



Power Wheelchair

TRANSPORTATION SAFETY

Guidance Document



is an Amylior Inc. brand

**Life is unpredictable...
your power wheelchair shouldn't be**

Phone: 1 450 424-0288 | Fax: 1 450 424-7211 | info@amylior.com | amylior.com



07 3265 4663

2/452 Bilsen Rd, Geebung QLD 4034

sales@powermobility.com.au • powermobility.com.au

OM | P10090 | 1000409 | Rev.00

Wheelchair Crash Test Guidance Document

TABLE OF CONTENTS

1	Introduction	Page 2
2	Transportation of a wheelchair within a vehicle	Page 3
3	Amysystems wheelchairs approved for transportation in accordance with ISO 7176-19/WC4-19	Page 5
4	History of the applicable standards	Page 7
5	Crash Test photos	Page 7
6	Securement points for wheelchair tie-down systems on Amysystems products	Page 8
7	Checklist: Transport of a person in a wheelchair	Page 9
8	Manufacturer addresses of wheelchair tie-down and personal restraint systems in accordance with ISO 10542	Page 10

1 Introduction

In this document you will find information on crash tested power wheelchairs from Amysystems. The document also includes information on the transport of wheelchair users while sitting in the wheelchair in a vehicle, information on tie-down systems used during crash tests, as well as diagrams of the securement points on wheelchairs. The means of securement (hooks, loops, Karabiner clips, etc.) of the wheelchair tie-down system are to be fitted onto the securement points.

This document also gives you information on the applicable standards to which our products are tested.

On the basis of the tests carried out and the results achieved, we know that the Amysystems products which are approved for transportation withstand the strong forces that occur during a crash test in accordance with ISO 7176-19/RESNA WC-4, Section 19, and are therefore suitable to be used as a seat in a vehicle for the transportation of wheelchair users.

A simulated crash test of a frontal impact that is performed in a test laboratory can in no way cover all accidental situations found in road traffic, therefore we always recommend that the wheelchair user is transferred to a vehicle seat when being transported in a vehicle and the wheelchair securely stowed in a designated area. Due to its construction the vehicle seat offers the highest level of safety as it is secured to the chassis and is designed for this purpose. If wheelchairs were to be developed to meet the requirements of vehicle seating, they would no longer fulfil their purpose, therefore not all wheelchairs are designed to withstand a crash test.

Due to the great number of systems on the market, it is not possible for Amysystems to crash test all wheelchair tie-down systems and personal restraint systems. However, all Amysystems crash tested wheelchairs, equipped with the ISO 7176-19/WC19 package, can be transported with all wheelchair tie-down and personal restraint systems as long as these meet the requirements of ISO 10542.

In order to establish whether the system you have meets these requirements, we would ask you to contact the relevant manufacturer of the wheelchair and personal restraint system (see Page 10).

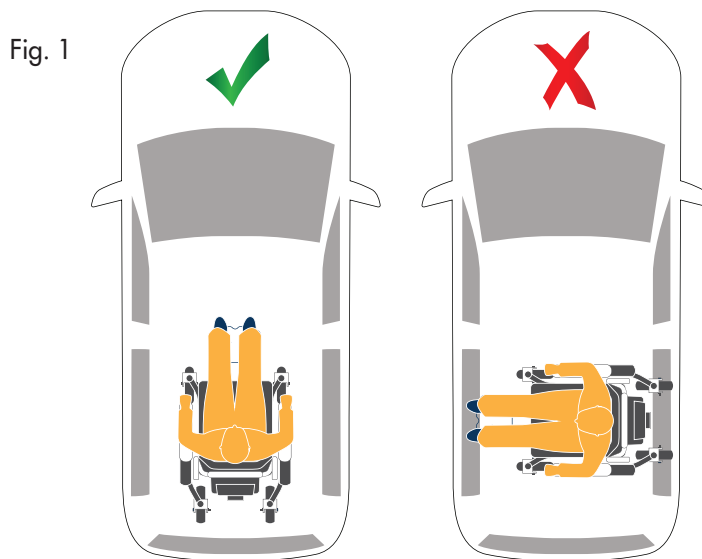
We hope that the following information is of help to you.

