

Test Report



CLIENT CONFIDENTIAL

Client

Sunrise Medical

Test Item

Elite 2 Plus (154 kg)

Test

ISO 7176/19 Wheelchair

Millbrook Report No.

12/0565

Millbrook Project No.

CR0011-035-001

Millbrook Test No.

S12136

Author:

Oliver King
Engineer

Approved:

Kieran Forinton
Principal Engineer

Date:

21st Jun 2012



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Distribution

Organisation	Recipient	Format	Qty
Sunrise Medical Sunrise European Office PO Box 228 High Street Wollaston Stourbridge West Midlands DY8 4ZH	D. Davis	PDF	1
Millbrook Proving Ground Ltd Millbrook Bedford MK45 2JQ	Contract file	PDF	1

Report Revision History

Rev.	Revision Description	Date	Author	Approver	Pages
0	Initial release	21st Jun 2012	O. King	K. Forinton	All

Contents

Section	Page Nos.
Distribution.....	2
Report Revision History	2
Contents	3
Appendices	3
Test Facility and Date	3

Appendices

Graphical Results	Appendix A
Pre and Post Test Photographs	Appendix B
Film Analysis	Appendix C
Test Results	Appendix D
High Speed Digital Films	See "Film" directory on data media

Test Facility and Date

The test, number S12136, was performed on 21st Jun 2012 at the HyGE Sled facility at Millbrook Proving Ground Ltd.

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Bedford
MK45 2JQ
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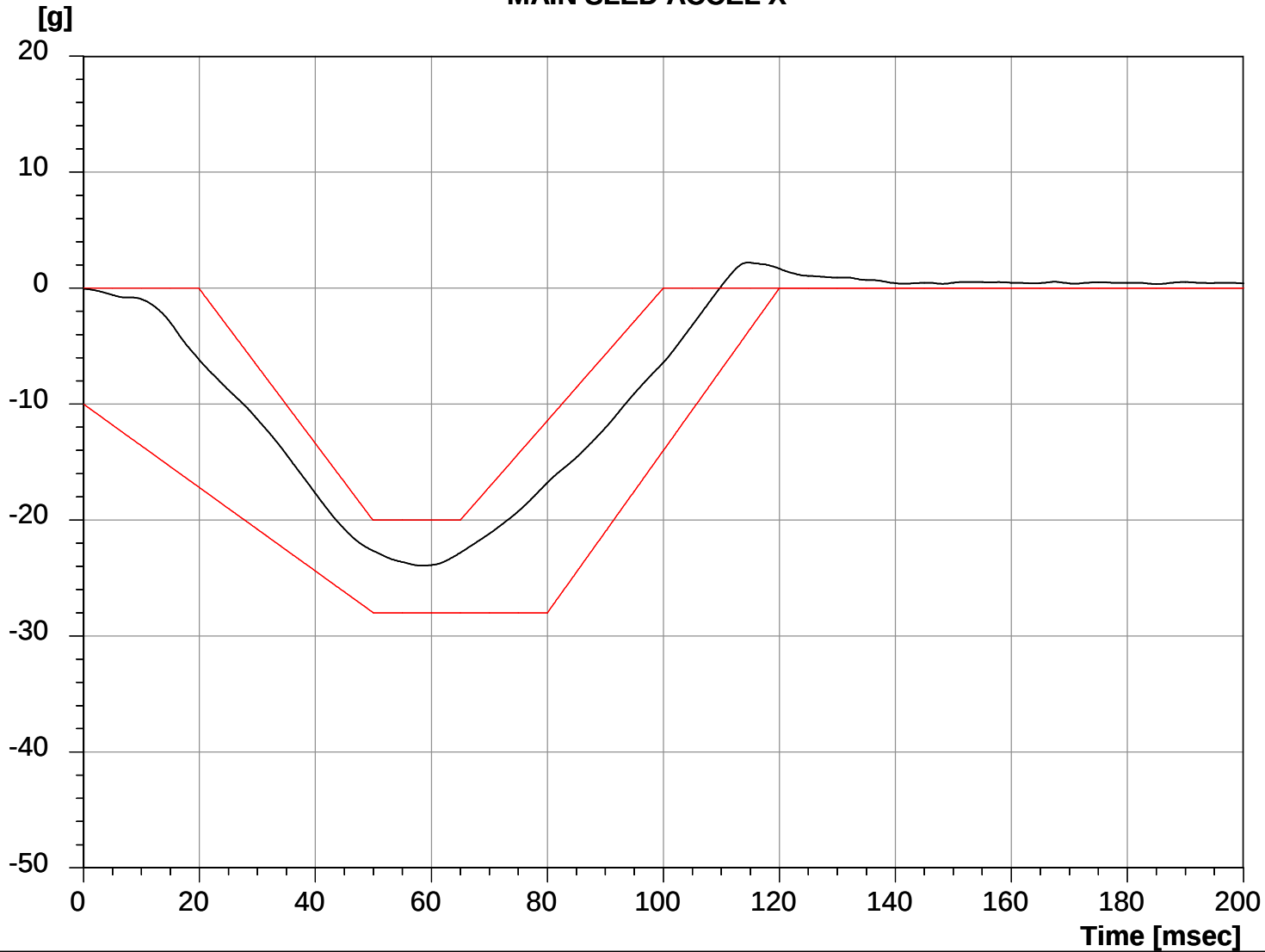
CRASH TEST LABORATORIES

