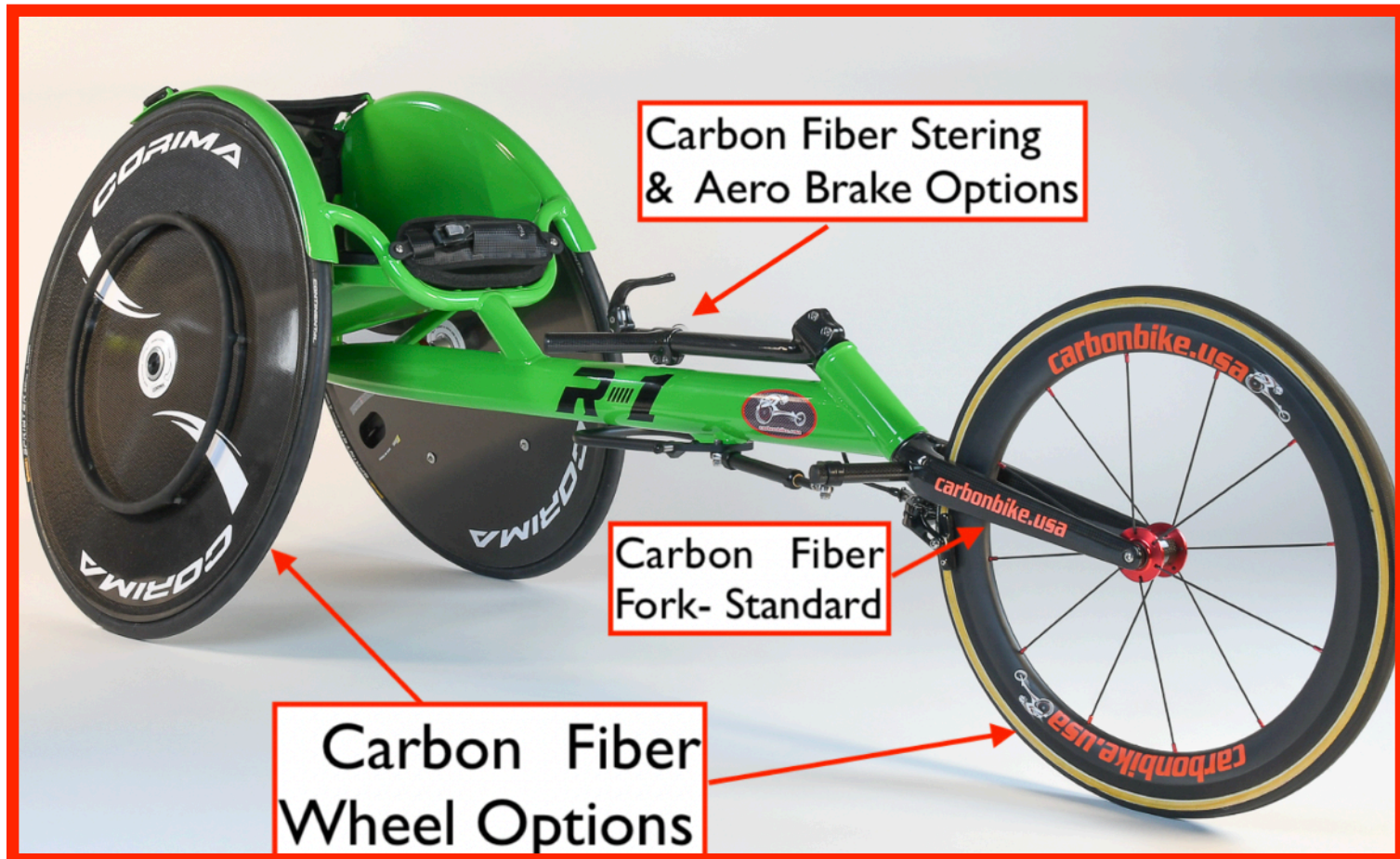




# Carbonbike-USA R-1 Racing Wheelchair Step-by-Step Measurement Guide



# Carbonbike-USA

## R-1 Features

- Custom 6061 T6 Aluminum Top and Sub-Frame
  - Fenders & full side panels
  - Ovalized tubing
  - Choice of U Cage or Open V Design
- Carbon fiber Fork
- Carbon fiber Steering
- Fabric sling/welded inserts for knee ratchet straps
- Brake
- Flag holder
- Fixed axle