2 Transportation of a wheelchair within a vehicle

A wheelchair secured in a vehicle does not offer the same level of safety as the bolted-in seating system of a vehicle. Amysystems therefore recommends that the wheelchair user transfers or is transferred to a vehicle seat and uses the seat belt in the vehicle. We are aware that in practice this is not always possible. If the user is to be transported in the vehicle while still sitting in the wheelchair, the following advice must be followed:

- 1 The wheelchair and occupant must be located in a forward facing position in the direction of travel and must be secured using the wheelchair tie-down system for the wheelchair. The personal restraint system for the user must meet the requirements of ISO 10542 or SAE J2249. The systems must be fitted in accordance with the manufacturer's user instructions for the wheelchair tie-down system and personal restraint system and the user instructions from the wheelchair manufacturer (see the checklist on page 9).

The test standard in accordance with ISO 7176-19/WC19 only provides for the transport of wheelchairs in a forward facing direction. So, for example, the wheelchair must never be transported in a side facing direction. (Fig. 1).

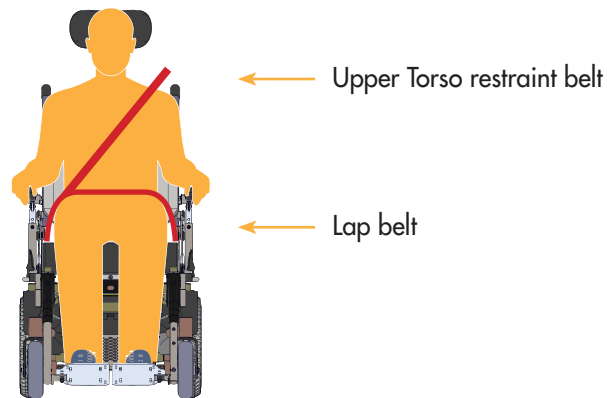


- 2 All add-on components should be removed from the wheelchair and stowed safely. These include but are not limited to:
Loose cushion - Tray tables - Vents - Crutches - Hip and Thigh Supports - Bags
- 3 Alterations or substitutions must not be made to the wheelchair securement points or to components of the chassis or frame without consulting the manufacturer. Failure to do this means that the wheelchair can no longer be transported in a vehicle and the manufacturer warranty is void.
- 4 A powerchair that is to be transported in a vehicle must be fitted with leak-proof, sealed batteries (e.g. gel batteries).
- 5 Should there be an accident or impact, the wheelchair must be inspected by an authorised wheelchair dealer before it is used again.

- 6 Both a lap belt and an upper torso restraint belt must be used to restrain the wheelchair occupant (Fig. 2). With this restraint setup, the possibility of head and chest impacts with any of the vehicles components is reduced. The upper torso restraint belt must not lie across the neck or underneath the armpit but across the chest. The lap belt should be positioned just above the hip bones.

The use of only a pelvic belt may compromise the performance of the wheelchair tie-down and occupant restraint system, and increase the risk of serious fatal injuries to the wheelchair occupant.

Fig. 2



- 7 A headrest suitable for transportation should be properly fitted and positioned at all times during transportation in a vehicle.
- 8 Standard wheelchair lap belts are not suitable.

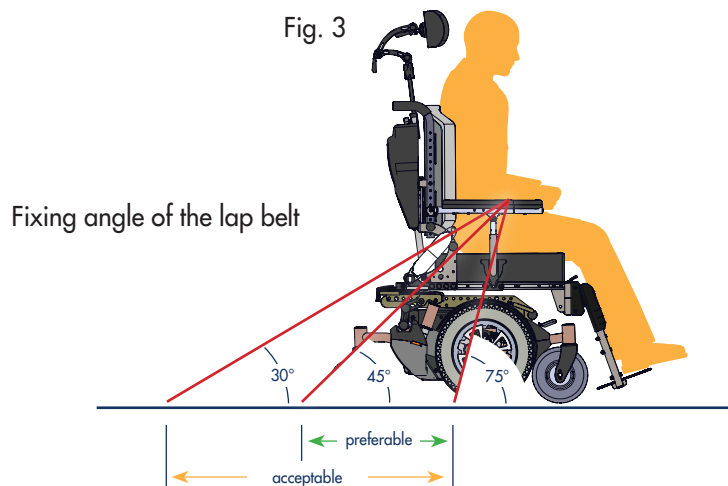
Postural supports (lap straps, lap belts) should not be used or relied on for occupant restraint in a moving vehicle unless they are labelled as meeting the requirements specified in RESNA WC-4, Section 18 (including successful performance in a 48 kph (30 mph) frontal impact test).

