



**INSTITUTE FOR RESEARCH AND
CERTIFICATION**

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**LABOREx Laboratory
ul. Aronii 4
44-102 Gliwice**



AB 1340

Gliwice, 29/05/2018

REPORT

from test no. LL/105/2018/A

Subject: WATEX lighting fixtures test

Test results are only applicable to the tested object. Without the written consent of the LABOREx Laboratory, the Report cannot be copied in any other way than in its entirety.

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Tax identification number (NIP): PL 631-21-53-136 dated 24 April 2004
Statistical Registration No. (REGON): 273725355
Share capital – 400 000,00 PLN
KRS: 0000161774 District Court in Gliwice
X Commercial Division of the National Court Register

- 1. Client's name and address:**
AIRFAL INTERNATIONAL
Calle Rio Esera 4,
50830 Villanueva de Gallego,
Zaragoza, HISZPANIA.
- 2. Contract/errand/order number:**
0540/OBAC/3715/17/CW/18/P
- 3. Case identification number given by the Laboratory:**
LL/105/2018
- 4. Place of performing tests:**
LABOREx Laboratory
ul. Aronii 4
44-102 Gliwice.
- 5. Date of delivery of test samples:**
24.04.2018
- 6. Description, condition and identification of the tested object:**
Tested objects:
- WATEX LED 24W lighting fixture with white sealing – 2 pcs.

Serial no.: none,
Manufacturing year: none,
Samples submitted by the client.

- 7. Date(s) of performing tests:**
25 April + 29 May 2018
- 8. Tests range and identification of the method used:**

Ite	Tested parameter	Applicable standards	Accredited method
1	Indication of working temperature	PN-EN 60079-0:2013-03 +A11:2014-02 item 26.5.1.2	yes
	Determining maximum temperature of the surface	PN-EN 60079-0:2013-03 +A11:2014-02 item 26.5.1.3	yes
		PN-EN 60079-31:2014-10 item 4.4.1	yes
2	Heat and cold resistance test	PN-EN 60079-0:2013-03 +A11:2014-02 item 26.826.9	yes
3	Shock resistance test	PN-EN 60079-0:2013-03 +A11:2014-02 item. 26.4.2	yes
4	IP66 protection class test	PN-EN 60079-0:2013-03 +A11:2014-02 item 26.4.5	no
		PN-EN 60079-31:2014-10 item 6.1.1	yes
5	Type test with additional product test	PN-EN 60079-15:2010 item 22.6.2.2	no

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9. List of test devices

Name of the device	Serial/inventory no.
Roll-up tape measure	A/201/LL
Electronic caliper	A/206/LL
Videographic recorder VR-18	A/001/LL
Temperature sensor IT-CM2-Pt100	A/001/01/LL
Temperature sensor IT-CM2-Pt100	A/001/02/LL
Temperature sensor IT-CM2-Pt100	A/001/03/LL
Temperature sensor IT-CM2-Pt100	A/001/04/LL
Temperature sensor IT-CM2-Pt100	A/001/05/LL
Temperature sensor IT-CM2-Pt100	A/001/06/LL
Thermographic camera IRI 4010	A/002/LL
Autotransformer MCP	C/212/LL
Power and leakage current measure DW 6160	A/226/LL
Environmental chamber SU 2000C	C/081/LL
Impact test rig	C/076/LL
Swingle	C/076/01/LL
Electronic stopwatch	A/135/LL
Dust chamber	C/075/LL
Can vacuum gauge	A/182/LL
Thermal flow-meter	A/145/LL
Electromagnetic flow meter MAGX2-STAP	A/141/LL
IPX6 measurement inlet nozzle	C/098/LL
Vacuum pump	C/119/01/LL
Micromanometer	A/188/LL
Thermo-hygrometer LB-522B type	A/207/LL

Prior to testing, the test devices were inspected. The devices were in order.

10. Course and results of the tests

The results and uncertainty resulting thereof relate only to the sample tested and cannot apply to any batch of product / substance / materials.

Measurement uncertainty was established according to the EA-4/02 document. The uncertainty values given constitute expanded uncertainty with the 95% confidence coefficient and expansion coefficient $k=2$.

10.1. Determining the working temperature, maximum temperature of the surface

Environmental conditions during test which influence test results:

The test was conducted under temperature of $(24.1 \pm 2.0 + 25.2 \pm 2.0)^\circ\text{C}$ and relative humidity of $(48.7 \pm 3.0 \div 45.8 \pm 3.0) \%$.

