

**TEST REPORT****IEC 62717****LED modules for general lighting – Performance requirements****Report reference No.**..... : LCSB070122143S**Compiled by(name+signature)**..... : Lucky(Project Engineer)

(Compiled engineer)

Check by(name+signature)..... : Ian Luo(Director)

(Director)

Approved by(name+signature)..... : Jesse Liu(Manager)

(Manager)

Date of issue : July 21, 2023**Contents**..... : 22 pages**Testing laboratory****Name** : Shenzhen Southern LCS Compliance Testing Laboratory Ltd.**Address** : 101-201, No.39 Buliding, Xialang Industrial Zone, Heshuikou
Community, Matian Street, Guangming District, Shenzhen, China**Testing location** : As above**Client****Name** : AOK Industrial Company Limited**Address**..... : 1/F of 1#Building, East Block of 3/F of Building 1,And 2/F of Building
4, ST George' s Science and Technology Industrial Park, Northside
of Xinyu Road,Xiangshan Community, Xianqiao Street Baoan
District,518000 Shenzhen, Guangdong, CHINA**Manufacturer****Name** : AOK Industrial Company Limited**Address**..... : 1/F of 1#Building, East Block of 3/F of Building 1,And 2/F of Building
4, ST George' s Science and Technology Industrial Park, Northside
of Xinyu Road,Xiangshan Community, Xianqiao Street Baoan
District,518000 Shenzhen, Guangdong, CHINA**Test specification****Standard**..... : IEC 62717:2014+A1:2015+A2: 2019**Test procedure** : Compliance with IEC 62717:2014+A1:2015+A2: 2019**Non-standard test method** : N/A**TRF No. IEC 62717**

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**Test item Description**: LED Street LightTrademark 

Model and/or type reference: AOK-100WiLA-NV-L3-00-3070-T2-P

Rating(s).....: AC100-277V, 50/60Hz, 100W

Test item particulars:

Lamp cap: N/A

Lamp identification.....: LED Luminaire

Commission received form: Same as applicant

Electrical safety class: --

IP number: N/A

Test case verdicts

Test case does not apply to the test object : N (N/A)

Test item does meet the requirement: P(Pass)

Test item does not meet the requirement ...: F(Fail)

Testing

Date of receipt of test item: November 11,2022

Date(s) of performance of test: November 12,2022– July 21, 2023

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item tested.

"(see remark #)" refers to a remark appended to the report.

"(see Annex #)" refers to an annex appended to the report.

Throughout this report a comma is used as the decimal separator.

Remarks

1. The laboratory ambient for testing: 22.0-28.0℃, 60%-73%R.H.
2. The report includes: Attachment 1(S) of LUMINOUS INTENSITY DISTRIBUTION DIAGRAM.
3. The report includes: Attachment 2(S) of product photos.
4. The report includes: Attachment 3(S) of product label.

Label of testing

Rubbing for 15 s with a piece of cloth soaked with water. And a further 15 s with a piece of cloth soaked with petroleum.

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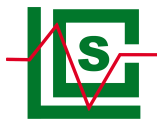


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IEC 62717			
Cl.	Requirement - Test	Result	Verdict
4	Marking		P
4.1	Mandatory marking		P
	Information on the parameters shown in Table 1		P
	a) Rated luminous flux (lm)	15000lm	P
	b) Photometric code (See Annex D) 4		P
	c) Rated median useful life (h) and the associated rated lumen maintenance factor (x)	100000H	P
	d) Rated abrupt failure value (%)		P
	e) Lumen maintenance code (see Table 6)		P
	f) Categories of rated chromaticity coordinate values both initial and maintained (see Table 5)		P
	g) Correlated colour temperature (K)	3000K	P
	h) Rated colour rendering index	70	P
	i) tp rated 3 of LED module (°C)		P
	j) tp-point		P
	k) Ageing time (h), if different from 0h		P
	l) Ambient temperature range		P
	m) Rated efficacy (lm/W)	150 lm/W	P
	n) Dimensions, including dimensional tolerances		P
	o) Availability of a heat sink		P
	s) Displacement factor		P
	t) Temperature ramping 1 K/min or 10 K/min		P
4.2	Additional marking as requested by Table 2		P
	tp temperature (°C) measured at the tp-point		P
	Rated life time (h)	100000H	P
	Optional marking by Table 3		P
	a) luminous intensity distribution		P
	b) beam angle		P
	c) peak intensity		P

