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Dynamic Test of Sunrise Medical Q300R Powered Wheelchair according to ISO 7176-19:2022

Test Date: 27th September 2021

CIC Test No.: D21096

CIC Report No.: D21-096

Report Requesting Authority: Sunrise Medical

Report Compiled By: Matt Herbert
Mechanical Test Engineer
Cranfield Impact Centre



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Cranfield Impact Centre is a trading division of Cranfield Innovative Manufacturing Ltd. Registered in England and Wales.

Company number 02965434 Registered office Bld 62, Cranfield University, Cranfield, Bedfordshire MK43 0AL VAT No GB 657 8915 77

Test Date

The dynamic test, D21096, was conducted at the Cranfield Impact Centre sled test facility on Monday 27th September 2021.

Distribution List

Organisation	Recipient	Format	Qty
Cranfield Impact Centre (CIM Ltd.) Cranfield University Cranfield Bedfordshire MK43 0AL	Dr. J. Watson	PDF	1
Sunrise Medical Thorns Road Brierley Hill West Midlands DY5 2LD	David Davies	PDF	1

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Revision History

Revision No.	Description	Author	Approved	Date	Pages
0	First Release	M. Herbert	Dr. J Watson	30/09/2021	All
1	Test Standard Updated	M. Herbert	Dr. J. Watson	08/08/2022	1, 3,4,13

1. Test Items

The test items are described in Table 1, including information on the ATD used in the test.

Table 1: Description of test items

Item	Part Name	Test Mass (kg)
Powered wheelchair	Q300R	142.50 (Combined)
Head Support	Fitted	
Seat	Standard	
Front Wheelchair Tie Downs	Unwin OR03	1.90
Rear Wheelchair Tie Towns	Unwin OR03 x2	3.80
Occupant Restraint	Cranfield Surrogate ORS v4 (Vehicle Anchored)	3.50
ATD	Hybrid III 50 th Percentile Male	78.50

2. Test Outcome

The Sunrise Medical Q300R Powered wheelchair, as described in Test Items, satisfied the dynamic test requirements of ISO 7176-19:2022.

Note: Pre and post-test stills photographs of the test set-up are presented in Section 5 and 6 of this report.