OCCUPANT RESTRAINT INSTRUCTIONS

- 1 The wheelchair tie-down belts and personal restraint systems must be fitted on the lower front side of the pelvis (Fig. 5) in such a way that the angle of the lap belt is within the range of 30° to 75° to the horizontal (Fig. 3).

A steeper (greater) angle of the belt is desirable but must never exceed 75°.

Fig. 3



- 2 Restraint belts must not be placed over and obstructed by wheelchair components such as armrests or wheels so that they are being held away from the body (Fig. 4).
- 3 The upper torso restraint belt must be fitted over the shoulder and diagonally across the chest. (Fig. 6)
- 4 The upper torso restraint belt and lap belt must be as tight as possible, without restricting the user.

- 5 Restraint belt webbing must not be twisted when in use.
- 6 Suitable headrests (strongly recommended) should be positioned correctly (Fig. 5).

Fig. 4

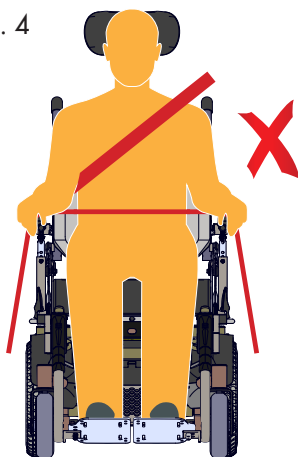


Fig. 5

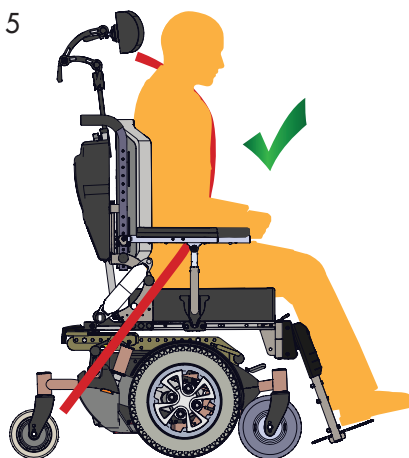
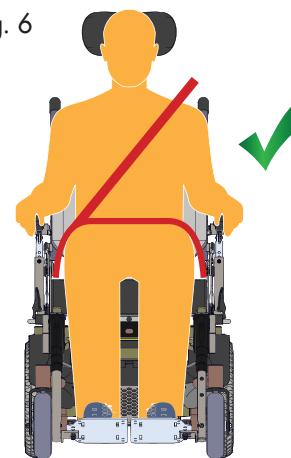


Fig. 6



3 Amysystems wheelchairs approved for transportation in accordance with ISO 7176-19/WC19

Amysystems wheelchairs are tested in accordance with ISO 7176-19/WC19 with a hybrid III test dummy of either 75 kg (165 lb) or 100 kg (220 lb), in the direction of travel with a frontal impact and a wheelchair tie-down system consisting of a 6-point tie-down system and a 3-point tie-down personal restraint system for the wheelchair user (with lap and diagonal belt in accordance with ISO 10542).

Some of the variants of the models tested were assessed and deemed that they fulfil the dynamic test requirements because they have the same construction (i.e. the same frame resistance cover materials, rigidity, structural integrity of the components and connections) as well as geometrical similarity with the models which have been approved for transportation in a vehicle.

