

Certificate of Crash Test according to

ISO 10542-1:2012 Wheelchair tiedown and occupant-restraint systems - SWM & ISO 7176-19 – 2008 Wheeled mobility devices for use as seats in motor vehicles

This report serves solely as documentation for the test results. The tested objects have been selected by the client without the assistance of Dahl Engineering.

Assignment: Crash testing of wheelchair and WTORS according to ISO 7176-19 sections 5.2, 5.2.1 and 5.2.2. as well as ISO 10542 sections 5.2.4 and 5.2.5

Date of testing: 1 March 2018

**Test object/
Wheelchair:** Dietz Sango R (rear wheel drive) with docking adaptation for Dahl Docking System.
Fixed back rest, manual foot rest without seat tilt.

Mass of wheelchair: 137,5 kg.

Serial no: not informed

WTORS: Dahl WTORS that meet requirements set out in ISO 10542
Wheelchair restraint system – Dahl Docking Station
Occupant restraint – Dahl 3p. shoulder and lap belt #500984

Test dummy/ATD: The test was carried out using a Hybrid II 50% male dummy with a mass of 77 Kg.

Measuring: The deceleration was measured by accelerometers mounted on the crash test sled.

Photography: The test was filmed with a high speed camera at 500 fps.
Still pictures, pre and post test, was also taken.

**Sled deceleration
and speed:** See page with plotted graph and speed

Test results:

| Section | Details | X if correct |
|--------------|---|--------------|
| 5.2.1 | During the test | |
| | Horizontal excursion limits | |
| | Wheelchair point P \leq 200 mm [Xwc] | 54 |
| | ATD knee \leq 375 mm[Xknee] | 176 |
| | ATD front of head \leq 650 mm [XheadF] | 424 |
| | ATD rear of head \leq 450 [XheadR] | -321 |
| | The knee excursion exceeded the wheelchair P point excursion | X |
| | (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 | |
| | 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 |
| | There were no visible signs of material failure on the wheelchair securing points | X |
| | There were no components, fragments or accessories of the wheelchair with a mass of more than 100g that completely separated from the wheelchair | X |
| | There were no fragmented or separated component, that may contact the occupant, produced with sharp edges less than radius 2 mm | X |
| | There were no visible signs of failure on the wheelchairs primary load carrying components | X |
| | There were no visible signs of failure on the wheelchairs seat adjusters | X |
| | The ADT was removed from the wheelchair without the use of tools | X |
| | The wheelchair was released from the tie-down system without the use of tools | X |
| | The post test decrease of the mean H-point height is not more than 20% | X |

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

Test Laboratory:

Dahl Engineering - Research and Testing Laboratory

Løvevej 3 - DK-7700 Thisted - Denmark

Phone: 45 96180077 - Fax: 45 96180078

e-mail: Dahl@dahlengineering.dk – web page: www.dahlengineering.dk

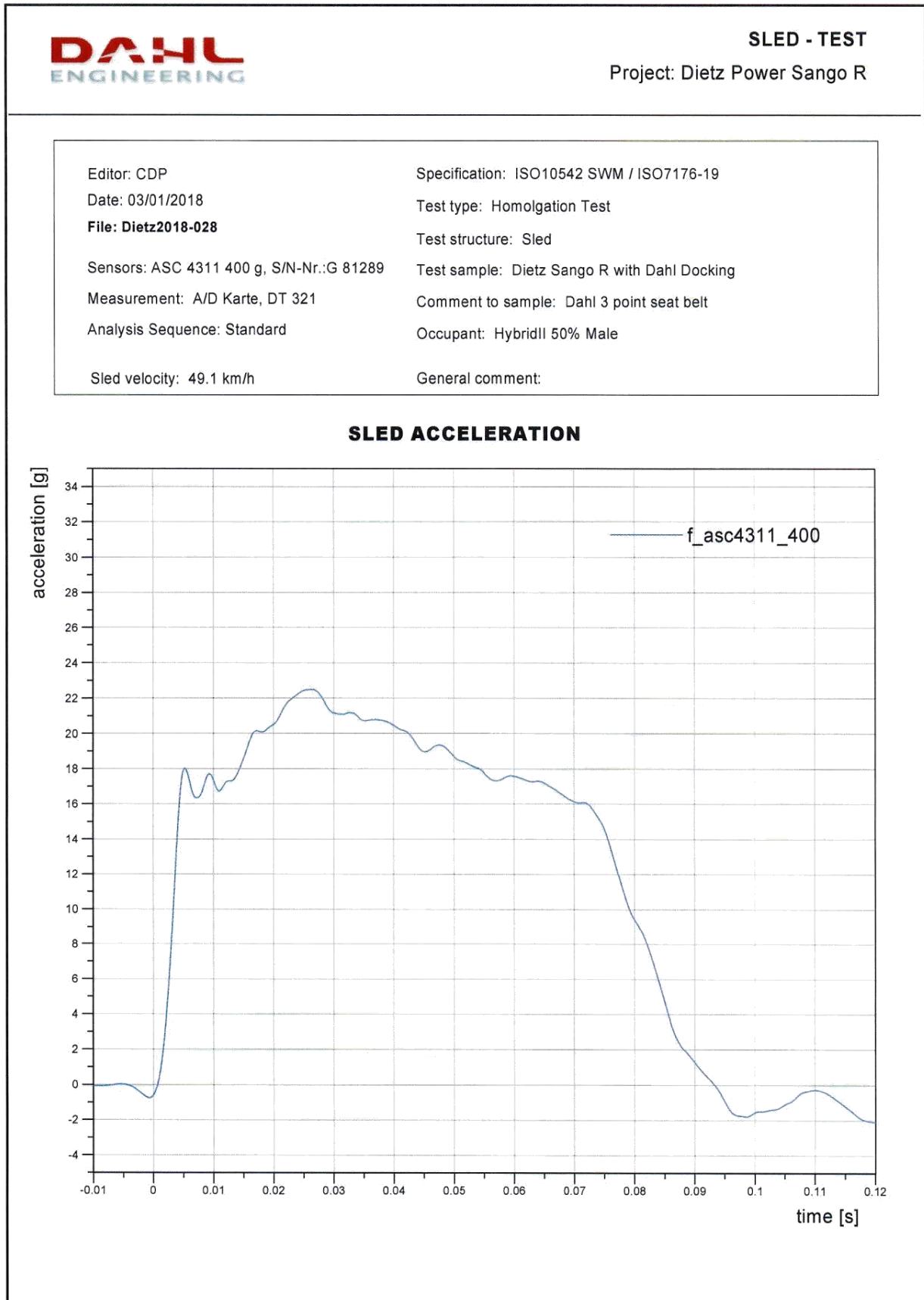
Thisted 9 March 2018

Claus Dahl Pedersen

Head of test laboratory



Plotted graph and speed



Pre- test photos



Post test photos



Post test photos

