

**TOPTESTER OY**

**TEST REPORT**

**MIL-STD-810H, Method 503.7 Temperature Shock**

Customer: Niko Peltoniemi  
Device name & version: Lumonite Compass (V7)

Customer: Handshake Finland Oy  
Test name: MIL-STD 810H, Method 503.7 Temperature Shock  
EUT: Lumonite Compass (V7)

TOPTESTER OY

## 1. TEST INFORMATION

CUSTOMER: Handshake Finland Oy  
TEST NAME: MIL-STD-810H, Method 503.7 Temperature Shock  
TEST DATE: 1. June 2021  
TEST SITE: Toptester, Rovaniemi

### EQUIPMENT UNDER TEST

DEVICE NAME: Lumonite Compass  
VERSION NR.: V7 (2021)  
DEVICE ID: LC000013  
  
Test ID: ENV\_Handshake\_210601  
Plan version: 1.0  
Class: Cust

### Persons in charge of the test

Customer: Niko Peltoniemi  
Toptester: Kati Mansikkasalo-Jurvelin  
Test ordered by: Niko Peltoniemi  
Test order month: May 2021

## 2. TEST REPORT HISTORY

Version	Date	Change description	Changes made by
1.0	15.6.2021	First version of the report is 1.0. If no changes are necessary, it will be also the final version.	Kati Mansikkasalo-Jurvelin

## 3. CONTENTS

1. TEST INFORMATION .....	1
2. TEST REPORT HISTORY .....	2
3. CONTENTS .....	2
4. TEST SUMMARY .....	3
5. INTRODUCTION .....	4
5.1. Background .....	4
5.2. Equipment under test.....	4
5.3. Goals of the test.....	4
6. TEST METHOD AND MEASUREMENT DESCRIPTION .....	5
6.1. Test Method.....	5
6.2. Acceptance Criteria .....	5
6.3. Analyses.....	5
6.4. Test Equipment, Reliability Control and Measurement.....	6
6.5. EUT functional Control and Measurement .....	6
7. TEST PROCESS .....	7
8. RESULTS AND CONCLUSIONS .....	11
9. QUALITY CONTROL .....	11

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## 4. TEST SUMMARY

### Used standard or test method summary

The test was a Mil-Std 810H, Method 503.7, Temperature shock, Procedure I-C (Multi-cycle shocks from constant extreme temperature).

### Description of equipment under test

Lumonite Compass (V7), Multifunctional High Power Headlamp

### Test result summary

No physical damage was found from the EUT after test. EUT was functional during and after the test.  
The test result is Pass.

### Signatures

Test performed and reported by:



Date: 15.6.2021

Kati Mansikkasalo-Jurvelin

Customer: Handshake Finland Oy  
Test name: MIL-STD 810H, Method 503.7 Temperature Shock  
EUT: Lumonite Compass (V7)

## 5. INTRODUCTION

### 5.1. Background

Test was ordered by Handshake Finland Oy as a part of testing program.

### 5.2. Equipment under test

- 1 pcs Lumonite Compass
  - Version: V7
  - Device ID: LC000013



Figure 1. EUT

### 5.3. Goals of the test

The goal of the test was to see if the EUT can withstand fast temperature change and if the EUT passed or failed the acceptance criteria named in the test standard and test plan.

## 6. TEST METHOD AND MEASUREMENT DESCRIPTION

### 6.1. Test Method

The test was MIL-STD-810H, Method 503.7, temperature shock, Procedure I-C (Multi -Cycle Shocks from Constant Extreme Temperature). Test dwelling temperatures were -40 °C and +40 °C. One cycle contained 30 min dwell in each temperature with less than one minute transfer time between temperatures (chambers). Three cycles were performed.

