

WHY CHOOSE A MADE TO MEASURE WHEELCHAIR?

“Everything has just
got so much easier”

- Francesca



RGK





"My made to measure sport and daily wheelchairs fit me perfectly. They're lightweight, comfortable and easy to manoeuvre. I couldn't ask for anything better."

- Abdi Jama

GB Basketball Paralympian

THE PROBLEM | POOR FITTING WHEELCHAIRS

Standard or configurable wheelchairs serve an important purpose, particularly supporting users in their initial stages of rehabilitation, however when the user wants to become more active and independent, they can find this type of wheelchair can limit them.

It's estimated that
80-90%
of wheelchair users do not fit properly in their current wheelchair *1

THE ISSUES:

STANDARD SIZES

Configurable wheelchair sizes can be limiting as they do not fit everyone individually. It's been estimated that 80-90% of wheelchair users do not fit properly in their current wheelchair.*1

LIMITED OPTIONS

Some wheelchairs can be basic in design and have limited options. This can restrict the ability to become more active and may not meet the user's individual requirements.

HEAVY AND LARGE

Not all wheelchairs are optimised to provide the most light and efficient solution. They can be large in size, use low cost materials and have a modular design which adds weight to the chair so more energy is needed to push, manoeuvre and lift.

THE EFFECTS:

POOR POSTURE

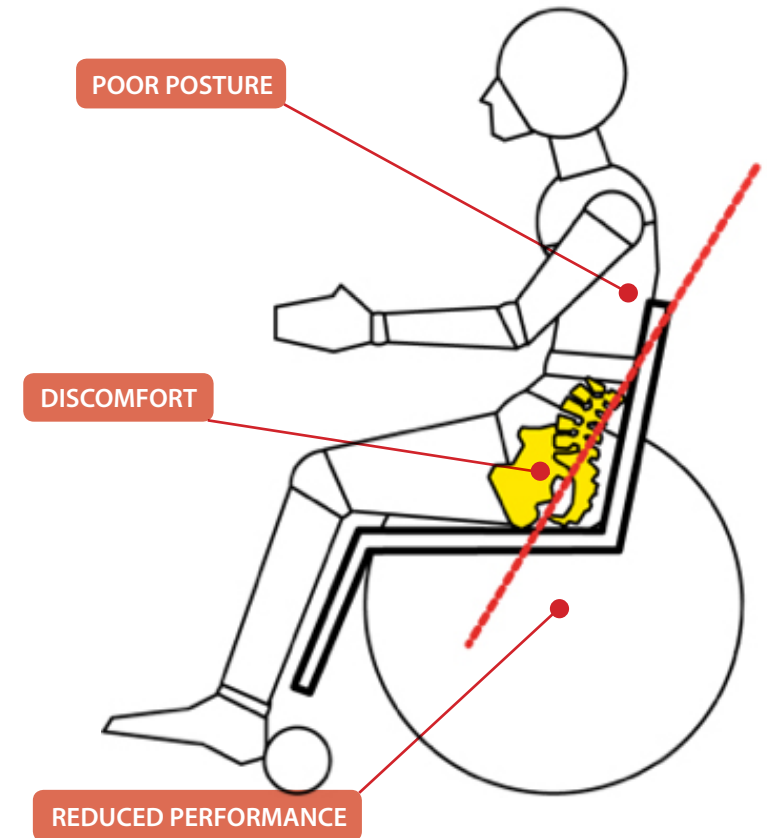
Poor fitting wheelchairs can force the pelvis and spine into positions which create poor posture and if maintained over time could cause severe health problems including: fatigue, pain, infections, tissue breakdown, respiratory problems and persistent injuries.

DISCOMFORT

Being uncomfortable reduces confidence and increases the risk of health problems and pain which 59%*2 of people with spinal cord injuries are reported to have.

REDUCED PERFORMANCE

A heavy wheelchair can limit its performance and make it difficult to use, particularly if the biomechanics are not optimised. More energy is needed to propel and manoeuvre which increases fatigue and puts more stress and strain on the upper body.