Test No. : S12136
 Test Date : 21 June 2012
 Test Type : ISO7176-19
 : Wheelchair
 Test Engineers: R GREEN
 : D DAVIS

Max Test Velocity = 49.32 [km/h]

Filter : CFC 60 (SAE J211)
 CAC : 200.00 [g]
 Sensor ID : ZR23
 Max Value : 2.21 g [114.6 msec]
 Min Value : -23.93 g [58.4 msec]
 Plot Date : 21/06/2012 at 17:15:54

MAIN SLED ACCEL X





CRASH TEST LABORATORIES

Test No. : S12136
 Test Date : 21 June 2012
 Test Type : ISO7176-19
 : Wheelchair
 Test Engineers: R GREEN
 : D DAVIS

Filter : CFC 180 (SAE J211)
 CAC : 200.00 [g]
 Sensor ID : ZR23

Acceleration

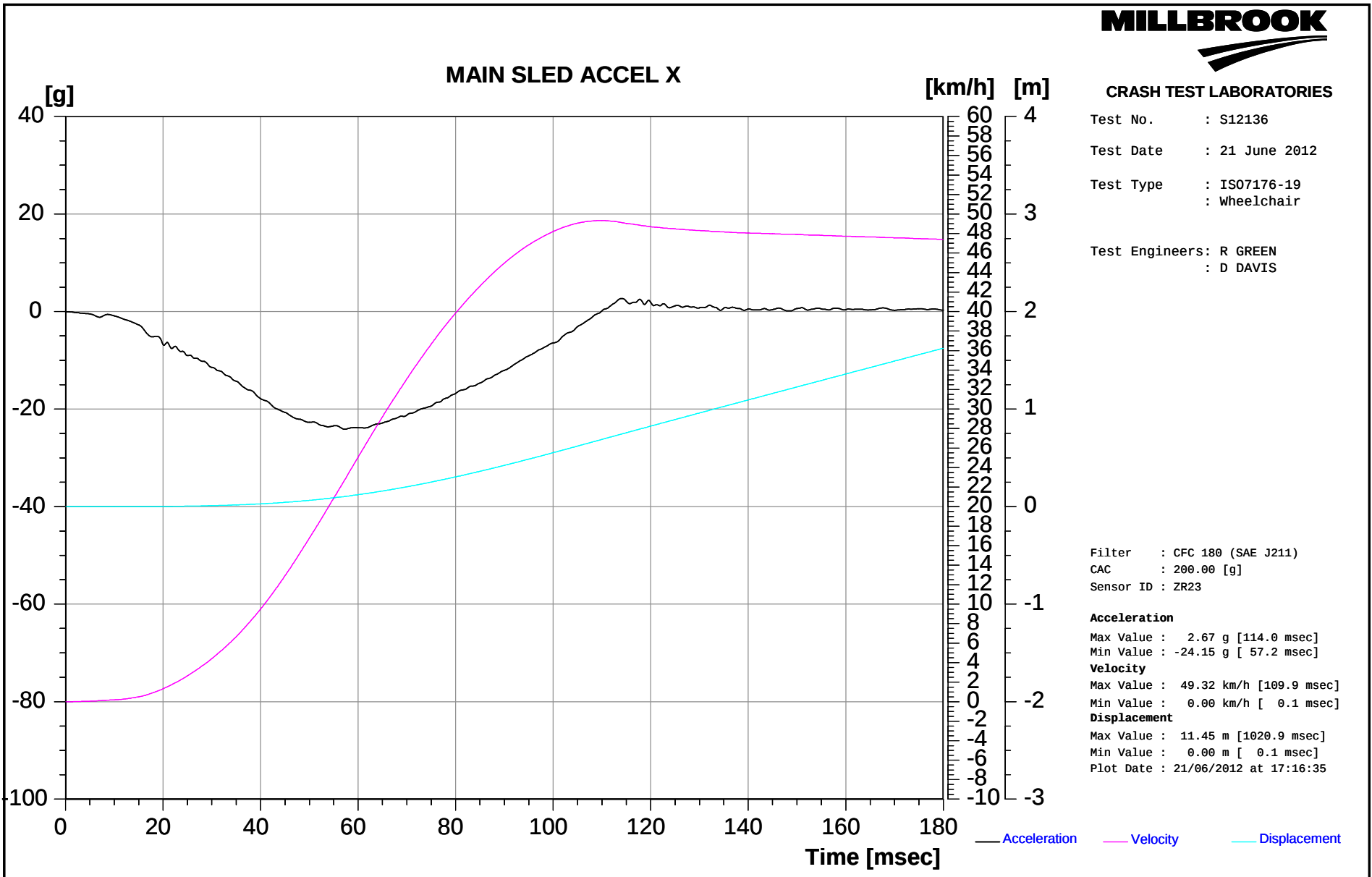
Max Value : 2.67 g [114.0 msec]
 Min Value : -24.15 g [57.2 msec]

