



Vehicle Certification
Agency Europe

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ISP N° 0178 E

Membro degli Accordi di Mutuo Riconoscimento
EA, IAF e ILAC

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Mutual Recognition Agreements

Report Number:
ESW528880/XLW001341

Issue: 0

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

Legislation

EU Regulation 2018/858/EC as amended by Regulation 2020/683, 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:	Braunability UK, The Horseshoe, Coat Road, Martock, TA12 6EY (test witnessed remotely)
Date of Inspection/Test:	8-17 March 2021
VCA Representative(s):	Fraser Coulter
Inspectors Home Office Location:	VCA HQ
Manufacturer's Representative(s):	Paul Nieuwenhuis
Reason for Test Report:	Test report only

Manufacturer Details

Name and Address:	Tripod Mobility B.V. Collseweg 10 5674 TR Nuenen / The Netherlands
Type:	SKT
Commercial Description:	Caddy Tripod / Caddy Maxi Tripod
Category:	M ₁ SPV (Wheelchair Accessible Vehicle)

Conclusion

The above mentioned vehicle/components were tested in accordance with the above mentioned legislation and were found to comply in all respects. This report relates only to the items tested.

Witness Engineer/Test Engineer
Signature:

Name:	Fraser Coulter
Position:	Type Approval Engineer
Date:	18 March 2021

Kevin Bridges
Technical Manager
23 April 2021



Vehicle Certification Agency Europe

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List of Annexes

Annex	No of Pages	Subject
I	2	Comparison of vehicle and WTORS test geometry
II	27	Braunability Test Reports
III	66	Information Document

Issue Record

Issue 0 is original report

Worst Case Rationale

Test report to cover 85kg SWC tests in both SWB and LWB VW Caddy converted to Tripod Mobility specification. Two tests were conducted in both the SWB and LWB configurations, this is to cover two different rear tie-downs.

T-12831

LWB with rear tie downs BQEMJ (with "Triplock" end fitting)

T-12833

LWB with rear tie downs BQE16MK (with "Triplock" end fitting)

T-12837

SWB with rear tie downs BQEMJ (with "Triplock" end fitting)

T-12839

SWB with rear tie downs BQE16MK (with "Triplock" end fitting)

Due to the similar nature of the "hook" variant of end fitting compared to the "J Hook" end fitting where the "J Hook" has been tested i.e. T-12831 and T-12837 it can also be assumed to cover a front tie down of:

EF3H and EF3CH

And rear tie downs of:

BQEMH and BQ(E)PH

Note: Include information on variants and versions this report covers, as applicable. Supporting documents may be annexed to this report

Inspection/Tests Required

Seats (Item 15a):

Seatbelt Anchorages (Item 19a):

Seatbelt Installation (Item 31a):

WTORS Anchorages:

WTORS Components – Dynamic Test

WTORS Components – Material Tests

WTORS Occupant Restraint Installation:

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

Not covered in this report

Yes

Not covered in this report

Yes

Yes

Yes

Yes



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Vehicle/Component Specification

Vehicle Type/Variant/Version:	Caddy SWB and Caddy Maxi
Wheelchair Front Tie-down Details:	EF3J (and see worst case)
Wheelchair Rear Tie-down Details:	BQEMJ (with "Triplock" end fitting) BQE16MK (with "Triplock" end fitting) (and see worst case)
Occupant Restraint Details:	SBT-11040-A

Manufacturer's Documentation

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

ad-hoc

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

Yes

Equipment	Serial / Certificate No.	Calibration due*
Data Acquisition	UIG133	09 April 2021
Accelerometers	UIG 108	21 September 2021
	UIG 275	21 September 2021
	UIG125	21 September 2021
	UIG 276	21 September 2021

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

Inspection/Test Requirements

Complies
Yes / NA

Seats (Item 15A)

See page 2

Seatbelt Anchorages (Item 19A)

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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.

Yes

AND/OR

Seatbelt anchorage testing carried out on modified/compromised seat
positions. (Give report number below.)

Yes

Details:

See report ESW527978 for LWB Caddy Maxi OEM row 2 effected
seats only



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Seatbelt Installation (Item 31A)

See page 2

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., 0.1.	Anchorage strength requirements are considered to be met if the dynamic WTORS component test is carried out in a representative body structure.	Yes
--	---	-----

Static Testing- Not Applicable Geometric Requirements

2018/858, Ann II, Part III, App 3., 1.2. R14.07, 5.4.2.2.	Side-view projected angles of the lines between the SWC P-point and the lower occupant anchorages are between 30 and 80 degrees from the horizontal.	Yes
2018/858, Ann II, Part III, App 3., 1.2.	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 1 g.	Yes



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2018/858, Ann II,
Part III, App 3,
2.3.1.

Test carried out in representative vehicle body structure*

OR

~~All anchorages on sled set up are within an absolute linear distance
of 50 mm from those on the vehicle*~~

Yes

*Strikethrough, as appropriate.

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.

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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 ⁺³⁰/₋₀ kPa.

Yes

Dynamic Test Results

ISO10542, Ann A,
4.1.(c)

Sled velocity change:

Test 1:48.9
Test 2:49.2
Test 3: 48.7
Test 4: 48.8

km/h

Yes

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



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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:

Test 1:154.62
Test 2:142.28
Test 3: 176.86
Test 4: 159.05

m m Limit: 200

- Horizontal excursion of ATD
knee:

Test 1:236.24
Test 2:241.27
Test 3: 221.42
Test 4: 240.41

m m Limit: 375

- Horizontal excursion of ATD
head:

Test 1:524.66
Test 2:536.41
Test 3: 454.24
Test 4:480.69

m m Limit: 650

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):

Minor burn marks on upper belt around upper anchorage point

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:

PV18-07711 and PV18-07712



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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 ^a
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
^a 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.

NA

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 ⁺²/₋₀ N, applied for a maximum of 3 ^{+0.5}/₋₀ seconds.

NA

Description of components and subjected to the above test and manner of partial engagement (with photographs, if applicable):



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WTORS Occupant Restraint Installation

2018/858, Ann II,
Part III, App 3.,
1.3.
R16.06, 8.2.2.

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:

Yes

R16.06, 8.2.2.1.

Straps are not liable to assume a dangerous configuration;

Yes

R16.06, 8.2.2.2.

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;

Yes

R16.06, 8.2.2.3.

Risk of the strap deteriorating through contact with sharp rigid parts of the vehicle or seat structure is reduced to a minimum;

Yes

R16.06, 8.2.2.4.

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.

Yes

R16.06, 8.3.1.

Rigid parts do not increase the risk of injury in the event of an accident.

Yes

R16.06, 8.3.2.

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.

Yes

R16.06, 8.3.2.

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.

Yes

R16.06, 8.3.2.

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 cm² and at least 46 mm in width, measured in a plane situated at a maximal distance of 2.5 mm from the contact surface.

Yes

R16.06, 8.3.3.

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.

Yes

R16.06, 8.3.4.

Belts incorporating retractors are installed so that they operate correctly and stow the strap efficiently.

Yes

Remarks

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Note: VCA apply measurement uncertainty to calibrated items but not test results.

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Annex I – Comparison of Vehicle and WTORS Test Geometry

Caddy SWB

Measured with arbitrary datum													
		Vehicle				WTORS Test							
		X	Y	Z		X	Y	Z					
Front left		1460	-225	-189		1460	-225	-189					
Front right		1460	225	-189		1460	225	-189					
Rear left		0	-150	-265		0	-150	-265					
Rear right		0	150	-265		0	150	-265					
LB		118	441	22		118	441	22					
LNB		118	441	22		118	441	22					
Upper		96	486	1116		96	486	1116					
Reel		46	618	77		46	618	77					
P point		561	0	300		561	0	300					
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*		899	-225	-489		899	-225	-489		0	0	0	0
Front right*		899	225	-489		899	225	-489		0	0	0	0
Rear left		-561	-150	-565		-561	-150	-565		0	0	0	0
Rear right		-561	150	-565		-561	150	-565		0	0	0	0
LB		-443	441	-278		-443	441	-278		0	0	0	0
LNB^		-443	441	-278		-443	441	-278		0	0	0	0
Upper		-465	486	816		-465	486	816		0	0	0	0
Reel^		-515	618	-223		-515	618	-223		0	0	0	0
P point		0	0	0		0	0	0		0	0	0	0



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Caddy Maxi

Rear left	0	-150	-283	0	-150	-297
Rear right	0	150	-283	0	150	-297
LB	118	-444	22	118	-444	22
LNB	118	444	22	118	444	22
Upper	72	486	1094	72	486	1094
Reel	63	618	77	50	618	77
P point	506	0	300	506	0	300

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*	734	-250	-561	734	-250	-561	0	0	0	0
Front right*	734	250	-561	734	250	-561	0	0	0	0
Rear left	-506	-150	-583	-506	-150	-597	0	0	14	14
Rear right	-506	150	-583	-506	150	-597	0	0	14	14
LB	-388	-444	-278	-388	-444	-278	0	0	0	0
LNB^	-388	444	-278	-388	444	-278	0	0	0	0
Upper	-434	486	794	-434	486	794	0	0	0	0
Reel^	-443	618	-223	-456	618	-223	13	0	0	13
P point	0	0	0	0	0	0	0	0	0	0

Test Number:	T-12831
Test Date:	3/17/2021
Test Engineer:	Ben Cox
Test House:	UDL
Witness 1:	Fraser Coulter
Witness 2:	Paul Nieuwenhuis

Customer:	Tripod Mobility
Address:	Collseweg 10
	5674 TR Nuenen
	Netherlands
	0
	0
	0

Test Objectives & Setup Details:
Caddy Maxi

Equipment Used In Test:		
Component	Description	Post Test
Occupant Restraint	SBT-11040-A	
Anchorage Type	Bolted	
3rd Point Restraint	SBT-11040-A	
Anchorage Type	Bolted	
Front Tie-Down	EF3J	
Anchorage Type	Bolted	
Rear Tie-Down	BQEMJ	
Anchorage Type	Bolted	
Combined System	N/A	
Anchorage Type	N/A	
Wheelchair	90Kg (+- 1Kg)	
ATD	50th %ile Hybrid 3	

Instrumentation:			
Type	Variant	Unwin ID	Last Calibration
Data Acquisition	BR00476	UIG 133	09/04/2020
Accelerometer	Sled Accelerometer (UIG108)	UIG108	09/21/2020 10:28:46
Accelerometer	Sled Accelerometer (UIG 275)	UIG 275	09/21/2020 10:31:31
Accelerometer	Sled Accelerometer (UIG 125)	UIG 125	09/21/2020 10:27:17
Accelerometer	Sled Accelerometer (UIG 276)	UIG 276	09/21/2020 10:23:05

Post Test Observations According to ISO 10542-1:2012

a	ATD Shall be retained in seat of the SWC	
b	The SWC shall remain in an upright position on the impact sled	
c	No WTORS anchorage components or securement end fittings shall be detached or separated	
d	Release of the SWC from the wheelchair tie-down shall not require the use of tools	
e	Release of the ATD from the occupant restraint shall not require the use of tools	
f	No part of the WTORS shall exhibit visible signs of tearing, fragmentation, fracture or complete failure of any load-bearing part unless such parts are intended to fail in a manner that limits the forces on the occupant	
g	The WTORS shall exhibit no dangerous roughness, sharp edges or protrusions likely to increase the risk of injury to the occupant	
h	The force required to open the buckle of any tie down or occupant restraint components shall not exceed 60N when tested as specified by 6.2.2.5 of ECE R16:1996, in accordance with the procedures of 7.8	

During Test Observations According to ISO 10542-1:2012

		Result	Complies?
a	The horizontal excursion of the test wheelchair P-Point (Xwc) shall not exceed 200mm	155 mm	Passed
b	The horizontal excursion of the ATD Knee (Xknee) shall not exceed 375mm	236 mm	Passed
c	The horizontal excursion of the ATD Head (Xhead) shall not exceed 650mm	525 mm	Passed
d	The WTORS shall prevent the wheelchair from imposing forward loads on the occupant Ratio of Xknee / XWC to be greater than or equal to 1.1	1.53	Passed
e	Inbound velocity (delta V 48kph +2 -0)	48.9 km.h-1	Passed
f	Cumulative Time to hold 20g (>15ms)	36.3 ms	Passed
h	Cumulative Time to hold 15g (>40ms)	81.0 ms	Passed