*1 Nurse Linda - Dana & Christopher Reeve Foundation, Apr 13, 2015

*2 Pentland WE, Twomey LT. 1991; 29:521-530

THE SOLUTION I MADE TO MEASURE WHEELCHAIRS

RGK believes every person is unique and therefore, every wheelchair should be unique too. This is why every wheelchair RGK designs and builds is made to the individual measurements of the user. RGK respects individuality and believes in maximising everyone's potential. An RGK made to measure wheelchair fits the user perfectly and supports every individual requirement.

WHAT IS MADE TO MEASURE:

INDIVIDUAL MEASUREMENTS

Over 30 individual measurements are taken of the user and the wheelchair, so that it can be designed and built to fit their individual requirements.

ERGONOMIC OPTIONS

Alongside many functional options, a wide range of ergonomic options are available to provide optimum comfort, balance and posture.

LIGHTWEIGHT AND COMPACT

The lightest possible solution is achieved using individual measurements, the highest quality materials and a rigid frame design.

WHY MADE TO MEASURE:

OPTIMUM POSTURE

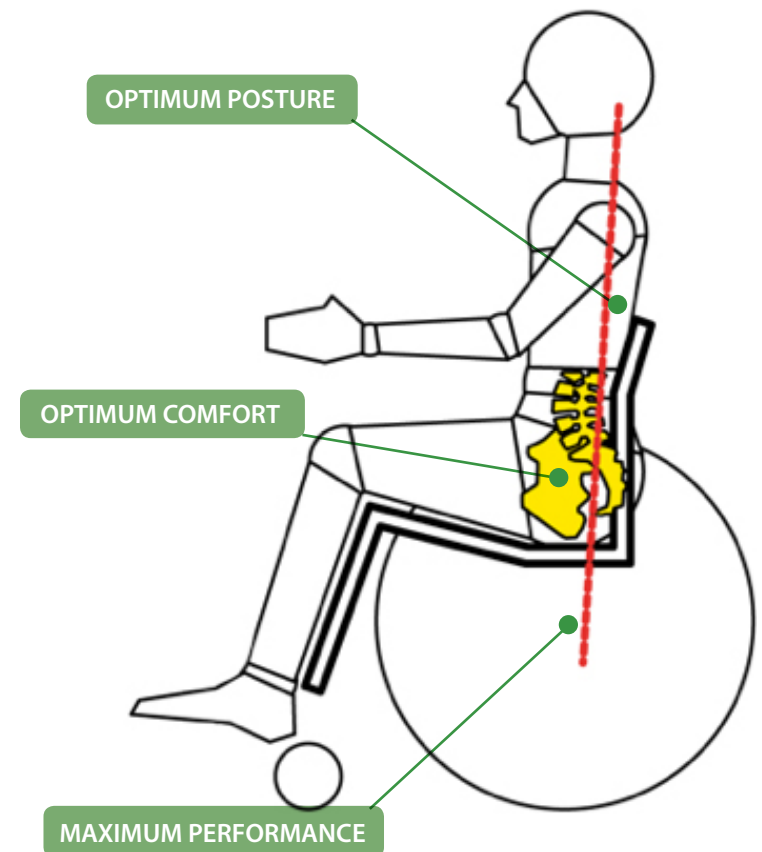
Sitting in the correct position can significantly reduce the risks of developing pressure related issues in the short and long term. Good health helps promote a more active lifestyle which in turn can positively impact a user's wellbeing.

OPTIMUM COMFORT

Feeling comfortable increases confidence which helps the user achieve an active lifestyle. The likelihood of developing prolonged discomfort, pain and persistent injuries are significantly reduced.

MAXIMUM PERFORMANCE

The user and wheelchair work in complete unison. This reduces the amount of energy needed to propel and in turn increases the wheelchair's efficiency to maximise the user's abilities.



CASE STUDY | BEFORE

When Fizz was using her first prescribed wheelchair the main difficulties she had included manoeuvring around the house, transferring and self-propulsion. She also needed to rely on her dad to lift the chair in and out of the car because it was too heavy to do it by herself. This was limiting her independence and restricting her from achieving the active lifestyle she wanted.

