

Test Report no: 2603.2010

Test object: Invacare Storm 4

Manufacturer: Invacare Gmbh, Kleistrasse 49, D-32457 Porta Westfalica

Certificate of testing

Crash Test according to ISO 7176-19 – 2001 & 10542-5

Wheeled mobility devices for use in motor vehicles

This report serves solely as documentation for the test results. The tested objects have been selected by the client with out the assistance of Dahl Engineering.

Assignment:	Crash testing of wheel chair and WTORS according to ISO 7176-19 & 10542-5annex A and B
Date of testing:	23 march 2010
Test object:	Invacare Storm 4
Mass of wheelchair:	200 kg
Serial no:	not informed – (proto type)
WTORS:	Dahl docking station, that meet requirements set our in clause 4.1 Wheelchair restraint – Dshl Docking Station Occupant restraint - 3p. static shoulder and lap belts
Test dummy:	The test was carried out using a Hybrid II 50% dummy with mass of 76 Kg.
Measuring:	The deceleration was measured by accelerometers mounted on the crash test sled.
Photografi:	The test was filmed with a high speed camera at 500 fps. Still pictures, pre and post test, was also taken.

Test results

Sled deceleration and speed:	See page with plotted graph and speed
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Section	Details	X if correct
5.21	During the test	
(a)	Horizontal excursion limits	
	Wheelchair point P $\leq$ 200 mm [Xwc]	100
	ADT knee $\leq$ 375 mm [Xknee]	152
	ADT front of head $\leq$ 650 mm [XheadF]	348
	(also see note) ADT rear of head $\leq$ - 450 [XheadR]	-137
(b)	The knee excursion exceeded the wheelchair P point excursion	X
(c)	(Batteries on powered wheelchairs) did not move completely outside the wheelchair footprint or move into the wheelchair user's space or contact with ADT legs	X
5.2.2	After the test	
(a)	The wheelchair remained in an upright position on the platform	X
	The ADT remained in the wheelchair with its torso at an angle of not more than 45° to the vertical, when viewed from any direction	X
(b)	There were no visible signs of material failure on the wheelchair securing points	X
(c)	There were no components, fragments or accessories of the wheelchair with a mass of more than 100g that completely separated from the wheelchair	X
(d)	There were no fragmented or separated component, that may contact the occupant, produced with sharp edges less than radius 2 mm	X
(e)	There were no visible signs of failure on the wheelchairs primary load carrying components	X
(f)	There were no visible signs of failure on the wheelchairs seat adjusters	X
(g)	The ADT was removed from the wheelchair without the use of tools	X
(h)	The wheelchair was released from the tie-down system without the use of tools	X
(i)	The post test decrease of the mean H-point height is not more than 20%	X
(j)	Wheelchair and components did not cause partial or complete failure of the webbing of any of the WTORS assemblies during the test	X

The presented samples meet the requirements set out in the above mentioned standard.

Note:

During the rebound stage the head of the dummy contacted with the shoulder belt anchorage, thereby limiting the ATD's rearward excursion of the head.

Test Laboratory:

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Thisted 26/3 2010



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