### OPTIONAL WHEELS

- Wheels
  - Front: 20"
    - Tubular tire
    - Aluminum or Carbon
  - Rear: 700C
    - Tubular tires
    - Aluminum or Corima Carbon fiber 4 spoke/disk
    - Pushrims
  - Tire coated standard



# Step 1

## Athlete & chair information

Before you begin:

- Height, weight
- Classification
- Injury and onset
- Experience level
- Type of racing:  
track or road
- Has existing chair

Measurement of existing  
chair to include:

(How-to in next slides)

- Upper frame
- Lower frame
- Overall length
- Rear seat height
- Front knee or seat  
height
- Axle position



# Measurement Considerations

## Type of injury:

- Spinal Cord Injury, lower limb loss or condition affecting the lower body
- Trunk balance: how much does athlete have?
  - Affects Axle position
- Trunk length affects:
  - Seat heights
- Transfers influence:
  - Cage style
  - Footplate needs

## • **Experience level**

- Cage design
- Axle position
- Chair length

## • **Type of racing:** track or road or both

## • **Camber**

- Chair length
- Affects front fender width

## • **Knee width**

- Cage style



# Determine best cage design: U Cage vs. Open V Seat Design

## Open V

- Recommended for new users
- Traditional or Kneel position Upholstery
- Athlete has limited balance. (T-10 & above)
- Needs more “squeeze” or bucket

## U Cage

- Best for elite or advanced users
- Kneel only or Amputee Upholstery
- Athlete has good trunk balance.
  - (SCI T-10 and below)
- Position is more flat





# U Cage Style

- U- cage: preferred by elite athletes
- Not recommended for beginners
- Requires additional measurements
  - Knee height from floor
    - Error on low side
  - Knee width critical



# Open V Cage Style

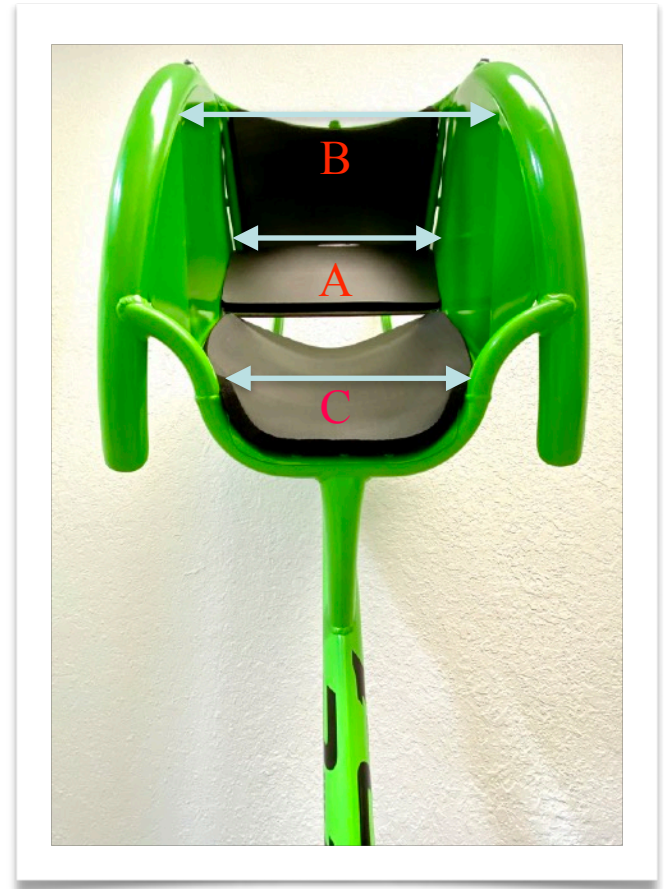
- Open V- offers stiffness and wider opening for big/thick legs
- Best for new athletes
- Easier transfer