NAME | Francesca (Fizz)
AGE | 26
INJURY | T10/11 Paraplegic
(10 months post injury)

POOR POSTURAL POSITION

Felt unstable when pushing and reaching from the wheelchair

HIGH BACKREST

Restricted her shoulder movement making it difficult to propel efficiently and increased overall size of the wheelchair

STANDARD FRAME SIZE

Wider than required which resulted in scraping doors and making manoeuvring around the house difficult

REARWARD WHEEL POSITION

Forced an uncomfortable arm angle making it difficult to propel

FORWARD FOOTREST POSITION

Having her feet forward makes it hard to manoeuvre around the house, open doors and transfer

HEAVY AND LARGE

Being 18kg made it difficult to propel and could not lift into car

STANDARD LEG POSITION

Feet and legs naturally sat apart and were unsupported



CASE STUDY | AFTER

With a made to measure wheelchair, Fizz is now in an optimum seated position for maximum comfort and performance. Being more than 50% lighter, she is now able to propel, transfer and lift her wheelchair easily, and live an independent and active lifestyle.

"My wheelchair is no longer a major focus, it fits me perfectly and is so easy to use and lift. I've regained my independence and I'm happy to be living an active lifestyle again"
- Fizz

CPG* 11 - see pg 8
OPTIMUM POSTURAL POSITION
Made to her individual measurements with an ergonomic seat which provides optimum comfort, balance, posture and performance

CPG* 5,9,10 - see pg 6
ACTIVE WHEEL POSITION
Optimising her biomechanics and her individual measurements, provides maximum propulsion efficiency which increases the overall performance of the wheelchair and reduces fatigue

CPG* 7 - see pg 11
ACTIVE FOOTREST POSITION
Made to her individual measurements in the most compact position for easy transfers, accessing car, opening doors and manoeuvring



CPG* 11 - see pg 9
ERGONOMIC BACKREST
Made to her individual measurements, an inward taper backrest provides optimum comfort, balance, posture and performance

CPG* 7 - see pg 12
LIGHTWEIGHT AND COMPACT
Using the TIGA product, made to her individual measurements, ensures the most compact, rigid and lightweight frame design made from the highest quality materials



CPG* 7,9 - see pg 7
INDIVIDUAL FRAME SIZE
Over 30 of her individual measurements have been taken to ensure wheelchair fits perfectly and supports every individual requirement

CPG* 7 - see pg 10
OPTIMUM LEG POSITION
Legs are fully supported with individual measurements and a taper seat front frame design. The legs are together in most comfortable and stable position

*CPG = Clinical Practice Guidelines - see following pages for more details and full references

FEATURE 1 | BIOMECHANICS

What is biomechanics?

Biomechanics relates to the application of mechanical laws to living structures, especially to the musculoskeletal system and locomotion; biomechanics addresses mechanical laws governing structure, function, and position of the human body*4.

In a made to measure wheelchair, optimum biomechanics ensures the correct arm position to maximise push range which reduces the amount of energy needed. When the arm is resting down, the middle finger should be at the center of the hub (Fig 1). And, when the hand is on top of the handrim, there should be a 100-120 degree elbow angle. (Fig 2).

Optimum biomechanics is achieved by having the combination of seat height and wheel size with a correct centre of gravity position (Fig 3).

Why is biomechanics important?

It maximises wheelchair efficiency and performance as well as reducing the risk of injury and fatigue in the short and long term.

Clinical Practice Guidelines*3 - No. 5

Recommends to “avoid extreme positions of the wrist”.

Clinical Practice Guidelines*3 - No. 9

Recommends “positioning the rear axle so that when the hand is placed at the top dead-centre position on the pushrim, the angle between the upper arm and forearm is between 100 and 120 degrees.”

Clinical Practice Guidelines*3 - No. 10

Recommends to “educate the patient to use long, smooth, strokes that limit high impacts on the pushrim” and “allow the hand to drift down naturally, keeping it below the pushrim when not in actual contact with that part of the wheelchair”