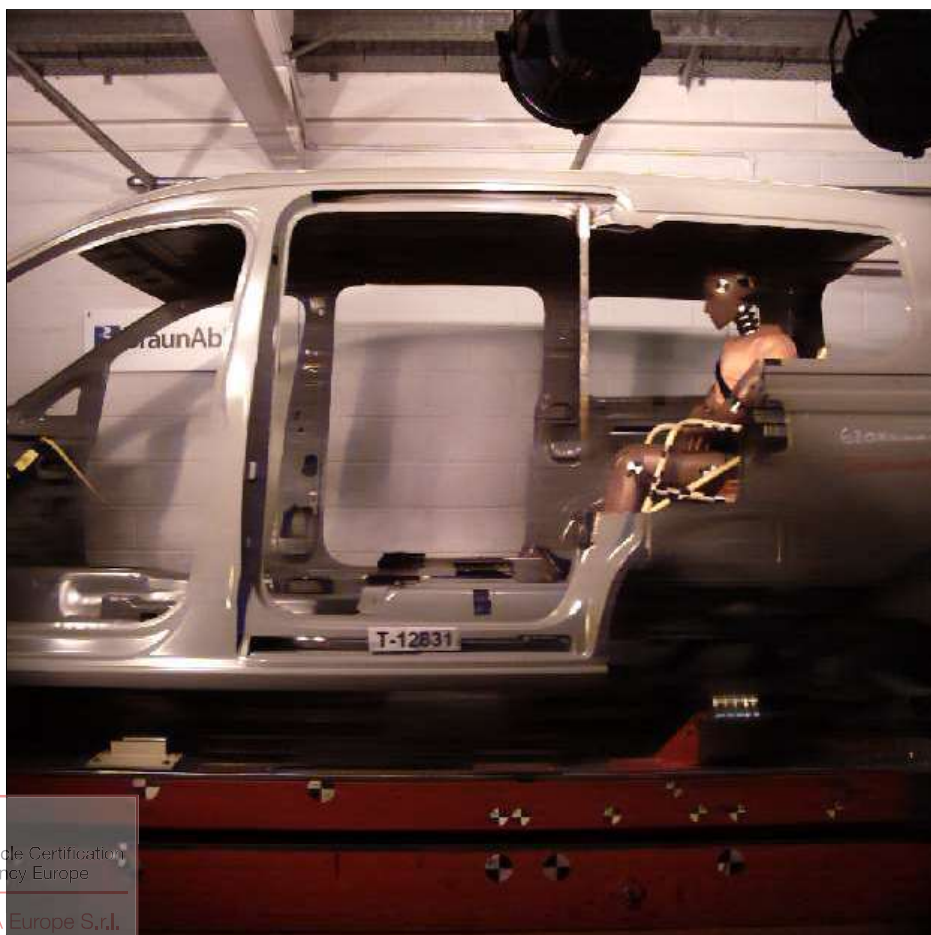
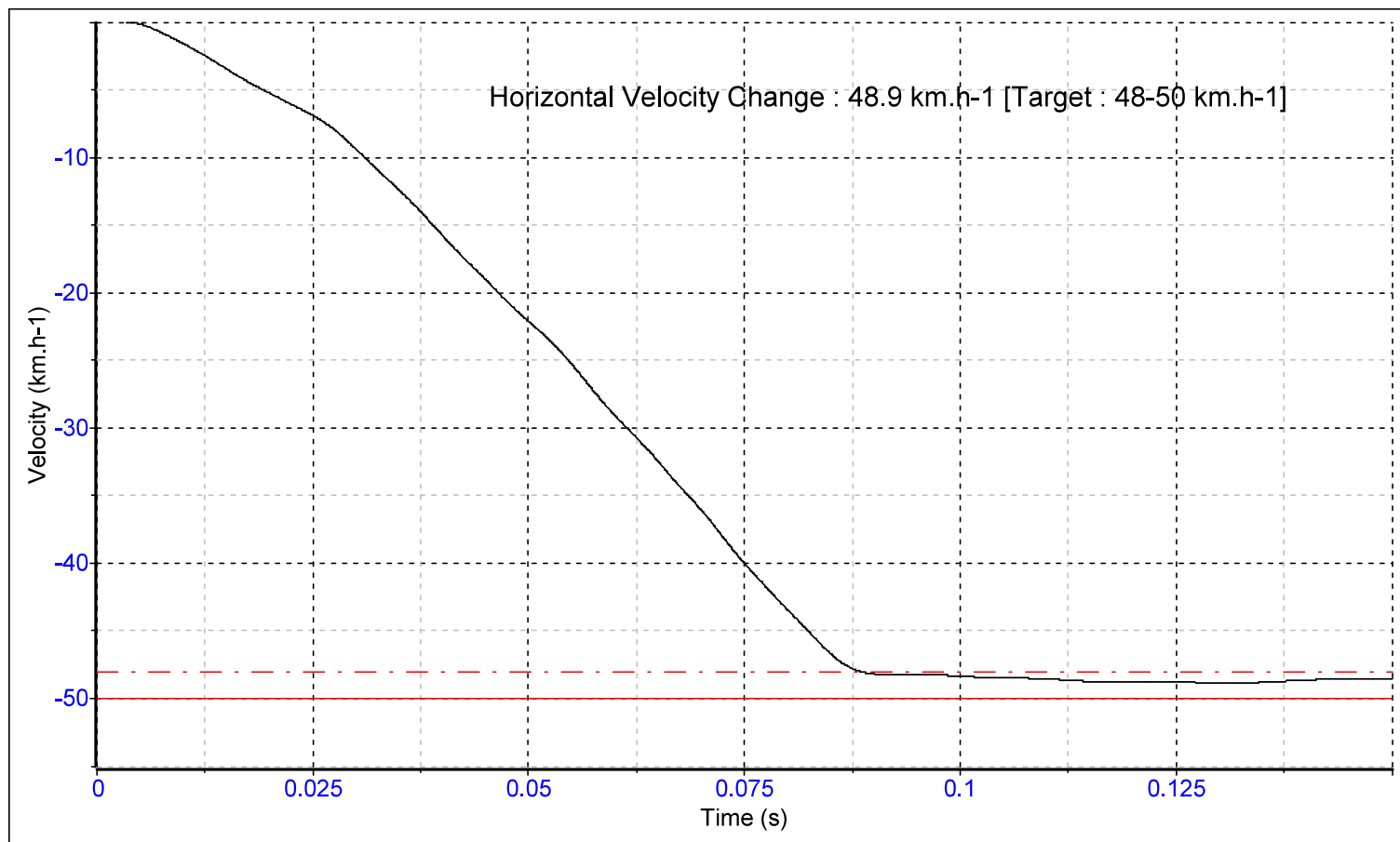
Test Pass or Fail Overall

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Notes

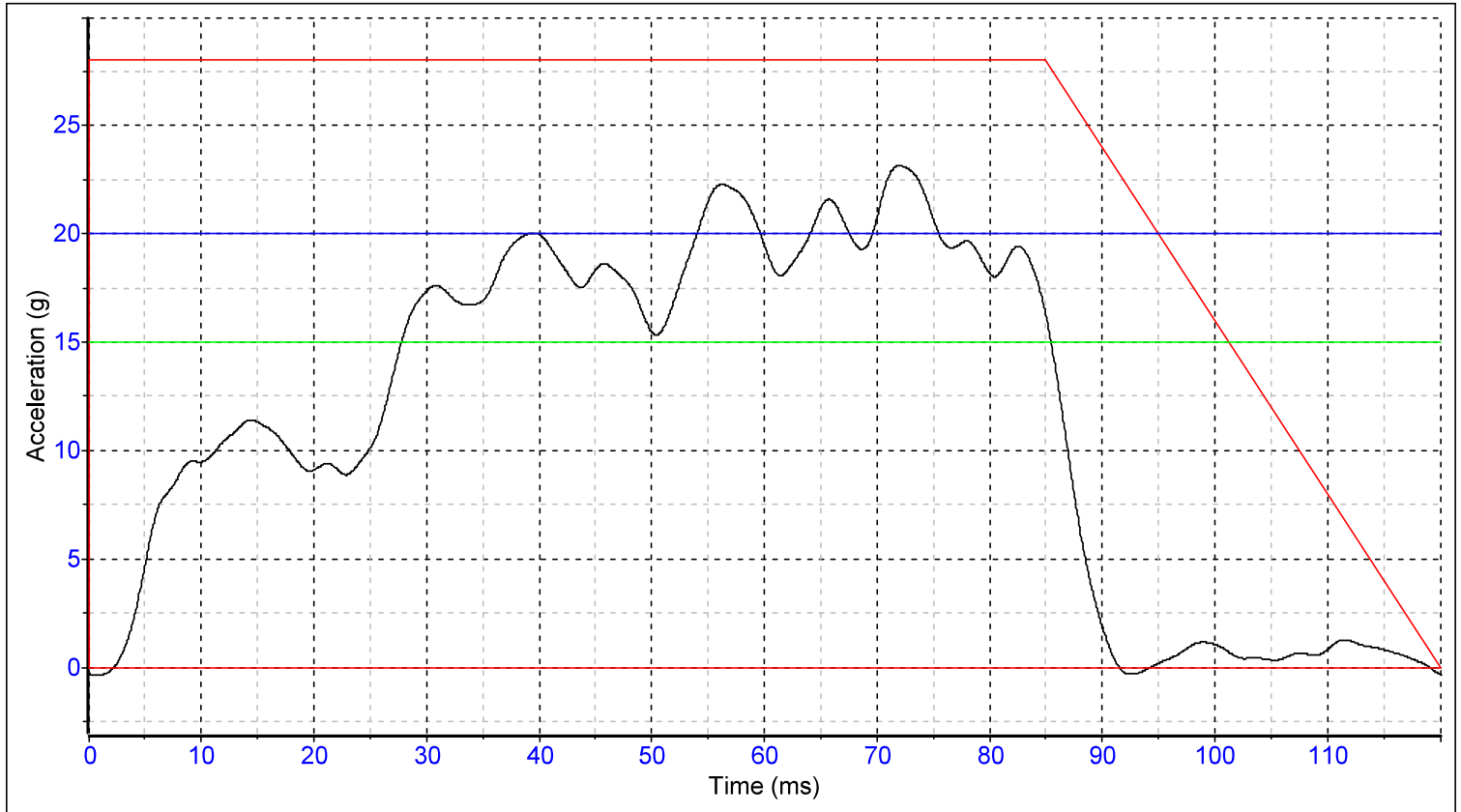
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Pulse Graph for Velocity T-12831



Camera Frame Rate = 1000 Fps

Pulse Graph for Deceleration T-12831



Time at 20g (Single Peak) : 8.7 ms [t1 : 69.7 ms, t2 : 75.5 ms] (Cumulative) : 36.3 ms

Time at 15g (Single Peak) : 57.6 ms [t1 : 27.8 ms, t2 : 85.5 ms] (Cumulative) : 81.0 ms