Velocity

Max Value : 49.32 km/h [109.9 msec]
 Min Value : 0.00 km/h [0.1 msec]

Displacement

Max Value : 11.45 m [1020.9 msec]
 Min Value : 0.00 m [0.1 msec]
 Plot Date : 21/06/2012 at 17:16:35



Test Report



Front view of occupant, pre-test



Front 3/4 view, pre-test

Test Report



RH view, pre-test



Rear 3/4 view, pre-test

Test Report

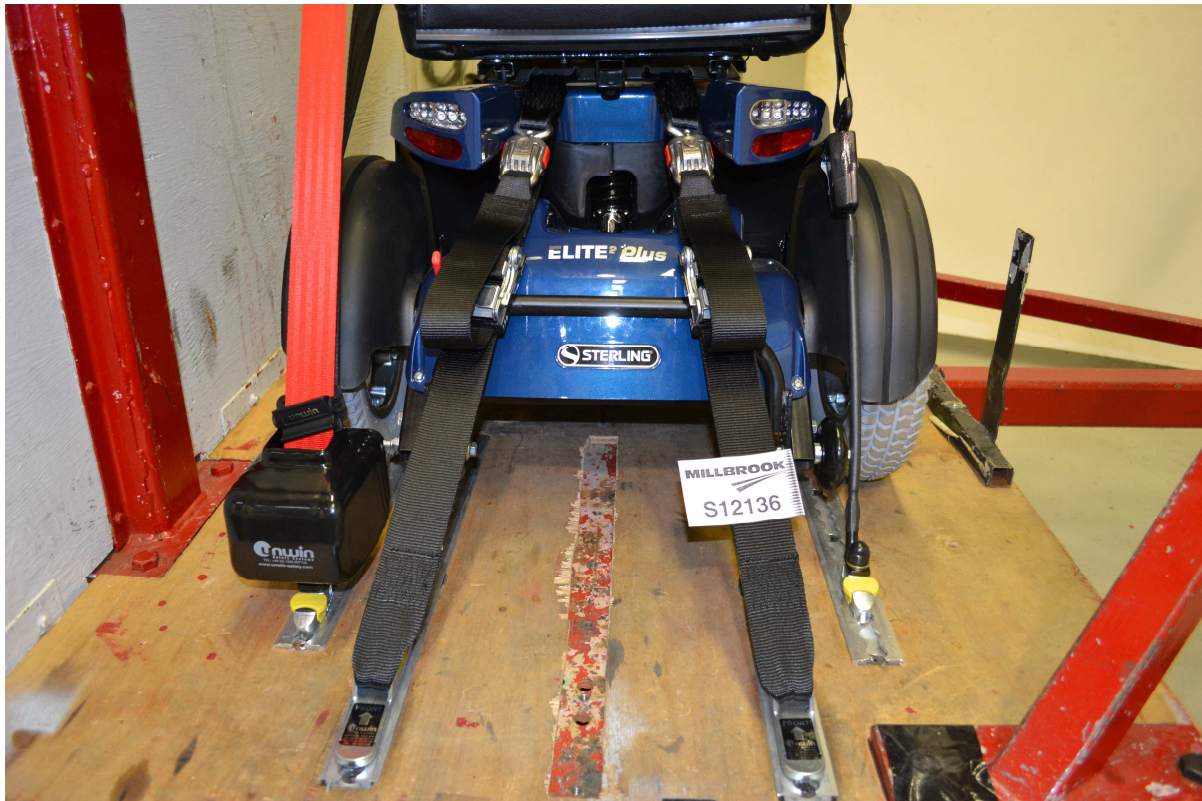


Rear view, pre-test



Front wheelchair restraints, pre-test