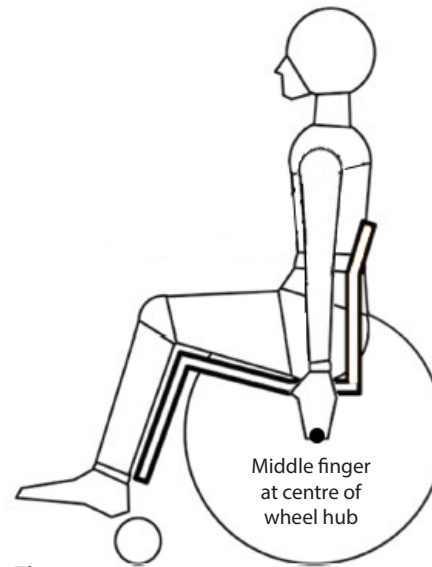


Fig 1

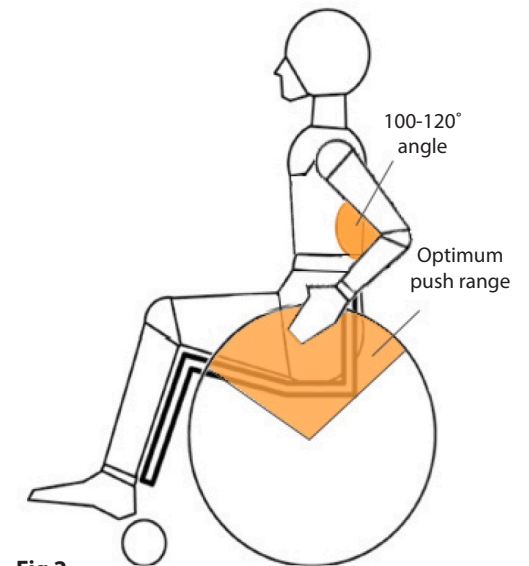


Fig 2

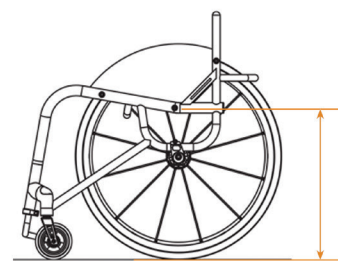


Fig 3

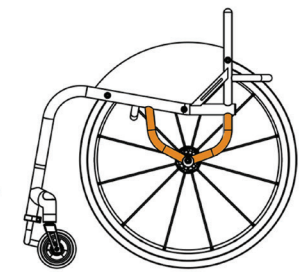
SEAT HEIGHT

+



WHEEL SIZE

+



CENTER OF GRAVITY POSITION

*3 Preservation of Upper Limb Function Following Spinal Cord Injury: A Clinical Practice Guideline for Health-Care Professionals

*4 McGraw-Hill Concise Dictionary of Modern Medicine. © 2002 by The McGraw-Hill Companies, Inc.

FEATURE 2 | INDIVIDUAL FRAME SIZE

Clinical Practice Guidelines*³ - No. 7
Recommends to “provide manual wheelchair users with SCI a high strength, fully personalised manual wheelchair made of the lightest possible material”

What is individual frame size?

This refers to a wheelchair that is made to over 30 of the user’s individual measurements (Fig 4) and requirements. Measurements can be unique to the user and to the nearest mm. Alongside individual measurements, frame size can be controlled to suit functional or practical requirements.