# How to Measure: Racing Wheelchair

## Step-by-Step Guide

- Demo or using existing chair is key
  - Guide for measurements without a chair is at the end of this document
- Measure the demo chair before the customer gets into it and document this on the order form (see diagram on right)
  - A. Upper frame width: directly above the axle, inside panels
  - B. Lower frame width: rear
  - C. Knee width
  - D. Axle position (next slide)
  - E. Rear/front seat height or angle



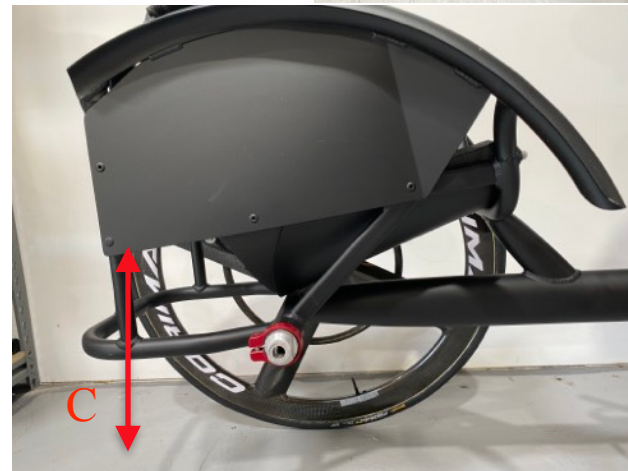
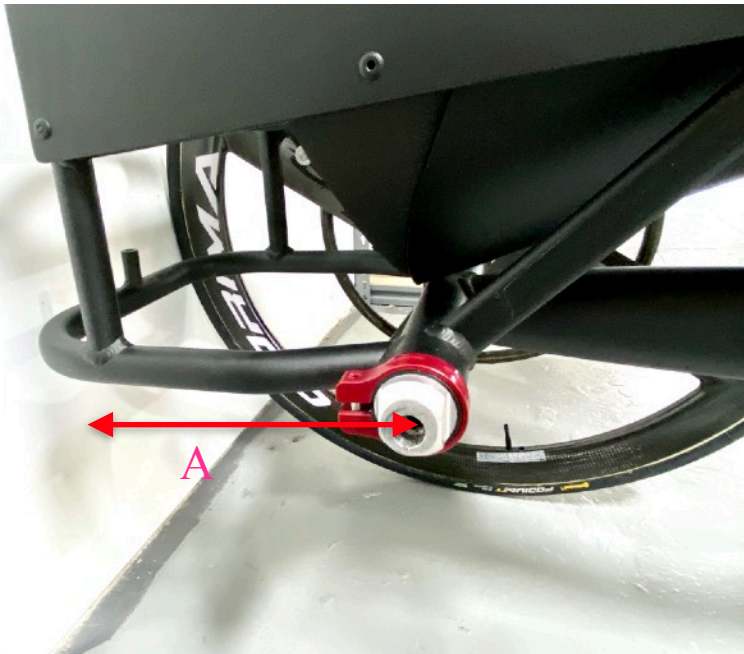
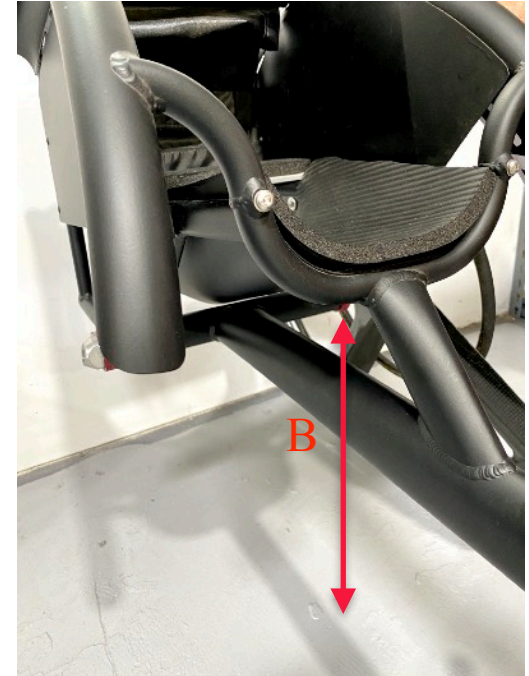


