



## Inspection/Test Report: WAV Seats, Belts, Belt Anchorages and WTORS

### Legislation

Regulation (EU) 2018/858 Consolidated to Commission Delegated Regulation (EU) 2021/1445,  
Annex II, Part III, Appendix 3  
Item 15A (Footnote W3)  
Item 19A (Footnote W5)  
Item 31A (Footnote W6)

### Inspection/Test Details

Location of Inspection/Test: Q'Straint 72-76 John Wilson Business Park, Whitstable CT5  
3QT  
Date(s) of Inspection/Test: 21-23 May 2024  
VCA Representative(s): Calum McGowan-Franklin, Nicholas Bridge  
Inspectors Home Office Location: VCA HQ  
Manufacturer's Representative(s): Not applicable  
Reason for Report: New Approval

### Manufacturer Details

Name and Address: Tripod Mobility B.V.  
Collseweg 10  
5674 TR Nuenen  
The Netherlands  
Type: XFKT  
Commercial Description: Kangoo / Townstar / Citan / T-Class Tripod  
Category: M1

### Conclusion

The above-mentioned vehicle / engine / component was tested in accordance with the above  
mentioned legislation and was found to comply in all respects. This report relates only to the items  
tested.

Witness Engineer  
Signature:

Name: Nicholas Bridge  
Position: Type Approval Engineer  
Date: 23 May 2024

Stefano Savarese  
Technical Manager  
23 September 2024

### List of Annexes



Vehicle Certification  
Agency Europe

VCA Europe S.r.l.

Annex	No of Pages	Subject
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### Issue Record

Issue 0 is original report

Note: Include reason for reissue, date of reissue, who has reissued.

### Worst Case Rationale

Tripod Mobility convert the Renault Kangoo / Nissan Townstar / Mercedes – Benz Citan to WAV incorporating a floorpan situated behind row 2 seats.

1 x Wheelchair geometry.

Test # 1. IQTRP4543401

85Kg

Front Tie down – QER-3200-CVR – Electrical retractors 3.2 m long.

Rear Tie down – QE5-8752 – J hooks, Mounted to adaption brackets.

Lap/ Shoulder belt – QE58749 – Lap/shoulder occupant belt with k12 tongues.

Stalk and buckle – QE5-6460

Test # 2. IQTRP4543402

85Kg

Front Tie down – QER-3200-CVR

Rear Tie down – Q011003 – QRT 350 retractors, unmounted

Lap/ Shoulder belt – QE58749

Stalk and buckle – QE5-6460

Test # 3. IQTRP4543501

85Kg

Front Tie down – QER-3200-CVR

Rear Tie down – Q011056/ Q011057 – QRT 550 retractors, unmounted.

Lap/ Shoulder belt – QE58749

Stalk and buckle – QE5-6460

Test # 4. IQTRP4543502

200Kg

Front Tie down – QER-3200-CVR

Rear Tie down – Q011003

Lap/ Shoulder belt – QE58749

Stalk and buckle – QE5-6460

### Significant Interpretations, Alternative Test Methods, New Technologies

### Inspection/Tests Required

Yes, NA, See Report ... / Approval ... / Annex ...

Seats, their anchorages and any head restraints (Item 15A):

As stage 1.



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Safety-belt anchorages, Isofix anchorages systems and Isofix top tether anchorages (Item 19A):  
Safety-belts, restraint systems, child restraint systems and Isofix child restraint systems (Item 31A):  
WTORS Anchorages:  
WTORS Components – Dynamic Test  
WTORS Components– Material Tests

Yes
As stage 1
Yes
Yes
NA

### Vehicle/Component Specification

Vehicle Type/Variant/Version:  
Wheelchair Front Tie-down  
Details:

XFKT
QER-3200-CVR
QE5-8752 Q011003 Q011056/Q011057
QE58749

Wheelchair Rear Tie-down  
Details:

Occupant Restraint Details:

### Manufacturer's Documentation

Manufacturer's documentation is complete and reflects the agreed specification for the vehicle component tested and covers all variants and versions agreed in the worst case rationale.

Yes

Information document uploaded to job folder and identified by job number.