Camera Frame Rate = 1000 Fps

Test Photos T-12831

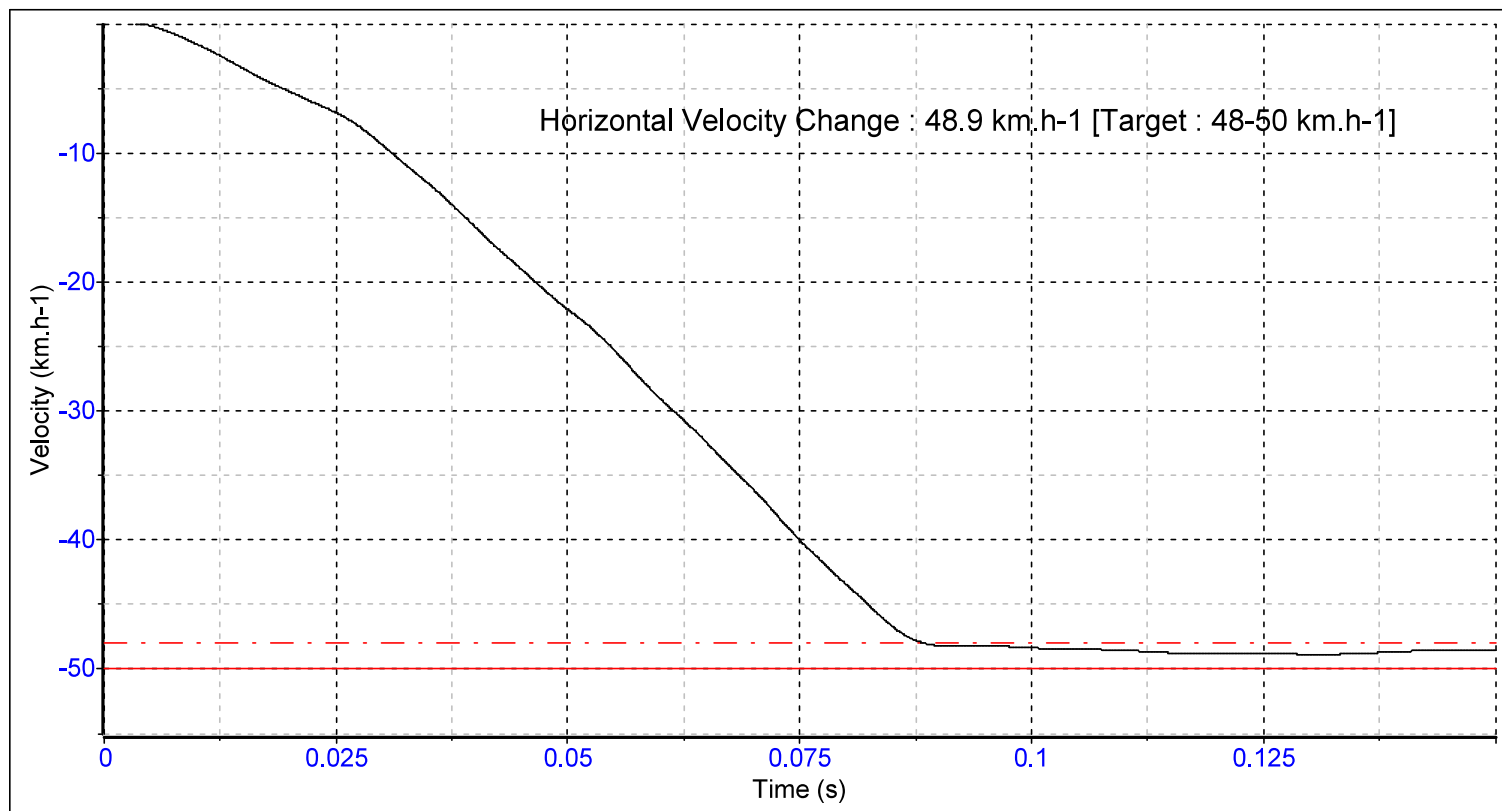


Pre Test

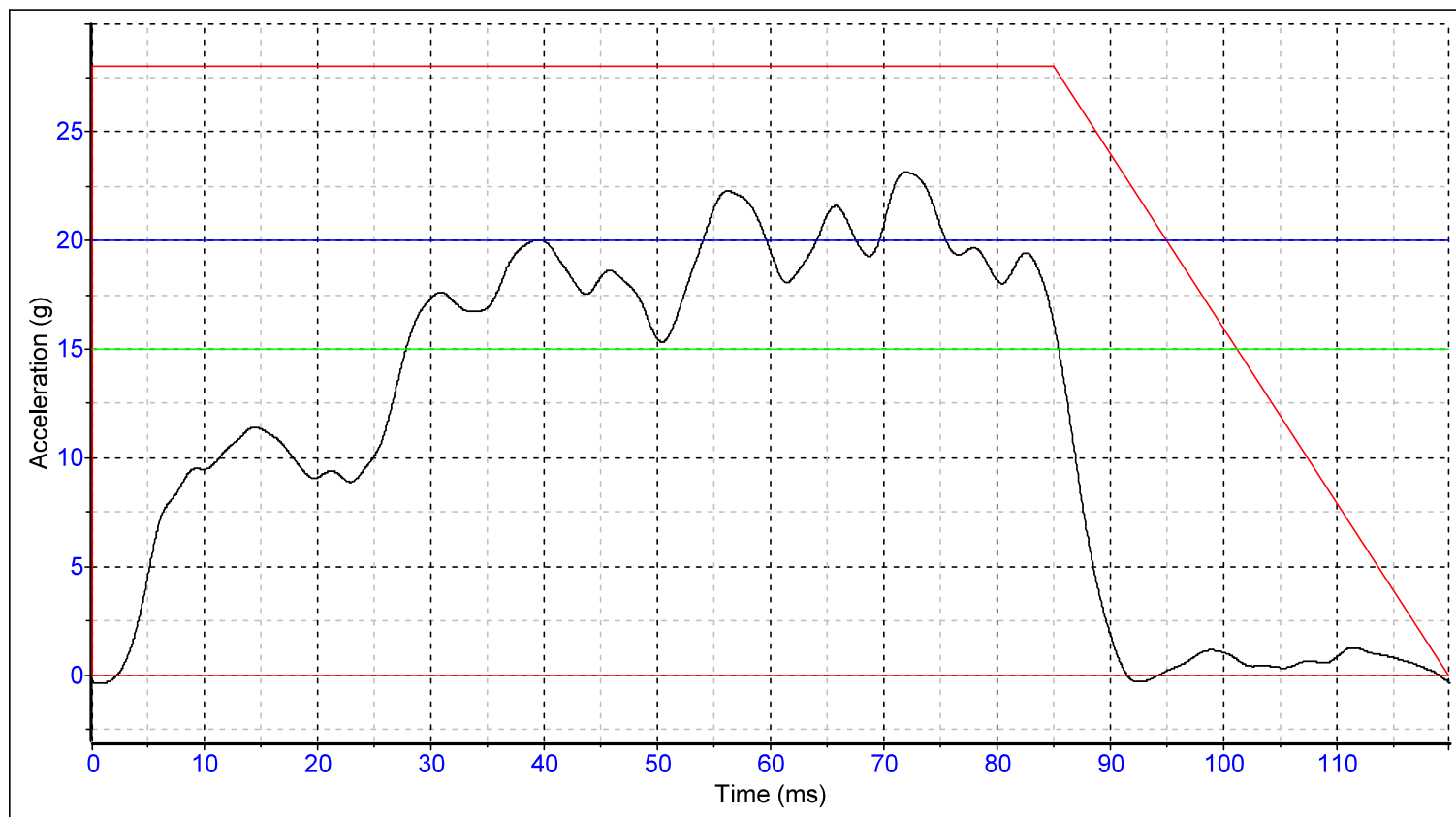


Post Test

Pulse Graph for Velocity T-12831



Pulse Graph for Deceleration T-12831



Excursions T-12831



Excursion Measurements

SWC Excursion = 154.62 mm

Max Excursion = 200 mm

Knee Excursion = 236.24 mm

Max Excursion = 375 mm

Head Excursion = 524.66 mm

Max Excursion = 650 mm

Ratio Knee / SWC = 1.53

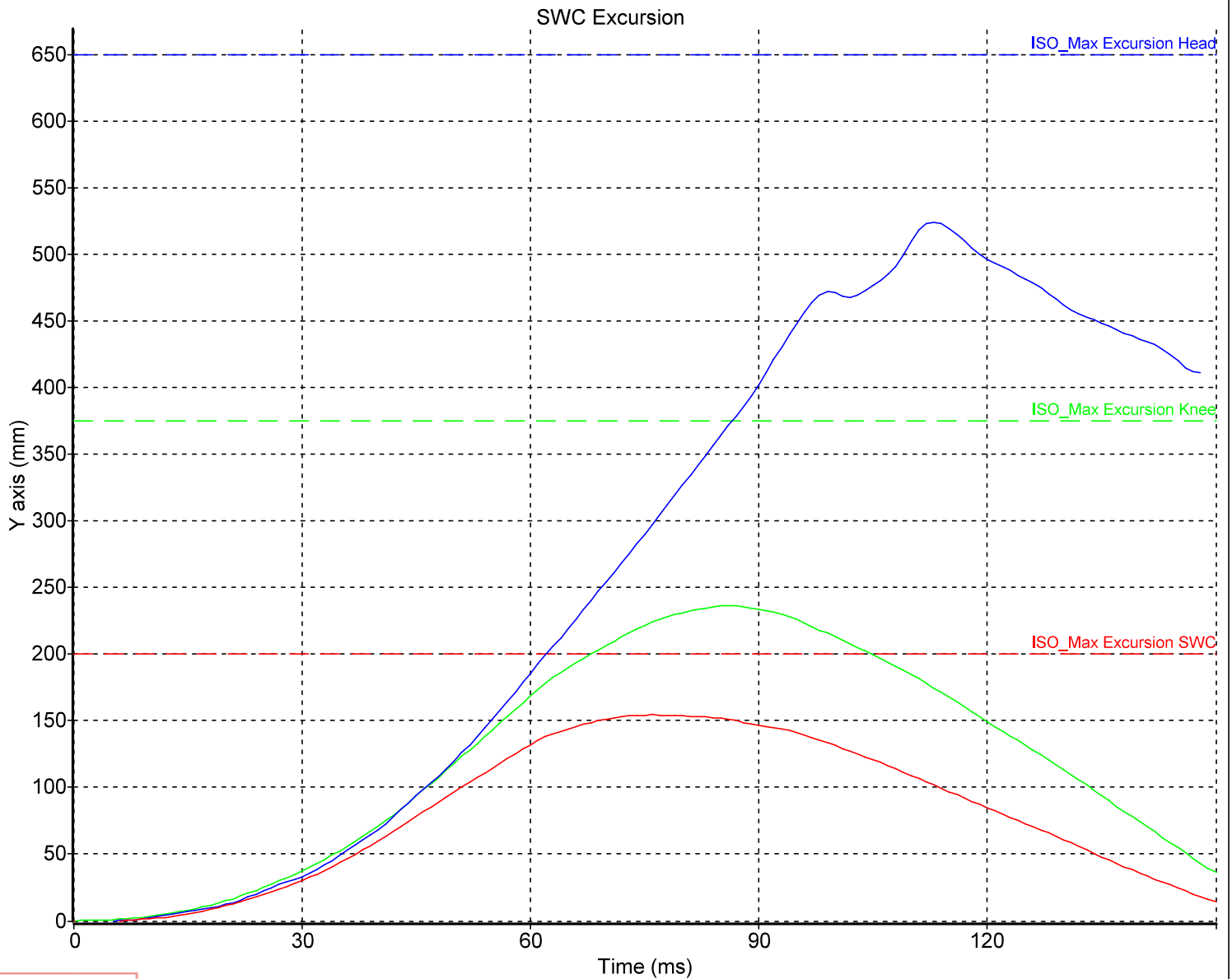
Video Depth Perception

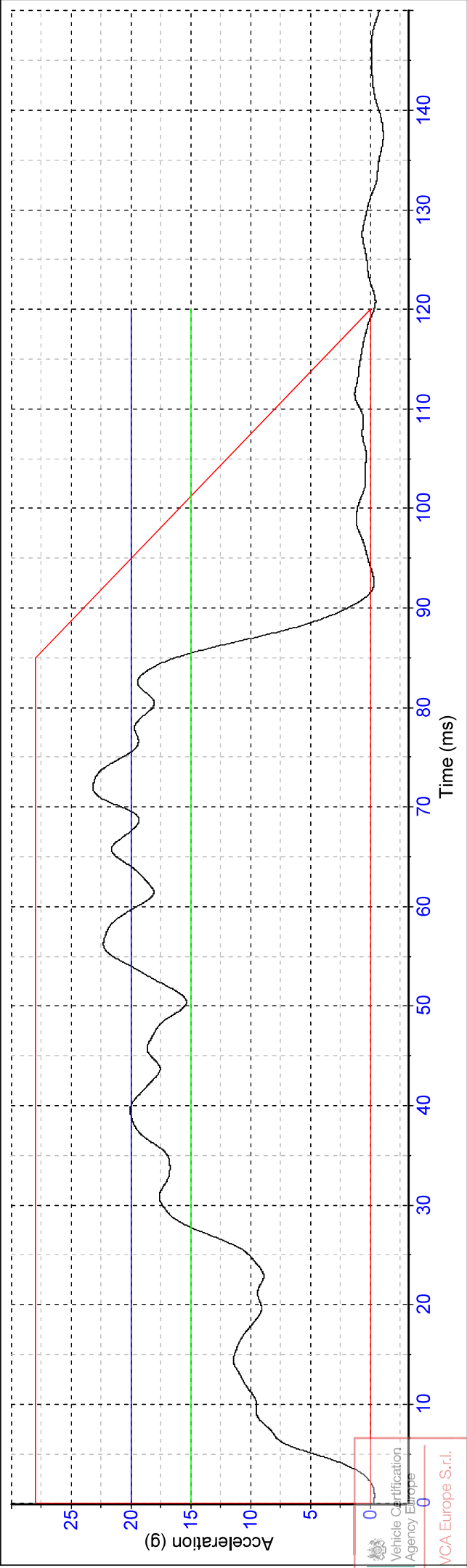
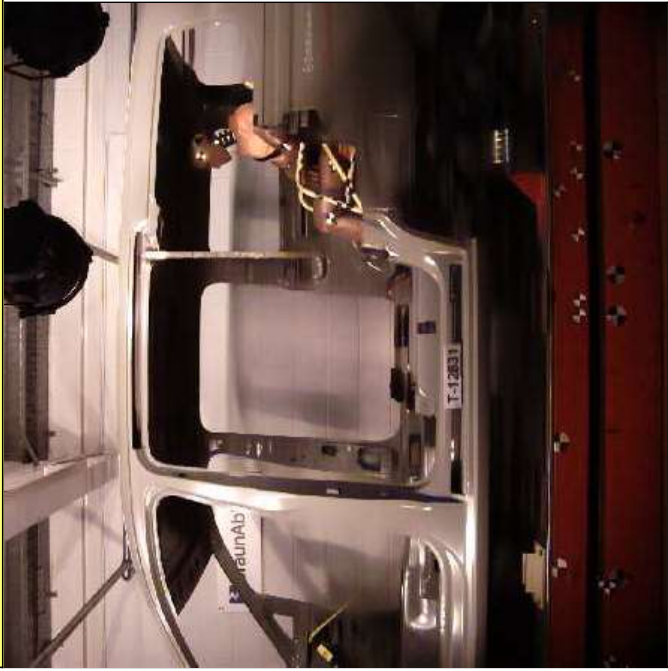
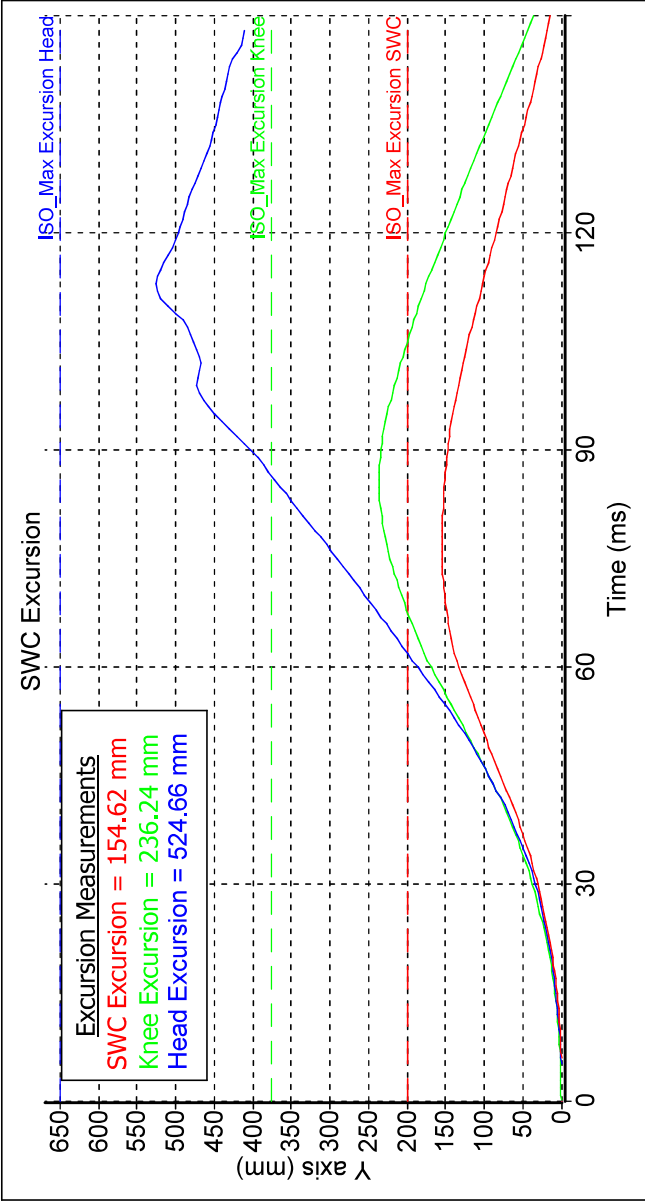
Camera to Sled = 3019 mm