# How to Measure Continued

A. Axle position: center of axle to front of vertical rear tube

B. Knee height: Floor to top of seat rail

C. Rear seat height: Floor to top of rear seat



# Completing the Order Form

- Decide Cage style: complete page 2 or 3 of order form
- Athlete should position themselves in the chair
- How does the athlete fit?
  - How much room on each side? Can use a hand or hard object like a book (add or subtract accordingly)
- Upper cage width: measure above axle
- Lower cage width: measured @ rear seat
- Camber: affects cornering and width of front fenders
- Axle position
  - Typically 5-8", 5-6" more stable for higher level injuries, 7" is most common, 8" low level injuries
  - Climbing
  - Hop around obstacles
  - Fine adjustments w/ upholstery
- Over all length:



# U-Cage specific measurements

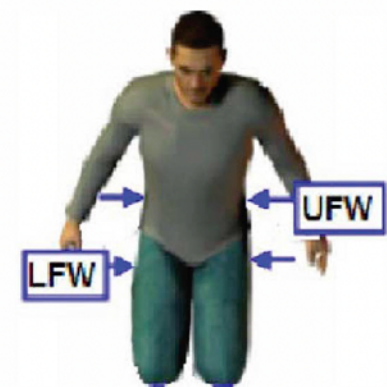
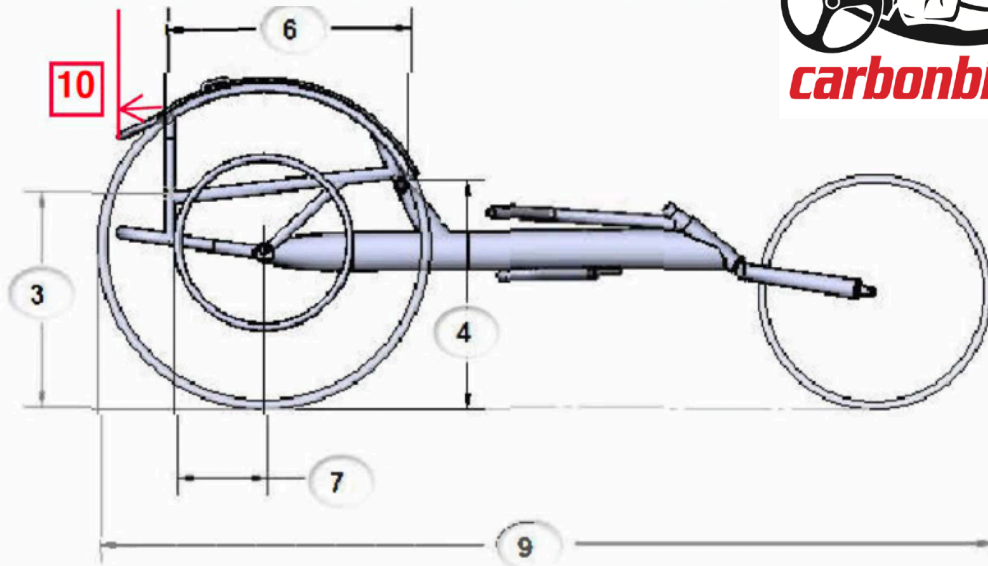
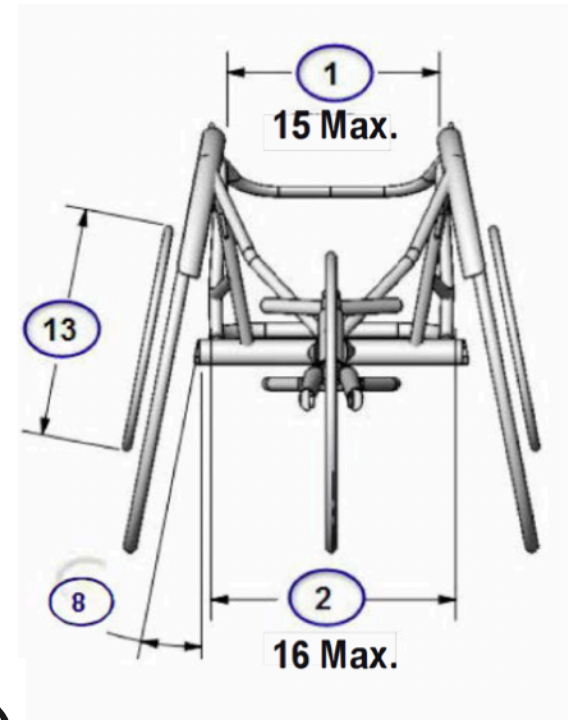
See diagrams on next slide for more details