The products given in the following tables were tested in their standard configuration and with standard settings. It is impossible to test the wide range of adjustable configurations and options.

The Amysystems power wheelchairs were tested with a modified configuration which must be **selected at the initial purchase** to comply with ISO 7176-19/WC19 standards.

The following list of crash tested Amysystems products is being expanded all the time. Please refer to the most recent version of this publication on the WC Transportation Safety website and click "Crash Tested Product Lists".

AMYSYSTEMS WHEELCHAIRS THAT ARE ISO 7176-19/WC19 FULL COMPLIANCE AS OF JANUARY 2017

The following link features the latest ISO 7176-19/WC19 compliance information :
<http://wc-transportation-safety.umtri.umich.edu/crash-tested-product-lists/wheelchairs>

Name and model	With following features / configuration	User weight limit
Alltrack M3 Series Alltrack M Series Alltrack R3 Series Alltrack R Series Alltrack P3 Series Alltrack P Series Quickie Xperience Quickie Xplore Zippie Xperience Zippie Xplore	Amyseat Static Seat Amyseat with Tilt Amyseat with Recline Amyseat with Elevate Amyseat with Tilt & Recline Amyseat with Tilt & Recline & Elevate	23 kg – 136 kg (51 lb – 300 lb)
Alltrack M3 (HD) Series Alltrack M (HD) Series	Amyseat Static Seat Amyseat with Tilt Amyseat with Recline Amyseat with Tilt & Recline	23 kg – 205 kg (51 lb – 450 lb)
Alltrack R3 (HD) Series Alltrack R (HD) Series	Amyseat Static Seat Amyseat with Tilt Amyseat with Recline Amyseat with Tilt & Recline	23 kg – 181 kg (51 lb – 400 lb)
Quickie 747	Static Seat Seat with Tilt Seat with Recline Seat with Elevate Seat with Tilt & Recline Seat with Tilt & Recline & Elevate	23 kg – 181 kg (51 lb – 400 lb)
Quickie 323	Static Seat Seat with Tilt Seat with Recline Seat with Elevate Seat with Tilt & Recline Seat with Tilt & Recline & Elevate	23 kg – 205 kg (51 lb – 450 lb)
Quickie Xperience HD	Eclipse Seat Static Seat Eclipse Seat with Tilt Eclipse Seat with Recline Eclipse Seat with Tilt & Recline	23 kg – 205 kg (51 lb – 450 lb)
Quickie Xplore HD	Eclipse Seat Static Seat Eclipse Seat with Tilt Eclipse Seat with Recline Eclipse Seat with Tilt & Recline	23 kg – 181 kg (51 lb – 400 lb)

4 History of the applicable standards

- 1 **ISO 7176-19/WC19 Crash Test Standard** – The wheelchair crash test was derived from the crash test already used in the car industry. Wheelchairs are crash tested at a speed of 48 kph (30 mph) and an impact deceleration of 20 G. The test dummy is limited to a maximum weight of 75 kg (165 lb) and 54 kg (119 lb) for children. Only frontal impact has so far been simulated for wheelchairs.
- 2 **Wheelchair tie-down systems and personal restraint systems in accordance with ISO 10542-2** – There are various versions of wheelchair tie-down systems and personal restraint systems that meet the requirements of ISO 10542. The wheelchair is connected by means of loops, hooks, Karabiner clips, buckle tongues or other means of securement. The wheelchair tie-down system and personal restraint system itself is also tested by a dynamic crash test. To do this, a "surrogate wheelchair" is used. With this system, particular attention is given to the weight that is being secured (wheelchair weight + user weight). For this reason heavy power chairs must be secured in a vehicle using a 6-point wheelchair tie-down system.

