

**TOPTESTER OY**

**TEST REPORT**

**DROP TEST**

Customer:

Handshake Finland Oy

Device name & version:

Lumonite Compass (V7)

Customer: Handshake Finland Oy  
Test name: Drop test  
EUT: Lumonite Compass (V7)

TOPTESTER OY

## 1. TEST INFORMATION

CUSTOMER: Handshake Finland Oy  
TEST NAME: Drop test  
TEST DATE: 1. June 2021  
TEST SITE: Toptester Laboratory Rovaniemi

### EQUIPMENT UNDER TEST

DEVICE NAME: Lumonite Compass  
VERSION NR.: V7 (2021)  
DEVICE ID: LC000022

Test ID: Drop\_Handshake\_210601  
Report version: 1.0  
Class: Cust

### Persons in charge of the test

Customer: Niko Peltoniemi  
Toptester: Arttu Tervo  
Test ordered by: Niko Peltoniemi  
Test order date: May 2021

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## 2. TEST REPORT HISTORY

| Version | Date      | Change description  | Changes made by |
|---------|-----------|---|-----------------|
| 1.0     | 11.6.2021 | First version of the report is 1.0. If no changes are necessary, it will be also the final version. | Arttu Tervo     |
|         |           |   |                 |

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## 4. TEST SUMMARY

### Used standard or test method summary

This was a drop test aiming to break the EUT. The testing started from 1500 g acceleration and the acceleration was raised every drop up to 20000 g.

### Description of equipment under test

Lumonite Compass (V7), Multifunctional High Power Headlamp

### Test result summary

The EUT stayed functional through the test.  
Testing was stopped after 10 drops with 20000 g  $\pm$ 10 % acceleration.  
EUT's body bent during the test causing that the battery got stuck inside the EUT.

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## 5. INTRODUCTION

### 5.1. Background

The test was ordered by Handshake Finland as a part of product testing program.

### 5.2. Equipment under test

Equipment Under Test (EUT):

- Lumonite Compass
  - Version: V7
  - Device ID: LC000022

### 5.3. Goal of the test

Goal of the test was to find the acceleration at which the EUT breaks.

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## 6. TEST METHOD AND MEASUREMENT DESCRIPTION

### 6.1. Test Method

The EUT was attached to drop tester's sledge with a jig. Acceleration of the first drop was 1500 g. The acceleration was raised with 500 – 1500 g steps every drop. The plan was to continue the test until the EUT breaks or 20000 g acceleration was reached.

### 6.2. Analyses

EUT was functional during the test. Functionality was monitored throughout the test.

### 6.3. Test Equipment, Reliability Control and Measurement

First drops up to 4600 g acceleration were made with Salon Teknopaja drop tester (Toptester ID: TT2). Rest of the drops were made with Lansmont drop tester (Toptester ID: Lansmont 2).

Used accelerometers:

- Kistler 8704B5000, SN: 5772785
  - Calibrated 28.8.2020, valid until 27.2.2022
  - This sensor was used with TT2 drop tester
- PCB Piezotronics M350D02, SN: 61180
  - Calibrated 22.10.2020, valid until 23.4.2022
  - This sensor was used with Lansmont 2 drop tester

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## 7. TEST PROCESS

The first 6 drops were made with TT2 drop tester.  
The acceleration was raised every drop from  $\approx 1500$  g up to  $\approx 4600$  g.

