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AB 261

LABORATORY OF CABLE TESTING AND ENVIRONMENTAL TESTS

TEST REPORT No 6029-ZLK-5/2020

ZESPÓŁ LABORATORIÓW BADAWCZYCH

Świadczy usługi w zakresie badań:

- kompatybilności elektromagnetycznej (EMC)
- środowiskowych
- elektrycznych
- mechanicznych
- trudnopalności materiałów
- funkcjonalności
- iskrobezpieczeństwa
- stopnia ochrony IP
- UN DOT 38.3

- aparatury rozdzielczej
- stacji transformatorowych
- akumulatorów
- kabli i przewodów
- urządzeń gazometrycznych
- podzespołów stosowanych w kolejnictwie, branży automotive i siłach zbrojnych RP
- pozostałych urządzeń elektrycznych i elektronicznych

Degree of protection provided by enclosures:
IP5X test – against penetration of dust
IPX8 – water immersion
for LED lamp type FT-410

Customer: **FRISTOM Sp. z o.o. Sp. k.**
Przemysłowa 5
86-014 Sicienko

Order: **IP/01/FRISTOM/2020 of January 23, 2020**

Test report prepared by:

Marcin Patoła

Marcin Patoła

Test report reviewed by:

Arkadiusz Szweda

Test report authorized by:

Katarzyna Wanot
Technical specialist

Katowice, February 28, 2020

Report contains pages:	8	Version of the form PL-1/11-ZLK/1-en w. 3	Copy No	1

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1. Equipment Under Test (EUT)

The subject of this IP58 test is automotive lamp type LED FT-410. The lamp does not have nameplate and serial numer. 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 IP5X test had an additional ø 6mm hole to create a vacuum.

No	Name and type	Functions, parameters	Allocation	Laboratory code
1	LED Lamp FT-410	Parking light, license plate light, STOP light, reversing light, turn signal and reflective light Power supply 12-36 V DC	To be tested on IP5X (dust)	6029.9
2	LED Lamp FT-410		To be tested on IPX8 (water)	6029.10

Photography 1: Sample 6029.9 – LED Lamp type FT-410 (to be tested on IP5X)

Photography 2: Sample 6029.10 – LED Lamp type FT-410 (to be tested on IPX8)

2. Test plan

No	Tested feature / test method	Remarks	A[1)]
1	Protection against penetration of dust: IP5X 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: IP5X test

3.1.1. Test procedure

The test was performed on sample 6029.9 in accordance with recommendations of standard PN-EN 60529:2003+A2:2014-07+AC:2017-12, clauses 13.4 and 13.5: test IP5X – protection against dust (category 1 enclosure).

Test parameters:

Dimmensions inside enclosure:	60 × 60 × 16 mm	
Volume inside of enclosure:	0,0000576 m^3 (0,0576 dm^3)	
Air flow inside enclosure:	55 × 0,0000576 [m^3/h] = 0,003168 [m^3/h]	= 3,168 [dm^3/h]
Total amount of air sucked into the housing:	80 × 0,0000576 [m^3] = 0,004608 [m^3]	= 4,608 [dm^3]
Test lenght:	1 h 27 min (4,408 ÷ 3,168 ≈ 1,45 h)	

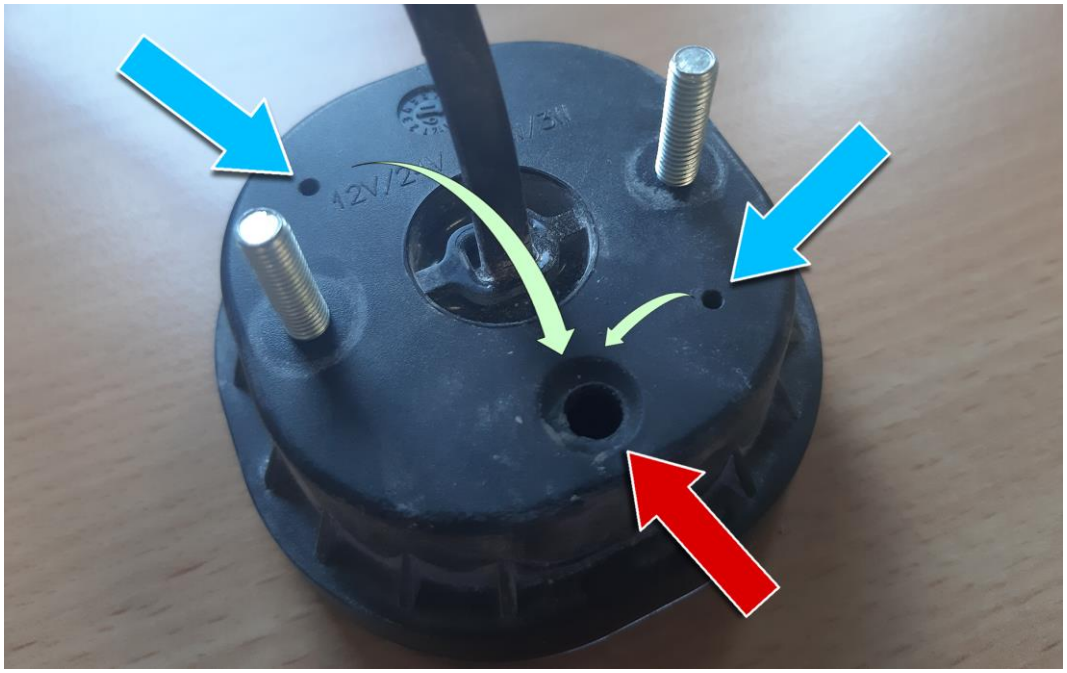
Dust:	2 kg of talcum powder
Grain size:	<75 µm
Chamber size:	1 m^3
Test duration:	2 h
Underpressure:	~ 140 Pa