Yes

### Facility and Equipment Checks

Facility Appraisal reference and date:  
*Reference and date if formal; state if ad-hoc appraisal).*

Mandatory FA not applicable

Calibration certificates are traceable to national or international standards of measurement, where available:

Yes

Calibration certificates checked and valid, recorded in the following table:

Yes

### Equipment

Description	Make	Model	Serial number	Calibration due date
Surrogate wheelchair	Q	SA000003	0001	NA



# Vehicle Certification Agency Europe

VCA Europe S.r.l.  
 Point - Polo per l'Innovazione Tecnologica  
 Via Pasubio, 5  
 24044 Dalmine (BG)  
 Italy  
 enquiries@vca-europe.com |  
 europe.vehicle-certification-agency.gov.uk

Report Number: VCAE007617-3  
 Issue: 0

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ISP N° 0178 E

Membro degli Accordi di Mutuo Riconoscimento  
 EA, IAF e ILAC

Signatory of EA, IAF and ILAC  
 Mutual Recognition Agreements

iQ video tracking system @ 1000fps	Phantom	Miro R320S	VR0318 14797	09/07/2024
Accelerometer (50g)	Measurement Specialities	3801A-0050	A138300	21/10/2024
Anthropomorphic test device @ 78.6Kg	Humanetics	H3 50th Male	DV9270	16/01/2025
Hanging scales	AE ADAM	LHS2000	AE9AQ183	02/10/2024
Digital inclinometer	Bosch	GLM50C	612604164	07/03/2025
Tape measure	Stanley	Tylon 5m	iQT003	07/03/2025

\*Specify calibrated date + (interval) or calibration due date.



**Inspection/Test Requirements**

Complies  
Yes / NA

**Seats (Item 15A) – As Stage 1**

**Seatbelt Anchorages (Item 19A)**

VCA	Modifications made to the vehicle structure are not deemed likely to affect the strength of the base vehicle's seatbelt anchorages, and therefore the base vehicle approval is deemed to remain valid.	NA
	AND/OR Seatbelt anchorage testing carried out on modified/compromised seat positions. (Give report number below.)	Yes
Details:		
Covered by VCA report VCAE007617-1		

**Seatbelt Installation (Item 31A) – As Stage 1**  
(Ordinary Seats)

**WTORS Anchorages**

(Anchorage strength may be tested using either the dynamic or static options below.)

**General Requirements**

Footnote W3	Longitudinal plane of the intended wheelchair-travelling position is parallel to the longitudinal plane of the vehicle.	Yes
Footnote W3	Appropriate information is made available to the vehicle owner that, in order to be capable of withstanding the forces transmitted by the tie-down mechanism during the various driving conditions, a wheelchair with a structure meeting the relevant part of ISO 7176-19:2008 is recommended.	Yes

**Dynamic Testing**

2018/858, Ann II, Part III, App 3, 4.1.	The full assembly of the WTORS system is tested by an in-vehicle dynamic test in accordance with the specified paragraphs and Annex of ISO 10542-1:2012, testing all components/anchorages simultaneously, using a vehicle body-in-white or representative structure.	Yes
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2018/858, Ann II, Part III, App 3, 4.2.	The component parts of the WTORS meet the relevant requirements of ISO 10542- 1:2012 and paragraphs 5.1, 5.3 and 5.4. These requirements are deemed to have been met in respect of the occupant restraint if it is approved in accordance with UN Regulation No 16.06.	Yes
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**Static Testing - NA**



## Geometric Requirements

2018/858, Ann II, Part III, App 3, 1.2.	The wheelchair occupant's lower belt anchorages are located in accordance with UNECE Regulation 14-07, paragraph 5.4.2.2, relative to Point P on the SWC when placed in the travelling position designated by the manufacturer (between 30 and 80degrees from the horizontal).	Yes
2018/858, Ann II, Part III, App 3, 1.2.	The upper actual anchorage(s) are located at least 1,100 mm above the horizontal plane, passing through the points of contact between the rear tyres of the SWC and the vehicle floor. This condition is still satisfied after the static/dynamic strength test.	Yes

## WTORS Components – Dynamic Test

### Dynamic Test Set-up

ISO10542, Ann A, 4.2.(a)	Wheelchair design meets characteristics specified in Annex E.	Yes
ISO10542, Ann A, 4.2.(b)	Hybrid III dummy used with mass of 77.7 kg. Close-fitting cotton clothes worn and static resistance of all joints set to 1g.	Yes
2018/858, Ann II, Part III, App 3, 3.3.1.	<p>Test carried out in representative vehicle body structure* OR <del>All anchorages on sled set-up are within an absolute linear distance of 50 mm from those on the vehicle*</del></p> <p><i>*Strikethrough, as appropriate.</i> <i>Note: There is no tolerance on the SWC P-point with respect to the declared travelling position of the wheelchair and so measurements of anchorage positions should be normalised to give the P-point as the origin in both sets of measurements.</i></p>	Yes
VCA	In the case of out-of-vehicle tests, comparison of anchorage positions is attached to the report as an Annex.	NA
ISO10542, Ann A, 5.7. VCA	Wheelchair reference plane parallel to vehicle longitudinal plane (+/- 3°). Where the wheelchair does not rest on a horizontal surface, this attitude is replicated on the sled, wherever possible.	Yes
ISO10542, Ann A, 5.8.	Tie-downs installed and tensioned, as per manufacturer's instructions.	Yes
ISO10542, Ann A, 5.12.	ATD is positioned upright in the SWC and symmetrical about its centreline with the pelvis as far back on the seat as possible and hands resting on thighs.	Yes
ISO10542, Ann A, 5.14.-5.18.	Occupant restraint installed, as per manufacturer's instructions.	Yes
ISO10542, Ann E, E.2.1	Tyre pressures set to 320 <sup>+30</sup> / <sub>-0</sub> kPa.	Yes