- Kneel height
  - 15 or 20 degrees common for most SCI
  - Legs lower would want less angle (those with good balance: amputees/very low SCI, etc.
- Knee depth: (18" standard)
  - Back of the hip to crease in knee
- Knee Width
- Rear of Backrest to Front of Crossbar

# U-CAGE

Customer/Dealer: \_\_\_\_\_

1. Upper Frame Width (UFW): \_\_\_\_\_
2. Lower Frame Width (LFW): \_\_\_\_\_
3. Rear Seat Height: \_\_\_\_\_
4. Kneel Height: \_\_\_\_\_
5. Knee Width: \_\_\_\_\_
6. Knee Depth (18" std.): \_\_\_\_\_
7. Axle Position: 5" \_\_\_\_\_ 6" \_\_\_\_\_ 7" \_\_\_\_\_ 8" \_\_\_\_\_
8. Camber: 11 \_\_\_\_\_ 12 \_\_\_\_\_ 13 \_\_\_\_\_
9. Overall Length: 68" \_\_\_\_\_ 70" \_\_\_\_\_ 72" \_\_\_\_\_ 74" \_\_\_\_\_
10. Rear of Backrest to Front of Crossbar:  
2" \_\_\_\_\_ 3" (Std.) \_\_\_\_\_ 4" \_\_\_\_\_