Sled to SWC = 548 mm

Sled to Knee = 635 mm

Sled to Head = 687.00 mm





Test Number:	T-12833
Test Date:	3/17/2021
Test Engineer:	Ben Cox
Test House:	UDL
Witness 1:	Fraser Coulter
Witness 2:	Paul Nieuwenhuis

Customer:	Tripod Mobility
Address:	Collseweg 10
	5674 TR Nuenen
	Netherlands
	0
	0
	0

Test Objectives & Setup Details:	
Caddy Maxi	

Equipment Used In Test:		
Component	Description	Post Test
Occupant Restraint	SBT-11040-A	Pass
Anchorage Type	Bolted	Pass
3rd Point Restraint	SBT-11040-A	Pass
Anchorage Type	Bolted	Pass
Front Tie-Down	EF3J	Pass
Anchorage Type	Bolted	Pass
Rear Tie-Down	BQE16MK	Pass
Anchorage Type	Bolted	Pass
Combined System	N/A	Pass
Anchorage Type	N/A	Pass
Wheelchair	90Kg (+- 1Kg)	Pass
ATD	50th %ile Hybrid 3	Pass

Instrumentation:			
Type	Variant	Unwin ID	Last Calibration
Data Acquisition	BR00476	UIG 133	09/04/2020
Accelerometer	Sled Accelerometer (UIG108)	UIG108	09/21/2020 10:28:46
Accelerometer	Sled Accelerometer (UIG 275)	UIG 275	09/21/2020 10:31:31
Accelerometer	Sled Accelerometer (UIG 125)	UIG 125	09/21/2020 10:27:17
Accelerometer	Sled Accelerometer (UIG 276)	UIG 276	09/21/2020 10:23:05

Post Test Observations According to ISO 10542 PAS 2012

a	ATD Shall be retained in seat of the SWC	Pass
b	The SWC shall remain in an upright position on the impact sled	Pass
c	No WTORS anchorage components or securement end fittings shall be detached or separated	Pass
d	Release of the SWC from the wheelchair tie-down shall not require the use of tools	Pass
e	Release of the ATD from the occupant restraint shall not require the use of tools	Pass
f	No part of the WTORS shall exhibit visible signs of tearing, fragmentation, fracture or complete failure of any load-bearing part unless such parts are intended to fail in a manner that limits the forces on the occupant	Pass
g	The WTORS shall exhibit no dangerous roughness, sharp edges or protrusions likely to increase the risk of injury to the occupant	Pass
h	The force required to open the buckle of any tie down or occupant restraint components shall not exceed 60N when tested as specified by 6.2.2.5 of ECE R16:1996, in accordance with the procedures of 7.8	Pass

During Test Observations According to ISO 10542 PAS 2012

		Result	Complies?
a	The horizontal excursion of the test wheelchair P-Point (Xwc) shall not exceed 200mm	142 mm	Passed
b	The horizontal excursion of the ATD Knee (Xknee) shall not exceed 375mm	241 mm	Passed
c	The horizontal excursion of the ATD Head (Xhead) shall not exceed 650mm	536 mm	Passed
d	The WTORS shall prevent the wheelchair from imposing forward loads on the occupant Ratio of Xknee / XWC to be greater than or equal to 1.1	1.70	Passed
e	Inbound velocity (delta V 48kph +2 -0)	49.2 km.h-1	Passed
f	Cumulative Time to hold 20g (>15ms)	21.9 ms	Passed
h	Cumulative Time to hold 15g (>40ms)	59.2 ms	Passed

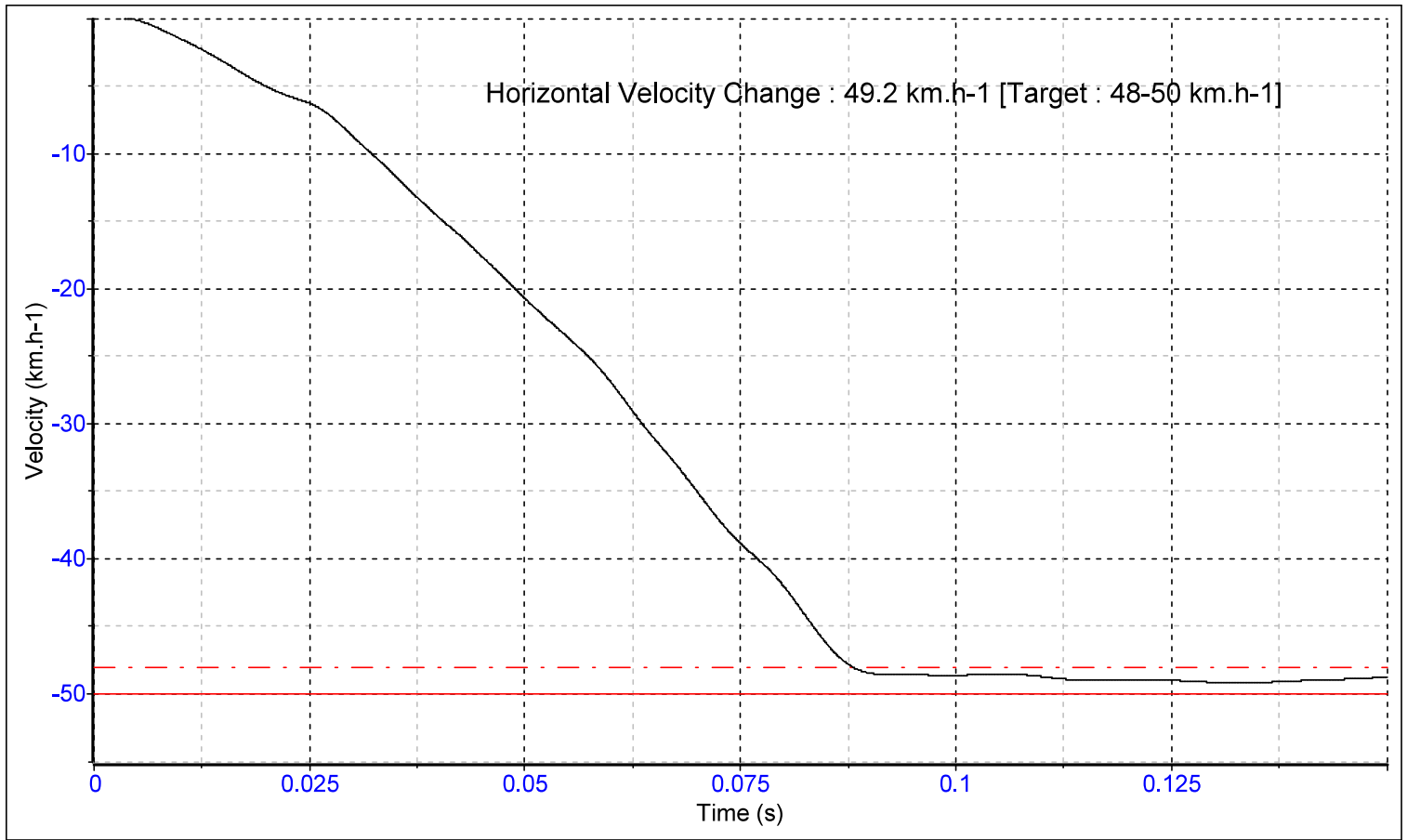
Test Pass or Fail Overall

Pass

Notes

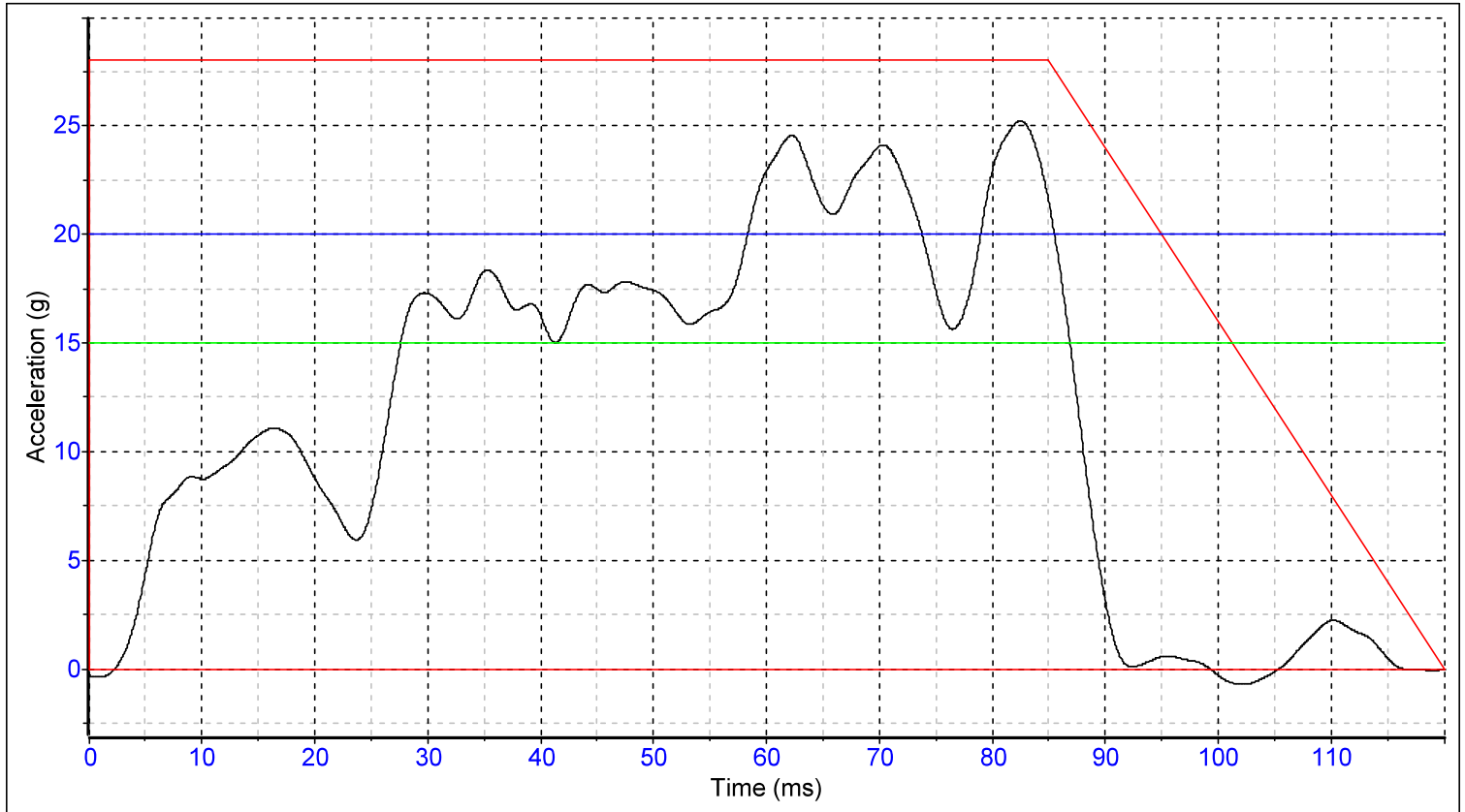
pulse and excursions are good

Pulse Graph for Velocity T-12833



Camera Frame Rate = 1000 Fps

Pulse Graph for Deceleration T-12833



Time at 20g (Single Peak) : 15.4 ms [t1 : 79.0 ms, t2 : 85.5 ms] (Cumulative) : 21.9 ms

