

Test report

Test report relating to an electrically powered wheelchair according to the international standard ISO 7176-19, concerning the product with trade mark: Sunrise Medical, type: Quickie Q700 M, manufactured by Sunrise Medical GmbH.

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1 Introduction

1.1 Purpose

The tests have been performed in order to establish whether or not the product meets the requirements of the international Standard ISO 7176-19 [1].

1.2 Description of the sample(s), identification

Subject	Specification/value
Description of the product	electrically powered wheelchair
Manufacturer	Sunrise Medical GmbH
Trade mark and type of product	Sunrise Medical, Quickie Q700 M
Serial number	21800100-100
Options on the wheelchair that were tested together with the wheelchair	Headrest
Test set up	
Maximum occupant mass	160 kg
Total mass of the tested wheelchair	160 kg
Used dummy during crash test	H3-95th, large adult male
Mass of the used dummy	102 kg
Angle to the vertical of the back rest	79°
Angle to the horizontal of the seat	2.9°
Tie down system handed in by the manufacturer of the wheelchair	Not applicable
Attachment method	Dummy tie down system according to ISO 7176-19 [1]
Crash Simulator	Inverse Crash Sled
Orientation	Forward facing
Test number	S17390901
Test date	2 October 2017

Remark

There was no wheelchair tie down system provided by the manufacturer of the wheelchair.

As suggested by TR-NL, a surrogate tie down system was used according to Annex E of ISO 7176-19 [1]. This system consisted of 2 metal bars at the rear of the wheelchair and safety belt webbing at the front.

For pictures is referred to Appendix A.

1.3 Sampling procedure

TÜV Rheinland B.V. has had no influence on the selection of the sample.

The sample was test-worthy and was received on 2 October 2017 from the manufacturer.

1.4 Application

The request for testing was submitted by the manufacturer on 22 September 2017.

1.5 Method of testing

All applicable tests have been performed according to the international Standard ISO 7176-19 [1].

1.6 Put out to contract

Tests were performed at TASS International, Helmond, The Netherlands.

1.7 Privacy statement

Due to privacy reasons, the names of involved personnel that executed the tests, are not disclosed in the report. However, this information is available on internal work sheets, test forms etc. in the project file.

2 Summary of test results

Summary of test results after performing all applicable tests according to the international Standard ISO 7176-19 [1].

Par.	Description	Pass/Fail/n.a
4	Design requirements	
4.1	Wheelchair securement	pass
4.2	Occupant restraints	n.a.
5	Performance requirements	
5.1	Wheelchair-anchored belt restraints	n.a.
5.2	Frontal impact	pass
5.3	Accessibility of securing points intended for use with four-point strap-type tie downs	pass
5.4	Accommodation of vehicle-anchored belt restraints (Normative Annex D)	Overall rating: A = good
6	Identification, labelling, user instructions, warning and disclosure requirements	
6.1	Identification and labelling	pass
6.2	Presale literature	pass
6.3	User and maintenance instructions	pass