### Dynamic Test Results

ISO10542, Ann A, 4.1.(c)	Sled velocity change:	<table border="1"> <tr><td>1. 48.69</td></tr> <tr><td>2. 48.54</td></tr> <tr><td>3. 48.7</td></tr> <tr><td>4. 48.7</td></tr> </table>	1. 48.69	2. 48.54	3. 48.7	4. 48.7	km/h	Yes
1. 48.69								
2. 48.54								
3. 48.7								
4. 48.7								
	Requirement: 48 $-0^{+2}$ km/h							
ISO10542, Ann A, 4.1.(d)	Acceleration pulse conforms to ISO 10542 requirements.			Yes				
	Requirement: > 0g for 75 ms; > 15 g for 40 ms; > 20 g for 15 ms							
ISO10542, 5.2.3.(a)	ATD retained in seat of SWC.			Yes				
ISO10542, 5.2.3.(b)	SWC is in an upright position on the impact sled.			Yes				
ISO10542, 5.2.3.(c)	No WTORS component became detached or separated.			Yes				
ISO10542, 5.2.3.(d)	Tools not required for release of SWC from tie-down system.			Yes				
ISO10542, 5.2.3.(e)	Tools not required for release of ATD from restraint system.			Yes				
ISO10542, 5.2.3.(f)	No part of the WTORS exhibits signs of tearing, fragmentation, fracture, or complete failure (unless designed to do so, e.g. load limiting webbing).			Yes				
ISO10542, 5.2.3.(g)	WTORS exhibits no dangerous roughness, sharp edges or protrusions likely to increase the risk of injury.			Yes				
ISO10542, 5.2.2.(a)	Movement of the SWC and ATD is within limits:			Yes				
	- Horizontal excursion of SWC:	<table border="1"> <tr><td>1. 118</td></tr> <tr><td>2. 91</td></tr> <tr><td>3. 58</td></tr> <tr><td>4. 95</td></tr> </table>	1. 118	2. 91	3. 58	4. 95	mm Limit: 200	
1. 118								
2. 91								
3. 58								
4. 95								
	- Horizontal excursion of ATD knee:	<table border="1"> <tr><td>1. 236</td></tr> <tr><td>2. 249</td></tr> <tr><td>3. 216</td></tr> <tr><td>4. 255</td></tr> </table>	1. 236	2. 249	3. 216	4. 255	mm Limit: 375	
1. 236								
2. 249								
3. 216								
4. 255								
	- Horizontal excursion of ATD head:	<table border="1"> <tr><td>1. 545</td></tr> <tr><td>2. 511</td></tr> <tr><td>3. 508</td></tr> <tr><td>4. 525</td></tr> </table>	1. 545	2. 511	3. 508	4. 525	mm Limit: 650	
1. 545								
2. 511								
3. 508								
4. 525								
ISO10542, 5.2.2.(b)	Horizontal excursion of ATD knee is at least 1.1 times excursion of SWC.			Yes				

Remarks (condition of anchorages after test):

All anchorages remained intact with some deformation



## WTORS Components – Material Tests

### ECE Regulation 16/Environmental/Material Tests

ISO10542, 5.1.1. ECE regulation tests as specified in the table below have been carried out and passed for all component parts of the WTORS, as applicable. Yes

Test report details or other reference:

Stored on file by VCA

ISO10542, 5.1.2. Burn rate of webbing and padding does not exceed 100 mm/min. Yes

Subclause	Component	Subject	ECE R 16 tests referenced	Application <sup>a</sup>
6.2.1.1	rigid parts	sharp edges	—	OR + WTD
6.2.1.2	rigid parts	corrosion	7.2	OR + WTD
6.2.1.4	rigid parts	cold impact test	7.5.4	OR + WTD
6.2.2.1	buckles	correct use and size	—	OR
6.2.2.2	buckles	closing/releasing	7.8.2	OR
6.2.2.3	buckles	cold mating	7.5.3	OR
6.2.2.4	buckles	repeated testing	7.7	OR
6.2.3.2	adjustment devices	micro-slip	7.3	OR
6.2.3.4	belt-adjusting device	force	7.5.6	OR + WTD
6.2.5	various belt retractors	performance	7.2, 7.6.1 to 7.6.4	OR
6.2.6	preloading devices	performance	7.2, 7.9.2	OR
6.3.1	belts	general specs	7.4.3	OR
6.3.2	belts	strength	7.4.1.1, 7.4.2	OR + WTD
6.3.3	belts	strength	7.4.1, 7.4.2	OR + WTD
6.4.2	belts	strength	7.4.1.6, 7.4.2, 7.5	OR + WTD

<sup>a</sup> OR = occupant restraint, WTD = wheelchair tiedown.