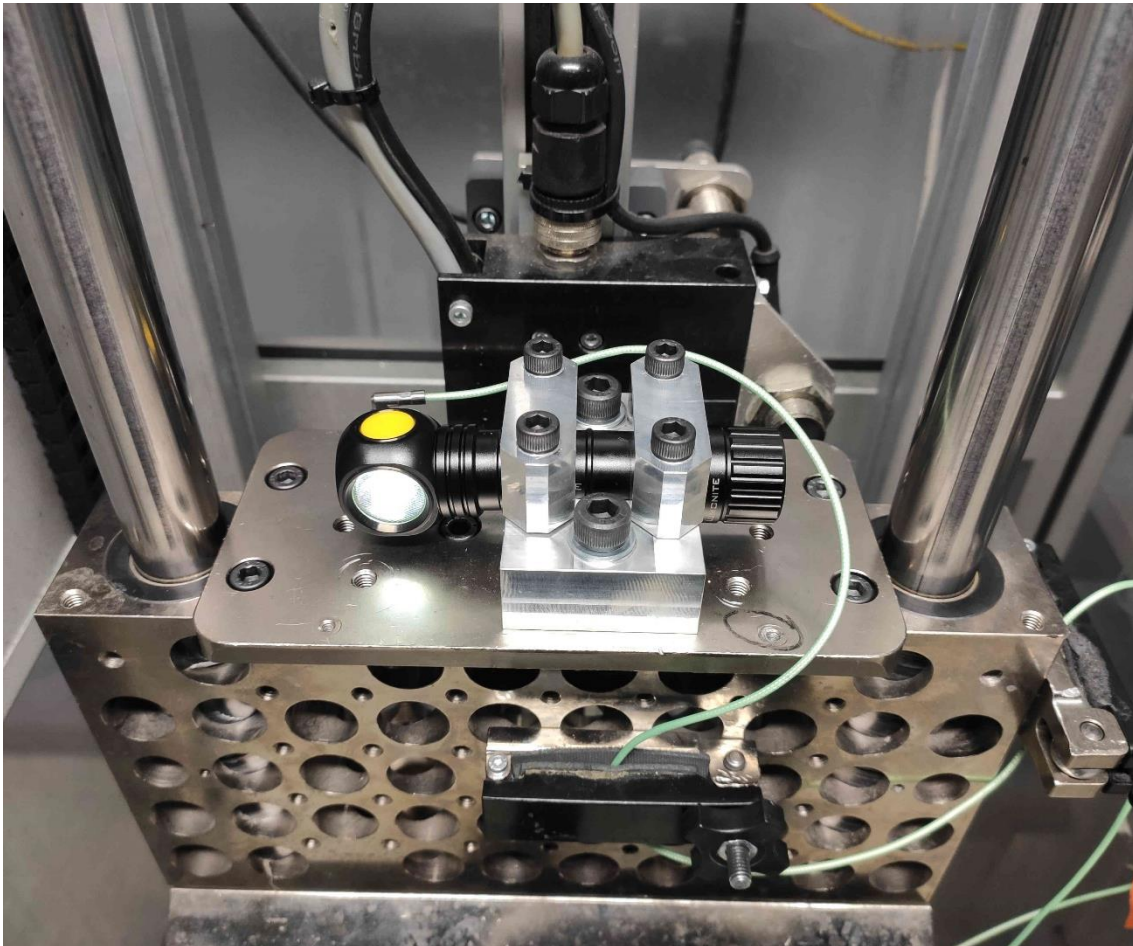


Figure 1. Test setup on TT2 drop tester.