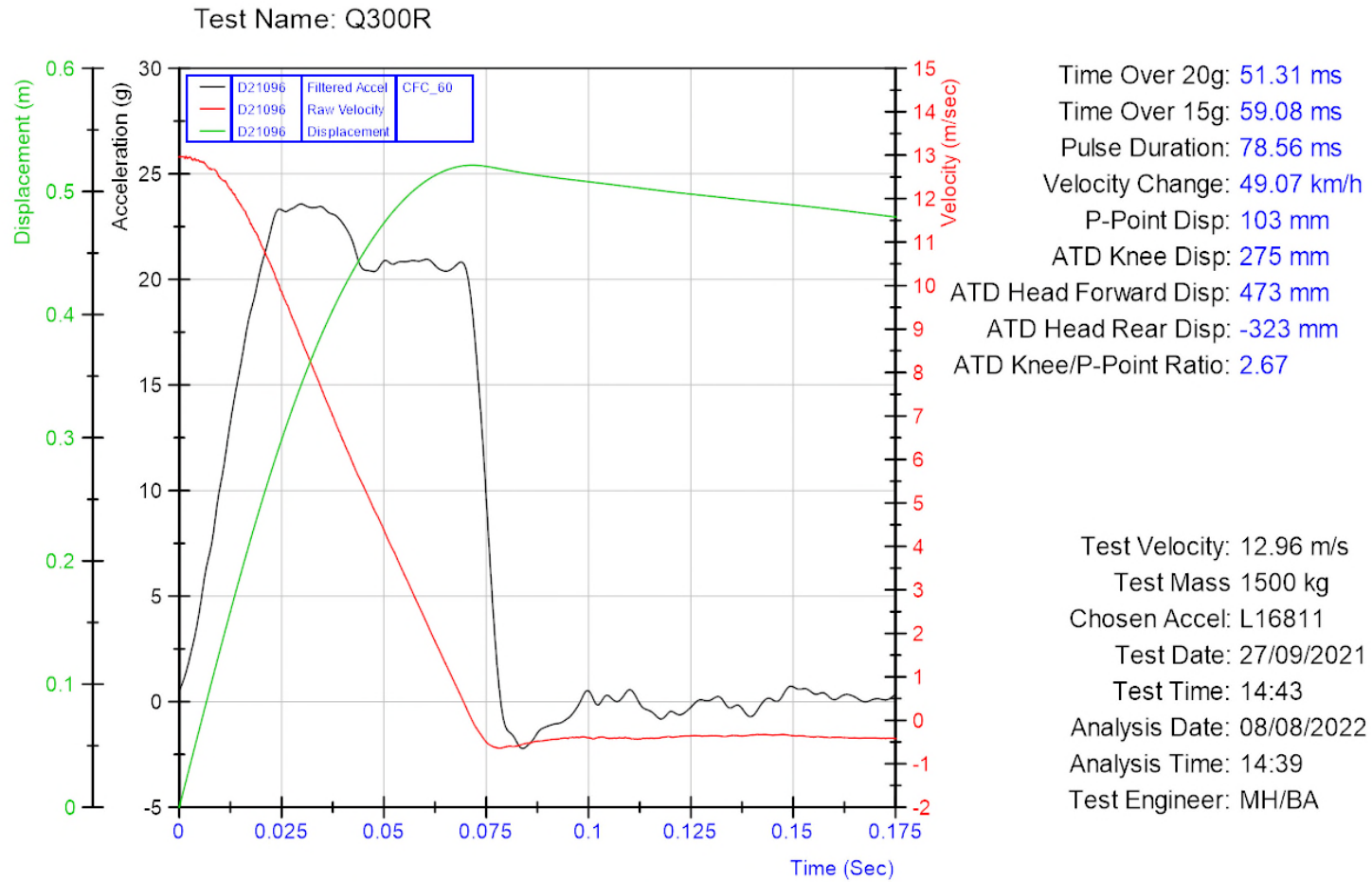
3. Disclaimer

The results contained within this report relate only to the Sunrise Medical Q300R Powered wheelchair as described in Test Items.

Cranfield Impact Centre has no control over matters pertaining to the Conformity of Production of tested items.



4. Graphic Results



Decelerator Test Report

Standard: ISO 7176-19:2022
 ATD: Hybrid III 50th Percentile Male

CIC Test ID: D21096

Client: SunRise

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5. Pre-Test Photographs



Figure 1: Front view, pre-test



Figure 2: Front ¾ view, pre-test

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Figure 3: Side view, pre-test



Figure 4: Rear 3/4 view, pre-test

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Figure 5: Rear view, pre-test



Figure 6: Rear tie-downs, pre-test



Figure 7: Rear tie-downs, pre-test

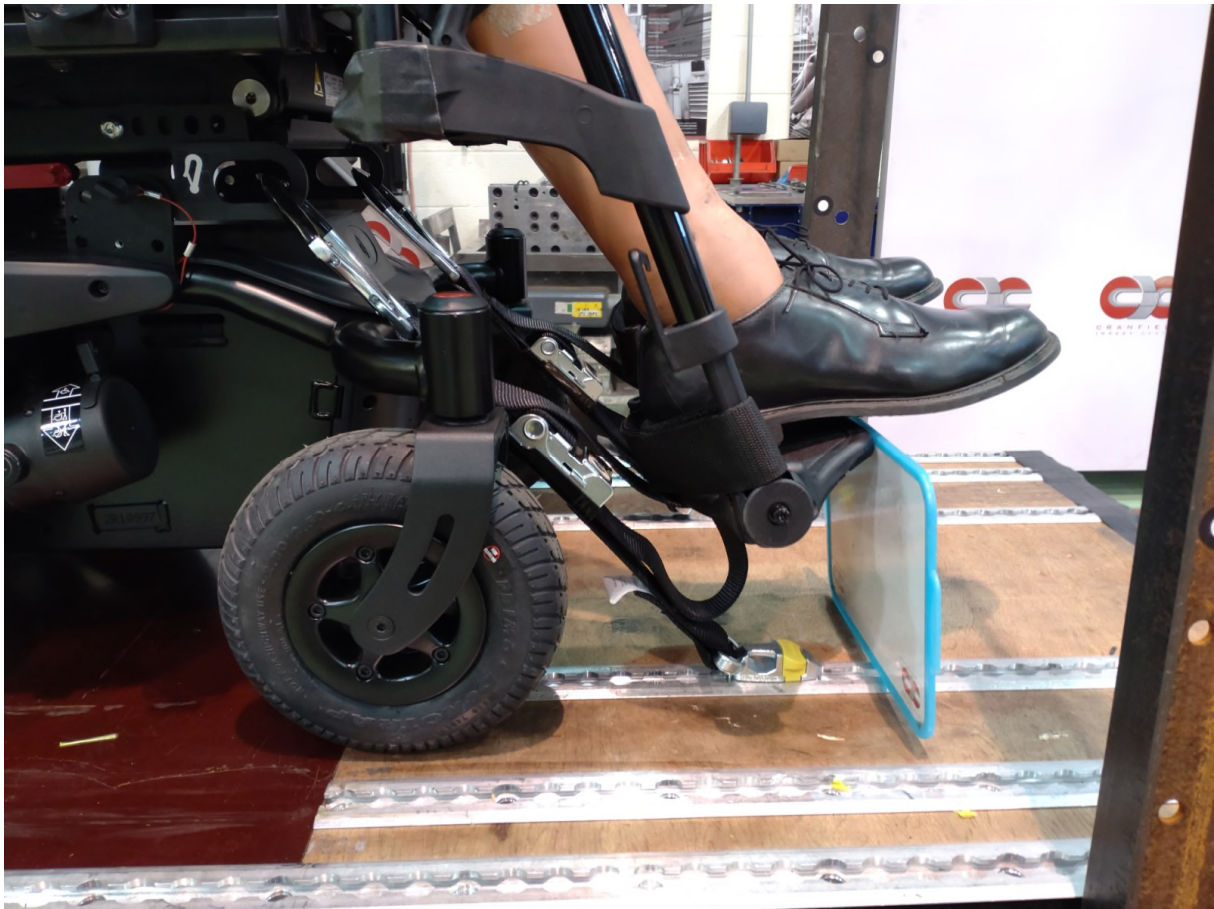


Figure 8: Front tie-downs, pre-test

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6. Post-Test Photographs



Figure 9: Front view, post-test



Figure 10: Front ¾ view, post-test



Figure 11: Side view, post-test



Figure 12: Rear ¾ view, post-test

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Figure 13: Rear view, post-test