Time at 15g (Single Peak) : 59.2 ms [t1 : 27.7 ms, t2 : 86.9 ms] (Cumulative) : 59.2 ms



Camera Frame Rate = 1000 Fps

Test Photos T-12833

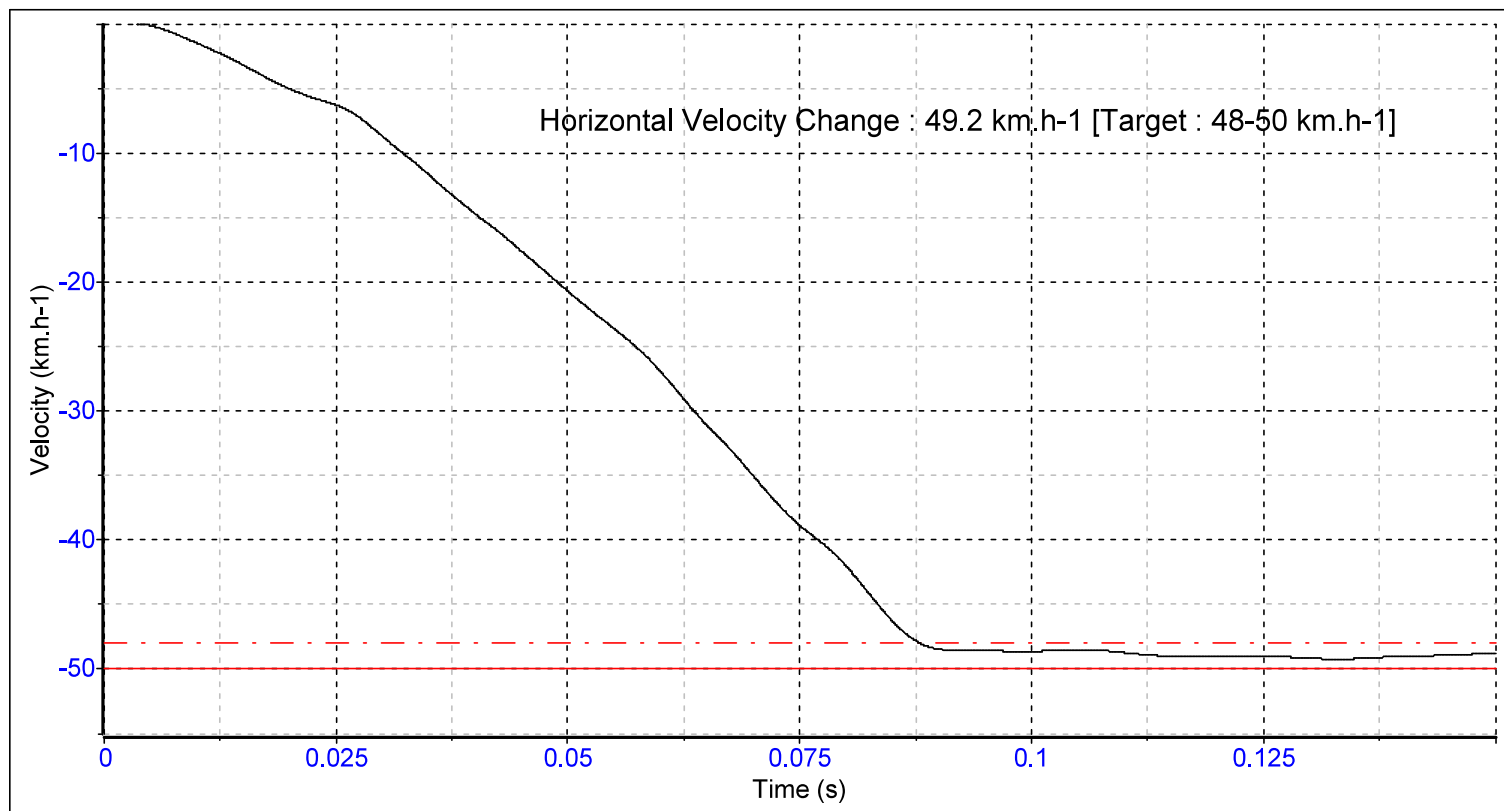


Pre Test

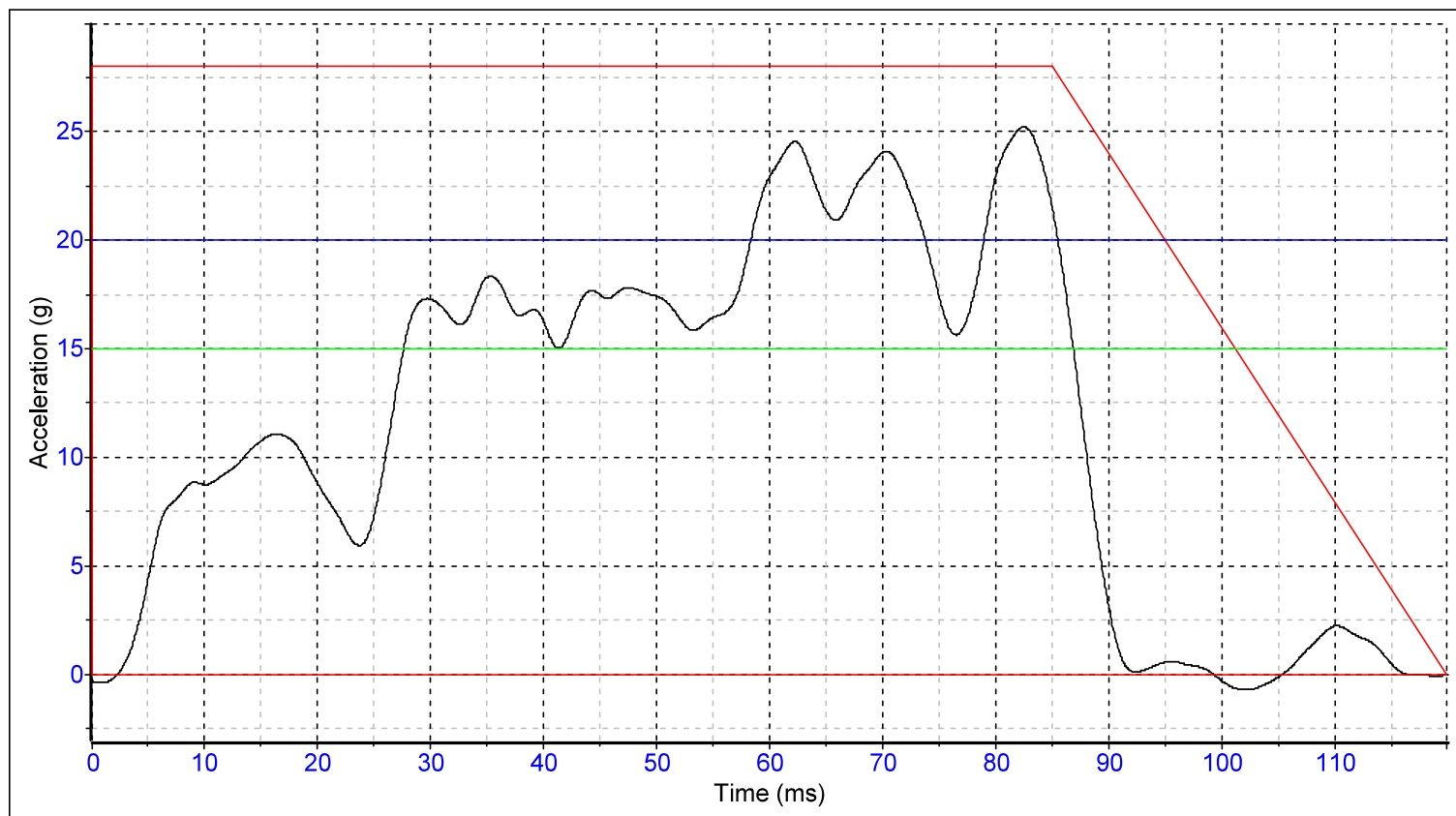


Post Test

Pulse Graph for Velocity T-12833



Pulse Graph for Deceleration T-12833



Excursions T-12833



Excursion Measurements

SWC Excursion = 142.28 mm

Max Excursion = 200 mm

Knee Excursion = 241.27 mm

Max Excursion = 375 mm

Head Excursion = 536.41 mm

Max Excursion = 650 mm

Ratio Knee / SWC = 1.70

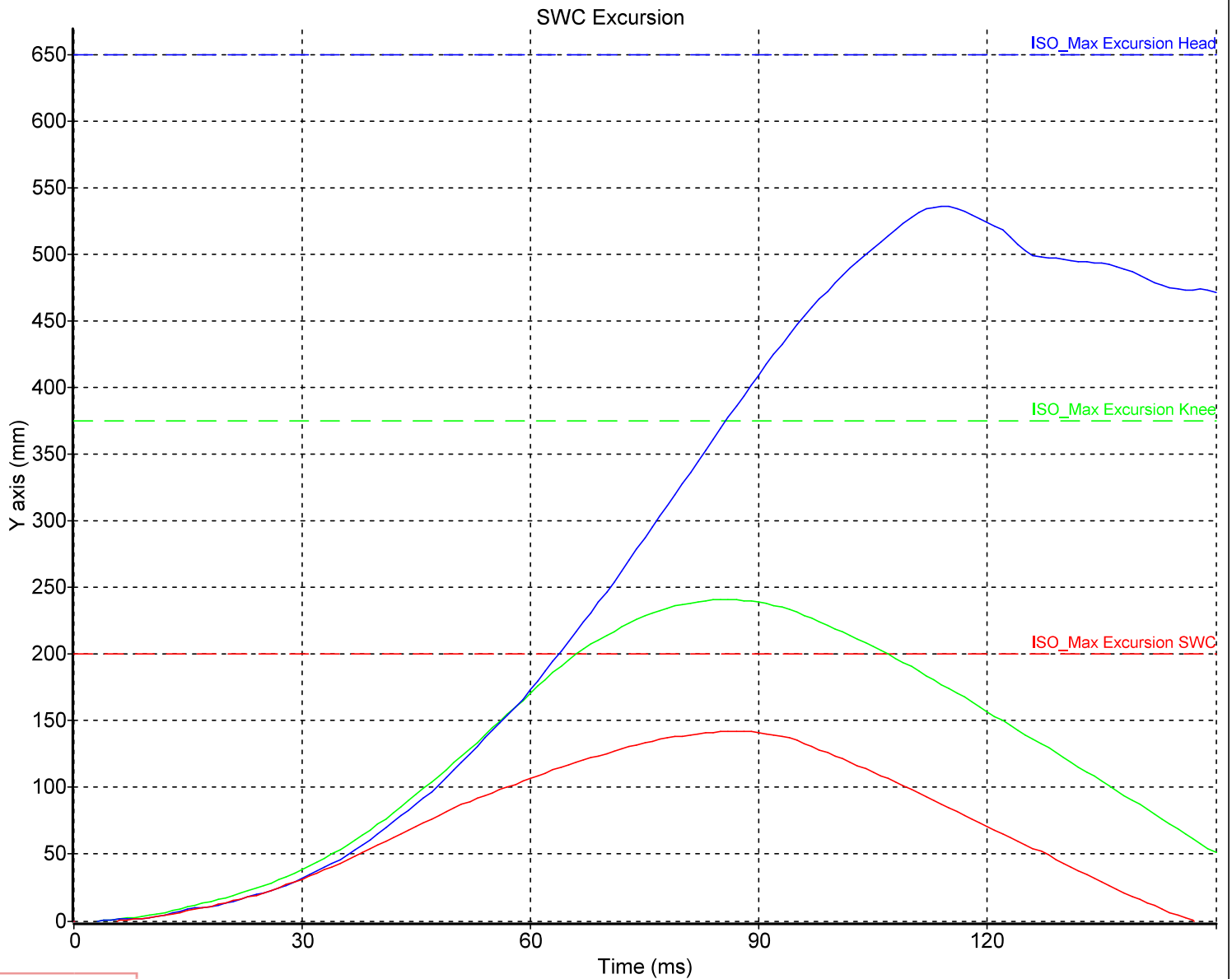
Video Depth Perception

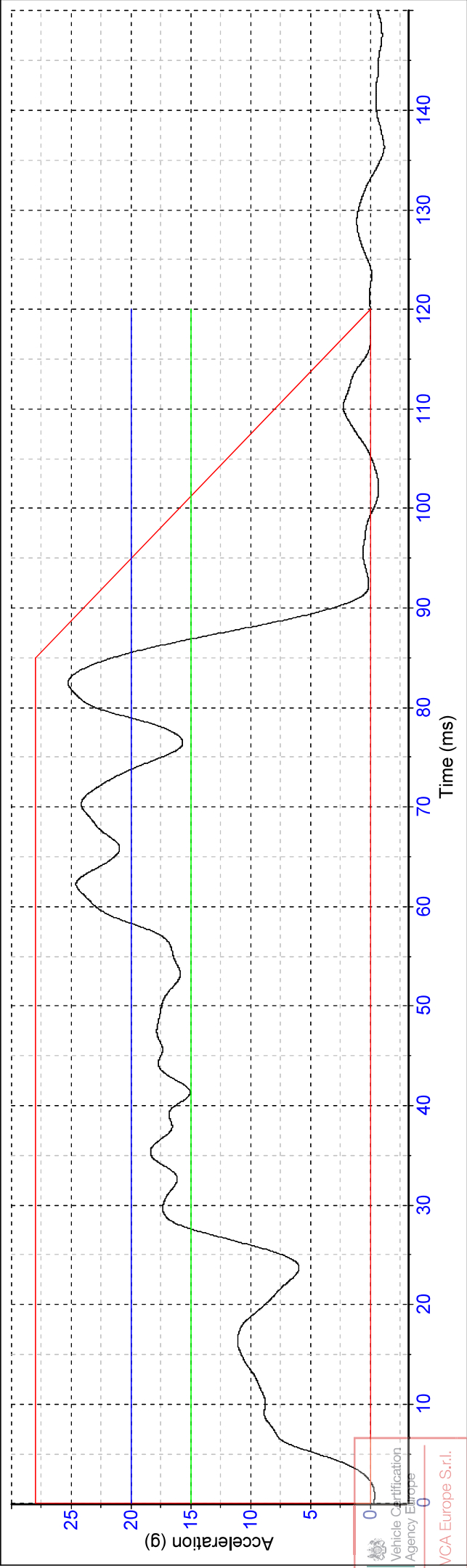
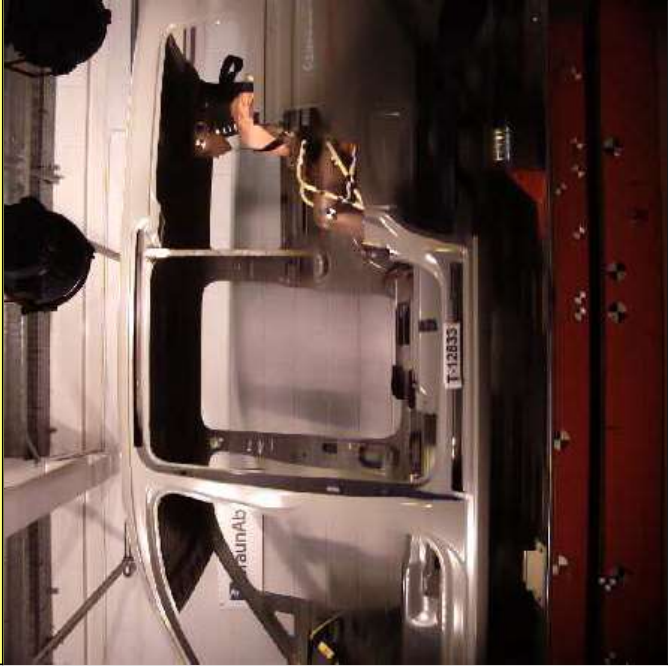
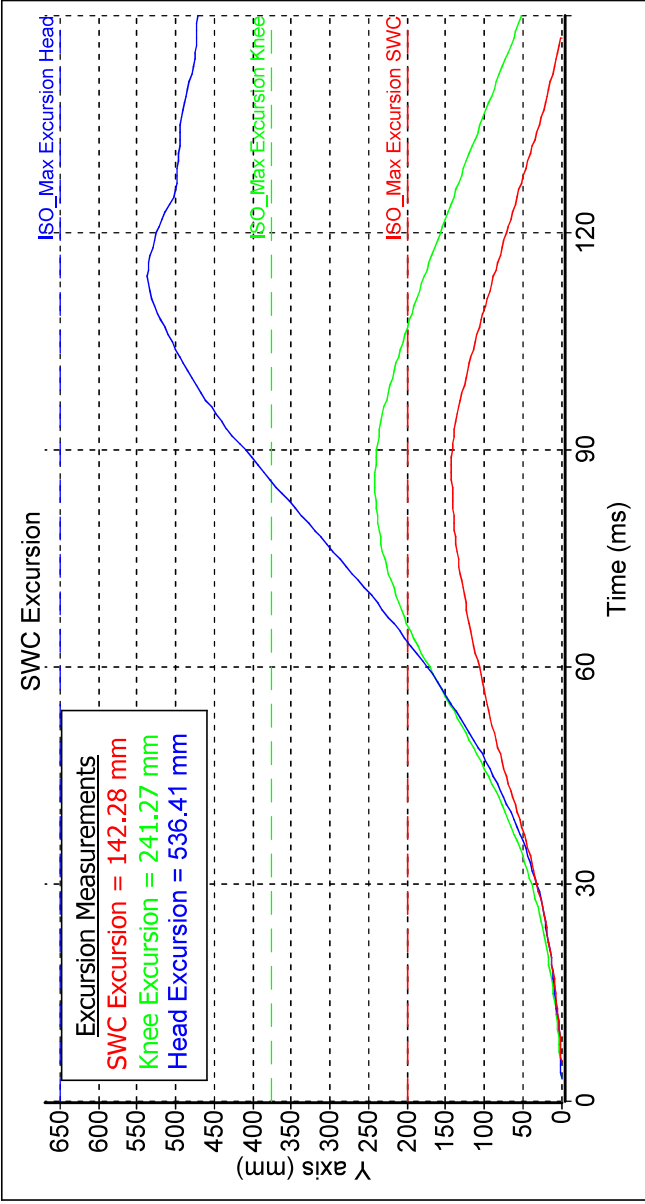
Camera to Sled = 3019 mm

Sled to SWC = 548 mm

Sled to Knee = 635 mm

Sled to Head = 687.00 mm





Test Number:	T-12837
Test Date:	3/12/2021
Test Engineer:	Gavin Pike
Test House:	UDL
Witness 1:	Fraser Coulter
Witness 2:	Paul Nieuwenhuis

Customer:	Tripod Mobility
Address:	Collseweg 10
	5674 TR Nuenen
	Netherlands
	0
	0
	0

Test Objectives & Setup Details:

Caddy SWB. Test 10

Equipment Used In Test:

Component	Description	Post Test
Occupant Restraint	N/A	Pass
Anchorage Type	N/A	Pass
3rd Point Restraint	N/A	Pass
Anchorage Type	N/A	Pass
Front Tie-Down	N/A	Pass
Anchorage Type	N/A	Pass
Rear Tie-Down	N/A	Pass
Anchorage Type	N/A	Pass
Combined System	N/A	Pass
Anchorage Type	N/A	Pass
Wheelchair	90Kg (+- 1Kg)	Pass
ATD	50th %ile N/A	Pass

Instrumentation:

Type	Variant	Unwin ID	Last Calibration
Data Acquisition	BR00476	UIG 133	09/04/2020
Accelerometer	Sled Accelerometer (UIG108)	UIG108	09/21/2020 10:28:46
Accelerometer	Sled Accelerometer (UIG 275)	UIG 275	09/21/2020 10:31:31
Accelerometer	Sled Accelerometer (UIG 125)	UIG 125	09/21/2020 10:27:17