The test was performed powering the fixture using an autotransformer:

- at 07:50 a.m. ÷ 11:07 a.m. powering with voltage $U=230 \text{ V AC}$, current consumption $I=0.126 \text{ A}$,
 - at 11:07 a.m. ÷ 12:30 p.m. powering with voltage $U=207 \text{ V AC}$, current consumption $I=0.134 \text{ A}$.
- Observation time was 4.5 hours.

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The temperature was recorded using the sensors installed in the locations specified in Table 1. Temperature curves during heating in individual locations are presented on the recorded diagrams (Fig. 1).

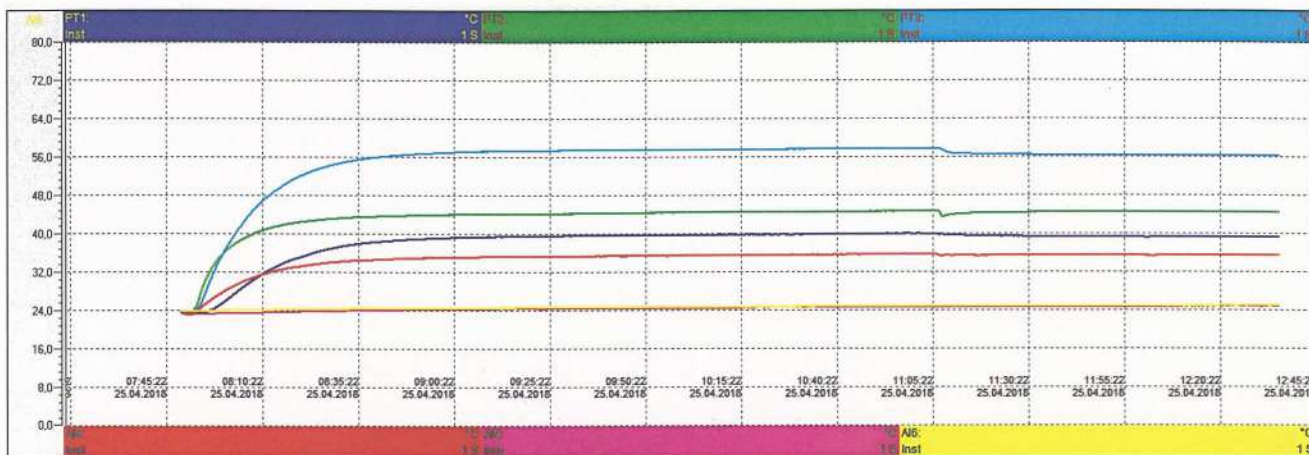






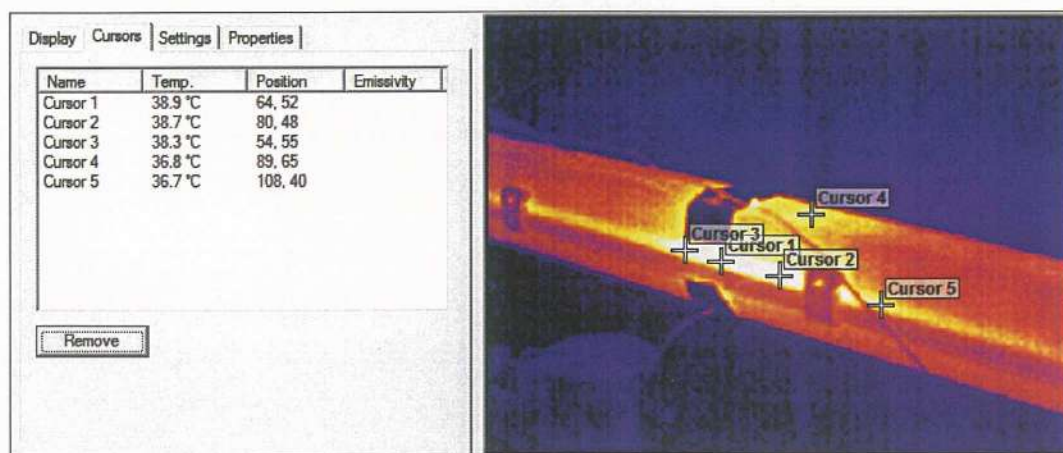


Fig. 1. Heating characteristics.