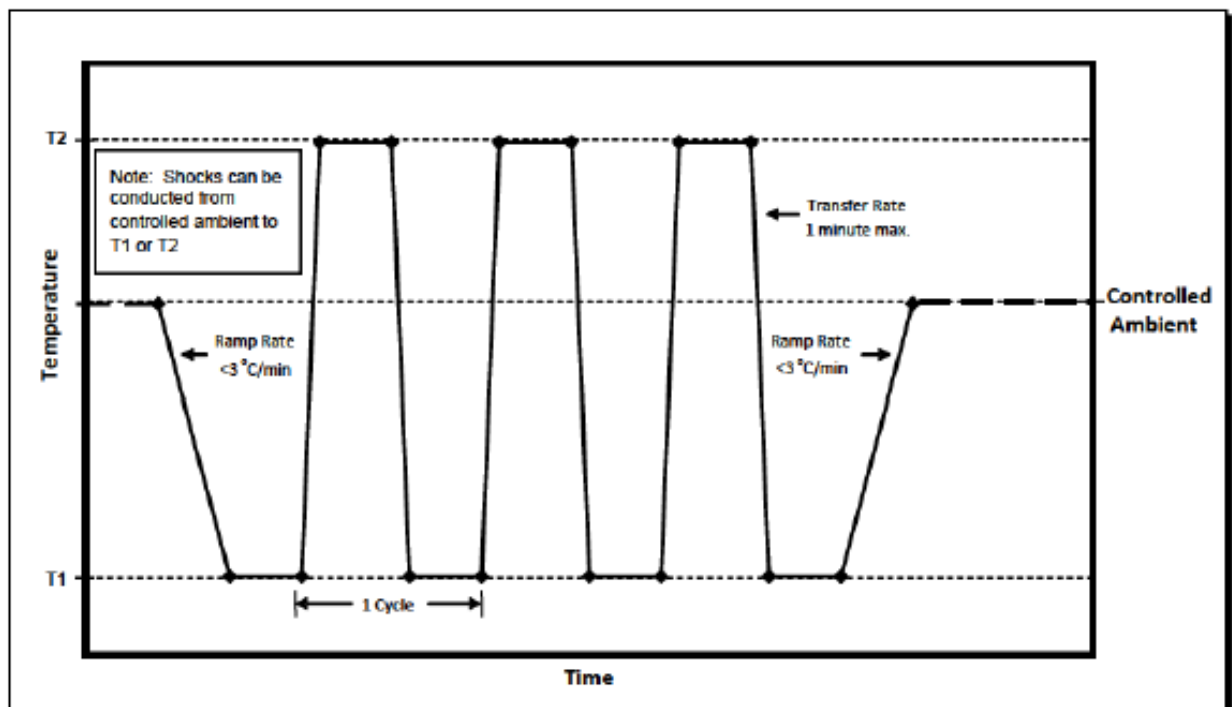


Figure 2. Multi-Cycle Shocks

### 6.2. Acceptance Criteria

EUT must be operational during and after the test. Physical damage was not acceptable.

### 6.3. Analyses

Before and after test was done visual check and inspection to verify the electrical functionality of the device.

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#### **6.4. Test Equipment, Reliability Control and Measurement**

Two temperature chambers were used to create the test conditions. EUT was manually transferred between the chambers.

The Espec environmental chamber was controlled, and the temperature data was recorded by ERC100 software.

Cold test chamber:

Environmental chamber Espec EGNX12-4CWL, sn. 179705, calibration date is 10.9.2020, calibration valid until 12.3.2022. The environmental chamber calibration interval is 12-18 months.

Hot test chamber:

Environmental chamber Espec SH-614, sn. 92006522, calibration date is 18.8.2020, calibration valid until 17.2.2022. The environmental chamber calibration interval is 12-18 months (first cycle)

Environmental chamber Vötsch VSC 7048-15, sn. 58566082630010, calibration date is 18.8.2020, calibration valid until 17.2.2022. The environmental chamber calibration interval is 12-18 months. (Last hot cycles)

Toptester laboratory conditions were measured with VAISALA Temp & Humidity Transmitter HMT337 sn. N2040942, calibration date is 19.8.2020, calibration valid until 18.2.2022 and VAISALA Digital Barometer PTB330 sn. N2040942, calibration date is 19.8.2020, calibration valid until 18.2.2022.

#### **6.5. EUT functional Control and Measurement**

EUT was functional during the test. Functionality was tested before and after test.

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## 7. TEST PROCESS

Before the test, operational inspection was performed.