Figure 14: Rear tie-downs, post-test



Figure 15: Rear tie-downs, post-test



Figure 16: Front tie-downs, post-test

7. Test Results Summary

Test No.:	D21096	Test Type:	ISO 7176-19:2022
Manufacturer:	Sunrise Medical	Wheelchair Model:	Q300R Powered
Wheelchair Mass:	142.5.00kg	Head Support:	Fitted
Seat Rail Angle:	2°	Seat Back Angle:	9°
Occupant:	Hybrid III 50th Percentile Male (78.50kg)		
Front Tie Downs:	Unwin OR03	Rear Tie Downs:	Unwin OR03 x2
Occupant Restraint:	Cranfield Surrogate ORS v4 (Vehicle Anchored)		
5.1	During The Test		Results
a)	Horizontal ATD and wheelchair excursion limits as per limits shown in table 3:		
	Was the horizontal movement of the test wheelchair P-Point (X_{SS}) less than 200mm (± 5 mm)		Pass 103mm
	Was the horizontal movement of the dummy knee (X_{knee}) less than 375mm (± 5 mm)		Pass 275mm
	Was the forward horizontal movement of the dummy head (X_{headF}) less than 650mm (± 5 mm)		Pass 473mm
	Was the rearwards horizontal movement of the dummy head (X_{headR}) greater than -450mm (± 5 mm)		Pass -323mm
b)	Was the ratio $X_{knee}/X_{SS} > 1.1:1$		Pass 2.67:1
c)	Did the batteries of powered wheelchairs, or their surrogate parts:		
	Move outside of the wheelchair footprint		Pass
	Move into the wheelchair user's space		Pass
5.2	Post Test		
a)	Did the wheelchair remain upright on the test platform and did the ATD remain in the seated posture in the test wheelchair with a torso angle $> 45^\circ$		Pass
b)	Did the wheelchair securement points show visible signs of material failure		Pass
c)	Did any components of a mass greater than 100gm become detached from the wheelchair		Pass
d)	Did any occupant contactable components fragment or separate with an edge less than 2mm		Pass
e)	Did any primary load carrying components of the wheelchair show any visible signs of failure		Pass
f)	Did any 'tilt in space' locking mechanisms show signs of failure		N/A
g)	Was the ATD released from the wheelchair without the use of tools		Pass
h)	Was the wheelchair released from the restraint system without the use of tools		Pass
i)	Was the average decrease of H-Point height relative to the wheelchair platform less than 20% of the pre-test height		Pass <5%
j)	Did the wheelchair and its components cause partial or complete failure of the webbing or any of the WTORS assemblies		Pass
The Sunrise Medical Q300R powered wheelchair satisfied the dynamic test requirements of ISO 7176-19:2022.			



8. Calibration Report

CERTIFICATE OF CALIBRATION

ISSUED BY: CALIBRATION MAINTENANCE & REPAIR LTD

DATE OF ISSUE: 1 March 2021

CERTIFICATE NUMBER: 1109599



0654



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Approved Signatory
Electronically Authorised Document

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CUSTOMER
CIM LTD
BUILDING B56
CRANFIELD UNIVERSITY
CRANFIELD
BEDFORD
BEDFORDSHIRE
MK43 0AL
UNITED KINGDOM

MANUFACTURER
DESCRIPTION
MODEL
SERIAL No.
IDENT No.
DATE RECEIVED
DATE OF CALIBRATION
ORDER No

ENDEVCO
ACCELEROMETER
2262A-2000
L16811
23
23 FEBRUARY 2021
1 MARCH 2021
111349

ENVIRONMENT

The instrument was placed in the Vibration Laboratory environment and allowed to stabilise prior to calibration. The laboratory is maintained at ambient conditions of 22°C ±3°C, relative humidity 45% ±15%.

STABILITY

The results contained in this Certificate refer to the measurements made at the time of test and not to the accelerometers ability to maintain calibration.

PROCEDURE

Measurements were performed in accordance with the in house Laboratory procedure No.9117 which conforms to ISO16063-21 back to back comparison method for frequency sweep, and ISO16063-22 for Shock.

The uncertainty evaluation has been carried out in accordance with UKAS requirements.

ACCELEROMETER DATA

Nominal Sensitivity @ 160Hz 0.4035mV/g
Temperature Ambient

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.