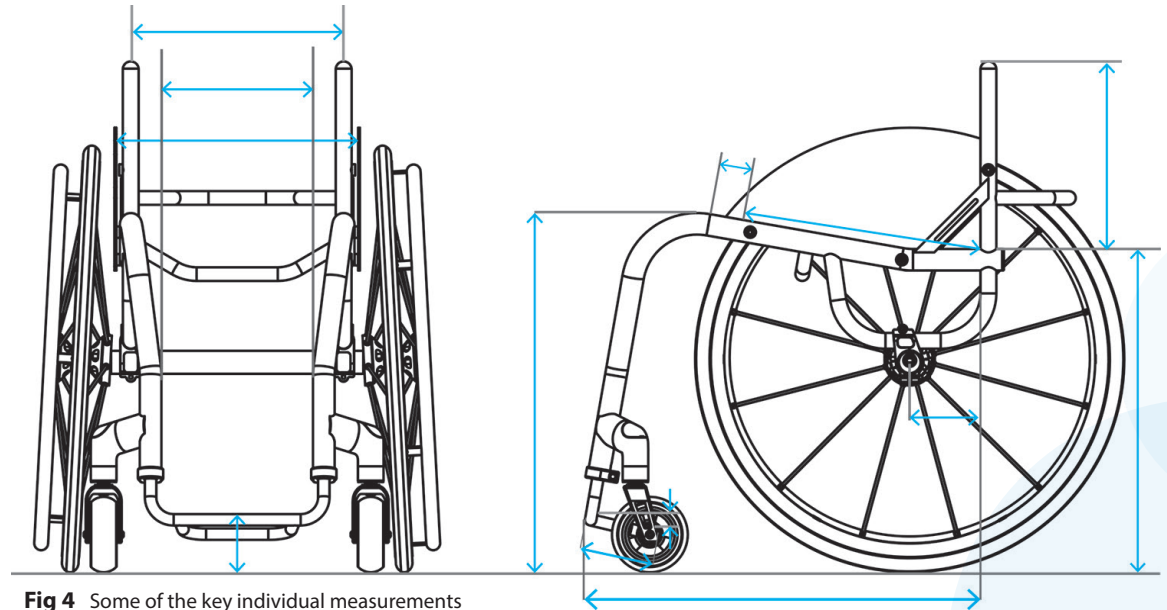


Fig 4 Some of the key individual measurements

Why choose to have an individual frame size?

All users have individual requirements which a made to measure wheelchair can accommodate. Having an individual frame size reduces the risks of developing severe health problems in the short and long term. It provides optimum comfort and maximum performance as the user and wheelchair work in complete unison.

DID YOU KNOW?

All RGK mobility advisors have first-hand wheelchair experience. They also have extensive clinical and technical knowledge to ensure they’re able to provide the most optimum wheelchair solution.

*³ Preservation of Upper Limb Function Following Spinal Chord Injury: A Clinical Practice Guideline for Health-Care Professionals

FEATURE 3 | ERGONOMIC SEAT

Clinical Practice Guidelines*³ - No. 11
Recommends “an appropriate seated posture and stabilization relative to balance and stability needs”

What is an ergonomic seat?

An ergonomic seat provides a flat section at the rear which positions the user’s pelvis (Fig 5). The individual measurement controls the length of the flat section.

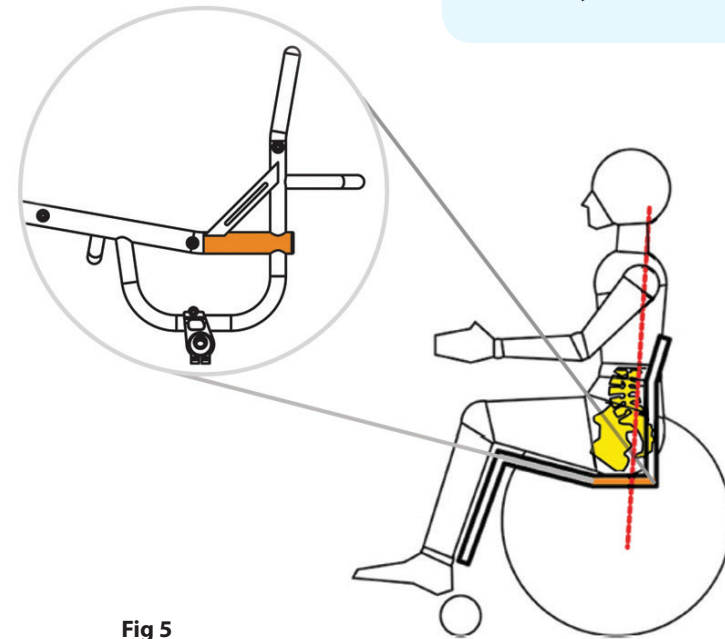


Fig 5

Why choose an ergonomic seat?

The ergonomic seat is recommended for users that require improved posture and balance. It positions the pelvis to ensure optimum comfort, balance and posture, which results in improved performance. Good pelvic posture significantly improves pressure distribution which reduces the risks of developing severe health problems in the short and long term.

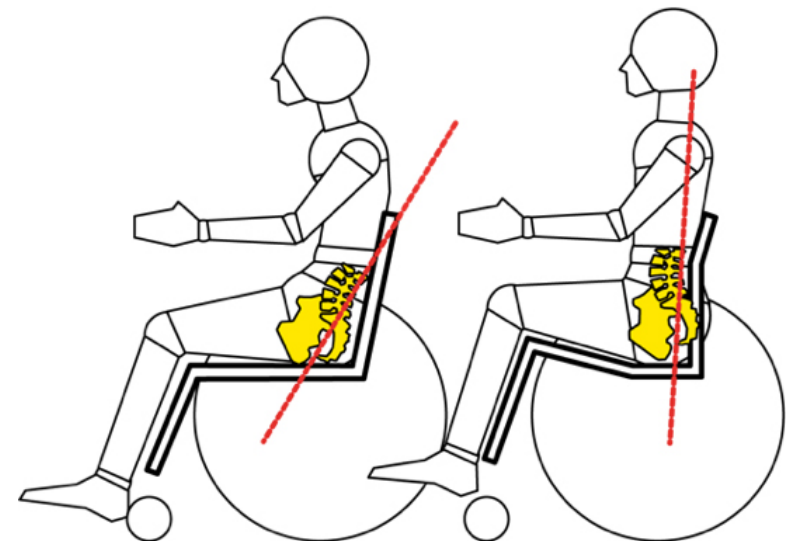


Fig 6

*³ Preservation of Upper Limb Function Following Spinal Chord Injury: A Clinical Practice Guideline for Health-Care Professionals

FEATURE 4 | ERGONOMIC BACKREST

Clinical Practice Guidelines*³ - No. 11
 Recommends an "appropriate seated posture and stabilization relative to balance and stability needs"

What is an ergonomic backrest?

An ergonomic backrest follows the contours of the spine to match the user's body shape. It's available in various options to suit the individual's requirements (Fig 7).

The individual measurements control how the backrest interacts with the user's upper body, either with height or ergonomic positioning.

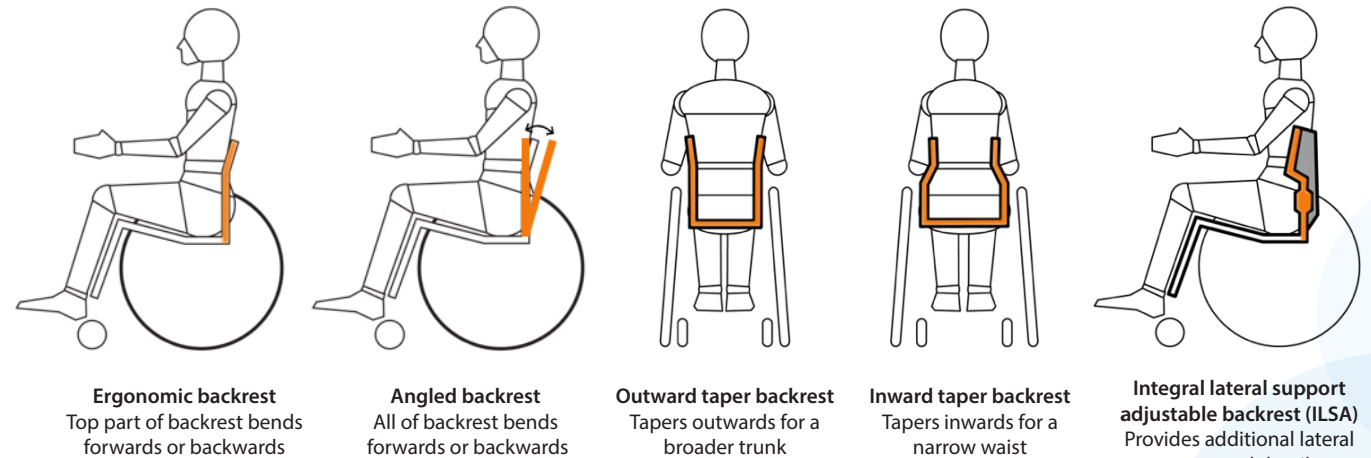


Fig 7

Why choose to have an ergonomic backrest?

An ergonomic backrest is recommended for users who require backrest support to improve posture and balance. It ensures that the spine is in the most comfortable and optimum postural position for maximum balance and performance (Fig 8). Feeling comfortable increases confidence and reduces the likelihood of developing prolonged discomfort, pain and persistent injuries.



Fig 8

*³ Preservation of Upper Limb Function Following Spinal Chord Injury: A Clinical Practice Guideline for Health-Care Professionals

FEATURE 5 | FRONT OF FRAME DESIGN

Clinical Practice Guidelines*³ - No. 7
Recommends to “provide manual wheelchair users with SCI a high strength, fully personalised manual wheelchair made of the lightest possible material”

What is front of frame design?

This refers to the positioning and style of the front two tubular bars that bend down from the seat to the footrest that position the legs and feet (Fig 9). The individual measurements control the space which the legs and feet will be positioned in, using different designs dependent on the users requirements. (Fig 10).

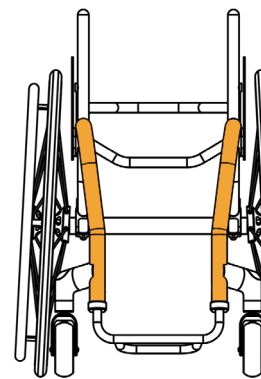
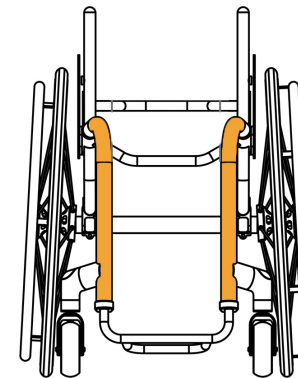


Fig 9 Parallel taper



Seat taper

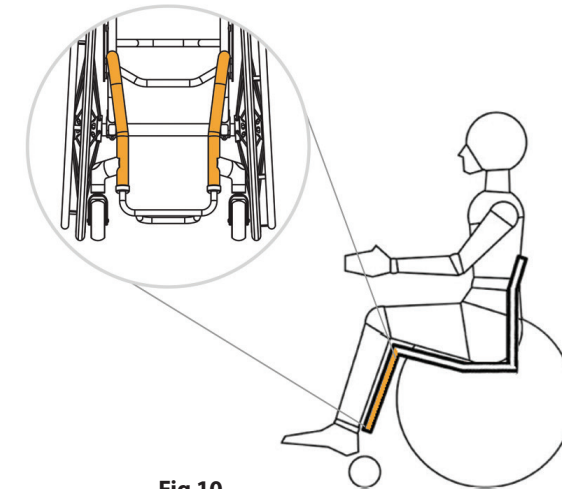


Fig 10

Why choose to have a front of frame design?

It is recommended for users that need lower limb support and positioning. It supports and places the legs in the most optimum position for maximum comfort and stability (Fig 11). Feeling comfortable and stable increases confidence and reduces the likelihood of developing prolonged discomfort, pain and persistent injuries.



Fig 11 Legs and feet unsupported



Legs and feet supported

*³ Preservation of Upper Limb Function Following Spinal Chord Injury: A Clinical Practice Guideline for Health-Care Professionals

FEATURE 6 | CASTOR WHEEL POSITION

Clinical Practice Guidelines*³ - No. 7
Recommends to “provide manual wheelchair users with SCI a high strength, fully personalised manual wheelchair made of the lightest possible material”

What is castor wheel position?

This refers to the positioning of the two front castor wheels in relation to the user’s feet based on their individual requirements. The individual measurements control the optimum balance between compact and rolling resistance, depending on the users requirements (Fig 12).

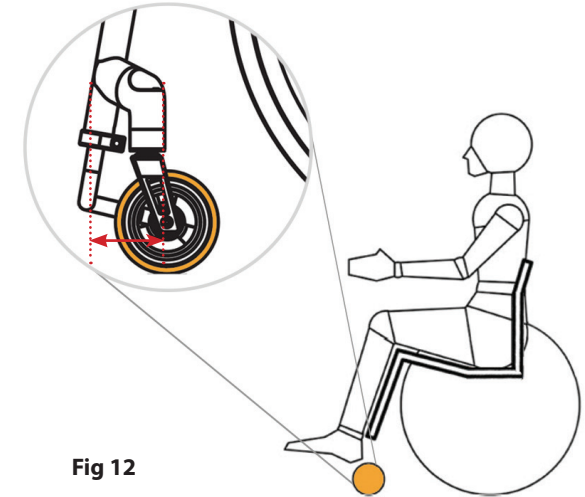


Fig 12

Why choose to have an optimum castor wheel position?

This is recommended for users that require a compact chair which is easy to transfer and propel. It makes the wheelchair more compact, manoeuvrable and practical (Fig 13). It reduces the amount of energy needed to propel and in turn increases the wheelchair’s efficiency to maximise the user’s potential.



Fig 13

Feet in forward position



Feet in optimum position

*³ Preservation of Upper Limb Function Following Spinal Chord Injury: A Clinical Practice Guideline for Health-Care Professionals

FEATURE 7 | OPTIMUM WHEELCHAIR WEIGHT

Clinical Practice Guidelines*³ - No. 7
Recommends to “provide manual wheelchair users with SCI a high strength, fully personalised manual wheelchair made of the lightest possible material”

What is optimum wheelchair weight?

This refers to a wheelchair model, which is lightweight and compact by using the highest quality materials and a rigid frame design (Fig 14). Individual measurements keep the frame as compact as possible to minimise weight.

Why choose to have a wheelchair at the optimum weight?

Users who want an independent and active lifestyle will benefit significantly from a lightweight wheelchair. It ensures the most compact, rigid and lightweight frame design for maximum efficiency and performance. Over 30 specific measurements of the user are taken so the wheelchair can be designed to an optimum specification, made from high quality materials and a rigid frame design.



Fig 14 TIGA model

DID YOU KNOW?

RGK can manufacture a made to measure wheelchair called the Sub4 guaranteed and certified to be less than 4kg*

* excluding cushion and wheels

FEATURE 8 | FUNCTIONAL OPTIONS



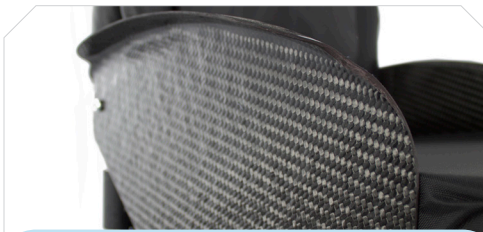
FOOTRESTS

Fixed, angle adjustable and flip back in a range of materials



ANTI TIPS

Swing away and height adjustable on left, right, or both sides



SIDEGUARDS

User made flat or with fender in a range of styles and materials



WHEELS & TYRES

A full range of wheels and tyres in different sizes by various manufacturers in different designs



CASTOR WHEELS & FORKS

High performance and lightweight in a range of sizes and options



PUSH HANDLES

Screw in, flip down and height adjustable options



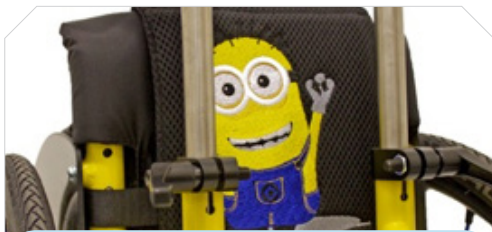
WHEEL LOCKS

Compact, scissor and push to lock styles



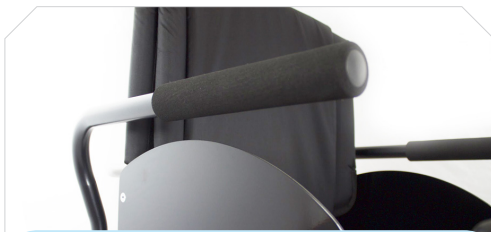
PUSH RIMS

Including standard aluminium, titanium, tetra grip and ergonomic dual grip designs



UPHOLSTERY

Quality tension adjustable backrest and seat upholstery available in nylon, Airlite or leather



ARMRESTS

Lift out or height adjustable options



CUSHIONS

In-house modified foam range or the full JAY Seating specialist cushions available.



FRAME COLOURS

Choice of frame powder coated colours and finishing options available



A REAL LIFE DOCUMENTARY
BELIEVE LIVE INSPIRE: FIZZ
APRIL 2017



Sunrise Medical Australia Pty Ltd
11 Daniel Street, Wetherill Park, NSW 2164
Phone: (02) 9678 6600
Email: enquiries@sunrisemedical.com.au
www.sunrisemedical.com.au