Table 1. Locations of temperature sensors.

Recorder channel no.	Colour on the chart	Locations of temperature sensors
1		housing back (above the converter)
2		LED light strip - interior
3		converter PHILIPS 30W
4		shed
5		cable gland
6		environment

The temperature values recorded with a video recorder were used for determining ambient temperature and determining the time, when the temperature of the tested object was stabilized. After the heating process ended, pictures were taken with a thermographic camera in order to determine the spots with the highest temperature. Figure 2÷3 presents the selected pictures from a thermographic camera.



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Fig. 2. Thermographic photo – housing (shed).

The highest temperature of **the external surface** recorded with a thermographic camera was $(38.9 \pm 3.7)^\circ\text{C}$. At that moment, the ambient temperature was $(25.2 \pm 0.8)^\circ\text{C}$.

Maximum temperature recalculated for ambient temperature of 40°C was $(53.7 \pm 4.5)^\circ\text{C}$.

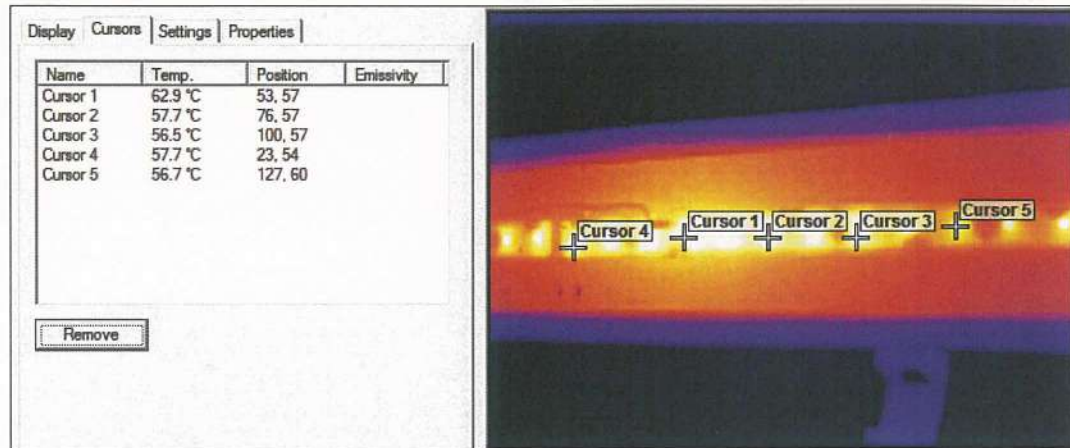


Fig. 3. Thermographic photo – interior (LED light strip).

The highest temperature of **the device** recorded with a thermographic camera was $(62.9 \pm 6.0)^\circ\text{C}$. At that moment, the ambient temperature was $(25.2 \pm 0.8)^\circ\text{C}$.

Maximum temperature recalculated for ambient temperature of 40°C was $(77.7 \pm 6.8)^\circ\text{C}$.

Estimate of measurement results uncertainty for contact method (recorder)

$$U(T) = (0.627 + 0.0053 \times W_{wsk}) \text{ } ^\circ\text{C}$$

W_{wsk} - value indicated by the recorder

Estimate of measurement results uncertainty for contactless method (thermographic camera)

$$U(T) = (0.095 \times W_{wsk}) \text{ } ^\circ\text{C}$$

W_{wsk} - value indicated by the thermographic camera

10.2. Heat and cold resistance test

Heat resistance test.

The test was conducted in the environmental chamber with air temperature of $(+80 \pm 2.0)^\circ\text{C}$ and relative humidity of $(90 \pm 3.0)\%$.

The test lasted 672 hours (4 weeks).

After the test, the fixtures were stored in air with a temperature of $(+23 \pm 2.0)^\circ\text{C}$ and relative humidity of $(50 \pm 3.0)\%$ for 24 hours.

Cold resistance test.

The test was conducted in the environmental chamber with air temperature of $(-30 \pm 2.0)^\circ\text{C}$.

The test lasted 24 hours.

After completion of the test, the fixtures were subject to visual inspection.

Notable damages of the coating on metal elements constituting the supporting construction for the electrical equipment inside two fixtures

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with white sealing were found. Furthermore, a cable gland in one of the fixtures with white sealing was damaged.