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IEC 62717			
Cl.	Requirement - Test	Result	Verdict

5	Dimensions		P
	All measured dimensions of a LED module in a sample shall be within the tolerances as declared by the manufacturer or responsible vendor.		P

6	Test conditions		P										
6.1	General test conditions		P										
	The LED modules for which compliance with this standard is claimed shall comply with the requirements of the safety standard IEC 62031.		P										
	For compliance with EMC requirements except harmonics, reference is made to regional requirements. For relevant standards see Bibliography.		P										
	All tests are conducted on n LED lamps of the same type		P										
	LED lamps with dimming control shall be adjusted to maximum light output for all tests		P										
	LED lamps with adjustable colour point shall be adjusted/set to one fixed value as indicated by the manufacturer or responsible vendor		P										
6.2	Creation of lamp families to reduce test effort		N										
6.2.1	General		N										
6.2.2	Variations within a family		N										
	Requirements for the identification of a family of LED lamps for type testing are given in definition 3.13 and used in Table 2:		N										
	Table 2 – Variations allowed within a family <table><tr><th>Part characteristics where variations are allowed (see Note 2)</th><th>Conditions for acceptance</th></tr><tr><td>Housing/chassis, heat sink/heat management</td><td>I_{LED} (location and value given by the LED lamp supplier) and other components remain at the same or at a lower value, if the rated life time is the same or higher than the baseline product, as indicated and specified by the manufacturer or responsible vendor (see also Note 1).</td></tr><tr><td>Optics (see Note 1)</td><td>The test results showing the effect of optical material change shall be documented in the manufacturer's technical file.</td></tr><tr><td>LED package</td><td>I_{LED} remains at the same or at a lower value, if the rated life time is the same or higher than the baseline product, as indicated and specified by the manufacturer or responsible vendor.</td></tr><tr><td>Controlgear</td><td>I_{LED} remains at the same or at a lower value, if the rated life time is the same or higher than the baseline product, as indicated and specified by the manufacturer or responsible vendor. A statistical failure rate calculation based on an MTBF (mean time between failures) calculation by the manufacturer shall show equal or lower failure rate of the electronic controlgear.</td></tr></table> NOTE 1 Optics include for instance secondary optics (lenses), reflectors, trims and gaskets and their interconnections. The results relate to changes in luminous flux, peak luminous intensity, luminous intensity distribution, beam angle, shift in colour co-ordinates, shift in CCT (see 10.1) and shift in colour rendering index (CRI) (see 10.2). NOTE 2 Any change on part tolerances are documented in the manufacturer's technical file. NOTE 3 Examples are under consideration.	Part characteristics where variations are allowed (see Note 2)	Conditions for acceptance	Housing/chassis, heat sink/heat management	I_{LED} (location and value given by the LED lamp supplier) and other components remain at the same or at a lower value, if the rated life time is the same or higher than the baseline product, as indicated and specified by the manufacturer or responsible vendor (see also Note 1).	Optics (see Note 1)	The test results showing the effect of optical material change shall be documented in the manufacturer's technical file.	LED package	I_{LED} remains at the same or at a lower value, if the rated life time is the same or higher than the baseline product, as indicated and specified by the manufacturer or responsible vendor.	Controlgear	I_{LED} remains at the same or at a lower value, if the rated life time is the same or higher than the baseline product, as indicated and specified by the manufacturer or responsible vendor. A statistical failure rate calculation based on an MTBF (mean time between failures) calculation by the manufacturer shall show equal or lower failure rate of the electronic controlgear.		
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LED package	I_{LED} remains at the same or at a lower value, if the rated life time is the same or higher than the baseline product, as indicated and specified by the manufacturer or responsible vendor.												
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IEC 62717			
Cl.	Requirement - Test	Result	Verdict
	Compliance testing of family members		N
	The following performance characteristics of members within a family at initial and after reduced testing time shall be in line with the values provided by the responsible manufacturer or vendor of the LED module: – chromaticity coordinates, – colour rendering index, – lumen maintenance code, – results of acceleration operated life test.		