3 Detailed test results

Sample nr:	89211892-12-01		
Req. nr.	Description of the requirement	Value of the test	Pass / fail / n.a.
4	Design requirements		
4.1	Wheelchair securement		
4.1.1	Wheelchair suitable for 4-point strap-type tie down system according to ISO 10542, that conforms to Annex B and clause 5	conforms	pass
4.1.2	If a wheelchair is intended by the manufacturer to also be secured by a docking securement device in public transportation and/or different private vehicles, the securement points on the wheelchair and/or of the wheelchair tiedown adaptors shall conform to the specifications set forth in Annex F and the performance requirements in Clause 5.	n.a. FOR APPROVAL TO EN 12183 OR 12184 VERSIONS 2014: SEE NEXT ROW	n.a.
	TEXT OF 4.1.2 IS MODIFIED BY EN 12183:2014 AND EN 12184:2014, MODIFIED TEXT: If a wheelchair is intended by the manufacturer to also be secured by a docking securement device in public transportation and/or different private vehicles, the securement points on the wheelchair and/or of the wheelchair tiedown adaptors shall conform to the performance requirements in Clause 5.	n.a.	n.a.
4.2	Occupant restraint		
4.2.1	Wheelchair-anchored pelvic belt	n.a.	n.a.
4.2.1 a)	Wheelchair-anchored pelvic belt between 30 and 75°	n.a.	n.a.
4.2.1 b)	ATD size.	n.a.	n.a.
4.2.2	Wheelchair-anchored shoulder belt		
4.2.2 a)	Fit over shoulder/chest as illustrated in Figure 4	n.a.	n.a.
4.2.2 b)	Upper anchor or guide point at or above shoulder of the ATD	n.a.	n.a.
4.2.2 c)	Locate the shoulder-belt at least as far from the ATD, as shown in figure 3	n.a.	n.a.
4.2.2 d)	Provide adjustment in the shoulder-belt as specified in Table 4	n.a.	n.a.
4.2.3	Rating the accommodation of vehicle or tie down-anchored occupant belt restraints using Normative Annex D	See 5.4	
5	Performance requirements		
5.1	Wheelchair-anchored belt restraints		
5.1 a)	All belt parts in conformity with applicable subsections of ECE 16 or FMVSS 209	n.a.	n.a.
5.1 b)	Burning rate webbing <100 mm/min, when tested according to ISO 3795	n.a.	n.a.
5.2	Frontal impact		
5.2.1	During the test		
5.2.1 a)	Horizontal excursions limits ATD size:	n.a.	n.a.

Sample nr:	89211892-12-01		
Req. nr.	Description of the requirement	Value of the test	Pass / fail / n.a.
	FOR APPROVAL TO EN 12183 OR 12184 VERSIONS 2014: SEE NEXT ROW		
	Wheelchair point P, variable $X_{WC} \leq$ Large 200 mm		
	ATD knee, variable $X_{knee} \leq$ Large 375 mm		
	ATD front of head, variable $X_{headF} \leq$ Large 650 mm		
	ATD rear of head variable $X_{headR} \leq$ -Large -450 mm		
	TEXT OF 5.2.1.a) IS MODIFIED BY EN 12183:2014 AND EN 12184:2014, MODIFIED TEXT: If the wheelchair has a head restraint, the horizontal excursions of the ATD and the wheelchair, with respect to the impact sled, shall not exceed the limits in Table 7 at any time during the test. If the wheelchair does not have a head restraint, the horizontal excursions of the ATD and the wheelchair, with respect to the impact sled, shall not exceed the limits in Table 7 at any time during the test <u>with the exception that the excursion of the back of the head of the ATD, X_{headR}, shall not be measured.</u> Horizontal excursions limits ATD size:	conforms n.a.	pass n.a.
	Wheelchair point P, variable $X_{WC} \leq$ Large 200 mm	41 mm	pass
	ATD knee, variable $X_{knee} \leq$ Large 375 mm	232 mm	pass
	ATD front of head, variable $X_{headF} \leq$ Large 650 mm	232 mm	pass
	ATD rear of head variable $X_{headR} \leq$ Large -450 mm	-432 mm	pass
5.2.1 b)	Knee excursion exceeding point P as follow $X_{knee} / X_{WC} : \geq 1.1$ When usage of vehicle-anchored pelvic belt restraint.	5.7	pass
5.2.1 c)	Excursions of batteries (if applicable) <ul style="list-style-type: none"> not outside footprint wheelchair not against ATD back of legs 	conforms conforms	pass pass
5.2.2	After the test		
5.2.2 a)	Wheelchair upright, on the sled platform	conforms	pass
5.2.2 a)	ATD torso angle $\leq 45^\circ$	19.9 °	pass
5.2.2 b)	No visible signs of material failure on securing points	conforms	pass
5.2.2 c)	No completely separated parts > 100 g	conforms	pass
5.2.2 d)	No sharp edges with $R = < 2$ mm	conforms	pass
5.2.2 e)	Primary load carrying components no visible signs of failure	n.a.	n.a.
	TEXT OF 5.2.2 e) IS MODIFIED BY EN 12183:2014 AND EN 12184:2014, MODIFIED TEXT: Primary occupant-load-carrying components of the wheelchair shall not show visible signs of failure, <u>unless there is a backup system to provide support.</u>	conforms	pass
5.2.2 f)	Locking mechanisms of tilting seating adjusters no signs of failure	n.a.	n.a.