Accelerometer	Sled Accelerometer (UIG 276)	UIG 276	09/21/2020 10:23:05

Post Test Observations According to Reg 17

a	ATD Shall be retained in seat of the SWC	Pass
b	The SWC shall remain in an upright position on the impact sled	Pass
c	No WTORS anchorage components or securement end fittings shall be detached or separated	Pass
d	Release of the SWC from the wheelchair tie-down shall not require the use of tools	Pass
e	Release of the ATD from the occupant restraint shall not require the use of tools	Pass
f	No part of the WTORS shall exhibit visible signs of tearing, fragmentation, fracture or complete failure of any load-bearing part unless such parts are intended to fail in a manner that limits the forces on the occupant	Pass
g	The WTORS shall exhibit no dangerous roughness, sharp edges or protrusions likely to increase the risk of injury to the occupant	Pass
h	The force required to open the buckle of any tie down or occupant restraint components shall not exceed 60N when tested as specified by 6.2.2.5 of ECE R16:1996, in accordance with the procedures of 7.8	Pass

During Test Observations According to Reg 17

		Result	Complies?
a	The horizontal excursion of the test wheelchair P-Point (Xwc) shall not exceed 200mm	177 mm	Passed
b	The horizontal excursion of the ATD Knee (Xknee) shall not exceed 375mm	221 mm	Passed
c	The horizontal excursion of the ATD Head (Xhead) shall not exceed 650mm	454 mm	Passed
d	The WTORS shall prevent the wheelchair from imposing forward loads on the occupant Ratio of Xknee / XWC to be greater than or equal to 1.1	1.25	Passed
e	Inbound velocity (delta V 48kph +2 -0)	48.7 km.h-1	Passed
f	Cumulative Time to hold 20g (>15ms)	24.5 ms	Passed
h	Cumulative Time to hold 15g (>40ms)	50.2 ms	Passed

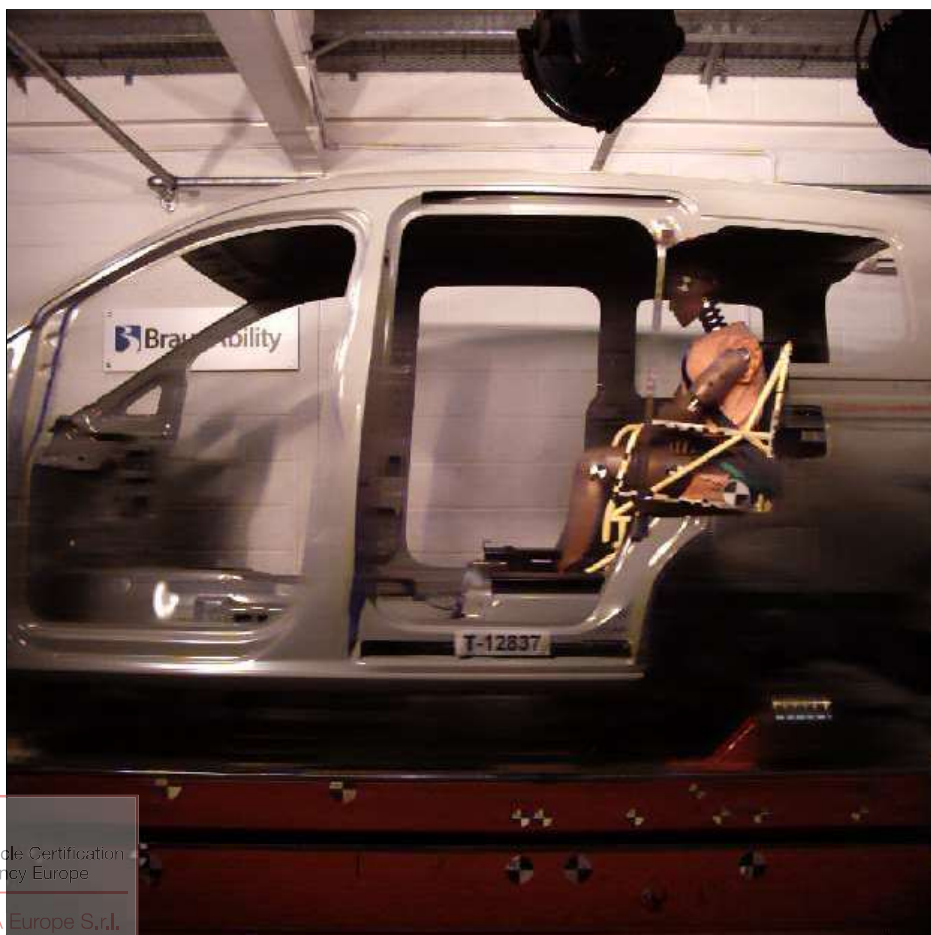
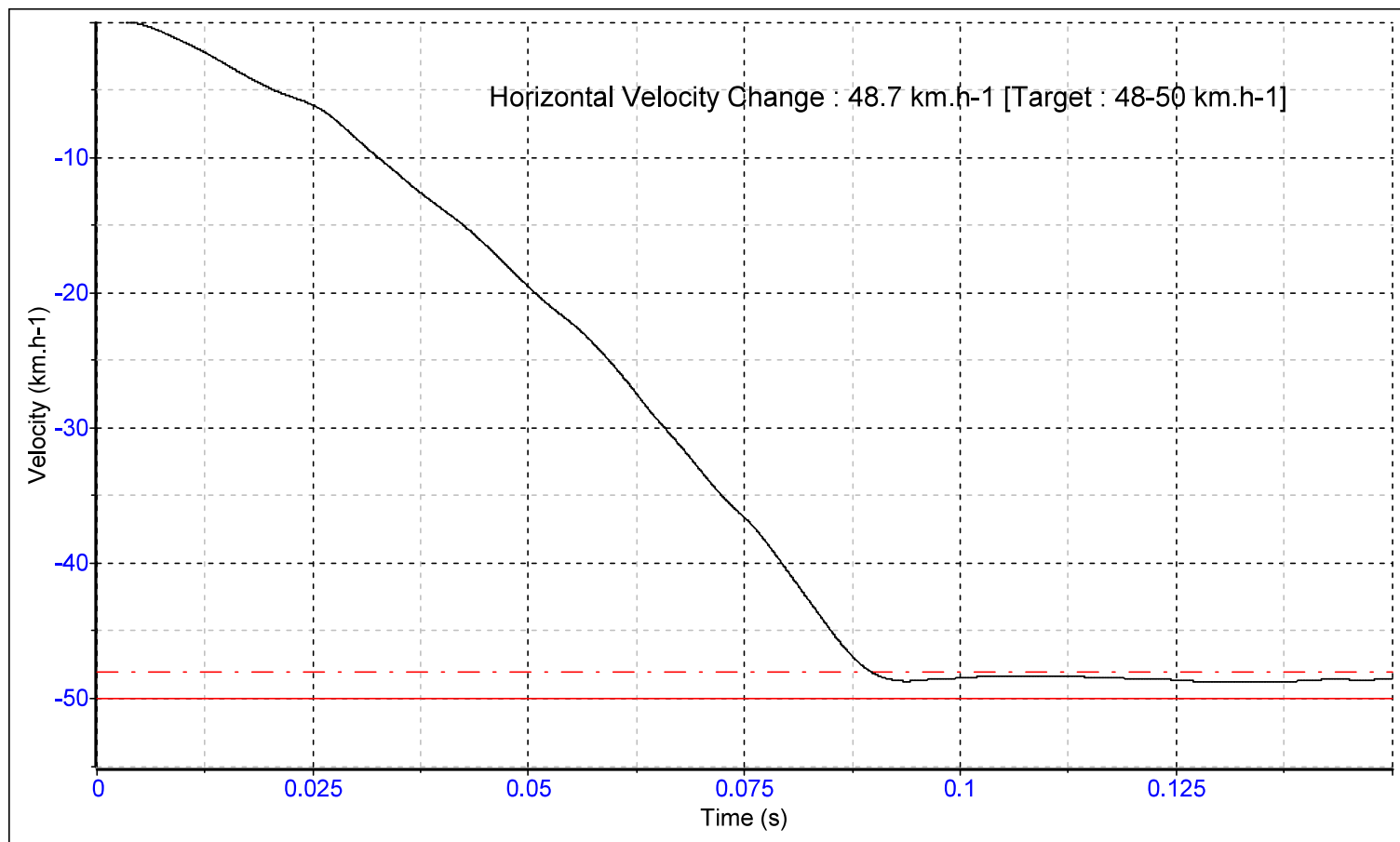
Test Pass or Fail Overall