Laboratory conditions:

- Temperature 21.7 °C
- Relative humidity 31.6 %
- Air pressure 101.61 kPa

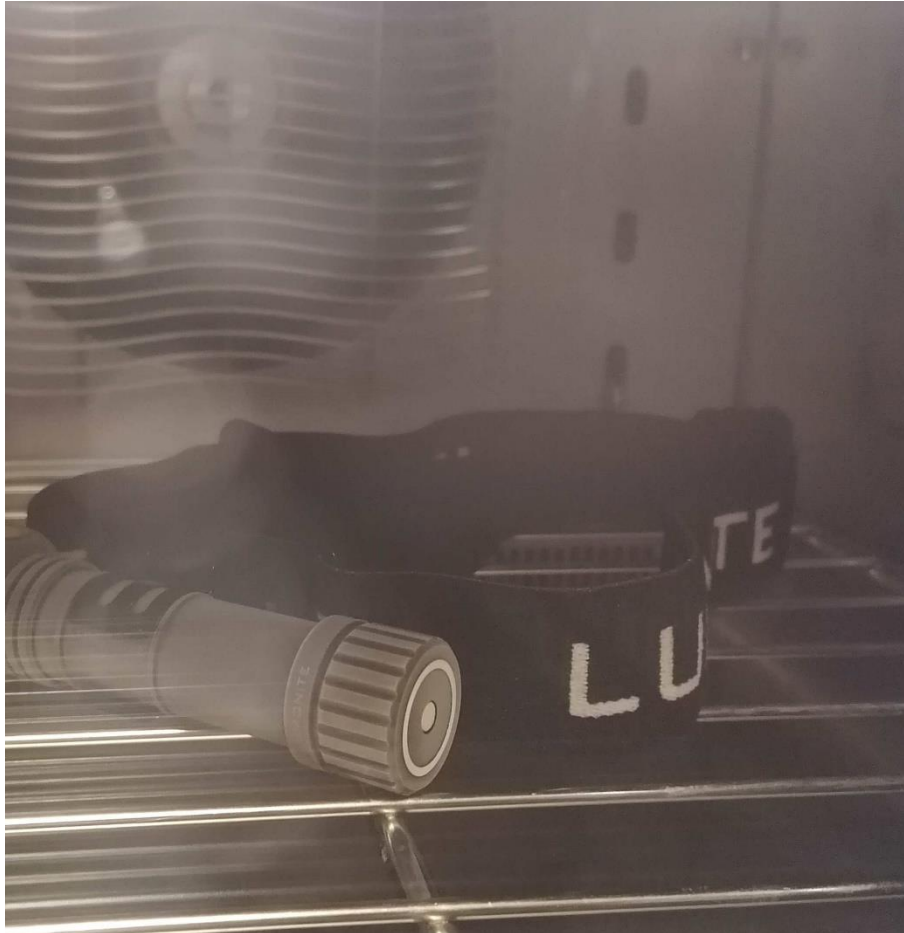
EUT was placed into a temperature chamber and the temperature was changed to -40 degrees in 21 minutes. EUT was 30 min in cold chamber. Then temperature cycling was started in +40 °C test chamber. After 30 min the EUT was manually transferred into -40 °C test chamber to 30 min. Transfer time between the chambers was ≈30 seconds. Three cycles were performed. Then temperature was changed to room ambient to 21 min.



**Figure 3. The EUT in cold test chamber.**



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**Figure 4. EUT moved to hot temperature chamber and frosting was seen on EUT's surface.**

In hot temperature periods the EUT's light was set to low power mode. In start of cold temperature periods the light was switched to high power mode. After 15 minutes in cold temperature the light turned off. After every cold period, the EUT was turned on by pushing the power button.

The EUT was functional after the test. No visual change or physical damages were found after test.