Test Report



Rear wheelchair restraints, pre-test



Occupant restraint anchorage point, pre-test

Test Report



Front view of occupant, post-test



Front 3/4 view, post-test

Test Report



RH view, post-test



Rear 3/4 view, post-test

Test Report



Rear view, post-test



Front wheelchair restraints, post-test

Test Report



Rear wheelchair restraints, post-test



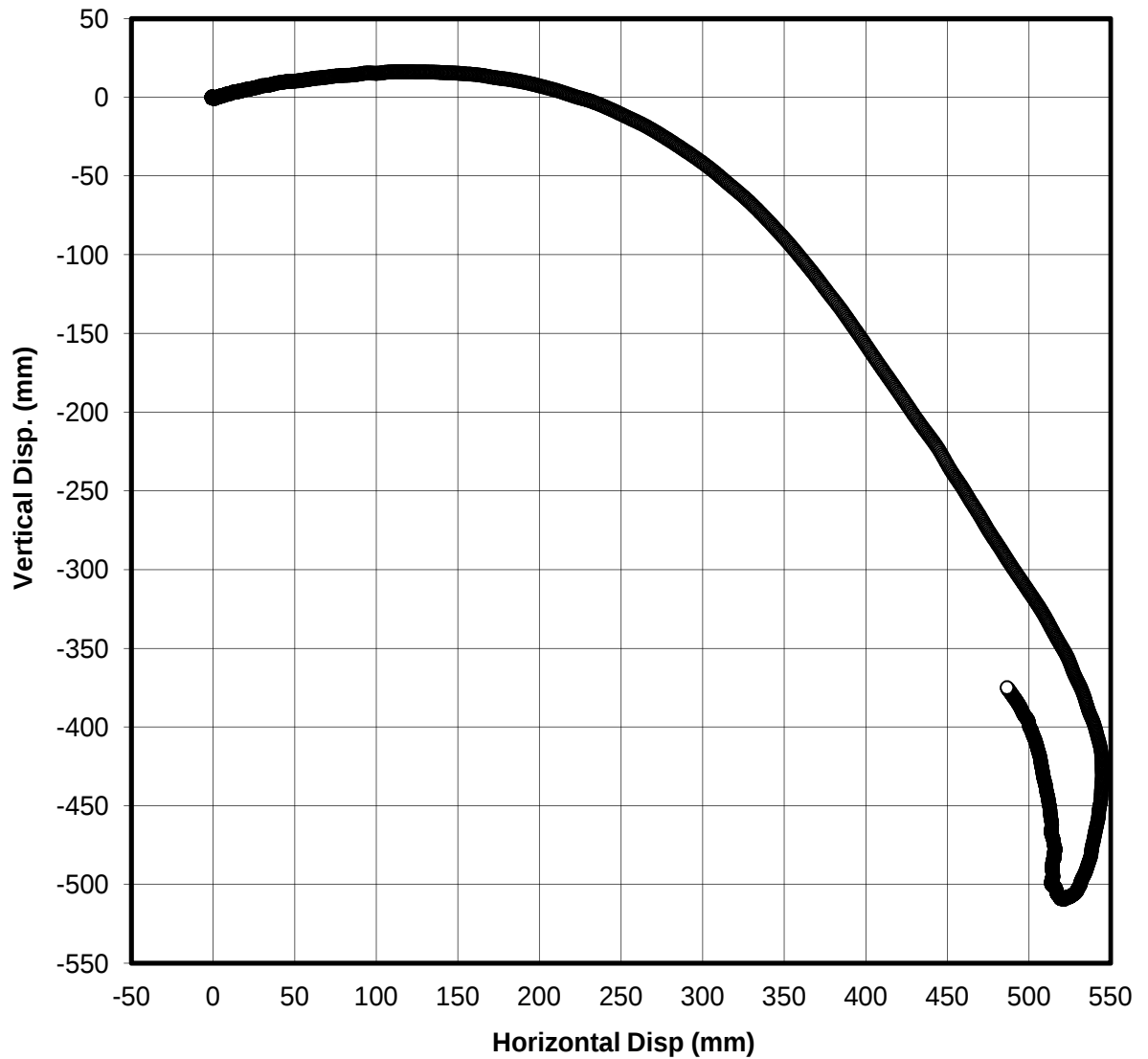
Occupant restraint anchorage point, post-test