20 G FRONTAL CRASH

ISO 10542-2, 3-point tie-down personal restraint system

Person (75 kg/165 lb hybrid dummy) ISO 7176-pe19
Frontal Crash Test for wheelchairs
as a seat in a vehicle (48 kph/30 mph, 20 G deceleration)

ISO 10542-2 wheelchair tie-down system



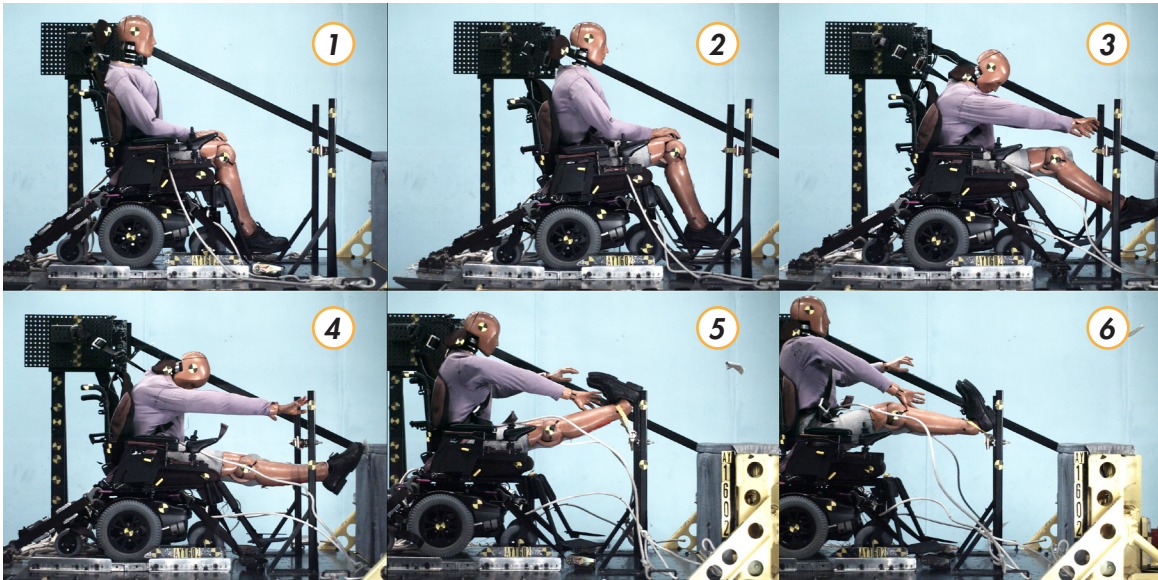
Power wheelchair tie-down system



Personal restraint system

5 Crash Test Photos

These photos show you what happens during a wheelchair crash test.



6 Securement points for wheelchair tie-down systems on Amysystems products

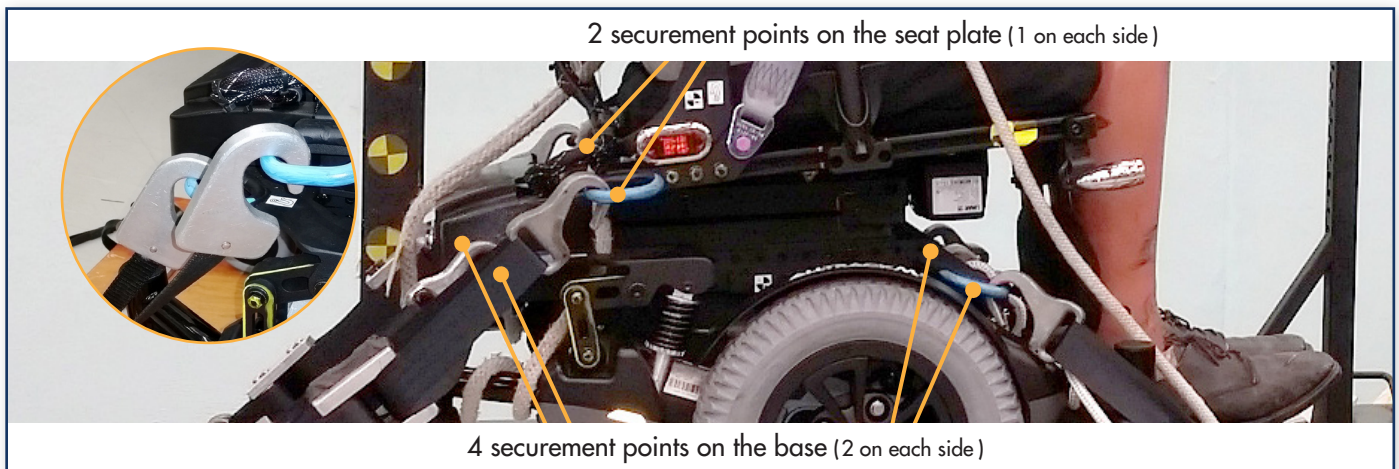
This section shows the securement points for the approved Amysystems products.