7	Electrical LED module input		P
7.1	LED module power		P
	The initial power consumed by each individual LED module in the measured sample shall not exceed the rated power by more than 10 %.		P
7.2	Displacement factor		P
	The displacement factor of integrated LED modules (Type 1) shall be measured according to Annex E. LED modules with dimming control shall be adjusted to maximum light output.		P
	The measured displacement factor for each individual module of the sample shall not be less than the marked value by more than 0,05.		P

8	Light output		P
9.1	Luminous flux		P
	The initial luminous flux of each individual LED module in the measured sample shall not be less than the rated luminous flux by more than 10 %.		P
8.2	Luminous intensity distribution, peak intensity and beam angle		P

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Cl.	Requirement - Test	Result	Verdict
8.2.1	General		P
	The requirements of 8.2.4 and 8.2.5 shall be applied to LED modules having a directional (spot) distribution.		P
8.2.2	Measurement		P
	The intensity of light emitted from the LED module in different directions is measured using a goniophotometer. All photometric data shall be declared for the LED module operating at its temperature t_p rated per Clause A.1.		P
	The allowed photometric variations detailed should take account of manufacturing tolerances.		P
8.2.3	Luminous intensity distribution		P
	The distribution of luminous intensity shall be in accordance with that declared by the manufacturer. The measurement is conducted according to A.3.3.		P
8.2.4	Peak intensity value ⁴		P
	Where a peak intensity value is provided by the manufacturer or responsible vendor, the initial peak intensity of each individual LED module in the measured sample shall not be less than 75 % of the rated intensity.		P
8.2.5	Beam angle value ⁵		P
	Where a beam angle value is provided by the manufacturer or responsible vendor, the beam angle value of each individual LED module in the measured sample shall not deviate by more than 25 % of the rated value.		P
8.3	Luminous Efficacy		P
	For all tested LED modules in a sample, the LED module efficacy shall not be less than 80% of the rated LED module efficacy as declared by the manufacturer or responsible vendor.		P
9	CHROMATICITY COORDINATES, CORRELATED COLOUR TEMPERATURE (CCT) AND COLOUR RENDERING		P
9.1	Chromaticity coordinates		P

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Cl.	Requirement - Test	Result	Verdict																	
	The initial chromaticity coordinates are measured. A second measurement of maintained chromaticity coordinates is made at an operational time as stated in 6.1. The measured chromaticity coordinate values (both initial and maintained) shall fit within one of 4 categories (see Table 5), which correspond to a particular MacAdams ellipse around the rated chromaticity coordinate value, whereby the size of the ellipse (expressed in n-steps) is a measure for the tolerance or deviation in the chromaticity coordinates of an individual LED module. Table 5 – Tolerance (categories) on rated chromaticity coordinate values <table><tr><th rowspan="2">Size of MacAdam ellipse, centred on the rated colour target</th><th colspan="2">Colour variation category</th></tr><tr><th>Initial</th><th>Maintained</th></tr><tr><td>3-step</td><td>3</td><td>3</td></tr><tr><td>5-step</td><td>5</td><td>5</td></tr><tr><td>7-step</td><td>7</td><td>7</td></tr><tr><td>>7-step ellipse</td><td>7+</td><td>7+</td></tr></table>	Size of MacAdam ellipse, centred on the rated colour target	Colour variation category		Initial	Maintained	3-step	3	3	5-step	5	5	7-step	7	7	>7-step ellipse	7+	7+		P
Size of MacAdam ellipse, centred on the rated colour target	Colour variation category																			
	Initial	Maintained																		
3-step	3	3																		
5-step	5	5																		
7-step	7	7																		
>7-step ellipse	7+	7+																		
9.2	Correlated colour temperature (CCT)		P																	
	Preferred values to ensure interchangeability are under consideration. The four-digit CCT value is divided by 100 and the resulting figure is rounded off to the next integer number, when using the photometric code in Annex D.		P																	
	For all of the tested LED modules in a sample, the measured correlated colour temperature shall not move beyond the values as declared by the manufacturer or responsible vendor.		P																	
9.2	Colour rendering index (CRI)		P																	
	The initial colour rendering index (CRI) of a LED module is measured. A second measurement is made at an operational time as stated in 6.1.		P																	
	- 3 points from the rated CRI value (see Table 1) for initial CRI values		P																	
	- 5 points from the rated CRI value (see Table 1) for maintained CRI values		P																	
10	Lamp life		P																	
10.1	General		P																	