Pass

Notes

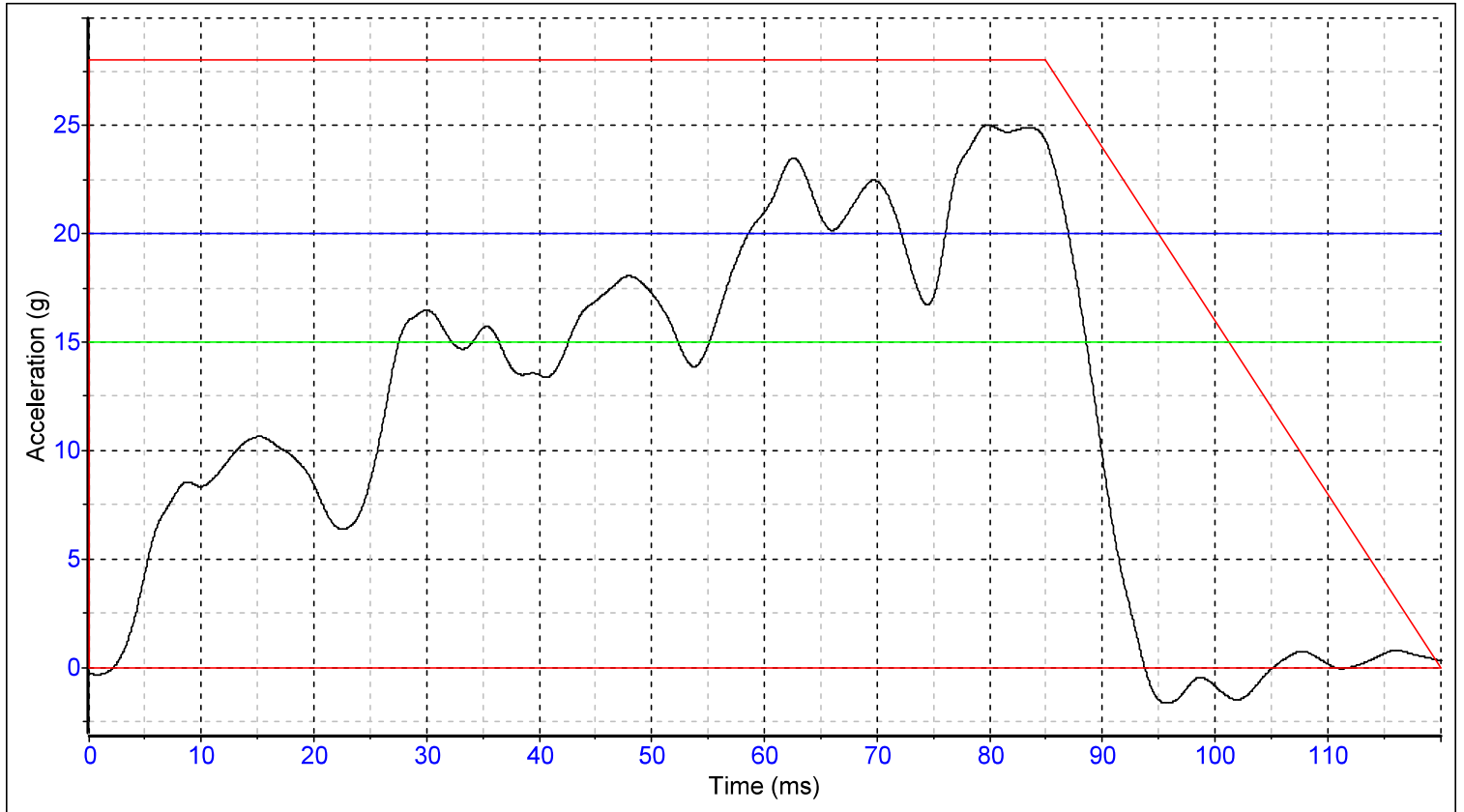
All passed to standards

Pulse Graph for Velocity T-12837



Camera Frame Rate = 1000 Fps

Pulse Graph for Deceleration T-12837



Time at 20g (Single Peak) : 13.5 ms [t1 : 76.1 ms, t2 : 87.0 ms] (Cumulative) : 24.5 ms

Time at 15g (Single Peak) : 33.4 ms [t1 : 55.2 ms, t2 : 88.5 ms] (Cumulative) : 50.2 ms



Camera Frame Rate = 1000 Fps

Excursions T-12837



Excursion Measurements

SWC Excursion = 176.86 mm

Max Excursion = 200 mm

Knee Excursion = 221.42 mm

Max Excursion = 375 mm

Head Excursion = 454.24 mm

Max Excursion = 650 mm

Ratio Knee / SWC = 1.25

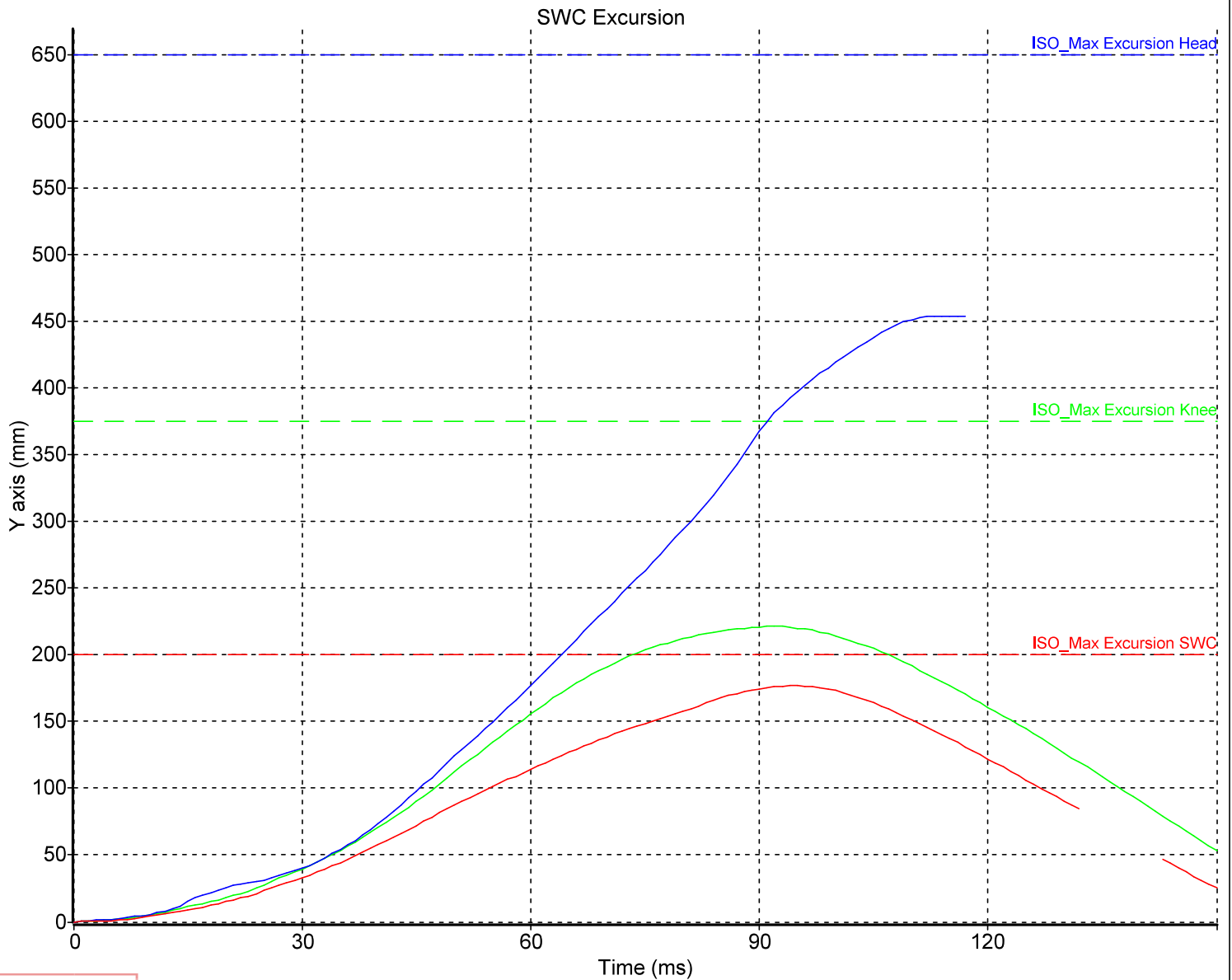
Video Depth Perception

Camera to Sled = 3019 mm

Sled to SWC = 548 mm

Sled to Knee = 635 mm

Sled to Head = 687.00 mm



Test Number:	T-12839
Test Date:	3/15/2021
Test Engineer:	Gavin Pike
Test House:	UDL
Witness 1:	Fraser Coulter
Witness 2:	Paul Nieuwenhuis

Customer:	Tripod Mobility
Address:	Collseweg 10
	5674 TR Nuenen
	Netherlands
	0
	0
	0

Test Objectives & Setup Details:
Caddy SWB. 85kg test

Equipment Used In Test:		
Component	Description	Post Test
Occupant Restraint	N/A	
Anchorage Type	N/A	
3rd Point Restraint	N/A	
Anchorage Type	N/A	
Front Tie-Down	N/A	
Anchorage Type	N/A	
Rear Tie-Down	N/A	
Anchorage Type	N/A	
Combined System	N/A	
Anchorage Type	N/A	
Wheelchair	90Kg (+- 1Kg)	
ATD	50th %ile N/A	

Instrumentation:			
Type	Variant	Unwin ID	Last Calibration
Data Acquisition	BR00476	UIG 133	09/04/2020
Accelerometer	Sled Accelerometer (UIG108)	UIG108	09/21/2020 10:28:46
Accelerometer	Sled Accelerometer (UIG 275)	UIG 275	09/21/2020 10:31:31
Accelerometer	Sled Accelerometer (UIG 125)	UIG 125	09/21/2020 10:27:17
Accelerometer	Sled Accelerometer (UIG 276)	UIG 276	09/21/2020 10:23:05