Sample nr:	89211892-12-01			
Req. nr.	Description of the requirement	Value of the test	Pass / fail / n.a.	
5.2.2 g)	ATD removable without tools	conforms	pass	
5.2.2 h)	Wheelchair releasable without tools	conforms	pass	
5.2.2 i)	Decrease of average height of ATD H-points to platform < 20%	8.1%	pass	
5.2.2 j)	No partial or complete failure of the webbing of any WTORS assembly during test by wheelchair and its components	conforms	pass	
5.3	Accessibility of securement points intended for use with four-point strap-type tie downs with hook-type end-fittings			
5.3 a)	Allowance of one-handed attachment and engagement within 10 s	2 s	pass	
5.3 b)	Allowance of one-handed disengagement and removal of the same hook gauge within 10 s	2 s	pass	
5.4	Accommodation of vehicle-anchored belt restraints The wheelchair shall be tested for accommodation of vehicle-anchored occupant-restraint systems in accordance with Annex D and the resulting rating shall be reported in the product presale literature. Overall rating: <ul style="list-style-type: none">score 12-16 = A = goodscore 8-11 = B = acceptablescore 7 or less = C = poor			
	D.1 Overall ease of belt positioning	good = 2	Overall rating: 15 points = A = good	
	D.2 Pelvic-belt-restraint contact area	good = 2		
	D.3 Shoulder-belt-restraint contact area	good = 2		
	D.4 Pelvic-belt-restraint contact location	good = 2		
	D.5 Shoulder-belt-restraint contact location	good = 2		
	D.6 Pelvic-belt-restraint angle	acceptable = 1		
	D.7 Pelvic-belt-restraint clear paths to anchor points	good = 2		
	D.8 Belt-restraint proximity to sharp edges	good = 2		
6	Identification, labelling, user instructions, warning and disclosure requirements			
6.1	Identification and labelling (on the wheelchair)			
6.1 a)	Securing point symbol <ul style="list-style-type: none">total height of symbol ≥ 12mmline widths ≥ 10% - ≤ 20% of heightsufficient contrast to the background, distance from 1 m	conforms	pass pass pass	
6.1 b)	Markings and/or wording to indicate location and type of any additional tie down (besides the four-point strap-type)	n.a.	n.a.	
6.1 c)	Indication of conformity with ISO 7176-19:2008 (on the wheelchair)	conforms	pass	
6.1 d)	Indication of conformity with ISO 7176-19:2008 (occupant restraints)	n.a.	n.a.	

Sample nr:	89211892-12-01		
Req. nr.	Description of the requirement	Value of the test	Pass / fail / n.a.
6.1 e)	Indication that postural support belts which are not intended as restraint, should not be used	conforms	pass
6.2	Presale literature		
6.2 a)	Statement about forward facing when used in a motor vehicle and about the accordance with ISO 7176-19:2008	conforms	pass
6.2 b)	Description of suitable tie down systems	conforms	pass
6.2 c)	Statement about effecting accessibility by size and turning radius of wheelchair	conforms	pass
6.2 d)	Statement if wheelchair is tested with any wheelchair-anchored occupant restraint belts	n.a.	n.a.
6.2 e)	The rating of the wheelchair's accommodation, Annex D	conforms	pass
6.3	User and maintenance instructions		
6.3.1	User instructions shall include following statements		
6.3.1 a)	Statement about forward facing only	conforms	pass
6.3.1 b)	Statement of conformity with ISO 7176-19:2008	conforms	pass
6.3.1 c)	Statement about transferring to vehicle seat, if possible	conforms	pass
6.3.2	User instructions shall include descriptions of/ information on		
6.3.2 a)	Suitable tie down systems	conforms	pass
6.3.2 b)	Locations of tie down securing points and the marking used to identify them	conforms	pass
6.3.2 c)	For wheelchair-anchored occupant restraints: location of anchor points and specifications of hardware	n.a.	n.a.
6.3.2 d)	Description of how wheelchair is to be secured in a vehicle	conforms	pass
6.3.2 e)	Description of compatible tie down systems and fittings (if applicable)	n.a.	n.a.
6.3.2 f)	Correct positioning of occupant restraints on the user <ul style="list-style-type: none"> • pelvic belt low as possible, angle between 30-75°, as shown in Figure 3 • a steeper angle within the zone is desirable • belt against body (not against wheelchair parts), with illustration similar to that of Figure 6 • upper torso belts should fit over shoulders and across the chest as illustrated in Figure 4 • restraints adjusted tightly as possible • belt webbing not worn twisted 	conforms conforms conforms conforms conforms	pass pass pass pass pass
6.3.2 g)	Recommended settings for any adjustable parts, including where applicable seat and back rest positions, when the wheelchair is in use in a motor vehicle	conforms	pass
6.3.2 h)	The wheelchair mass, as measured in ISO 7176-5	conforms	pass
6.3.2 i)	The maximum recommended user mass	conforms	pass
6.3.3	User instructions shall include illustrations of		