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Cl.	Requirement - Test	Result	Verdict								
	Life of an individual LED module as explained in Annex C, is limited by a combined effect of gradual light output degradation, mostly caused by material degradation (see 10.2) and abrupt light output degradation, mostly caused by electrical component failure (see 10.3, endurance tests as an indication for reliability and life). Both elements are tested.		P								
10.2	Lumen maintenance		P								
	The rated lumen maintenance factor may vary depending on the application of the LED module. Dedicated information on the chosen percentage should be provided by the manufacturer.		P								
	This standard has opted for “lumen maintenance codes” (see Figure 2) that cover the initial decrease in lumen output until an operational time as stated in 6.1. There are three codes which define lumen maintenance in percent of the initial luminous flux (see Table 6). Table 6 – Lumen maintenance code at an operational time as stated in 6.1 <table><tr><th>Lumen maintenance %</th><th>Code</th></tr><tr><td>≥ 90</td><td>9</td></tr><tr><td>≥ 80</td><td>8</td></tr><tr><td>≥ 70</td><td>7</td></tr></table>	Lumen maintenance %	Code	≥ 90	9	≥ 80	8	≥ 70	7		P
Lumen maintenance %	Code										
≥ 90	9										
≥ 80	8										
≥ 70	7										
	An individual LED module is considered having passed the test when the following criteria have been met.		P								
	1) The measured luminous flux value at 25 % of rated life (with a maximum duration of 6 000 h) shall not be less than the luminous flux, multiplied by the rated lumen maintenance factor (x).		P								
	2) The calculated lumen maintenance being the ratio of the measured initial and maintained luminous flux shall correspond with the “lumen maintenance code” as declared by the manufacturer or responsible vendor.		P								
10.3	Endurance tests		P								
10.3.1	General		P								
10.3.2	Temperature cycling test		P								
10.3.2.1	General		P								

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Cl.	Requirement - Test	Result	Verdict
	The temperature cycling test shall be conducted according IEC 60068-2-14, Test Nb: Change of temperature with specified rate of change, and the following conditions.		P
10.3.2.2	Alternative test 1 with 10 K/min		P
10.3.2.2.1	Test set up		P
	The LED module shall be mounted on an appropriate heat sink and operated in the test chamber according IEC 60068-3-5 and with settings for tp as requested by this standard, at nominal current respectively at test voltage. The heat sink shall be such that after thermal stabilisation, the LED module is operating at its maximum rated tp temperature (± 10 K) (according to Table 2) in a test chamber temperature of $40\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$. The test chamber temperature at which tp is reached is the maximum ambient temperature of the temperature cycle. The minimum ambient temperature is obtained by subtracting 50 K from this temperature. These two temperatures are used for the temperature cycle.		P
	The test shall consist of 250 cycles.		P
10.3.2.2.2	Test procedure		P
	At the end of the test all the LED modules shall operate and have a luminous flux which stays within the claimed lumen maintenance code for a period of at least 15 min and show no physical effects of temperature cycling such as cracks or delaminating of the label.		P
10.3.2.3	Alternative t 10.3.2.3 est 2 with 1 K/min		P
	The LED module is placed in a test chamber in which the temperature is varied from $-10\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ over a 4 h period and for a test duration of 2508 periods (1 000 h).		P
	The LED module is mounted on an appropriate heat sink to reach its maximum rated tp temperature at $+50\text{ }^{\circ}\text{C}$ test chamber temperature.		P

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Cl.	Requirement - Test	Result	Verdict
	A 4 h period consists of 1 h holding on each extreme temperature and 1 h transfer time (1 K/min) between the temperature extremes. The LED module is switched on and off for 17 min.		P
	At the end of the test, all the LED modules shall operate and have a luminous flux which stays within the claimed lumen maintenance code for a period of at least 15 min and show no physical effects of temperature cycling such as cracks or delaminating of the label.		P
10.3.3	Supply switching test		P
	At test voltage, current or power, the LED module shall be switched on and off for 30 s each. The cycling shall be repeated for a number equal to half the rated life in h (example: 10 000 cycles if rated life is 20 000 h.).		P
	At the end of the test all the LED modules shall operate and have a luminous flux which stays within the claimed lumen maintenance code for a period of at least 15 min		P
10.3.4	Accelerated operational life test		P
	The LED module shall be operated continuously without switching at test voltage and at a temperature corresponding to 10 K (see last paragraph) above the maximum recommended operating temperature t_p rated, over an operational time of 1 000 h. Any thermal protecting devices that would switch off the LED module or reduces the light output at a threshold temperature $> t_p$ rated, shall be bypassed.		P
	At the end of this period, and after cooling down to room temperature and being stabilised, all the LED modules have an allowed decrease of light output at the end of the test of max. 20 % compared to the initial value, for at least 15 min.		P