In accordance with ISO 7176-19/WC19, the securement points on the wheelchair are equipped with the relevant standard hook label. This means the hooks, Karabiner clips, loops, etc. of the wheelchair tie-down system are to be fitted at the points indicated by the labels.

Please remember that in order for your AmySystems power wheelchair to feature the shown safety transport options, **the securement points configuration must be selected during the initial purchase.**



Fasten securement points on both sides



7 Checklist: Transport of a person in a wheelchair

For those people who transport and/or accompany the wheelchair user, we advise that the following is also taken into account:

- 1 Amysystems recommends that you do not transport a person in a vehicle while they are sitting in a wheelchair. We recommend that the person is transferred to a vehicle seat when possible.
- 2 If a person must be transported in a vehicle while sitting in a wheelchair then the following must be noted:
 - A The wheelchair must be tested in accordance with ISO 7176-19/WC19. Amysystems wheelchairs that have been tested carry the relevant labels.



- B A suitable wheelchair tie-down system and personal restraint system in accordance with ISO 10542 must be used. This means a 6-point tie-down system for powerchairs, as well as a 3-point tie-down personal restraint system.
- C The wheelchair and user must be positioned in the direction of travel and in the axis of symmetry above the securement rails in the vehicle.
- D All removable and loose parts such as tables, crutches etc, must be removed and stowed safely.
- E If the wheelchair features wheel locks, they are to be engaged.
- F The wheelchair tie-down system is to be fitted to the wheelchair in accordance with the manufacturer's recommendations. The hook labels indicate the position of the securement points on the wheelchair. Fit the front straps on the wheelchair first, then fit the rear straps. Release the brakes so that the wheelchair can be pulled back towards the rear to create tension. Afterwards, re-apply the brakes. The rear straps put the system under tension.
- G After the wheelchair is firmly attached to the vehicle floor the personal restraint system should be fitted in accordance with the manufacturer's recommendations. When doing this please make sure that the upper torso restraint belt and lap belt are fitted securely. The belts must not be twisted and must not pass over wheelchair components such as the sideguards, armrests or other edges. The upper torso restraint belt and lap belt must be fitted close to the user. The upper belt should be passed over the shoulder and must not lie across the neck.
- H A headrest approved to ISO 7176-19/WC19 should be fitted and positioned correctly.
- I Finally the belts should be checked one more time to make sure that they are correctly positioned:

- Are the wheelchair straps firmly tensioned and fitted in the right place?
- Is the lap belt positioned just over the pelvis?
- Is the upper torso restraint belt positioned over the shoulder/collar bone?
- Is the upper torso restraint belt positioned away from the neck?
- Are the belts fitted close to the body?

Manufacturers of wheelchair tie down and personal restraint systems in accordance with ISO 7176-19/WC19

Q'Straint Europe

72-76 John Wilson Business Park Whitstable
Kent, CT5 3QT
Great Britain

Tel: +44 (0)1227 773035
qstraint.com

Q'Straint America

5553, Ravenswood Rd, suite # 110,
Kent, CT5 Fort Lauderdale, FL 33312, USA

Tel: +1 954 986-0021
qstraint.com

This document is available in a printable PDF on our website at amylior.com



Amylior Inc.

3190 F.-X.-Tessier,
Vaudreuil-Dorion, Qc
J7V 5V5, Canada

Tel: +1 450 424-0288
info@amylior.com
amylior.com



07 3265 4663

2/452 Bilsen Rd, Geebung QLD 4034
sales@powermobility.com.au
powermobility.com.au