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1. Equipment Under Test (EUT)

The subject of this IP68 test is automotive lamp type LED FT-400. The lamp has no nameplate and serial number. The customer has provided catalog in pdf format, on the basis of which the employee identified the type of lamp and assigned the laboratory code.

The sample intended to IP6X test had an additional \varnothing 6mm hole to create a vacuum.

No	Name and type	Functions, parameters	Allocation	Laboratory code
1	LED Lamp FT-400	Parking light, license plate light, STOP light, reversing light, turn signal and reflective light Power supply 12-36 V DC	To be tested on IP6X (dust)	6029.7
2	LED Lamp FT-400		To be tested on IPX8 (water)	6029.8



Photography 1: Sample 6029.7 – LED Lamp type FT-400 (to be tested on IP6X)



Photography 2: Sample 6029.8 – LED Lamp type FT-400 (to be tested on IPX8)

2. Test plan

No	Tested feature / test method	Remarks	A ¹⁾
1	Protection against penetration of dust: IP6X test According to the standard PN-EN 60529:2003+A2:2014-07+AC:2017-12	After the test: functional check	A
2	Protection against water immersion: IPX8 test. According to the standard PN-EN 60529:2003+A2:2014-07+AC:2017-12	6h at 1 m of deep. After the test: dielectric withstand test ²⁾ and functional check	A

1) A" means the accredited testing; „-“ means the non-accredited testing

2) Dielectric withstand test is not accredited

3. Description and results of tests

3.1. Protection against penetration of dust: IP6X test

3.1.1. Test procedure

The test was performed on sample 6029.7 in accordance with recommendations of standard PN-EN 60529:2003+A2:2014-07+AC:2017-12, clauses 13.4 and 13.6: test IP6X – protection against dust (category 1 enclosure).

Test parameters:

- dust – 2kg of talcum powder, grain size <75 µm
- chamber size 1 m³
- test duration 8 h
- underpressure 1960...1994 Pa
- climatic conditions: temperature 19,3 °C; relative humidity 42 % RH; atmospheric pressure 975 hPa

3.1.2. Test equipment

- | | | |
|------------------------|------------------|-----------|
| Dust chamber | SD1000S | ZL/1160/P |
| Stopwatch | SMSSport JS-6618 | ZL/1102/A |
| Rotameter | | ZL/0993/A |
| Differential manometer | MRC | ZL/1161/A |
| Hytherograph | LB-701H / LB-706 | ZL/0454/A |
| Multisensor | LB-717 | ZL/1514/A |



Photography 3: Sample 6029.7 – LED Lamp type FT-400 (marked with red line) during the IP6X test

3.1.3. Test result

Dust did not penetrate into tested object.

Functional test involving power connection and lighting check – passed.

Test result positive.

3.2. Protection against continuous water immersion: IPX8 test

3.2.1. Test procedure

The test was performed on sample 6029.8 in accordance with recommendations of standard PN-EN 60529:2003+A2:2014-07+AC:2017-12, clauses 14.1 and 14.2: protection against continuous water immersion.

The purpose of the test is to check the device's tightness under continuous immersion at deep of 1 m.

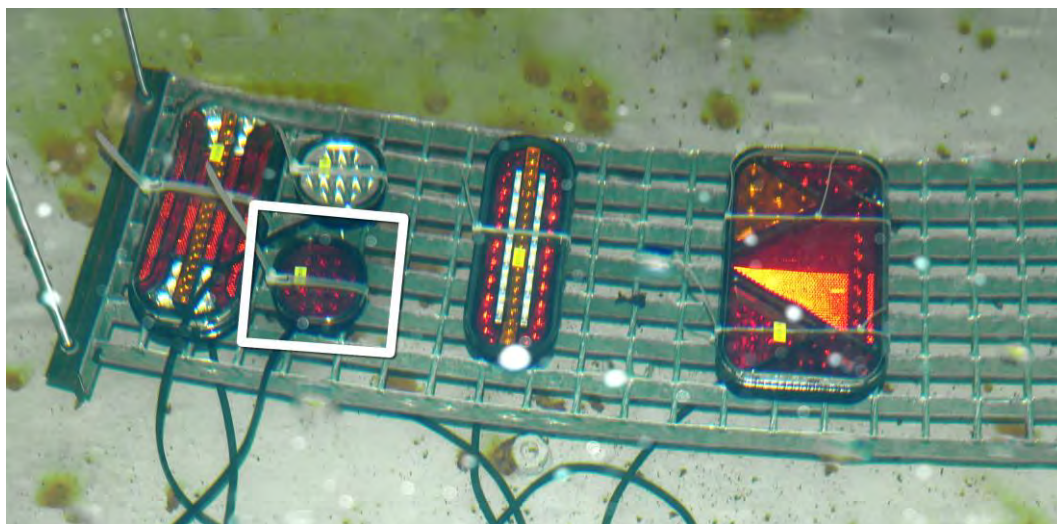
Test was performed in accordance with standard PN-EN 60529:2003+A2:2014-07+AC:2017-12, clause 14.2.8.

Test conditions:

- temperature of water: 16,9 °C
- temperature of EUT: 18,3 °C
- test duration: 6 h
- climatic conditions: temperature 20,7 °C; humidity 40 % RH, atmospheric pressure 970 hPa

3.2.2. Test equipment

- | | | |
|---------------|------------------|-----------|
| • Water tank | - | ZL/1068/P |
| • Stopwatch | SMSSport JS-6618 | ZL/1102/A |
| • Thermometer | LB-706 / LB-701T | ZL/1156/B |



Photography 4: Sample 6029.8 – LED Lamp type FT-400 (marked with white line) during the IPX8 test

3.2.3. Test result

Water did not penetrate into tested object.

Functional test involving power connection and lighting check – passed.

Test result positive.

3.3. Dielectric withstand test – not accredited

The purpose of this test is to perform dielectric withstand check between electric wiring and screw connected together and housing of the lamp.

3.3.1. Test procedure

The terminals of insulation tester GPT-9903 are connected:

- first terminal (hot): to electric cables supplying DC voltage to the lamp and screw on back of the lamp connected together,
- second terminal (ground): to aluminium foil spread under the lamp.

The test is running for 1 minute at voltage 500 V AC.

Result is positive if there were no breakdown, flashover or if current will not rise up quickly.

Test conditions:

- test voltage: 500 V AC
- test duration: 1 min
- temperature of EUT: 17,8 °C
- climatic conditions: temperature 20,5 °C
humidity 42 % RH
atmospheric pressure 970 hPa

3.3.2. Test equipment

- Insulation tester GPT-9903 ZL/1151/A

3.3.3. Test result

During dielectric withstand test there was no current rise up, breakdown or flashover.
Test result is positive.

4. Dates of tests, climatic conditions and research staff

Date of tests	Staff
Feb 2 - 27, 2020	Marcin Patoła Arkadiusz Szweda

5. Distribution list of test reports

Copy No	Recipients
1	FRISTOM Sp. z o.o. Sp. k., Przemysłowa 5, 86-014 Sicienko
2	Sieć Badawcza Łukasiewicz – Instytut Technik Innowacyjnych EMAG Laboratorium badań kabli i badań środowiskowych

E N D O F R E P O R T