

**TOPTESTER OY**

**TEST REPORT**

**MIL-STD-810G 509.6 SALT FOG**

Customer:

Handshake Finland

Device name:

Lumonite Compass

Customer: Handshake Finland  
Test name: Salt fog  
EUT: Lumonite Compass

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## 1. TEST INFORMATION

CUSTOMER: Handshake Finland  
TEST NAME: MIL-STD-810G 509.6 Salt fog  
TEST DATE: October 31. – November 4. 2022  
TEST SITE: Toptester Oy, Rovaniemi

## EQUIPMENT UNDER TEST

DEVICE NAME: Lumonite Compass  
DEVICE ID: LC001176

Test ID: COR\_Handshake\_221024  
Report version: 1.1  
Class: Cust

## Persons in charge of the test

Customer: Aleksi Isoherranen  
Toptester: Kati Mansikkasalo-Jurvelin  
Test ordered by: Aleksi Isoherranen  
Test order month: October 2022

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## 2. TEST REPORT HISTORY

Version	Date	Change description	Changes made by
1.0	16.11.2022	First version of the report is 1.0. If no changes are necessary, it will be also the final version.	Kati Mansikkasalo-Jurvelin
1.1	17.11.2022	Repaired text in Chapter 7.	Kati Mansikkasalo-Jurvelin

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## 4. TEST SUMMARY

### Used standard or test method summary

The test was a MIL-STD 810G, Method 509.6, Salt fog.

- 2x 24-hour period of salt fog exposure and 24-hours drying conditions (at standard ambient temperature and a relative humidity of less than 50 %).

### Description of equipment under test

1 pcs Lumonite Compass LC001176

### Test result summary

EUT was functioning normally after the test and no mechanical or chemical failures were found.

- The test result is **pass**.

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## 5. INTRODUCTION

### 5.1. Background

This test was a part of Equipment Under Test (EUT) product reliability testing.

### 5.2. Equipment under test

1 pcs Lumonite Compass, LC001176



**Figure 1. The Lumonite Compass.**

### 5.3. Goal of the test

The goal of the test was to see if the EUT can withstand salt fog atmosphere.

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## 6. TEST METHOD AND MEASUREMENT DESCRIPTION

### 6.1. Test Method

The test was conducted according to MIL-STD 810G w/Change 1 August 2014, Method 509.6, Salt Fog

- Salt mist test chamber temperature was  $35\text{ °C} \pm 2\text{ °C}$ .
- Salt mist solution was prepared by dissolving  $50\text{ g} \pm 5\text{ g}$  sodium chloride (NaCl) to amount of 1 l of demineralized water.
- pH-value of the salt solution was between 6.5 – 7.2
- fall out rate 1-3 ml/hour
- 2x 24-hour period of salt fog exposure and 24-hours drying conditions (at standard ambient temperature and a relative humidity of less than 50 %)

After the test, the EUT was washed using demineralized water.  
After drying a visual check was performed.

### 6.2. Acceptance Criteria

No mechanical or electrical failures were allowed. No corrosion for its immediate and potential long-term effects on the proper functioning and structural integrity of the test item were allowed.

### 6.3. Analyses

The EUT was visually checked, photographed and functionally tested before and after the test.

The EUT was functional (moonlight mode) during the test. After test the EUT was opened, and salt penetration was checked from battery box.

Customer will make final analyzes.

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

Test process during the salt mist period is controlled by CTC-control system. The salt mist chamber, Weiss SaltEvent SC/KWT 1000 (serial number 59226208160010) last calibration date is 28.1.2022. Calibration is valid until 28.7.2023.

Salt and water scale: KERN EOB WOC13007478. Last calibration date is 8.9.2022 and calibration is valid until 8.3.2024.

pH of saltwater is measured with VWR MD 8000H Multi Parameter Meter.

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Test process during the drying conditions period is controlled by SIMPATI system.  
Environmental chamber Vötsch VSC 7048-15 (serial number 58566082630010) last calibration date is 28.1.2022 and calibration is valid until 28.7.2023.

**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)  
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## 7. TEST PROCESS

In the first half of the cycle the EUT was placed in the salt mist chamber for 24 hours. The test parameters were set according to MIL-STD 810G, Method 509.6 Salt fog.