Sample nr:	89211892-12-01		
Req. nr.	Description of the requirement	Value of the test	Pass / fail / n.a.
6.3.3 a)	Incorrect belt restraints placement using Figure 6 as an example	conforms	pass
6.3.3 b)	Correct placement of belt restraints using Figure 7 as an example	conforms	pass
6.3.3 c)	The location of securement points, each type tiedown	conforms	pass
6.3.4	User instructions shall include statements/warnings (using at least 12-point font)		
6.3.4 a)	Wheelchair complies with the requirements of ISO 7176-19:2008 has been designed and tested for use only in forwards-facing seat	conforms	pass
6.3.4 b)	Wheelchair tested forward facing with ATD restrained by pelvic and shoulder belt	conforms	pass
6.3.4 c)	Both pelvic and shoulder belt should be used to reduce possible head and chest impacts with vehicle components	conforms	pass
6.3.4 d)	That wheelchair-mounted trays should be removed and secured OR be secured to the wheelchair, away from the occupant, with energy-absorbing padding in between	conforms	pass
6.3.4 e)	Auxiliary equipment secured to the wheelchair or removed and secured to the vehicle	conforms	pass
6.3.4 f)	Postural supports and belts may be used as restraints but only reliable if labelled as such	conforms	n.a.
6.3.4 g)	Wheelchair should be inspected by the manufacturer before reuse following involvement in any type of vehicle impact	conforms	pass
6.3.4 h)	No alterations/substitutions to securement points without consulting the manufacturer of the wheelchair	conforms	pass
6.3.4 i)	Recommendation about using spill-proof batteries	n.a.	n.a.
6.3.4 j)	Care should be taken when applying the occupant restraint to position the seatbelt	conforms	pass

4 Remarks on the test results

Req.nr.	Description of the requirement	Remark
	No remarks	

5 Conclusion

The electrically powered wheelchair, trade mark: Sunrise Medical, type: Quickie Q700 M, **meets** the applicable requirements as stated in the international Standard ISO 7176-19 [1], with modifications to ISO 7176-19 as stated in EN 12183:2014 and EN 12184:2014.

The test results exclusively relate to the tested object.

Remark 1

The tests according to the test standard ISO 7176-19 were performed with the aim to receive approval according to the product standard EN 12183:2014 for manual wheelchairs or EN 12184:2014 for electrically powered wheelchairs and scooters. Both product standards contain modifications to ISO 7176-19, regarding the following performance requirements:

- 4.1.2 is replaced by the following:

If a wheelchair is intended by the manufacturer to also be secured by a docking securement device in public transportation and/or different private vehicles, the securement points on the wheelchair and/or of the wheelchair tiedown adaptors shall conform to the performance requirements in Clause 5.

NOT APPLICABLE

- 5.2.1 a) is replaced by the following:

If the wheelchair has a head restraint, the horizontal excursions of the ATD and the wheelchair, with respect to the impact sled, shall not exceed the limits in Table 7 at any time during the test.

HEAD REST MOUNTED DURING TEST

If the wheelchair does not have a head restraint, the horizontal excursions of the ATD and the wheelchair, with respect to the impact sled, shall not exceed the limits in Table 7 at any time during the test with the exception that the excursion of the back of the head of the ATD, Xhead, R, shall not be measured.

NOT APPLICABLE

- 5.2.2 e) is replaced by the following:

Primary occupant-load-carrying components of the wheelchair shall not show visible signs of failure, unless there is a backup system to provide support.