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Cl.	Requirement - Test	Result	Verdict
	An accelerated test should not evoke fault modes or failure mechanisms which are not related to normal life effects. For example, a too high temperature increase above t_p rated would lead to chemical or physical effects from which no conclusion on real life can be made.		P
	LED module manufacturer or responsible vendor may declare higher temperature above t_p rated as indicated, but the precedent paragraph shall be respected		P

11	Verification		P																																																				
	The minimum sampling size for type testing shall be as given in Table 7. The sample shall be representative of a manufacturer's production. Table 7 – Sample sizes <table><tr><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><th>Clause or subclause</th><th>Test</th><th>Minimum number of LED modules in a sample for an operational time as stated in 6.1</th><th>Minimum number of LED modules in a sample for testing a family at reduced test duration after changing product feature according to 6.2</th></tr><tr><td>4.1.i)</td><td>t_p rated</td><td rowspan="2">Same 1 LED module for all tests</td><td rowspan="2">Same 1 LED module for all tests</td></tr><tr><td>4.1.j)</td><td>t_p-point</td></tr><tr><td>5</td><td>Dimensions including dimensional tolerances</td><td rowspan="4">Same 5 LED modules for all tests</td><td rowspan="4">Same 1 LED module for all tests</td></tr><tr><td>8.2.3</td><td>Luminous intensity distribution</td></tr><tr><td>8.2.4</td><td>Peak intensity value</td></tr><tr><td>8.2.5</td><td>Beam angle value</td></tr><tr><td>7</td><td>Power</td><td rowspan="7">Same 10 LED modules for all tests</td><td rowspan="7">Same 3 LED modules for all tests</td></tr><tr><td>8.1</td><td>Luminous flux</td></tr><tr><td>8.3</td><td>Efficacy</td></tr><tr><td>9.1</td><td>Chromaticity coordinates</td></tr><tr><td>9.2</td><td>Correlated colour temperature</td></tr><tr><td>9.3</td><td>Colour Rendering Index</td></tr><tr><td>10.2</td><td>Lumen maintenance</td></tr><tr><td>10.3.2</td><td>Temperature cycling, energised</td><td>5</td><td>3</td></tr><tr><td>10.3.3</td><td>Supply voltage switching</td><td>5</td><td>3</td></tr><tr><td>10.3.4</td><td>Accelerated operation life test</td><td>5</td><td>3</td></tr></table>	1	2	3	4	Clause or subclause	Test	Minimum number of LED modules in a sample for an operational time as stated in 6.1	Minimum number of LED modules in a sample for testing a family at reduced test duration after changing product feature according to 6.2	4.1.i)	t_p rated	Same 1 LED module for all tests	Same 1 LED module for all tests	4.1.j)	t_p -point	5	Dimensions including dimensional tolerances	Same 5 LED modules for all tests	Same 1 LED module for all tests	8.2.3	Luminous intensity distribution	8.2.4	Peak intensity value	8.2.5	Beam angle value	7	Power	Same 10 LED modules for all tests	Same 3 LED modules for all tests	8.1	Luminous flux	8.3	Efficacy	9.1	Chromaticity coordinates	9.2	Correlated colour temperature	9.3	Colour Rendering Index	10.2	Lumen maintenance	10.3.2	Temperature cycling, energised	5	3	10.3.3	Supply voltage switching	5	3	10.3.4	Accelerated operation life test	5	3		P
1	2	3	4																																																				
Clause or subclause	Test	Minimum number of LED modules in a sample for an operational time as stated in 6.1	Minimum number of LED modules in a sample for testing a family at reduced test duration after changing product feature according to 6.2																																																				
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8.1	Luminous flux																																																						
8.3	Efficacy																																																						
9.1	Chromaticity coordinates																																																						
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9.3	Colour Rendering Index																																																						
10.2	Lumen maintenance																																																						
10.3.2	Temperature cycling, energised	5	3																																																				
10.3.3	Supply voltage switching	5	3																																																				
10.3.4	Accelerated operation life test	5	3																																																				
12	Information for luminaire design																																																						