After 24 hours the EUT was removed from the chamber and placed inside an environmental chamber for 24 hours for the drying sequence. This cycle was repeated twice. The test setups for the complete cycle can be seen in Figure 2. and Figure 3.



**Figure 2. The EUT in salt mist chamber.**

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Postal address: Ahjotie 23, FI-96300 Rovaniemi, Finland  
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Tel. +358 (0)400 322 344 | E-mail: [info@toptester.com](mailto:info@toptester.com) | [www.toptester.com](http://www.toptester.com)  
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**Figure 3. The EUT in environmental chamber.**

After the test the EUT was rinsed and cleaned from salt residue and dried.

The EUT was inspected after the test.

No problems in mechanical integrity were seen and the functionality was the similar before, and after the test. No salt penetration was found inside the battery box.

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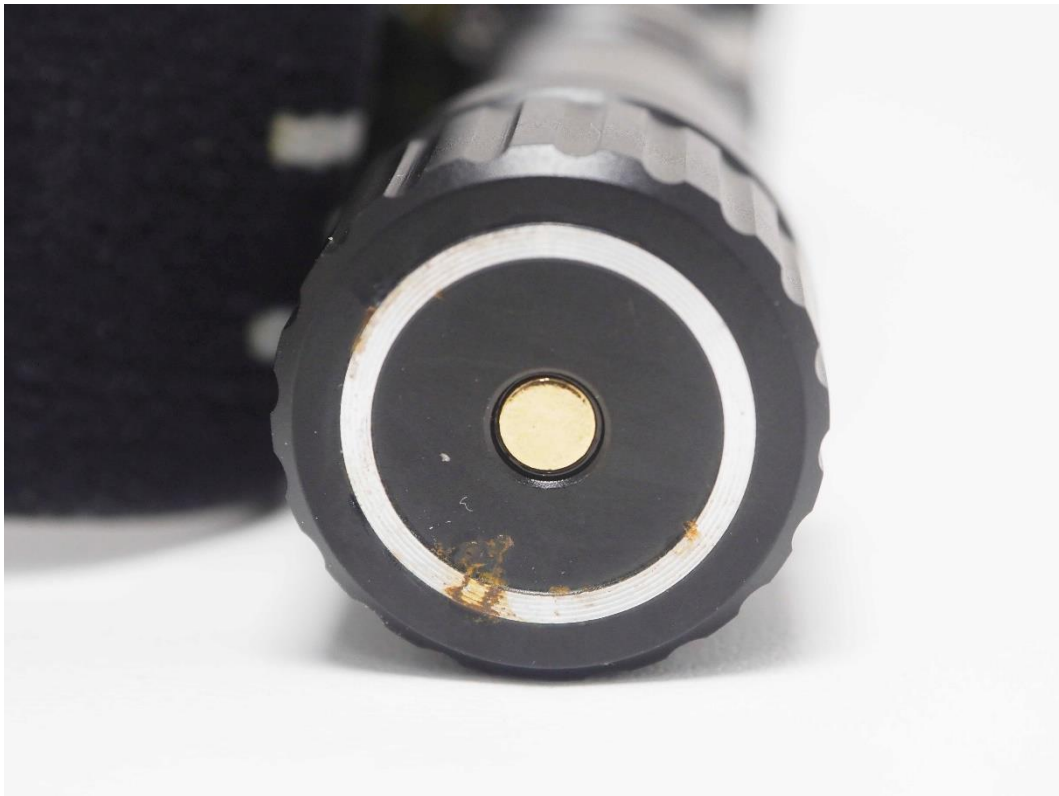
**Figure 4. No salt penetration inside the battery box.**

A small spot of corrosion was found from a surface of the EUT. The surface is aluminum which does not form this kind of corrosion. The corrosion spot can be caused by metal particles stuck to the surface.

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**Figure 5. A small spot of corrosion was found from the EUT after test.**



**Figure 6. A small point of corrosion was found from the EUT after test.**

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## 8. RESULTS AND CONCLUSIONS

EUT was functioning normally after the test and no mechanical or chemical failures were found.

- The test result is **pass**.

## 9. QUALITY CONTROL



Toptester is an ISO 9001  
certified organisation



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