Test Report



post-test

HEAD TRAJECTORY GRAPH



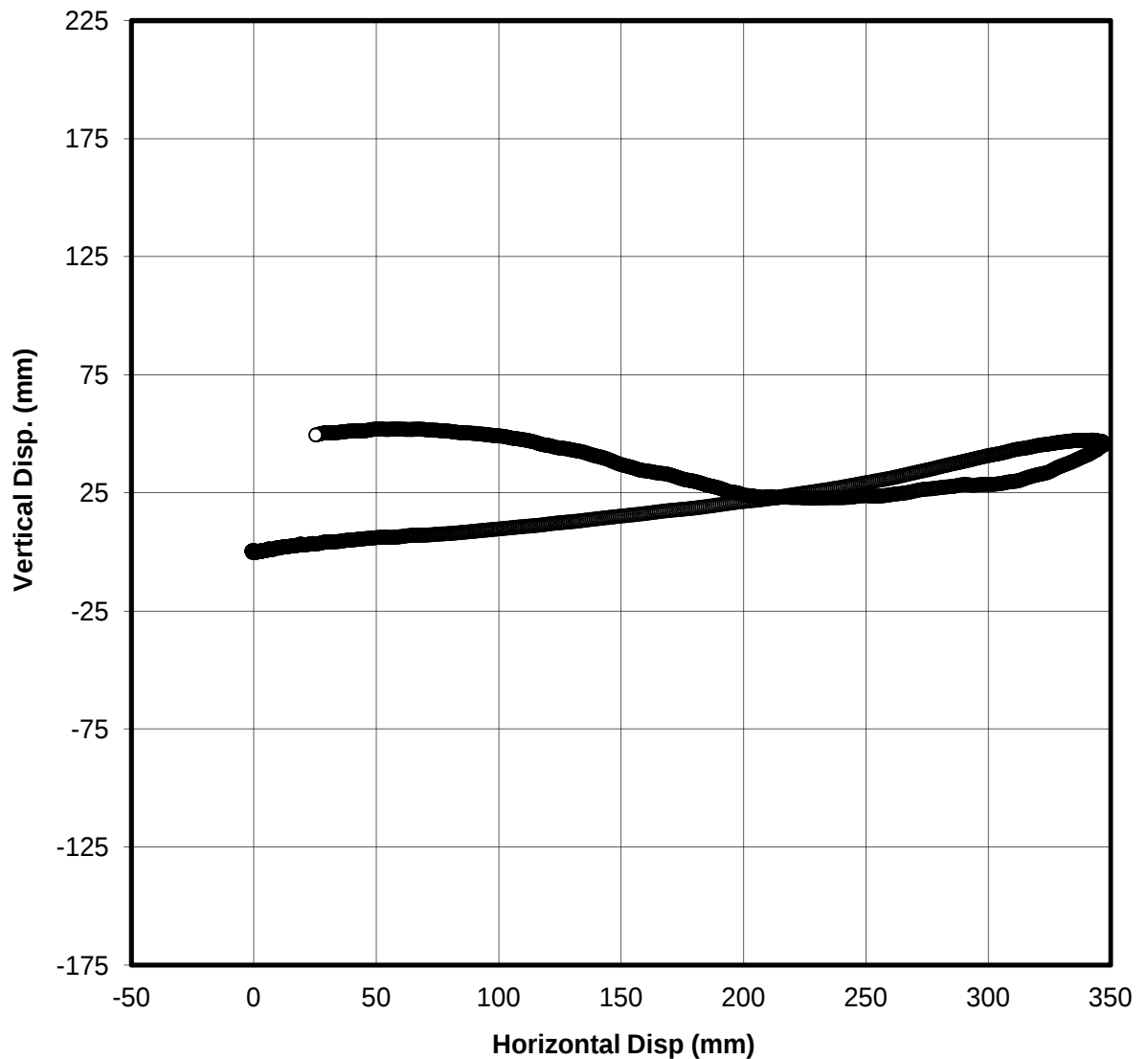
Maximum horizontal displacement	=	545mm
Minimum horizontal displacement	=	-1mm
Maximum vertical displacement	=	16mm
Minimum vertical displacement	=	-509mm