Annex A	Method of measuring LED module characteristics		P
A.1	General		P
	Unless otherwise specified, all measurements shall be made in a draught free room at a temperature of 25 °C with a tolerance of ± 1 °C, a relative humidity of 65 % maximum and steady state operation of the LED module.		P

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Cl.	Requirement - Test	Result	Verdict
	Maintenance (10.2) and supply switching (10.3.3) operation shall be conducted in the temperature interval (t_p rated - 5, t_p rated) at a rated maximum ambient temperature specified by the manufacturer, with a tolerance of (+0 K, -5 K).		P
	All test results shall be presented as if testing had been executed at the maximum recommended operating temperature (t_p rated) of the LED module.		P
	The manufacturer shall provide, on request, information on the method used to reproduce the claimed characteristics declared at t_p -point.		P
	The test voltage, current or power shall be stable within $\pm 0,5$ % during stabilisation periods, this tolerance being $\pm 0,2$ % at the moment of measurements. For ageing and luminous flux maintenance testing the tolerance is 2 %. The total harmonic content of the input shall not exceed 3 %. The harmonic content is defined as the r.m.s. summation of the individual harmonic components using the fundamental as 100 %. All tests shall be carried out at rated frequency. In the case of a range, measurements shall be carried out at the frequency value corresponding to the most adverse effect on the temperature of the LED module.		P

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IEC 62717			
Cl.	Requirement - Test	Result	Verdict
	For stabilisation, the following steps need to be conducted. 1) Ascertain that the LED module has thermal management, either integrated or externally equipped. 2) Operate the LED module and record the light output as a time depending variable and note the typical electrical mode of operation (by voltage, current or power) 3) During stabilisation period, measurements of light output are made at least at 1 min intervals. The LED module under test may be regarded as stable and suitable for test purpose, if the difference of maximum and minimum readings of light output observed over the last 15 min is less than 0,5 % . If stabilisation conditions are not achieved within 45 min the measurement may be started and the observed fluctuations shall be reported. 4) In order to accelerate subsequent measurements of other LED modules of the same type a pre-stabilisation (operation of the light source prior to mounting in the test system) may be applied on basis of the stabilisation time observed in step 3 and subsequent LED modules may be measured after 15 min in the test system.		P
A.2	Electrical characteristics		P
A.2.1	Test voltage, current or power		P
	The test voltage, current or power shall be the rated voltage, current or power (for tolerance see A.1).		P
A.2.2	Ageing		P
A.2.2.1	LED modules do not require any ageing prior to testing. However, the manufacturer may define an ageing period of up to 500 h.		P
A.3	Photometric characteristics		P
A.3.1	Test voltage, current or power		P
A.3.2	Luminous flux		P
	The initial and maintained luminous flux shall be measured after stabilisation of the LED module.		P
A.3.3	Luminous intensity distribution		P
	Luminous intensity distribution shall be measured in accordance with CIE 121 and IEC TR 61341.		P

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Cl.	Requirement - Test	Result	Verdict
A.3.4	Peak intensity		P
	The peak intensity shall be measured in accordance with IEC TR 61341.		P
A.3.5	Beam angle		P
	The beam angle shall be measured in accordance with IEC TR 61341.		P
A.3.6	Colour rendering		P
	Measurement of colour rendering index shall be made in accordance to CIE 13.3 and CIE 177.		P
A.3.7	Chromaticity coordinate values		P
	Reference shall be made to IEC 60081, Annex D: Chromaticity coordinates.		P
	Chromaticity coordinate values of LED modules may depend on the radiation angle. Spatially averaged chromaticity coordinates shall be used, unless otherwise specified by the manufacturer. This may be accomplished by sphere photometry or other declared means.		P

Annex B	Information for luminaire design		P
B.1	Temperature stability		P
	It should be safeguarded that the LED module performance temperature t_p is not exceeded.		P
B.2	Binning procedure of white colour LEDs		P
B.3	Ingress protection		P
	In case a 'built-in' LED module forms part of the luminaire enclosure and is applied in an application with a certain IP classification the LED module specification shall reflect this. Final assessment will be done on the luminaire.		P

Annex C	Explanation of recommended LED product lifetime metrics		P
C.1	General		P
	Life of an individual LED module is the length of time during which an individual LED module provides at least percentage x of the initial luminous flux, under standard test conditions. The end of life of an individual LED module can be reached by both parametric and abrupt failures (operating and inoperative LED modules).		P