# Open V Cage specific measurements

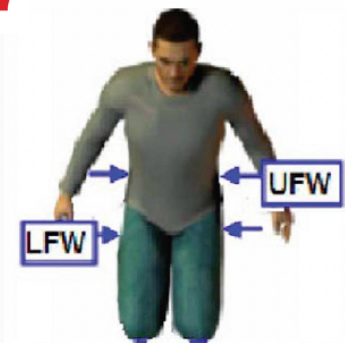
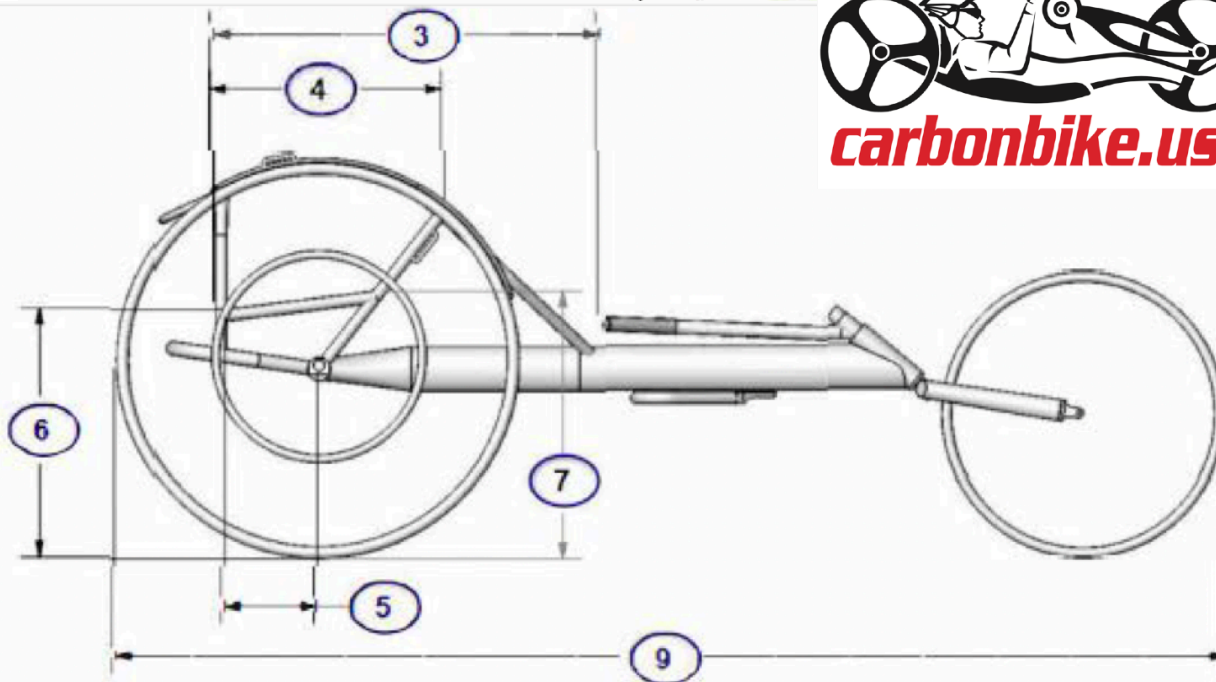
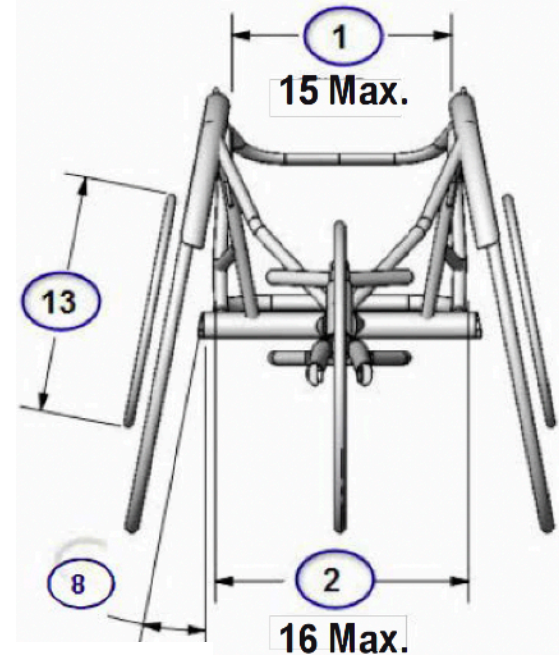
- V Depth-longer allows more room for transfers and legs
- Cage Depth
  - knees lower would be longer (have more balance)
  - Knees higher would be shorter (less balance, higher level injuries)
- Seat Heights (must be able to reach pushrim)
  - 17” rear and 18” front minimum to use kneel uphol.
  - Lower seat heights for higher level injuries
  - Long trunk sit lower/short trunk sit higher