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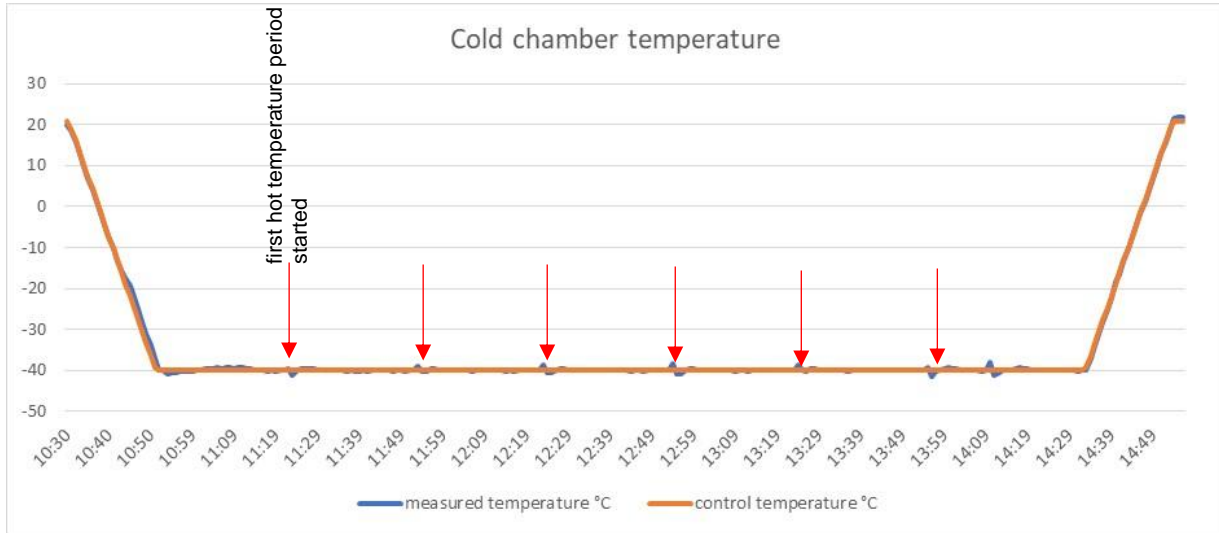


Figure 5. EUT after test. No visual change was found after test.

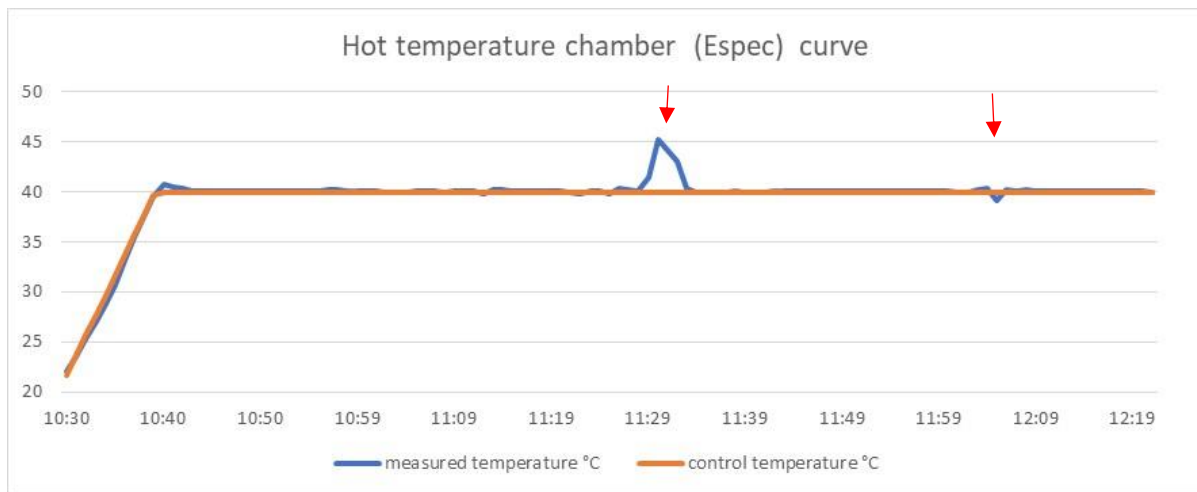


Figure 6. EUT after test. No physical damage was found after test.

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**Figure 7. Cold temperature chamber curve with transfer time (red arrows)**



**Figure 8. Hot temperature chamber curve (Especc) with transfer time (red arrows), first hot period**

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## 8. RESULTS AND CONCLUSIONS

No physical damage was found from the EUT after test. EUT was functional during and after the test.

The test result is Pass.

## 9. QUALITY CONTROL



Toptester is an ISO 9001  
certified organisation



**TOPTESTER OY**

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