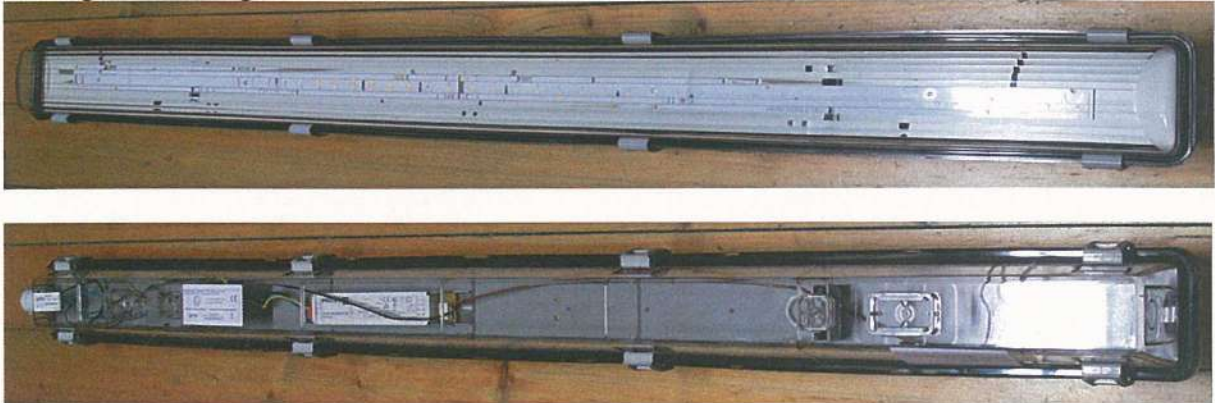


Fig. 1. Tested lighting fixtures.



Fig. 2. Rating plates.

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Fig. 3. Interior of the fixture after the climate tests.

10.3. Impact resistance test

Environmental conditions during test which influence test results:

The tests were conducted under temperature of $(21.4 \pm 2.0)^\circ\text{C}$ and relative air humidity of $(40.9 \pm 3.0)\%$.

The device was subject to impact test consisting of impact of a 1 kg swingle dropping onto the enclosure from 0.7 m.

The location of the impact is shown on fig. 4. Test results are presented in table 2.

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Fig. 4. Spot of swingle impact in the fixture enclosure.

Table 2. Results of the shock resistance test.

Sample name	Impact spot	Height of impact [m]	Test result
WATEX lighting fixture 24W	fixture with white sealing		
	A	0.7	No damage
	B	0.7	No damage
	fixture with black sealing		
	A	0.7	No damage
	B	0.7	No damage

The tests did not result in loss of functionality of the device.

10.4. Test of the IP66 protection class ensured by the enclosure

Environmental conditions during test which influence test results:

The tests were conducted under temperature of $(21.8 \pm 2.0)^\circ\text{C}$ and relative air humidity of $(40.3 \pm 3.0)\%$.

- a) Test of protection class against foreign solid bodies, marked with the first characteristic digit (IP6X).

The enclosure test was performed in a dust chamber with vacuum. Vacuum pressure was 2 kPa. Vacuum speed was less than 20-times the enclosure volume per hour. Test time was 8 hours.

After completion of test, the sample was subject to visual inspection. No traces of dust inside the enclosure were stated.

- b) Test of protection class against penetration by water, marked with the second characteristic digit (IPX6).

The enclosure test was performed with an outlet nozzle for IPX6 measurement. Water flow was 100l/minute. Test time was 3 minutes.

After completion of the test, the enclosure was subject to visual inspection. No traces of water were found inside.

The enclosures of WATEX lighting fixtures meet the requirements of IP66 protection class.

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Fig. 5. Enclosure of WATEX fixture after a dust chamber test.



Fig. 6. Enclosure of WATEX fixture after a water test.

10.6. Type test with additional product test

a) WATEX 24W lighting fixture with black sealing:

created vacuum	$\Delta p = 0,3 \text{ kPa} = 300 \text{ Pa}$
after 90 seconds	vacuum $\Delta p = 274 \text{ Pa}$
after 180 seconds	vacuum $\Delta p = 249 \text{ Pa}$

Test result: POSITIVE.

The tests were performed by:

29 May 2018 Leon Bieniek
Date name and surname

specialist for research and development
position


signature

Authorized by:

29 May 2018 Wojciech Bobecki
Date name and surname

laboratory manager
position


signature

END OF THE REPORT

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