# V-CAGE

Customer/Dealer: \_\_\_\_\_

1. Upper Frame Width (UFW): \_\_\_\_\_
2. Lower Frame Width(LFW): \_\_\_\_\_
3. V Depth: 25" \_\_\_\_\_ 26" \_\_\_\_\_
4. Cage Depth(15"std.) \_\_\_\_\_
5. AxlePosition: 5" \_\_\_\_\_ 6" \_\_\_\_\_ 7" \_\_\_\_\_ 8" \_\_\_\_\_
6. Rear Seat Height: \_\_\_\_\_
7. Front Seat Height: \_\_\_\_\_
8. Camber: 11 \_\_\_\_\_ 12 \_\_\_\_\_ 13 \_\_\_\_\_
9. OverallLength: 68" \_\_\_\_\_ 70" \_\_\_\_\_ 72" \_\_\_\_\_ 74" \_\_\_\_\_



# Options

- Welded Strap Hooks
- Extra insert for ratchet straps
- Aluminum welded back
- Aluminum solid seat
- 3" cut out axle
- Aero Brake lever

**Wheels:** not included in price

- Use your existing wheels or add:
- 20" aluminum spoked front wheel
- 20" Carbon fiber rim front wheel
- 700C aluminum spoked rear wheels
- 700C Corima Carbon fiber 4 spoke
- 700C Corima Disk wheels

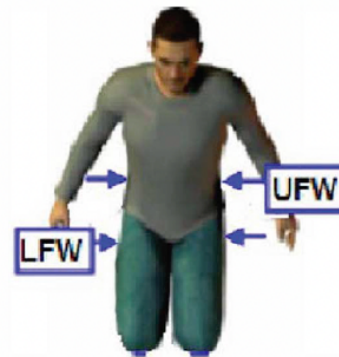
Note:

Price of rear wheels included tire coated push rims. If purchasing wheels need to choose push rim size



# How to measure new athletes without an existing Racing Wheelchair or demo chair

- Position athlete sitting on a chair or in their everyday chair
- Take 2 flat hard objects such as a book
- Upper Frame Width (UFW): place a book on each side of athlete as shown in diagram on right (about 2" above navel)
- Using a metal tape measure take the measurement between the books and record
- Lower Frame Width (LFW): repeat same procedure as UFW to measure the outside of the hips pressing in slightly to get an accurate measurement
- Knee Width: (U cage only) Position the knees together and measure across the knees, do not press too tightly, it is better have more room to avoid excess pressure



# Guidelines for Open V cage measurements without an existing racing wheelchair

- **V depth:**
  - 25" recommended for most persons
  - 26" recommended for persons with longer or thicker legs
- **Cage Depth:** 15" recommended
- **Axle position:** 7" is the most common
  - 5" for athletes with very limited trunk balance or lower amputees
  - 6" for athletes with limited trunk balance
  - 7" for athletes with good trunk balance
  - 8" not recommended for new athletes
- **Rear seat height:** 16"
- **Front seat height:** 17"
- **Camber:** 12 degrees recommended
- **Overall length:** determined by athlete competition venues: track or road
  - 72" is best for most athletes but shorter recommended for shorter athletes or those only racing on the track and a bit longer for taller athletes

## V-CAGE

Customer/Dealer: \_\_\_\_\_

1. Upper Frame Width (UFW): \_\_\_\_\_
2. Lower Frame Width (LFW): \_\_\_\_\_
3. V Depth: 25" \_\_\_\_\_ 26" \_\_\_\_\_
4. Cage Depth (15" std.) \_\_\_\_\_
5. Axle Position: 5" \_\_\_\_\_ 6" \_\_\_\_\_ 7" \_\_\_\_\_ 8" \_\_\_\_\_
6. Rear Seat Height: \_\_\_\_\_
7. Front Seat Height: \_\_\_\_\_
8. Camber: 11 \_\_\_\_\_ 12 \_\_\_\_\_ 13 \_\_\_\_\_
9. Overall Length: 68" \_\_\_\_\_ 70" \_\_\_\_\_ 72" \_\_\_\_\_ 74" \_\_\_\_\_





***Getting it right = RESULTS!  
We can help, just give us a call.***