Post Test Observations According to ISO 10542-1:2012

a	ATD Shall be retained in seat of the SWC	
b	The SWC shall remain in an upright position on the impact sled	
c	No WTORS anchorage components or securement end fittings shall be detached or separated	
d	Release of the SWC from the wheelchair tie-down shall not require the use of tools	
e	Release of the ATD from the occupant restraint shall not require the use of tools	
f	No part of the WTORS shall exhibit visible signs of tearing, fragmentation, fracture or complete failure of any load-bearing part unless such parts are intended to fail in a manner that limits the forces on the occupant	
g	The WTORS shall exhibit no dangerous roughness, sharp edges or protrusions likely to increase the risk of injury to the occupant	
h	The force required to open the buckle of any tie down or occupant restraint components shall not exceed 60N when tested as specified by 6.2.2.5 of ECE R16:1996, in accordance with the procedures of 7.8	

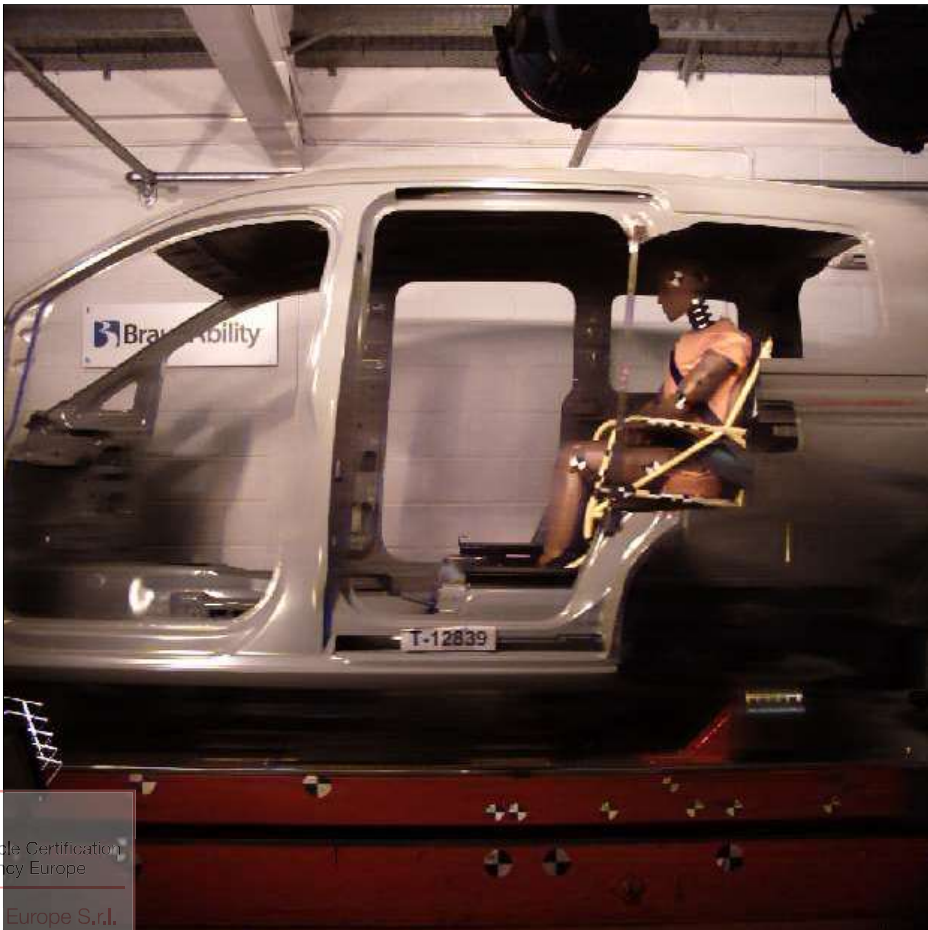
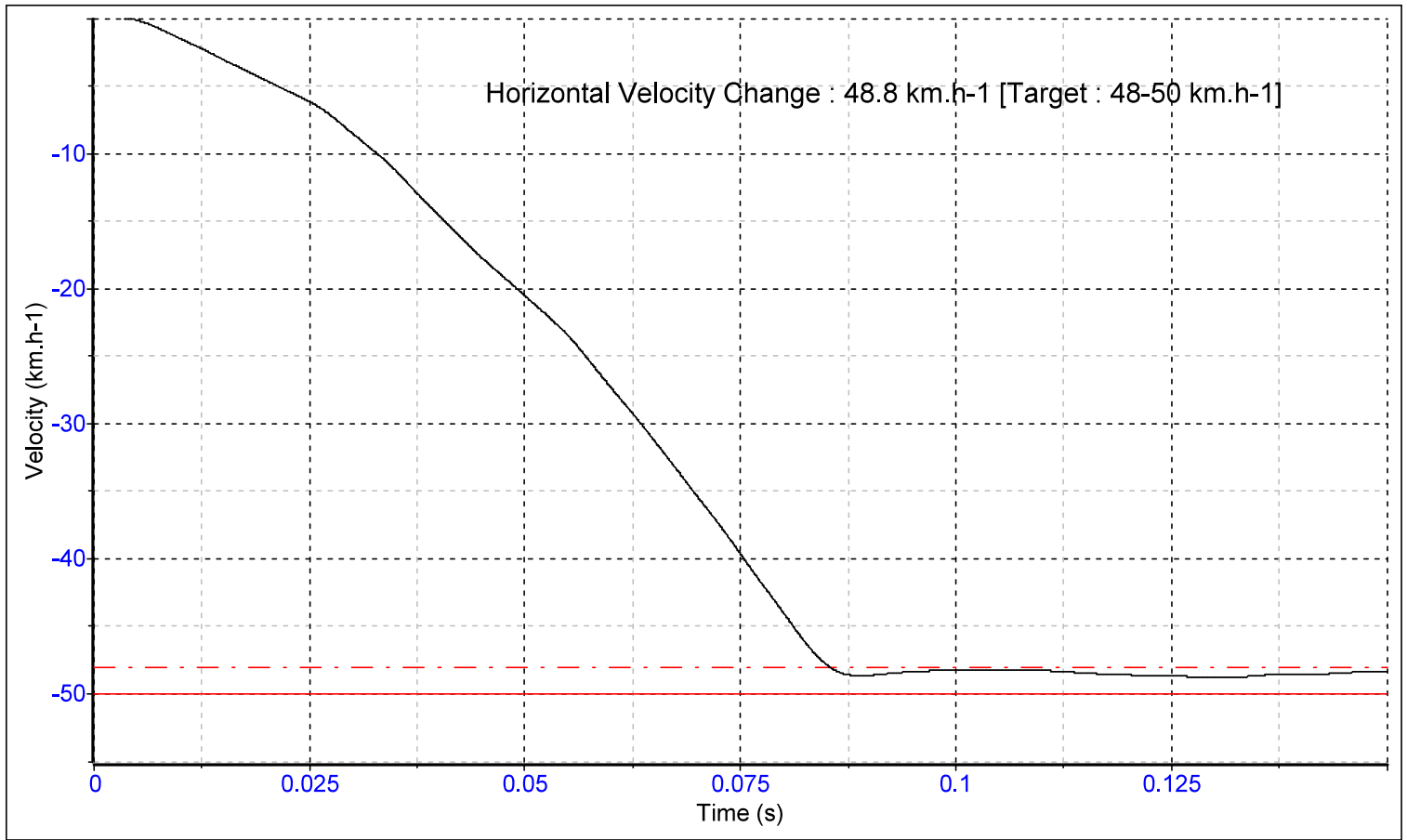
During Test Observations According to ISO 10542-1:2012

		Result	Complies?
a	The horizontal excursion of the test wheelchair P-Point (Xwc) shall not exceed 200mm	159 mm	Passed
b	The horizontal excursion of the ATD Knee (Xknee) shall not exceed 375mm	240 mm	Passed
c	The horizontal excursion of the ATD Head (Xhead) shall not exceed 650mm	481 mm	Passed
d	The WTORS shall prevent the wheelchair from imposing forward loads on the occupant Ratio of Xknee / XWC to be greater than or equal to 1.1	1.51	Passed
e	Inbound velocity (delta V 48kph +2 -0)	48.8 km.h-1	Passed
f	Cumulative Time to hold 20g (>15ms)	28.1 ms	Passed
h	Cumulative Time to hold 15g (>40ms)	53.3 ms	Passed

Test Pass or Fail Overall

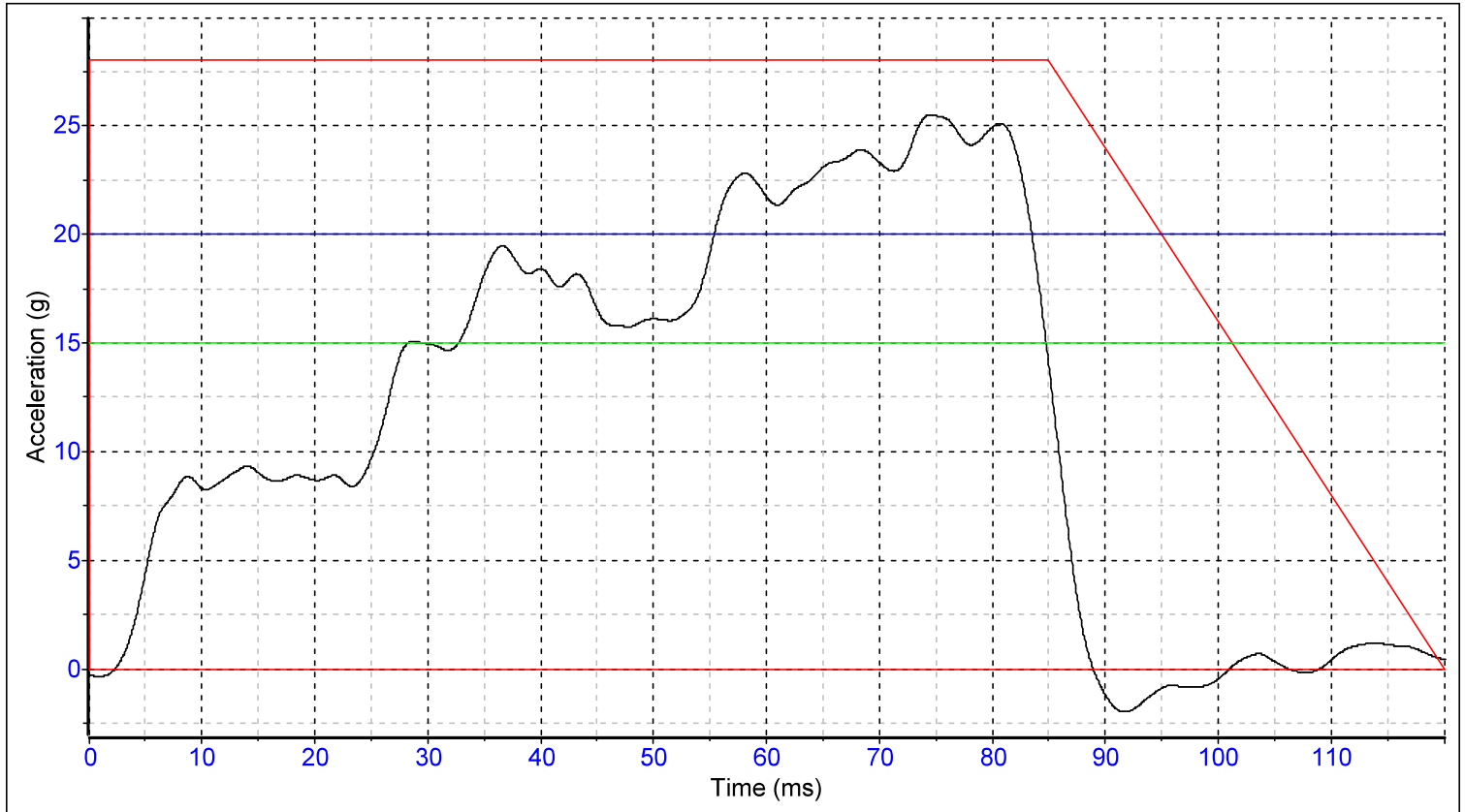
Notes

Pulse Graph for Velocity T-12839



Camera Frame Rate = 1000 Fps

Pulse Graph for Deceleration T-12839



Time at 20g (Single Peak) : 28.1 ms [t1 : 55.4 ms, t2 : 83.5 ms] (Cumulative) : 28.1 ms

Time at 15g (Single Peak) : 52.0 ms [t1 : 32.8 ms, t2 : 84.8 ms] (Cumulative) : 53.3 ms



Camera Frame Rate = 1000 Fps

Test Photos T-12839



Pre Test



Post Test

Excursions T-12839



Excursion Measurements

SWC Excursion = 159.05 mm

Max Excursion = 200 mm

Knee Excursion = 240.41 mm

Max Excursion = 375 mm

Head Excursion = 480.69 mm

Max Excursion = 650 mm

Ratio Knee / SWC = 1.51

Video Depth Perception

Camera to Sled = 3019 mm

Sled to SWC = 548 mm

Sled to Knee = 635 mm

Sled to Head = 687.00 mm