Remark 2

When and if changes are made in production method and/or equipment, assessment according to this standard shall be reconsidered and re-tests shall be performed when the changes can lead to different specifications of the product. The decision and responsibility lies at the manufacturer.

6 References

- [1] International Standard ISO 7176-19:2008/Amd.1:2015 (E),
Wheelchairs – Part 19: Wheeled mobility devices for use as seats in motor vehicles,
International Standardization Organisation, July 2008/November 2015.

7 Signatures

Author	Signature
Mr. T.R. Cruijff Expert medical products	
Approved by	Signature
Mr. R. de Jonge Managing Director	

Appendix A, Pictures of the tested product

Pictures of the tested sample, trade mark: Sunrise Medical, type: Quickie Q700 M

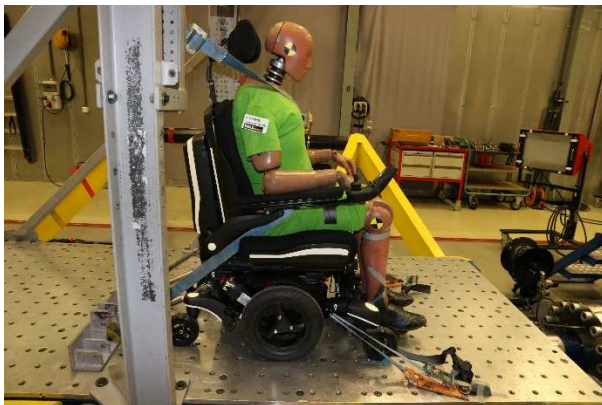
BEFORE the test



Front side



Left side



Right side



Back side

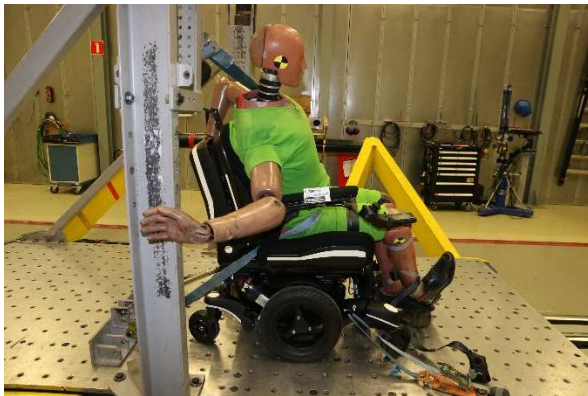
AFTER the test



Front side



Left side

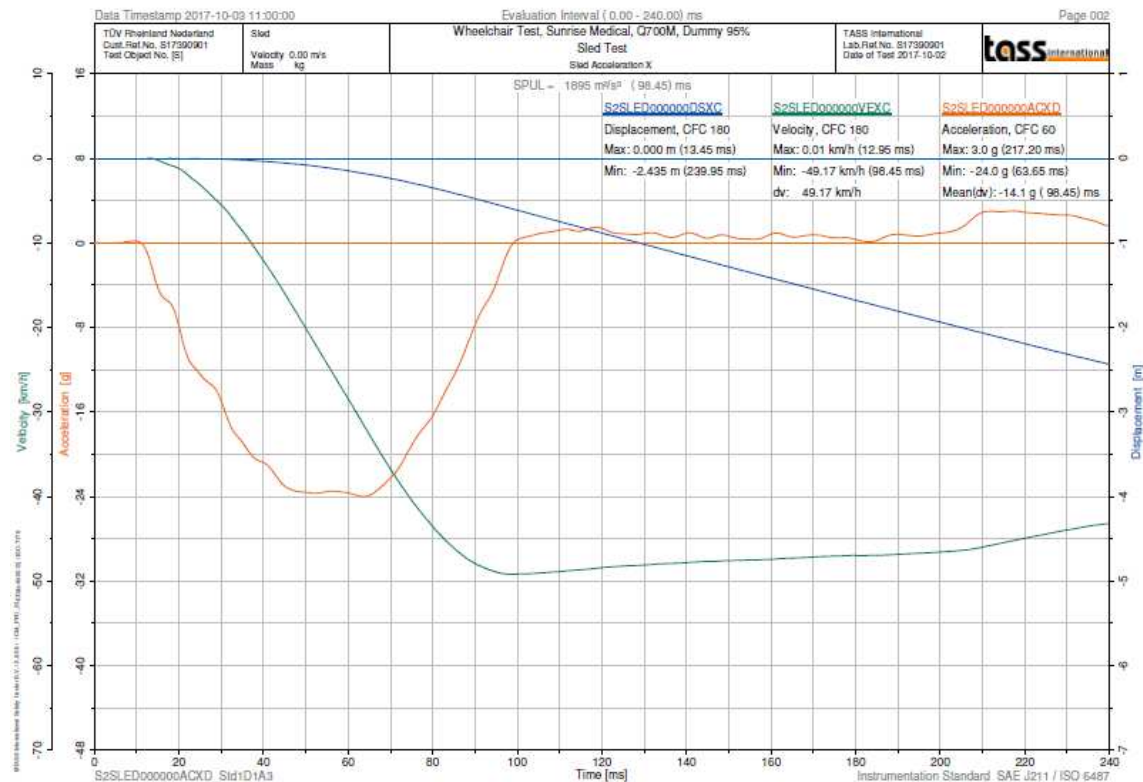
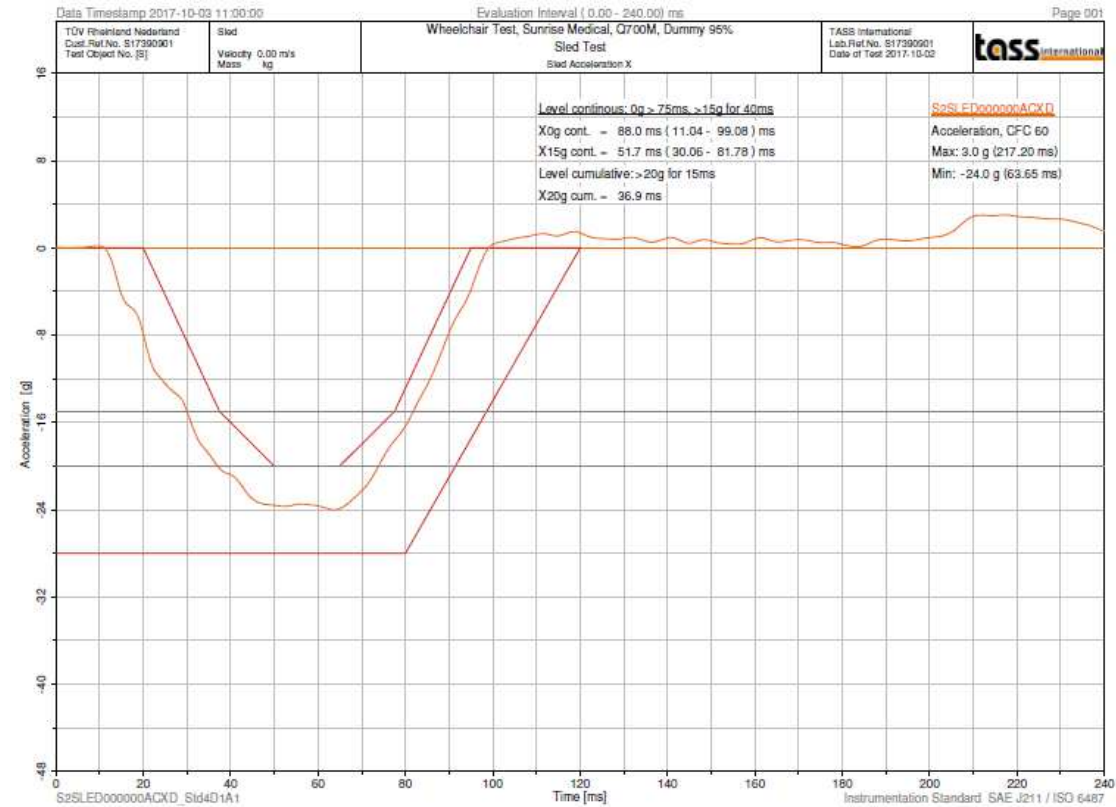


Right side



Back side

Appendix B, Sled deceleration (or acceleration) and velocity



This is the end of this report.