

# Test Report



**Customer**

**Alu Rehab**

**Test Item**

**Netti 'Mobile E4'**

**Test**

**ISO 7176-19:2008 as amended by EN  
12184:2014**

**Millbrook Report No.**

**18/0048**

**Millbrook Test No.**

**S15153**

**Author:**

A handwritten signature in black ink, appearing to read "B. Appleyard".

**B. Appleyard**  
Engineer

**Approved:**

A handwritten signature in black ink, appearing to read "N. Targett".

**N. Targett**  
Manager: Safety Test  
Engineering

**Date:**

**6<sup>th</sup> January 2018**

**This test report shall not be reproduced, except in full, without written approval of Millbrook**

## Distribution

Organisation	Recipient	Format	Qty
Alu Rehab AS, Bedriftsveien 23, 4353Klepp stasjon Norway	Oddvar Kverne	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	6 <sup>th</sup> January 2018	B. Appleyard	N. Targett	All

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## Appendices

Graphical Results	Appendix A Transducer Calibration Report
Pre and Post Test Photographs	Appendix B
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High Speed Digital Films	See "Films" directory on data media
Still Photography	See "Stills" directory on data media

## Test Facility and Date

The test, number S15153, was performed on 16<sup>th</sup> December 2017 at the Servo Sled facility at Millbrook Proving Ground Ltd.

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## Test Items

Test parts were delivered to Millbrook on 5<sup>th</sup> December 2017.

Item	Part No.	Test mass (kg)
Powered Wheelchair	Netti 'Mobile E4'	110kg
Front Wheelchair Tie Downs	Unwin OF02	7kg
Rear Wheelchair Tie Downs	Unwin OR02 x 2	
Occupant Restraints	MPG SORv1	

The following table provides information regarding the ATD used in the test.

Description	Family	Test mass (kg)
95 <sup>th</sup> percentile male	HIII	102kg

## Test Outcome

The 'Netti Mobile E4' wheelchair successfully met the dynamic test requirements of ISO 7176-19:2008 as amended by EN 12184:2014.

Note 1: High definition pre and post-test still images of the test are provided in the 'Stills' directory.

Note 2: A summary of test results is given in Appendix C

## Photographic

A single high speed camera was positioned to provide overall coverage of the dynamic response of test item and occupant during the test. The high speed camera (nominal 1000 frames per second) used for this test was as detailed below:

Camera Position	Camera	Lens
LH Total on-board view	MotionXtra NX-Air-5-S2	IDT 6mm

## Disclaimers

1. The results contained within this report relate only to the Alu-Rehab 'Netti Mobile E4' powered wheelchair product.

Millbrook Proving Ground has no control over matters pertaining to conformity of production items with tested items.



At Millbrook, we provide a comprehensive range of engineering, test and validation services to customers in the automotive, transport, petrochemical, defence and security industries. We are independent and impartial in everything we do.

At our Proving Ground in the UK, we have 70km of varied test tracks, including hills routes, high speed areas and challenging off road courses. Our professional drivers and engineers perform repeatable tests, on all types of vehicles, in a secure and safe environment. We have a range of test facilities for components and full vehicles. These include engine dynamometers, environmental chambers, crash laboratory and advanced emissions testing. We engineer and manufacture specialist vehicle conversions. These range from new versions of existing platforms, such as

estate cars, to armoured solutions and complex electronics installations. We conduct impartial vehicle assessments and develop class-leading vehicle dynamics improvements. We help Vehicle Manufacturers manage complex bills of materials and launch new models.

We are passionate about customer service and technical excellence; we take pride in delivering exactly what our customers want, whether that is a vehicle test, engineered solution or smooth-running conference. We develop our people so that they remain at the leading edge of their specialist fields and contribute to the development of future regulations. The quality of our work is reflected in our ISO 9001 and ISO 17025 certification. All of this combines to make Millbrook an integral part of the industries we serve and an ideal partner at any stage in the development and launch of the vehicles of tomorrow.

### Test Results Summary

<b>Test No:</b> S15153 <b>Test Type</b> ISO 7176-19:2008 as amended by EN12183:2014 <b>Manufacturer</b> Alu Rehab. <b>WC Model:</b> Netti 'Mobile E4' <b>Mass:</b> 110kg <b>Seat Rail Angle:</b> 15° <b>Seat Back Angle:</b> 20° <b>Head Restraint:</b> Fitted <b>Occupant:</b> Hybrid III 95 <sup>th</sup> Percentile (102kg) <b>Front Tie Downs:</b> Unwin OF02 <b>Rear Tie Downs:</b> Unwin OR02 x 2 <b>Occupant Restraint:</b> MPG SORv1	<b>RESULTS</b>
<b>5.1 During the Test</b>	
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. ( $\pm 5$ mm)	Pass 50mm
Was the horizontal movement of the dummy Knee ( $X_{knee}$ ) less than 375 mm. ( $\pm 5$ mm)	Pass 278mm
Was the forward horizontal movement of the Dummy Head ( $X_{headF}$ ) less than 650 mm. ( $\pm 5$ mm)	Pass 385mm
Was the rearwards horizontal movement of the Dummy Head ( $X_{headR}$ ) greater than -450 mm. ( $\pm 5$ mm)	Pass -430mm
b) Was the ratio $X_{knee}/X_{ss} > 1.1:1$	Pass 5.5:1
c) 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
<b>5.2 Post Test</b>	
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 <1%
j) Did the wheelchair and its components cause partial or complete failure of the webbing or any of the WTORS assemblies	Pass
<b>The Netti Mobile E4 powered wheelchair satisfied the dynamic test requirements of ISO 7176-19:2008 as amended by EN12184:2014</b>	