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Cl.	Requirement - Test	Result	Verdict
C.2	Life time specification for gradual light output degradation		P
C.3	Lifetime specification for abrupt light output degradation		P
C.4	Combined gradual and abrupt light output degradation		P
C.5	Overview of LED lifetime metrics and related lighting product groups		P

Annex D	Explanation of the photometric code	P
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Annex E	Measurement of displacement factor	P
E.1	General	P
	The phase shift angle (ϕ 1) of the displacement factor ($\cos(\phi$ 1)) of 7.2 shall be measured according to the definition of E.2 and with the measurement requirements of Clause E.3	P
E.2	Phase shift angle definition	P
E.3	Measurements requirements	P
E.3.1	Measurement circuit and supply source	P
E.3.2	Requirements for measurement equipment	P
E.3.3	Test conditions	P
	The test conditions for the measurements of the displacement / phase-angle associated with some types of equipment are given in the following clause: see C.5 of IEC 61000-3-2:2005/AMD 2:2009.	

Annex F	Explanation of displacement factor	P
F.1	General	P
F.2	Recommended values for displacement factor	P

Annex G	Examples of LED dies and LED packages	N
G.1	LED die	N
G.2	LED package	N

Annex H	Test equipment for temperature measurement	P
H.1	General	P

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IEC 62717			
Cl.	Requirement - Test	Result	Verdict
	The following recommendations refer to methods of making temperature measurements on LED modules in a draught-proof enclosure. They are derived from IEC 60598-1, Annex K when methods of measurement have evolved as being particularly suitable for LED modules; alternative methods may be used, if it is established that they are of at least equal precision and accuracy.		P
H.2	Set-up and procedure		P
	Temperatures of solid materials are usually measured by means of thermocouples		P
	Thermocouples are attached to the measuring point with minimum disturbance of thermal conditions and with low-resistance thermal contact.		P
	The average ambient temperature in the draught-proof enclosure is taken as the air temperature at a position near one of the perforated walls on a level with the centre of the LED module.		P

Annex I	Use of IES LM-80 for lumen maintenance, colour rendering index and maintained chromaticity coordinates data	N
I.1	General	N
I.2	Criteria for the use of IES LM-80	N
I.2.1	LED package data used for LED modules	N
I.2.2	LED module with IES LM-80 data	N
I.2.3	Boundary conditions	N
I.2.3.1	General	N
I.2.3.2	Temperature	N
I.2.3.3	LED package input current	N
I.3	Compliance criteria	N
I.3.1	Chromaticity coordinates	N
I.3.2	Colour rendering index (CRI)	N
I.3.3	Lumen maintenance factor	N

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Lamp Wattage (W)										
Model:	AOK-100WiLA-NV-L3-00-3070-T2-P			Voltage (V):		230		Frequency(Hz):		50
Test No	1	2	3	4	5	6	7	8	9	10
--	99.29	100.06	98.58	99.13	99.52	99.02	98.68	99.74	98.80	98.36
Average	99.29W									
Note	1、 The initial power consumed by each individual LED module in the measured sample shall not exceed the rated power by more than 10 %.									

Luminous Flux (lm)										
Model:	AOK-100WiLA-NV-L3-00-3070-T2-P			Voltage (V):		230		Frequency(Hz):		50
Test No	1	2	3	4	5	6	7	8	9	10
--	14950	15067	14842	14926	14984	14910	14859	15017	14877	14809
Average	14950 lm									
Note	1、 The initial luminous flux of each individual LED module in the measured sample shall not be less than the rated luminous flux by more than 10 %.									

Peak intensity (cd)					
Model:	AOK-100WiLA-NV-L3-00-3070-T2-P	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
--	6129	6130	6142	6110	6136
Average	6129 cd				
Note	Where a peak intensity value is provided by the manufacturer or responsible vendor, the initial peak intensity of each individual LED module in the measured sample shall not be less than 75 % of the rated intensity.				

Beam angle (°)					
Model:	AOK-100WiLA-NV-L3-00-3070-T2-P	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
--	130.1	130.3	130.2	129.8	130.2
Average	130.1°				
Note	Where a beam angle value is provided by the manufacturer or responsible vendor, the beam angle value of each individual LED module in the measured sample shall not deviate by more than 25 % of the rated value.				