### Webbing Slippage Tests

ISO10542, 5.3. Strap type adjustment mechanisms show slippage of no greater than 25 mm when tested in accordance with Annex C or ECE R16. Yes

### Partial Engagement Test

ISO10542, 5.4. & Ann D All parts of the WTORS with potential to be partially engaged separate from this condition, with a force of no greater than 22 <sup>+2/-0</sup> N, applied for a maximum of 3 <sup>+0.5/-0</sup> seconds. Yes  
Description of components and subjected to the above test and manner of partial engagement (with photographs, if applicable):

NA



## WTORS Occupant Restraint Installation

<p>2018/858, Ann II, Part III, App 3, 2.3. R16.06, 8.2.2.</p>	<p>Belt(s) are installed so that, when properly worn, they will work satisfactorily and reduce the risk of bodily injury in the event of an accident. In particular, they are installed so that the:</p>	<p>Yes</p>
<p>R16.06, 8.2.2.1.</p>	<p>Straps are not liable to assume a dangerous configuration;</p>	<p>Yes</p>
<p>R16.06, 8.2.2.2.</p>	<p>Danger of a correctly positioned belt slipping from the shoulder of a wearer as a result of his/her forward movement is reduced to a minimum;</p>	<p>Yes</p>
<p>R16.06, 8.2.2.3.</p>	<p>Risk of the strap deteriorating through contact with sharp rigid parts of the vehicle or seat structure is reduced to a minimum;</p>	<p>Yes</p>
<p>R16.06, 8.2.2.4.</p>	<p>Safety belt provided for each wheelchair position is such as to be readily available for use, including after a seat (or wheelchair) has been displaced/folded and then restored.</p>	<p>Yes</p>
<p>R16.06, 8.3.1.</p>	<p>Rigid parts do not increase the risk of injury in the event of an accident.</p>	<p>Yes</p>
<p>R16.06, 8.3.2.</p>	<p>Device for releasing the buckle is clearly visible to and within easy reach of the wearer, and designed so that it cannot be opened inadvertently or accidentally. It is located so that it is readily accessible to a rescuer in an emergency.</p>	<p>Yes</p>
<p>R16.06, 8.3.2.</p>	<p>Both when not under load and when sustaining the wearer's weight, the buckle is capable of being released by the wearer with a single simple movement of either hand in one direction.</p>	<p>Yes</p>
<p>R16.06, 8.3.2.</p>	<p>If the buckle is in contact with the wearer, the parts of the buckle likely to contact the body of the wearer presents a section of not less than 20 cm<sup>2</sup> and at least 46 mm in width, measured in a plane situated at a maximal distance of 2.5 mm from the contact surface.</p>	<p>Yes</p>
<p>R16.06, 8.3.3.</p>	<p>Belt either adjusts automatically to fit or is designed so that the manual adjusting device is readily accessible to the wearer, is convenient and easy to use, and may be tightened with one hand.</p>	<p>Yes</p>
<p>R16.06, 8.3.4.</p>	<p>Belts incorporating retractors are installed so that they operate correctly and stow the strap efficiently.</p>	<p>Yes</p>

## Remarks

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## Annex I – Comparison of Vehicle and WTORS Test Geometry

Measured with arbitrary datum										
	Vehicle			WTORS Test						
	X	Y	Z	X	Y	Z				
Front left	1278	-198	80	1278	-197	82				
Front right	1278	498	80	1278	499	82				
Rear left	0	0	0	0	0	0				
Rear right	0	0	0	0	0	0				
LB	60	-312	314	63	-307	327				
LNB	60	612	314	63	611	327				
Upper	185	569	1427	174	570	1433				
Reel	57	776	468	60	778	468				
P point	437	150	539	437	150	539				
Corrected to make P-point the origin (0,0,0) in both cases										
	Vehicle			WTORS Test			Difference			
	X	Y	Z	X	Y	Z	X	Y	Z	Abs
Front left*	841	-348	-459	841	-347	-457	0	-1	-2	2
Front right*	841	348	-459	841	349	-457	0	-1	-2	2
Rear left	-437	-150	-539	-437	-150	-539	0	0	0	0
Rear right	-437	-150	-539	-437	-150	-539	0	0	0	0
LB	-377	-462	-225	-374	-457	-212	-3	-5	-13	14
LNB^	-377	462	-225	-374	461	-212	-3	1	-13	13
Upper	-252	419	888	-263	420	894	11	-1	-6	13
Reel^	-380	626	-71	-377	628	-71	-3	-2	0	4