TOPTESTER OY

TEST REPORT

IP6X DUST TEST

Customer:	Handshake Finland Oy
Device name & version:	Lumonite Compass (V7)

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1. TEST INFORMATION

CUSTOMER:	Handshake Finland Oy
TEST NAME:	IP6X Dust test
TEST DATE:	1. – 2. June 2021
TEST SITES:	Toptester Laboratory Rovaniemi

EQUIPMENT UNDER TEST

DEVICE NAME:	Lumonite Compass
VERSION NR.:	V7 (2021)
DEVICE ID:	LC000004

Test ID:	IP6X_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

2. TEST REPORT HISTORY

Version	Date	Change description	Changes made by
1.0	9.6.2021	First version of the report is 1.0. If no changes are necessary, it will be also the final version.	Arttu Tervo

3. CONTENTS

4. TEST SUMMARY

Used standard or test method summary

The IP6X dust test was performed according to IEC 60529 standard, Degrees of protection provided by enclosures (IP code), Edition 2.2 (2013).

Description of equipment under test

Lumonite Compass (V7), Multifunctional High Power Headlamp

Test result summary

After the test, no dust was found inside the battery case and the EUT was functioning normally.
IP6X test result is **pass**.

Signatures

Test performed and reported by: 

Date: 9.6.2021 Arttu Tervo

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: LC000004

5.3. Goal of the test

Goal of the test was to see if the EUT pass or fail the acceptance criteria.

6. TEST METHOD AND MEASUREMENT DESCRIPTION

6.1. Test Method

The IP6X dust test was conducted according to IEC 60529 standard, Degrees of protection provided by enclosures (IP code), Edition 2.2 (2013), chapter 13.4 with following procedure:

- The test was made using a proper dust test chamber.
- The talcum powder used in test was able to pass through a square-meshed sieve the nominal wire diameter of which is 50 µm and the nominal width between wires 75 µm.
- The amount of talcum powder to be used was 2 kg per cubic meter of the test chamber volume. Powder shall not have been used for more than 20 tests.
- Enclosure was connected to a vacuum pump.
- The object of test was to draw into the enclosure a volume of air 80 times the volume of the enclosure tested without exceeding the extraction rate of 60 volumes per hour. Depression shall not exceed 2 kPa.
- If an extraction rate of 40 to 60 volumes per hour is obtained the duration of test is 2 h.
- If, with a maximum depression of 2 kPa, the extraction rate is less than 40 volumes per hour, the test is continued until 80 volumes have been drawn through, or a period of 8 h has elapsed.

The vacuum pump was connected to EUT's battery case.

6.2. Analyses

After the test, outer surfaces of the EUT were cleaned and battery case was opened and visually inspected for dust ingress. After inspection, functionality of the EUT was tested.

6.3. Acceptance criterion

No deposit of dust shall be observable inside the battery case.

6.4. Test Equipment, Reliability Control and Measurement

The test was performed with Vötsch VDT 1000 A dust chamber.

During the test, air flow from the enclosure was measured with SMC PFMV530-1 air flow sensor. Calibration interval for the sensor is 12 – 18 months, last calibration date is 3.12.2020. The calibration is valid until 4.6.2022.

Dust amount for the test was measured with Vaakatalo SB-15MR scale (SN: 1628004004). Calibration interval for the scale is 12 – 18 months, last calibration date is 21.4.2021. The calibration is valid until 21.10.2022.

Laboratory conditions were measured with Testo Hygrometer 608-H2 (SN: 41457326). Calibration interval for the meter is 12 – 18 months, last calibration date is 9.4.2021. The calibration is valid until 9.10.2022.

6.5. EUT functional Control and Measurement

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

7. TEST PROCESS

Laboratory conditions:

- Temperature 19.7 °C
- Relative humidity 41.3 %

The EUT was placed inside a dust test chamber. Pressure inside the battery case was maintained below the surrounding atmospheric pressure by a vacuum pump. Object was to continue the test until 80 volumes have been drawn through the enclosure, or a period of 8 h had elapsed. The extraction rate was was under 40 volumes per hour with maximum pressure of 20 mbar. Duration of the test was 5 hours.

Figure 1. IP6X test setup.

Figure 2. EUT after the test.

After the test, outer surfaces of the EUT were cleaned and the battery case was opened for the inspection. No dust was found inside the enclosure. After inspection, functionality of the EUT was tested. The EUT was operating normally.

Figure 3. Battery case opened after test.

Figure 4. Battery case opened after test.

Figure 5. Battery case opened after test.

Figure 6. Battery case opened after test.

8. RESULTS AND CONCLUSIONS

After the test, no dust was found inside the battery case and the EUT was functioning normally.
IP6X test result is **pass**.

9. QUALITY CONTROL

ORGANISATION CERTIFIED BY Inspecta ISO 9001

Toptester is an ISO 9001 certified organisation

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T275 (EN ISO/IEC 17025)