the first part of the test, the individual will propel the wheelchair using the lever with both feet on the foot rests for the full 25ft. Deviation from the line in inches will be recorded below at the 25ft mark. In the second part of the test, the individual will propel using the lever and also have the ability to correct with their feet in order to maintain straight line movement. The number of corrections and power pulses will be recorded. A "power pulse" is considered a round-trip movement of the lever. A failure occurs when the ratio of corrections to power pulses is greater than 1 to 1.

Materials/Equipment Needed:

1. Tape measure

Resources Needed:

2. A level, unobstructed, 25ft long ground (tile is preferred)

Date 05-13-09

Part 1: Deviation without corrections (inches): 36"

Part 2: Number of corrections 2

Number of power pulses 10

Ratio 1:5

Test Performed By:



Check Below:

Pass

Fail

Comments:

Ramp Test

This test is designed to verify that the wheelchair can meet the ADA standard of maintaining stationary on a 1:12 ramp grade. And individual of approximately 170lbs will sit on the wheelchair on a 1:12 ramp grade with the parking brake engaged. A tape measure will be used to ensure a ramp grade of 1:12. This test will be done in ideal conditions meaning, no ice or other obstructions on the ramp. A failure occurs if the wheelchair is unable to maintain stationary on a 1:12 ramp.

Materials/Equipment Needed:

1. Tape measure

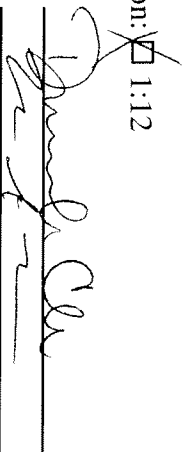
Resources Needed:

2. 1:12 ramp grade
3. ~170 lb individual (~50 percentile male)

Date 5/13/09

Maintains stationary on: 1:12

Test Performed By:



Check Below:

Pass Fail

Comments:
