Transit Approval Testing Update

Aug 2008

SUNRISE MEDICAL

Index

Introduction

Please find enclosed, details on the Sunrise Medical crash tested wheelchairs, complete with advice on customer instructions, information on Unwin's restraint system used in the test and also, drawings showing the position for attaching the webbing karabiners. Also included are the latest standards to which our products are tested.

From our testing we believe that from the results obtained our Transit approved products are strong enough to withstand the forces as required by the ISO 7176 Part 19 Pulse, Dynamic Impact Test.

However, because the test does not reflect any uncontrolled everyday situation, for best practise we do recommend, when transported on secondary transport systems, the user transfers into a regular seat and transports the wheelchair in a storage compartment as a piece of luggage.

It would be impractical for Sunrise Medical to test every available wheelchair restraint system in use today. Although many wheelchair restraint systems might be suitable for secondary transportation purposes, we have tested our wheelchairs with both Unwin restraint systems and more recently Q'Straint, as these are the most frequently used systems. However, since no official Government standard exists, Sunrise Medical does not recommend this or any other restraint system to be used, and do not recommend the use of Sunrise Medical chairs in seated / occupied transit.

We are aware that other restraint systems are currently being used, but are unable to comment as to their suitability in transit approved test conditions. We suggest that you contact the manufacturer of any other system should you require information as to its suitability.

We are fully aware that wheelchairs have been transported without incident for many years. Sunrise Medical has no desire to interfere with these practices. However, we realise that, in these times of increasing awareness over liability issues, guidance on effective procedures is required as well as peace of mind that testing has been conducted satisfactorily.

We hope you find this information useful.

Transportation of a Wheelchair within a Vehicle

A wheelchair secured in a vehicle will not provide the equivalent level of safety and security of a vehicle seating system. Sunrise Medical recommends that the user transfers to the vehicle seating and uses the vehicle-installed restraint system wherever possible. Sunrise Medical recognises that it is not always practical for the user to be transferred and in these circumstances, where the user must be transported whilst in the wheelchair; the following advice must be followed:

Warnings:

The occupied wheelchair must be located in a forward facing position and secured by the wheelchair tie down and occupant restraint straps (WTORS tie downs meeting the requirements of ISO 10542 or SAE J2249) in accordance with the WTORS manufacturer's instructions. Refer to the section 'Tie Down Instructions' for further information on transporting your wheelchair.

The wheelchair's use in other positions within a vehicle has not been tested e.g. transportation in a side facing position must not be carried out under any circumstances. See fig 1.

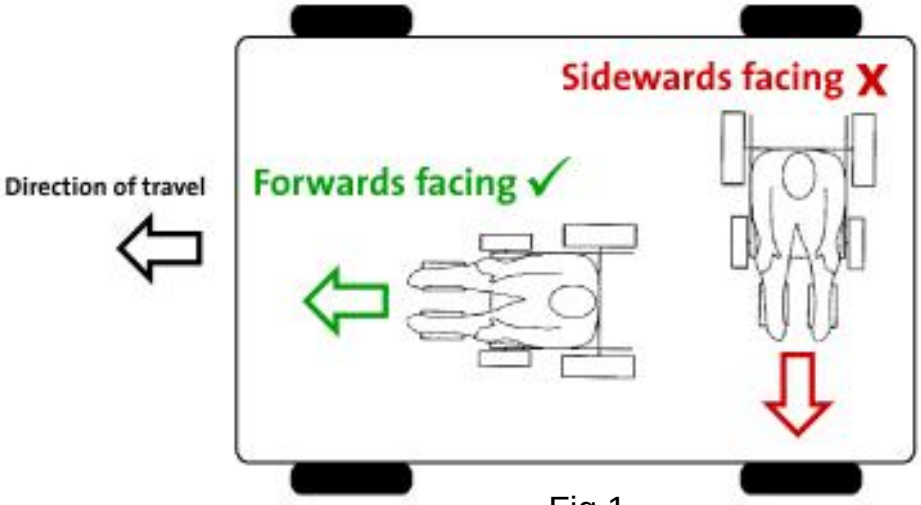


Fig 1

Wherever possible remove and stow safely away from the wheelchair, all auxiliary equipment, for example:

Kerb climbers
Crutches
Loose cushions
Tray tables

Alterations or substitutions must not be made to the wheelchair securement points or to structural and frame or components without consulting the manufacturer. Failure to do so will invalidate the ability of the wheelchair to be transported within a vehicle.

Spill proof sealed batteries such as “gelled electrolyte” must be installed on powered wheelchairs when used in a motor vehicle.

The wheelchair should be inspected by a Sunrise Medical Authorised Dealer before re-use following involvement in any type of vehicle impact.

Both pelvic and upper torso restraint belts must be used to restrain the occupant (fig 2), to reduce the possibility of head and chest impacts with the vehicle components.

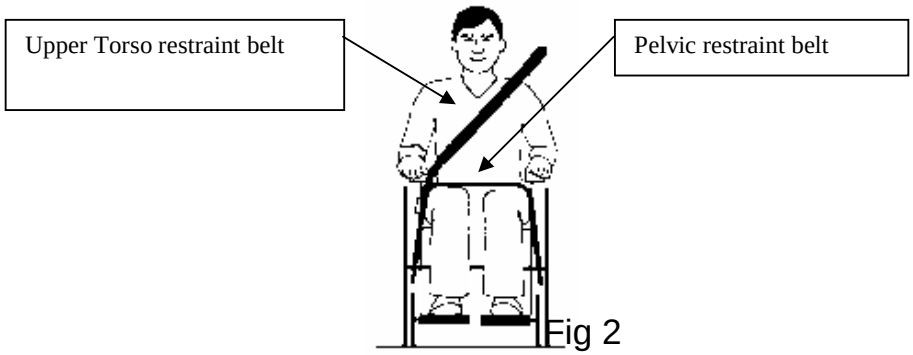


Fig 2

A head restraint suitable for transportation (see label of headrest) must be fitted (where possible) and suitably positioned at all times during transportation (fig 5).

Postural supports (lap straps, lap belts) should not be used or relied on for occupant restraint in a moving vehicle unless they are labelled as meeting the requirements specified in ISO 7176-19:2001 or SAE J2249.

Occupant Restraint Instructions

The pelvic restraint belt must be worn low across the front of the pelvis (fig 5), so that the angle of the pelvic belt is within the preferred zone of 30 to 75 degree to the horizontal, see fig 3.

A steeper (greater) angle within the preferred zone is desirable i.e. closer to, but never exceeding 75°.

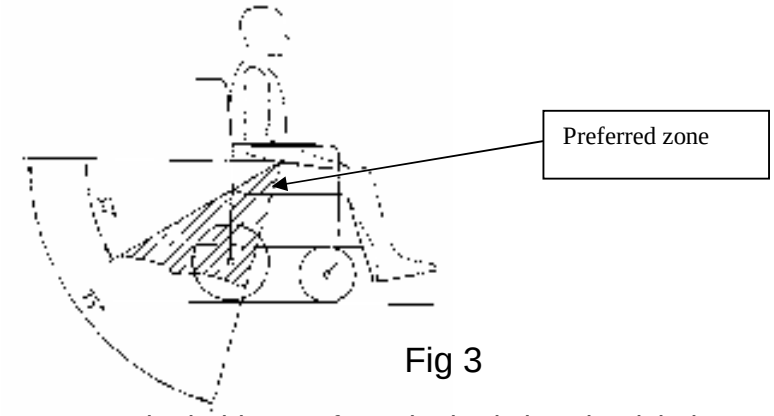


Fig 3

Restraint belts must not be held away from the body by wheelchair components or parts such as the armrests or wheels. (Fig 4)

The upper torso restraint belt must fit over the shoulder and across the chest as illustrated. (Fig 5)

Restraint belts must be adjusted as tightly as possible consistent with user comfort

Restraint belt webbing must not be twisted when in use.

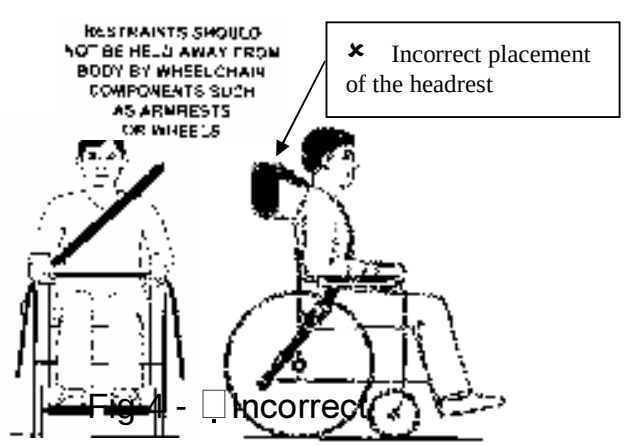


Fig 4 - Incorrect

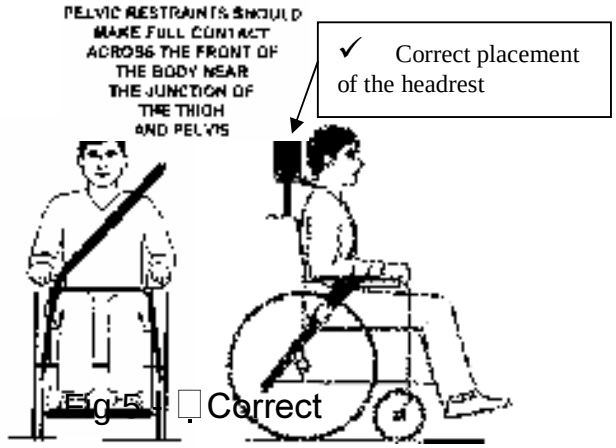


Fig 5 - Correct

Sunrise Medical transit approved products

Sunrise Medical wheelchairs tested to European ISO standards:

Sunrise Medical chairs are tested for forward facing frontal impact strength using a 4-point chair restraint (6-point in the case of some of our heavier power vehicles), and a 3-point occupant restraint lap and diagonal belt with a 75kg Hybrid 2 ATD, unless otherwise specified.

The chairs named in the following tables are mostly tested with standard sling seat upholstery and sling back upholstery to the dynamic impact strength requirements of ISO 7176-19 resulting in the issue of an Impact Test Report.

Some variants of tested models have been assessed as meeting the dynamic test requirement by engineering equivalence, that is equivalent strength of frame, upholstery materials, stiffness, structural integrity of componentry and their connections, and geometric similarity - to transit approval tested models. Such products have been identified in the tables with * following the Model name.

Dynamic testing of Sunrise products has continued over many years in parallel with the evolution of ISO 7176-19 from its earliest work group beginnings in late 1996 to Committee Draft status onto Draft International Standard then Final Draft International Standard status and recently approval for incorporation into ISO 7176. The cumulative results of these tests have influenced the development and refinement of ISO 7176-19 with present Sunrise product benefiting from this work.

The products identified within the tables have been tested in the standard configuration and standard set up only.
For the standard configuration of any of the above products please refer to the respective order form.

Products have not been tested with any forms of modification or third party parts or accessories.

<u>Products have been tested up to maximum user weight limit of 75 kg (as per the ISO 7176-19 requirement)</u>

MANUAL WHEELCHAIRS - Table 1

Model	Impact Test Report Title	Report No.	Date	Recommended Chair Restraints
Breezy 100	Breezy 100	TRL 139TT01	19/06/08	4 Point Q'Straint M-Series
Breezy 210 Transit	Breezy 200 (Transit)	TRL 05MM03	17/04/01	4 Point WWR/ATF/K/R
Breezy 215 Self Prop	Breezy 200(1/2 folding back)	TRL 12MM01	22/06/01	4 Point WWR/ATF/K/R
Breezy 200 Recliner	Breezy 200 Recliner (With integral fabric headrest)	Millbrook S7847	24/05/02	4 Point WWR/ATF/K/R
Breezy 300	Breezy 300	TRL 150tt02	11/07/08	4 Point Q'Straint M-Series
Breezy TL NHS	Breezy standard TL NHS	TRL 37LM02	11/12/00	4 Point WWR/ATF/K/R
Breezy SL NHS	Breezy standard SL NHS	TRL 37LM01	11/12/00	4 Point WWR/ATF/K/R
Breezy TL	Breezy standard TL NHS	TRL 37LM02	11/12/00	4 Point WWR/ATF/K/R
Breezy SL	Breezy standard SL NHS	TRL 37LM01	11/12/00	4 Point WWR/ATF/K/R
Breezy TL OTS	Breezy standard TL NHS	TRL 37LM02	11/12/00	4 Point WWR/ATF/K/R
Breezy SL OTS	Breezy standard SL NHS	TRL 37LM01	11/12/00	4 Point WWR/ATF/K/R
Breezy Moonlite	Moonlite	Millbrook MBK07-0431	31/05/07	4 Point Q'Straint M-Series
Breezy Rubix	Rubix	Millbrook MBK07-0777	02/10/07	4 Point Q'Straint M-Series
Breezy Basix	Basix	Millbrook MBK08-0226	25/03/08	4 Point Q'Straint M-Series
Breezy Basix Half Folding Back	Breezy Basix	Millbrook MBK08-0227	25/03/08	4 Point Q'Straint M-Series
Quickie 2	Quickie 2 (High Back)	TRL 05MM02	17/04/01	4 Point WWR/ATF/K/R
Quickie 2 HP*	Quickie 2 (High Back)	TRL 05MM02	17/04/01	4 Point WWR/ATF/K/R
Quickie 2 Kids*	Quickie 2 (High Back)	TRL 05MM02	17/04/01	4 Point WWR/ATF/K/R
Quickie RXS	Quickie RXS standard	TRL 37LM04	11/12/00	4 Point WWR/ATF/K/R
Quickie RXS Kids*	Quickie RXS standard	TRL 37LM04	11/12/00	4 Point WWR/ATF/K/R
Youngster2	Sopur Youngster2 with Unwin HR	Millbrook S7848	24/05/02	4 Point WWR/ATF/K/R
Easy 160	Sopur Easy 160	TRL 150tt01	11/07/08	4 Point Q'Straint M-Series
Easy300	Sopur Easy300 with Unwin HR	Millbrook S7845	24/05/02	4 Point WWR/ATF/K/R
Quickie Classic 160 / Breezy X2	Classic 160 / Breezy X2	Millbrook S8123	05/02/03	4 Point WWR/ATF/K/R
Quickie Classic 160 / Breezy X3	Classic 160 / Breezy X3	Millbrook S8122	05/02/03	4 Point WWR/ATF/K/R
Quickie Classic 160 K3 Transit	Classic 160 K3 Transit	Millbrook S8282	03/07/03	4 Point WWR/ATF/K/R
Quickie Classic 160 XL / Breezy X4	Breezy X4 /Classic 160 XL	Millbrook S8411	02/10/03	4 Point WWR/ATF/K/R
Youngster 3	Youngster 3 (ISO)	Millbrook S8462	17/11/03	4 Point WWR/ATF/K/R
Classic Active / Quickie 2 Classic	Classic Active / Quickie 2 Classic	SUNTR-06001 (TRL)	03/12/04	4 Point WWR/ATF/K/R

Breezy Relax	Relax (Tilt in Space)	Millbrook S9217	30/9/05	4 Point WWR/ATF/K/R
Breezy Elegance	Elegance	Millbrook S8662	10/5/04	4 Point WWR/ATF/K/R
Classic 160 Comfort	Classic 160 Comfort	Millbrook S8548	11/2/04	4 Point WWR/ATF/K/R
Neon	Neon SA	Millbrook S9401	07/02/06	4 Point WWR/ATF/K/R
Quickie GPV	Quickie GPV	MBK08-0537	12/06/08	4 Point Q'Straint M-Series
Spirit MT1	Spirit MT1	Middlesex SRM07	1/10/96	4 Point WWR/ATF/K/R
Quickie RX Kidz	Quickie RX Kidz	Millbrook S10268	12/3/08	4 Point WWR/ATF/K/R
Lomax Uni 8	Uni 8	27LM01	13/9/00	4 Point WWR/ATF/K/R
Lomax Uni 9	Uni 9	27LM02	13/9/00	4 Point WWR/ATF/K/R
Lomax Heavy duty & Tall	HD Tall	Millbrook S8270	23/06/03	4 Point Q'Straint M-Series
Lomax Buddy	Buddy	Millbrook S9413	16/03/06	Q'Straint Q-5002-T2

*By engineering equivalence – refer to page 4 for details

POWER WHEELCHAIRS – Table 2

Model	Impact Test Report Title	Report No.	Date	Recommended Unwins Chair Restraints
Breezy P100	P100	TRL 02JMSUN04	03/02/99	4 Point WWR/ATF/K/R
Breezy P100 NHS	Breezy P100 NHS standard	TRL 37LM07	12/12/00	4 Point WWR/ATF/K/R
Powertec F40*	F45 Standard	TRL 05MM01	17/04/01	4 Point WWR/ATF/K/R
Powertec F45	F45 Standard	TRL 05MM01	17/04/01	4 Point WWR/ATF/K/R
Powertec F45 Golf	F45 Standard	TRL 05MM01	17/04/01	4 Point WWR/ATF/K/R
Quickie F55 Mk2	Quickie F55	TRL 06JM01	08/04/99	4 Point WWR/ATF/K/R with Double Straps and Double DR rings at rear
Quickie F55 Mk3	F55 MK3 with Unwins HR	Millbrook S7611	29/11/01	Gemini G3 Combined or 4 Pt WWR/ATF/K/R with Double Straps at rear
Quickie F55 SL	Quickie F55 SL	Millbrook S8068	11/12/02	Gemini G3 Combined or 4 Pt WWR/ATF/K/R with Double Straps at rear
Quickie F35	F35	Millbrook S8248	04/06/03	4 Point WWR/ATF/K/R with D Ring Straps (DR)
Quickie P220	P220	Millbrook S8246	04/06/03	4 Point WWR/ATF/K/R
Quickie Samba and Samba2	Quickie Samba	Millbrook S8410	03/07/03	3 Point Gemini G3
Quickie Rumba	Quickie Rumba	Millbrook S9331	07/12/05	4 Point WWR/ATF/K/R

Quickie Groove RWD	Groove RWD	Millbrook S9210	26/8/05	6 Pt WWR/ATF/K/R with Double Straps at rear
Quickie Groove FWD	Groove FWD	Millbrook S9208	26/8/05	6 Pt WWR/ATF/K/R with Double Straps at rear
Quickie Samba Lite and Samba2 Lite	Samba Lite	Millbrook S8893	11/11/04	4 Point WWR/ATF/K/R
Quickie Salsa (due to launched Aug 08)	Tango	Millbrook MBK 07/0779	02/10.07	6 Point WWR/ATF/K/R

*By engineering equivalence – refer to page 4 for details.

Sunrise Medical wheelchairs tested to American ANSI/RESNA standards:

MANUAL WHEELCHAIRS - Table 3

Model	Impact Test Report Title	Report No.	Date	Restraints
Kid Kart/Quickie Xpress	Frontal Impact of a Kid Kart Express wheelchair with thin – wall tube. Loaded with a six year old ATD	KK9907	May 11, 1999	All SAE J2249 qualified compatible with ANSI/RESNA WC/19 Secured by a surrogate four-point, strap tie down ATD restrained by a surrogate three-point belt
Kid Kart/Quickie Xpress	Frontal Impact of a Kid Kart Express wheelchair with thin – wall tube. Loaded with a six year old ATD	KK9908	May 11, 1999	All SAE J2249 qualified compatible with ANSI/RESNA WC/19 Secured by a surrogate four-point, strap tie down ATD restrained by a surrogate three-point belt
Zippie TS	Frontal Impact of a Zippie TS wheelchair Loaded with a midsize-male ATD	MP 9919 MP 9920	October 7, 1999	All SAE J2249 qualified compatible with ANSI/RESNA WC/19 Secured by a surrogate four-point, strap tie down ATD restrained by a surrogate three-point belt
Quickie IRIS	Frontal Impact of a Sunrise Medical CGTS 250lb base option wheelchair Loaded with a midsize-male ATD	MP 0301	Jan 28, 2003	All SAE J2249 qualified compatible with ANSI/RESNA WC/19 Secured by a surrogate four-point, strap tie down ATD restrained by a surrogate three-point belt
Quickie IRIS HD	Frontal Impact of a Sunrise Medical CGTS 350lb base option wheelchair Loaded with a midsize-male ATD	MP 0302	Jan 28, 2003	All SAE J2249 qualified compatible with ANSI/RESNA WC/19 Secured by a surrogate four-point, strap tie down ATD restrained by a surrogate three-point belt

USA manufactured chairs are tested to the dynamic impact strength requirements of ANSI/RESNA WC/19.

Sunrise Medical wheelchairs tested to American ANSI/RESNA standards:

POWER WHEELCHAIRS - Table 4

Model	Impact Test Report Title	Report No.	Date	Restraints
Quickie Groove M	Frontal impact of a Paramount powered wheelchair Loaded with a midsize male ATD	MP 0511	Sep 21,2005	6 Pt WWR/ATF/K/R with Double Straps at rear

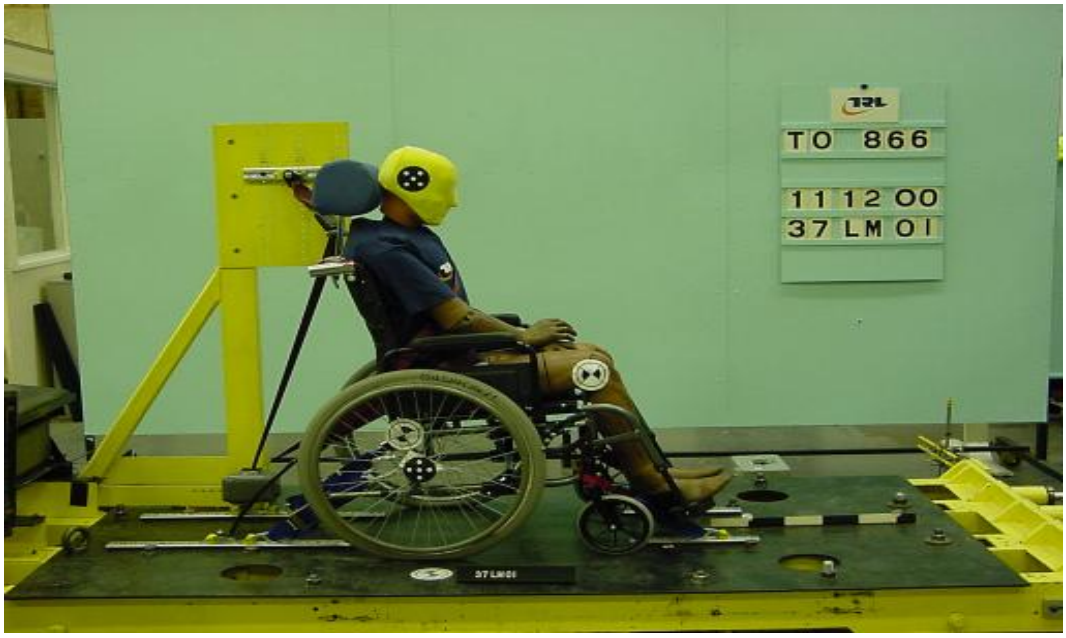
USA manufactured chairs are tested to the dynamic impact strength requirements of ANSI/RESNA WC/19.

Transit approval testing standards

ISO 7176-19 and ANSI/RESNA WC/19 have been developed in relation to one another via international co-operation on the basis of providing wheelchair users in vehicles with a level of safety equivalent to that required for able bodied occupants of the same vehicle. This co-operation continues today with studies of rear facing frontal impact behaviour and improvements in securement methods and whiplash reduction. This work will be reflected in future versions of both standards.
Sunrise continues to influence and incorporate such developments in future product.

Impression of test set up

These photos give you a brief impression of the product in its test situation.
For a full video of the test, please refer to our Sunrise Medical e-commerce site http://www.ecom.sunrisemedical.co.uk (only accessible to authorised dealers).



Before moment of impact

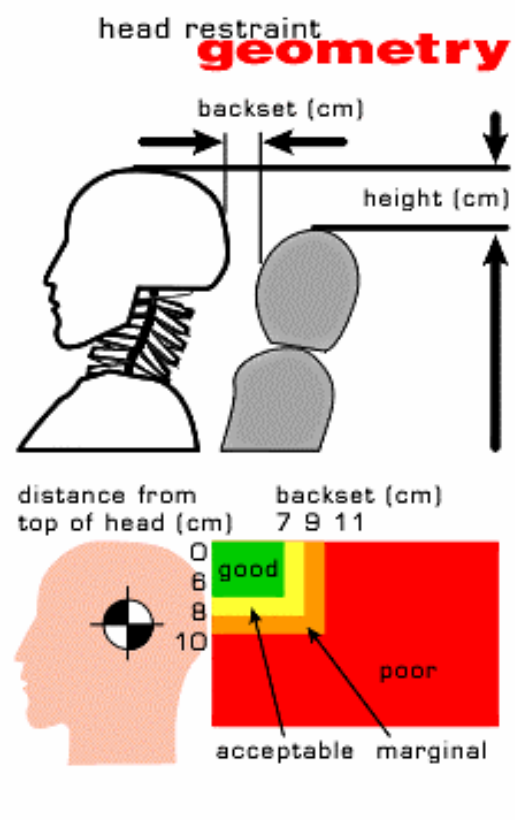
After moment of impact

Head restraint geometry

It is considered good practice to use a head restraint to ensure improved crash protection during travel.

Head restraint geometry explained

The necessary first attribute of an effective head restraint is good geometry. If a head restraint isn't behind and close to the back of an occupant's head, it can't prevent a "whiplash" injury in a rear-end collision. Institute researchers regularly evaluate the geometry of head restraints in passenger vehicles based on the height and back set relative to an average-size male. A restraint should be at least as high as the head's centre of gravity, or about 9 centimetres (3.5 inches) below the top. The backset, or distance behind the head, should be as small as possible. Backsets of more than 10 centimetres (about 4 inches) have been associated with increased symptoms of neck injury in crashes. (Source: Insurance institute for Highway safety, Highway Loss Data Institute)



Tie down points for Sunrise Medical products

In this section you will find information on tie down points for all Sunrise Medical approved products.
Tie down points shown are those on the right side of chair. On the left side the restraint should be fitted symmetrically.

The section is divided in two:
1. Current available products
2. Discontinued products

1. Current available products:

Manual Chairs

Breezy 100


Rear of the chair tie down point


Front of the chair tie down point

Breezy 210/215 and Breezy 210/215 NHS


Rear of the chair tie down point
Self propelling version


Rear of the chair tie down point
Transit version


Front of the chair tie down point

Breezy 300

Rear of the chair tie down point

Front of the chair tie down point

Breezy TL / Breezy TL NHS / Breezy TL OTS

Rear of the chair tie down point

Front of the chair tie down point

Breezy SL/ Breezy SL NHS / Breezy SL OTS

Rear of the chair tie down point

Front of the chair tie down point

Breezy Moonlite

Rear of the chair tie down point

Front of the chair tie down point

Breezy Rubix / Basix

Cair tie down points

Quickie RXS and Quickie 2(Adult & Kids Frames)

Rear of the chair tie down point

Front of the chair tie down point

Sopur Easy 160

Rear of the chair tie down point

Front of the chair tie down point

Quickie Classic 160 (Breezy X2, Breezy X3, Breezy X4, classic active, and K3 Transit)

Rear of the chair tie down point

Front of the chair tie down point

Neon SA

Rear of the chair tie down point

Front of the chair tie down point

Quickie RX Kidz

Rear of the chair tie down point

Front of the chair tie down point

Breezy Elegance

Rear of the chair tie down point

Front of the chair tie down point

Quickie GPV

Rear of the chair tie down point

Front of the chair tie down point

Breezy Relax

Rear of the chair tie down point

Front of the chair tie down point

Quickie Youngster 3

Rear of the chair tie down point

Front of the chair tie down point

Quickie Zippie TS

Photographs to follow, if in doubt please contact Sunrise Medical Engineering

Rear of the chair tie down point

Front of the chair tie down point

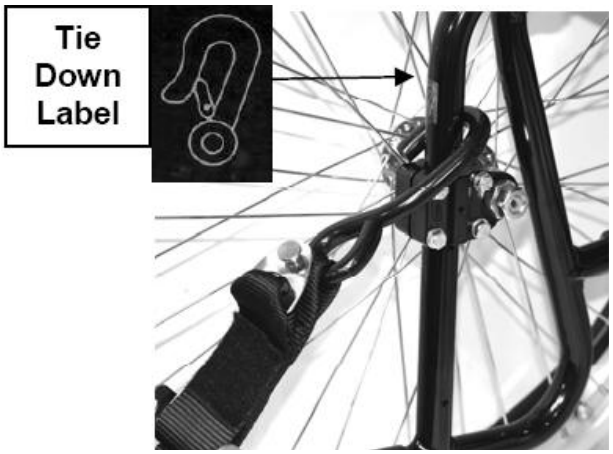
Quickie IRIS

Photographs to follow, if in doubt please contact Sunrise Medical Engineering

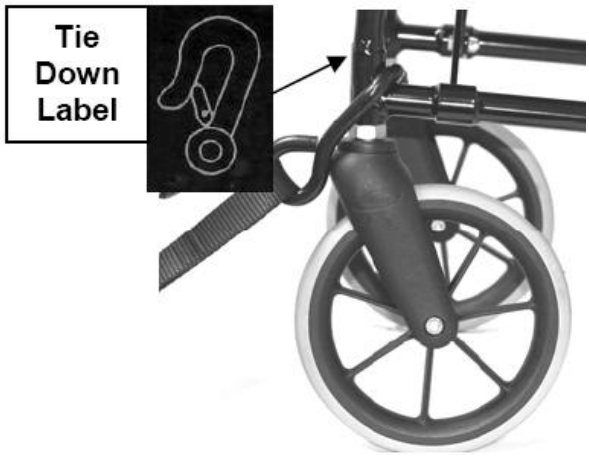
Rear of the chair tie down point

Front of the chair tie down point

Lomax Uni 8

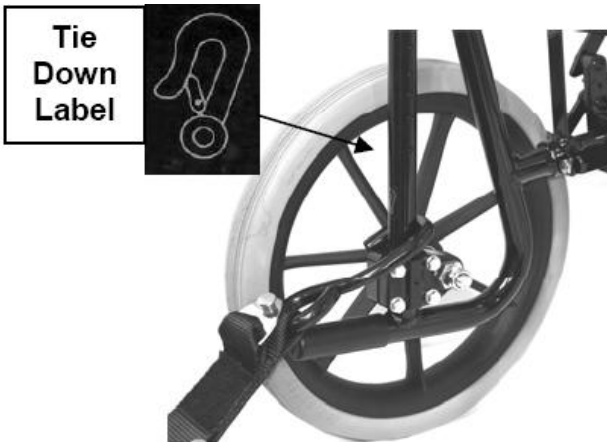


Rear of the chair tie down point

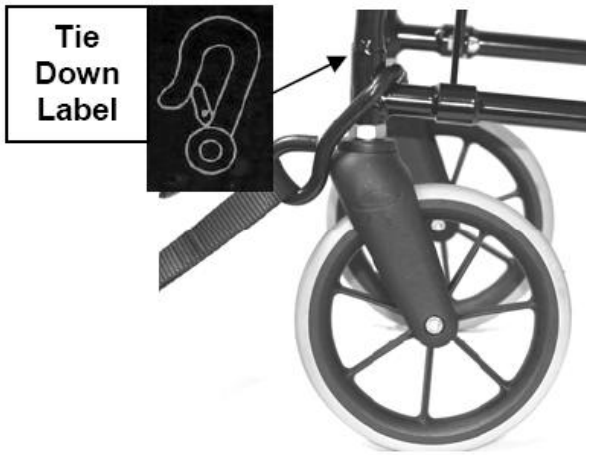


Front of the chair tie down point

Lomax Uni 9



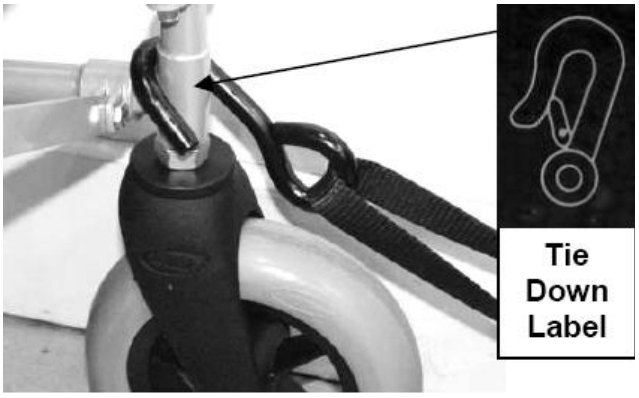
Rear of the chair tie down point



Front of the chair tie down point

Lomax HDTM

Rear of the chair tie down point



Front of the chair tie down point

Lomax Buddy 8

Rear of the chair tie down point

Front of the chair tie down point

Lomax Buddy 9

Rear of the chair tie down point

Front of the chair tie down point

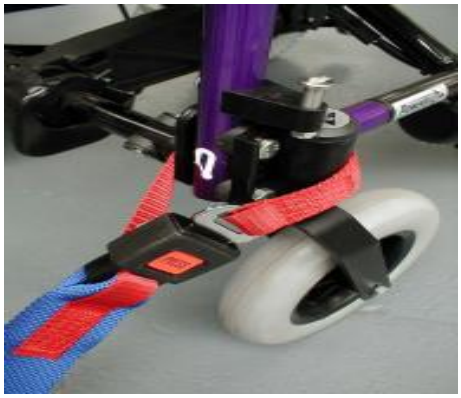
Breezy P100 / Breezy P100 NHS

Rear of the chair tie down point

Front of the chair tie down point

Powertec F45

Rear of the chair tie down point



Front of the chair tie down point

Quickie F55 (Mk2) From 01/04/98 - 28/11/01

Rear of the chair tie down point

Front of the chair tie down point

Quickie F55 (Mk3 and SL) From 29/11/01 - Present

Rear of the chair tie down point

Front of the chair tie down point

Quickie F35

Rear of the chair tie down point. D Ring straps

Front of the chair tie down point

Quickie P220

Rear of the chair tie down point

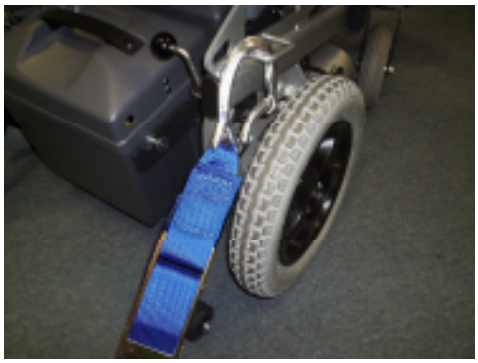
Front of the chair tie down point

Quickie Samba

Rear of the chair tie down point

Front of the chair tie down point

Rumba



Rear of the chair tie down point

Front of the chair tie down point

Groove FWD

Rear of the chair tie down point

Front of the chair tie down point

Groove RWD

Rear of the chair tie down point

Front of the chair tie down point

Groove M

Rear of the chair tie down point

Front of the chair tie down point

Samba lite

Rear of the chair tie down point

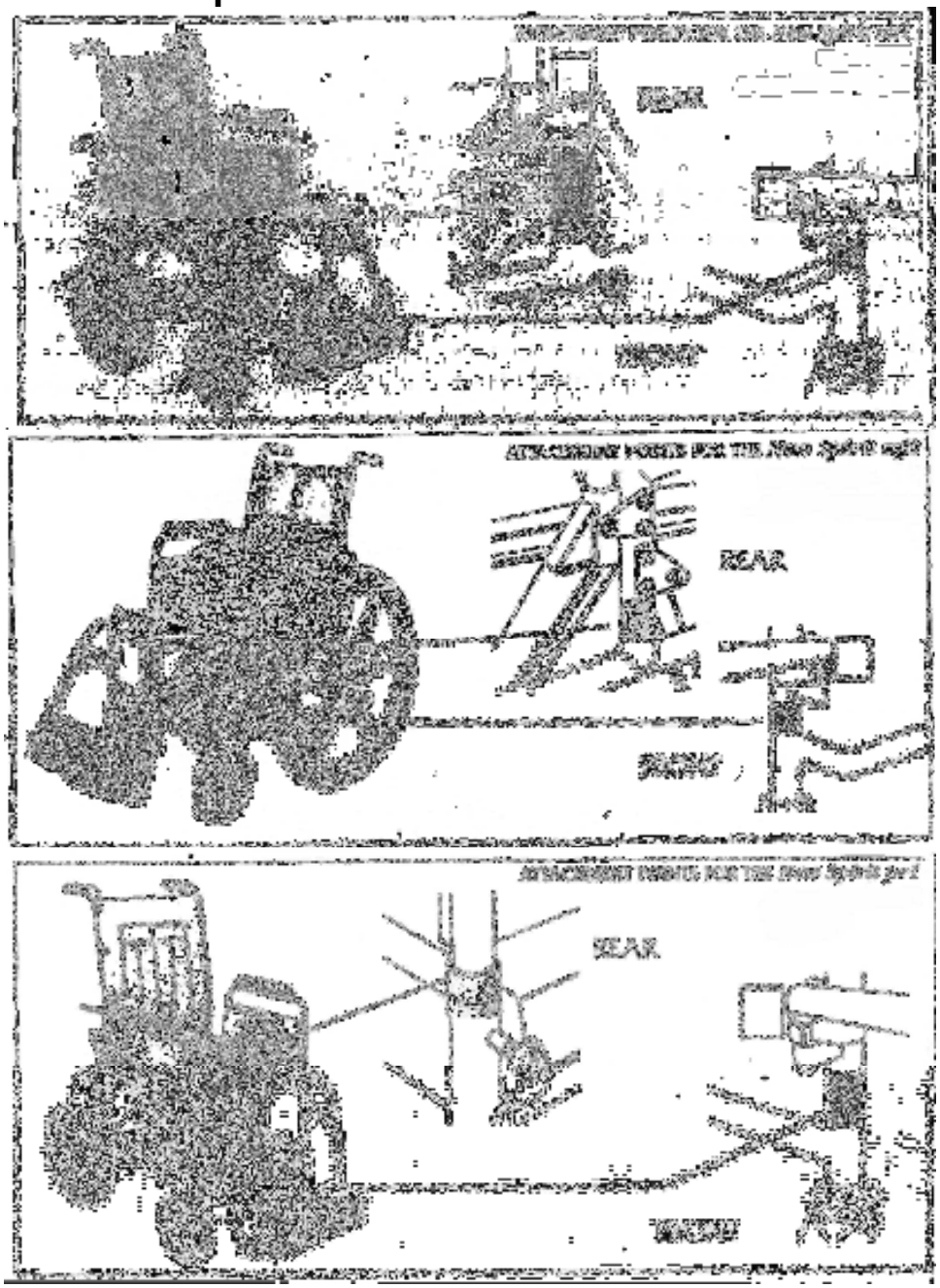
Front of the chair tie down point

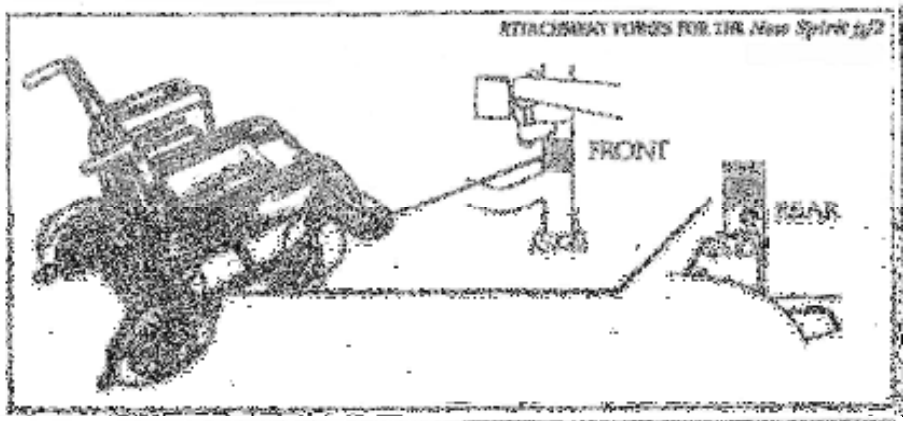
Salsa

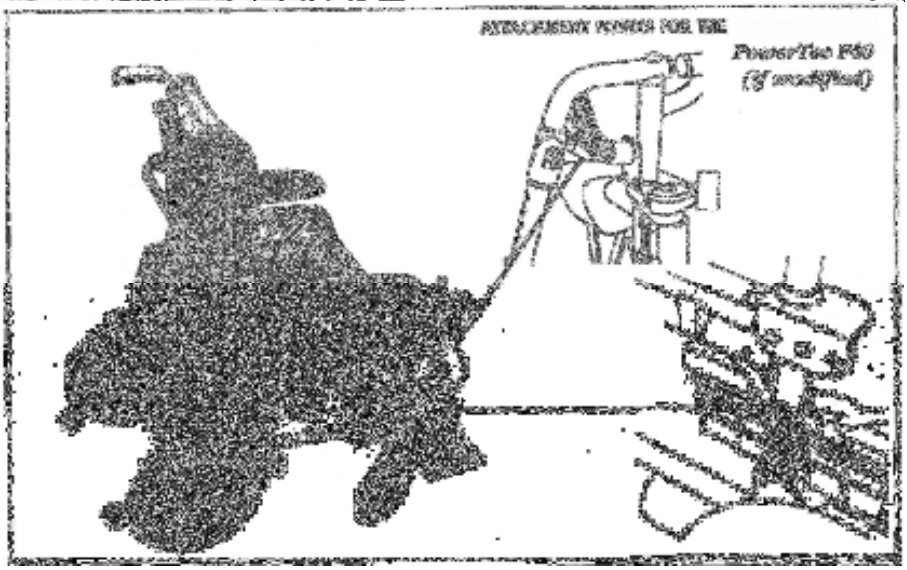
Rear of the chair tie down point

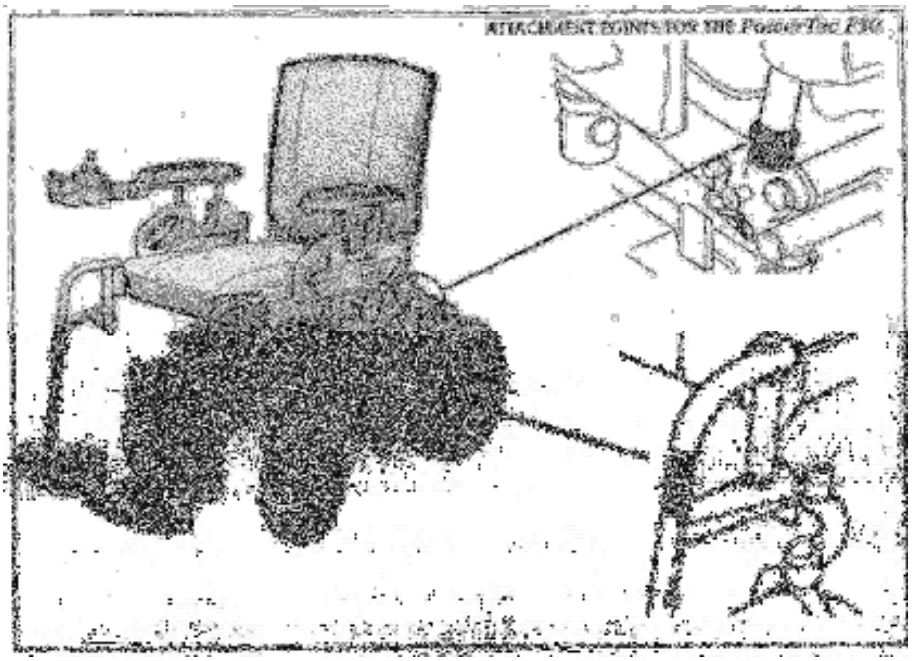
Front of the chair tie down point

2. Discontinued products:




FRONT
REAR


PowerTec F50
(if modified)



Advice to clients

We recommend the following information to be a part of your instructions to end-users, professionals, parents or any other person or organisation when advising them on the use of a product for transportation:

1. Sunrise Medical does not recommend the transportation of people in their wheelchairs on secondary transport systems.

2. Should a person need to be transported in a wheelchair on transport systems, then the following should be adhered to:

    A. The chair must be positioned forward facing.
    B. The correct restraint system must be used as per the test.
    C. The restraints must be fixed as per test and labelling on product.
    D. An ISO 7176-19 approved head restraint should always be fitted and suitably positioned where possible.
    E. If possible remove the seat cushion to create a lower centre of gravity.
    F. The chair meets the requirements of ISO 7176-19.

Useful addresses

MHRA

Medicines & Healthcare Products Regulatory Agency
Wheeled Mobility Centre
241 Bristol Avenue
Bispham
Blackpool
FY2 0BR

Tel 01253 596000
Fax 01253 596177
Website: www.mrha.gov.uk

BHTA

British Healthcare Trades Association
New Loom House
Suite 4.06
101 Back Church Lane
London
E1 1LU

020 7702 2141
020 7680 4048

Website: www.bhta.com
E-mail: bhta@bhta.com

Unwin

C.N.Unwin Ltd
The Horseshoe
Coat Road
Martock
Somerset
TA12 6EY

Tel 01935 827740
Fax 01935 827760
Website: www.unwin-safety.com

Q'Straint

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Fax: +44 (0)1227 770035
Website: WWW.qstraint.com
E-mail: info@qstraint.co.uk