The Millbrook logo, featuring the word "MILLBROOK" in a bold, green, sans-serif font. Below the text is a stylized graphic consisting of two curved lines, one yellow and one green, sweeping upwards and to the right.

Time (ms)	Horizontal Disp.(mm)	Vertical Disp.(mm)
0	0	0
5	-1	0
10	0	0
15	0	0
20	3	0
25	7	1
30	13	4
35	22	5
40	36	8
45	54	11
50	78	14
55	106	16
60	141	16
65	179	12
70	221	1
75	264	-18
80	306	-47
85	347	-86
90	384	-134
95	418	-185
100	452	-236
105	482	-285
110	510	-330
115	531	-374
120	544	-413
125	544	-446
130	539	-473
135	534	-492
140	529	-504
145	522	-509
150	517	-506
155	514	-498
160	514	-487
165	515	-475
170	514	-460
175	512	-444

[illegible]

KNEE TRAJECTORY GRAPH



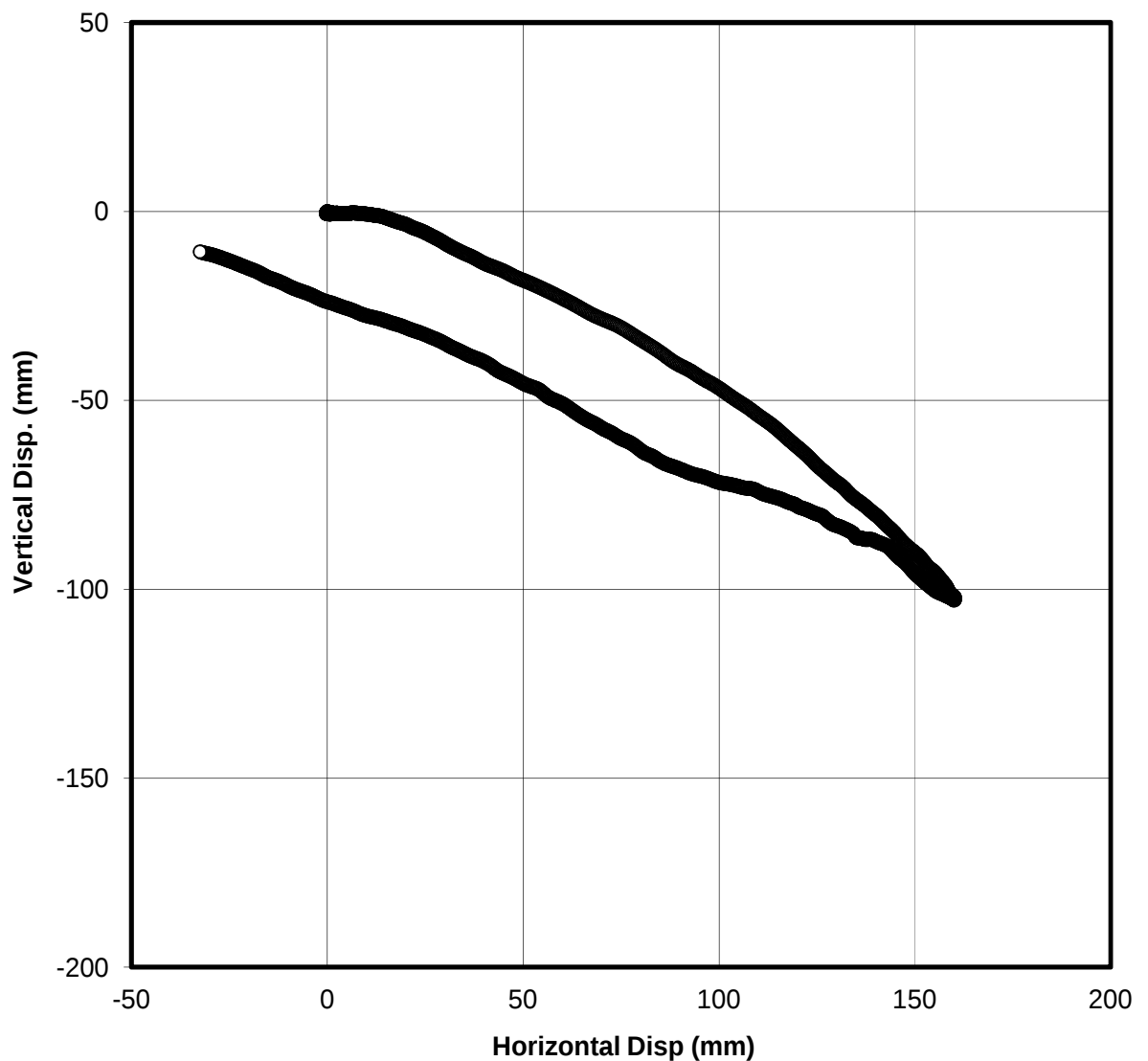
Maximum horizontal displacement	=	347mm
Minimum horizontal displacement	=	-1mm
Maximum vertical displacement	=	52mm
Minimum vertical displacement	=	0mm

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Time (ms)	Horizontal Disp.(mm)	Vertical Disp.(mm)
0	0	0
5	-1	0
10	0	0
15	1	0
20	3	0
25	8	1
30	15	3
35	26	3
40	41	5
45	60	7
50	85	8
55	116	11
60	152	15
65	192	20
70	232	26
75	269	33
80	301	41
85	324	46
90	339	47
95	346	47
100	345	44
105	333	38
110	319	32
115	301	29
120	282	27
125	258	24
130	237	23
135	219	23
140	207	23
145	195	25
150	179	30
155	161	34
160	146	39
165	131	43
170	115	47
175	99	49

[illegible]

P-POINT TRAJECTORY GRAPH