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	ROS-06	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 6029.9 – LED Lamp type FT-410 (marked with red line) during the IP5X test



Photography 4: Sample 6029.9 – LED Lamp type FT-410:
red arrow – connection place of vacuum hose; blue arrows - air intake holes;
green arrow – air flow inside enclosure (direction from small intake holes to vacuum hose)

3.1.3. Test result

Small amount of dust did penetrate into tested object, but it did not affect safety or interfere with the proper operation of the device. Functional test involving connection every LED section to power supply (12-24 V DC) and lighting check – passed. Test result positive.

Photography 5: Sample 6029.9 – LED Lamp type FT-410: Small amount of dust did penetrate into tested object, but it did not affect safety or interfere with the proper operation of the device.

3.2. Protection against continuous water immersion: IPX8 test

3.2.1. Test procedure

The test was performed on sample 6029.10 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.

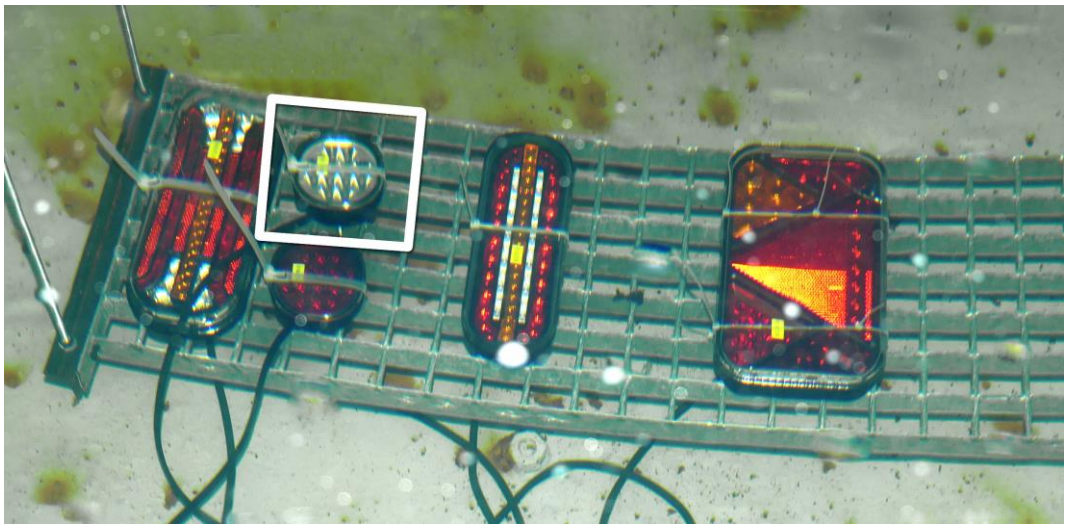
The purpose of the test is to check the device's tightness under continuous immersion at deep of 1 m.
Test was performed in accordance with standard PN-EN 60529:2003+A2:2014-07+AC:2017-12, clause 14.2.8.

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 6: Sample 6029.10 – LED Lamp type FT-410 (marked with white line) during the IPX8 test

3.2.3. Test result

Small amount of water did penetrate into tested object, but it did not affect safety or interfere with the proper operation of the device (electrical live parts are protected by a hermetic seal). Functional test involving connection every LED section to power supply (12-24 V DC) and lighting check – passed. Test result positive.

Photography 7: Sample 6029.10 – LED Lamp type FT-410 during functional test after IPX8 test

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 were 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

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