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Supply switching test (cycles)					
Model:	AOK-100WiLA-NV-L3-00-3070-T2-P	Voltage (V):	230	Frequency(Hz):	50
Test No	1	2	3	4	5
--	50000	50000	50000	50000	50000
Average	50000				
Note	t test voltage, current or power, the LED module shall be switched on and off for 30 s each. The cycling shall be repeated for a number equal to half the rated life in h				

Efficacy (lm/W)										
Model:	AOK-100WiLA-NV-L3-00-3070-T2-P		Voltage (V):		230		Frequency(Hz):		50	
Test No	1	2	3	4	5	6	7	8	9	10
--	150.57	150.58	150.56	150.57	150.56	150.58	150.58	150.56	150.58	150.56
Average	150.60 lm/W									
Note	For all tested LED modules in a sample, the LED module efficacy shall not be less than 80% of the rated LED module efficacy as declared by the manufacturer or responsible vendor.									

Correlated Color Temperature (K) 、Chromaticity coordinates、SDCM										
Model:	AOK-100WiLA-NV-L3-00-3070-T2-P		Voltage (V):		230		Frequency(Hz):		50	
Test No	1	2	3	4	5	6	7	8	9	10
CCT	3062	3086	3040	3057	3069	3054	3043	3076	3047	3033
x	0.4340	0.4341	0.4343	0.4345	0.4346	0.4348	0.4349	0.4351	0.4352	0.4354
y	0.4036	0.4036	0.4038	0.4039	0.4041	0.4043	0.4044	0.4047	0.4048	0.4051
SDCM	4.5	4.5	4.5	4.6	4.5	4.6	4.5	4.5	4.6	4.6
Average	3062 K									

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Colour rendering(Ra) for lamp										
Model:	AOK-100WiLA-NV-L3-00-3070-T2-P		Voltage (V):		230		Frequency(Hz):		50	
Test No	1	2	3	4	5	6	7	8	9	10
The initial CRI	72.1	72.7	71.6	72.0	72.3	71.9	71.7	72.4	71.7	71.4
6000 hours of CRI	70.2	70.1	70.4	70.2	70.1	70.2	70.1	70.3	70.1	70.2
Average	71.8									
6000 hours of Average CRI	70.2									
Note	For all tested units in a sample the measured CRI values shall not decrease by more than: - 3 points from the rated CRI value (see Table 1) for initial CRI values, and - 5 points from the rated CRI value (see Table 1) for maintained CRI values.									

Lumen maintenance (%)										
Model:	AOK-100WiLA-NV-L3-00-3070-T2-P		Voltage (V):		230		Frequency(Hz):		50	
Test No	1	2	3	4	5	6	7	8	9	10
Luminous Flux at 6 000 h	13769	13726	13684	13613	13830	13658	13566	13786	13553	13506
Lumen Maintenance	92.1%	91.1%	92.2%	91.2%	92.3%	91.6%	91.3%	91.8%	91.1%	91.2%
Average Lumen Maintenance	91.8%									

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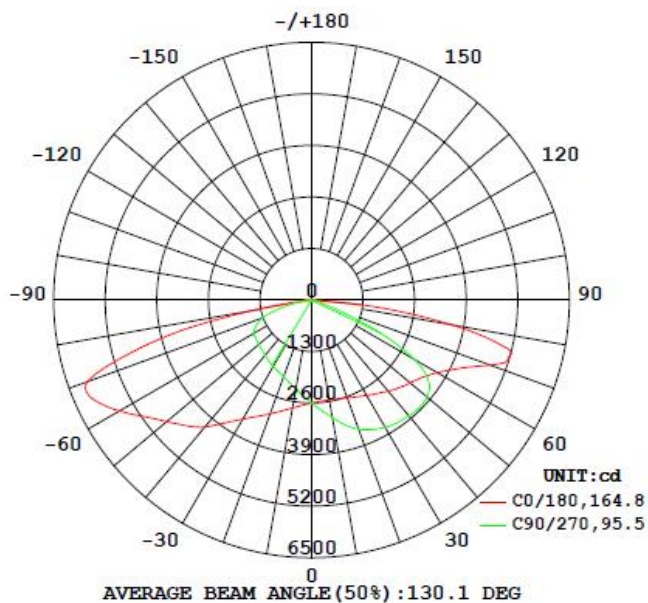
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ATTACHMENT 1(S)

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



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ATTACHMENT 2(S)

Photos of AOK-100WILA-NV-L3-00-3070-T2-P



----- End of test report -----

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