Maximum horizontal displacement	=	160mm
Minimum horizontal displacement	=	-33mm
Maximum vertical displacement	=	0mm
Minimum vertical displacement	=	-103mm

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P-POINT TRAJECTORY TABULATED DATA

[illegible]

Test Results

ISO 7176/19

Section 5.2 - Dynamic Performance Requirements

Test No: S12136 Client: Sunrise Medical Wheelchair: Elite 2 Plus Occupant: Hybrid II 50th % (75 kg)		RESULTS
5.1	During the Test	
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 200 mm. (± 5 mm)	PASS 160 mm
	Was the horizontal movement of the dummy Knee (X_{knee}) less than 375 mm. (± 5 mm)	PASS 347 mm
	Was the horizontal movement of the Dummy (X_{head}) less than 650 mm. (± 5 mm)	PASS 545 mm
b)	Was the ratio $X_{knee}/X_{ss} > 1.1:1$	PASS 2.17 : 1
c)	Not conducted	
	Did the batteries of powered wheelchairs, or their surrogate parts:-	
	I. move outside of the wheelchair footprint	PASS
	II. 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 a 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 100g become detached from the wheelchair	PASS
d)	Did any occupant contactable components fragment or separate with an edge of 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	PASS
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
The wheelchair satisfied the Dynamic Test requirements of ISO/NP 7176/19 of 7th July 2008		PASS