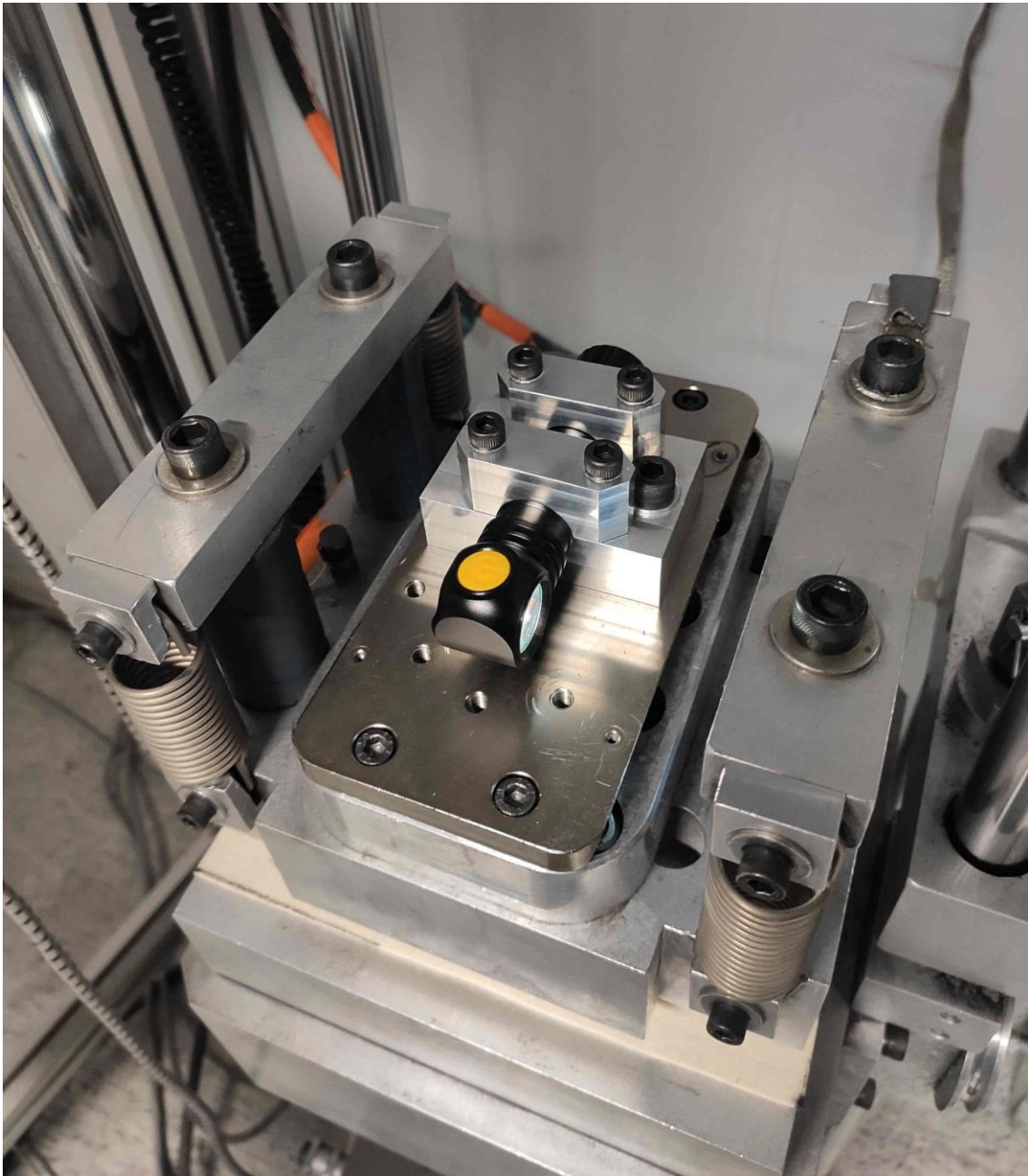
The EUT stayed functional and no visual damage was detected.

The test was continued with Lansmont 2 drop tester to achieve higher accelerations.  
The acceleration was raised every drop from  $\approx 6000$  g up to  $\approx 20000$  g.

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Postal address: Ahjotie 23, FI-96300 Rovaniemi, Finland  
Visiting and courier address: Teollisuustie 34, FI-96300 Rovaniemi, Finland  
Tel. +358 (0)400 322 344 | E-mail: [info@toptester.com](mailto:info@toptester.com) | [www.toptester.com](http://www.toptester.com)  
VAT No. FI17036376

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**Figure 2. Test setup on Lansmont 2 drop tester.**

After 20 000g acceleration was reached, the EUT was still functional. It was decided with the customer that additional 9 drops with  $\approx 20000$  g will be made.

After total of 10 drops with  $20000$  g  $\pm 10$  % acceleration was made, the test was stopped.

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Example of 20000 g shock pulse dropped with Lansmont is shown in Figure 3.



**Figure 3. 20 000 g shock pulse.**

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## 8. RESULTS AND CONCLUSIONS

The EUT stayed functional through the test.  
Testing was stopped after 10 drops with 20000 g  $\pm$ 10 % acceleration.  
EUT's body bent during the test causing that the battery got stuck inside the EUT.



Figure 4. EUT after the test.



Figure 5. EUT after the test.

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## 9. QUALITY CONTROL



Toptester is an ISO 9001  
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